

# EMS Update

An Emergency Medical Services Learning  
Resources Center Publication

Summer 2005  
Vol. 25, No. 2

## Fireworks-related injuries skyrocket every summer

*Even after patients seek appropriate medical treatment, at least 40 percent of the eyes with fireworks-related trauma recorded in the U.S. Eye Injury Registry remain legally blind.*



**Thomas Weingeist, PhD, MD**

Summer celebrations often include parades and barbecues. Mention the Fourth of July and most people think of fireworks. Unfortunately, for many, the weeks surrounding the holiday also involve a visit to the emergency room. Each year hospital emergency rooms treat thousands of people for fireworks-related injuries. Typically, two thirds of injuries from fireworks occur in the summer.

“Every summer we see eye injuries from fireworks. Many result in severe loss of vision or permanent blindness,” says Thomas Weingeist, PhD, MD, Professor and Head, Department of Ophthalmology and Visual Sciences, University of Iowa Hospitals and Clinics.

According to the U.S. Eye Injury Registry, approximately 12,000 Americans are treated in emergency departments annually for fireworks-related injuries. Of these injuries, the hands (40 percent), head and face (20 percent) and eyes (20 percent) are the areas most often involved. Burns account for more than half of fireworks-related injuries.

Approximately 2,000 of the annual fireworks-related injuries nationwide



involve the eye. About one-third of those injuries result in permanent damage and blindness.

Larger and more explosive, class “B” fireworks, such as cherry bombs

and M-80s, cause the most severe harm, but nearly two-thirds of all fireworks-related injuries are caused

*continued on page 2*



## Fireworks cont'd

***Seemingly harmless sparklers can cause serious injury. Legal in most states, sparklers account for three-quarters of all fireworks injuries to children five years and younger.***

by the smaller class “C” fireworks, such as firecrackers, bottle rockets, and Roman candles.

According to Weingeist, the most common and devastating eye injuries come from shooting bottle rockets. They are the most dangerous and are responsible for about 80 percent of eye injuries.

“These high-velocity projectile rockets are usually put in a pop bottle and lit and then they fly off erratically. They are so powerful that they can cause the eye to rupture or damage it in such a way that vision is lost,” says Weingeist.

While many injuries associated with fireworks occur to the person lighting the fireworks, almost half of those injured are simply bystanders hurt by projectile fireworks or debris from explosions. Bottle rockets fly an unpredictable path and can hit bystanders hundreds of feet away.

“The bottles or cans used to launch the rockets can explode,

showering fragments of glass or metal, often resulting in bystander injuries,” adds Weingeist. “Corneal abrasions can occur when the flying particles get into the eye. In addition, the impact of the explosion can rupture eyeballs.

“Severe, permanent damage often occurs at the moment of impact, and surgical repair may not salvage useful vision,” adds Weingeist.

The typical fireworks injury victims are teenagers, at home, unsupervised, with a group of friends. They are playing with fireworks and, chances are, one of them will end up in the emergency room with an injury to the head, eyes or hands.

“Injuries typically happen when people—often young people—assume a fuse isn’t lit,” Weingeist says. “They lean over a bottle rocket after it seems to have fizzled and it goes off.”

A primary cause of injury is fireworks that explode earlier or later than expected. When lighting a device, place it on the ground—not in your hands—and move away

quickly. Keep a bucket of water nearby and pour it on fireworks that do not ignite properly. Never try to relight or handle malfunctioning fireworks. Wait at least 15 minutes, approach the “dud” carefully, then soak with water and throw away.

Although illegal fireworks, bottle rockets, and Roman candles account for the majority of injuries, seemingly harmless sparklers also cause numerous injuries each year—including thermal or chemical injuries to the eye.

For children under age five, sparklers account for three-fourths of all fireworks injuries. Children often find these bright, innocent-looking fire sticks too irresistible not to touch. Younger children often lack the physical coordination to handle fireworks safely.

“Sparklers are sharp and can pierce the eyes. They can reach a temperature of 1,200 degrees—hot enough to melt gold,” Weingeist says. “Even when supervised, young children running with burning sparklers may burn themselves or fall on a burning sparkler, resulting in the loss of an eye.”

Weingeist emphasized that injuries from fireworks are often more serious than they appear, and that if an injury does occur, bystanders should immediately call EMS.

“Even injuries that do not rupture the eye often cause permanent blindness. In case of an eye injury, patients and EMS personnel should not touch, rub or press the injured eye. The patient should receive immediate care from an ophthalmologist or hospital emergency room personnel,” Weingeist adds.

At least 40 percent of the eyes with fireworks-related trauma recorded in the U.S. Eye Injury Registry remain legally blind.

Fireworks can also cause tremendous injury to the hand. The result is usually a blast injury to the hand or fingers which cannot be reconstructed. Most of these injuries result in amputation.

In 2002, eight out of nine (88.4%) emergency room fireworks injuries involved fireworks that Federal regulations permit consumers to use.

# Emergency physicians and surgeons evaluate blood substitute



**Chris Russi, DO**

*“In trauma care, the first 30-60 minutes are crucial, and the ability to deliver oxygen and decrease the severity of hemorrhagic shock, or even reverse or avoid it all together, may help us save more lives,” says Russi.*

**T**raumatic injuries are the leading cause of death for young adults and for U.S. military combat casualties. As a nationally known Level I trauma center, University of Iowa Hospitals and Clinics and the U.S. Naval Medical Research Center, will study the effectiveness of an oxygen carrying blood substitute (HBOC-201, also called Hemopure®), as a prehospital treatment for people suffering from severe blood loss or hemorrhagic shock.

“The **RESUS (Restore Effective Survival in Shock)** study will help determine if HBOC-201 can save lives by delivering more oxygen to organs of severely injured people,” says Chris Russi, DO, Assistant Professor, Clinical, Department of Emergency Medicine, University of Iowa Hospitals and Clinics.

“Early administration of an oxygen-carrying blood substitute at the scene of an accident has the potential to improve the chances of survival of patients who reach our emergency room door,” says Russi.

“In trauma care, the first 30-60 minutes are crucial, and the ability to deliver oxygen and decrease the severity of hemorrhagic shock, or even reverse or avoid it all together, may help us save more lives.”

Currently, people who have lost a significant amount of blood from an accident or injury are administered intravenous solutions, such as Lactated Ringer’s (LR), until blood can be transfused at the hospital. LR is a salt solution that replaces lost blood but does not carry oxygen.

Patients meeting the main eligibility criteria will be assigned randomly to receive infusions of either HBOC-201 or LR while en route to the hospital, either by ambulance or medical helicopter. Once at the hospital, blood transfusions will be administered as needed.



## Mark your calendar!

Experts will present the latest developments in emergency medicine at the Department of Emergency Medicine's conference, Friday, September 16, in Iowa City.

Morning lectures and afternoon breakout sessions are offered to meet the diverse needs of emergency care providers.

Featured speaker, Chuck Huss, MD, Adjunct Faculty, University of Iowa Carver College of Medicine, will discuss wilderness medicine and his Mount Everest expeditions.

“As EMS providers, we need to maintain our skills and stay current in our knowledge,” says Dave Dvorsky, PS, Assistant Director, Johnson County Ambulance Service. “We owe it to our patients to receive continuing education.”

For more information contact Hans House, MD, at [hans-house@uiowa.edu](mailto:hans-house@uiowa.edu)

## EMS Update

*EMS Update* is published three times yearly by the EMSLRC for emergency medical service professionals. Correspondence should be addressed to *EMS Update* Editor, EMSLRC, the University of Iowa Hospitals and Clinics, 200 Hawkins Drive, 6-South, GH, Iowa City, IA 52242.

### Contributing Sponsors:

Acute Care, Inc  
Emergency Medical Products, Inc  
Emergency Practice Associates  
Iowa Chapter, American College of Emergency Physicians  
Laerdal Medical Corporation  
WorldPointECC  
ZOLL Medical Corporation

**Director:** Doug York  
**Writer/Editor:** Jeri Irvine

**Printer:** UI Printing Department

**View the *EMS Update* at:**  
[www.uihealthcare.com/emslrc/](http://www.uihealthcare.com/emslrc/)

**FAX (319) 353-7508**  
**Phone (319) 356-2597**

**Do you have an interest in certain EMS topics?**

**Would you like to read more about them in the *EMS Update*?**

**Do you have a change of address?**

**Please e-mail your questions and suggestions to [irvinej@uihc.uiowa.edu](mailto:irvinej@uihc.uiowa.edu).**

**All e-mails will receive a response.**

The University of Iowa prohibits discrimination in employment, educational programs and activities on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or associational preference. The University also affirms its commitment to providing equal opportunities and equal access to University facilities. For additional information, contact the Office of Equal Opportunity and Diversity, (319) 335-0705.

People with disabilities are welcome at the University of Iowa Hospitals and Clinics where reasonable accommodations will be made upon request. Please contact the UIHC Department of Social Service, (319) 356-2207.

*Wilderness Medicine course participants climbed on a mountain and learned about hypothermia and high altitude medicines. They built snow shelters and camped overnight at 11,000 feet on Telescope Peak, California.*



## Physicians offer Iowa's first Wilderness Medicine course

**W**ilderness medicine encompasses a broad range of topics from high altitude medicine to wound management to environmental emergencies to orthopedic trauma to basic backcountry rescue. It focuses on medical problems and treatment in remote environments.

The interest in wilderness medicine is increasing rapidly. In addition, outdoor and wilderness recreation has become tremendously popular over the past two decades.

The UI Carver College of Medicine offered Iowa's first Wilderness Medicine course last March. Only about 20 other wilderness medicine courses are held in the U.S.

The four-week course, held each spring, accepts only 12, fourth year medical students. The small group size, outstanding faculty, and "hands-on" learning is designed to

offer a high-quality wilderness medicine educational experience.

"A core component of this course is the development of backcountry and wilderness travel and survival skills, including technical climbing, canyoneering, and rope management skills," says Eric Nilles, MD, Assistant Professor (clinical), Department of Emergency Medicine, University of Iowa Hospital and Clinics. He is Director of the Wilderness Medicine course; Chuck Huss, MD, is Assistant Director; and Brian Hood, PAC, is an instructor.

"Beyond fundamental wilderness skills and scenarios, the students learn how to apply their medical training in the wilderness environment," Nilles adds.

Nilles' wilderness experience includes climbing throughout Alaska, the Alps, and Asia and cycling 6,000 miles across the breadth of Africa.

Huss, Adjunct Faculty, University of Iowa Carver College of Medicine, has been involved in 40 climbing expeditions, including four expeditions at Mt. Everest.

Wilderness medicine shares many interests with emergency medicine—

since there is a high risk for medical problems. In the wilderness, equipment and supplies are severely limited by space, weight, and by consideration of what can be used in the field. One must utilize whatever supplies or materials are available.

"Nonmedical equipment must often be used for splints, airway control, or other medical purposes. Any medical equipment and medications carried should have multiple uses to be efficient," says Nilles.

The five students spend a half day with search and rescue rangers and learn to function in the backcountry.

"We take a 10-day, high-altitude, desert and wilderness trip in and around Zion and Death Valley National Parks. We spend time on the floor of Death Valley which is 320 feet at water level—the lowest point of North America. Then we climb to Telescope Peak and learn about high altitude medicines and treat hypothermia at 11,000 feet," adds Nilles. "We build snow shelters and camp overnight, then hike and climb during the day."

The second half of the course is classroom learning held in Iowa City.



**Eric Nilles,  
MD**



**Chuck Huss,  
MD**



## Adam takes Advanced Medical Life Support course to England and Hong Kong

*EMS providers from Portugal practice skills during the AMLS course in England.*

*Rosemary Adam, right.*

“Rosemary’s enthusiastic and expert help has been absolutely instrumental in getting Advanced Medical Life Support Instructor training into the United Kingdom, by way of the University of Hertfordshire,” says Andy Newton, Professional Lead, School of Paramedic Science, Physiotherapy

and Radiography, University of Hertfordshire, England.

Rosemary Adam, RN, PS, Nurse Instructor, EMS Learning Resources Center, is one of six members of the National Association of EMT’s Executive Committee for AMLS. She and Vincent Mosesso, Jr, MD, taught the first Advanced Medical Life Support (AMLS) course in the United Kingdom (UK), April 9-14.

Mosesso, Associate Professor, Emergency Medicine; Medical Director, Prehospital Care, University of Pittsburgh Medical Center, is Medical Director of the National Executive Committee on Advanced Medical Life Support.

“Feedback from the participants has confirmed that the instructor and

provider candidates alike were very impressed,” he adds. “They also realized they, themselves, play a very useful role in the continuing professional development of paramedics in England and the rest of the UK. The course proved to be international and enjoyable.”

“We taught them an AMLS Instructor course and then monitored them teaching their first AMLS provider course,” says Adam. “We also advised them on how to organize their courses with Ireland and Scotland.”

The subsequent provider course was held for 20 prehospital EMS providers from Ireland, Scotland, England and Portugal.

“The first group of AMLS Instructors we taught had various backgrounds,” she says. “Those from the UK were experienced paramedics with previous teaching backgrounds; many had Prehospital Trauma Life Support Instructor experience. There were five emergency nurses from Portugal with various critical care experience.”

Adam also took the AMLS course to Hong Kong, May 24-June 2.

John Wong, Professor of Surgery, University of Hong Kong Medical Center, Queen Mary Hospital, invited Adam to teach Hong Kong’s inaugural AMLS Instructor Course.

“The main difference between the two sites was that in England we taught prehospital providers. The Hong Kong course participants were primarily physicians and nurses, adds Adam.”





## EMSLRC introduces Rural Trauma Team Development Course<sup>®</sup>

**G. Patrick Kealey, MD,** (above center) discusses a trauma scenario during a recent RTTDC<sup>®</sup> course.



**Tom Foley, MD**

The EMS Learning Resources Center held their first Rural Trauma Team Development Course (RTTDC)<sup>®</sup> in April to train rural hospital personnel the team approach to initial assessment and resuscitation of the injured patient. RTTDC<sup>®</sup> focuses on primary assessment, stabilization and early transfer of patients to definitive care.

This American College of Surgeons-sponsored trauma course is designed for Level III and IV trauma centers/facilities. It is part of the Level I and II trauma centers' outreach programs.

Tom Foley, MD, General Surgeon, Marshalltown, Iowa, and member of the Rural Trauma Subcommittee of the Committee on Trauma, American College of Surgeons, helped develop the national Rural Trauma Team Development Course<sup>®</sup>.

“An informal survey of rural hospitals, taken by our subcommittee, revealed that most could mobilize three individuals to attend the trauma patient,” says Foley. “It was also revealed that these individuals lacked the efficient utilization and coordination of resources necessary to effectively care for these patients.”

The Rural Trauma Subcommittee evaluated the issues that rural surgeons, physicians and hospitals face in the timely delivery of care of the rural trauma patient. The committee felt that the factors causing time delays associated with the assessment and resuscitation of the injured patient can be improved by educating the rural hospital staff.

“It became obvious to the committee that the small, rural, medical facility staff would benefit most from an educational program teaching them how to organize a trauma team. The result is the Rural Trauma Team Development Course<sup>®</sup>,” adds Foley.

The course's purpose is to increase the efficiency of resource utilization and improve the level of

care provided to the injured patient in the rural environment.

“We teach participants to develop a rural trauma team and prepare for the arrival of a critically injured patient,” says Foley.

Each participating rural Level III or IV trauma center hospital registers “teams” of personnel who would normally provide primary trauma care in their facilities. This team should consist of the Leader Physician: (MD, DO) or physician extender (PA, NP); Team Member One: RN; and Team Member Two: RN, EMS provider, nursing assistant, or clerk. Supportive trauma team personnel, such as laboratory and respiratory technicians, also attend the course and participate in the team functions.

Each host hospital completes a pre-course questionnaire regarding local trauma services so the course may be adapted to meet the local team needs.

“It is hoped that RTTDC<sup>®</sup> will improve the quality of care in the host hospital community by developing a timely, organized, rational response to the care of the trauma patient,” says Bill Elder, PS, EMSLRC Instructor. “We teach a team approach that addresses the common concerns in the initial assessment and stabilization of the injured. We take this course on the road and teach it at the rural trauma care facility.”

Courses will be given by the Level I and II trauma centers in the vicinity of the rural hospital where it refers its critically injured patients. These trauma centers provide outreach education to their referring hospitals. The sponsoring hospital and teaching staff may decide which course design fits the “team” needs.

RTTDC<sup>®</sup> is taught by surgeons, emergency physicians and nurses who are experienced trauma providers and trauma course instructors. A course coordinator from the trauma center and another at the local facility are required.

For more information on Rural Trauma Team Development Courses<sup>®</sup> contact Bill Elder at 319/384-6824 or elderw@uihc.uiowa.edu

*Students work with the computer-controlled mannequin in the EMSLRC's new Patient Simulation Center. The students treat the mannequin as if it were a "patient" in an emergency setting. They use real equipment, while the instructor controls the "patient" from within a separate room with a one-way observation window.*



## Iowa's first emergency patient simulation lab enhances training



**Roy Werner,  
MD, MS**



**Lee Ridge**

Iowa's first lifelike and medically authentic emergency medicine Patient Simulation Center, in the UI Department of Emergency Medicine, meets the needs of prehospital emergency medicine training.

The Center, located in the EMS Learning Resources Center, offers the unique challenge of direct experience in emergency care training. The quality of hands-on training can determine the outcome in responses to medical emergencies.

"This new teaching tool is a state-of-the-art, computer controlled mannequin," says Roy Werner, MD, MS, Medical Director, EMSLRC, Assistant Professor (Clinical), Department of Emergency Medicine.

"The students' mannequin experience improves their ability to transfer their skills from practice sessions to real life," he adds.

The lab was designed and equipped by Werner and Lee Ridge, PS, FP-C, Instructor, EMS Learning Resources Center.

"The patient simulators allow us to present challenging scenarios in a realistic manner outside the emergency scene environment. The training can be accomplished by our students learning skills on a mannequin and gaining confidence in them before treating patients," says Ridge.

The mannequin has lifelike human characteristics and responds to medical treatment and drugs. It simulates a human patient in a variety of conditions to reproduce emergency cases in a controlled learning environment. The simulator cries, moans, has lifelike pulses, heart functions and sounds, bowel sounds, has eyes that dilate and blink, and can be a male or a female.

"With the recent advances in medical education, we will increasingly utilize human simulators to enhance emergency medical management," says Werner.

As the emergency medicine providers participate in various rotations, they will also be exposed to mock-up rooms and ambulance work areas to gain experience before going on scene.

"The simulators will help train all emergency medical personnel from first responders, EMTs, paramedics, medical students, and emergency medicine residents, to nurses and senior emergency medicine staff physicians," says Werner.

"Teaching scenarios can begin in a home mock-up, progress to an ambulance mock-up, and end in the emergency room mock-up. This will allow realistic presentations of the cases," adds Ridge.

EMSLRC staff develops and adapts the scenarios to the providers' appropriate level of training.

# EMSLRC course calendar

## 2005

- Aug 22, 24, 29, 31 Iowa City: Basic EKG Interpretation
- Sep 8-9 Iowa City: Pediatric Education for Prehospital Professionals
- Sep 12, 14, 19, 21 Iowa City: Advanced Cardiac Life Support Provider
- Sep 15-16 Iowa City: Geriatric Education for Emergency Medical Services
- Sep 22-23 Iowa City: Advanced Trauma Life Support Student
- Sep 23 Iowa City: Advanced Trauma Life Support Refresher
- Sep 26-27 Iowa City: Advanced Medical Life Support
- Sep 29-30 Iowa City: Trauma Nursing Core Courses
- Oct 6-7 Red Oak: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor
- Oct 7 Red Oak: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor Renewal
- Oct 10-11 Iowa City: Prehospital Trauma Life Support Basic Advanced Life Support
- Oct 13-14 Iowa City: Emergency Nursing Pediatric Course
- Oct 15 Chariton: Rural Trauma Team Development Course
- Oct 20-21 Iowa City: Advanced Trauma Life Support Student
- Oct 21 Iowa City: Advanced Trauma Life Support Refresher
- Oct 24 Iowa City: Advanced Cardiac Life Support Provider Renewal
- Oct 27-28 Iowa City: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor
- Oct 28 Iowa City: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor Renewal
- Oct 31 Iowa City: EMT-Basic training begins
- Nov 1 Iowa City: Advanced Cardiac Life Support-Experienced Provider
- Nov 3-4 Sioux City: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor
- Nov 3-4 Iowa City: APLS—The Pediatric Emergency Medicine Course
- Nov 4 Sioux City: Advanced Cardiac Life Support/Pediatric Advanced Life Support Instructor Renewal
- Nov 7, 9, 14 Iowa City: Pediatric Advanced Life Support Provider
- Nov 14 Iowa City: Pediatric Advanced Life Support Provider Renewal
- Nov 18 Iowa City: Advanced Trauma Life Support Refresher



University of Iowa  
Hospitals and Clinics, EMSLRC  
200 Hawkins Drive, 6-South, GH  
Iowa City, Iowa 52242-1009

Nonprofit Organization  
U.S. Postage  
PAID  
Permit No. 45  
Iowa City, Iowa

RETURN SERVICE REQUESTED