



*Dr. R Adams Cowley testifies in favor of air bags or automatic seat belts at the United States Department of Transportation hearing on automatic restraints.*



Maryland  
**EMS  
NEWS**

Vol. 10 No. 6 JANUARY 1984

# Cowley Testifies on Automatic Restraints

*Statement of R Adams Cowley, MD, before the United States Department of Transportation, Hearing on Automatic Restraints, Washington, DC, December 5, 1983.*

I am Dr. R Adams Cowley, president of the American Trauma Society, director of the Maryland Institute for Emergency Medical Services Systems, and professor of thoracic and cardiovascular surgery at the University of Maryland School of Medicine. I am pleased to have this opportunity to explain the importance of automatic restraints, although I am deeply concerned that after so many years of study and so much preventable death and injury, the Department of Transportation has regressed from the point of installing automatic restraints in cars to yet another rulemaking.

Each day I see the dying and the maimed from the Maryland highways. In our shock trauma center and the nine designated Maryland areawide trauma centers we see about 3,000 people each year who are severely damaged because of traffic crashes. We call them "crunch injuries" because all the body systems are damaged. Nationwide, these injuries are a huge public health burden.

- Hospital-treated brain injuries to vehicle occupants alone are estimated at

more than 90,000 annually in the United States.

- Hospital-treated facial injuries (lacerations and fractures) are estimated at 625,000 annually from motor vehicle crashes.

- Half of all cases of traumatic spinal cord injury—paraplegia and quadriplegia—result from motor vehicle crashes.

The use of emergency rooms across the country is skyrocketing. One out of five people sustains injuries requiring emergency-room treatment every year. Motor vehicle crashes have been found in a study of emergency cases in Ohio hospitals to be among the three leading causes of both injury and death.

We in trauma medicine have made advances in the treatment of these injured people. But I am sad to say that what is likely the single greatest step toward preventing death and injury in motor vehicles has been known for years but has not been taken—automatic restraints are not yet in automobiles.

Despite years of availability and millions of dollars and countless volunteer efforts to induce higher manual seat belt use, fewer than 10 percent of those in serious crashes are wearing belts. It is time to stop waiting for the miracle of high manual belt use that we know is not going to happen. It is time to put automatic protec-

tion in every car.

Air bags or automatic seat belts would prevent thousands of deaths and scores of thousands of serious injuries every year. This fact was clear when the rulemaking started in 1970. It is still clear today. The Department of Transportation must act to see that the lifesaving technology is in all cars as soon as possible.

Doing so makes good economic as well as human sense. Medical treatment, maintenance of the disabled crash-injured, and lost productivity—all cost society a staggering amount. From what I have read of the record now before the Department of Transportation, automatic restraints would save far more money than they would cost.

But even if air bags and automatic belts were far more expensive than the Department of Transportation estimates, the extra expense should be borne like the cost of any other life-saving measure. When a broken body is pulled still alive out of a crashed car, we don't argue about whether the cost of treatment—perhaps over a lifetime—is more than the savings to society. We treat that person the best we can. We try to save that person regardless of the cost. Likewise, we should be willing to bear the cost of safer cars—if there are any such costs—in order to save human lives.



# Firefighter Survives Grueling Ordeal

If all goes well, sometime soon Sandy Lee will go back to living a somewhat normal life. But that won't be before a year-long battle that saw her pulled from beneath the wheels of her fire truck, and led her through every step of Maryland's emergency medical system.

Ms. Lee's ordeal began on a perfectly clear September day in 1982, when the fire truck on which she was riding made an ordinary stop. The truck stopped smoothly, but since she was slightly off balance, Ms. Lee, a Prince Georges County firefighter, fell from her perch on the side of the truck and struck the ground. The truck began to roll before she could scream out or move away, and she found herself under its wheels.

"I grabbed onto the street and dragged myself forward to get away from the truck," she said. "I kept dragging myself forward, staying just ahead of the truck." Keeping her wits, each time the wheels pushed against her, she pulled ahead with her hands above her so they wouldn't be crushed.

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***"The support of her family, friends, and fellow firefighters never really dropped off," she said. "At times she even had to ask for time to herself."***

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When the truck finally came to a brief stop, she caught her breath and screamed for help. Luckily, the captain heard her cries. "I lay there on the ground and thought 'Okay, so you've been hit by a truck, a big truck. Now check, are your legs broken? No. . . . Is your pelvis broken? Yes. . . . Is your back broken? Well, I can wiggle my toes so I guess not.' Then I reminded myself to be sure and tell the driver it wasn't his fault." After the truck stopped, Ms. Lee waited for help, fully realizing that she was badly hurt, but not knowing how badly. She began to have some awareness of the severity of her injuries when the driver came back to her.

"I knew it was bad by the look on his face, and I didn't want him to be upset, so I joked about what had happened. If I'd have known how hurt I was, I'd have probably been upset as well," she said.

"A few minutes later I felt myself going into shock. I told everyone that it wasn't their fault, and then I lost the feeling in my hands and feet and I began to get tired. I kept repeating that it wasn't any-

one's fault and then I got real scared and asked them all not to let me die." Never forgetting her medical training she kept repeating those words so she would stay awake and not lapse into shock.

When the paramedics came it was a "scoop and run," according to Ms. Lee. She had no blood pressure and was later classed as a cardiac arrest, but she kept talking and begging the ambulance crew (and later the ED staff) not to let her die.

"When they got me to the ED [at Prince Georges General Hospital], I could hear Dr. [David] Gens talking about injuries that were far worse than I ever imagined. I recognized everyone in the room since I'd brought so many patients in there, and I was aware that I kept talking to them.

"At one point I knew that my mom and dad were there and I can remember them assuring me that everything would be okay. After 17 hours at Prince Georges' I remember being loaded in the helicopter and thinking 'I guess I'm really hurt badly if they're taking me to Shock Trauma.'

"Then I was going down the parking lot in the ambulance to Shock Trauma, and I basically blacked out for about three to four months after that," Ms. Lee added.

When Sandy Lee was pushed along the red line and through the swinging doors into the Admitting Area at MIEMSS Shock Trauma Center, Sheldon Brotman, MD, then attending surgeon, looked down at her and saw the most vivid example of multiple trauma that he had perhaps ever seen.

"MIEMSS has been saving a lot of patients with excessive injuries, but Sandy was a first in many ways," he said. "It was the worst thing I have ever seen. The amount of blood used [747 total blood products in just 3 days] and the magnitude of the injuries surpassed anything we have ever treated before. There was a feeling of hopelessness, but impetus was to try something."

When Ms. Lee was admitted last September, her abdomen was torn open, flaps of skin were lifted and torn away, and both legs were macerated. According to Dr. Brotman, "everything was gone from the waist down. All of the skin was just gone. We prepared her parents for the worst, but nonetheless began serious attempts to save her life."

Dr. Brotman and his team kept working on their patient while realizing that there was practically no way she could live. They took her into surgery and upon arrival in the OR she promptly had a series of cardiac arrests. "But," he said, "you

have to remember she was a firefighter and firefighters are different. She was exceptionally fit and in the prime of her life."

Eight hours after surgery, and with 173 pints of blood already transfused, Ms. Lee awoke complaining, "I'm thirsty, I'm hungry . . . will I still be a firefighter?" Everyone looked in amazement and wondered what to do next.

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***She is convinced that "this is an emergency medical system that works. They never gave up on me . . . when anyone else would have."***

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"A lot of people did a lot of work in the following weeks and months, with constant procedures and pressures and little improvement in her condition to urge us on. While she was still critically ill, we grafted dozens of layers of skin," Dr. Brotman said. During this time they also amputated one leg at the knee—one of 50 operations during a 3½ month period.

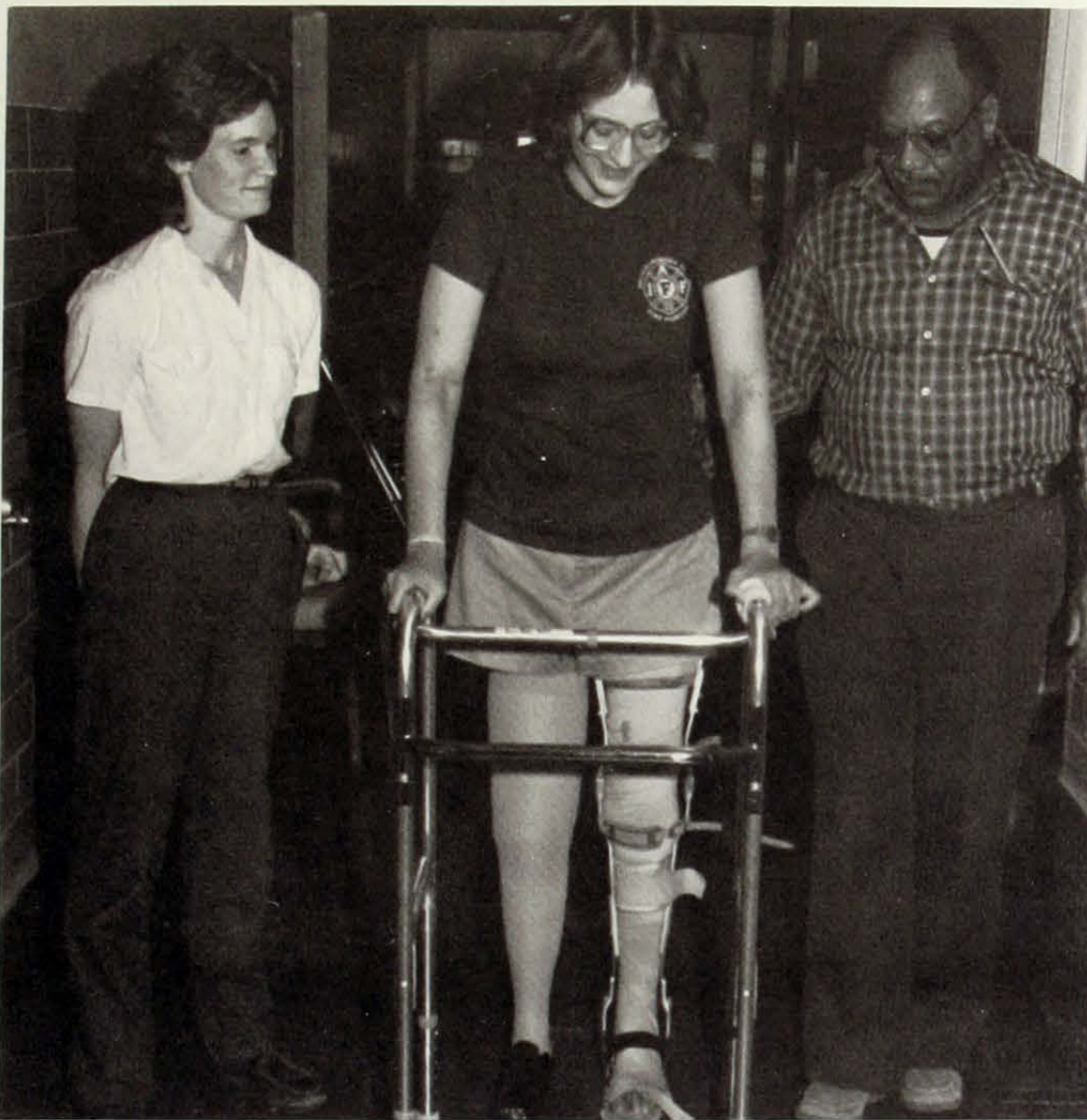
In November when an intestinal fistulization again threatened her life, the still gravely ill Ms. Lee underwent more massive surgery, and again she pulled through.

Just before Christmas, while still on a respirator, she passed a note to one of the staff that read "I want to breathe on my own." After cautious consideration, they disconnected her from the machine and she has breathed on her own ever since.

Ruth Ann Wells, RN, was Ms. Lee's primary nurse while she was in the Intensive Care Unit. She said she credits Ms. Lee's "magnificent support system" with helping to make her recovery as smooth as possible. "The support of her family, friends, and fellow firefighters never really dropped off," she said. "At times she even had to ask for time to herself." During her stay in the Shock Trauma Center, members of Ms. Lee's squadron were constantly in the waiting area, available for help with any special needs that might arise, as well as emotional support. Firefighters throughout the nation donated blood generously, anxious to help Ms. Lee in any way possible.

Once the troublesome fistulas were treated and finally healed (in half the predicted time), Ms. Lee's progress was rapid. Nurses called her a "real hard worker who responded well to challenges." She was no longer a candidate for inpatient care, although long-term rehabilitation was necessary.





*At Montebello, Sandy Lee practices using a walker as Susan O'Hare, physical therapist, and David Wise, health assistant, look on.*

The Lee family jointly chose the MIEMSS/Montebello program for Sandy's follow-up care, citing its comprehensive program and understanding of the complex case. During their discussions, staff members from the Montebello program came to MIEMSS to discuss potential procedures, follow-throughs, and ways of making the transition period as smooth as possible.

Roslyn Corasaniti, RN, nurse supervisor for the MIEMSS/Montebello program and liaison between the two facilities, became involved with Ms. Lee's care even before she was transferred.

"Since Sandy was such a complex trauma patient, there were many special preparations that had to be made. She could not be weaned from the non-irritating surface of her Clinitron bed, since her skin was still mostly macerated, and susceptible to breakdown or injury. There were countless collaborations with medical staff about procedures, since there was no normal category of medical care for her," Ms. Corasaniti explained. "We were always working to make a comprehensive environment, educating the patient, her family, and our staff. Wellness became our emphasis, how to get her ready to lead a full, normal life."

Despite the long and arduous recovery, Ms. Lee still needed an intensive period of therapy. When she arrived at Montebello in February, she had little, if any, hip flexion. Only hard work, strict goals, and support from physical therapy staff and friends have helped her to make dramatic increases and regain about 75 percent of her flexion.

"Ms. Lee's friends and family helped to make her recovery very dramatic," Ms. Corasaniti said. "Their tireless hours of cocoa butter massages helped heal scar tissue, and prevent or decrease the need for many skin grafts."

Once goals were established for her at Montebello, Ms. Lee motivated herself to become mobile as quickly as possible. Since she was used to rigorous physical training, she rapidly learned to use a self-propelled stretcher. Within days she was able to wheel herself on the stretcher to physical therapy sessions. Her stamina and motivation amazed everyone who met her.

Saul Weingarden, MD, the physiatrist at Montebello who treated Ms. Lee, said he has continually been surprised by her progress. But he is quick to emphasize that she is alive today only because of the care

she received at MIEMSS. "Dr. Brotman did an amazing job treating her," he noted, "and it is obvious that a multiply injured patient has been saved who would never have been saved before. The complex musculo-skeletal problems that were seen in this case have never been dealt with before.

"Although it is true that rehabilitation can be done anywhere, the MIEMSS system was able to give her the comprehensive, all-encompassing care that she needed. This was a unique situation, and there was a need to be flexible and innovative, since there were no set protocols for care."

Dr. Weingarden said he chose to break her problems into manageable components to help her achieve successes. Then they jointly set goals and charted progress. "The chart gave Sandy a look at what she could accomplish on Friday that she could not accomplish on Monday. Once she saw the small successes, she could define her own goals and see just how far she could go." And, Dr. Weingarden was quick to add, Sandy was never lax with herself. The goals and the chart became her confidence builders.

According to Dr. Weingarden, Ms. Lee is quite functional now and can do many things by herself. Through intensive daily physical therapy sessions at MIEMSS/Montebello, she has been able to regain much of the range of motion in her hip and walk (with the aid of a walker) several times around Montebello's halls.

Ms. Lee is now back in the MIEMSS system, receiving intensive physical therapy at Montebello following several operations at Johns Hopkins Hospital. She said that she is convinced that "this is an emergency medical system that works. They never gave up on me . . . when anyone else would have. It was a lot for the staff to do, but as long as I was trying, they never gave up."

It was Ms. Lee's incredible spirit and perseverance that many of her care givers credit for her miraculous recovery. Last April, at the Prince Georges County Awards Ceremony in Lanham, she was presented with the Fire Chief's award for courage. With the help of her ever-available colleagues, Ms. Lee traveled from Montebello to the ceremony via stretcher to receive the coveted award.

It is the same courage for which she was honored that keeps her progressing. She now aspires to adjusting to her prosthesis, going back to work, living on her own, caring for her two horses, and just "getting back to normal as much as possible. To me," she said, "that's very graspable."

— Rochelle Cohen



# Symposium on Trauma Care Innovations

The sixth annual national symposium, sponsored by MIEMSS and the National Study Center for Emergency Medical Systems, drew more than 300 participants to Baltimore for three days in November.

This year's symposium featured discussions on the latest findings in clinical trauma care, support services, and trauma center administration. In addition to general interest sessions, specialty tracks were offered for physicians, nurses, and administrators.

Synopses of some of the discussions follow. (More will appear in a later issue.)

## Pregnant Trauma Patient

A mini-baby boom and more relaxed attitudes toward mobility throughout pregnancy have helped to boost the risk of accidental injury during pregnancy to 7 percent.

"The greater risk of distraction, slower reflexes, and general tiredness make pregnancy the greatest time for accidental injury during adult life. Also, pregnant women generally continue to work and drive during the third trimester," according to Trish Payne, high risk maternity coordinator at MIEMSS. Ms. Payne, along with nurse clinician Lynn Gerber Smith, explained procedures for quickly diagnosing and then properly treating the pregnant trauma victim.

"If you have a pregnant patient, it is urgent that you think and act quickly," Ms. Smith noted, "and remember that you are caring for two lives and not just one." In the field, that means determining whether or not a victim is pregnant, and alerting appropriate staff. If possible, all conscious female victims of childbearing years should be asked whether they are pregnant so appropriate treatment can begin immediately. This is especially important since several physiological changes occur during pregnancy. First, since blood volume is already dramatically increased, blood loss can be masked, often resulting in delayed treatment for the patient and fetus. Additionally, blood pressure tends to be lower, GI motility is slow, hematocrits tend to be lower, and electrolytes tend to become easily imbalanced.

Drugs pose a special problem for pregnant patients. During the first trimester (when pregnancy is the most difficult to diagnose at an accident scene), drugs are the most potentially toxic; therefore, risks must be carefully weighed against benefits.

With acute injuries, the greatest risks are premature labor, abruptio placenta, ruptured uterus, and fetal distress. "In any

case, a quick trip to the nearest trauma center is the best bet," Ms. Smith said.

Ms. Payne also stressed the current national campaign urging all pregnant women to wear seat belts properly whenever riding in a car (see page 5). "Prevention techniques coupled with prompt medical care for the mother and fetus are the only ways the problem of trauma during pregnancy can be resolved," she said.

## Pediatric Trauma Resuscitation

Since trauma-related injuries account for half of the deaths occurring in children between one and fourteen years of age, an organized, well-planned approach to the pediatric patient during emergency situations is essential.

"Priorities in pediatrics are the same as in adults: remember the ABCs and deal with complications immediately," said Margaret Widner-Kolberg, pediatric nurse coordinator at MIEMSS.

In her talk entitled "Pediatric Trauma Resuscitation," she stressed that most cardiopulmonary resuscitation training has been based on adult models, but that care givers must be aware of differences if the child is to survive. "Adequately performed resuscitation is generally successful in children — even more successful than in adults," Ms. Widner-Kolberg stated, "but it must be performed correctly and in accordance with age and size."

Proper airway management includes clearing the mouth using a chin lift or modified jaw thrust, giving four quick breaths, checking for obstructions, and watching for the chest to rise and fall; and in infants, an arm or blanket under the neck and upper back may be necessary to give adequate chest compressions.

"In young children and infants you look for movement in the lower chest and abdomen, observing adequate ventilation while you look, listen, and feel," she said. If a bag mask is used, it should be the correct size to seal the mouth; the mask should be clear and the bag should be equipped with a pop-off valve so as not to overinflate the lungs.

Special problems for children include drug dosages, which should be given according to weight. Charts on commonly used drugs and their dosages should be prepared and easily accessible for pediatric emergencies. Ms. Widner-Kolberg stressed prevention programs to greatly decrease injury and death. "Appropriate car seats and/or seat belts are a must, if we want to turn the alarmingly high mortality and injury rates around," she stressed.

## Management of Burns

Burns can be some of the most critical results of traumatic accidents, and al-

though the national mortality rate from burns is down to 7 percent, the remaining 93 percent of burn patients may need up to 2 years of treatment and a team of care givers to assist in their recovery.

"Physical recovery is quicker and more thorough than psychological recovery, which may take years to occur," according to Andrew M. Munster, MD, director of the Baltimore Regional Burn Center at City Hospitals and associate professor at the Johns Hopkins University School of Medicine. In his talk entitled "What's New in the Management of Burns," Dr. Munster explained that although burn size seems to make no difference in the recovery of the victim, burn distribution does. Burns on the hands and face are the most difficult to recover from, and need the most prompt and extensive care.

One of the newest discoveries in burn treatment is the importance of nutrition, and the availability of adequate calories. According to Dr. Munster, many burn patients have died unnecessarily because caloric intake wasn't increased to adequately sustain the burn patient.

Currently in the research stage is an immunotherapy technique that will beef up normal resistance and accelerate healing. According to Dr. Munster the implementation of that technique in medical facilities is still three to five years away.

## Suspected Aortic Aneurysm

What trauma injury is so severe that 85 percent of its victims are dead at the scene; 30 percent are dead within 6 hours; and 90 percent of those remaining are dead within several days? It is the once rare, but increasingly common aortic aneurysm, and despite its long known presence, the survival rate is not improving.

Although the thorax can tolerate as much as 550 pounds of pressure on the chest for one minute or 1100 pounds for less than one minute, a 60-mile-per-hour head-on crash would impose 1250 pounds of force on the main arterial system. Clinically, aortic aneurysm is the result of an acceleration followed by rapid deceleration and is usually accompanied by multiple injuries such as head, chest, hip, or those accompanying ejection through the windshield. They may follow blunt trauma (such as that resulting from car accidents) or penetrating wounds (such as those resulting from stabbings or shootings).

"Steering wheel imprints are an obvious sign of possible aneurysm, and should never be treated lightly," said Carolyn S.

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# Group Urges Seat Belts during Pregnancy

**NO!**



**YES!**



Seat belts should always be worn during pregnancy. The shoulder belt, if available, should be worn as usual to avoid uterine rupture. Lap belts help to prevent ejection from the car, and should be worn low, below the uterus, and pulled tightly across the pelvis. If only a lap belt is available, wear it as described.

More pregnant women die in car accidents than from any other cause — childbirth included. And since increasing numbers of women are mobile during most of their pregnancy, the risk of a car accident — and resulting injury to mother or fetus — is compounded. It is predicted that one out of 14 pregnant women will be involved in a vehicular accident sometime during her pregnancy.

With these facts in mind, Trish Payne, RN (high risk nurse coordinator at MIEMSS and the OB/GYN department at University of Maryland Hospital) and David Nagey, PhD (assistant professor of OB/GYN at University of Maryland School of Medicine) produced a professional development brochure urging care givers to instruct their pregnant patients to wear seat belts. Publication of the brochure was cosponsored by MIEMSS, the Maryland sections of the American College of Obstetricians and Gynecologists and of the Nurses Association of the American College of Obstetricians and Gynecologists, and the Maternal Welfare Committee of the Medical Surgical Faculty.

Entitled "Should I Wear a Seat Belt While I'm Pregnant," the brochure illus-

trates how to wear a seat belt properly during this particularly vulnerable time. The shoulder belt should be worn as usual, with the lap belt below the uterus and pulled tightly across the pelvis.

"Properly worn, the seat belt can keep the impact of a crash away from the

uterus, and help to prevent possible uterine rupture, which can be fatal to the fetus," Ms. Payne explained. "We urge women to wear the shoulder belt to avoid this problem and to wear the lap belt (as illustrated) to prevent ejection from the automobile," she said. The risk of death is 25 times greater if the victim is ejected.

Other maternal problems that seat belts can help to assuage in an accident include abruptio placenta, premature labor, and severe hemorrhage.

"All told," Ms. Payne noted, "we need to get the word out. Seat belts during pregnancy are a must!"

Copies of the brochure are available from the MIEMSS Office of Field Nursing, (301) 528-3930.

— Rochelle Cohen

## John Donohue Resigns

John Donohue, assistant administrator for Region III, recently resigned his position to go to medical school. MIEMSS appreciates his hard work and efforts to improve EMS and wishes him good luck in his new endeavor.

## Symposium on Trauma Care

(Continued from page 4)

Harrell, a MIEMSS nurse clinician, in her talk "Suspected Aortic Aneurysm."

"Many victims are completely asymptomatic with only an abnormal chest x-ray, or we may have no abnormal findings at all," she added. For a firm diagnosis, an upright chest x-ray is essential, followed by an aortogram if a widened mediastinum is found. After a positive diagnosis, resuscitation and immediate surgical repair are essential.

Symptoms of aortic aneurysm include shock and upper extremity pain, pulse deficit, contusions, abrasions, crepitation, and tracheal shift. Other signs are hoarseness, difficulty swallowing, dyspnea, cough hemoptysis, and harsh systolic murmur.

### Infection in Trauma

Although infection is the second leading cause of mortality among trauma patients, preventive techniques to decrease the risk of cross infection are actually safer and more effective than the prophylactic use of antibiotics.

Ellis Caplan, MD, chief of infectious disease at MIEMSS, said he believes that sectioning off patients, keeping all necessary equipment in the patient's self-contained cubicle, and having a sink readily available in the cubicle, can actually help to prevent cross infection.

"It is difficult to assess the need and value of antibiotics when it is so difficult to determine whether infection is even present," he said. "White counts are generally elevated in trauma patients anyway, so it is best to reevaluate the patient everyday, watching for changes and clues to whether infection is present, and where it is located."

According to Dr. Caplan, the major cause of infection is the routine use of invasive instruments in caring for patients; these instruments are a source of contamination. "Considering the situation, it's amazing that so few patients actually get infections.

"Our overall goal is the use of antibiotics in a limited, carefully monitored fashion, since in many cases these drugs are not necessary or effective on a prophylactic basis," Dr. Caplan stressed.

### Reminder

MD Fire-Rescue Education & Training Commission Meeting, January 19, 1984, 10 am, Calvert Room, State House, Annapolis. CONTACT: Ted Porter, (301) 269-2971.



# Evaluating EMS Systems: Trauma Registry

*Editor's Note: In the first part of this series (see December issue), the MIEMSS Trauma Registry was described. This part contains examples of how the information in the registry can be used, and is being used, to evaluate the Maryland EMS system.*

How many calls for emergency medical service were received last year and did the volume of calls fluctuate with the seasons?

Are more CRTs needed on the staff to handle the local need for advanced life support?

Are prehospital care providers following medical and triage protocols in the field?

How often should the medical supplies carried on ambulances be re-ordered?

Are trauma patients being transported to the most appropriate hospital in the shortest possible time?

These are a few of the many questions that local fire and rescue companies *may* get answered if they use the computer-read ambulance runsheets provided by MIEMSS. There are also questions that companies *need* to get answered to improve the management of their resources. When the company's resources fall short of the demand, the data that prove that fact can be used to justify the acquisition of greater resources.

The information on the MIEMSS ambulance runsheets is read by a device called an optical scanner and then stored in the MIEMSS Trauma Registry, along with in-hospital patient data supplied by the MIEMSS Shock Trauma Center and the nine areawide trauma centers in Maryland.

On a monthly basis, the prehospital data in the registry are tabulated for each fire and rescue company that uses the computer-read ambulance runsheets, and are published by the Evaluation and Analysis Department of MIEMSS for those companies' respective jurisdictions.

Each participating jurisdiction receives a management information report and a clinical assessment report for both basic life support and advanced life support vehicles.

The management report contains information about the functioning of the Maryland EMS system during the pre-hospital phase of care, while the clinical report contains diagnostic and treatment information concerning trauma patients.

The information in the reports is presented in the form of statistical tables. Interpretation and use of the data are left up to the local jurisdictions.

The in-hospital patient data are entered into the registry directly from computer terminals that have been installed in each of the state's areawide trauma centers. The same terminals can be used to retrieve patient data from the registry.

Upon request, the registry will tabulate and display statistical summaries on the requesting center's own patients, or statistical comparisons between that center's patients and all other patients treated at areawide trauma centers in Maryland. Information can be requested on the cause of injury, patient condition on admission, the demographic characteristics of patients, surgical intervention, and patient outcome.

The MIEMSS Trauma Registry became operational in January 1982 and the first statistical reports on prehospital care came out in March of that year. However, the data base in the registry was too small and incomplete at first to be of much value.

Too few of the ambulance companies in the state used the computer-read runsheets initially, and not all areawide trauma centers were hooked up to the registry. In addition, a period of adjustment was needed by prehospital care providers to get used to filling out the new runsheets and by hospital personnel to get used to entering patient data into a computer.

Today, all of the areawide trauma centers are connected to the registry, but the computer-read runsheets still are not used by many ambulance companies outside of Region III. Nevertheless, the data base is now large enough to be of practical value, at least to the ambulance companies and trauma centers in Region III.

"Ambulance companies are just now beginning to ask questions about the data, such as: 'What do these numbers mean?' and 'Do these figures represent a comparison?'" says Kerry Smith (former Region III administrator who recently moved to New York).

Some of the ambulance companies in Baltimore City and County are using the information in the statistical reports issued by MIEMSS to monitor the use of their supplies.

The clinical report "tells us what quantities of supplies should be purchased to meet our needs," says Chief Michael Jachelski, of the Baltimore City Medical Bureau. For example, he says the need for medications and solutions can be estimated more exactly than was possible previously. This helps prevent the waste that occurs when these materials go out of date before they are used, he adds.

In Baltimore County, some advanced life support vehicles have stopped carrying lidocaine in both drip and bolus forms because the demonstrated need for lidocaine in certain areas was not great enough to warrant using both forms of the drug, reports Mr. Smith.

Inventory control is just one of the many uses of the information contained in the statistical reports. Another important use, according to Lou Jordan, associate director of prehospital care for MIEMSS, is justifying the placement of basic life support and advanced life support vehicles, depending on the volume of calls for each type of vehicle in a particular area.

Mr. Jordan also says the reports show trends in the need for prehospital care services. For example, he says knowing the number of ambulance runs made in Ocean City per year is not very informative because the number fluctuates greatly throughout the year. To be able to plan adequately for the changing need for EMS services, a monthly breakdown is needed and the management report provides that information, he says.

Perhaps most importantly, however, the reports help the local jurisdictions demonstrate their needs for additional resources, says Mr. Jordan. The statistical reports already have been used for this purpose several times.

One of the most impressive examples to date has been the recent awarding of a \$4,000 grant from the Department of Transportation to Baltimore City for the purchase of pediatric MAS trousers. The need for the trousers was supported by the data contained in the city's clinical reports. The grant request "sailed through the review process" because the claim that the trousers were needed was backed up with hard evidence, says Mr. Smith.

In northern Baltimore County, a non-transport vehicle, driven by an ACLS-trained field supervisor, was put into service about seven months ago. Management reports for Baltimore County clearly showed that EMS coverage was inadequate in the county north of Shawan Road. Formerly, this area was served only by a single ambulance, stationed at the Hereford Volunteer Fire Company.

The need for an additional vehicle was proven by the fact, obtained from the management report, that it took Hereford's ambulance 45 to 90 minutes to respond to a second call when it was already in service.

In a similar situation, the Liberty Road Volunteer Fire Company is using

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# Trauma Care on the International Scene

Do the "Mercedes madness" of Germany or the overcrowded railways of India dictate the style of trauma care in those countries? Does the low incidence of gunshot wounds in Great Britain mean a trauma system is unnecessary there?

Robert J. Freeark, MD, Ambrose and Gladys Bowyer Professor and Chairman of the Department of Surgery at the Loyola University School of Medicine in Chicago, recently took a one-year sabbatical to examine trauma systems around the world. In his luncheon address to those attending the National Symposium on Trauma last November, Dr. Freeark explained that the British are really not interested in spending money on trauma,

and have no plans to invest further in it in the future.

Until recently, orthopedists had been the center of trauma care, but they have been gradually phased out by accident/emergency consultants under the national health care program. The Birmingham Accident Hospital (comparable to the MIEMSS Shock Trauma Center) was once the center of trauma care in Great Britain, but it has been phased out in favor of newer, more efficiently run hospitals.

In contrast, Germany has a highly developed system of trauma care, brought on by what Dr. Freeark calls "Mercedes madness" or the unlimited speeds on the nation's autobahns. "The accidents in Germany are more frequent and worse because of the great speeds," he said, "so the Germans almost had to get into helicopters." Unlike most Med-Evac pilots in the United States, German helicopter pilots transport doctors to the scene rather than transport patients to the hospital. Law requires that a physician be at the accident scene within 20-25 minutes. Germany is virtually covered by circles of responsibility for emergency care. At the center of each circle is a hospital-based helicopter program that services the entire area except if an accident is within a 15-km radius, when a sophisticated land transport vehicle brings the patient to the hospital.

For a \$20 yearly fee, the Swiss are covered by an air rescue fleet of 14 helicopters and two Lear jets. Once enrolled, you are assured of transport from anywhere in the world back to Switzerland in the event of an emergency. "Every Swiss citizen enrolled in this plan can identify with the system," Dr. Freeark said, "and every time they see one of the rescue helicopters in the air, they feel a part of this system."

Austria is considered the home of traumatology, and accident patients are given the special services and attention Austrians believe they deserve. According to Dr. Freeark, the "bone and belly" teams rotate through the various hospital services with the patient, until the patient is ready for discharge. Fifty percent of the trauma patients are victims of industrial accidents. Head injuries, torn aortas, and other injuries requiring CT scans are sent to separate facilities. Rehabilitation is stressed at trauma hospitals, where regular gym classes are scheduled for patients during rehabilitation and an Olympic-sized pool is available for special treatment and therapy.

Hungary was Dr. Freeark's only venture behind the Iron Curtain, and there he found meager hospital facilities with open wards, high ceilings, and unkempt surroundings. The center for trauma care in this country of 2 million is Budapest, where four hospitals rotate the responsibility of treating trauma cases each day. The on-call hospital gets anyone from anywhere in the country who has been in an accident. Health care in Hungary is localized and centralized, with a local director at the head of each region. If any segment is not up to snuff, the responsible party is sent into military service as a lesson.

In India, Dr. Freeark found more people and thus more problems, the greatest of which were railroad and subway accidents. Since most of the traumas occur while Indians are riding on the roofs or hanging out of the windows of mass transit, Dr. Freeark humorously suggested that perhaps additional cars and not additional trauma beds are necessary. Despite the overcrowding and seriously outdated facilities, Dr. Freeark praised the education of physicians at the All India Institute of Trauma, and the excellent care provided.

The need for trauma care in Australia is somewhat diminished by the excellent prevention programs that are mandatory throughout the continent. Car seats and seat belts are mandatory, and noncompliance brings sure and strict fines and apprehension for violators. Compliance with the law is estimated at 95 percent. Drunk driving laws are almost unnecessary since any drinking and driving is considered taboo. A blood alcohol level of only .05 percent is considered high enough for incarceration. Road blocks where breathalyzer tests are administered are ever-present, as is pressure from peer groups not to drive after drinking.

— Rochelle Cohen

## Trauma Registry

(Continued from page 6)

the data from Baltimore County's management reports to wage a local fundraising campaign to purchase another ambulance to better serve its community, says Mr. Smith.

"It is unfortunate that so few of the fire and rescue companies in the rest of the state are using the computer-read runsheets," says Alasdair Conn, MD, medical director of the MIEMSS field programs. "The companies that don't use the new runsheets lock themselves out of the benefits that are being derived from the data in the statistical reports we send out," he adds.

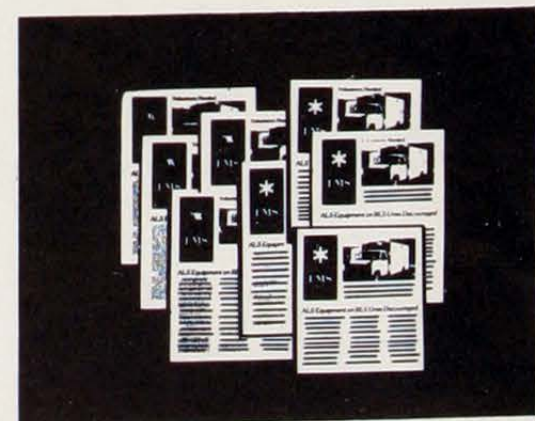
Although the statistical information is useful, and probably will become essential to developmental efforts, there is a definite limit to its value for EMS evaluation, says Mark Moody, PhD, former director of evaluation and analysis for MIEMSS.

The statistical reports produced for prehospital care providers, and the statistical summaries generated for the areawide trauma centers and the Shock Trauma Center merely describe EMS activity, notes Dr. Moody. "To judge the effectiveness of the Maryland EMS system, the data in the MIEMSS Trauma Registry must be analyzed, using various statistical procedures."

The difference between descriptive and analytical statistics is similar to the difference between simply reporting facts in a news story and interpreting the meaning of those facts in an editorial.

An important tool that will be used in the analysis of EMS data will be injury severity scores. How injury severity scores might be used in EMS evaluation will be discussed in the final part of this series.

— Dick Grauel



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22 S. Greene St., Baltimore, MD 21201-1595

Emergency Medical Services Systems  
for  
Maryland Institute  
Published monthly by the



EMTS  
NEWS  
Maryland

# How EMTs Handle Intoxicated Patients

Warning! The way you handle that intoxicated patient may be hazardous to your company.

According to Jeffrey Mitchell, PhD, instructor in the emergency health services program at UMBC, "Immediate warning signals should flash in the EMT's mind when approaching the intoxicated victim, who is often less capable of feeling or verbalizing pains and symptoms than other victims.

"The decreased ability to reason and respond means that the EMT on the scene must think and anticipate for alcoholics and other substance abusers," he continued. "Because of the abuser's odor and general condition, responding personnel may want to do less, but need to ignore personal judgments and do even more."

Dr. Mitchell, who often conducts crisis intervention courses for EMTs and other emergency personnel, cited an example from *Law and Emergency Care* by James George to exemplify the legal implications of mishandling substance abusers. Although the case was settled years ago and is not binding on future cases, it illustrates Dr. Mitchell's concerns.

In Pollack Pines, California, 32-year-old bartender Joseph Anthony Rosa was drinking with fellow partyers at the bar where he worked. Festivities moved out to the poolside, and the intoxicated Mr. Rosa dove into the water, striking his head.

Bar patrons quickly lifted him out and laid him down on the side, possibly rolling him over in the process. The nearby Foothills Ambulance Company was summoned to the scene, where crew members were met by a rowdy crowd and a conscious and allegedly belligerent Mr. Rosa, who refused all treatment.

After learning from a bystander that the victim was borderline diabetic, EMTs remained on the scene to perform a more complete history and physical examination. Finding no sign of spinal injury, they lifted him to an upright position in a chair, assisted him onto a stretcher, and lifted him into the ambulance. Within 10 minutes, Mr. Rosa's legs were numb, he suffered from excruciating neck pain, and developed diaphragmatic breathing.

His injury to the neck and the resulting partial quadriplegia led to a \$1.5 million lawsuit by Mr. Rosa against the Foot-

hills company, claiming their failure to suspect spinal injury resulted in additional disability. Foothills' attorneys countered that the injuries would have produced quadriplegia anyway.

In their decision, the jury awarded Mr. Rosa \$500,000 of his initial demand. The lack of an ambulance runsheet documenting the results of the physical made the attendants' claims of having examined Mr. Rosa for spinal injury unbelievable. The jury stated Mr. Rosa's intoxication and refusal of care was an unacceptable defense for the attendants. The plaintiff also claimed, and was granted, that the attendants should have suspected spinal injury, and their failure to act caused further damage.

In reviewing the case, Dr. Mitchell stressed that spinal cord injury is the greatest legal threat to field personnel. "The judge in this case decided an intoxicated victim actually needs greater than usual care, which sets up considerable pressure on the EMT. The bottom line for field personnel is this: with the substance abuser, always react with even greater caution, not less." — Rochelle Cohen