

THE CIREN EXPERIENCE

Jeffrey S. Augenstein

University of Miami School of Medicine, William Lehman Injury Research Center

Kennerly Digges

George Washington University

Gail Cooper

San Diego Department of Health Services

David B. Hoyt

University of California

Brent Eastman

Scripps Memorial Hospital Trauma Services

Andrew Burgess, Pat Dischinger

R. Adams Cowley Shock Trauma Center

Jerry Scally

Volpe National Transportation System Center

Stewart Wang, Lawrence Schnider

University of Michigan

John Siegel, George Loo

UMDNJ, New Jersey Medical School

David Grossman, Fred Rivara

Harborview Injury Prevention and Research Center

Martin Eichelberger, Cathy Gotschall

Children's National Medical Center

Lou Lombardo, Lou Brown, R. Eppinger

National Highway Traffic Safety Administration

United States

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ABSTRACT

The Crash Injury Research and Engineering Network, or CIREN links seven trauma centers from around the country together with engineers to study the cause, kinematics, and results of real world crashes. Each trauma center has a multidisciplinary team of physicians, medical researchers, safety engineers, crash reconstructionist, public safety professions, and others who review the crash and the patients. The network includes trauma centers in San Diego, Seattle, Newark, Baltimore, Miami, Washington and Ann Arbor. General Motors funds three of these centers. A high-speed computer network will soon link the seven centers. This state of the art teleconferencing system will allow on-line multidisciplinary analyses of crashes to be performed by personnel from the trauma centers, manufacturers and government agencies.

The first national conference was held last October in Ann Arbor. This research will hopefully aid the auto industry to continuously design safer cars. It is already helping the medical community, doctors and Emergency Medical Services personnel, to develop new diagnostic and treatment tools.

INTRODUCTION

The National Highway Traffic Safety Administration's (NHTSA) Crash Injury Research and Engineering Network is designed to help save lives and prevent harm from automobile crashes.

The Network is known by its CIREN acronym, pronounced "siren". This effort focuses on improvements in prevention, treatment and rehabilitation to reduce deaths, disabilities and human and economic costs through medical and engineering research.

APPROACH TO RESEARCH

This multicenter research program involves the collaboration of clinicians and engineers in academia, industry and government. CIREN presently links seven trauma centers from around the country with engineers to study the cause, kinematics and effects of real world crashes. Each trauma center has a multidisciplinary team of physicians, medical researchers, safety engineers, crash reconstructionists, public safety professionals and others who perform in-depth studies of car crashes, injuries and treatments to improve processes and results. Trauma centers in San Diego, Seattle, Newark, Baltimore, Miami, Washington and Ann Arbor comprise CIREN. A high-speed computer network will shortly link the seven centers. This state of the art electronic rounds system will allow on-line multidisciplinary analyses of crashes to be performed by personnel from participating locations.

This research will hopefully aid the auto industry to continuously design safer cars. It is already helping the medical community, doctors and Emergency Medical Services personnel, to develop new diagnostic and treatment tools. A recent case from Miami

demonstrates the potential for improving the survival from crashes.

THE IMPORTANCE OF CIREN

A few months ago, the head nurse in the Ryder Trauma Center Resuscitation Unit received a call from a police officer stating he was working a crash and was concerned that the driver, a nurse, might have a liver injury. The officer stated that the nurse said she was unharmed and wanted to have a taxi take her to her place of work. (She did not meet any of Florida's objective trauma criteria such as systolic blood pressure below 90 mm Hg, which mandate transport to a trauma center). The policeman was requesting that the Fire Rescue team on scene in coordination with air rescue transport her to the trauma center based on the subjective criterion of high index of suspicion of injury. He pointed out that although she was not obviously injured, the crash pattern, particularly the fact that she was only wearing her automatic shoulder belt, was identical to crashes that cause severe liver injuries and the victims initially appear fine. Additionally, he stated he had learned of this injury pattern in lectures provided to the Miami-Dade Police Department by the William Lehman Injury Research Center. A Miami-Dade Rescue and Fire Team attended to the victim at the scene and she was airlifted to the Ryder Trauma Center.

The police officer was right. Within minutes of arrival the patient was in the operating room. She had a very severe liver injury. It was the worst case scenario of the shoulder belt-liver injuries that the Lehman Center had described in the literature. The back of her liver and the veins that connect the liver to the vena cava, the largest vein in the body, were ripped from the vena cava. Traditional surgical techniques did not offer a solution for this catastrophic problem. The chief of Liver Transplant Surgery came to the Trauma Center operating room. Largely due to the innovative application of transplant techniques to a trauma situation, a definitive repair was achieved. The patient did quite well and was discharged home a few days later. The police officer at the crash scene applied newly learned knowledge about injury patterns to a real life situation. He saved the life of this crash victim. Had she not been rapidly transported to a trauma center with its wealth of clinical expertise, she would not have survived.

THE CIREN PROGRAM

The CIREN program is coordinated with the NHTSA, National Automotive Sampling System (NASS) in many ways, yet CIREN provides some details of injury causation not found in the larger program's data. NASS investigators use handheld pen-computers to collect data. The NASS information about the crash and the injuries that it produced is entered into a nationwide information network. Some 24 sectors included in the system are expected to collect data on approximately 5,000 crashes

annually. The NASS cases are typically investigated some time, days or weeks, after the crash. Reviewing medical records, which are at times incomplete, makes injury determination quite difficult. It is not uncommon for caregivers to describe only the severe injuries in the record. Bumps and bruises, which may be highly informative for locating body positions during the crash, are often not described in the medical record.

CIREN will compliment NASS by zeroing in on approximately 350 nationwide crashes to produce highly detailed injury and damage profiles. The CIREN centers can provide very high quality data on the crash and the injuries because experts in clinical care and injury research can very precisely describe and photographically document all injuries while caring for the patient. Each of the centers is developing techniques that build high quality data collection into the already demanding task of providing often life-saving care. Some of the centers have developed computerized documentation systems that facilitate the description/documentation process. Additionally, the CIREN researchers can be on the scene and evaluate the cars typically within hours of the crash while the data are fresh. Most centers have developed arrangements with local police agencies that inform and often enable CIREN investigators to be on the crash scene with the police investigators. The CIREN program will study key traffic safety issues, such as air bags and new side-impact standards.

The CIREN centers will utilize an information system that is derived from the presently operational NASS system. The CIREN information system will link the seven trauma centers to each other, as well as other participating locations. The information system will make two important contributions to automobile crash research. First, it will facilitate teleconferencing among the participants in the trauma centers and experts in industry and government. This multimedia information system will allow conference participants to each review pertinent data including photographs, video and x-rays. The most qualified experts will be able to provide their input to analyses at the earliest stage. The highest quality interpretations of crashes should emanate from the CIREN program.

Second, the data and analyses will be available to qualified researchers in the shortest time through the online database; similar to what NASS provides.

FUNDING

General Motors (GM) has provided funding for the CIREN effort under a settlement agreement between GM and the US DOT. With these funds GM is supporting the University of Washington, University of Michigan and San Diego County; each for four years. (The other centers are funded by NHTSA). Each of the seven

centers has a long history of excellence in a specific research area.

- Children's National Medical Center, Washington, DC – Pediatric injuries.
- R. Adams Cowley Shock Trauma Center, National Study Center for Trauma and EMS, Baltimore, Maryland – Orthopedic injuries, specifically lower extremity.
- New Jersey Medical School, New Jersey – Brain injury, Roll of direction of crash and compartment intrusion on organ injury.
- William Lehman Injury Research Center, University of Miami School of Medicine, – Mechanism and patterns of injury.
- University of Michigan Medical Center, Ann Arbor, Michigan – Long history of crash research through the University of Michigan Transportation Research Institute and burn injury.
- County of San Diego, Department of Health Services, San Diego, California – Unique advantage of most advanced EMS system in the country for trauma.
- Harborview Injury Prevention and Research Center, Seattle, Washington – Neck and pediatric injury, long term focus on injury control.

Additionally, General Motors has funded the initial one-year CIREN information network implementation effort. All seven centers are served through the information system funding.

CIREN builds on the work done by NHTSA funded trauma centers more than a decade ago. This program does not just increase the number of cases that can be studied in depth. It brings a new dimension of multidisciplinary expertise to the very complex problem of crash and injury causation analysis. Automobile designers and government regulators will benefit by augmenting their understanding of crash performance from not only dummy responses, but also through real world crashes involving people. The medical and emergency responder communities will benefit from ongoing injury research and the discovery of injury patterns. The CIREN program will be a driving force for education of care providers in a rapidly changing world of automobile safety technology. Continued improvement of diagnostic and therapeutic approaches to automobile injury will save lives and reduce morbidity from what has been called America's neglected disease, injury.