



Engineering
Prevention



Medical
Treatment

Inova Fairfax Hospital CIREN Center

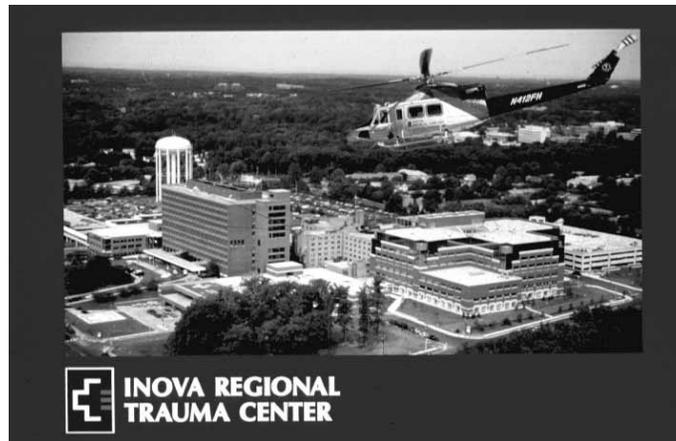
CIREN Program Report

About the Inova Regional Trauma Center

The Inova Regional Trauma Center (IRTC) is one of the busiest trauma centers in the Washington, DC, metropolitan area. In 2001 the trauma center treated more than 2,600 severely injured patients with the majority of patients injured in motor vehicle crashes (61 percent), which represents a significant increase (12 percent) from the previous year. The IRTC is committed to decreasing trauma-related death and disability through education, outreach, prevention, and research to improve the quality of life for everyone in the community. Sixty-nine percent of the patients treated at the IRTC are from Fairfax County, which is an affluent community with a high percentage of new vehicles in the population resulting in a higher probability of encountering new vehicle safety technology.

This report is for the period of time primarily funded by Ford Motor Company until September 2002. Subsequently, Ford funding was replaced by American Honda Motor Company.

The CIREN Center at the IRTC has the unique opportunity to capture crash events and information because of our long standing integration with the Fairfax County Fire and Rescue Department and the on-scene real-time availability of the Fairfax County Police Accident Reconstruction Unit for most of our cases. The Fairfax County Fire and Rescue Department provide all-professional staffing for vehicle crash victims backed up by the Inova Fairfax Hospital Helicopter service (Inova Medical AirCare). The Fairfax County Fire and Rescue Department have an average response time to crashes of 4–6 minutes. The helicopters are less than 10 minutes from any point in the county. The Fairfax County Police Department has a specialized Accident Reconstruction Unit (ARU) available on call 24 hours per day, 7 days a week in response to fatal and other severe crashes (including potential CIREN cases). This provides real time, accurate reconstruction of crashes and more reliable data.



What is New at the Inova Regional Trauma Center

In May 2001 the Inova Regional Trauma Center joined forces with trauma centers across the state and the Medical Society of Virginia to hold the first annual Blue Ribbon Campaign, Trauma Awareness Month. Staff from the trauma center and the Ford Inova Fairfax Hospital CIREN Center checked motorists driving into the parking areas on the Inova Fairfax Hospital campus for seat belt usage and gave them a blue ribbon if they were buckled up. Unbelted drivers received educational brochures regarding the dangers of unbelted driving.

In August 2001, the Inova Regional Trauma Center hosted two groups of Northern

Virginia legislators for the presentation “Trauma in your Community: The Reality”. The goals of the of these presentations were: to increase awareness of Northern Virginia’s highway injury problems; provide an overview of the variety of ways the trauma center is working to address these problems; present injury prevention and safety measures for consideration; and highlight the resources available when trauma/injury issues arise.

In 2001, the Inova Regional Trauma Center received a grant for \$87,200 from the Centers for Disease Control to support and facilitate the recovery of trauma patients and caregivers from the effect of trauma.

As part of the continued research on aggressive driving in the Washington, DC, metropolitan area: presented “Results of Research on Aggressive Driving Behavior” at the Second Annual Symposium on Aggressive Driving, “Strategies and Solutions for Aggressive Driving, held at the University of Maryland; received a \$120,000 grant from the motor vehicle administration of Maryland, Virginia and the District of Columbia to support this research for the coming year; support a joint effort with the Washington Redskins to survey fans at local games regarding aggressive driving behaviors

and the Smooth Operator Program.

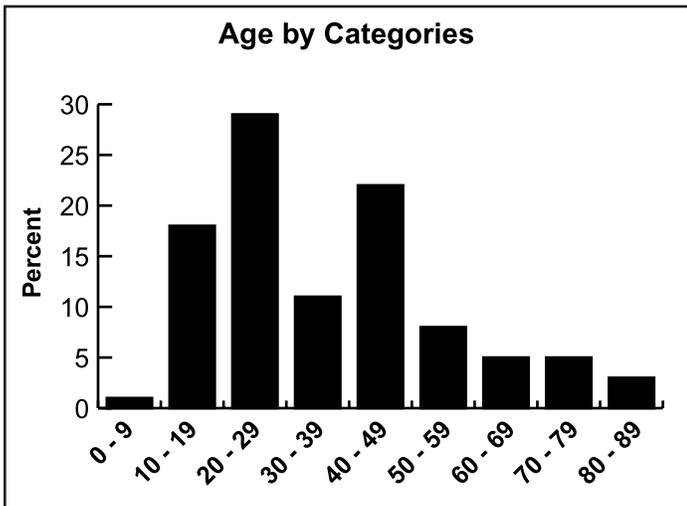
In 2001, REBUILD, a support group for victims of trauma, expanded its services to address the special needs of traumatic brain injury (TBI) and spinal cord injury (SCI) victims and their families.

James D. Bean has joined the Ford Inova Fairfax Hospital CIREN Center, as a crash reconstructionist. Mr. Bean has retired after 26 years as a police officer and has 17 years experience in crash reconstruction for the Fairfax County Police Department.

Ford Inova Fairfax Hospital CIREN Center Statistics

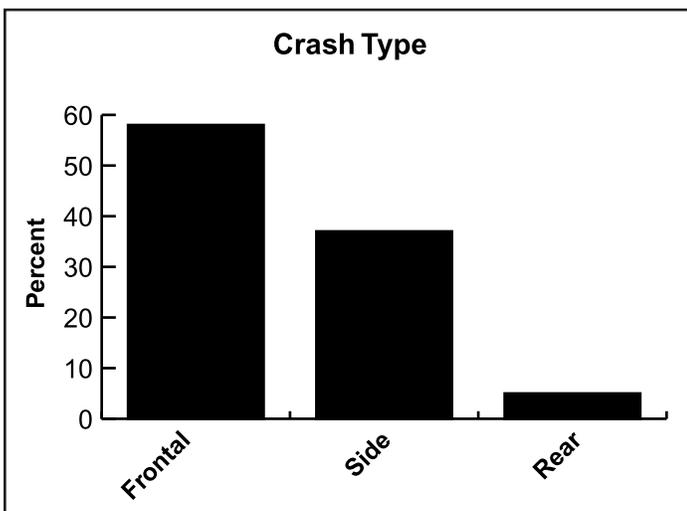
Since joining the CIREN network in May 2000, the Ford Inova Fairfax Hospital CIREN Center has enrolled eighty-eight (88) subjects into this study.

Age Distribution



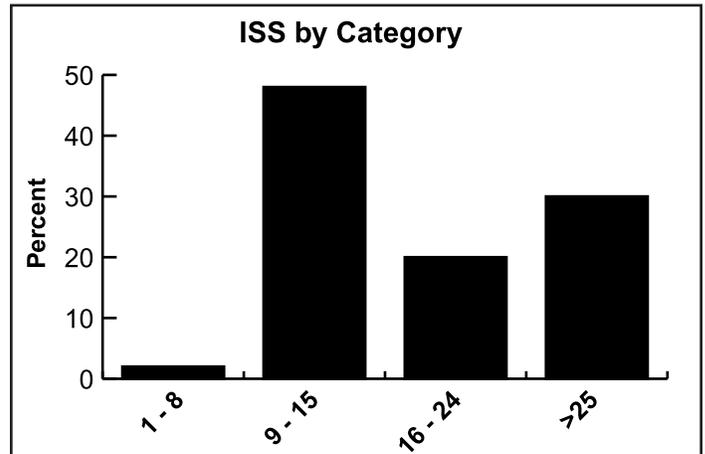
Crash Types

55% cases in frontal crash; 39% cases in side crash; 6% cases in rear crash



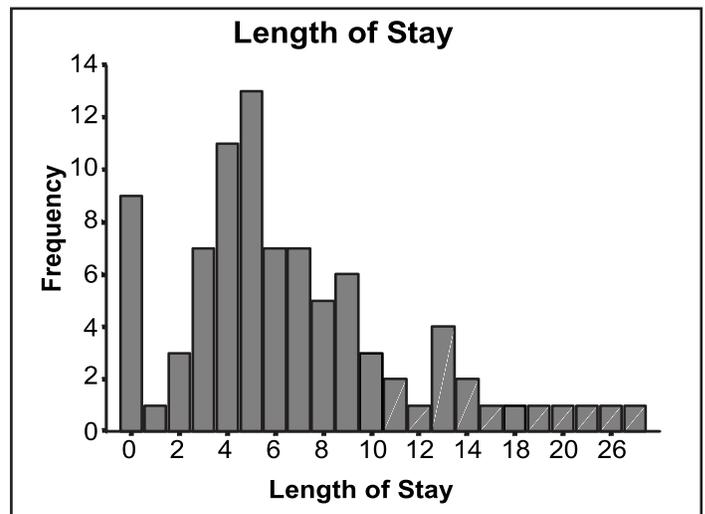
Injury Severity Scores (ISS)

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|-----------|-----|----------|-----|
| ISS 1-8 | 3% | ISS 9-15 | 45% |
| ISS 16-24 | 21% | ISS > 25 | 31% |

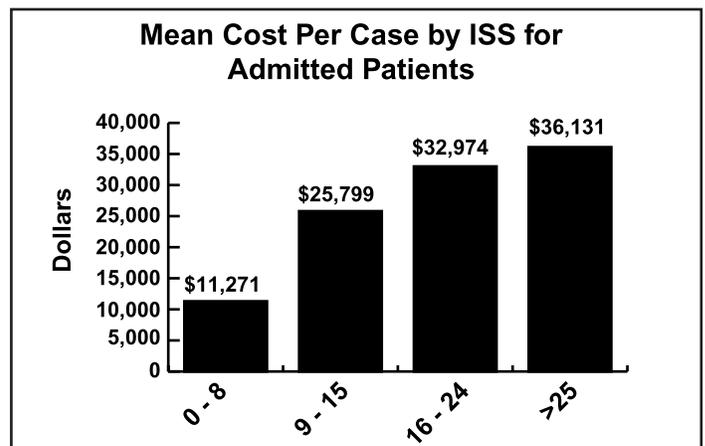


Crosstabulation analysis determined that 50% of frontal crash ISS scores were 16 or greater and 44% of side crash ISS scores were > 25.

Average length of hospital stay was 7 days. 10% of patients were fatalities accounting for 0 hospital days.



Mean Cost Per Case by ISS for admitted patients



Testimonial

“Since the beginning of the involvement of the Fairfax County Police Department’s Accident Reconstruction Section with the Crash Injury Research and Engineering Network (CIREN) Program, we have noticed a change in our investigations. The Accident Reconstruction Section has the responsibility of investigating all fatal and life threatening motor vehicle crashes.

During the investigation of the crashes, a determination is made as to occupant positioning within vehicles. Our involvement with CIREN has improved our evidence gathering, occupant kinematics and documentation of the vehicle, thusly making a determination as to positioning.

The relationship with INOVA Fairfax Hospital that has developed through CIREN participation has been used to provide a flow of information. This information is used to assist the Fairfax County Police Department in its mission to save lives. As this relationship continues, I am sure we will continue to save more lives within the realm of transportation.”

James J. Banachoski, Detective
Fairfax County Police Department
Accident Reconstruction Section

What We Have Learned

Pre-Hospital Providers

Fairfax County Fire and Rescue representatives are invited to all CIREN Case Reviews since only a few can attend at any one time, results from the CIREN Case Reviews are forwarded to the individual stations that transported the study subject to allow them insight into the crash. Based on this information paramedics are now triaging and transporting with more emphasis on side impacts and the differences in injury patterns and severity seen in side impacts.

Trauma Surgery

Through participating in CIREN Case Reviews, trauma surgeons have learned to more completely understand mechanisms of injury, which has led them to consider the seriousness of side impacts vs frontal impacts. Trauma surgeons are now paying more attention to the pre-hospital providers reporting on mechanism of injury, pictures taken at the scene and appreciate the relationship of crash description to the patient’s risk of injury. Residents and medical students are educated in considering mechanism of injury when evaluating a motor vehicle crash victim.

CIREN information has led to tying the seriousness of side impact into the Aggressive Driving Study that is funded by the Department of Motor Vehicles of the States of Virginia, Maryland and the District of Columbia. Traffic signal violation statistics have found disturbing evidence that the dis-

regard for traffic signals and stop signs have reached dangerous highs (Aggressive Driving: A Preliminary Analysis of a Serious Threat to Motorists in a Large Metropolitan Area, Journal of Trauma, 2001, Volume 52). The knowledge gained from CIREN will help educate the public on the danger of side impact crashes and is planning to be a part of the public education campaign. The Ford Inova Fairfax Hospital CIREN Center has also utilized CIREN data to educate student drivers that participate in the Reality Check Program on the dangers of driving under the influence of drugs and/or alcohol as well as distractions by other vehicle occupants and other sources. In the future, Reality Check will also include crash modeling from the University of Virginia to convince young drivers to utilize seatbelts and become more safety conscious.

New Injury Patterns

Being operational for only a short period of time, the Ford Inova Fairfax Hospital CIREN Center has not enrolled a large enough patient base to show any patterns in injury.

Education and Outreach

Over the past two years, the CIREN team has held numerous educational presentations to pre-hospital providers educating approximately 500 pre-hospital providers on advanced occupant protections systems, vehicle dynamics and occupant kinematics. The following is a selection of outreach and educational sessions offered by the Ford Inova Fairfax Hospital CIREN Team.

Anatomy of a Crash

A representative from the Discovery Channel contacted Dorraine D. Watts, PhD, PI, CIREN in March 2002 indicating interest in developing a Discovery Channel documentary on the “Anatomy of a Crash”. A CIREN study participant agreed to have her crash highlighted in this educational TV program. The Discovery crew filmed the scene, the vehicle inspection, which included an interview with Detective James Banachoski, Fairfax County Police Department, as well as interviews with Dr. Dorraine D. Watts and the patient. The show aired in September and October 2002.

Trauma Externship Program

The Trauma Externship is a bi-annual intensive three-week program that offers preprofessional students interested in a career in the trauma care a comprehensive introduction to the world of trauma. As part of the curriculum, the students receive a lecture on CIREN. The following is a testimonial from one of the students that attended the program in July 2002.

“My name is Heather McGraw, and I am a 24-year-old nursing student who recently participated in the trauma externship program at Inova Fairfax Hospital. One of my favorite parts of the externship was learning

about CIREN. I had never heard of anything quite like CIREN before, and I was absolutely fascinated by it. After having spent a great deal of time this summer observing the devastating effects of motor vehicle crashes – not just the victims themselves, but also on families, friends and even on the community as a whole – I am more convinced than ever that injury prevention needs to be a major focus in our society. That is why I think the CIREN program is so tremendously important. By collecting data from real-life crashes and integrating it with the expert knowledge of professionals from multiple disciplines, CIREN produces a unique, highly-detailed body of research which can help automotive engineers design safer cars. I think CIREN is cool, and I am hoping to get involved with it personally once I graduate.”

Heather McGraw

Trauma Extern Participant

EMS Night

Trauma Services and Inova AirCare sponsors a bi-annual EMS Night at the hospital. This provides an opportunity for pre-hospital personnel to attend an educational session and participate in related discussion. Invitations are sent to all Fire and Rescue stations, EMS agencies, and emergency departments in Inova Regional Trauma Center's catchment area. In an effort to educate pre-hospital providers in outlying areas the Ford Inova Fairfax Hospital CIREN Center presented **“Advanced Occupant Protection Systems, Vehicle Dynamics and occupant Kinematics: Implications for Pre-hospital Providers”** at the **May 2002 EMS Night. Approximately 100 pre-hospital providers attended the program.**

EMS Week

As part of EMS week that took place June 3-8, 2002, the Ford Inova Fairfax Hospital CIREN Center sponsored an advanced course on vehicle extrication considerations for cars equipped with Advanced Occupant Protection Systems for the Fairfax County Fire and Rescue Department. The course covered rescuer and patient issues as well as new equipment available. Dorraine Watts, PhD, PI, CIREN also spoke on “Vehicle Dynamics and Occupant Kinematics: Reconstructing the Crash”.

Other Education

June 28, 2002 – International Pre-Hospital Education Course for Firefighter and Paramedics, Plymouth, Massachusetts – “Vehicle Dynamics and Occupant Kinematics: Predicting Patient Injury”, presented by Dorraine D. Watts, PhD

May 13, 2002 – EMS Case Review – “Case Studies of 2 Frontal and 2 Side Impact Crashes and their Associated Injuries”, presented by Christopher Michetti, M.D. and James D. Bean, Accident Reconstructionist

April 25, 2002 – Quarterly CIREN Meeting – Washington, D.C. – “Unbelted Occupant Kinematics and Head Injury in Frontal Crashes”, presented by Detective James D. Bean and Christopher Sherwood, UVA

January 22, 2002 – Fairfax County Fire and Rescue – Alexandria “A Case Review in Rear and Frontal Impact” presented by Kevin Dwyer, M.D., Associate Chief, Trauma Services

October 8, 2001 – The Association of Operating Room Nurses (AORN) Meeting – Inova Fairfax Hospital – VA “Motor Vehicles Crash Injuries: Implications for Clinical Practice” presented by Dorraine Watts, PhD, RN, Trauma Research Manager

October 2001 – American College of Emergency Physicians Meeting – Chicago “Airbags and Eye Injuries”, presented by Dorraine Watts, PhD, RN, Trauma Research Manager and Bill Hauda, MD from the Department of Emergency Medicine. This research was sponsored by Ford Motor Company as part of the CIREN program. The results also are published in *Annals of Emergency Medicine*.

September 6, 2001 – CIREN Quarterly Meeting – Ann Arbor, MI – “Case Studies in SUV Performance in Gross Mismatch Crashes” presented by Samir M. Fakhry, M.D. and Dorraine D. Watts, PhD.

June 21, 2001 – CIREN Quarterly Meeting – Washington, DC – “Fire and Rescue Personnel: Education is a Two-Way Street”, presented by D. Watts, PhD and K. Watts, FXC Fire & Rescue

May 4, 2001 – Fairfax County Fire and Rescue – Merrifield, VA – “Biomechanics of Motor Vehicle Crashes with Shoulder Belt Only Use and Liver Injuries”, presented by D. Watts, PhD

March 16, 2001 – CIREN Quarterly Meeting – Washington, DC – “A Case Study in Offset Frontal Collision”, presented by D. Watts, PhD

Publications

Watts, D., Fakhry, S., Pasquale, M., Kurek, S., Malhotra, A., Fabian, T., & Boulanger, B. (2002). Motor Vehicle Crash (MVC) And Abdominal Seatbelt Mark As Risk Factors For Perforating Small Bowel Injury (SBI): Results From A Large Multi-Institutional Study. *Proceedings of the Eastern Association for the Surgery of Trauma Fifteenth Scientific Assembly*, January 2002, Orlando, FL.

Watts, D., Hauda, W., & Anderson, J. (2001). The Role of Airbags in Eye Injuries: Protective or Injury Producing? *Proceedings of the American College of Emergency Physicians 2001 Research Forum*, October 2001, Chicago, IL.

- Watts, D. (2001). Management of Patients with Neurologic Trauma. S. Smeltzer, & B. Bare (editors), *Medical Surgical Nursing* (10th ed., Vol. (in press) Chapter 58). Philadelphia: Lippincott.
- Rivera, L., Peitzman, A. B., ..., Fakhry, S., & et.al. (2001). Contributions of Age and Gender to Outcomes of Blunt Splenic Injury in Adults: Multicenter Study of the Eastern Association for the Surgery of Trauma. in *Proceedings of the Fourteenth Annual Scientific Assembly of the Eastern Association for the Surgery of Trauma* (p. page 46).
- Peitzman, A. B., Harbrecht, B. G., ..., Fakhry, S., & et.al. (2001). EAST Study of Failure of Observation of Blunt Splenic Injury in Adults. *Journal of Trauma*.
- Hanfling, D., Watts, D., Mayer, T., Trask, A., & Fakhry, S. (2001). Forming the Initial Link: Educating Providers in the Guidelines for Pre-hospital Management of Traumatic Brain Injury. *Proceedings of the American College of Emergency Physicians 2001 Research Forum*, October 2001, Chicago, IL.
- Fakhry, S., & Salaita, K. (2001). Aggressive Driving: Preliminary Analysis of a Serious Threat to Motorists in a Large Metropolitan Area. in *Proceedings of the Fourteenth Annual Scientific Assembly of the Eastern Association for the Surgery of Trauma* (page 122).