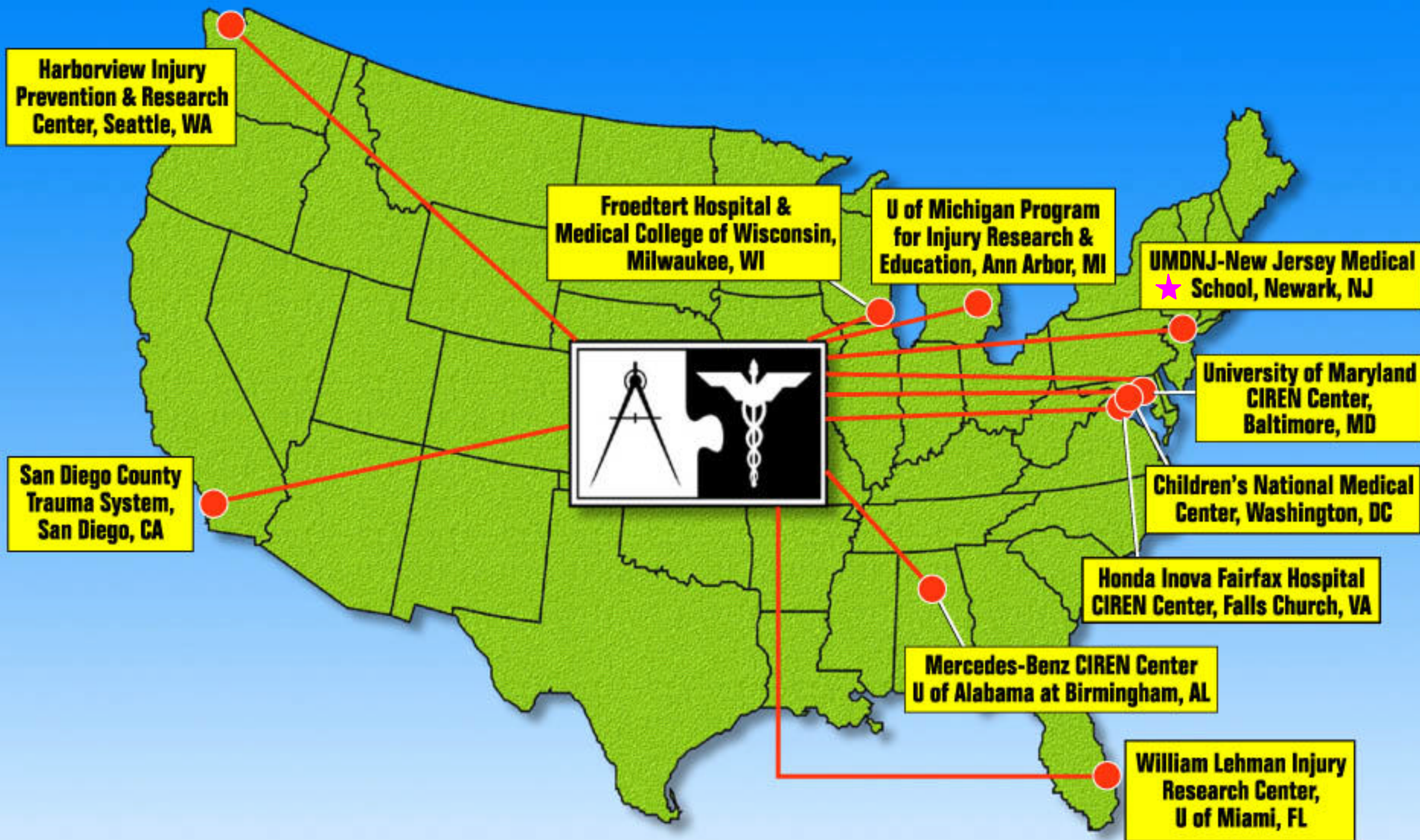


CIREN Network



With Special Thanks To:

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Catherine McCullough and Mark Scarboro of CIREN

Steve Erwin and Sharon Pacyna of San Diego CIREN

and...



The Ten Fine CIREN Centers Nationwide whose data was used in this analysis

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 - Gail Cooper, PhD
- MCW - Froedtert Hospital
 - Thomas Gennarelli, MD



Materials and Methods

Datasets were downloaded from the CIREN Intranet site and a special dataset was requested through Volpe and provided by Brian Powell at NHTSA.

Downloaded datasets were combined by CIRENID where possible.

Data for “all lateral” and “all frontal” crashes were selected by PDOF alone. These data points, unfiltered, were used to create the “all lateral” and “all frontal” graphs and regressions. Every data record that had ENERGY and DELTA V1 available was used to compute Vehicular Impact Dynamics.

This dataset was filtered to remove rear seat passengers and records in which fatality information was missing. This was used to create the graphs for vehicle dynamics by FATALITY.

Separately, seat belt use, airbag deployment, V1 class and V2 class data was transformed and combined with the downloaded dataset. This dataset was filtered to remove children (<14 years) and rear seat passengers. Then data for lateral and frontal crashes were selected by PDOF alone. These data records were further classified by V2 class, restraint use and fatality to generate the sedan v sedan and sedan v SUV graphs by Patient Restraint Use.

Patterns of Injury by Sedan v Sedan compared to Sedan v SUV/MVCs:

Next, the injury database was updated with data on V1 class, V2 class and PDOF. Number of discrete cases represented in the database was determined. AIS codes for injuries of interest were determined and transformed into digital data indicating presence or absence of the injury type. The dataset was filtered to remove occupants less than 16 years of age. The injuries were then tabulated and calculated as a “per case” number.



Case Presentation: Sedan vs SUV FATALITY



Near Side Lateral motor vehicle crash

- V1 = 2000 Mazda 626 (1391 kg)
- V2 = 2000 Honda CRV (1455 kg)
- Delta V1 = 55 kph (34 mph)
- Energy = 163692 joules
- PDOF = 280
- CDC = 09LYAW5
- Max crush = 70 cm at C3
- Rollover - 2 quarter turns



Case Occupant (V1)

- 28 year old male unrestrained driver
- Weight = 83 kg (182 lbs)
- Height = 188 cm (6' 2")
- Airbag deployed





Case Vehicle
2000/Mazda/
626



1299kg (2863)

Vehicle #2
2000/Honda/CRV



1452kg (3201lb)





Lookback from Impact





Frontal Damage to Case Vehicle





Left Side Views of Case Vehicle





Debride Skin Graft

Blunt Trauma

Second Degree Burn

New

Clear

List

Show

Print

File

Amend

Delete

Third Degree Burn

Name Last First Age Weight kg; Sex Race

Gunshot Wound

Height ft; in; Hospital ID Trauma No SS#

Shotgun Wound

INS carrier INS no

Stab Wound

Address City State Zip

Blunt Contusion

Date MM DD YY Time HH MM Day File Date

Superficial Laceration

MVCDR MCVPA PEDEST MCA GSW SHOTGUN STAB ASSAULT FALL INDURY

Deep Laceration

HOME FLAME ELECT. CHEM. BP / HR RR Hgb Hct

Blunt Trauma

wbc PLAT PTT FIO2 PaO2 PaCO2 pHa BE Lact

Mass X CM

EXAM SITE ER OR ICU UNIT HOLDING OPD MORGUE

EXPANDING PULSATILE

PHYSICAL EXAM + X-RAY

FLAIL CHEST

R L STERNUM

PARENCHYMAL LESION

RU RL RM LU LL

LOC

BRIEF MODERATE PROLONGED COMA

TRACHEAL SHIFT

R L SEIZURES

PNEUMOTHORAX

R L Shock

HEMOTHORAX

R L Cardiac Arrest

PENETRATING WOUND

R L SURVIVAL Y N

HEART SOUNDS

+ N - 0 ECG N SVT AF

MEDIASTINUM

++ + N RBB VT MI

ABDOMEN + X-RAY

SOFT FREE AIR FREE FLUID

DISTENDED

++ + N AIR-FLUID LEVELS

BOWEL SOUNDS

++ + N - 0 ABD PAIN

TENDER

RU RL LU LL EPI UMB SP

RIGID

RU RL LU LL EPI UMB SP

REBOUND

RU RL LU LL EPI UMB SP

EMESIS, NG

CLEAR HILE BLOOD

RECTAL

TENDER GUIAC+ BLOOD

DPL

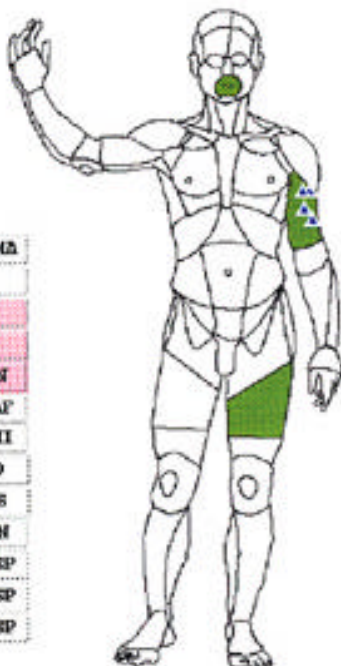
NEG >2K >50K >100K BLOOD wbes

URINE

NEG rbes BLOOD glucose ketones wbes

Intercurrent Disease

R



L

L



R

Time Series

Rx Advisory

Skin/Body

BSM/BSN

Spinal/CNS

Skeletal

Vascular

Visceral

Liver

Retropert

AWG

Dieta

Cu Skin/Body

Cu Viscera

Cu Retropert

History

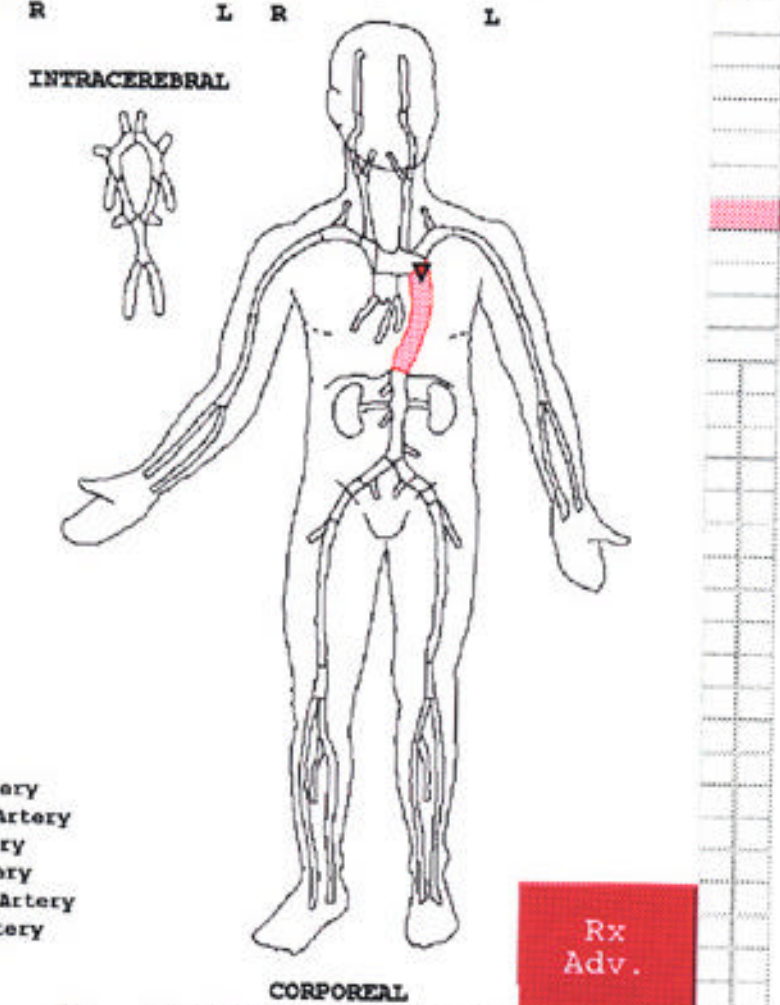
- Gunshot Wound
- ◆ Shotgun Wound
- ▾ Blunt Trauma
- ▾ Laceration
- ⚡ Stab Wound

Procedure

Laceration

New	List	Show	Print	File	Amend	Delete
Name Last	First		Age	Weight	kg; Sex	Race
Height	ft; in;	Hospital ID	Trauma No		SS#	
Date MM	DD	YY	Time HH	MM	Day	File Date

- Injury Grade**
- Severity 1
 - Severity 2
 - Severity 3
 - Severity 4
 - Severity 5
 - Severity 6



- Right Coronary Artery
- Left Anterior Descending Coronary Artery
- Left Circumflex Coronary Artery
- Ascending Aorta
- Aortic Arch
- Innominate Artery
- Descending Thoracic Aorta
- Abdominal Aorta
- Coeliac Artery
- Superior Mesenteric Artery
- Inferior Mesenteric Artery
- Renal Artery
- Superficial Temporal Artery
- Internal Carotid Artery
- External Carotid Artery
- Common Carotid Artery
- Vertebral Artery
- Subclavian Artery
- Axillary Artery
- Brachial Artery
- Radial Artery
- Ulnar Artery
- Common Iliac Artery
- Internal Iliac Artery
- Common Femoral Artery
- Superficial Femoral Artery
- Profunda Femoris Artery
- Popliteal Artery
- Anterior Tibial Artery
- Posterior Tibial Artery
- Peroneal Artery

- R L
- INTRACEREBRAL**
- Anterior Cerebral Artery
 - Anterior Communicating Artery
 - Middle Cerebral Artery
 - Internal Carotid Artery
 - Posterior Communicating Artery
 - Posterior Cerebral Artery
 - Basilar Artery
 - Vertebral Artery

Rx
Adv.

IV Thoracic aorta, descending injury 901.0 4

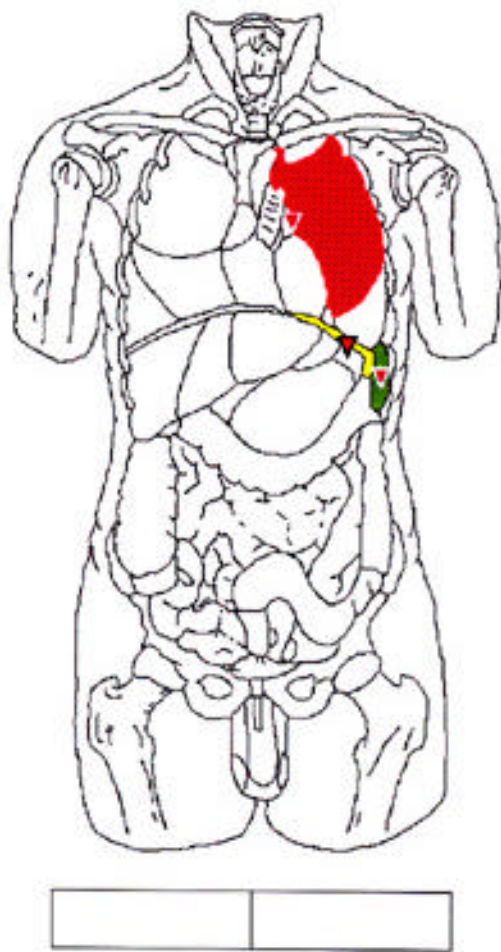
- Gunshot Wound
- Shotgun Wound
- Blunt Trauma
- Laceration
- Stab Wound

Laceration

Name Last _____ First _____ Age _____ Weight _____ kg; Sex _____ Race _____
 Height _____ ft; _____ in; Hospital ID _____ Trauma No _____ SS# _____
 Date MM _____ DD _____ YY _____ Time HH _____ MM _____ Day _____ File Date _____

- Injury Grade**
- Severity 1
 - Severity 2
 - Severity 3
 - Severity 4
 - Severity 5
 - Severity 6

- Complication**
- Systemic
 - Cardiopulmonary
 - Pneumonitis
 - Inflammation
 - Obstruction
 - Infarction
 - Hemorrhage
 - Infection
 - Perforation
 - Abscess
 - Organ Failure
 - Infectious Agents



- | R | L | |
|--------------------------|--------------------------|-------------------------|
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| <input type="checkbox"/> | <input type="checkbox"/> | Larynx |
| <input type="checkbox"/> | <input type="checkbox"/> | Cricothyroid Membrane |
| <input type="checkbox"/> | <input type="checkbox"/> | Thyroid Gland |
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| <input type="checkbox"/> | <input type="checkbox"/> | First Rib |
| <input type="checkbox"/> | <input type="checkbox"/> | Clavicle |
| <input type="checkbox"/> | <input type="checkbox"/> | Apex of Lung |
| <input type="checkbox"/> | <input type="checkbox"/> | Lung, Upper Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Right Lung, Middle Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Lung, Lower Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Superior Vena Cava |
| <input type="checkbox"/> | <input type="checkbox"/> | Atrium |
| <input type="checkbox"/> | <input type="checkbox"/> | Ventricle |
| <input type="checkbox"/> | <input type="checkbox"/> | Ascending Aorta |
| <input type="checkbox"/> | <input type="checkbox"/> | Pulmonary Artery |
| <input type="checkbox"/> | <input type="checkbox"/> | Diaphragm |
| <input type="checkbox"/> | <input type="checkbox"/> | Liver, Right Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Liver, Middle Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Liver, Left Lobe |
| <input type="checkbox"/> | <input type="checkbox"/> | Esophagus |
| <input type="checkbox"/> | <input type="checkbox"/> | Stomach, Antrum |
| <input type="checkbox"/> | <input type="checkbox"/> | Stomach, Body |
| <input type="checkbox"/> | <input type="checkbox"/> | Stomach, Cardia |
| <input type="checkbox"/> | <input type="checkbox"/> | Stomach, Fundus |
| <input type="checkbox"/> | <input type="checkbox"/> | Spleen |
| <input type="checkbox"/> | <input type="checkbox"/> | Gall Bladder |
| <input type="checkbox"/> | <input type="checkbox"/> | Proximal Jejunum |
| <input type="checkbox"/> | <input type="checkbox"/> | Mid Jejunum |
| <input type="checkbox"/> | <input type="checkbox"/> | Distal Ilium |
| <input type="checkbox"/> | <input type="checkbox"/> | Cecum |
| <input type="checkbox"/> | <input type="checkbox"/> | Appendix |
| <input type="checkbox"/> | <input type="checkbox"/> | Ascending Colon |
| <input type="checkbox"/> | <input type="checkbox"/> | Transverse Colon |
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| <input type="checkbox"/> | <input type="checkbox"/> | Rectum |
| <input type="checkbox"/> | <input type="checkbox"/> | Urinary Bladder |
| <input type="checkbox"/> | <input type="checkbox"/> | Urethra |
| <input type="checkbox"/> | <input type="checkbox"/> | Uterus |
| <input type="checkbox"/> | <input type="checkbox"/> | Ovary |
| <input type="checkbox"/> | <input type="checkbox"/> | Penis/Vagina |
| <input type="checkbox"/> | <input type="checkbox"/> | Testis |
| <input type="checkbox"/> | <input type="checkbox"/> | External Genitalia |
| <input type="checkbox"/> | <input type="checkbox"/> | Mound |
| <input type="checkbox"/> | <input type="checkbox"/> | Whole Body |

Time Series

Rx Adv.

Vascular: Milar vessel disruption Pulmonary vein 901.42 4

- Abrasion
- Contusion
- Laceration
- Fracture
- Open Fracture
- Organ Injury
- Brain Injury
- Airbag Injury
- Intrusion

- 2 Door Sedan
- 4 Door Sedan**
- Hatchback
- Station Wagon
- Light Truck
- Other

- Airbag Equipped
- Driver Y N
- Passenger Y N

- Airbag Deployed
- Driver Y N
- Passenger Y N

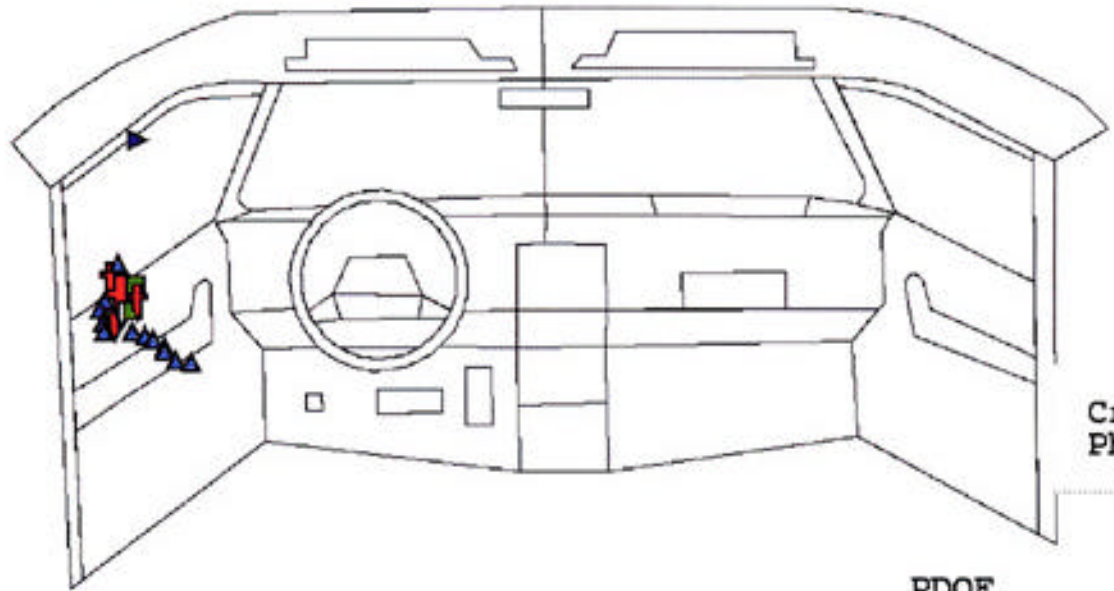
- 1997 Side Impact
- Restrained Y N
- Frontal Crash Y N
- Lateral Crash Y N

- Extrication Y N
- Ejection Y N

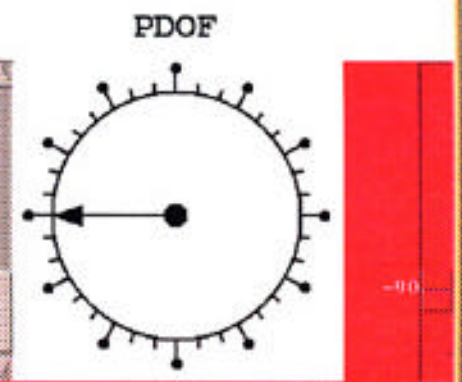
- Compartment Intrusion Y N

Laceration

New	List	Show	Print	File	Amend	Delete
Name Last	First	Age	Weight	kg; Sex	Race	
Height	ft; in;	Hospital ID	Trauma No		SS#	
Date MM	DD	YY	Time HH	MM	Day	File Date
Make	Model	Year	Case			



- Left Rib T8 fx
- Left Rib T9 fx
- Left Rib T10 fx
- Laceration Left Lung, Upper Lobe
- Laceration Left Diaphragm
- Laceration Descending Thoracic Aorta
- Laceration Spleen
- Blunt Contusion Left Upper Arm
- Superficial Laceration Left Upper Arm
- Blunt Contusion Left Upper Thigh
- Simple Closed Fracture Left Pubic Ramus
- Simple Closed Fracture Left Midshaft Femur
- Ligament Disruption Pubis



Exam/Body	Skull/ECG	Spinal/CNS	Skeleton	Vascular	Viscera	Liver
Respiratory	Auto	Billing	Ca Skin/Body	Ca Viscera	Ca Retroperit.	History

Lateral motor vehicle crash vs SUV – Case Occupant (V1) Injury List

INJURY	SOURCE
Transection of aorta, 99%	Door
Bilateral subarachnoid hemorrhage	Unknown
Right mandible fracture	Unknown
Bilateral rib fractures with hemothorax	Unknown
Left parietal pleural rupture	Door
Left pulmonary vein rupture	Door
Laceration of left hemidiaphragm	Door
Spleen laceration, Grade II	Door
Symphysis pubis and superior ramus fx	Armrest
Left femur midshaft fracture	Door
Left upper extremity laceration (minor)	Door
Left thigh contusion	Door

Case Presentation:

Sedan vs Van

SURVIVOR



Near Side Lateral motor vehicle crash

- V1 = 2002 Mercury Grand Marquis (1881 kg)
- V2 = 1990 Ford Club Wagon (2099 kg)
- Delta V1 = 27 kph (17 mph)
- Energy = 73260 joules
- PDOF = 290
- CDC = 10LYEW4
- Max crush = 35 cm



Case Occupant (V1)

- 46 year old male restrained driver
- Weight = 86 kg (190 lbs)
- Height = 180 cm (5' 11")
- Airbag deployed





Frontal Damage to Case Vehicle





Left Side View of Case Vehicle





Interior Views of Frontal Dash





Contact Marks





Door Panel





Deformed Driver's Seat





Seat Belt Pretensioners



Near Side Lateral motor vehicle crash

Sedan vs Van –

Case Occupant (V1) Injury List

INJURY	SOURCE
Large left hemothorax with 5th rib fracture	Left door panel
Liver laceration, Grade I (right lobe)	Seat belt (?)
Left pneumomediastinum, small	Left door panel
Loss of consciousness <1 hour	Door frame
Small punctate lacerations on left forehead	Door frame

- Simple Closed
- Comminuted Closed
- Simple Open
- Comminuted Open
- Segmental Bone Loss
- Soft Tissue Loss
- Nerve Injury
- Fracture Site
- Amputation Site
- Lesion Excision
- Prosthesis

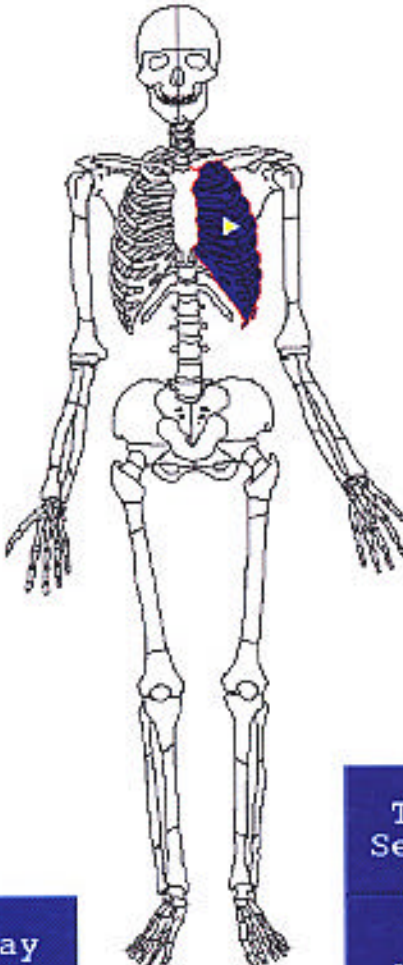
Rib Fx T5 Left

- Sprain/Soft Tissue
 - Shoulder R L
 - Elbow R L
 - Wrist R L
 - Hip R L
 - Knee R L
 - Ankle R L
- Ligament Disruption
 - Shoulder R L
 - Elbow R L
 - Wrist R L
 - Hip R L
 - Knee R L
 - Ankle R L
 - Pubis R L
- Sacroiliac R L
- Dislocation
 - Jaw R L
 - Shoulder R L
 - Elbow R L
 - Wrist R L
 - Hip R L
 - Knee R L
 - Ankle R L
 - Pubis R L
- Sacroiliac R L

Simple Closed

New	List	Show	Print	File	Amend	Delete
Name Last		First		Age	Weight	kg; Sex
Height	ft;	in;	Hospital ID		Trauma No	SS#
Date MM	DD	YY	Time HH	MM	Day	File Date

R
L
R
L



X-Ray Image

Time Series

Rx Adv.

- Cervical Spine
- Thoracic Spine
- Lumbar Spine
- Sternum
- Skull
- Face
- Jaw
- Clavicle
- Scapula
- Ribs**
- Proximal Humerus
- Midshaft Humerus
- Distal Humerus
- Elbow
- Proximal Radius/Ulna
- Midshaft Radius/Ulna
- Distal Radius/Ulna
- Hand
- Sacrum
- Ilium
- Pubic Ramus
- Ischium
- Acetabulum
- Femur Head
- Femur Neck
- Inter Troch. Femur
- Sub Troch. Femur
- Midshaft Femur
- Supra Condylar Femur
- Patella
- Proximal Tibia/Fibia
- Midshaft Tibia/Fibia
- Distal Tibia/Fibia
- Ankle
- Foot

- Gunshot Wound
- Shotgun Wound
- Blunt Trauma
- Laceration
- Stab Wound

Laceration

Name Last First Age Weight kg; Sex Race

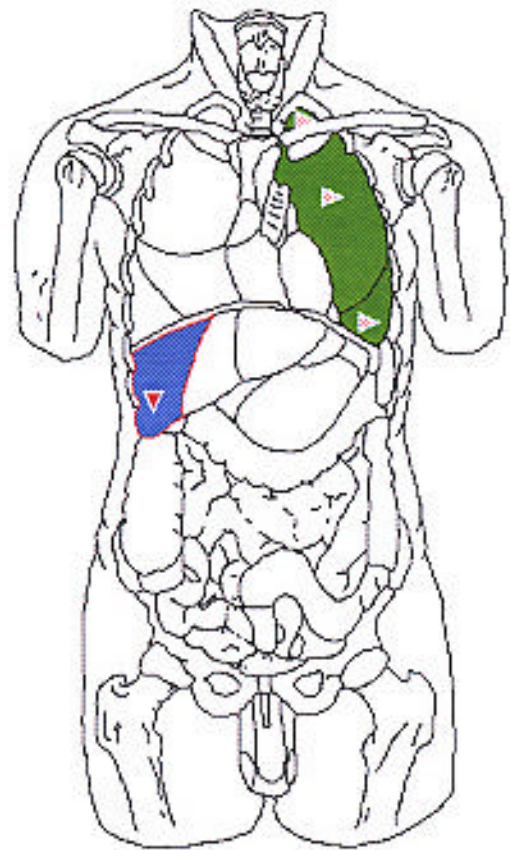
Height ft; in; Hospital ID Trauma No SS#

Date MM DD YY Time HH MM Day File Date

- Injury Grade**
- Severity 1
 - Severity 2
 - Severity 3
 - Severity 4
 - Severity 5
 - Severity 6

- Complication**
- Systemic
 - Cardiopulmonary
 - Pneumonitis
 - Inflammation
 - Obstruction
 - Infarction
 - Hemorrhage
 - Infection
 - Perforation
 - Abscess
 - Organ Failure
 - Infectious Agents

R L



- Thyroid Membrane
- Larynx
- Cricothyroid Membrane
- Thyroid Gland
- Trachea
- First Rib
- Clavicle
- Apex of Lung
- Lung, Upper Lobe
- Right Lung, Middle Lobe
- Lung, Lower Lobe
- Superior Vena Cava
- Atrium
- Ventricle
- Ascending Aorta
- Pulmonary Artery
- Diaphragm
- Liver, Right Lobe**
- Liver, Middle Lobe
- Liver, Left Lobe
- Esophagus
- Stomach, Antrum
- Stomach, Body
- Stomach, Cardia
- Stomach, Fundus
- Spleen
- Gall Bladder
- Proximal Jejunum
- Mid Jejunum
- Distal Ilium
- Cecum
- Appendix
- Ascending Colon
- Transverse Colon
- Descending Colon
- Sigmoid Colon
- Rectum
- Urinary Bladder
- Urethra
- Uterus
- Ovary
- Penis/Vagina
- Testis
- External Genitalia
- Mound
- Whole Body

Time Series

Rx Adv.

I Laceration: Capsular tear, nonbleeding <1 cm parenchymal depth 864.02 2

Organ Injury

- Abrasion
- Contusion
- Laceration
- Fracture
- Open Fracture
- Organ Injury
- Brain Injury
- Airbag Injury
- Intrusion

- 2 Door Sedan
- 4 Door Sedan
- Hatchback
- Station Wagon
- Light Truck
- Other
- Airbag Equipped
 - Driver Y N
 - Passenger Y N
- Airbag Deployed
 - Driver Y N
 - Passenger Y N
- 1997 Side Impact Y N
- Restrained Y N
- Frontal Crash Y N
- Lateral Crash Y N
- Extrication Y N
- Ejection Y N
- Compartment Intrusion Y N

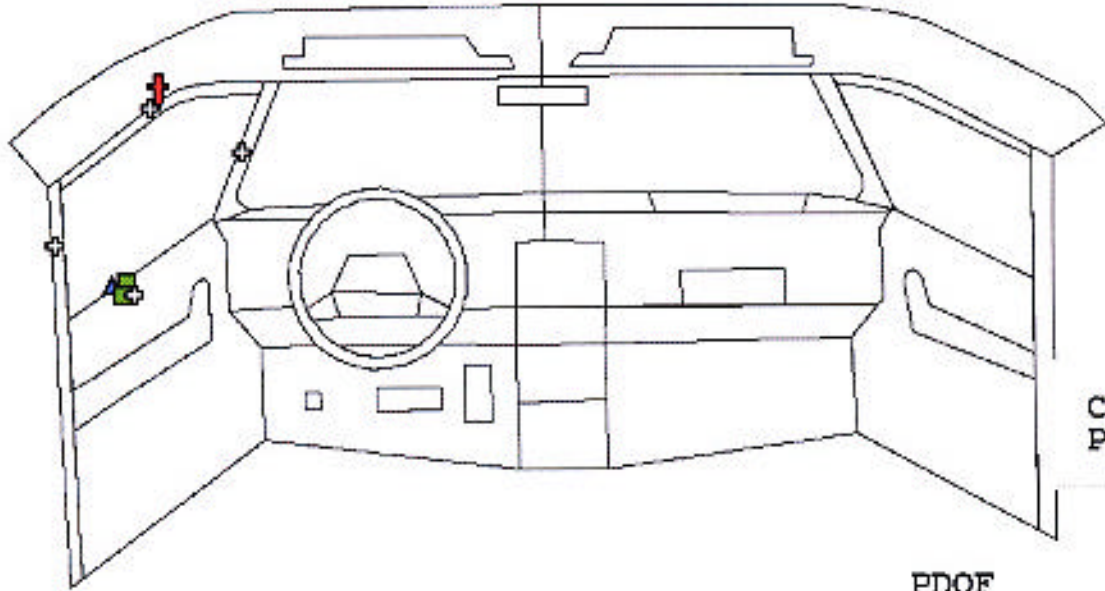
New List Show Print File Amend Delete

Name Last First Age Height Kg: Sex Race

Height ft; in; Hospital ID Trauma No SS#

Date MM DD YY Time HH MM Day File Date

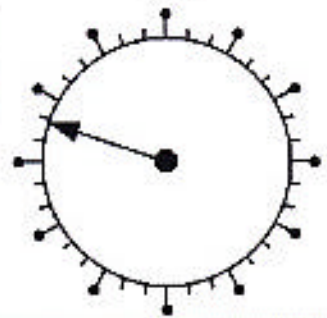
Make Model Year Case



Crash Photo

Systemic Whole Body
 Superficial Laceration Face
 Blunt Trauma Left Anterior Thorax
 Parenchymal Lesion Left Lower
 Simple Closed Fracture Left Ribs
 Fracture Site Left Ribs
 Left Rib T5 fx
 Blunt Trauma Left Apex of Lung
 Blunt Trauma Left Lung, Upper Lobe
 Blunt Trauma Left Lung, Lower Lobe
 Tender Right Upper
 Abdominal Pain
 Laceration Liver, Right Lobe

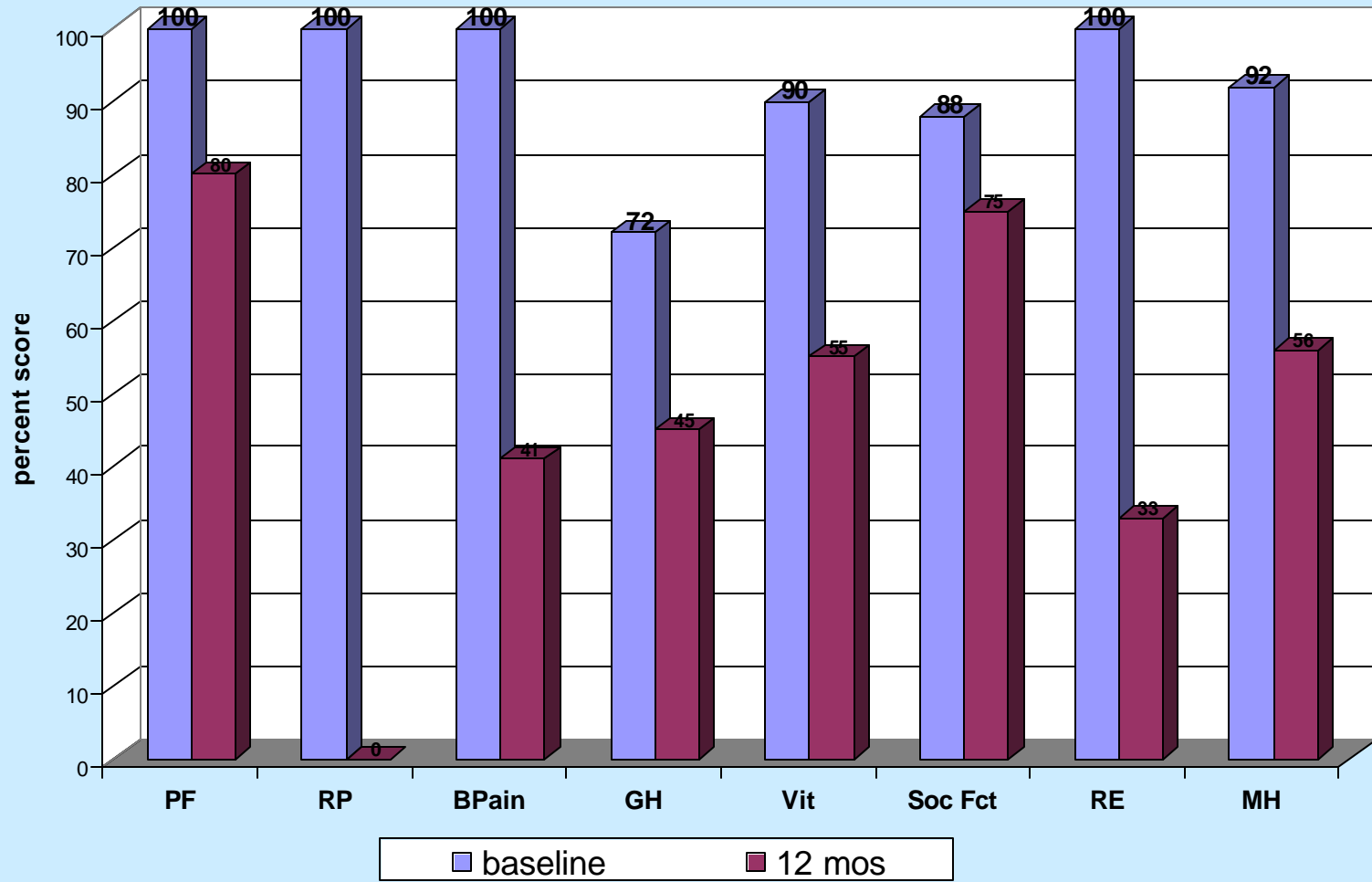
PDOF



Clear Relations Clear Selections Show Result

SKIN/body	Crani/SCS	Spinal/CNS	Skeleton	Vascular	Viscera	Liver
Retropert	Auto	Ullias	Cu Skin/body	Ca Viscera	Ca Retropert	History

SF-36 at Baseline and 12 Months



Case Presentation: Sedan vs SUV SURVIVOR



Far Side Lateral motor vehicle crash

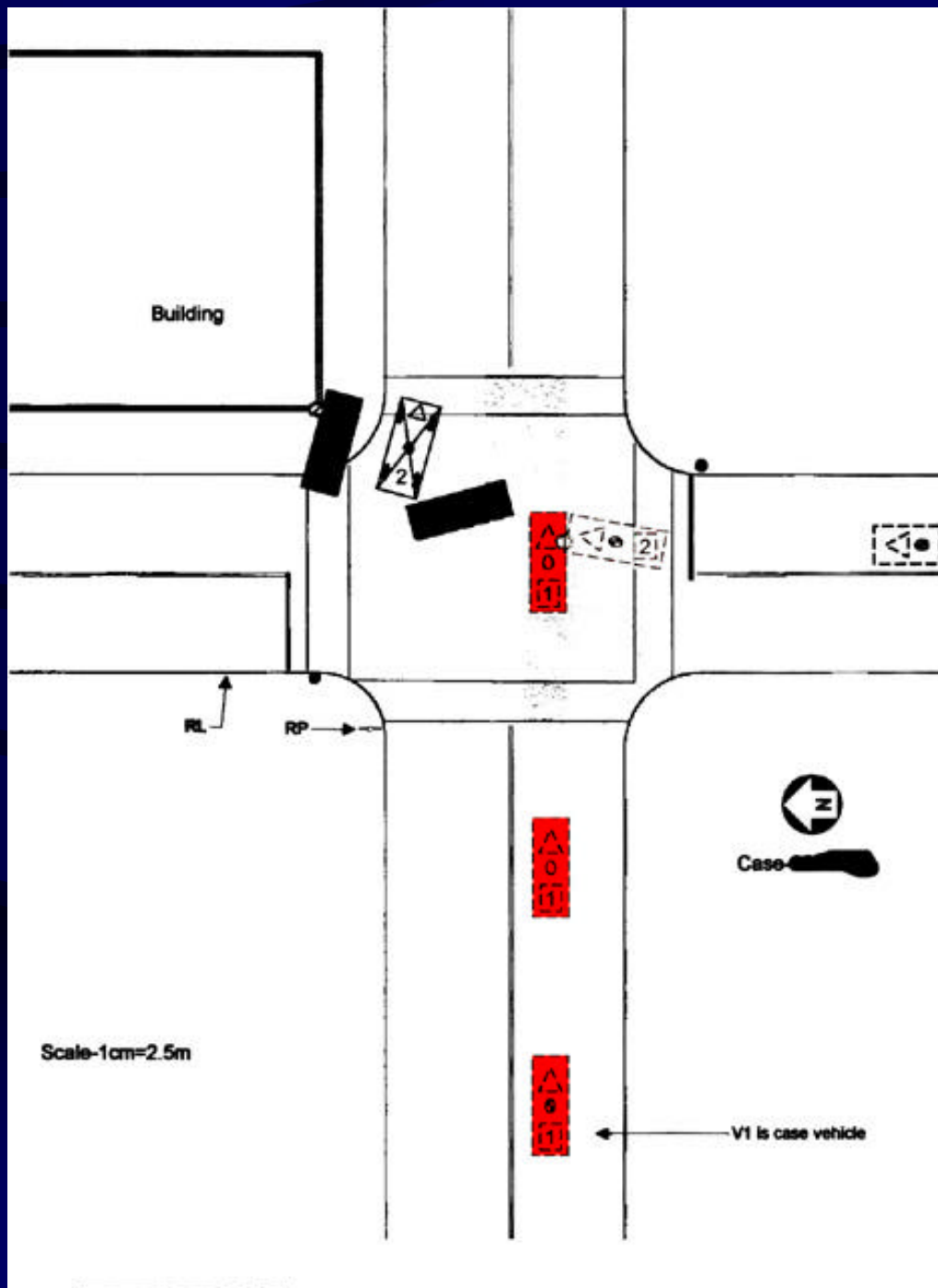
- V1 = 1994 Cadillac Seville (1709 kg)
- V2 = 2000 Ford Expedition (2317 kg)
- Delta V1 = 36 kph (22.5 mph)
- Energy = 125220 joules
- PDOF = 114
- CDC = 04RYAW4
- Max crush = 52 cm at C4



Case Occupant (V1)

- 55 year old male restrained driver
- Weight = 95 kg (210 lbs)
- Height = 165 cm (5' 5")
- Airbag deployed



















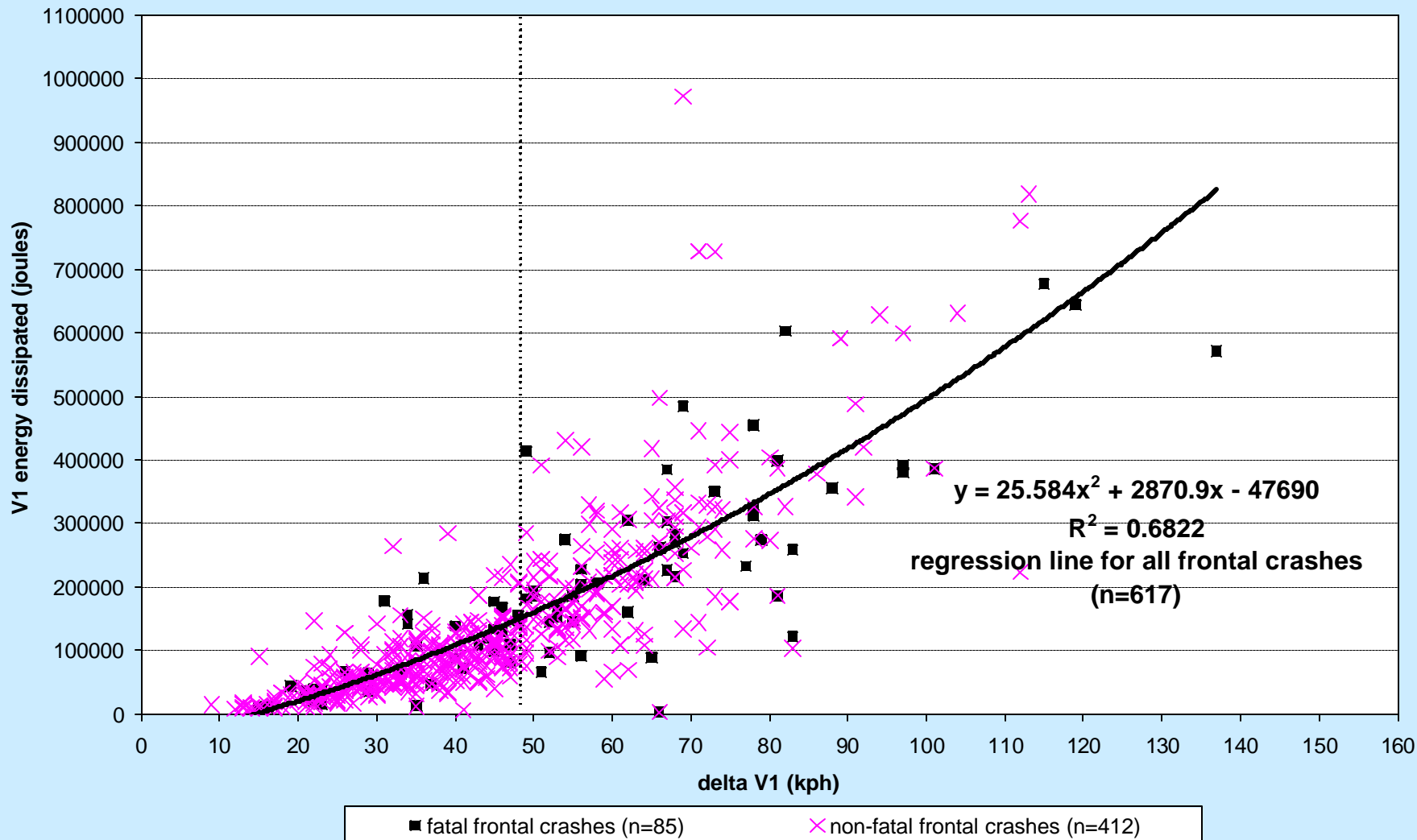




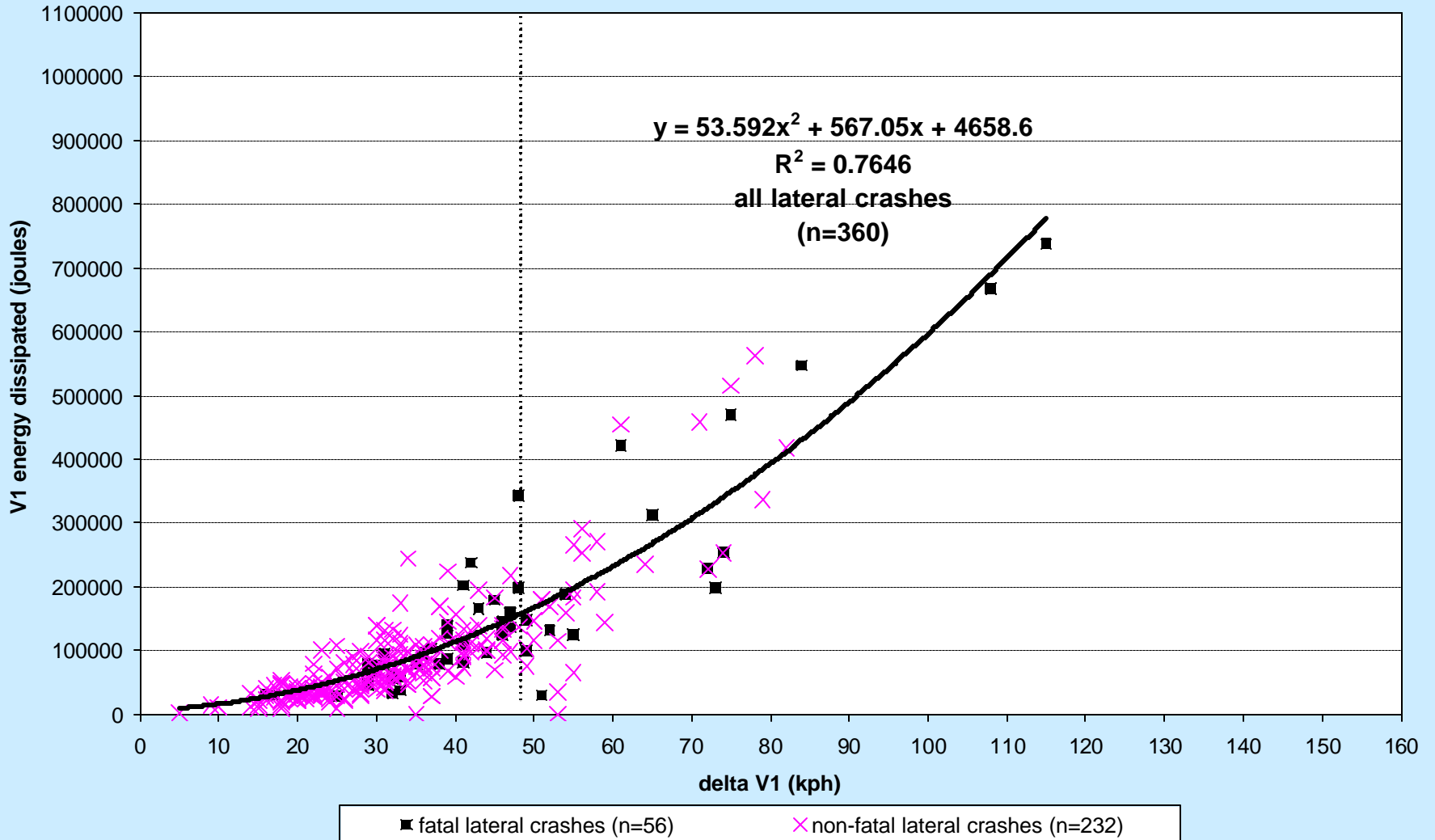
Far Side Lateral motor vehicle crash Sedan vs SUV – Case Occupant (V1) Injury List

INJURY	SOURCE
Right multiple posterior rib fractures	Seat arm rest
Right pulmonary contusion	Seat arm rest
Right subcutaneous emphysema	Seat arm rest
Right kidney laceration	Seat arm rest
Liver laceration, Grade I	Seat arm rest
Right temporo-parietal abrasion	Door panel

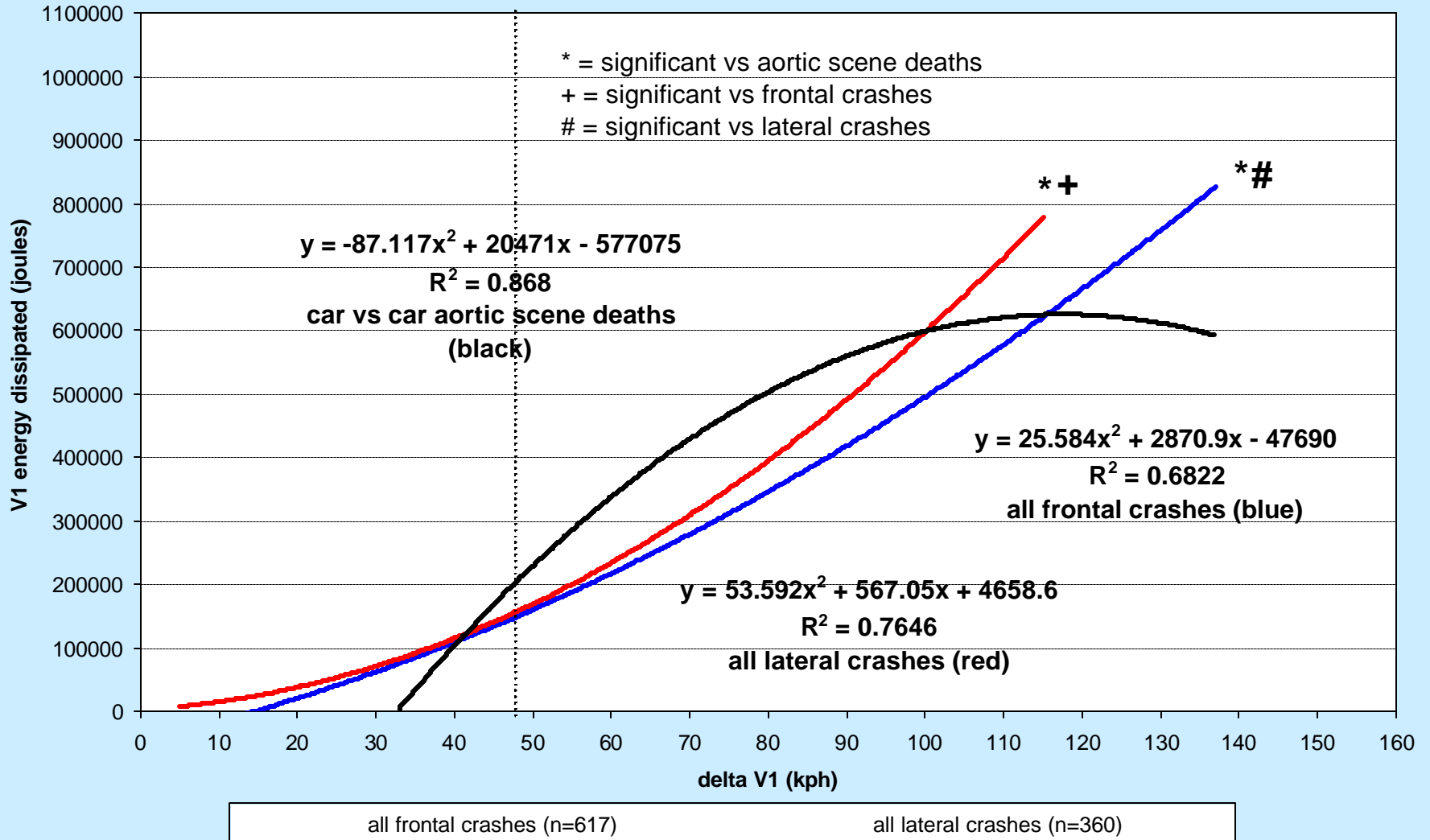
Vehicle Dynamics (V1): fatal vs non-fatal frontal crashes from CIREN data base



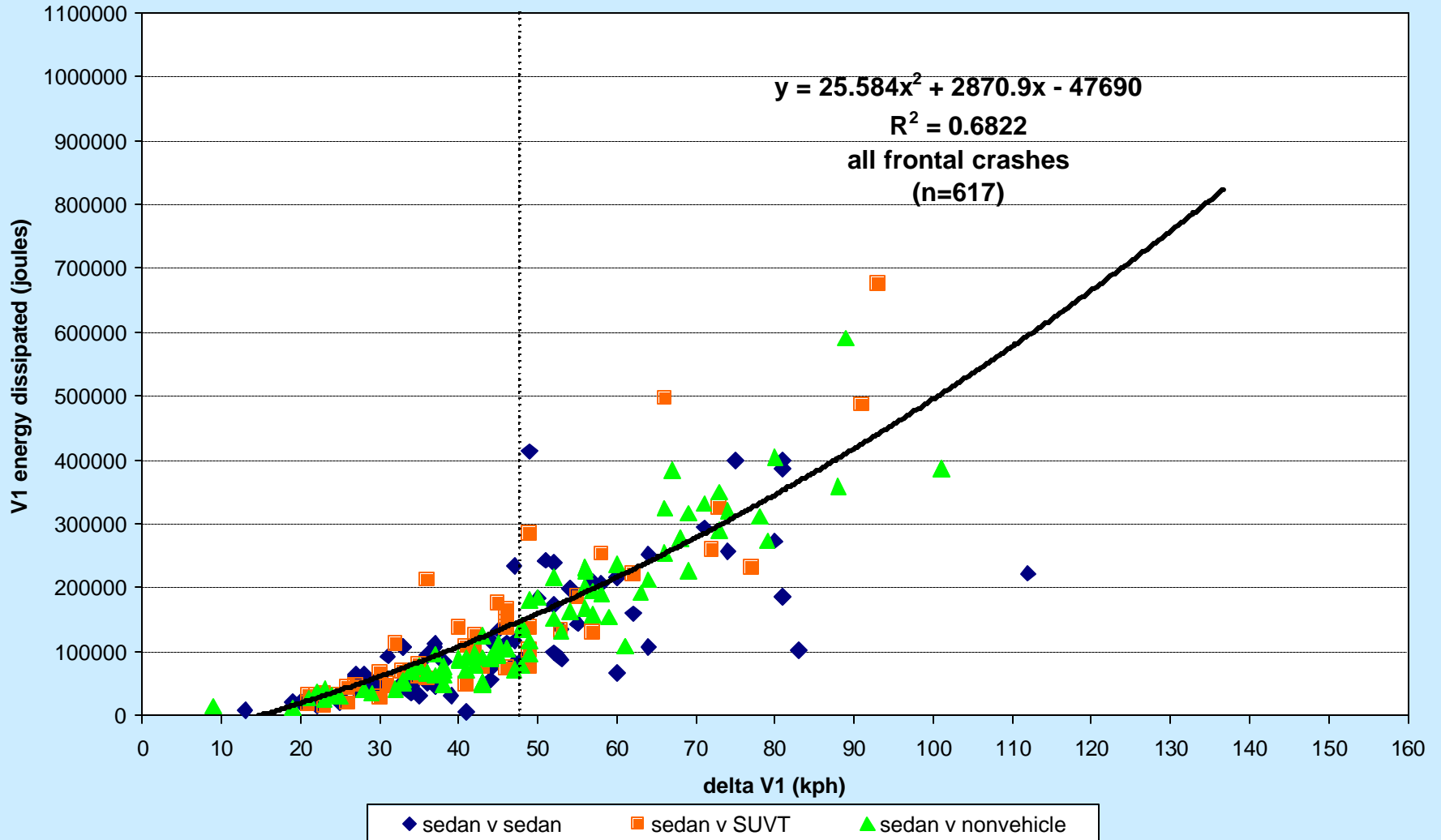
Vehicle Dynamics (V1): fatal vs non-fatal lateral crashes from CIREN data base



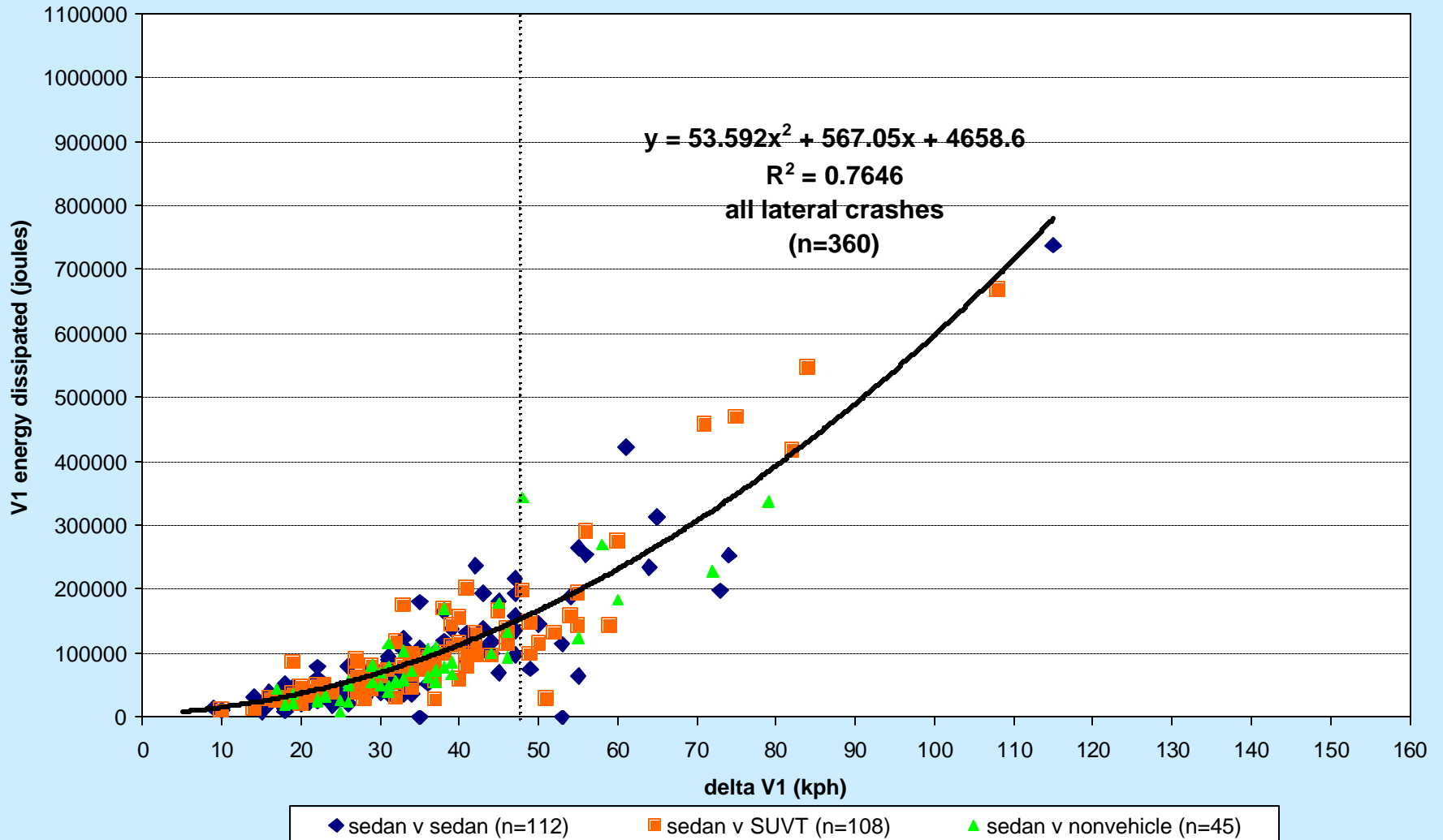
all frontal and lateral crashes from CIREN data base



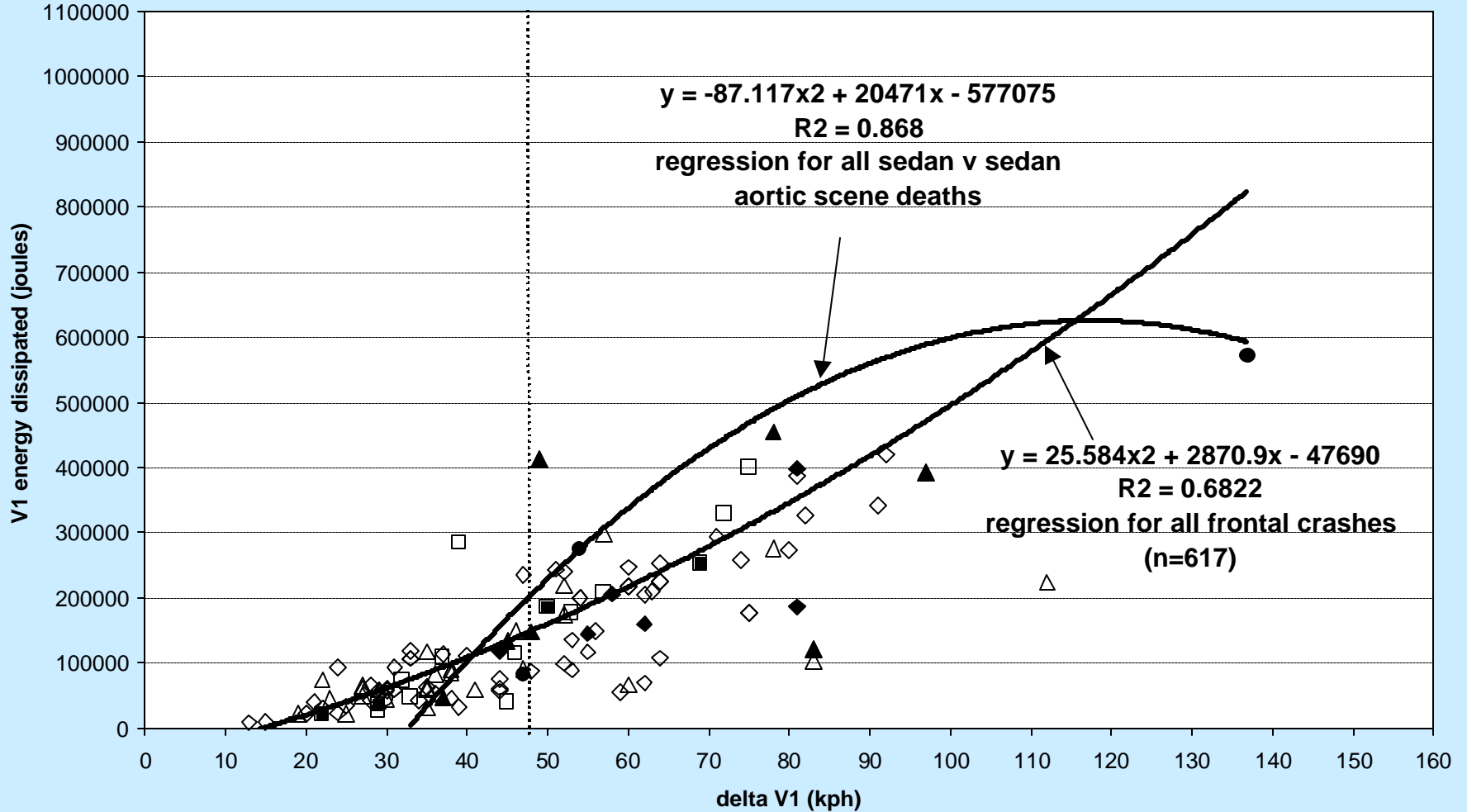
all frontal crashes by V2 type from CIREN data base



all lateral crashes by V2 type from CIREN data base

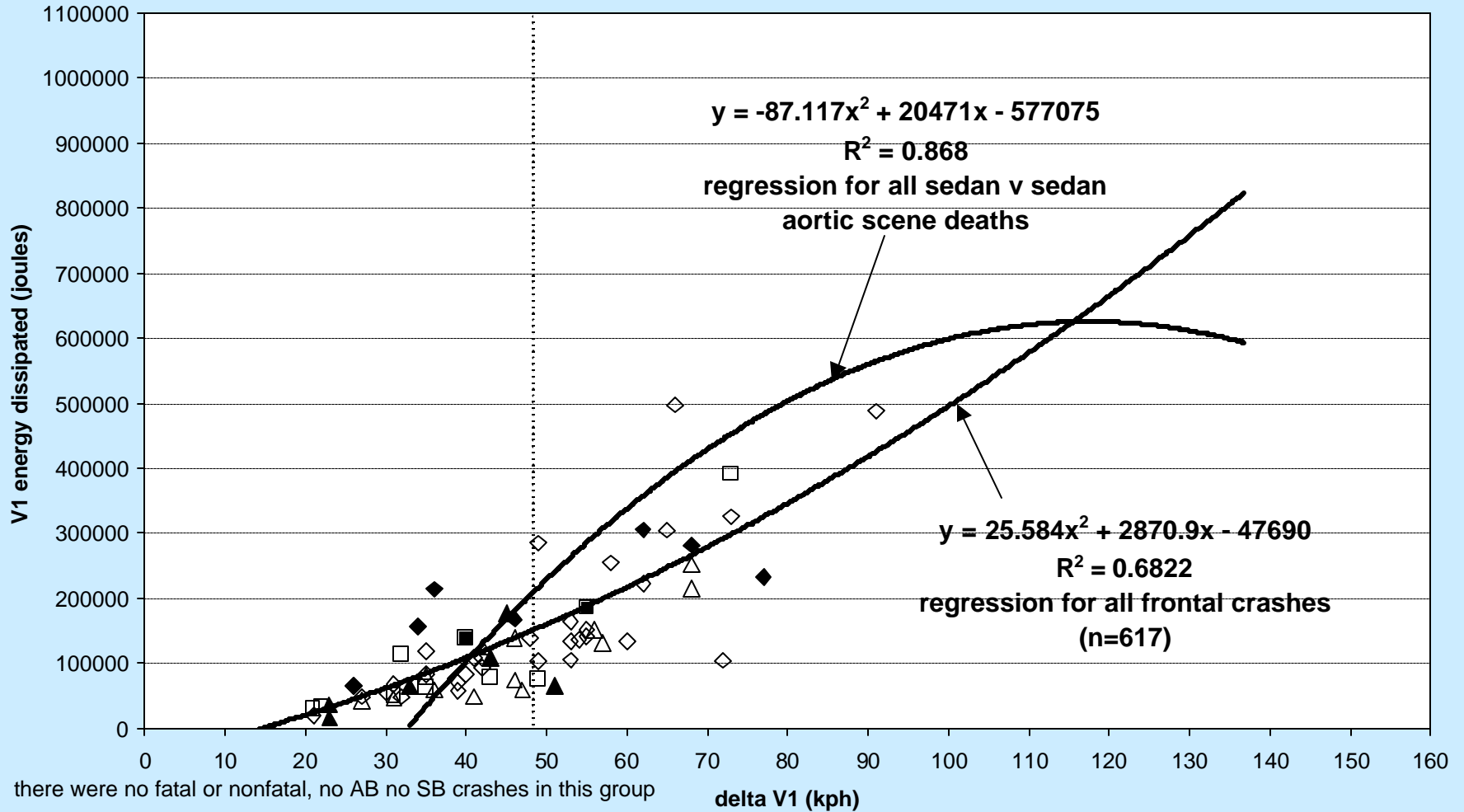


sedan v sedan frontal crashes, driver and front seat passenger only from CIREN data base



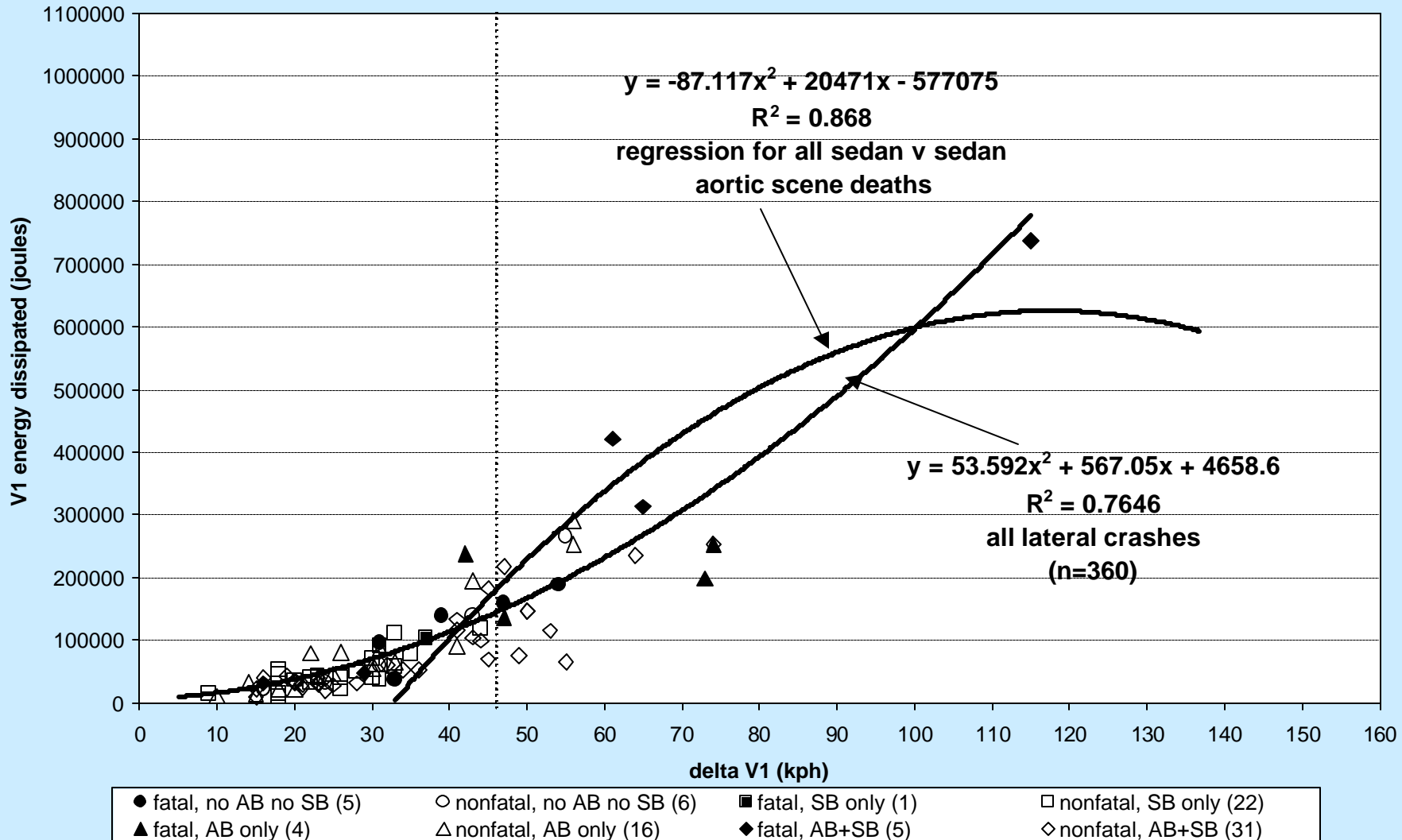
● fatal, no AB no SB (3)	○ nonfatal, no AB no SB (1)	■ fatal, SB only (4)	□ nonfatal, SB only (12)
▲ fatal, AB only (7)	△ nonfatal, AB only (29)	◆ fatal, AB+SB (6)	◇ nonfatal, AB+SB (62)

sedan v SUV crashes, driver and front seat passenger only from CIREN data base

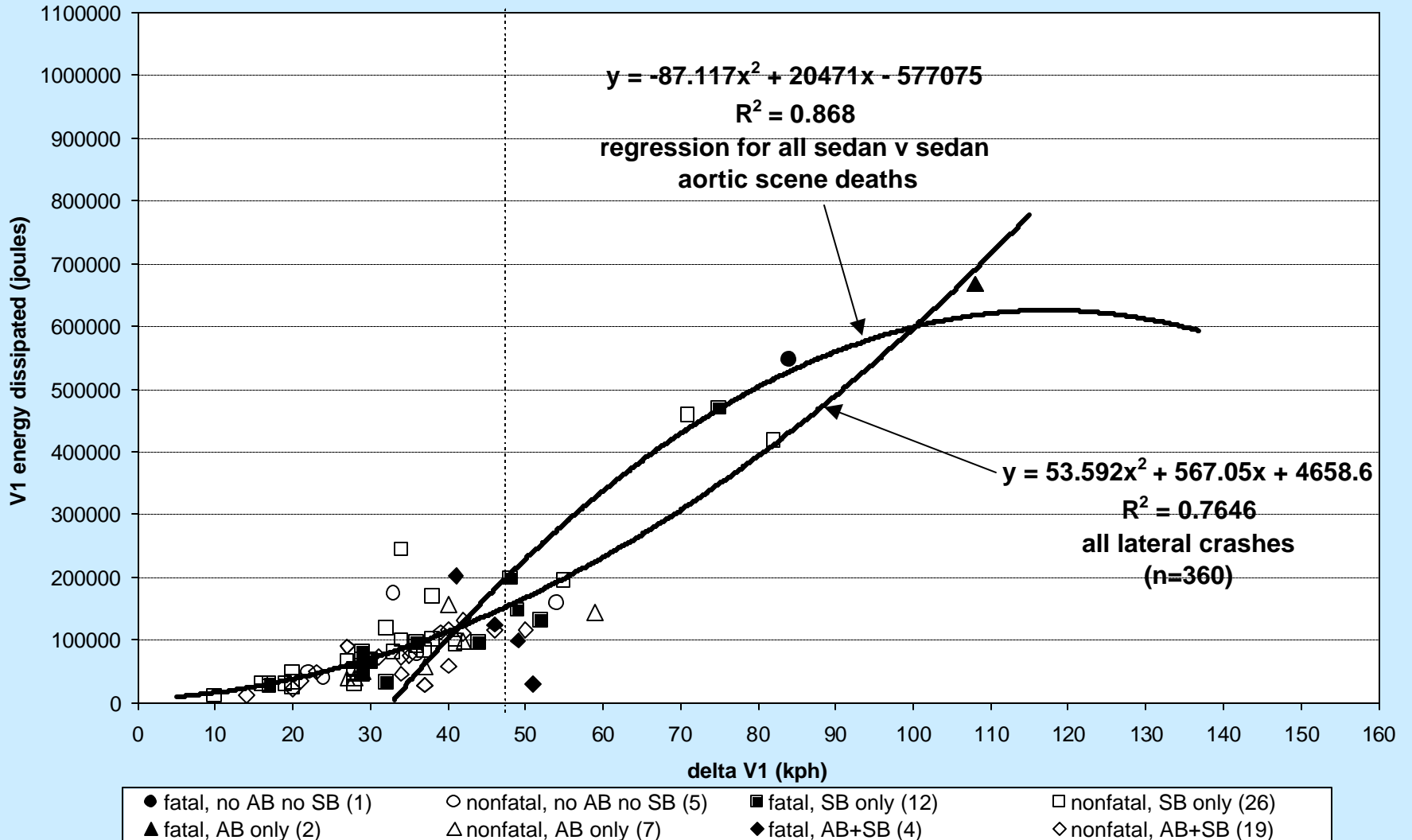


■ fatal, SB only (2)	□ nonfatal, SB only (9)	▲ fatal, AB only (6)	△ nonfatal, AB only (13)
◆ fatal, AB+SB (8)	◇ nonfatal, AB+SB (30)		

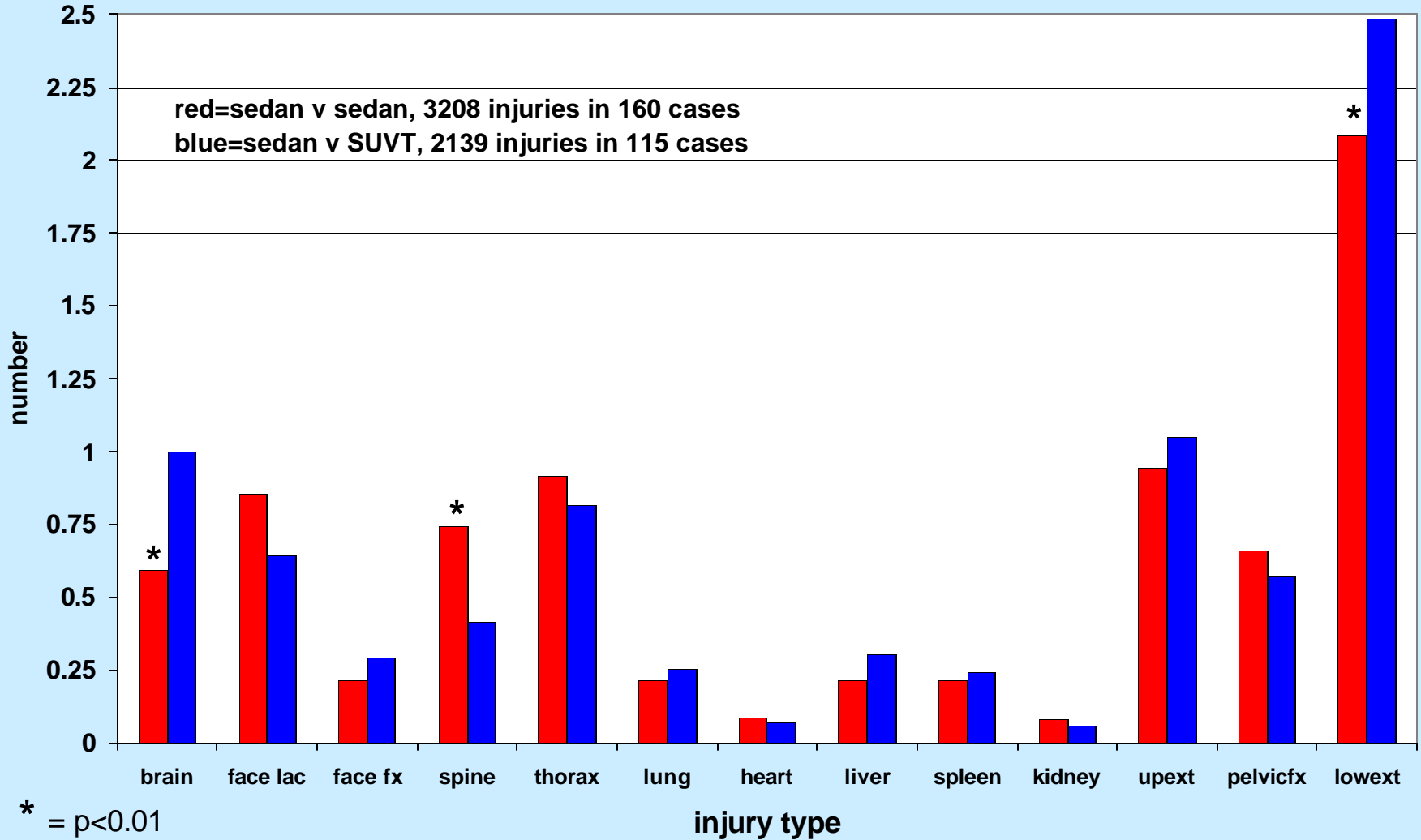
sedan v sedan lateral crashes, driver and front seat passenger only from CIREN data base



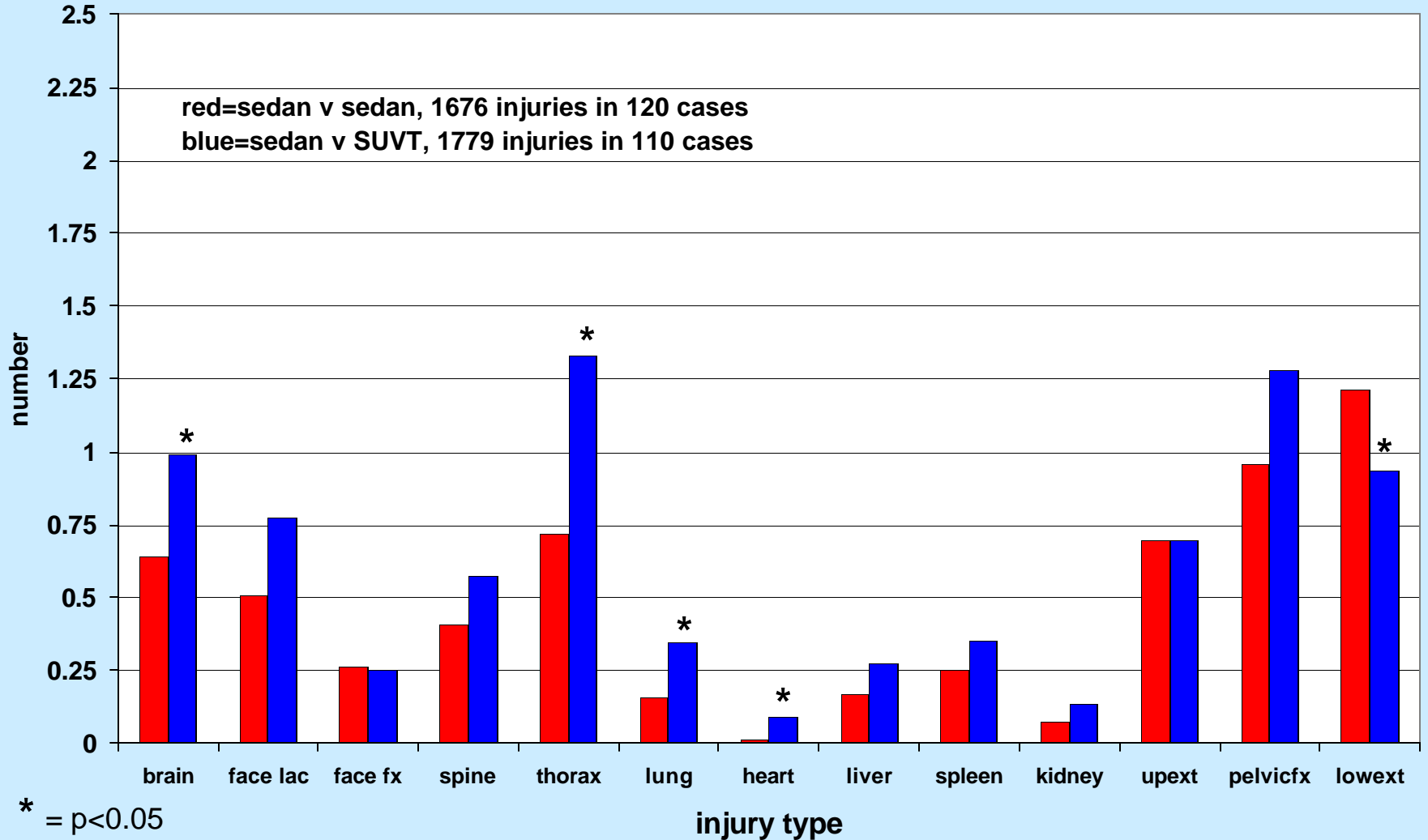
sedan v SUV/T lateral crashes, driver and front seat passenger only from CIREN data base



Frontal Crashes: Injuries Per Case by Type



Lateral Crashes: Injuries Per Case by Type



SUMMARY AND CONCLUSIONS I

VEHICLE DYNAMICS:

REGRESSION ANALYSIS OF THE IMPACT ENERGY DISSIPATED ON V1 AS A FUNCTION OF THE DELTA V1 HAS BEEN DERIVED FROM ALL FRONTAL MVCs (617) AND FROM ALL LATERAL MVCs (360)

PATIENT DATA:

BASED ON PDOF, A TOTAL OF 358 CASES OF DRIVERS OR FRONT SEAT PASSENGERS HAVE BEEN EXAMINED FROM THOSE CONTAINED IN THE CIREN DATA BASE, 192 FRONTAL & 166 LATERAL MVCs

CONCLUSIONS II

THE REGRESSION OF IMPACT ENERGY / DELTA V FOR ALL LATERAL CRASHES IS SIGNIFICANTLY DIFFERENT FROM THAT FOR ALL FRONTAL CRASHES BUT BOTH ARE SIGNIFICANTLY DIFFERENT FROM THE REGRESSION FOR AORTIC INJURY SCENE DEATHS

HOWEVER, THE RATE OF INCREASE FOR THE IMPACT ENERGY PER UNIT DELTA V IS GREATER IN THE LATERAL CRASHES THAN IN THE FRONTAL CRASHES ABOVE THE THRESHOLD VALUE OF 48 KPH. THIS SUGGESTS THAT MVC CRASH TESTING SHOULD BE DONE BOTH AT 48 KPH AND ALSO AT A HIGHER LEVEL, 60 KPH FOR LATERAL MVCs AND 70 KPH FOR FRONTAL MVCs

CONCLUSIONS III

BOTH FRONTAL AND LATERAL SEDAN VS SUVT (SUV, VAN & PICKUP TRUCK) MVCs OCCUR OVER THE ENTIRE RANGE OF DELTA Vs EXAMINED

IN FRONTAL MVCs INVOLVING EITHER SEDAN VS SEDAN OR SEDAN VS SUVT MVCs, NONE OF THE 192 PATIENTS EXAMINED WHOSE CRASH OCCURRED ABOVE A DELTA V OF 48 KPH AND WHO WERE COMPLETELY UNRESTRAINED SURVIVED. ALL OF THE SURVIVORS OF CRASHES ABOVE DELTA V 48 KPH HAD SEATBELT, AIRBAG OR BOTH TYPES OF RESTRAINTS IN USE.

OF ALL FRONTAL MVCs ON WHOM DATA WAS AVAILABLE, NO-SB-OR-AB 25% SURVIVED, AB-ONLY 76% SURVIVED, SB-ONLY 78% SURVIVED, SB + AB 85% SURVIVED.

CONCLUSIONS IV

IN LATERAL MVCs INVOLVING EITHER SEDAN VS SEDAN OR SEDAN VS SUVT MVCs, ONLY TWO OF THE 166 PATIENTS EXAMINED WHOSE CRASH OCCURRED ABOVE A DELTA V OF 48 KPH AND WHO WERE COMPLETELY UNRESTRAINED SURVIVED. THE REST OF THE SURVIVORS OF CRASHES ABOVE DELTA V 48 KPH HAD SEATBELT, AIRBAG OR BOTH TYPES OF RESTRAINTS IN USE. OF ALL LATERAL MVCs ON WHOM DATA WAS AVAILABLE, NO-SB-OR-AB 65% SURVIVED, AB-ONLY 79% SURVIVED, SB-ONLY 79% SURVIVED, SB + AB 85% SURVIVED.

CONCLUSIONS V

PATTERNS OF INJURY IN SEDAN VS SEDAN COMPARED TO SEDAN VS SUV CRASHES:

FRONTAL MVCs: IN COMPARING THE PATTERN OF INJURIES RESULTING FROM SEDAN VS SEDAN MVCs TO THAT SEEN IN SEDAN VS SUV CRASHES, IT WAS FOUND THAT DRIVERS OR FRONT SEAT PASSENGERS IN SEDANS STRUCK BY SUVs HAD A SIGNIFICANTLY GREATER INCIDENCE OF BRAIN AND LOWER EXTREMITY INJURIES, BUT FEWER SPINE INJURIES THAN THOSE IN SEDAN VS SEDAN MVCs.



CONCLUSIONS VI

LATERAL MVCs: IN COMPARING THE PATTERN OF INJURIES RESULTING FROM SEDAN VS SEDAN MVCs TO THAT SEEN IN SEDAN VS SUV T CRASHES, IT WAS FOUND THAT DRIVERS OR FRONT SEAT PASSENGERS IN SEDANS STRUCK BY SUVTS HAD A SIGNIFICANTLY GREATER INCIDENCE OF BRAIN, THORAX, LUNG & CARDIAC INJURIES, BUT FEWER LOWER EXTREMITY INJURIES THAN THOSE IN SEDAN VS SEDAN MVCs.



HEEDLESS DRIVER GCS 15



IN YOUR FANCY CAR YOU'LL BE SO MELLOW
THAT YOU MAY EVEN PLAY THE CELLO

BUT

IF YOU DRIVE WITHOUT RESTRAINT,

TO SOUND LIKE J. S. BACH YOU AIN'T

RATHER WHEN YOU CRASH

YOU'LL BE LIKE THIS DUMMY I CONFESS,

BECAUSE YOU'LL LOSE YOUR GCS

CRASH DUMMY GCS 3 = ZERO BRAIN