



UNIVERSITY *of* MARYLAND
SCHOOL OF MEDICINE

SHOCK, TRAUMA AND ANESTHESIOLOGY
RESEARCH CENTER

THE CHARLES "McC" MATHIAS, JR.
NATIONAL STUDY CENTER FOR TRAUMA AND
EMS

Motorcycle Awareness Through Data

Cynthia Burch, MPH
Epidemiologist
cburch@som.umaryland.edu



Objectives

- To identify data sources applicable to Motorcycle Safety Programs
 - To illustrate use of the data to support problem identification and program evaluation activities
- 



Maryland Motorcycle Safety Coalition

- Created by the Maryland Motor Vehicle Administration (MVA) and the Maryland Highway Safety Office (MHSO)
 - Mission- through essential partnerships, develop and implement a 5 year comprehensive strategic plan
 - Initiatives and strategies are based on the “Maryland motorcycle crash picture”
 - Each initiative & strategy will be measured and evaluated throughout the plan period
 - Plan will be shared with stakeholders and decision makers
 - One agency will administer, monitor and evaluate the plan
 - Maryland Motor Vehicle Administration
- 

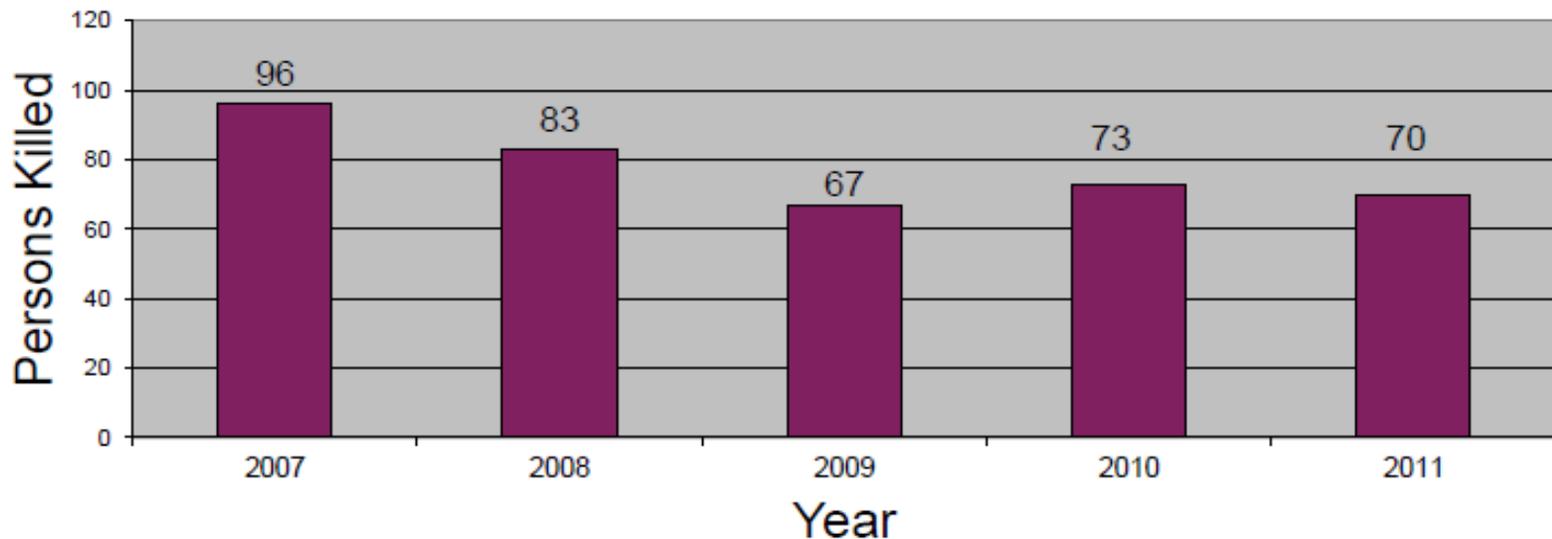


Why are data needed to support programming?

- Diverse target & user groups
 - Difficult to reach consensus and rally support
 - Available data may not be painting an accurate picture
 - Few states measure and evaluate efforts
 - Little evidence regarding successful and effective countermeasures
 - Most states rely on operator training and public awareness
- 

Maryland Crash Trends:

Motorcyclists Killed

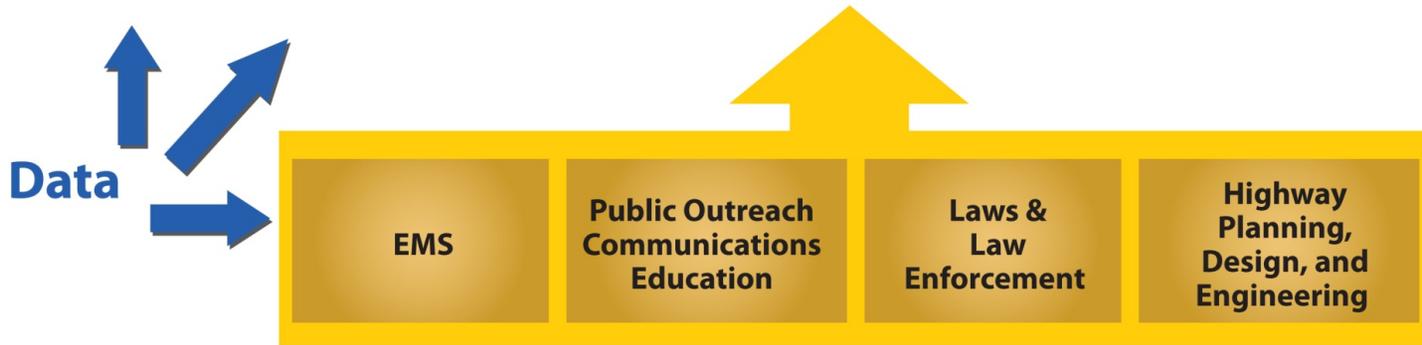


5-yr Average: Over **1,500** Motorcyclists Injured Every Year

Projection for 2012: 75 (approx 7%↑)

Target Group

| Emphasis Area | Young Drivers | High Risk 21-34 | Motorcyclists | Trucks/Buses | Older Drivers |
|--------------------------------|---------------|-----------------|---------------|--------------|---------------|
| Distracted Driving | | | ↑ | ↑ | |
| Impaired Driving | | | ↑ | ↑ | |
| Aggressive Driving | ← | | ↑ | ↑ | → |
| Occupant Protection | | | ↑ | ↑ | |
| Highway Infrastructure Related | | | ↑ | ↑ | |
| Pedestrians | | | | | |

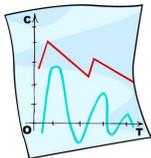


Countermeasure Tools

Navigating through the Presentation



Click for more information on the subject



Click for data (or more data) on the subject



Click to 'Go Home'



Click to go to previous page



Click to go to next page

Crash Reports



Medical Examiner Reports



Behavioral Surveys



EMS Reports



Citation Data



SAFETY PROGRAMS

Geographic Information System



Training, Licensing & Vehicle Info



Medical Records

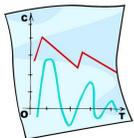


Crash Reports



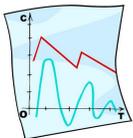
Fields of Interest

- Culpability
- Roadway type (Intersection/Non-Intersection)
- Direction of impact
- Contributing factors- Operator
- Contributing factors- Roadway
- Vehicle type (VIN)



Crash Report Data

- Motorcycle operators are reported to be at fault in approximately 54% of all motorcycle crashes
- Intersection & intersection related crashes make up 72% of motorcycle crashes
- In rear-end collisions, 47% of the time the motorcycle is hitting the motor vehicle
- Operators of cruiser and sport motorcycles seem to have more crash involvement



Crash Report Data

- Operator Contributing Factors
 - Distracted - 38.5%
 - Aggressive – 24.6%
 - Speed – 13.9%
- Roadway Contributing Factors
 - Debris, holes, highway & construction – 3%
- Top Contributing Factors in motorist at-fault crashes
 - Failure to give full time and attention (distracted)
 - Failure to yield right of way
 - Following too closely
 - Improper turn

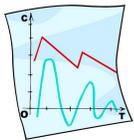


Medical Examiner Reports



Fields of Interest

- Cause of death
- Types of injury
- Safety equipment
- Toxicology



Medical Examiner Data

- Specific injuries
- Injury severity coding

Injury Locations in Fatally Injured Motorcyclists When Only One Injury-Related Record Was Coded, 2000-2002

| Injury | Helmeted | | Unhelmeted | | Total | |
|----------------------|--------------|-------------|--------------|-------------|--------------|-------------|
| | Num | % | Num | % | Num | % |
| Multiple Locations | 1,580 | 57% | 1,036 | 44% | 2,713 | 51% |
| Head | 518 | 19% | 864 | 36% | 1,428 | 27% |
| Neck | 79 | 3% | 38 | 2% | 124 | 2% |
| Thorax | 174 | 6% | 83 | 4% | 268 | 5% |
| Shoulder/Arms | 2 | 0% | 0 | 0% | 2 | 0% |
| Abdomen/Lumbar/Spine | 73 | 3% | 49 | 2% | 125 | 2% |
| Hip/Legs | 9 | 0% | 6 | 0% | 15 | 0% |
| Unspecified | 361 | 13% | 297 | 13% | 674 | 13% |
| Total | 2,796 | 100% | 2,371 | 100% | 5,349 | 100% |

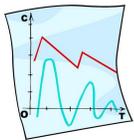


Behavioral Surveys



Driver & Operator Reported

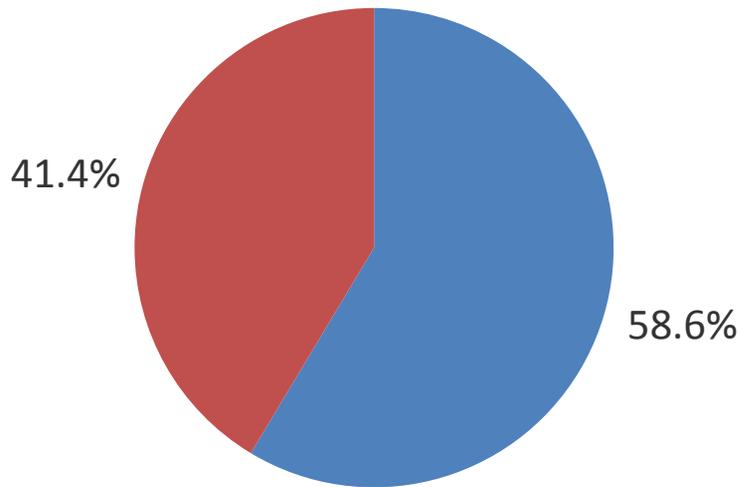
- Helmet use
- Protective equipment
- Traffic awareness
- Motor vehicle driver & operator behaviors on the roadway
- Awareness of motorcycle initiatives



Behavioral Data

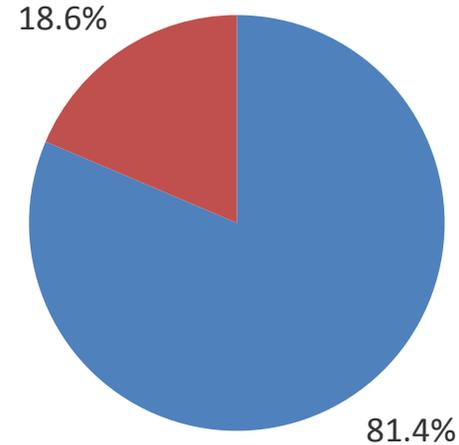
Have you completed a certified/state sanctioned rider safety course? (N=58)

■ Yes ■ No ■ Completed in other State

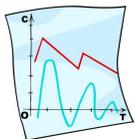
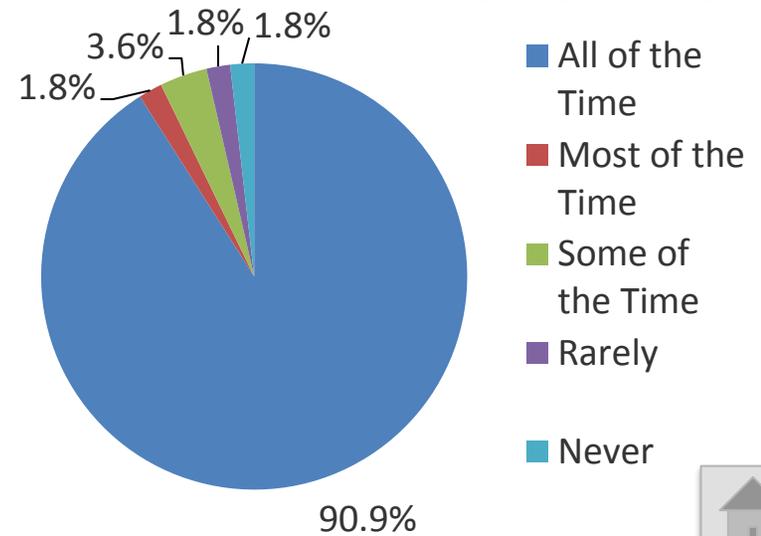


Are you a licensed rider? (N=59)

■ Yes ■ No



How often do you wear a DOT compliant helmet when you drive a motorcycle (MTF)? (N=55)



Behavioral Data

Results from a survey conducted @ safety courses

Training – most students reported

- Limited riding experience prior to course
- Do not own motorcycle
- Do not complete licensing waiver process
- Do not enroll in further training
- Do not feel “on-road” qualified

Licensing – most students reported

- Limited riding experience
- Holding learner’s permit for 1-2 months before taking skills test

Vehicle – most students reported

- Purchasing a motorcycle after obtaining a license

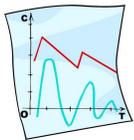


EMS Reports



Fields of Interest

- Injury Type
- Safety Equipment
- Baseline Vitals
- Glasgow Coma Score
- Provider narrative



EMS Data

| Patient Information | | | | |
|---|--------------------------------------|--|------------------|--------------------|
| Name: | Age: 62 Years | D.O.B: (mm/dd/yyyy) | | |
| Address: | Gender: Female | SSN: | | |
| | Weight: 60.000 KG / 132.28 LB | Race: White | | |
| | Phone: | Ethnicity: | | |
| Provider Impression | | | | |
| Primary Impression | Secondary Impression | Patient Priority | Patient Priority | Patient Priority |
| Pain | | Priority 2 - Patient Less Serious (Urgent / Potentially Life Threatening) | | |
| Protocols Used | | | | |
| General Patient Care ONLY | | | | |
| Narrative | | | | |
| Summary of Events | | | | |
| SUBJECTIVE: Called for a reported at _____ On arrival, found a 62 year Female patient weighing 60 KG. Chief complaint of PAIN. Events surrounding incident: PER PT OTHER CAR CROSSED THE CENTER LINE AND HIT HER HEAD ON _____ PT STATES SHE REMEMBERS THE ACCIDENT. The patient's medical history, medications and allergies are noted below. | | | | |
| OBJECTIVE: At 17:54, the patient was found SITTING IN DRIVER SEAT CAOx4 IN SOME DISTRESS. Initial assessment revealed the patient had a GCS of 15, with V/S of 140/70, P - 78, R - 16. Other significant physical exam findings: PT WAS FOUND TO HAVE AN OPEB FIB FRACTURE ON LEFT ANKLE AND CLOSED ON RIGHT. PT ALSO COMPLAINED OF PAIN IN HER RIBS ON THE RIGHT SIDE OF HER CHEST. PT DENIES NECK OR BACK PAIN. | | | | |
| ASSESSMENT: The field impression of the patient was Pain. Treatment begun utilizing the following protocols: General Patient Care ONLY. | | | | |
| PLAN: Treatments were administered as follows: 18:00:00: Spinal Immobilization - Long Back Board was performed successfully after 1 attempt. 18:10:00: Venous Access-Extremity 18 was performed successfully after 1 attempt. 18:15:00: ECG Monitor was applied. Interpretation was Normal Sinus Rhythm. 18:20:00: Fentanyl 60 MCG Intravenous (IV) Fluids per Protocol (Standing Order). The patient's response was . The outcome of field treatment was NO CHANGE IN PT STATUS. The patient was transported to _____ Lights and Sirens. Medical control contact established with _____ ON SCENE. Patient delivered to room _____ and verbal report was given to DR. | | | | |
| Trauma Category | | | | |
| C - Vehicle telemetry data consistent high risk of injury (High Risk Auto Crash) | | | | |
| Prior Aid | | | | |
| Prior Aid | Performed By | Outcome | | |
| / | N/A, | | | |
| Glasgow Coma Score | | | | |
| Date/Time | Glasgow Eye Opening | Glasgow Verbal | Glasgow Motor | Glasgow Coma Score |
| 18:10 | | | | |
| 18:30 | | | | |
| 18:45 | | | | |
| Past Medical History | | | | |
| MEDICATION ALLERGIES | Generic Name | Description | | |
| NKDA (No Known Drug Allergies) | NKDA (No Known Drug Allergies) | | | |

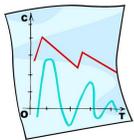


Citation
Data



Fields of Interest

- Demographics
- Violation type
- Date/Time
- Registration information
- Adjudication



Citation Data

Citation type

- Speeding 48%
- Impaired 12%
- Reckless/Negligent 11%
- Suspended/Revoked 8%
- Improper license 7%
- Helmet 3%

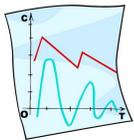


Geographic Information System

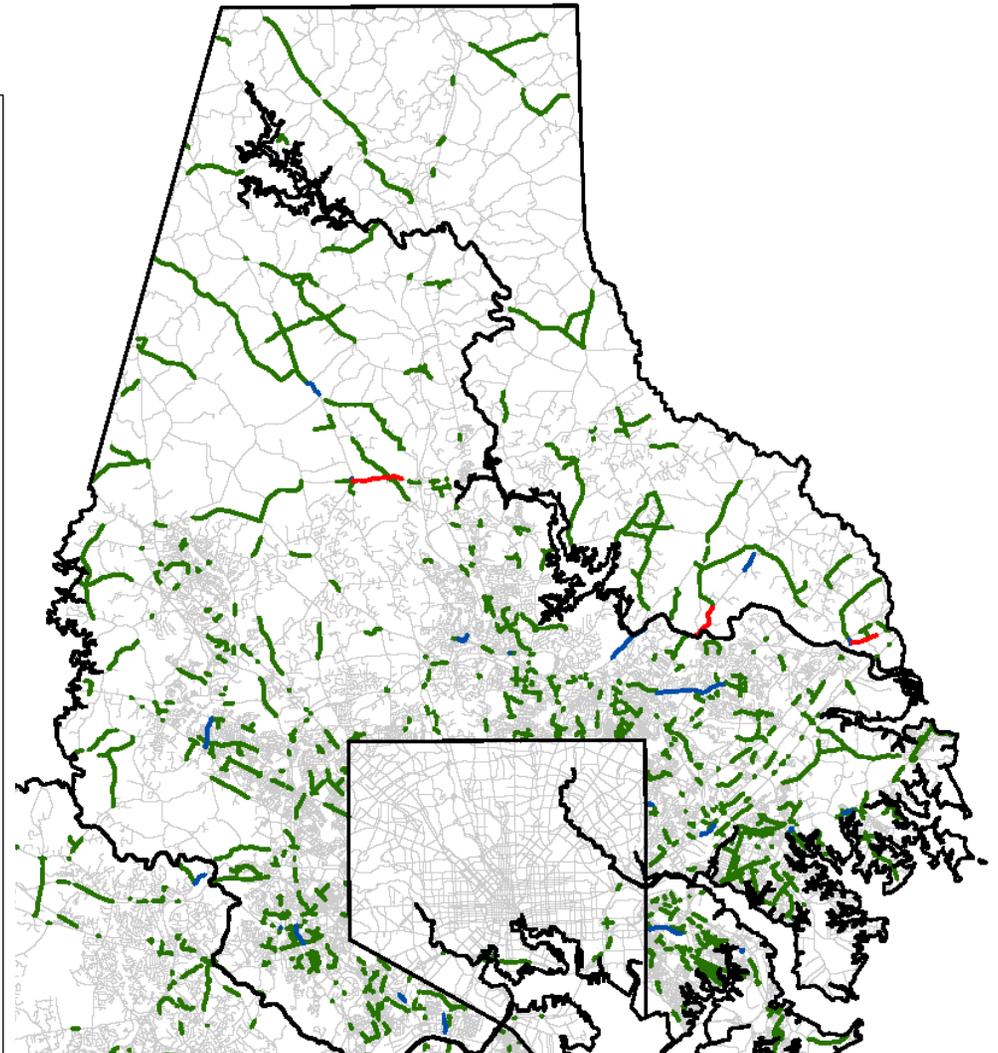
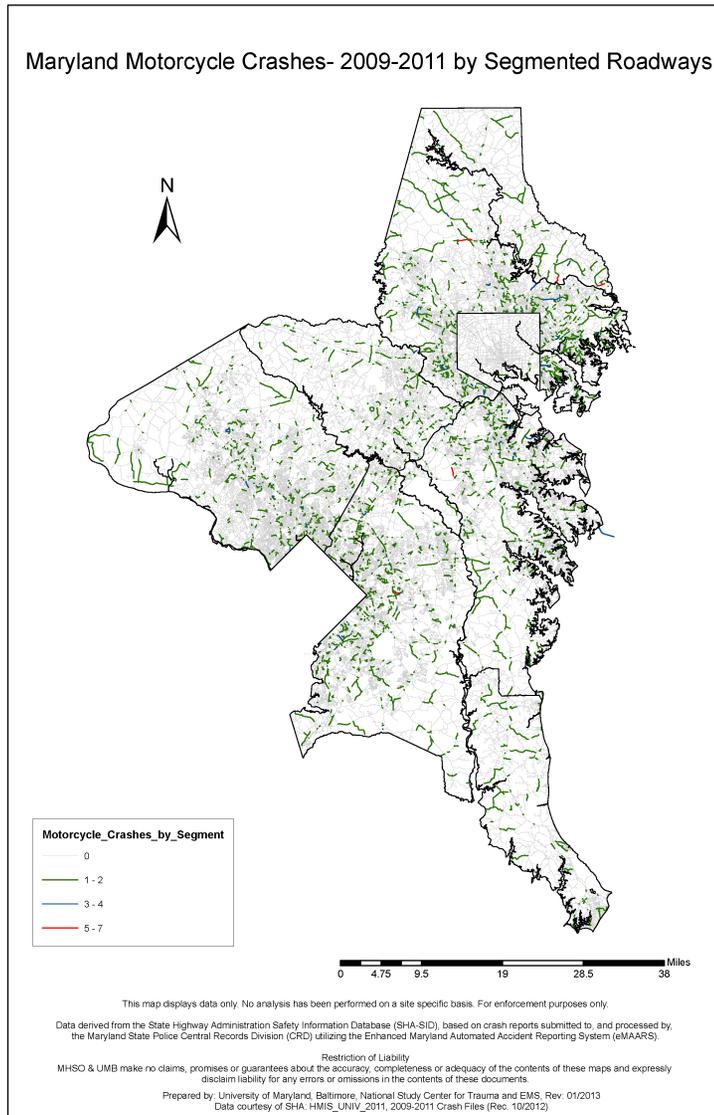


Use of Data

- Roadway type
- Intersection relationship
- Crash density within an area
- Zip codes – residence & crash location
- Program planning



GIS Data



Training,
Licensing &
Vehicle Info.

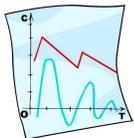


Vehicle & Titling

- Driver license number
- Vehicle ownership
- VIN
- Type of motorcycle
- Odometer reading (when re-titled)

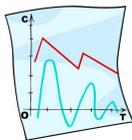
Licensing

- Driver license number
- Previous experience/training
- Skills and knowledge testing
- Date issued



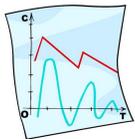
Training Data

| 2011 Training Numbers - License Waiver | | | | Received Waiver Certificate |
|--|--------------|--------------|--------------|-----------------------------|
| | Enrolled | Completed | Passed | |
| Basic Rider Course | 7,928 | 7,138 | 6,663 | 6,340 |
| Alternate Basic Rider Course | 769 | 753 | 720 | 695 |
| Totals | 8,697 | 7,891 | 7,383 | 7,035 |
| Percentage of those Enrolled | | 91% | 85% | 81% |



Licensing Data

- 2,037 motorcycle operators were involved in crashes
 - 24% were out-of-state operators
- 1,544 were reported to have a MD license
- 1,513 linked to MVA licensure files
 - 896 (59%) had an M endorsement on record
- Only 339 (22%) had an M in the class field on the crash report



Vehicle Data

- 11 character (de-identified) VIN numbers from Motor Vehicle Administration (MVA) registration file provided to Insurance Institute for Highway Safety (IIHS)
- IIHS returned motorcycle 'class name' information for each VIN number
 - Cruiser (35%)
 - Sport (9%)
 - Sport Touring (1%)
 - Super Sport (34%)
 - Touring (14%)
 - Other (chopper, dual purpose, off road, scooter, sidecar, standard, unclad sport)





Motorcycle Training Data

(project with Cambridge Systematics)

- Primary research questions
 - Do crash characteristics (collision type, contributing factors, etc) and injury outcomes (injury severity, type, frequency) differ between motorcycle riders that were trained in Maryland as compared to those not trained in Maryland?
 - Is there a difference in rider behavior (contributing factors such as speed, impairment, aggressive or distracted driving) between trained and untrained riders? Are those factors associated with injury occurrence and outcome?
 - What types of citations are issued to trained and untrained riders while they are operating a motorcycle? While they are operating a passenger vehicle?
- 



Cambridge Systematics Project

- Data integration

- motorcycle training data (provided by the Maryland Motor Vehicle Administration)
- police crash reports (provided by the Maryland State Police)
- emergency department and hospital inpatient records (provided by the Health Services Cost Review Commission)
- traffic citation data (provided by the Maryland District Court)

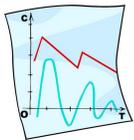


Medical
Records



Fields of Interest

- Demographics
- Injury type & severity
- Safety equipment
- Disposition
- Charges



Medical Records Data

| Mechanism | Number | Charge (\$ in 1,000s) | Percent (%) | Hospital Charges (Percentile) | | |
|---------------|--------|--------------------------|----------------|----------------------------------|--------|------------------|
| | | | | 25 th | Median | 75 th |
| Driver | 3,132 | 60,945 | 45.7 | 3,923 | 5,650 | 14,996 |
| Passenger | 1,125 | 19,363 | 14.5 | 4,075 | 6,110 | 15,403 |
| Motorcyclist | 835 | 27,455 | 20.6 | 4,835 | 9,999 | 27,207 |
| Pedal Cyclist | 105 | 2,225 | 1.7 | 4,062 | 7,526 | 22,240 |
| Pedestrian | 736 | 18,171 | 13.6 | 4,588 | 9,083 | 25,455 |
| Unspecified | 247 | 5,110 | 3.8 | 4,281 | 7,066 | 18,201 |
| Total | 6,180 | 133,269 | 100.0 | 4,104 | 6,396 | 17,713 |





What the data tell you-

- Training status, scores, course type
 - Crash frequency, severity, type & location
 - License status, rider/operator gender & age and driving history
 - Motorcycle vehicle type
 - Roadway characteristics
 - Citations, convictions & dismissals
 - Injury type, severity and cost
 - EXPOSURE
- 



- Maryland MVA
- ABATE of Maryland
- Maryland State Police
- MD Motorcycle Dealers
- Maryland EMS
- State Highway Administration
- Maryland Highway Safety Office
- Prince George's County Police
- NHTSA Region 3
- and other partners.....

