



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](mailto: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

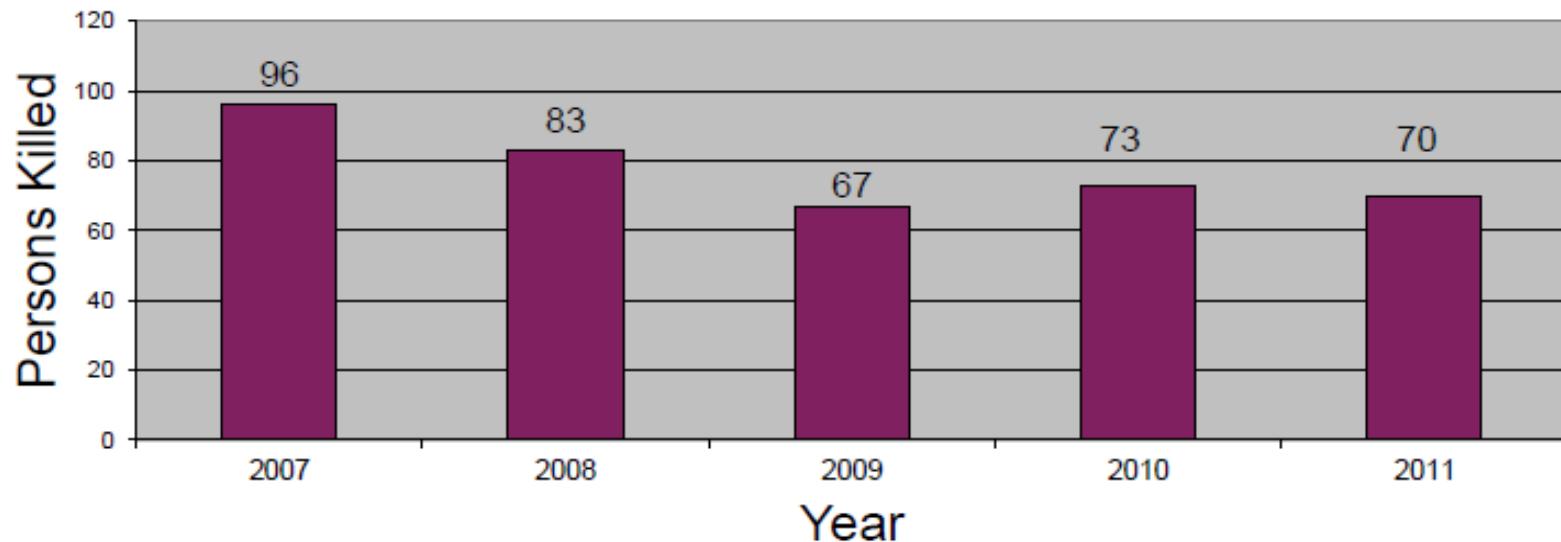
- Created by the Maryland Motor Vehicle Administration (MVA) and the Maryland Highway Safety Office (MHSO)
  - Mission- through essential partnerships, develop and implement a 5 year comprehensive strategic plan
- Initiatives and strategies are based on the “Maryland motorcycle crash picture”
  - Each 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:

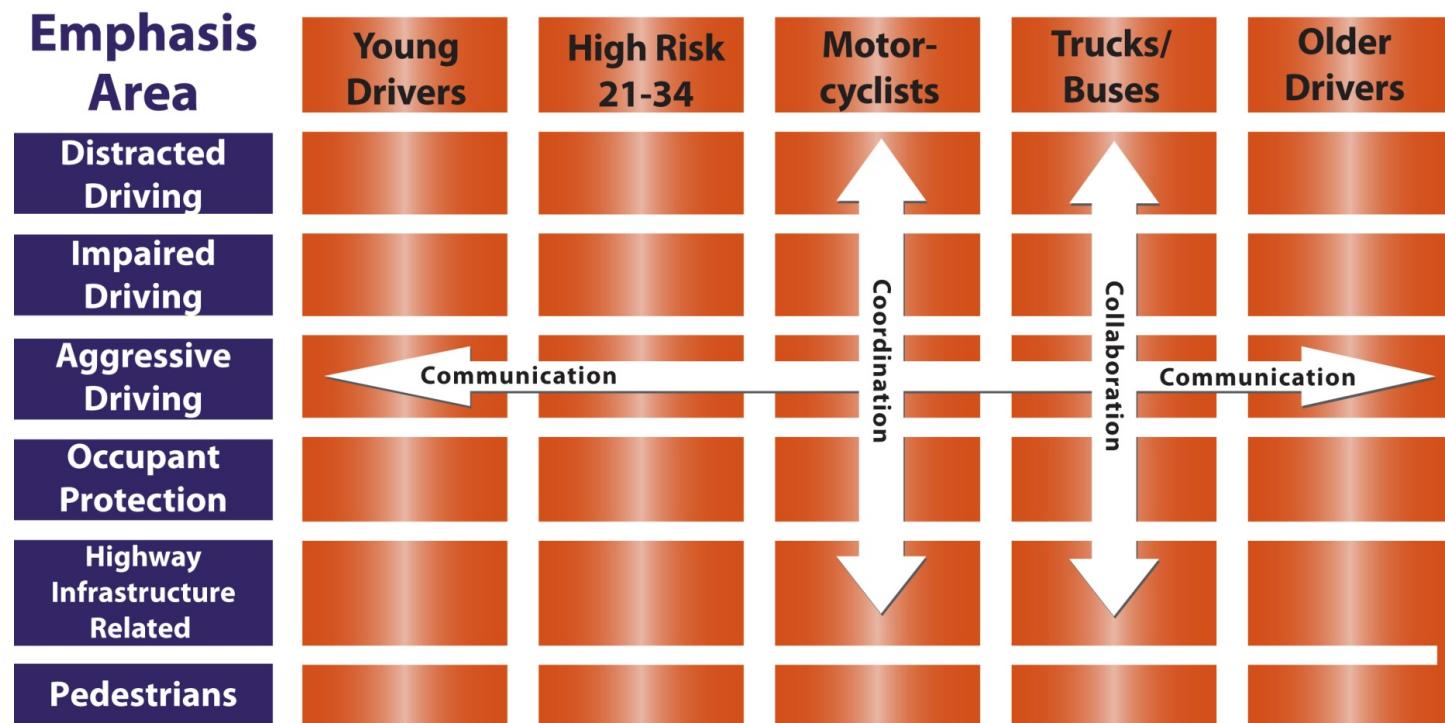
## Motorcyclists Killed



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

*Projection for 2012: **75** (approx 7%↑)*

## Target Group

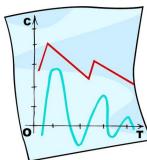


## Countermeasure Tools

# Navigating through the Presentation



Click for more information on the subject



Click for data (or more data) on the subject



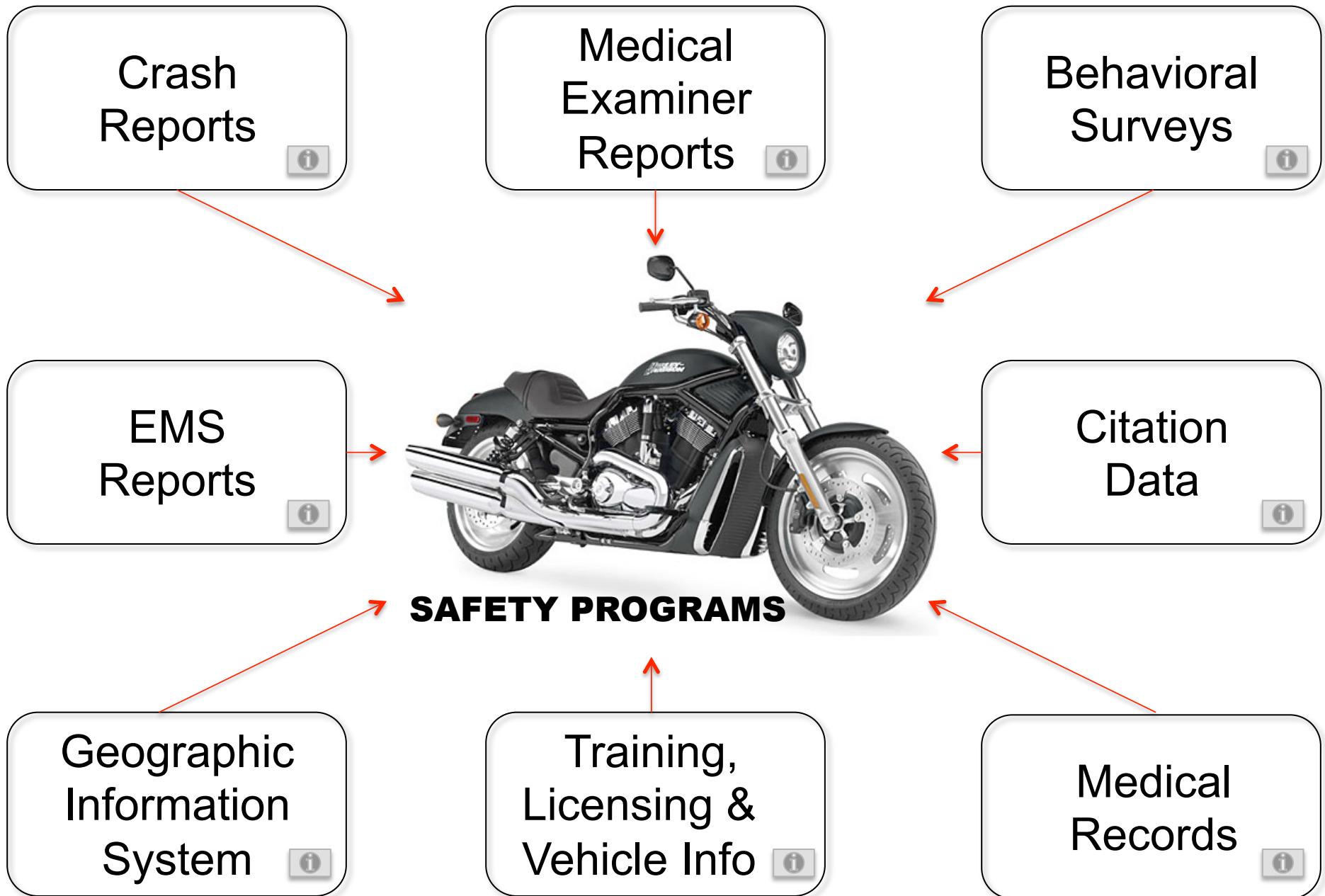
Click to 'Go Home'



Click to go to previous page



Click to go to next page

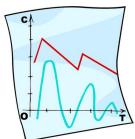


Crash  
Reports



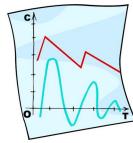
## Fields of Interest

- 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

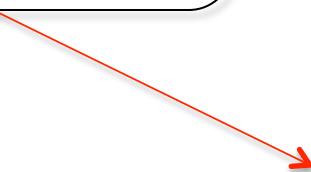


# Crash Report Data

- 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

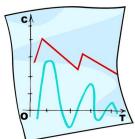


## Medical Examiner Reports



## Fields of Interest

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



# Medical Examiner Data

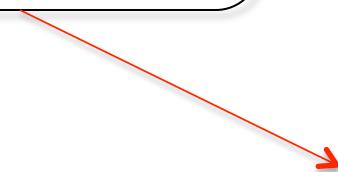
- Specific injuries
- Injury severity coding

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%

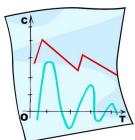


## Behavioral Surveys



### Driver & Operator Reported

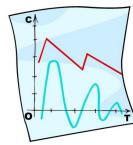
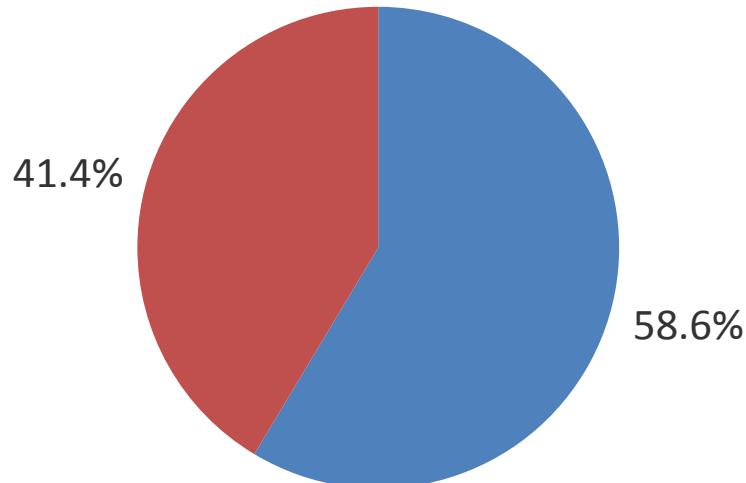
- Helmet use
- Protective equipment
- Traffic awareness
- Motor vehicle driver & operator behaviors on the roadway
- Awareness of motorcycle initiatives



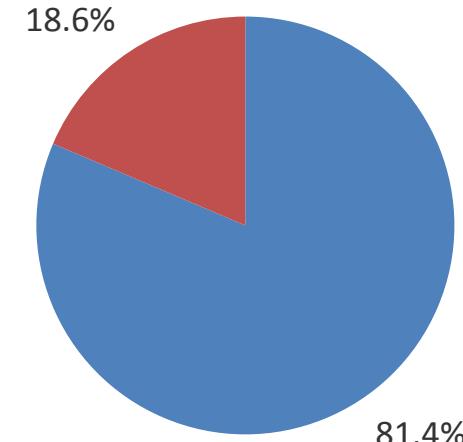
# Behavioral Data

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

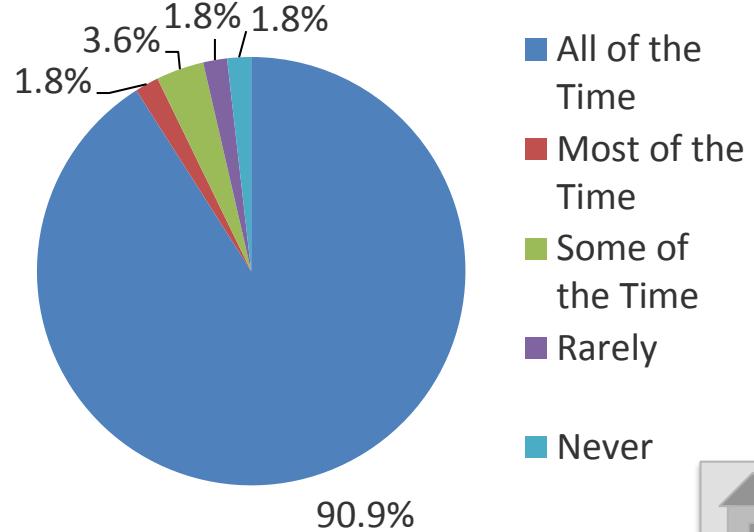
■ Yes ■ No ■ Completed in other State



Are you a licensed rider? (N=59)



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

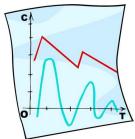


EMS  
Reports



## Fields of Interest

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



# EMS Data

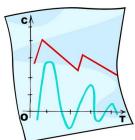
Patient Information					
<b>Name:</b>			<b>Age:</b> 62 Years	<b>D.O.B.:</b>	(mm/dd/yyyy)
<b>Address:</b>			<b>Gender:</b> Female	<b>SSN:</b>	
		<b>Weight:</b> 60.000 KG / 132.28 LB		<b>Race:</b> White	
		<b>Phone:</b>		<b>Ethnicity:</b>	
Provider Impression					
Primary Impression	Secondary Impression	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					
<p><b>SUBJECTIVE:</b> 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.</p> <p><b>OBJECTIVE:</b> 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.</p> <p><b>ASSESSMENT:</b> The field impression of the patient was Pain. Treatment begun utilizing the following protocols: General Patient Care ONLY.</p> <p><b>PLAN:</b> 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 ON SCENE. Patient delivered to room and verbal report was given to DR. Lights and Sirens. Medical control contact established with</p>					
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



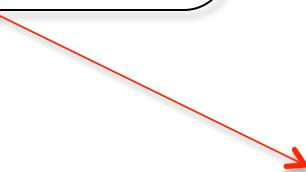
# Citation Data

## Citation type

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

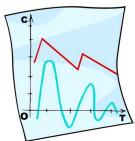


## Geographic Information System

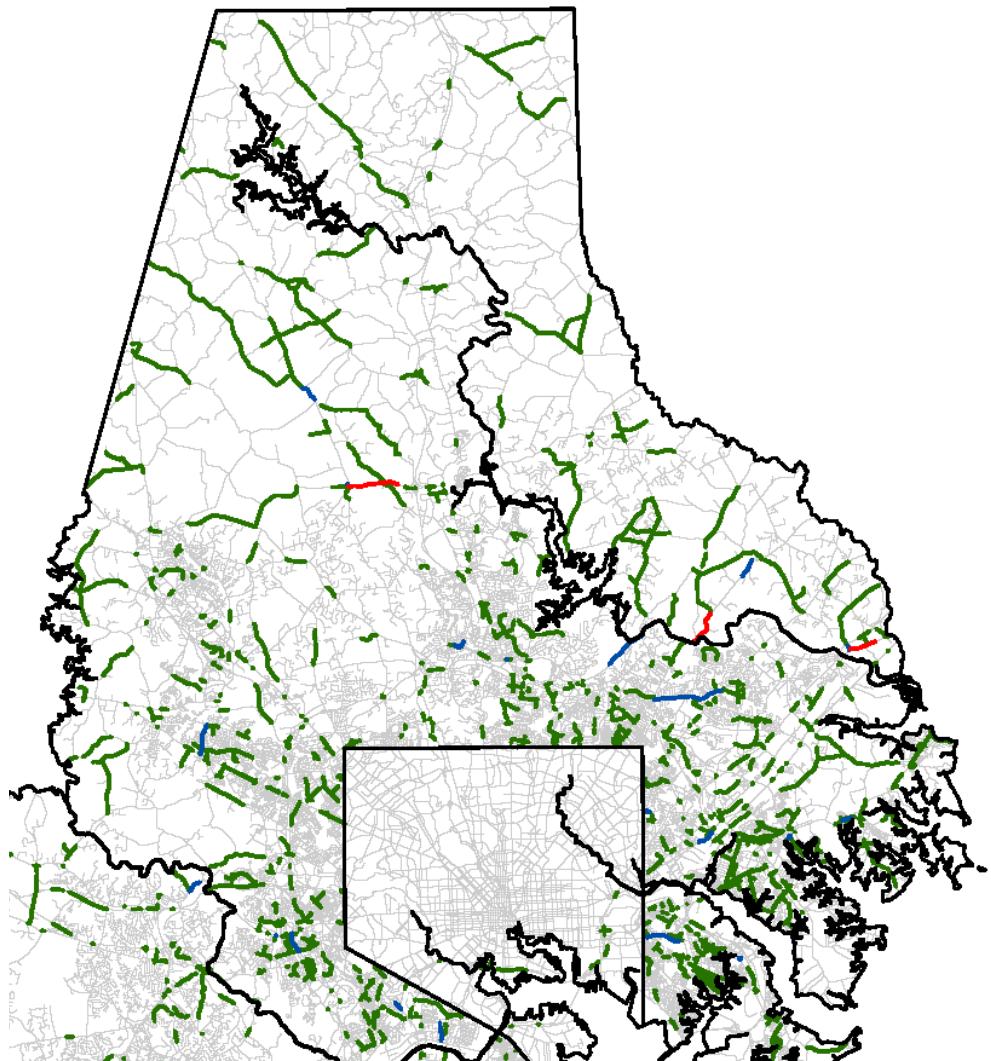
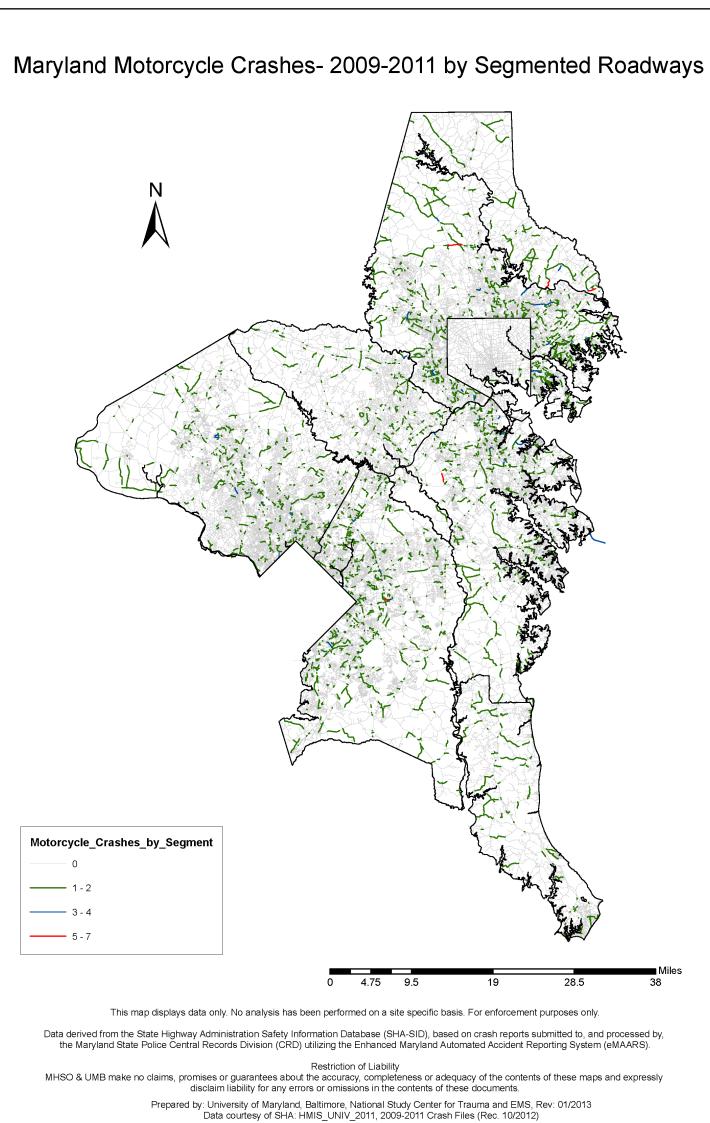


### Use of Data

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



# GIS Data



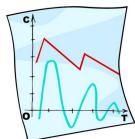
Training,  
Licensing &  
Vehicle Info.

## Vehicle & Titling

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

## Licensing

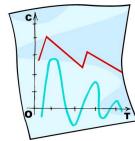
- Driver license number
- Previous experience/training
- Skills and knowledge testing
- Date issued



# Training Data

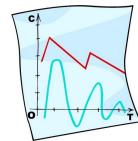
## 2011 Training Numbers - License Waiver

	Enrolled	Completed	Passed	Received Waiver Certificate
Basic Rider Course	7,928	7,138	6,663	6,340
Alternate Basic Rider Course	769	753	720	695
Totals	<b>8,697</b>	<b>7,891</b>	<b>7,383</b>	<b>7,035</b>
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)

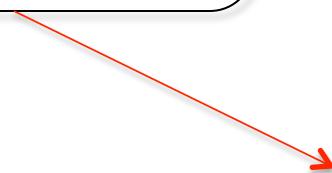
- Primary research questions

- 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

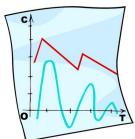
- Data integration
  - motorcycle training data (provided by the Maryland Motor Vehicle Administration)
  - police crash reports (provided by the Maryland State Police)
  - emergency department and hospital inpatient records (provided by the Health Services Cost Review Commission)
  - traffic citation 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 <sup>th</sup>	Median	75 <sup>th</sup>
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.....

