

Off-road Motor Vehicle-related Injuries in Massachusetts

Details from an Assessment of Medical Records

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As part of a new initiative to evaluate the accuracy of injury codes, the Injury Surveillance Program (ISP) conducted a medical record review to assess the data quality of codes assigned by medical records coders in categorizing accidental off-road motor vehicle injuries. The findings helped us determine the accuracy of codes used by medical records personnel and provided us with specific details previously unknown on the type of vehicle involved, helmet use, and other information about off-road motor vehicle injuries among MA children ages 0-17. Due to the limited nature of the project, the findings are not to be used to estimate off-road vehicle injuries or make comparisons to other years, age groups, or other motor vehicles.

Overview:

- Data Sources and Methods Used
- Surveillance Quality Improvement (SQI) project
- Present Findings from the Off-road Injuries to Children project
- Potential Next Steps

Electronic Hospital Databases* to Assess the Burden of Injury

- 1) Hospital Admissions Data**
- 2) Observation Stays Data**
- 3) Emergency Department Discharge Data**

*All databases are owned by the Center for Health Analysis (CHIA).

Injury Definition

- We use the International Classification of Diseases Manual (ICD-9-CM) which provides a coding system for injuries including External Cause-of-Injury Codes (**E-Codes**) which tell us what caused the injury.
- For example, E814 identifies an injury from a “motor vehicle traffic accident involving a pedestrian”, E965 identifies an assault-related injury by firearm.

The Surveillance Quality Improvement (SQI) Project

- In 2011, the Department received CDC funding to examine the quality of E-Codes that we rely on for injury analyses (*the SQI project*).
- Our first two projects examined E-Codes that we've used as proxies, since ICD-9 does not include specific E-codes to capture them. These included “window falls” and “Off-road vehicle” injuries among children.
- This presentation provides findings from the “Off-road injury” project.

Off-Road Motor Vehicle Injuries to MA Children, Ages 0-17

E821 is the ICD-9 code that refers to injuries occurring from:

**“Nontraffic Accidents Involving
Other Off-Road Motor Vehicles”**

Broken down by Person Injured

E821 is further broken down by the person who was injured:

E8210 (driver of off-road mv, other than motorcycle)

E8211 (passenger of off-road mv, other than motorcycle)

E8212 (driver of motorcycle)

E8219 (off-road MV with unspecified person injured)

- These are the codes that we pulled from the electronic files

Total Cases in the Electronic Files

- During the three year period (FY2008-FY2010) there were 1,440 cases identified with these codes, for MA children ages 0-17.

Selected E8210- E8212, E8219	# of Records in the Electronic Files (FY2008- FY2010)
	<i>Number</i>
Hospital Discharges	140
Observations	36
ED Visits	1264
TOTAL	1440

The SQL Sample:

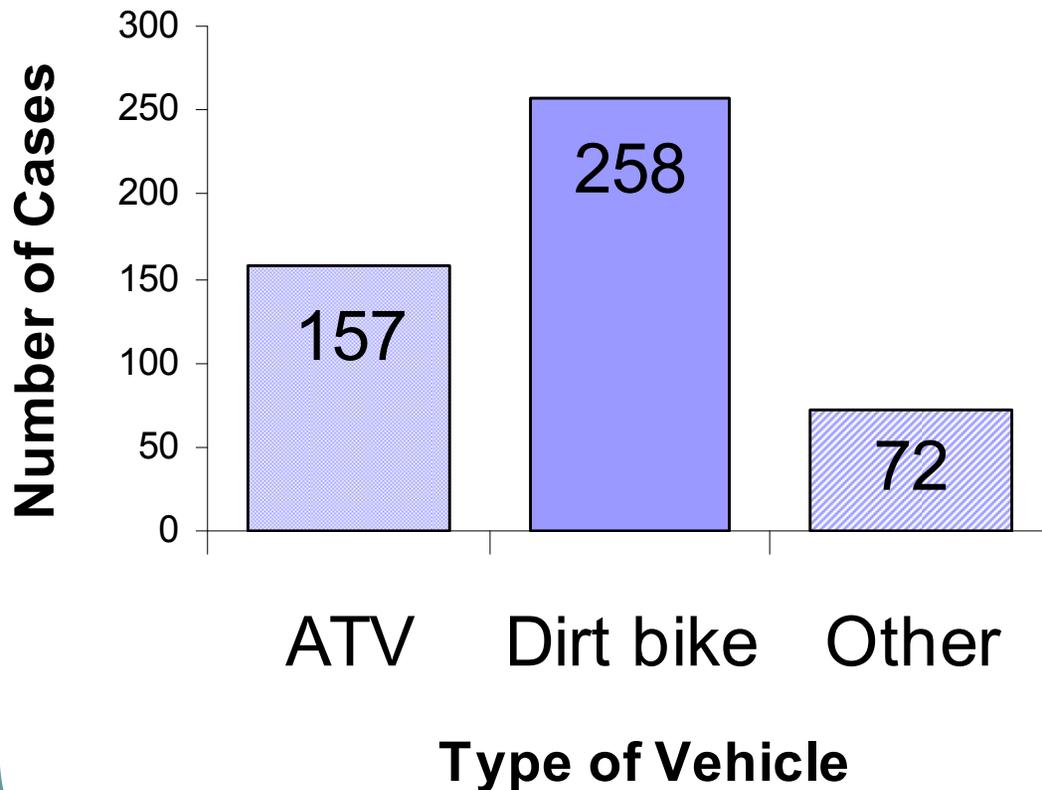
- We selected 100% of hospital discharges and observation stays
- And 25% of all emergency department cases.
- Resulting sample included:

Selected E821 E-Codes	# of Records in the Electronic Files (FY2008-FY2010)	# of Records Selected for our Sample (FY2008-FY2010)
	<i>Number</i>	<i>Number</i>
Hospital Discharges	140	140
Observations	36	36
ED Visits	1264	315
TOTAL	1440	491

Abstractors Reviewed the Records

- SQI Abstractors reviewed all records and categorized the vehicle into three groups: All-terrain vehicles, Dirt bikes, and “Other” vehicles.
- They also looked for additional information including helmet use, organized event, etc.

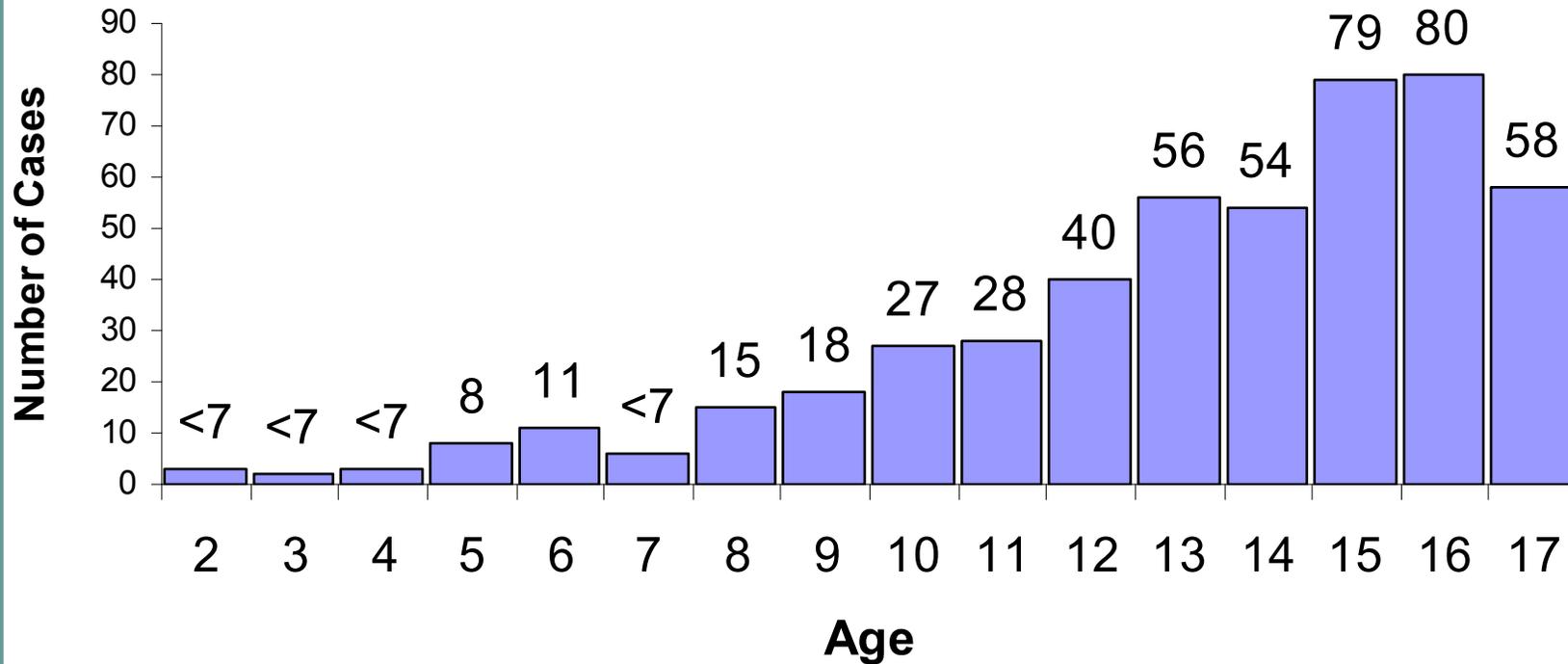
Number of Cases by Vehicle Category



- **The largest category was Dirt Bikes; 53%**
- **Followed by ATV's; 32%**
- **Pattern for ED and Hospitalizations was similar.**

Source: SQI_Off-Road Data File_2012, ISP, MDPH

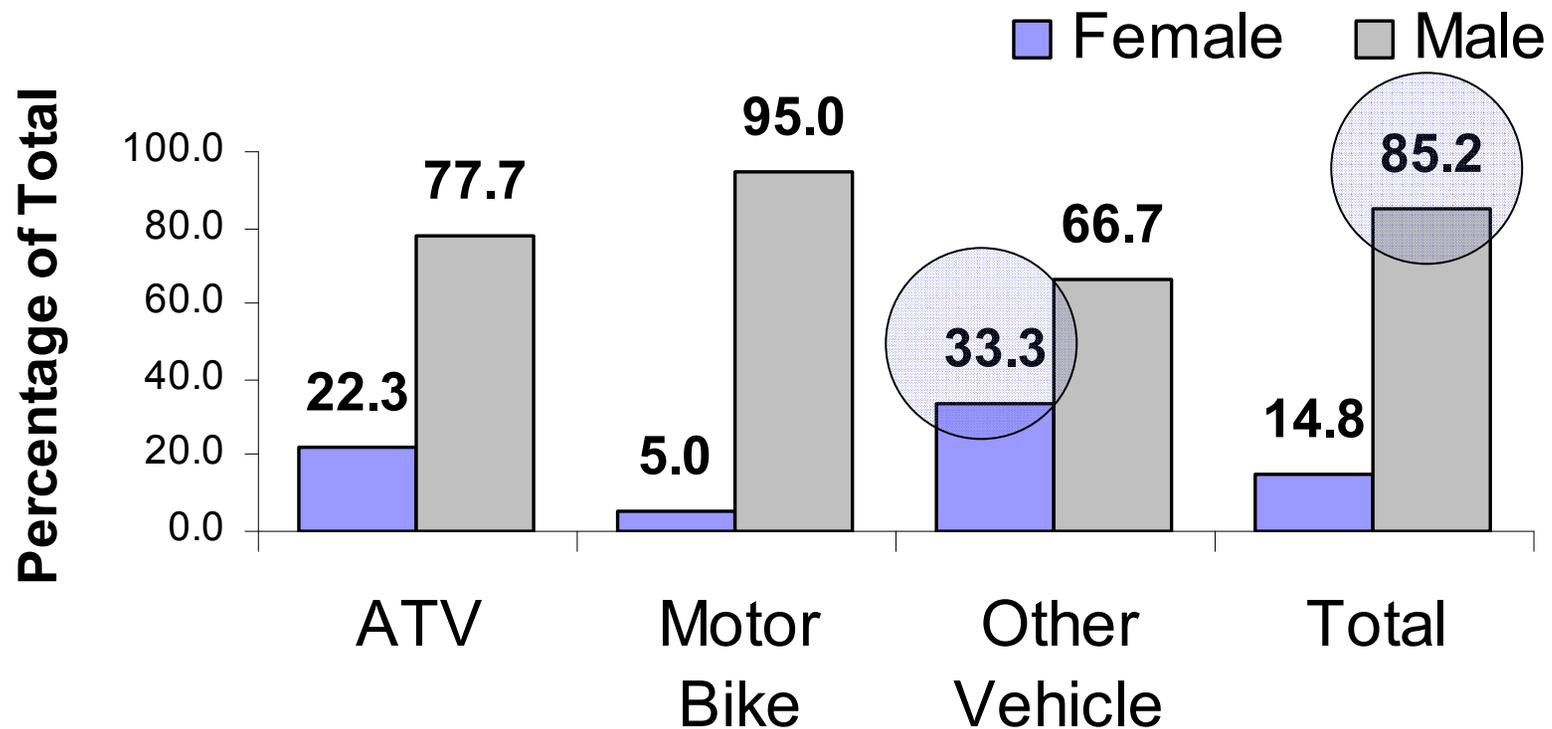
Number of Cases by Age



- **Not surprisingly, the number of injuries increased with age, with children ages 15 and 16 having the highest counts.**
- **This pattern was similar for all three vehicle categories.**

Source: SQI_Off-Road Data File_2012, ISP, MDPH

Percent by Sex of Patient and Vehicle Type



The majority of injuries were among males; 85% of total injuries and 95% of motor bike injuries.

Source: SQI_Off-Road Data File_2012, ISP, MDPH

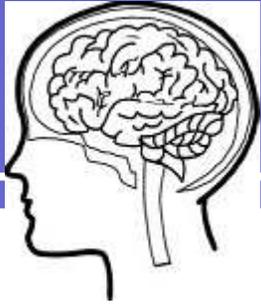
Description of “Other” Vehicles

Other Vehicle Specified	Count	%
GO-Cart	17	23.6
Golf Cart	11	15.3
Car	9	12.5
Snowmobile	8	11.1
Bike/BMX Bike	7	9.7
Other	7	9.7
Scooter	6	8.3
Motorcycle	5	6.9
Snow disc/sled	2	2.8
TOTAL	72	100.0

Source: SQL_Off-Road Data File_2012, ISP, MDPH

Among “Other” Vehicles

- Go-carts (23.6%) and golf carts (15.3%) were the most frequently recorded “Other” vehicles
- Some records in the electronic files were simply miscoded, for example:
 - Snowmobiles should fall under E820
 - E-codes other than E821 should be used to capture occupants of cars, and non-motorized bikes.
- "Other" vehicles were more likely to involve multiple vehicle crashes (16.7%) vs. ATV (5.7%) and Motor Bike (6.2%)



Traumatic Brain Injury (TBI)

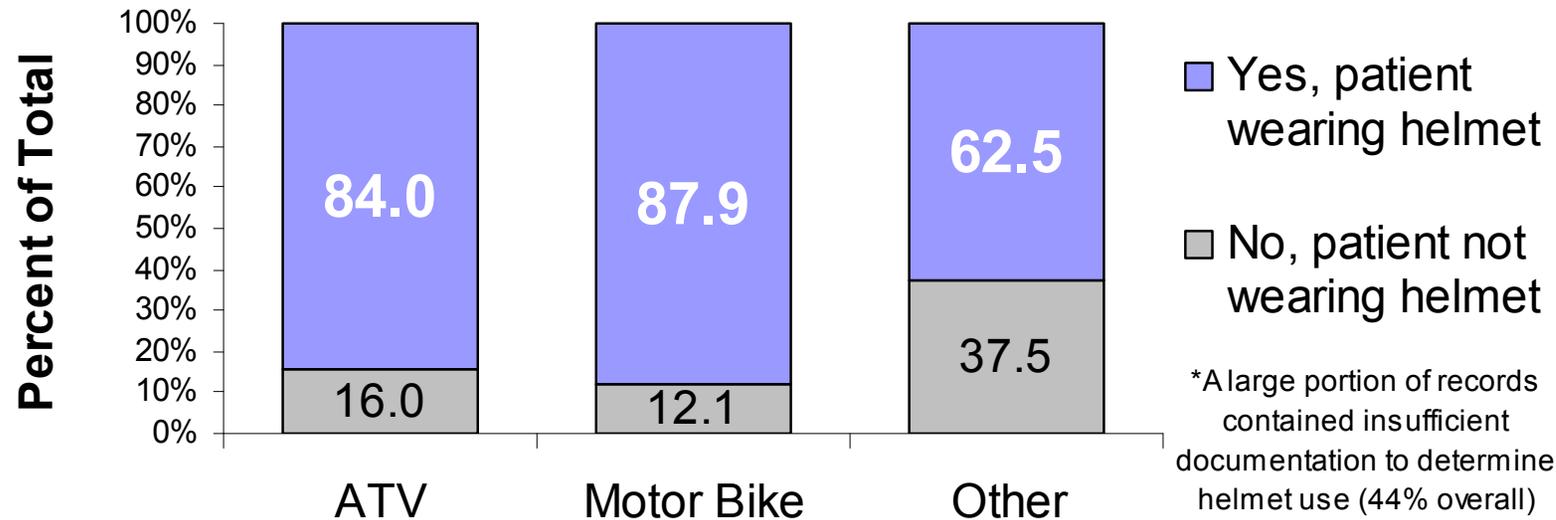
The majority of individuals who sustain a moderate or severe TBI, experience significant physical, behavioral, psychosocial, cognitive, and medical problems.¹

- **Among our off-road sample, TBI-related injury was highest among children ages 5-9 years (17.2%) compared to 16.6% among 15-17 year olds, and 14.1% among children ages 10-14.**
- **The percent of TBI among all injury causes combined was only 11.2% during the same time period.**

Source: SQI_Off-Road Data File_2012, ISP, MDPH

1. LaVecchia F. *Final Report of the Massachusetts Traumatic Brain Injury Transition Project*; June, 1996.

Helmet Use* by Vehicle Type

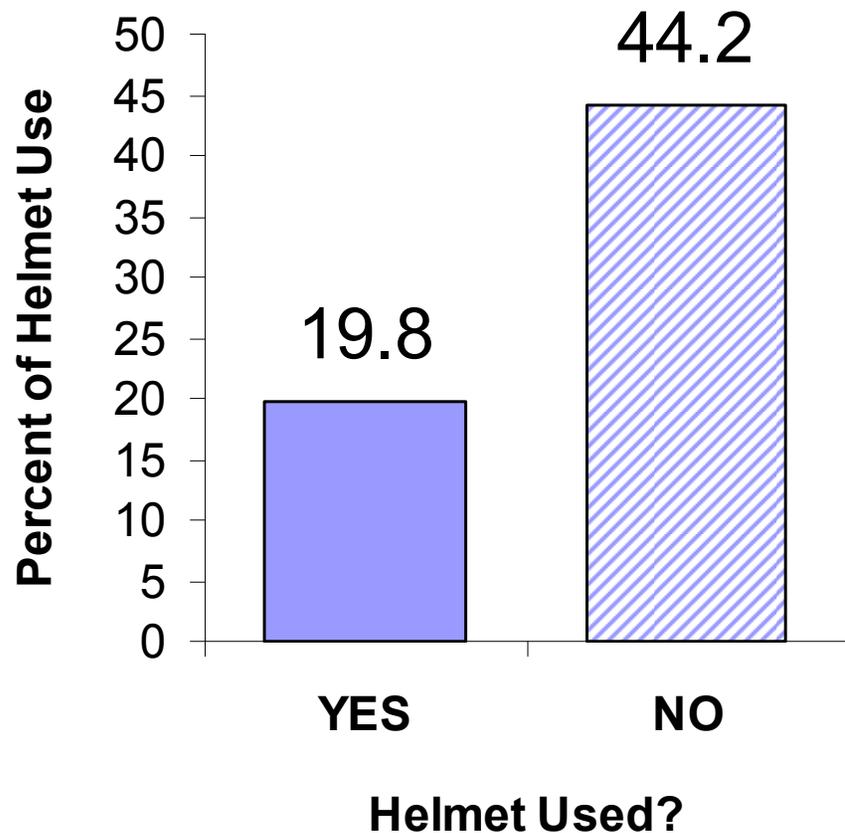


Where Helmet Use *is* Known:

- Among riders of ATVs and Motor Bikes helmet use was very high (84% for ATVs, 88% for motor bikes)
- Among just “Drivers” of ATVs helmet use goes up to 91%.

Source: SQI_Off-Road Data File_2012, ISP, MDPH

Helmet Use and TBI



- **Patients not wearing a helmet were more likely to sustain a TBI 44% vs. 20% for those wearing a helmet.**
- **10% of motor bike injuries were noted to have occurred during an organized event, and the majority (81%) of these patients were *known* to be wearing a helmet.**

Source: SQI_Off-Road Data File_2012, ISP, MDPH

Next Steps:

- Clarification of definitions – Dirt bikes vs. motorcycles
- Outreach to medical records coders
- ICD-10-CM will provide more extensive codes (Oct. 2014); but may not capture 4-wheeled ATVs.
- Data compared with other sources – MA Environmental Police data

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