



Crash Outcome Data Evaluation Systems (CODES)

Mehdi Nassirpour
Illinois Department of
Transportation
Division of Traffic Safety

Recommendation

- "Create and formalize a multi-disciplinary STRCC that forges partnership, assures that all constituents who have a stake in injury/crash reporting are represented, and can provide effective access, integration and linking of all appropriate files".

Role of ITRCC Committee

- Provide a forum for review and comment of traffic records issues within the state of Illinois.
- Review traffic related data systems and vote on suggested changes to data systems before they are implemented.
- Review the views of organizations in the state that are involved in the administration, collection and use of highway safety data.
- Review and evaluate new technologies to keep the highway safety data systems up-to-date.
- Develop the strategic plan (e.g., CODES project)
- Authorize each agency to access selected data from other Agency's data files for the purpose of the data linkage project.

NHTSA's INITIATIVES TO ADDRESS IMPROVING TRAFFIC SAFETY DATA

- NHTSA (National Highway Traffic Safety Administration) seeks to improve traffic safety

THE GOAL

Better data

-are absolutely essential to reducing the terrible human and economic cost of motor vehicle crashes.

Missing Links

- Individual databases are not always adequate for certain analyses (e.g., race and ethnicity, socioeconomic status).
- Two sources, law enforcement and public health track victims separately.
- None of the health-related data are linked back to crash data.

Coordination and Leadership

- ITRCC is supposed to build, strengthen and coordination of traffic safety data.
- Improve the quality, quantity, timeliness, and completeness of state data (BAC Reporting, capture exact location, collect more exposure data).

Strategy

- Link crash report records to medical treatment records in a computer database to learn the full story

Benefits of Linked Data

- Collaboration of traffic safety and health care communities
- The linked data can be used by multiple users for different purposes.
- The linked data process results in increased data quality.
- Linking data encourages standardized and computerization of state data.
- Linked data can be disaggregated to provide information to local communities.
- Linkage enhances the value of each state data file being linked by expanding the comprehensiveness of each state data set.
- Linkage provides access to more detailed medical information for highway and traffic safety evaluation; and linkage provides more detailed safety information for injury control purposes.

Data Linkage and Its Applications

- What is data linkage?
- What do linked data and injury data tell us?
- What is CODES?
- What are some of the examples of data linkage projects?
- What are the potential applications of the linked data in Illinois?

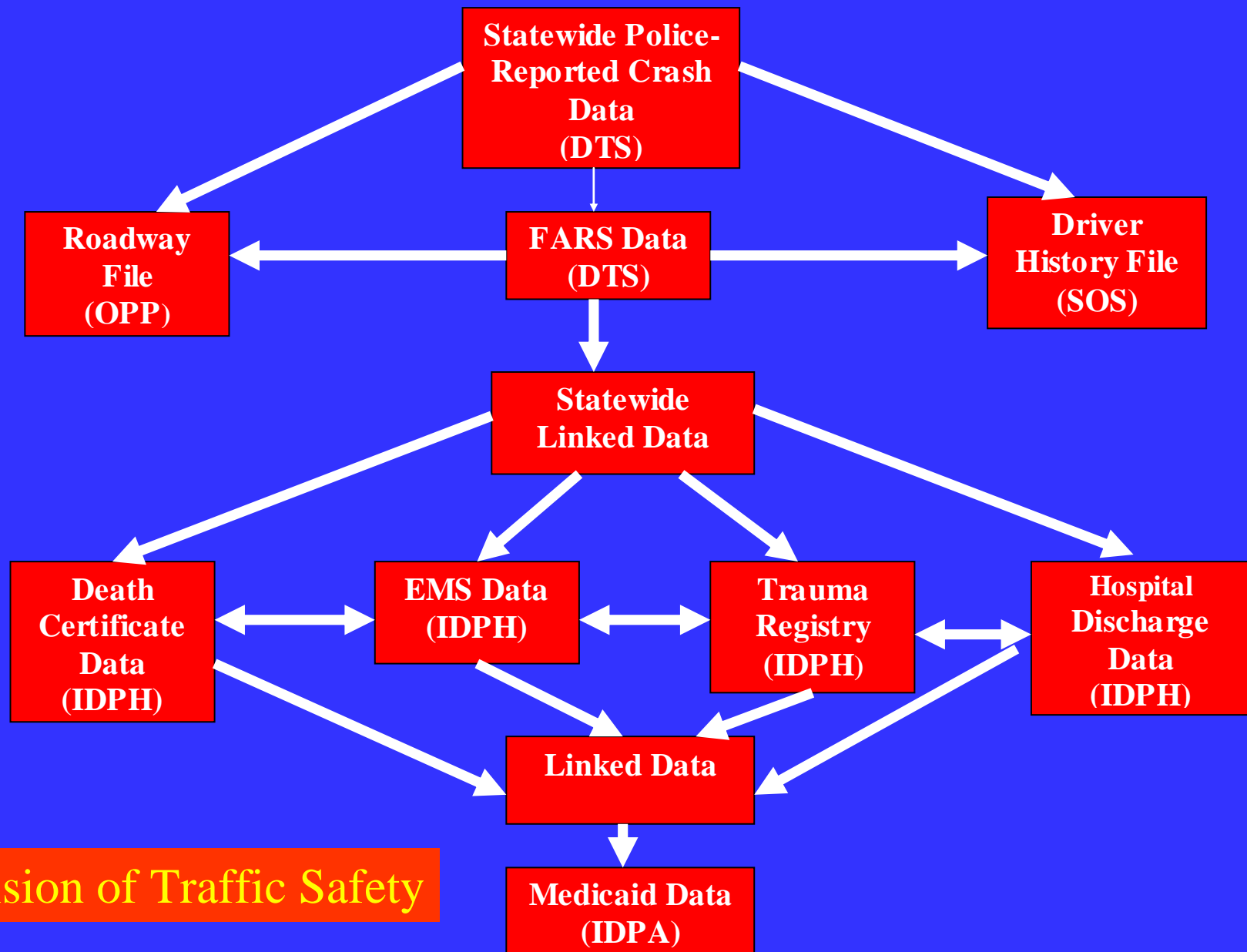
What is CODES?

- Crash Outcome Data Evaluation System
- CODES evolved from the ISTEA 1991-- ISTEA mandated that NHTSA to prepare a report to Congress about the benefits of safety belt and helmet use.
- NHTSA sponsored the CODES projects and awarded grants to several states to link their databases.

What do linked data and injury data tell us?

- People who are at risk for increased severity or high health care cost
- Nature of the injury problems
- Factors associated with injuries
- Ways to reduce severity of injuries

Exhibit 1: Flow Chart of Safety Related Data



Division of Traffic Safety

What are some of the examples of data linkage projects?

- Wisconsin--Older and younger drivers are at risk.
- Utah--Young and inexperienced drivers are at risk.
- Missouri--Types of injury and crash characteristics
- New York--Study of rear seat occupants and those riding in pick-up truck beds
- Maine--Injuries and costs resulting from collision with moose and deer.
- Missouri--Effectiveness of helmets in preventing brain injuries.

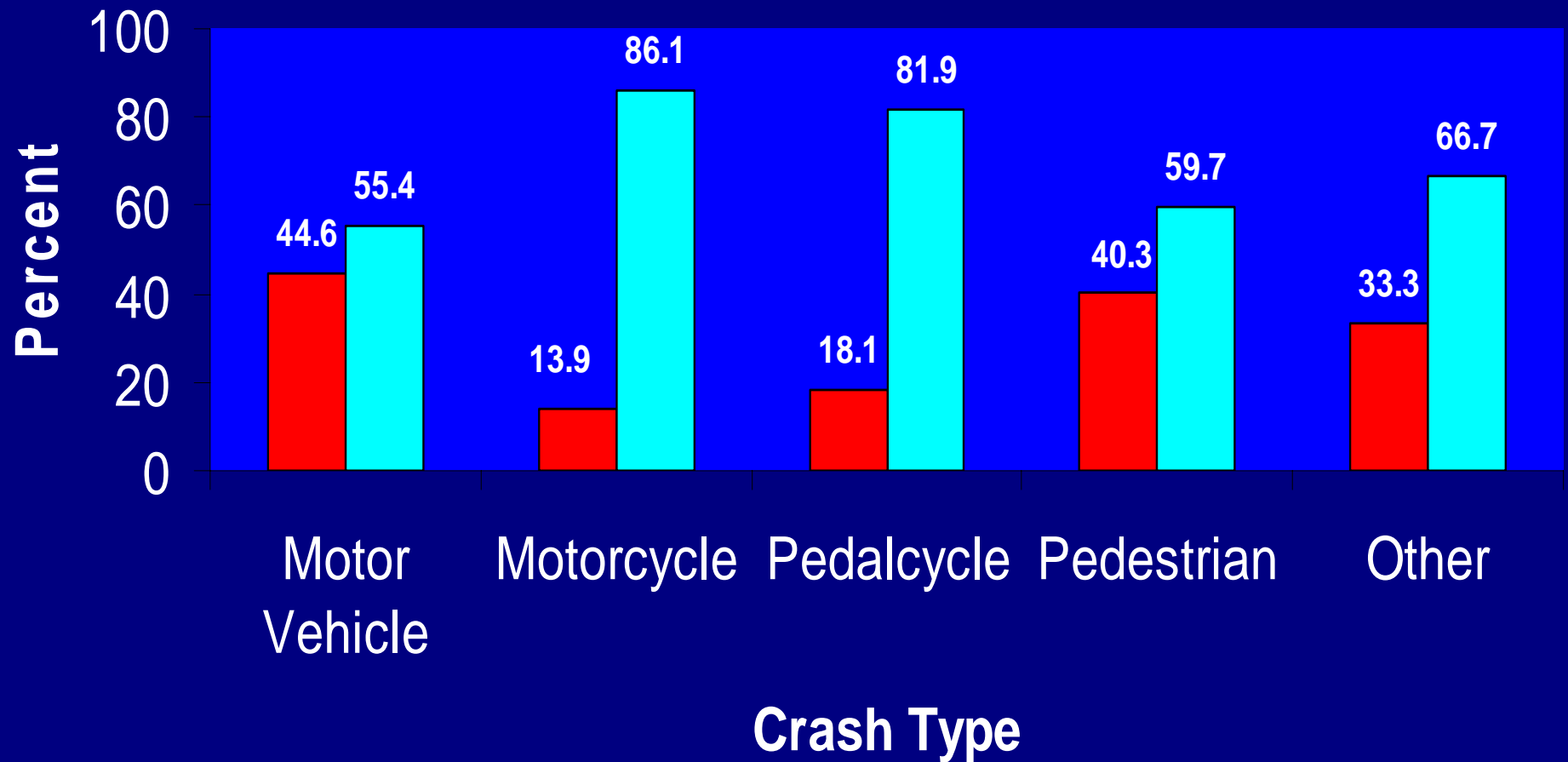
What are the potential applications of the linked data in Illinois?

- Effectiveness of helmets and safety Belts
- High cost users of health care
- Identifying high crash locations
- Understanding the nature of crashes and injuries
- Identifying causes of motor vehicle injuries
- Improving data quality
- Other applications

Research Question

- Does safety belt use affect risk of injury for passenger car occupants?
- Does helmet use affect hospital inpatient charges for motorcycle riders?
- Does type of impacting vehicle (car, truck, SUV) affect type of injury in a side impact?
- Does safety belt use affect type of injury for children sitting in the back seat?

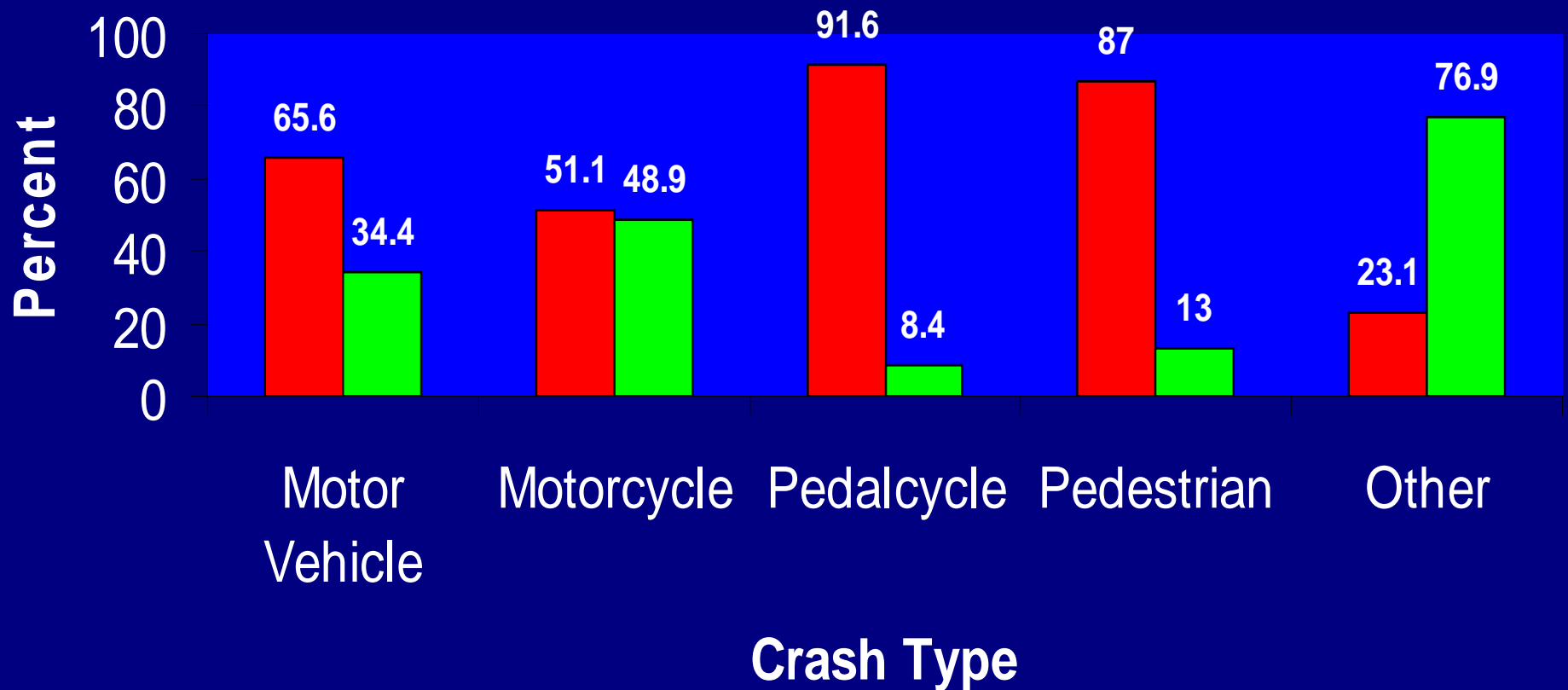
Figure 1: Percent Distribution of Crash Type by Gender in Illinois



Source: IHCCCC

Female Male

Figure 2: Percent Distribution of Crash Type by Collision Type in Illinois



Source: IHCCCC

■ Collision ■ No Collision

Figure 3: Percent Distribution of Crash Type by Injury Type in Illinois

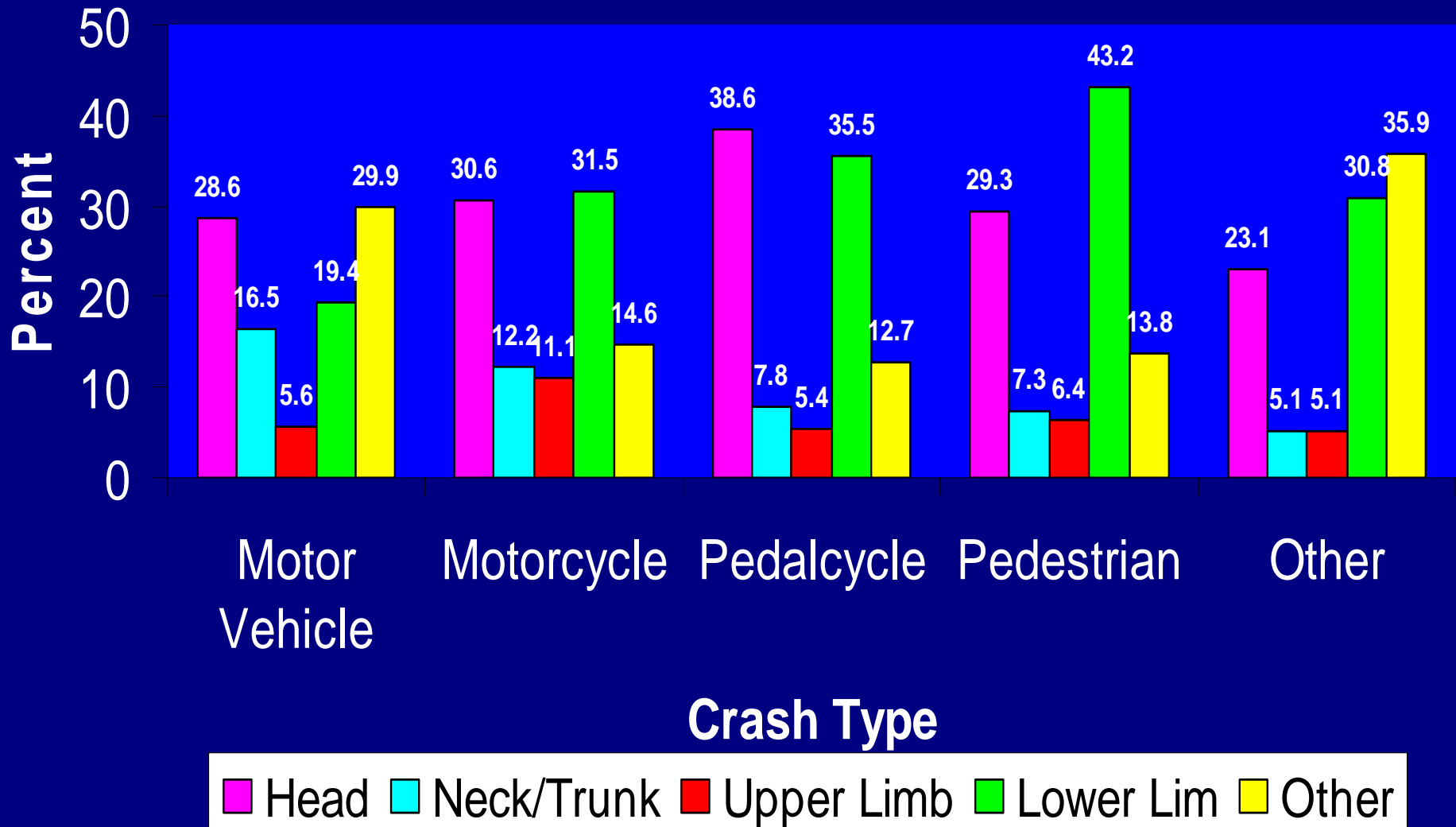
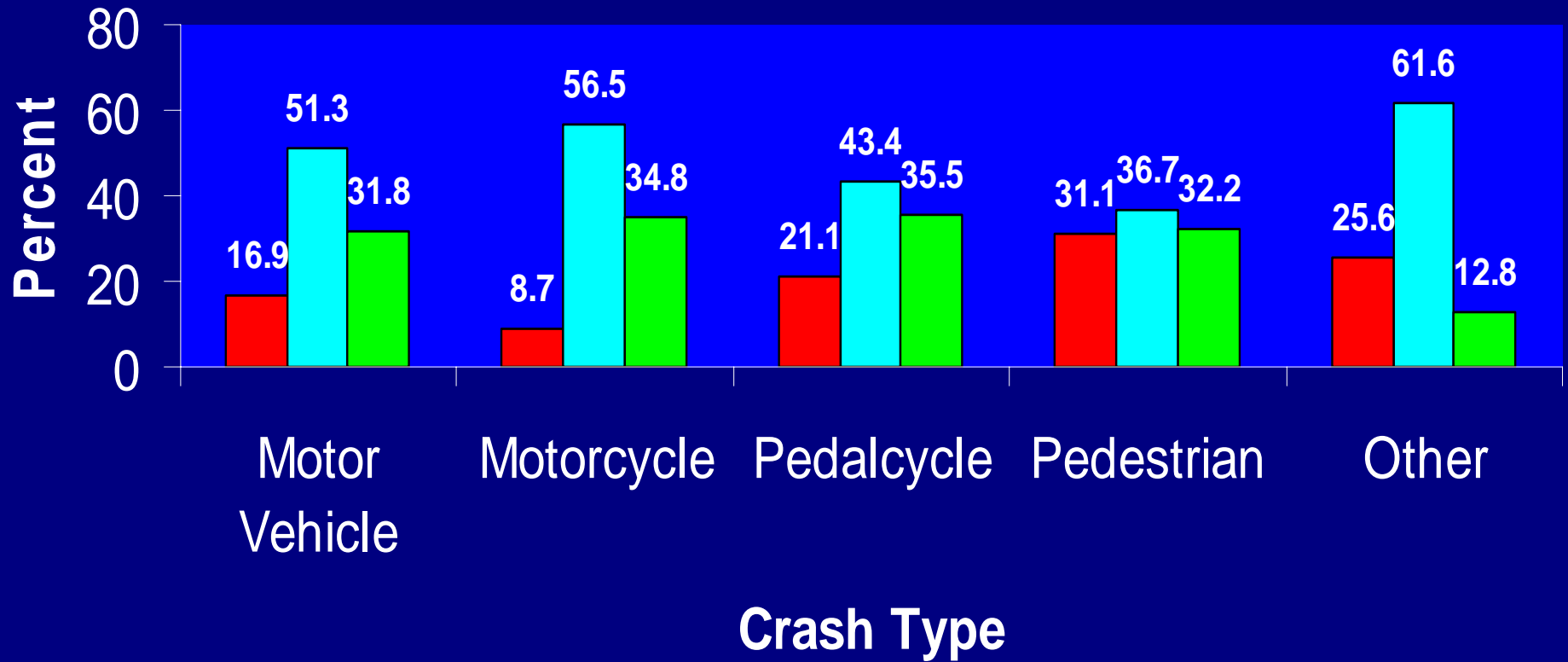


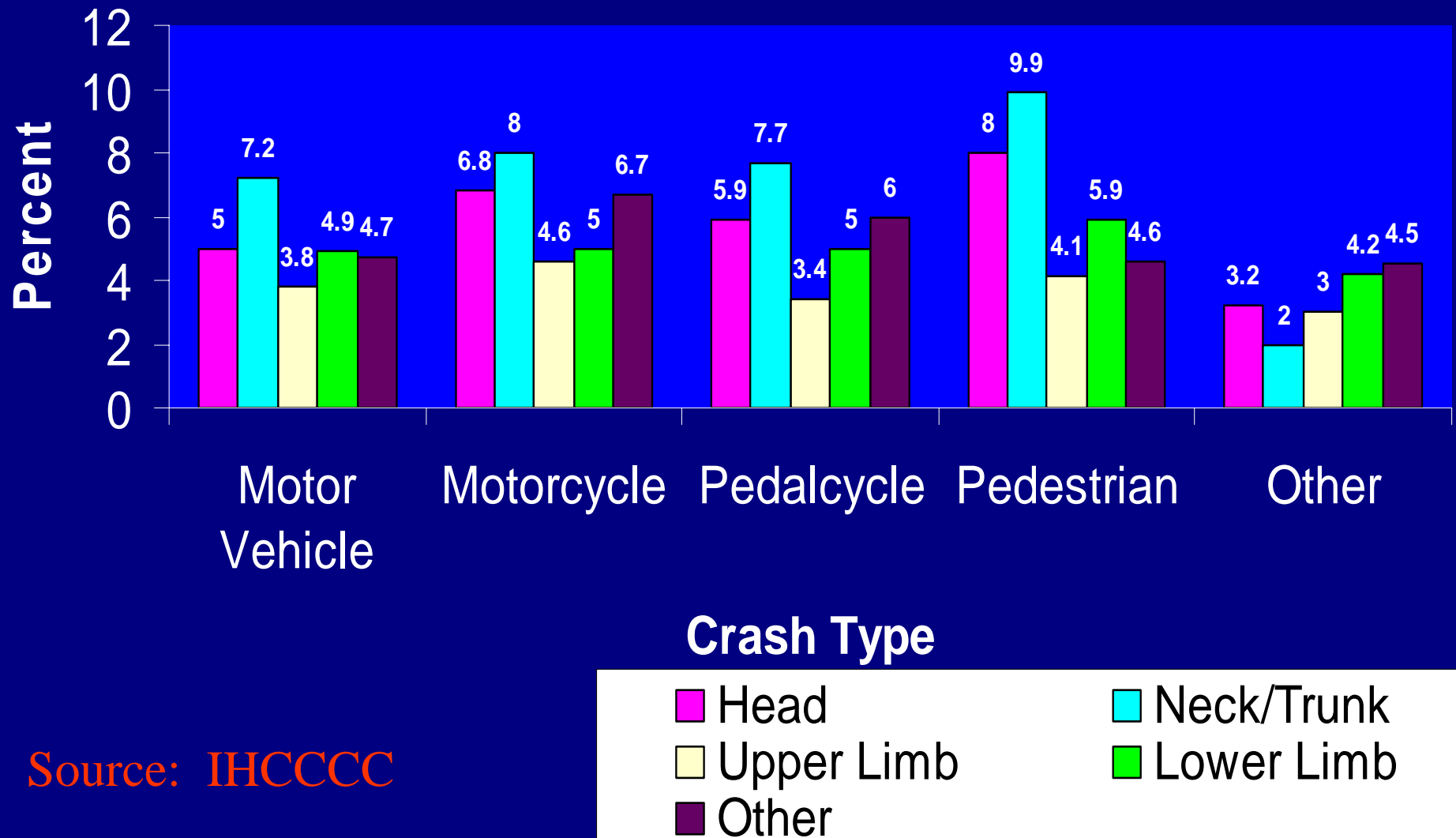
Figure 4: Percent Distribution of Crash Type by Payor Type in Illinois



Source: IHCCCC

Public Private Other

Figure 5: Average Length of Stay by Crash Type in Illinois



Source: IHCCCC

TABLE 1: AVERAGE LENGTH OF STAY (LOS) AND AVERAGE CHARGES (ACH) FOR MOTOR VEHICLE INJURY DISCHARGES BY VEHICLE TYPE AND TYPE OF INJURY IN ILLINOIS IN 1997

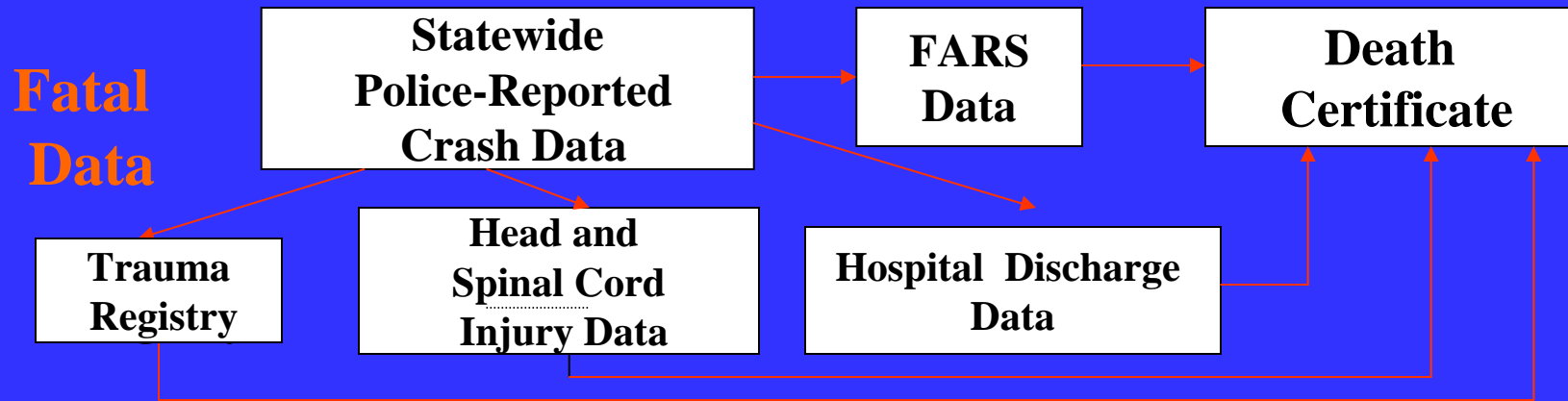
Type of Injury	Motor Vehicle		Motorcycle		Pedalcycle		Pedestrian		Other	
	LOS	ACH (\$)	LOS	ACH (\$)	LOS	ACH (\$)	LOS	ACH (\$)	LOS	ACH (\$)
Head	5.0	20,256	6.8	38,974	5.9	22,432	8.0	40,449	3.2	9,368
Neck/Trunk	7.2	21,717	8.0	22,940	7.7	31,225	9.9	47,557	2.0	4,175
Upper Limb	3.8	12,660	4.6	17,460	3.4	11,447	4.1	14,038	3.0	15,304
Lower Limb	4.9	17,514	5.0	20,966	5.0	19,253	5.9	23,208	4.2	10,606
Other	4.7	13,366	6.7	21,192	6.0	23,810	4.6	16,488	4.5	17,458

Source: IHCCCC

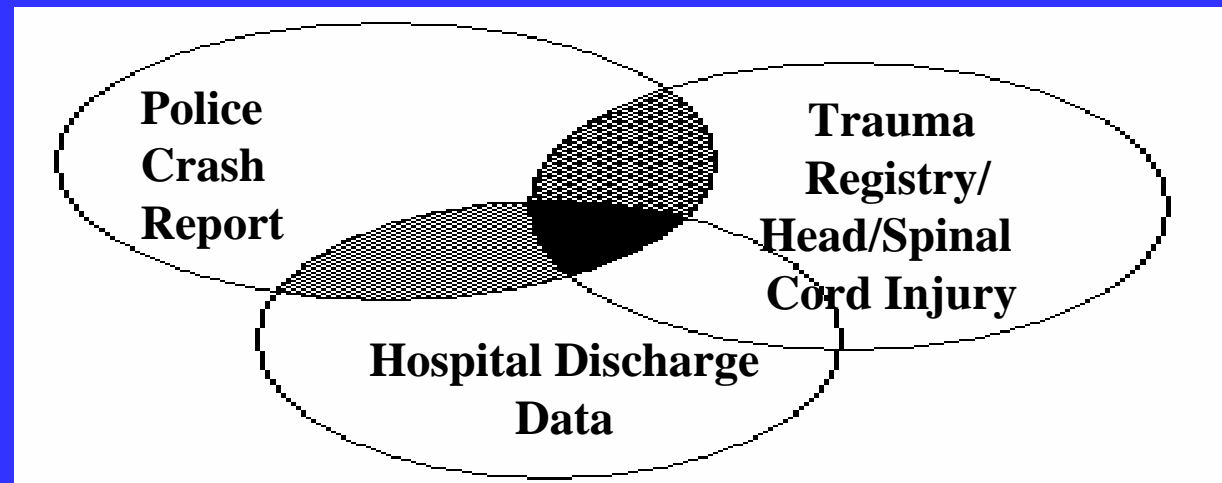
CODES IN ILLINOIS

- The National Highway Safety Administration (NHTSA) recently awarded the Illinois Department of Transportation (IDOT) about \$281,000 to develop a CODES (Crash Outcome Data Evaluation System) program in Illinois. This project will be based on collaboration between IDOT and the Illinois Department of Public Health (IDPH) and other state agencies.
- Under this grant, IDOT will link existing traffic crash records with health care data sources from EMS, trauma registry, hospital discharges, and vital records (death certificates). The linked database will be used to support local, regional and statewide highway safety decision-making to affect decreases in deaths, non-fatal injuries (e.g., head, neck, upper extremity and lower extremity), and health care costs resulting from motor vehicle crashes.

Exhibit 2: Proposed CODES Data System for the State of Illinois



Inpatient Information



Outpatient Information

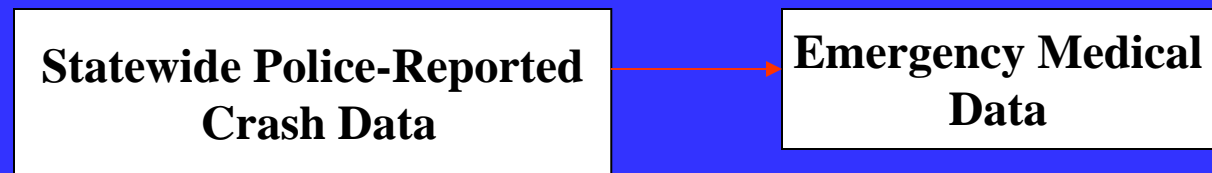
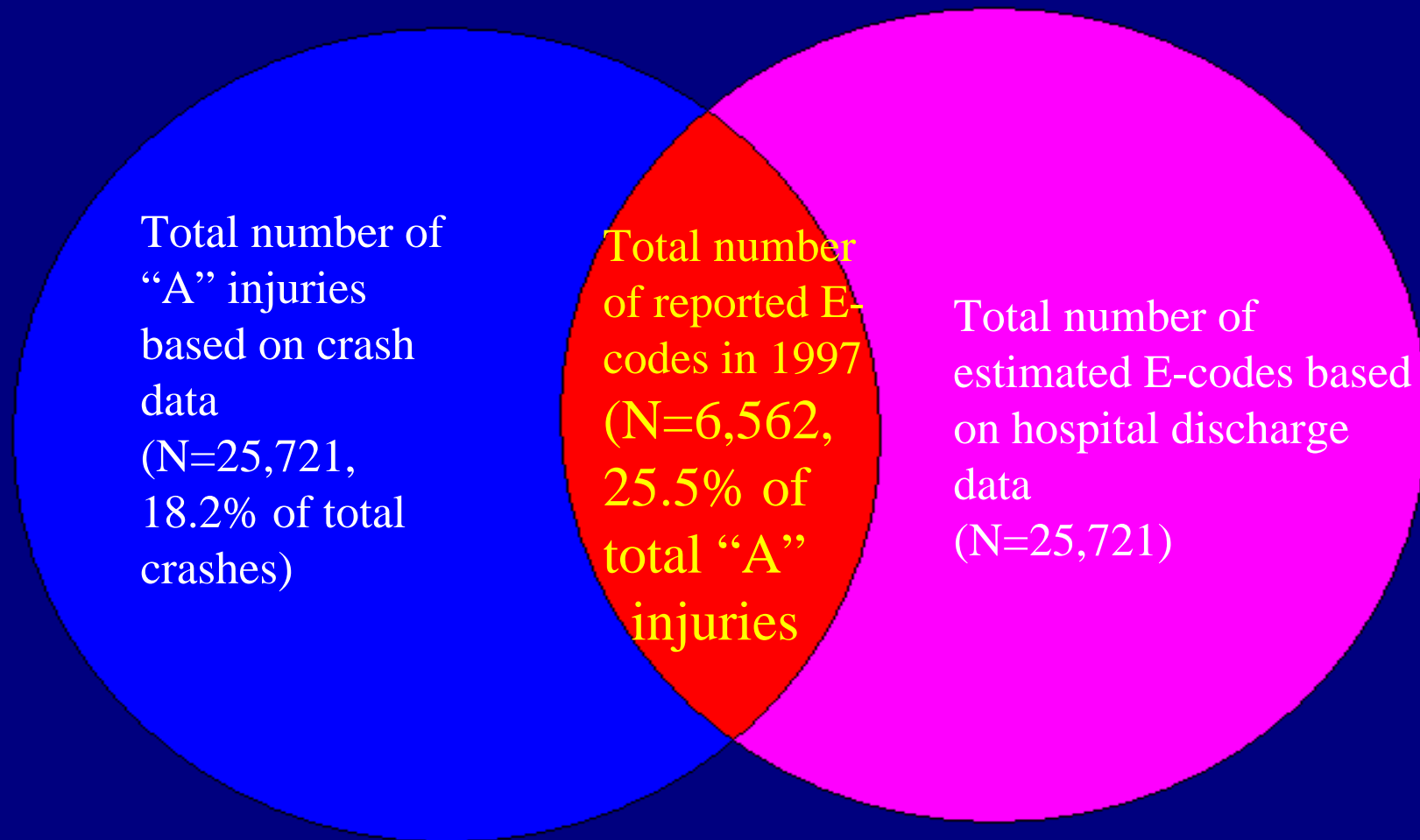


Exhibit 3: Estimated Percentage of Reported E-Codes in Illinois in 1997



Sources: 1995 Crash Data and 1997 Hospital Discharge Data

Data Linkage Model

- Bayesian Statistical Theory—
The main objective of this theory is to calculate the probability of an uncertain claim in light of prior information and new experimental evidence.

CODES2000 Linkage Software

- It is developed by Strategic Matching , Inc. that has contract with NHTSA.
 - It is a probabilistic records Linkage Software that includes effective algorithms for data preparation, analysis, and comparison.
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Probability = .9999

File	Date	Time	City	DOB	Sex
Crash	June 2	10 AM	Chicago	5/10/2	
EMS	June 2	10 AM	Chicago	5/10/2	M

Probability = .733

File	Date	Time	City	DOB	Sex
Crash	June 2	10 AM	Chicago	5/10/2	
EMS	June 2	10 AM		5/10/2	M

Probability = .125

File	Date	Time	City	DOB	Sex
Crash	June 2	10 AM	Chicago	5/10/2	
EMS	June 2	7AM	Normal	5/10/2	M

Users of CODES Data

- Academic Researchers - Engineering, Public Health, Public Policy
- Federal & State Senators & Representatives
- Governor's Offices
- Federal, State, and Local Agencies - DOT, DPS, DMV, DH, DHC -EMS
- First Responders - Sheriff, Police, Fire Department, Emergency Medical Services
- Advocacy groups - MADD
- Community Groups - "Safe" anything