Comprehensive, Complete Data are the Key...

To understanding why the injury outcome and financial consequences of motor vehicle crashes remain a major public health problem.

The Problem…
Crash data are not comprehensive and complete.

The Solution…
Link crash, injury, and other traffic records to improve the injury and financial conditions of the data.

Samples of State-specific fact sheets, standardized reports, and publications can be found on the CODES Web sites. Some also provide interactive query capabilities that allow the user to directly access the linked data in compliance with State privacy legislation/regulations.
What Resources Does NHTSA Provide to Assist States to Implement CODES?

1. Two years of statewide, electronic data
   - Crash
   - Emergency Medical Services (EMS) or Emergency Department (ED)
   - Hospital Discharge
   - Death
   - Other Traffic Records

2. Data elements that discriminate between persons and events to generate the comprehensive crash outcome data that are needed to improve traffic safety.

What is Probabilistic Linkage?

Unique identifiers (e.g., name) usually are not available for linkage. To complicate matters, data may be missing or inaccurate. So, probabilistic linkage techniques are used to generate an estimate of the probability that a matched pair is a valid match.

Are the Linked Data Representative?

Conclusions generated by case control studies are to improve traffic safety, information is needed about the people, vehicles, and environment involved before, during, and after the crash. Based on high-probability linked pairs (excluding low-probability linked pairs) of which many would be valid with complete data) cannot be presented as representative of the population. To compensate for the imperfect data, linkage imputation techniques are implemented to generate sets of data that can be used to statistically fill in the gaps. The linked data are then complete for the linked data.

To improve traffic safety, information is needed about the people, vehicles, and environment involved before, during, and after the crash.

State-Specific CODES Applications

CODES States have developed different formats for presenting the linked data.

Fact Sheets

A one- or two-page, issue-based format that focuses the data so the reader gets the message in a glance.

Standardized Reports

A one-page format that displays descriptive data using columns for outcome measures, increasing in severity level from left to right, and changing rows to reflect the units being studied for the audience that needs the data. These reports facilitate intermediate comparisons and identify local, regional, and statewide problems.

Research Reports

A multipage format for providing in-depth analysis of traffic safety issues, such as the effectiveness of safety belts in terms of preventing or reducing fatalities, injuries, severity, and hospital charges statewide and nationally. A one-page format for presenting the linked data.

Uses of CODES Data

State Traffic Records Coordinating Committee (TRCC) and NHTSA

Identify traffic safety priorities that will have an impact on improving mortality, morbidity, severity, and charges statewide and nationally.

Legislators

Support traffic safety legislation (belts, helmets, etc.)

Traffic Safety Trainers

Provide realistic crash outcome data for training traffic safety professionals.

Program Manager

Monitors results before and after implementation of a specific costumer change.

Injury Control Professionals

Monitor specific population groups, locations, seasons, time periods, and vehicle types to reduce deaths, injuries, severity, and costs.

Emergency Medical Service (EMS) Professionals

Support a systems approach to evaluating EMS effectiveness.
What is CODES?
CODES electronically tracks victims of a motor vehicle crash from the scene through the health care system to determine crash outcome in terms of mortality, injury, severity, and health care costs.

What Resources Does NHTSA Provide to Assist States to Implement CODES?
1. One week of training implementing the CODES2000 software and the linkage/ imputation techniques onsite for new States.
2. Onsite technical assistance on demand.
3. An annual national meeting to provide technical assistance and training for all grantees and states interested in CODES.

What Do the States Need to Do to Implement CODES?
1. Two years of statewide, electronic data
2. Data elements that discriminate between vehicle, and/or event to injury type, severity, and hospital charges.
3. Personnel experienced working with ACCESS, and/or to experience working with Access State data files.
4. Willingness to
   - Collaborate with NHTSA
   - Provide State matching funds
   - Conserve the data owners as the CODES Board of Directors to control release and use of the data
   - Conserve linked data users as the CODES Advisory Committee to encourage use of the linked crash outcome data for more effective traffic safety decisions.

Convene linked data users as the CODES Board of Directors to control release and use of the data

WHAT IS PROBABILISTIC LINKAGE?
Uniques identifiers (e.g., name) usually are not available for linkage. To complicate matters, data may be missing or inaccurate. So, probabilistic linkage techniques are used to generate an estimate of the probability that a matched pair is a valid match.

Are the Linked Data Representative?
Conclusions generated by case control studies are To improve traffic safety, information is needed about the people, vehicles, and environment involved before, during, and after the crash. Based on high-probability linked pairs (excluding those probability linked pairs, of which many would be valid with complete data) cannot be generated as representative of the population. To compensate for the imputed data, linkage imputation techniques are implemented to generate sets of data that can be used to statistically fill in the gaps. The linked data are then complete for traffic safety analyses and planning.

To improve traffic safety, information is needed about the people, vehicles, and environment involved before, during, and after the crash.

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Standardized Reports
A one-page format that displays descriptive data using columns for outcome measures, increasing in severity level from left to right, and changing rows to reflect the units being studied for the insets report on the right. These reports facilitate interanate comparisons and identify local, regional, and statewide problems.

Research Reports
A multipage format for providing an in-depth analysis of traffic safety issues, such as the effectiveness of safety belts in terms of preventing or reducing fatalities, injuries, severity, and hospital charges within the region. Statistical significance is tested and the results are reported with confidence intervals. These reports are useful in analyzing the significance of low-frequency events on crash outcomes.

CODES Data Network
CODES States that have successfully linked at least two years of data are invited to collaborate with the CODES States that have successfully linked at least two years of data and statewide problems.

Uses of CODES Data
State Traffic Records Coordinating Committee (TRCC) and NHTSA
- Identify traffic safety priorities that will have an impact on improving mortality, morbidity, severity, and charges statewide and nationally.
- Support traffic safety legislation (bills, helmets, etc.)

Traffic Safety Trainers
- Provide realistic crash outcome data for training traffic safety professionals.

Program Manager
- Monitors results before and after implementation of a specific countermassure.

Injury Control Professionals
- Target specific population groups, locations, seasons, time periods, and vehicle types to reduce deaths, injuries, severity, and costs.

Emergency Medical Service (EMS) Professionals
- Support a systems approach to evaluating EMS effectiveness.
What is CODES?
CODES electronically tracks victims of a motor vehicle crash from the scene through the health care system to determine crash outcome in terms of mortality, injury, severity, and health care costs.

Benefits of CODES
- Generates State-specific crash outcome information.
- Matches specific characteristics of the person, vehicle, and/or event to injury type, severity, and hospital charges.
- Identifies data quality problems during the linkage process.
- Creates a permanent database that includes all of the data elements in each data file that is linked.

Protection of Privacy
In each CODES State, the CODES Board of Directors controls access to its linked data in compliance with State privacy legislation and regulations.

What Resources Does NHTSA Provide to Assist States to Implement CODES?
1. Two years of statewide, electronic data
   - Crash
   - Emergency Medical Services (EMS) or Emergency Department (ED)
   - Hospital Discharge
   - Death
   - Other Traffic Records

2. Data elements that discriminate between crashes and the persons involved in the crash.
3. Personnel experienced working with ACCESS, SAS, and crash and/or injury State data files.
4. Willingness to:
   - Collaborate with NHTSA
   - Provide State matching funds
   - Convene the data owners as the CODES Board of Directors to control release and use of the data
   - Convene linked data users as the CODES Advisory Committee to encourage use of the linked crash outcome data for more effective traffic safety decisions.

Linkage Variables
Types of data elements that identify a PERSON:
- Sex
- Day and Month of Birth
- Gender
- Vehicle Number for Crash
- Seating Position
- Injury Status
- Transport by EMS
- Admission as Hospital Inpatient
- Sex
- Social Security Number
- Other variables

Types of data elements that identify a CRASH:
- Day and Month of Crash
- Year of Crash
- County/City of Crash Location
- Type of Crash
- Type of Vehicle
- Vehicle Identification Number
- EMS Agency Providing Transport
- Service Areas: Police, EMS, Hospital

To improve traffic safety, information is needed about the people, vehicles, and environment involved before, during, and after the crash.

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Standardized Reports
A one-page format that displays descriptive statistics using columns for outcome measures, increasing in severity level from left to right, and changing rows to reflect the units being studied for the issue report on the left. These reports facilitate inter-state comparisons and identify local, regional, and statewide problems.

Research Reports
A multipage format for providing an in-depth analysis of traffic safety issues, such as the effectiveness of safety belts in terms of preventing or reducing fatalities, injuries, severity, and hospital charges within the state. Statistical significance is tested and the results are reported with confidence in intervals. These reports are useful in analyzing the significance of low-frequency events on crash outcomes.

CODES Data Network
CODES States that have successfully linked at least two years of data are invited to collaborate with CODES2000

Uses of CODES Data
State Traffic Records Coordinating Committee (TRCC) and NHTSA
- Identify traffic safety priorities that will have an impact on improving mortality, morbidity, severity, and charges statewide and nationally.

Legislators
- Support traffic safety legislation (belts, helmets, etc.)

Traffic Safety Trainers
- Provide realistic crash outcome data for training traffic safety professionals.

Program Manager
- Monitors results before and after implementation of a specific countermeasure.

Injury Control Professionals
- Target specific population groups, locations, seasons, time periods, and vehicle types to reduce deaths, injuries, severity, and costs.

Emergency Medical Service (EMS) Professionals
- Support a results approach to evaluating EMS effectiveness.
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The Crash Outcome Data Evaluation System

Is Your State a CODES State?

CODES Web Sites
NHTSA www.nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/ CODES.html

- Arizona
- Delaware
- Kansas
  - www.kipcs.ks.edu/projects/CODES
- Maine
  - www.mhcir.org/CODES
- Maryland
  - medsch.university.edu/NSGorTrauma-2002%Ummedian%20charges/mediategraphs.pdf
- Missouri
  - www.dhs.mo.gov/MICA/index.html (select motor vehicle crashes)
- Minnesota
  - www.dgs.state.mn.us/OTS/crashdata (select CODES project)
- Nebraska
  - www.hhs.state.ne.us/src/codeisreport91.pdf
  - www.hhs.state.ne.us/search/CODES select #8
- New Hampshire
  - www.srh.state.nh.us/safety/ems/projects.html
- Oklahoma
  - codes.ou.edu
- South Carolina
  - www.ccr2.state.sc.us (select SC CODES project)
- South Dakota
  - www.sed.state.sd.us/brbinfo/codes
- Tennessee
- Utah
  - codes.ou.edu
- Wisconsin
  - www.chsra.wisc.edu/codes

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