APPENDIX A

IOWA DATA AND ANALYSIS

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- Iowa DOT Office of Traffic and Safety Identification of Highway Safety Improvement Candidate Locations
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APPENDIX A
Iowa Data and Analysis

KEY TOPICS

- data gathering, integration, and analysis
- geographical information systems (GIS)
- knowledge tools
- multidisciplinary approach

INTRODUCTION

Data Knowledge

Knowledge is power—and in the world of traffic safety, knowledge has the ultimate power . . . saving lives.

Iowa Department of Transportation (Iowa DOT), *INSIDE* (May 2001)

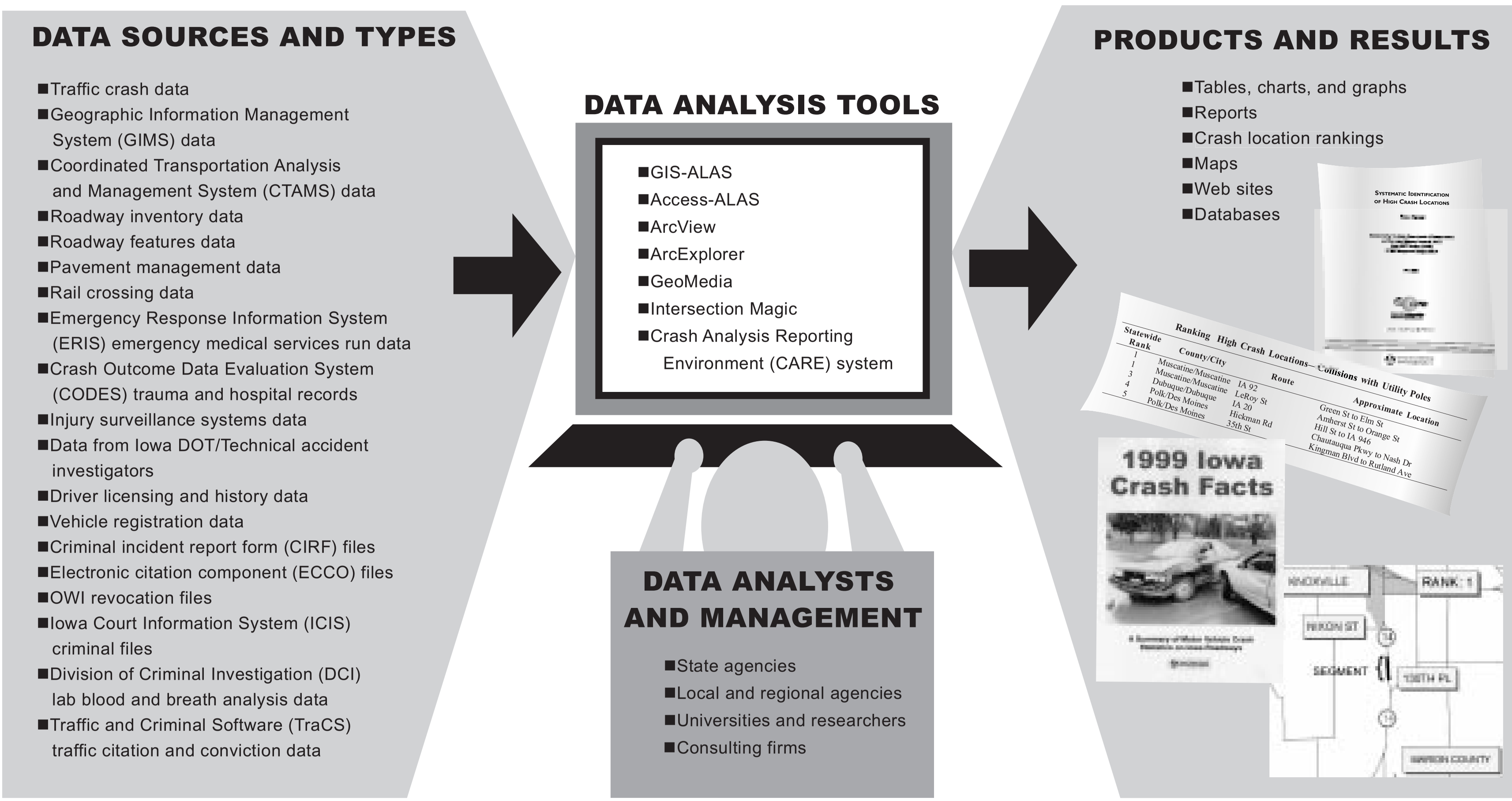
Data knowledge is probably the most powerful tool available in the campaign for highway safety. The Iowa Safety Management System (Iowa SMS) and its partners recognize that the combined *knowledge* of highway safety and related discipline practitioners can be a powerful tool in applying appropriate strategies to reduce Iowa's crashes, fatalities, injuries, and property losses. The knowledge available to these practitioners comes in many forms, including crash data, behavioral and sociological information, roadway engineering research, and health and demographic statistics.

Highway safety professionals and advocates face the challenge of making the best use of the data by integrating various sources of relevant and reliable information and incorporating a multidisciplinary approach to analyzing the facts. Ultimately, by acquiring and utilizing all available data in an accurate and timely manner these practitioners have the knowledge and power required to make appropriate and effective policy, law, budget, and operational decisions related to highway safety at both state and local levels.

Iowa's Data Sources, Analysis Tools, and Outcomes

Iowa's current system of data gathering, integration, and analysis is illustrated in the following figure. Note that the analysts represent multidisciplinary approaches.

System of Data Gathering, Integration, and Analysis in Iowa



Crash Data

Highway safety practitioners at both the state and local level are challenged to use all available data to identify crash patterns that may indicate specific roadway features and driver behaviors or expectations that could be improved to mitigate certain types of crashes or crashes in certain locations. Crash records constitute the core data base, but note that crash data describe only the *failures* of drivers, vehicles, and/or roadway elements to function together successfully. Such data by themselves do not identify near-failures, potential failures, or successes.

Other potentially useful information includes

- Traffic volume and composition
- Traffic control devices
- Roadway and roadside design features
- Perceived operational and safety problems
- Maintenance of objects struck in crashes
- Traffic citation patterns
- Adverse litigation history

Crash Costs

Many individuals and agencies are reluctant to assign a dollar value to a human life. This difficult and often emotional issue has been and will continue to be discussed and considered among highway safety practitioners and policy makers.

The costs of highway crashes are used for many purposes, including allocating highway safety resources to maximize safety benefits, evaluating proposed safety regulations, and convincing policy makers and employers that safety programs are beneficial. Crash costs are also one of the most important measures available for determining the effectiveness of highway safety improvement projects.

Benefit/Cost Analysis Methodology

The Federal Highway Administration (FHWA) publication entitled *Highway Safety Evaluation Procedural Guide* (1981) describes a nine-step methodology for the benefit-cost ratio (B/C) analysis of highway safety improvement projects (i.e., crash countermeasures or countermeasure combinations). These steps determine the following countermeasure properties and economic parameters:

- Annual average safety benefit
- Implementation cost
- Net annual operating and maintenance costs

The B/C analysis is an economic tool for assessing and comparing possible countermeasures. For each countermeasure considered, it compares expected benefits to expected costs. "Benefits" here consist of the reduced frequency and severity of crashes. "Costs" include elements for selecting, designing, implementing, operating, and maintaining a countermeasure. Both benefits and costs are expressed in dollars to facilitate the use of their ratio as a key economic performance indicator. B/C ratios indicate economic viability when they are greater than or equal to 1.0, and they reflect relative economic desirability by the degree to which they exceed 1.0.

Once the cost of a proposed safety project or public education initiative has been estimated, a decision must be made whether to fund the project. A common method used to make (or at least influence) this decision is a B/C analysis. Such an analysis requires the quantifying of expected project benefits. This quantifying requires, in turn, estimates of the numbers of crashes, deaths, and injuries that may be avoided by the implementation of the project. It also requires the adoption and use of average dollar values for each life saved and injury avoided.

These crash costs are sensitive to time and the methodology used to compute them. Thus, it is essential that crash costs are current and that the underlying methodology used is theoretically sound.

Crash Costs Used by the Iowa DOT

The Iowa Department of Transportation (Iowa DOT) recently adopted the following new figures for use beginning July 1, 2001 (the Iowa DOT had last adjusted its cost figures in 1997):

Fatality	$1,000,000
Major injury	$150,000
Minor injury	$10,000
Possible injury	$2,500
Property damage only	$2,500

Fatality Cost Figures Used Elsewhere

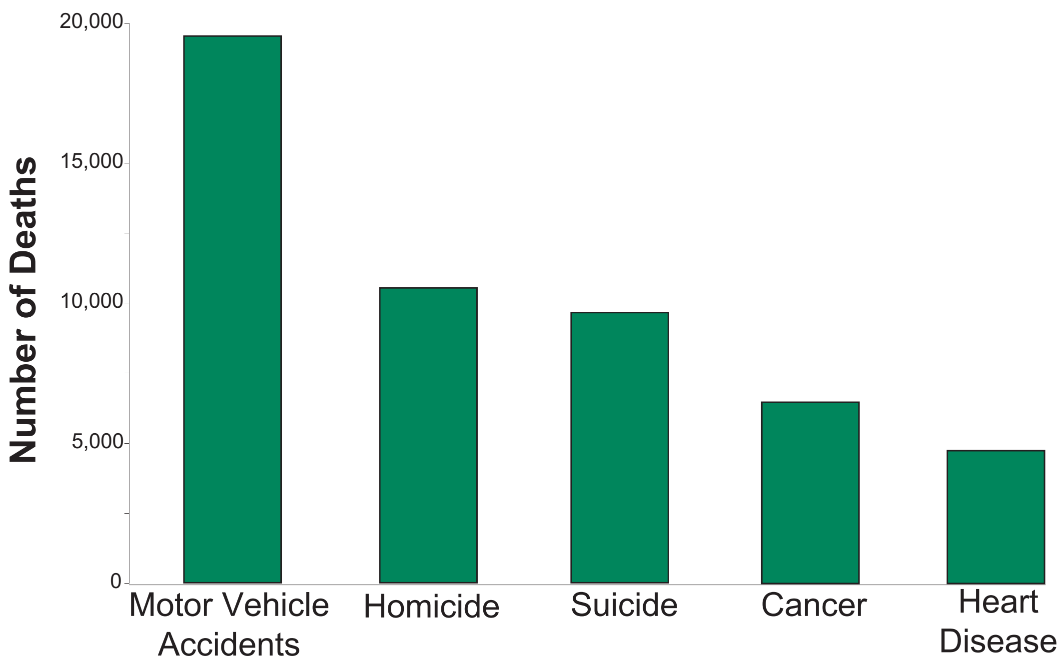
Average used by other state departments of transportation	$1,200,000
Cost used by U.S. Department of Transportation	$2,500,000
Cost used by the National Safety Council	$3,040,000

Other disciplines, agencies, and entities may assign other cost factors based on their own data and political climate.

IOWA AND COMPARATIVE DATA

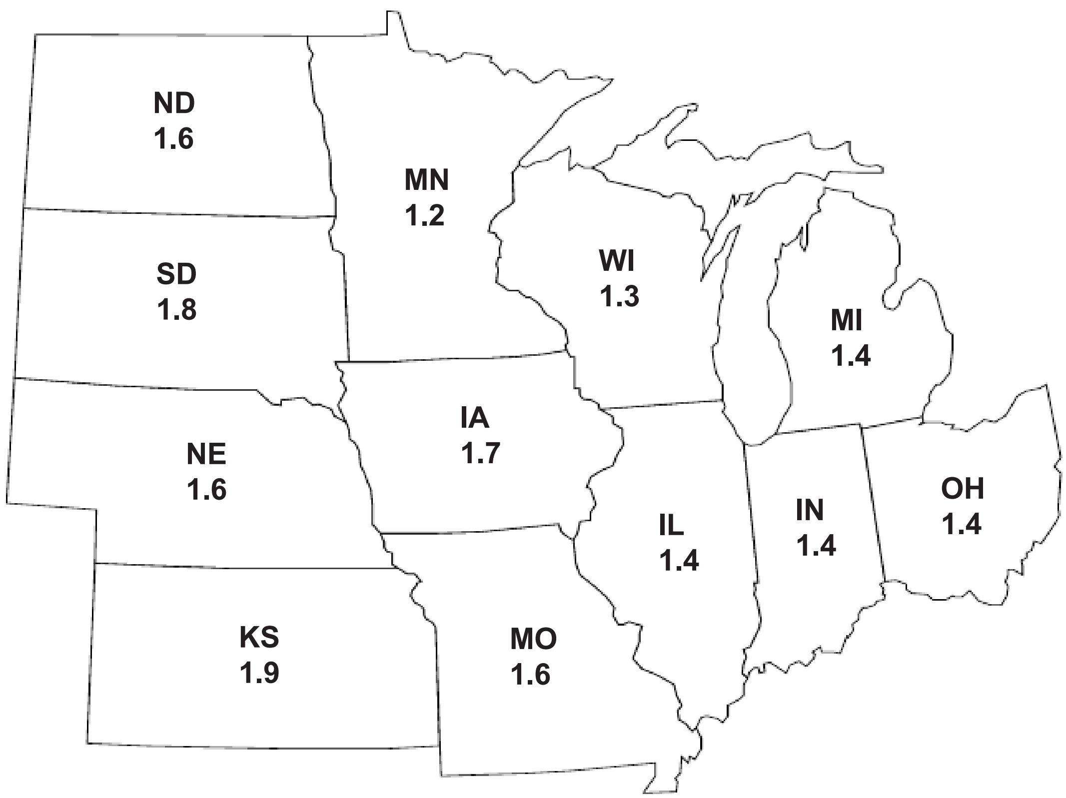
Numerous charts, graphs, and maps illustrating relevant highway safety data from many sources and perspectives are presented on the following pages.

Leading Causes of Death for Americans Age 1–34*



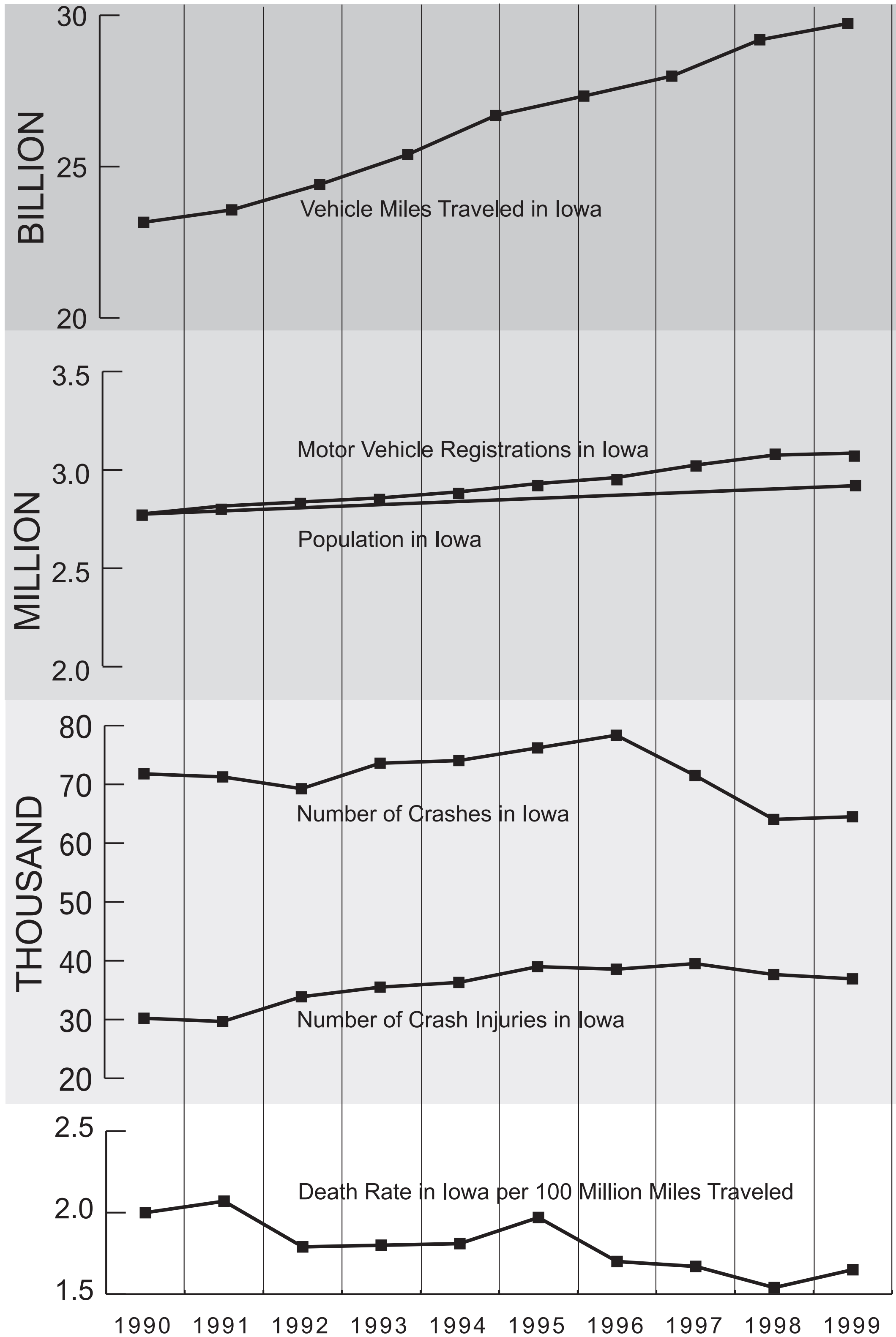
* 1998 data from the Centers for Disease Control and Prevention.

Midwest Crash Fatality Rates per 100 Million Miles Traveled*

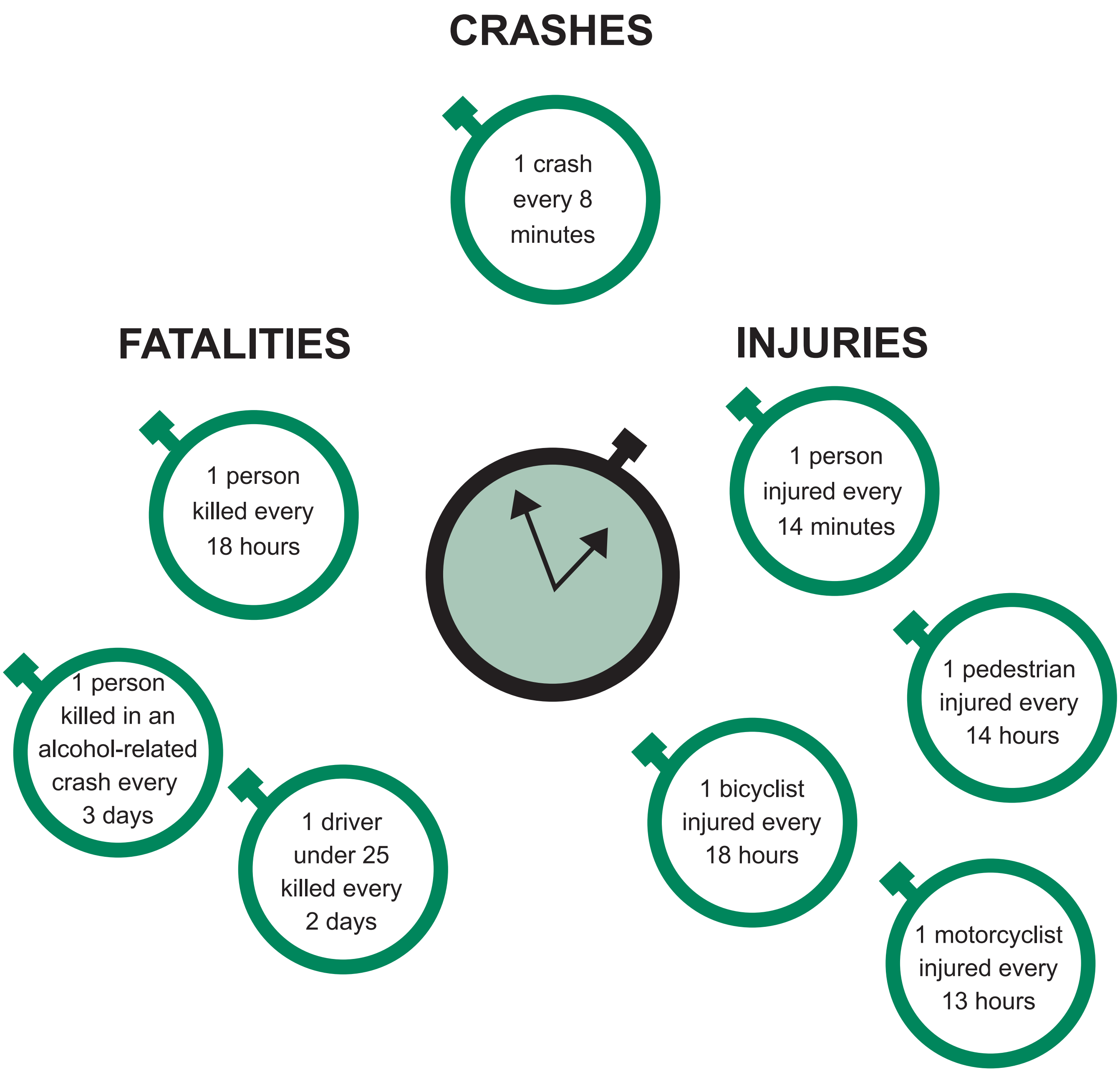


* 1999 data from the National Highway Traffic Safety Administration (NHTSA). National average is 1.55 fatalities per 100 million vehicle miles traveled.

Iowa Trends


BILLION
30
25
20
Vehicle Miles Traveled in Iowa
MILLION
3.5
3.0
2.5
2.0
Motor Vehicle Registrations in Iowa
Population in Iowa
THOUSAND
80
70
60
50
40
30
20
Number of Crashes in Iowa
Number of Crash Injuries in Iowa
2.5
2.0
1.5
Death Rate in Iowa per 100 Million Miles Traveled
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

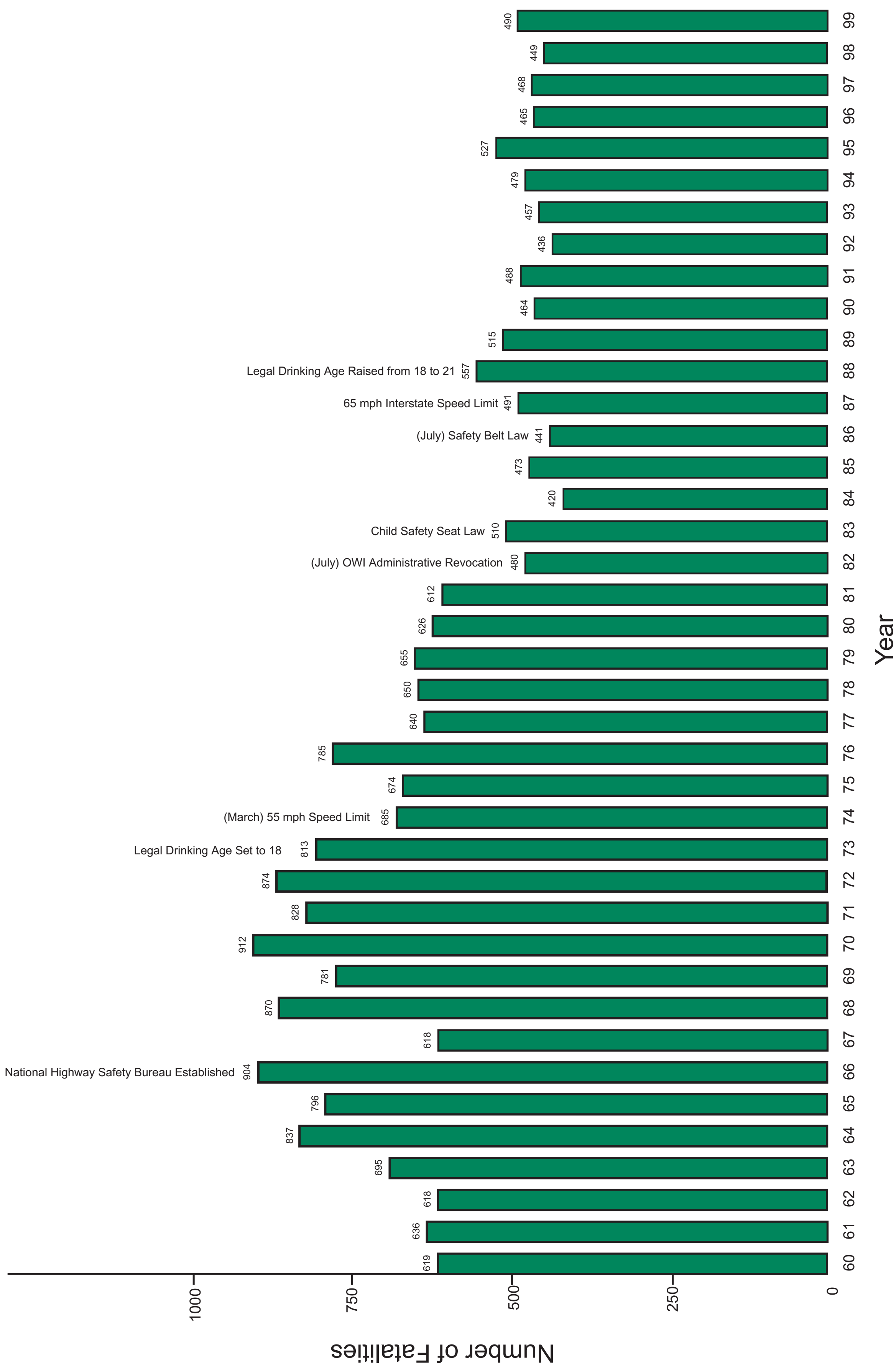
Iowa's Crash Clock*



* Based on data from the Iowa DOT's *1999 Iowa Crash Facts.*

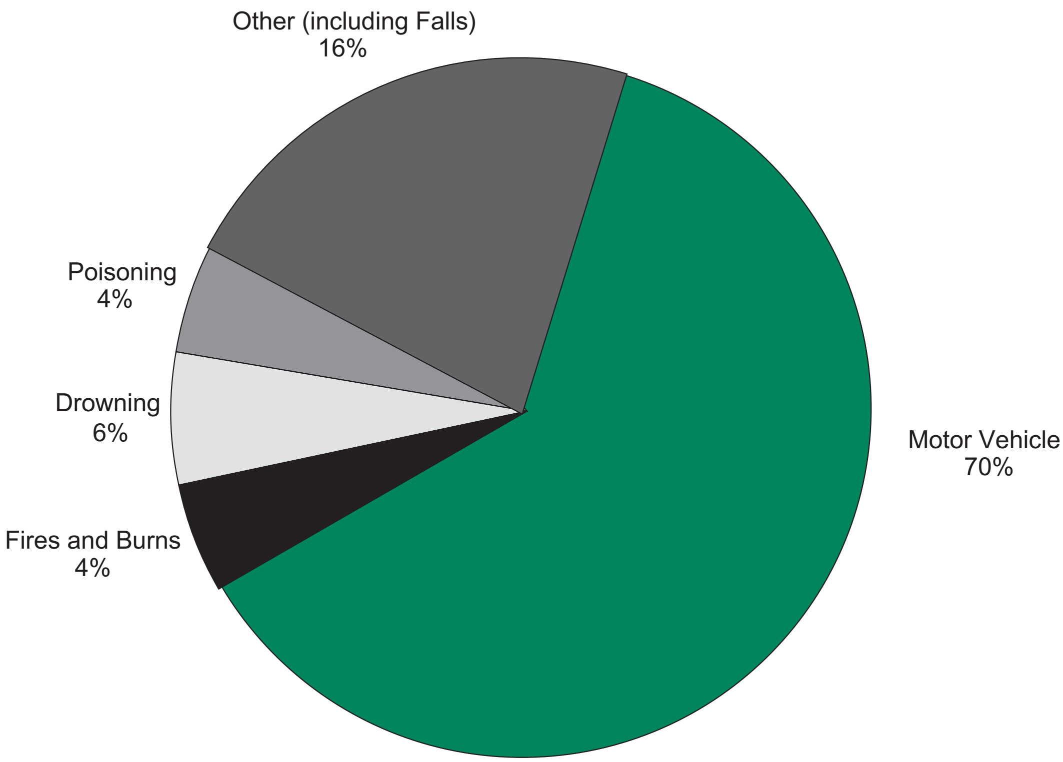
A. Iowa Data and Analysis

Iowa Traffic Crash Fatalities 1960–1999*



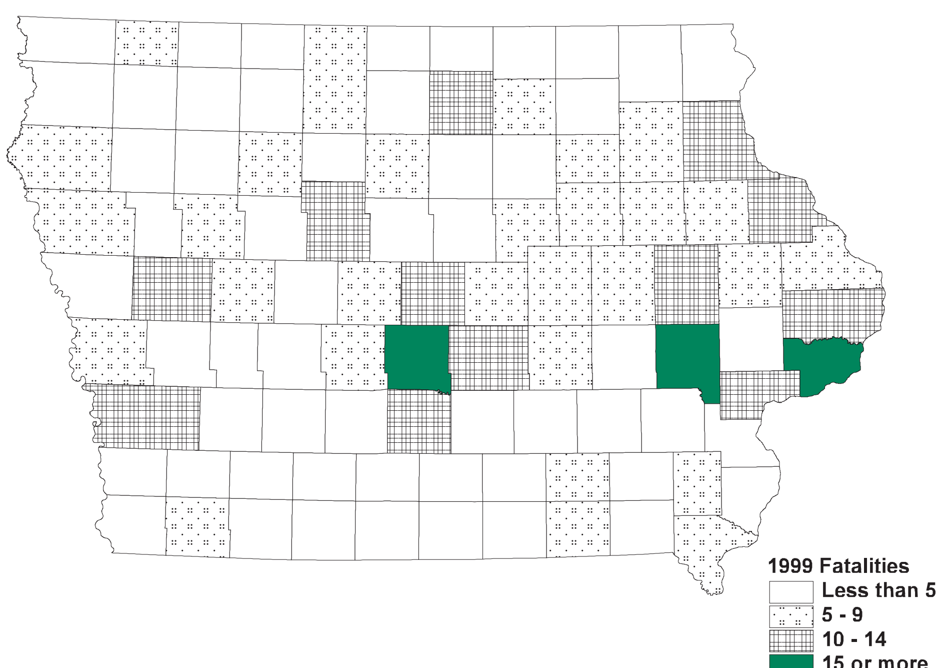
* Data from *Iowa DOT Crash Facts 1999.*

Iowa Leading Causes of Unintentional Event Fatalities*



* 1988–1998 data from the Centers for Disease Control and Prevention.

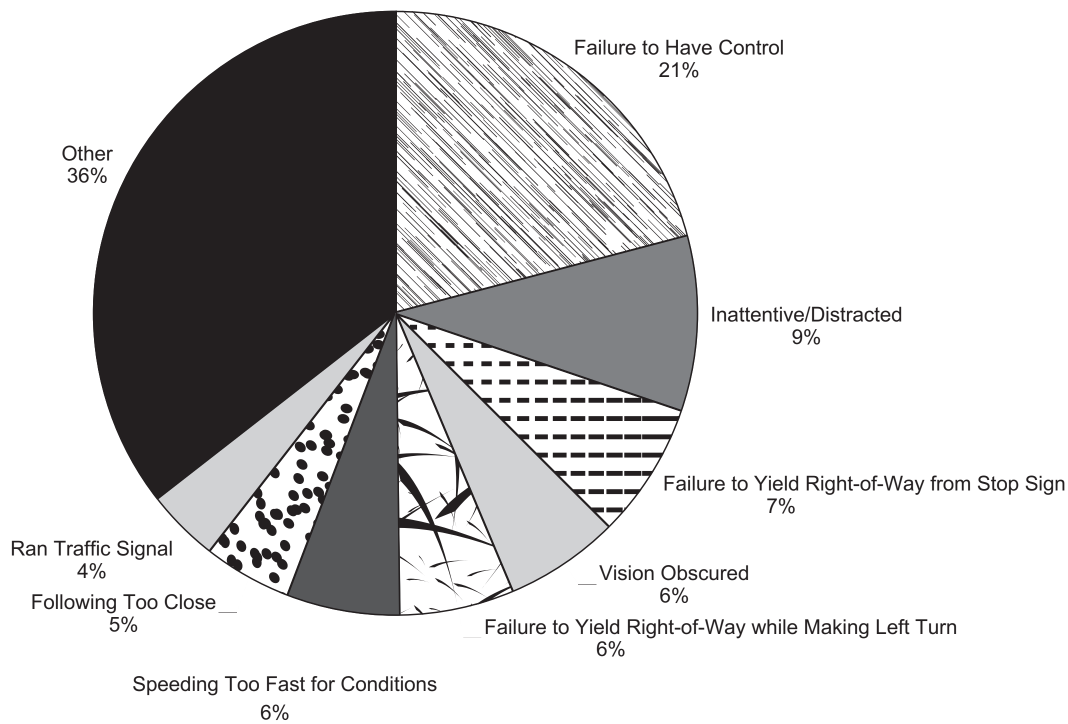
Iowa Traffic Crash Fatalities by County*



* 1999 data from the Iowa DOT Office of Traffic and Safety.

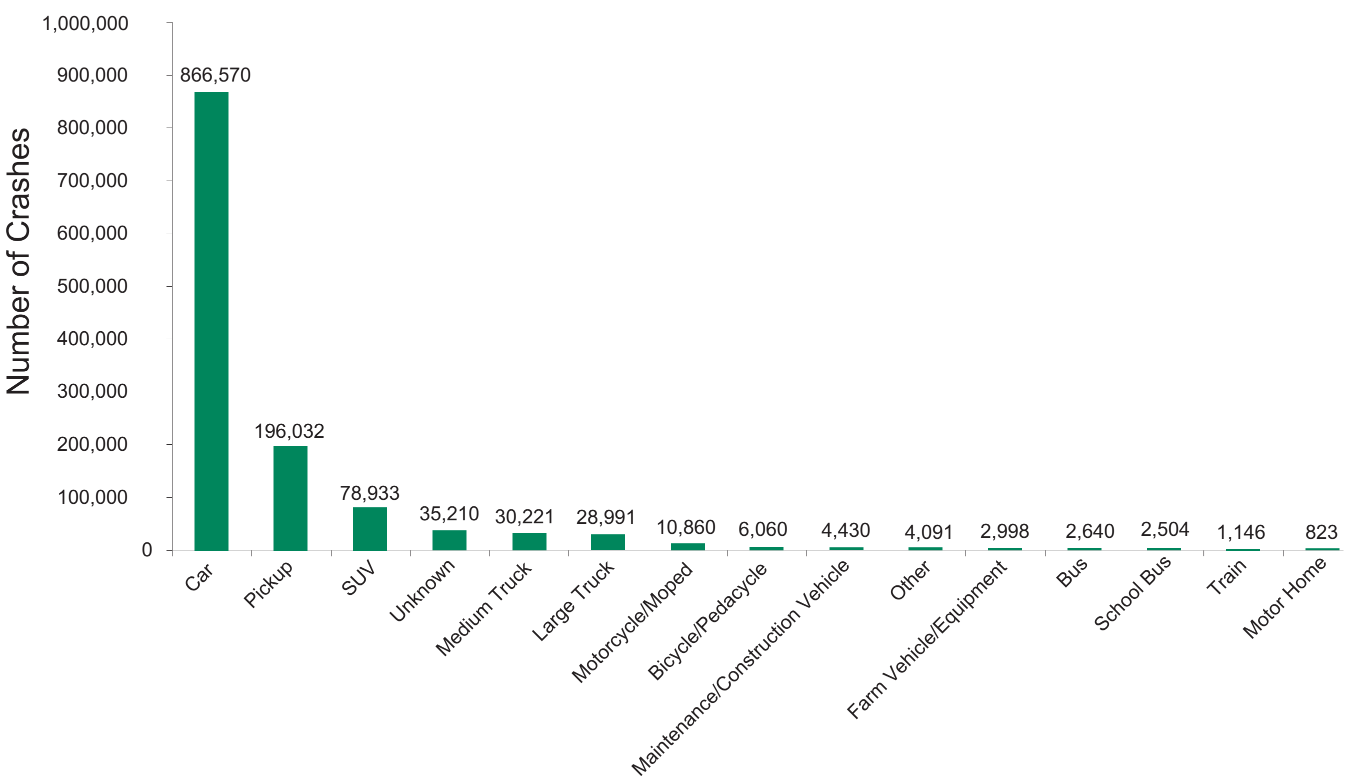
A. Iowa Data and Analysis

Iowa Driver Error Causes of Crashes*



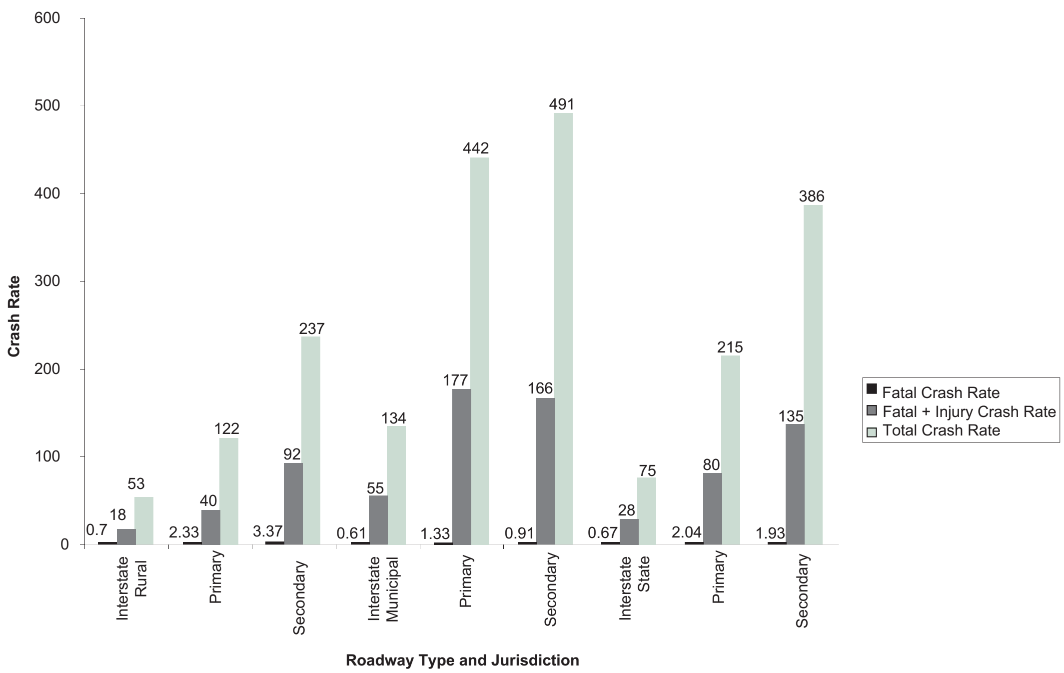
* 1990–1999 data from the Iowa DOT Office of Traffic and Safety.

Iowa Crashes by Vehicle Type*



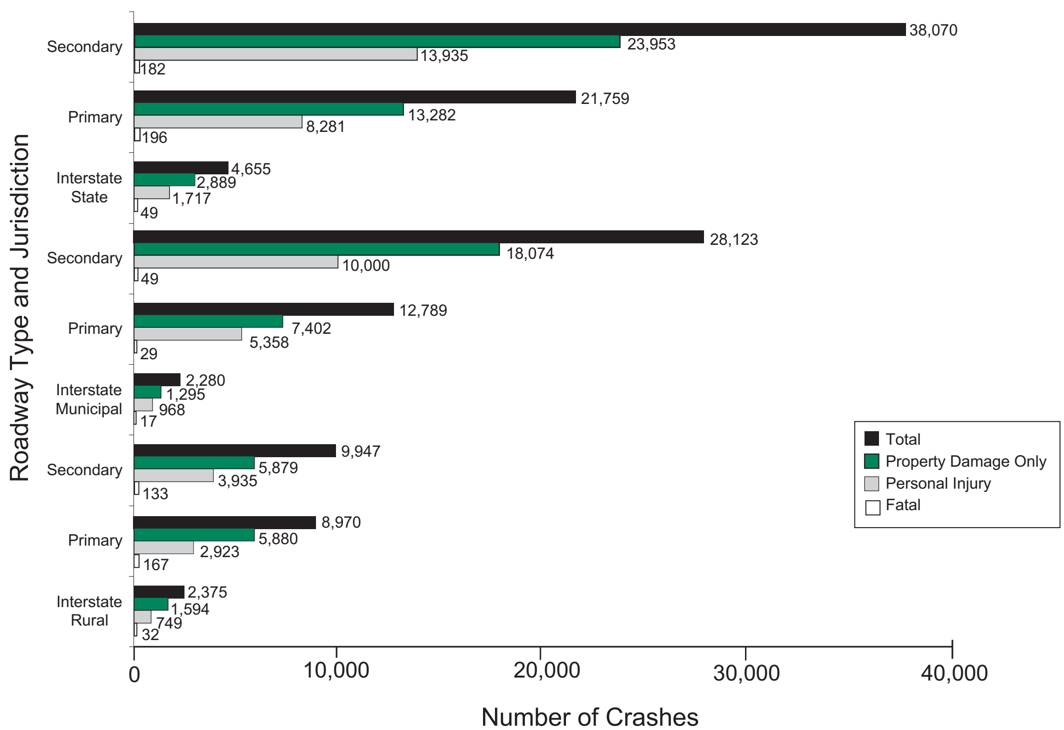
* 1990–1999 data from the Iowa DOT Office of Traffic and Safety.

Iowa Crash Rates*



* Data from the Iowa DOT Office of Traffic and Safety.

Iowa Crashes*



* 1999 data from the Iowa DOT Office of Traffic and Safety.

Iowa Facts by Toolbox Chapter Topic

General

- The Iowa DOT's *1999 Iowa Crash Facts* reports the following crash facts:
  - Iowa experienced 64,485 traffic crashes in 1999.
  - Iowa experienced 490 traffic crash fatalities in 1999.
  - Iowa experienced 36,920 traffic crash injuries in 1999.
  - Iowa experienced 3,621 traffic crash major injuries in 1999.
- During 2000, preliminary figures indicate Iowa fatalities decreased 8%, falling from 490 in 1999 to an estimated 450 in 2000, a decrease of 40, according to figures from the Iowa DOT.
- Iowa's fatality rate for 2000 is preliminarily estimated at 1.55 deaths per 100 million vehicle miles traveled, the lowest rate ever recorded. Iowa's rate compares favorably to the national rate of 1.6 deaths per 100 million vehicle miles traveled.
- Over the past 10 years Iowa's fatality rate has dropped from 2.1 to 1.5, a decline of more than 30%.

1. Driver Safety Awareness

- Approximately 85% of the causation factors associated with motor vehicle crashes are attributed to the driver according to research.
- Over 80% of Iowans surveyed indicated the goal to "increase safety education for experienced drivers" should receive high or moderate emphasis over the next five years.

2. Seat Belts and Child Restraints

- Iowa seat belt usage averaged 78% in 2000. Iowa has the highest belt use rate among the 12 states in the greater Midwest and 9th highest in the nation.
- The Iowa DOT "life toll" for July 1986–January 2001 lists the names of over 4,400 people who were spared death or life threatening injury because they buckled up.

3. Drowsy and Distracted Driving

- National and Iowa drowsy driver trends show that males age 16 to 25 are most likely to be involved and that the incidence of crashes involving drowsy drivers increases at night and peaks around 2 a.m.
- 74% of Iowans surveyed support the strategy of prohibiting cell phone use while driving.

4. High-Risk Driving Behaviors (Excessive Speeding)

- Speed ranks behind only alcohol and stop light/stop sign violations as a contributing factor in fatal crashes in Iowa.
- 11% of Iowa's 1999 fatal crashes reported excessive speed or driving too fast for conditions as a contributing factor.

5. Driver Licensing and Competency

- During 1999, the first year of the new graduated driver license, traffic citations issued to 16-year-old drivers declined 20% (further improvements were reported in 2000). As of January 1, 1999, Iowa instituted a graduated licensing law for drivers ages 16 and 17.
- Drivers age 20 and under are disproportionately over-represented in alcohol-related fatal crashes.

6. Impaired Driving

- During 1999, 132 alcohol-related traffic deaths were reported in Iowa, up 19 or 17% 1998.
- Over 30% of all victims who died in alcohol-related crashes in Iowa from 1990 to 1999 were 25 years old or younger.
- 1997–1999 operating while intoxicated revocations were highest in Polk, Linn, Scott, Black Hawk, and Woodbury Counties.

7. Young Drivers

- In 1996, the crash rate for 16-year-old drivers in Iowa reached 21 per 100 licensed drivers, a rate that more than doubled since the mid-1980s.
- Drivers age 20 and under represent about 12% of Iowa's licensed drivers but were involved in 16.41% of fatal crashes and 22.35% of all crashes.

8. Older Drivers

- Over 20% of all traffic fatality victims were age 65 or older, with 90 people age 65 or older killed in Iowa traffic crashes during 2000.
- People age 65 and older experience higher hospital costs per crash than younger crash victims according to data from Iowa's Crash Outcome Data Evaluation System (CODES) project.

9. Pedestrians

- 22 pedestrians were killed in Iowa traffic crashes in 1999.
- More than 50% of all pedestrian fatalities in Iowa since 1984 have been under 20 or over 65 years of age.

10. Bicyclists

- During the 1990s, over 600 bicyclists have been injured annually while an average of eight bicyclists have been killed each year as a result of Iowa traffic crashes.
- Since 1984, over 50% of all bicyclists killed in Iowa traffic crashes were 19 years of age or younger. During the same period, over 70% of all bicyclists injured in Iowa crashes were 19 or younger.

11. School Buses

- Total recorded school bus crashes in Iowa: 211.
- Total fatal school bus crashes in Iowa: 1.

12. Public Transit

- Total recorded public transit vehicle crashes in Iowa: 248.
- Total fatal public transit vehicle crashes in Iowa: 1.

13. Motorcycles

- Since the mid-1980s Iowa motorcycle registrations have declined by more than 80,000, from nearly 190,000 to less than 110,000.
- Motorcycle crashes are less than 2% of Iowa's reported crashes, but they still account for 7% of all Iowa fatalities and seven percent of all Iowa injuries.
- In 1999, only two of Iowa's 30 fatality victims were using helmets.

14. Large Trucks

- 79 persons were killed in crashes involving large trucks in 2000 (down from 108 in 1999).
- 25% of all interstate traffic vehicles were trucks, 17.5% of interstate crashes involved trucks, and 31.6% of all interstate fatal crashes involved trucks.

15. Farm Vehicles

- 1999 farm vehicle crashes totaled 290 with 7 fatal crashes, 137 injury crashes, and 146 property-damage-only crashes.
- Between 1988 and 1992, the Iowa DOT reported 1,477 collisions that involved farm vehicles on public road and right-of-ways.

16. Intersections

- In Iowa, about one-third of fatal crashes, and over half of injury crashes, occur at intersections.
- Older drivers as a group have a particularly difficult time entering and crossing intersections.

17. Leaving the Road Crashes

- Crashes from vehicles leaving the road result in nearly 150 fatalities and 5,000 injuries annually in Iowa.
- These crashes represent a societal cost to Iowa's citizens of $30 million each year.

18. Head-On and Across-Median Crashes

- 14.9% of Iowa's fatal crashes from 1992 to 1996 were results of head-on or across-median crashes.
- Nearly 90% of these fatal head-on crashes occurred on rural roads.

19. Work Zones

- 358 total work zone crashes occur per year, with 6 fatalities in 2000, and 17 fatalities in 1999.
- 90% of Iowa work zone crash fatalities are motorists, and 10% are Iowa DOT or contractor workers.

20. Accommodating Older Drivers

- 50% or more of older drivers surveyed reported these highway features reported becoming more difficult with age: lighting at intersections, pavement markings at intersections, number of left-turn lanes at an intersection, and width of travel lanes.

21. Train-Vehicle Crashes

- 1999 motor vehicle and train crashes totaled 74 with 4 fatal crashes, 36 injury crashes, and 34 property damage only crashes.
- Since 1988, total accidents have declined by 49%, while rail traffic measured in ton-miles has increased by 77% and non-interstate vehicle miles of travel has increased by 31%.

22. Vehicle-Animal Crashes

- Iowa deer-vehicle crashes increased from 3,700 crashes in 1980 to 11,366 crashes in 1999.
- Over 10% of all motor vehicle crashes (and over 30% of all rural crashes) in the state result from a deer-vehicle collision.

23. Road Safety Audits

- The Iowa DOT maintains a comprehensive list of over 17,000 crash locations and regularly identifies and mitigates problems at the highest crash locations.
- A study of 94 traffic safety projects conducted by CTRE at Iowa State University concluded that there was a mean crash reduction rate of 23% on these hazard elimination and safety improvement fund projects.

24. Emergency Response

- Over 70% of respondents to the Iowa SMS public opinion survey indicated the goal to increasing emergency response efforts should receive high or moderate emphasis over the next five years.

25. Data

- As of August 2001, there are over 350 trained Access-ALAS data analysis users statewide.
- Over 20 agencies and entities collaborate to compile and share crash data under the Statewide Traffic Records Advisory Committee.

26. Intelligent Transportation Systems

- Technology applications aimed at improving highway safety are being studied and used in maintenance, roadway monitoring, traffic operations, and driver assistance.

27. Planning and Management

- Iowa SMS has involved more than 40 member groups in highway safety analysis, strategic planning, and shared initiatives.

28. Safety Teams (Local Groups)

- Several of Iowa's nine metropolitan areas have local traffic safety groups addressing local traffic concerns.

DATA SOURCE AND ANALYSIS EXAMPLES FROM IOWA'S HIGHWAY SAFETY PRACTITIONERS

Iowa Crash Data Forms (Iowa DOT Office of Driver Services)

The Iowa DOT Office of Driver Services provides the initial crash data compilation and analysis using data reported on the investigating officer's report of motor vehicle accident form (#433003) and the driver report of motor vehicle accident form (#433002) (report form follows). These "crash forms" and the accompanying supplements are the primary sources for Iowa's motor vehicle crash data.

In 2000, a multidisciplinary and multi-agency task force collaborated to revise the Iowa crash form. The new form meets the Federal Highway Administration model minimum uniform crash criteria. Practitioners accommodated additional specific agency needs and requests wherever possible. Several new fields were added to enhance complete and accurate crash data (e.g., adding a field for cell phone use). The driver report form is available electronically at http://www.dot.state.ia.us/mvd/ods/accidentform.htm.

Data from these crash forms include location vehicle, driver, insurance, vehicle damage, crash description, occupants, accident environment, alcohol/drug testing, roadway characteristics, sequence of events, work zone descriptions, crash diagram, emergency status, and occupant restraint use and deployment.

After editing, these data are made available electronically to various agencies for their specific use. Often, these crash data are analyzed with additional data from other sources.

For more information, contact Scott Falb, Office of Driver Services, 515-237-3154.

A. Iowa Data and Analysis

Driver Report of Motor Vehicle Accident Form (Iowa DOT Office of Driver Services)

Form 433002
01-01

Iowa Department of Transportation

REPORT OF MOTOR VEHICLE ACCIDENT

See Instructions on completing *(please print or type)*

Did accident occur on private property? ☐ Yes ☐ No

Step 1.

Accident Date (Mo/Day/Year)	Day of Week	Time ☐ AM ☐ PM	Number of Vehicles	Total Killed	Total Injured	Total Estimated Damage $

Step 2. DRIVER / OWNER / VEHICLE

NO. 1 (YOUR VEHICLE)	NO. 2 (OTHER VEHICLE)
Date of Birth / Sex / Dr.Lic. State / Driver License No. as Printed on License	Date of Birth / Sex / Dr.Lic. State / Driver License No. as Printed on License
Last Name of Driver 1 / First Name / Middle Initial	Last Name of Driver 2 / First Name / Middle Initial
Number and Street / City / State / Zip Code	Number and Street / City / State / Zip Code
Last Name of Owner 1 / First Name / Middle Initial	Last Name of Owner 2 / First Name / Middle Initial
Number and Street / City / State / Zip Code	Number and Street / City / State / Zip Code
No. of Occupants / Plate Number / State of Registration / Year	No. of Occupants / Plate Number / State of Registration / Year
V.I.N. / Est. Cost of Repairs	V.I.N. / Est. Cost of Repairs
Vehicle Year & Make / **Step 3.** Vehicle Type Code	Vehicle Year & Make / **Step 3.** Vehicle Type Code

Step 4. LOCATION OF ACCIDENT

County

Accident occurred within corporate limits of (city)

If accident occurred outside of city limits, describe distance to city ________ miles ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW of nearest city ________

Name of Road, Street or Highway ________ At Intersection with ________

Note: Unless accident occurred at an intersection which is completely described above, use the space below to give the exact location from a milepost or definable intersection, bridge or railroad crossing, using two distances and directions if necessary.

Feet ____ or Miles ____ ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW and Feet ____ or Miles ____ ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW of

Milepost Number ________ Or Definable Intersection, bridge, or railroad crossing ________

Step 5. **Accident Codes** *(on page 2)* For your own vehicle

A Location of Accident	B Manner of Crash	C Vehicle Action	D First Harmful Event
E Type of Roadway Junction/Feature	F Traffic Controls	G Light Conditions	H Weather Conditions
I Surface Conditions	J Vision Obscured	K Driver Condition	L Contributing Circumstances

Step 6.

Identify Damaged Property Other Than Vehicles	Owner	Amount of Damage

Step 7. **Injury Section:** Fill Out Space Below For Every Person Injured Or Killed In The Accident *(Attach additional sheets if necessary)*

Insert Correct Code *(See Step 7 of Instructions)*

Name & Address	In Vehicle Number	Date of Birth	Gender	Describe Injuries	Injury Status	Occupant Protection	Airbag Deployment	Ejection	Type Non-Motorist	Seating Position	Date of Death

(Complete reverse side)

-3-

Step 8.

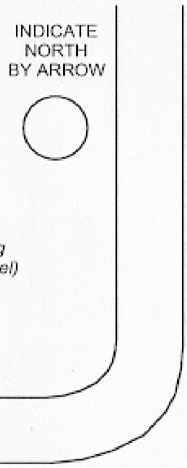
Indicate On This Diagram What Happened
Use one of these outlines to sketch the scene of your accident, writing in street or highway names or numbers.

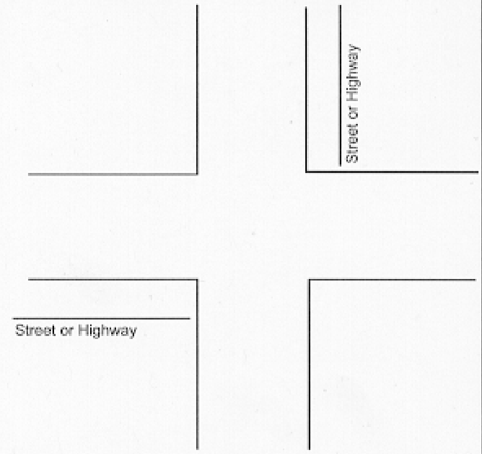
Initial Travel Direction
(prior to coded Vehicle Action)
1 - North
2 - East
3 - South
4 - West
9 - Unknown

Original Direction of Travel: *(Example: Vehicle going north then turning left, code 'N' for Original Direction of Travel)*

Vehicle 1 __________ Vehicle 2 __________

______________________________ Street or Highway





Description

____

____

____

____

____

____

____

Did Peace Officer investigate? ☐ Yes ☐ No Department ______________________

If you did not have automobile liability insurance coverage for this accident, please check this box ☐.

If you had automobile liability insurance coverage for this accident, please complete insurance information below:

Failure To Complete Insurance Coverage Information Requested Below May Result In A Suspension Of Your Driving And/Or Registration Privileges.

Step 9.

Name of Insurance Company **(Not Agent)** Providing Insurance To Cover Your Liability For Damage Or Injury To Others:

____

Name of Agent Who Sold Policy ______________________________

Agent Address ______________________________

Policy No. ______________ Policy Period: From ______________ To ______________

V.I.N. No. ______________________________

Name of Driver ______________________________

Name of Owner ______________________________

Name of Policyholder ______________________________

Step 10.

Date	Signature of Driver of Vehicle No. 1	If Signed By Person Other Than Driver, Give Reason

IMPORTANT: This accident should also be reported directly to your insurance company. Failure to report may jeopardize your automobile liability insurance.

-4-

Fatality Analysis Reporting System

The Fatality Analysis Reporting System (FARS) contains data on all fatal traffic crashes within the 50 states, the District of Columbia, and Puerto Rico. FARS data include all motor vehicles crashes resulting in one or more involved people dying of their injuries within 30 days of the crash.

The data system was conceived, designed, and developed by the National Center for Statistics and Analysis (NCSA) to assist the traffic safety community in identifying traffic safety problems, developing and implementing vehicle and driver countermeasures, and evaluating motor vehicle safety standards and highway safety initiatives.

FARS data are available for every year since FARS was established in 1975. The data can be used to answer many questions on the safety of vehicles, drivers, traffic situations, and roadways. FARS data can also be accessed at the state level by the FARS analyst to respond to state safety issues. To protect individual privacy, no personal information, such as names, addresses, or specific crash locations, is coded.

NCSA responds to over 3,000 requests for information and sends out more than 50 computer tapes of FARS data each year. FARS data are used extensively within the National Highway Traffic Safety Administration (NHTSA), and requests are received from sources such as state and local governments, research organizations, private citizens, the auto and insurance industries, Congress, and the media.

Iowa is required to report certain crash data to the national FARS. The Iowa DOT Division of Motor Vehicles Office of Driver Services has a FARS administrator who is responsible for accurately compiling and submitting Iowa crash data required by FARS.

Most of the national figures quoted from NHTSA fact sheets in this toolbox rely on FARS data reported to NHTSA and analyzed by NCSA.

FARS home page and query site: http://www-fars.nhtsa.dot.gov. NCSA home page: http://www.nhtsa.dot.gov/people/ncsa/. NHTSA crash fact sheets: http://www.nhtsa.dot.gov/people/ncsa/factshet.html.

For more information, contact Scott Falb, Office of Driver Services, 515-237-3154.

Iowa Crash Facts (Iowa DOT)

The Iowa DOT Division of Motor Vehicles is responsible for reporting Iowa crash data for public use and produces annual reports of Iowa crash facts. The annual reports provide both statewide and county-specific information for use by highway safety practitioners, government officials, policy makers, and the general public.

The annual reports use crash facts derived from the crash report forms completed by investigating officers and drivers involved in crashes. These data are compiled by topic and displayed in charts, graphs, rankings, and maps.

In addition to crash facts from the most recent year of crash forms, the Division of Motor Vehicle's annual reports include

- A glossary
- 10-year charted statistics by topic
- 30-year statistics of fatalities, injuries, total crashes, vehicle miles traveled, crash and fatality rates, and licensed driver and registered vehicle counts
- Population numbers (obtained from the U.S. Bureau of Census as prepared by the State Data Center Program, State Library of Iowa)
- A 40-year trend chart
- National statistics and rates (national statistics are obtained from *Traffic Safety Facts* published by the National Highway Traffic Safety Administration)

In 2001, the *1999 Iowa Crash Facts* book was made available on the Iowa DOT web site (see example page from *1999 Iowa Crash Facts* on the following page).

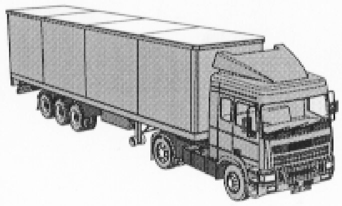
When additional data is needed to understand a particular highway safety concern, the Office of Driver Services provides additional data or observations that may be helpful to the media or public inquiring.

For more information, contact Scott Falb, Office of Driver Services, 515-237-3154.

A. Iowa Data and Analysis

Sample Page from *1999 Iowa Crash Facts* Book (Iowa DOT)

Truck Tractors & Semitrailer Trucks



Out of 64,485 total crashes, one or more truck tractors or semitrailer trucks were involved in:

2,796 crashes (all types)
79 fatal crashes
942 injury crashes
1,775 property damage crashes

10 occupants were killed, or 02.04% of all fatalities
348 occupants were injured, or 00.94% of all injuries

Injury Severity of All Persons Involved

Severity of Injury	Fatalities & Injuries: Truck Tractors & Semitrailer Trucks		All Others	
	Number	Percent	Number	Percent
Fatal	10	10.99%	81	89.01%
Major	44	21.78%	158	78.22%
Minor	164	28.72%	407	71.28%
Possible	140	21.98%	497	78.02%
Unknown	0	0.00%	0	0.00%
Total	358	23.85%	1,143	76.15%

This chart compares injury severity of truck tractor and semitrailer truck occupants with all other fatalities and injuries (i.e., occupants of other vehicles, pedestrians) in crashes that involved truck tractors and semitrailer trucks.

Fatalities & Injuries by Gender

Gender of Killed & Injured	Fatalities & Injuries: Killed		Injured	
	Number	Percent	Number	Percent
Female	0	0.00%	34	9.77%
Male	10	100.00%	314	90.23%
Unknown	0	0.00%	0	0.00%
Total	10	100.00%	348	100.00%

Fatalities & Injuries by Age Group

Age Group of Killed & Injured	Fatalities & Injuries: Killed		Injured	
	Number	Percent	Number	Percent
Under Age 21				
14 & Under	0	0.00%	7	2.01%
15	0	0.00%	2	0.57%
16	0	0.00%	2	0.57%
17	0	0.00%	2	0.57%
18	0	0.00%	5	1.44%
19	0	0.00%	0	0.00%
20	0	0.00%	2	0.57%
Total Under 21*	0	0.00%	20	5.75%
All Ages				
14 & Under	0	0.00%	7	2.01%
15 to 24	0	0.00%	35	10.06%
25 to 34	1	10.00%	65	18.68%
35 to 44	2	20.00%	93	26.72%
45 to 54	2	20.00%	69	19.83%
55 to 64	4	40.00%	51	14.66%
65 to 74	0	0.00%	9	2.59%
75 & Over	1	10.00%	5	1.44%
Unknown	0	0.00%	14	4.02%
Total	10	100.00%	348	100.00%

Under age 21 percentages based on total for all ages.

Fatalities & Injuries by Protective Device

Protective Device	Fatalities & Injuries: Killed		Injured	
	Number	Percent	Number	Percent
None	4	40.00%	76	21.84%
Lap Belt	0	0.00%	33	9.48%
Lap & Shoulder Belt	1	10.00%	154	44.25%
Airbag Deployed	0	0.00%	4	1.15%
Child Restraint	0	0.00%	2	0.57%
Helmet	0	0.00%	2	0.57%
Passive Belt	0	0.00%	1	0.29%
Other	0	0.00%	2	0.57%
Unknown	5	50.00%	74	21.26%
Total	10	100.00%	348	100.00%

Fatalities & Injuries by Position

Position in Vehicle	Fatalities & Injuries: Killed		Injured	
	Number	Percent	Number	Percent
Driver	10	100.00%	302	86.78%
Front Seat Passenger	0	0.00%	31	8.91%
Back Seat Passenger	0	0.00%	5	1.44%
Third+ Seat Passenger	0	0.00%	10	2.87%
Bus Passenger	0	0.00%	0	0.00%
Riding on Exterior	0	0.00%	0	0.00%
MC/Moped Driver	0	0.00%	0	0.00%
MC/Moped Passenger	0	0.00%	0	0.00%
Pedalcyclist	0	0.00%	0	0.00%
Other	0	0.00%	0	0.00%
Unknown	0	0.00%	0	0.00%
Total	10	100.00%	348	100.00%

Fatalities & Injuries by Area of Injury

Area of Injury	Fatalities & Injuries: Killed		Injured	
	Number	Percent	Number	Percent
Upper Torso	0	0.00%	70	20.11%
Lower Torso	0	0.00%	12	3.45%
Internal	0	0.00%	10	2.87%
Head	1	10.00%	36	10.34%
Arms	0	0.00%	19	5.46%
Legs	0	0.00%	20	5.75%
Multiple	7	70.00%	157	45.11%
Other/Unknown	2	20.00%	24	6.90%
Total	10	100.00%	348	100.00%

Iowa Governor's Traffic Safety Bureau Problem Identification

Introduction

Each year, traffic crashes in the United States result in over 350,000 deaths and serious injuries. In 1999 alone, traffic accidents cost the nation an estimated $160 billion, seven times more than the estimated cost of all crime. Highway crashes represent the leading cause of death and disabling injury for persons under age 35.

In recognition of this problem, the Congress of the United States enacted national highway safety legislation in 1966, which led to the establishment of the National Highway Traffic Safety Administration (NHTSA). The legislation also provided for federal highway safety monies to be made available to the states with a goal of reducing death and injury on the nation's roads. Iowa has been very active in the federal-state-local highway safety partnership since the mid-1960s. The Iowa Governor's Traffic Safety Bureau (Iowa GTSB) administers funding for Iowa that is available from various NHTSA programs.

In Iowa, we are justifiably proud of our success in reducing highway fatalities since the 1960s. Despite these gains and the fact that Iowa figures compare favorably to national averages of 38% alcohol-related fatalities and 71% belt use, much remains to be done.

- In 1966, 904 persons were killed in Iowa traffic mishaps. For 2000, the comparable total is 450, a reduction of 50%. This figure compares very favorably to the national highway fatality reduction of approximately 20% over the same time.
- During 2000, Iowa may, for the first time, achieve a fatality rate per 100 million vehicle miles traveled of less than 1.5. In 1966, the fatality rate peaked at 6.3, four times the present rate.
- Alcohol-related fatalities in Iowa reached their third lowest total ever in 1999 with 132 deaths. Twenty-seven percent of all 1999 traffic fatalities were alcohol-related, the second lowest percentage on record.
- Iowa's statewide safety belt use rate of 78% ranks us among the top 10 states in the nation. The 2000 statewide child restraint use survey shows a 79% usage rate, which is up from 75% one year ago.

A. Iowa Data and Analysis

Overview of Problem Identification in Iowa

The major objective of the Iowa GTSB problem identification for federal funding is the determination of the relative severity of traffic safety problems in each of the 99 counties each year. Most important for this analysis is the actual record of fatalities, serious injuries, overall injuries, and alcohol involvement in traffic mishaps in each of Iowa's 99 counties.

Iowa GTSB has carefully selected eight quantifiable measures of serious traffic incidents. The Administrative Code of the State of Iowa specifies the inclusion of fatalities, alcohol-related fatalities, injuries, serious injuries, alcohol-related injuries, vehicle miles traveled, operating while intoxicated revocations, and motorcycle/pedestrian/bicycle fatalities/injuries in problem identification analysis for Iowa's federally funded 402 highway safety programs. Whenever possible, the NHTSA guideline of analyzing three consecutive years of data is used.

For evaluation purposes, each of the eight data elements has been given equal weight. The Administrative Code does not specify any particular emphasis on the individual elements, but because each element was worthy of inclusion in problem identification analysis as defined by the Code, equal consideration of each element was adopted.

Each county is ranked with the other counties in each of the eight traffic-related problem areas from the highest number of occurrences to the lowest. After all categories have been analyzed, the problem rankings in all eight data groups for each individual county are averaged and compared, providing an overall or composite ranking for each county. The composite ranking is used to determine the relative need for federal 402 highway safety program assistance. This is only the first step in developing highway safety programs that are responsive to the problems and needs of a given county or community.

Additional review and analysis of local accident data facilitates the targeting of limited 402 resources at the most prevalent traffic problems. For example, further analysis, in concert with local agencies, may focus on high crash locations, time-of-day or day-of-week crash considerations or demographic profiles of the drivers over represented in injury and fatality crashes such as age and gender.

Highlights

- The average number of traffic fatalities for the three-year period 1997–1999 is 469, down 22 fatalities or 4.7% from the 1994–1996 average of 491.
- Polk County remains the highest fatality county in the state with an average of 37 fatalities per year.
- Fatalities are more widely dispersed among the counties than any other data element used in the problem identification analysis. Only nine counties average 10 or more fatalities per year while 47 counties average between three and seven fatalities per year.
- Because fatalities are relatively rare occurrences in the highway environment, the number of fatalities often varies significantly from year to year within the same county.

Composite Ranking

The composite ranking (see ranking tables) reflects the overall magnitude of the highway safety problem in a given county in comparison to the other 98 counties in the state of Iowa. Because federal funds for highway safety programs are limited and have been reduced substantially since the 1970s, it has been and continues to be necessary to determine a cutoff point for program eligibility.

The top 22 counties in the composite ranking (see map) represent just over one-fifth or 22% of all Iowa counties, yet they represent

- 67% of Iowa's total population
- 48% of all traffic fatalities in the state
- 48% of all alcohol-related traffic fatalities over the past three years
- 70% of all personal injuries, 64% of all serious traffic injuries, and 64% of all alcohol-related injuries in the state
- 59% of all vehicle miles traveled in Iowa over the past three years
- 66% of the operating while intoxicated revocations that occur in Iowa each year
- Nearly 75% of all bicycle, pedestrian, and motorcycle fatalities and injuries each year

For more information, contact Bob Thompson, Iowa GTSB, 515-281-3014.

A. Iowa Data and Analysis

Iowa GTSB Problem Summary Tables

1997-1999 FATALITIES BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Polk	46	39	26	37.0	1
Scott	13	16	13	14.0	2
Linn	14	14	12	13.3	3
Pottawattamie	13	12	14	13.0	4
Black Hawk	13	12	9	11.3	5
Cerro Gordo	10	13	11	11.3	5

1997-1999 MAJOR INJURIES BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Polk	505	541	501	515.7	1
Scott	192	188	235	205.0	2
Linn	148	166	193	169.0	3
Black Hawk	97	124	134	118.3	4
Woodbury	93	116	127	112.0	5

1997-1999 TOTAL INJURIES BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Polk	7,651	7,101	6,621	7,124	1
Scott	3,065	2,858	2,976	2,966	2
Linn	2,345	2,256	2,257	2,286	3
Woodbury	1,599	1,578	1,762	1,646	4
Black Hawk	1,664	1,613	1,624	1,634	5

1997-1999 OWI REVOCATIONS BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Polk	2,222	2,549	2,250	2,340.3	1
Linn	1,745	1,713	1,712	1,723.3	2
Scott	1,014	920	948	960.7	3
Black Hawk	1,057	951	862	956.7	4
Woodbury	1,009	889	942	946.7	5

1997-1999 VEHICLE MILES TRAVELED (millions) BY RANK & COUNTY

County	1997	1998	1999	Rank
Polk		3,402	3,456	1
Linn		1,539	1,553	2
Scott		1,427	1,454	3
Pottawattamie		1,158	1,182	4
Black Hawk		1,092	1,110	5

1997-1999 ALCOHOL & DRUG-RELATED INJURIES BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Polk	379	417	379	391.67	1
Scott	178	190	202	190.00	2
Linn	123	140	140	134.33	3
Black Hawk	145	89	119	117.67	4
Pottawattamie	118	105	83	102.00	5

1997-1999 ALCOHOL & DRUG-RELATED FATALITIES BY RANK & COUNTY

County	1997	1998	1999	Average	Rank
Black Hawk	7	6	5	6.0	1
Polk	4	5	7	5.3	2
Scott	7	3	5	5.0	3
Woodbury	8	4	1	4.3	4
Cerro Gordo	5	5	2	4.0	5
Clayton	1	2	9	4.0	5

1996-1998 SPECIAL USER GROUP INJURIES BY RANK & COUNTY
Motorcycle/Bicycle/Pedestrian

County	Motorcycle	Bicycle	Pedestrian	Total Injuries	Rank
Polk	272	234	433	939	1
Scott	143	95	180	418	2
Linn	117	85	118	320	3
Pottawattamie	86	82	137	305	4
Black Hawk	80	77	117	274	5

1996-1998 SPECIAL USER GROUP FATALITIES BY RANK & COUNTY
Motorcycle/Bicycle/Pedestrian

County	Motorcycle	Bicycle	Pedestrian	Total Fatalities	Rank
Polk	10	0	17	27	1
Linn	1	1	8	10	2
Pottawattamie	2	1	4	7	3
Scott	2	1	4	7	3
Woodbury	4	0	2	6	5

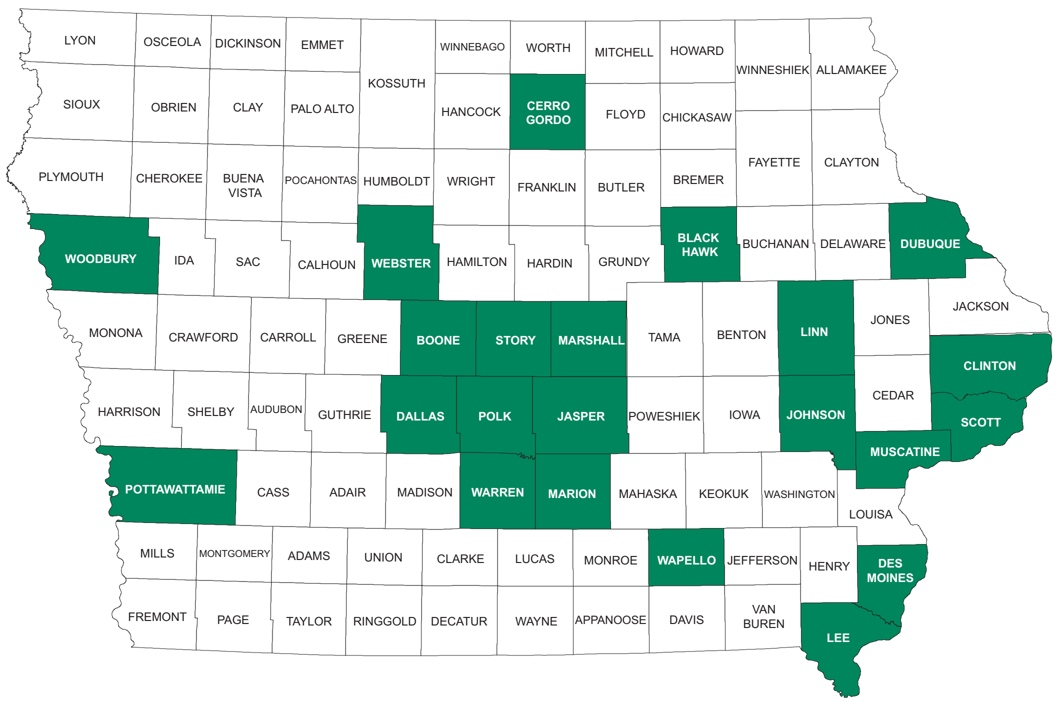
1996-1998 SPECIAL USER GROUP COMPOSITE RANK BY COUNTY
Motorcycle/Bicycle/Pedestrian

County	Spcl Inj	Spcl Fatal	Avg Rank	Spcl Rank
Polk	1	1	1.00	1
Linn	3	2	2.50	2
Scott	2	3	2.50	2
Pottawattamie	4	3	3.50	4
Black Hawk	5	8	6.50	5
Dubuque	7	6	6.50	5
Woodbury	8	5	6.50	5

COMBINED COMPOSITE RANKING BY COUNTY

County	Fatals	A/R Fatals	Total Injury	A/R Injury	Major Injury	VMT	OWI Revocations	Motorcycle /Bike/Ped Injury/Fatals	Overall Rank
Polk	1	2	1	1	1	1	1	1	1
Scott	2	3	2	2	2	3	3	2	2
Black Hawk	5	1	5	4	4	5	4	5	3
Linn	3	15	3	3	3	2	2	2	3
Woodbury	7	4	4	7	5	7	5	5	5

Iowa GTSB Top 22 Problem Counties*



* Fiscal Year 2001.

Iowa DOT Roadway Engineering Crash Analysis

Data

Crash Data

Detailed information reported on past crashes by location provides the most direct means of identifying roadway safety deficiencies. Examples include

- Identifiable roadway features
- Weather, light, time of day, and pavement conditions
- Crash diagrams showing movements of all vehicles and other persons directly or indirectly involved
- Cause-related observations by key crash participants and the investigating officer
- Crash sequences and circumstances reported that may be related to roadway features observed during field inspections

Traffic Volume and Composition

Traffic volume data allow for the computation of exposure-based crash rates (e.g., the number of crashes per million vehicles entering an intersection):

- The use of crash rates in comparing the crash experience between different time periods or between locations provides a basis for more accurate and meaningful conclusions since it accounts for the numbers of vehicles "exposed" to the hazards of driving within a given time period.
- The use of rates prevents the potentially misleading classification of a relatively safe high-volume location as "high-crash" simply because it has experienced a relatively large number of crashes.
- Information on the composition of traffic (i.e., the percentages of total traffic consisting of various vehicle types, sizes, or weights) can be useful in explaining differing crash histories of two otherwise similar locations.

Traffic Control Devices

Traffic control devices consist of the signs, signals, and pavement markings used to regulate, warn, and inform drivers of the performance requirements essential to safe operation. Systemwide traffic control device inventories for maintenance purposes can be a source of accurate, time-related data. These elements should be included in crash analysis:

- Type, location, and condition of existing traffic control devices at the crash site
- Upstream devices—because driver conditioning and expectancy can strongly affect the likelihood of safely negotiating a particular roadway feature

Roadway and Roadside Design Features

Roadway characteristics data describe the severity and length of curves and grades; curve super-elevation (or "banking"); lane and shoulder widths; side slopes and obstacles; and crest and corner sight restrictions. Changes due to safety improvement projects should be noted.

Other Considerations

Perceived Operational and Safety Problems

Concerns come from the public, elected officials, agency management, and other employees:

- Citizen complaints and elected officials' observations are useful in identifying a developing pattern of behavior that may lead to future crashes.
- Comparing these concerns to a list of existing crash locations may highlight high-crash locations warranting more immediate attention.
- Local transportation managers, employees throughout an agency are often well positioned to both identify traffic safety problems and give impetus to their solution.
- Safety practitioners should remain alert to potential traffic safety problems as they drive. Situations observed can range from such obvious problems as burned-out signal lights to such comparatively subtle problems as excessive tire marks entering intersections and curves.

Time Considerations

Generally, crash data for the most recent one- to five-year period are used. However, the crash frequency at a given location can fluctuate significantly from year to year, often in a statistically random manner. Thus, the use of a single year of crash data in identifying high-crash locations may yield unreliable and even misleading results. This is especially true for locations having low traffic volumes and relatively few crashes in most years. Longer analysis periods, up to ten years in rural areas, are generally more reliable for identifying true high-crash locations. However, if sudden changes in crash patterns are suspected due to specific causal factors, the use of both short and long analysis periods—or a year-to-year statistical profile—may be warranted.

Length Considerations
The roadway network may be divided into spots and segments.

Spots:

- are isolated curves, bridges, railroad crossings, and intersections
- include the area of influence of the feature in question (e.g., driver behavior can be influenced as far as 500 feet from a curve and 250 feet from an intersection, or further with severe congestion and queuing)

Segments:

- are defined by a particular section length (typically in the range of one to five miles)
- are defined as the roadway between two spots

Data Analysis
Various data analysis methods allow the analyst to analyze the available crash data in any number of ways—for example, by reviewing all similar locations within a jurisdiction, by comparing the crash histories of a few locations of concern, or by checking the crash history of a single location.

Methods for determining safety improvement candidate locations, high-hazard locations, or sites with promise enable practitioners to determine those sites that they focus their limited safety funds on improving. Identification of these locations is a vital component of hazard reduction and safety improvement. Focusing on the locations identified, practitioners can address safety concerns and ultimately reduce crash frequency and/or severity.

Past and current (state-of-the-practice) data analysis methods used by public agencies are described below. The method used by the Iowa DOT Office of Traffic and Safety to identify safety improvement candidate locations is described in detail the following section (Iowa DOT Office of Traffic and Safety Identification of Highway Safety Improvement Candidate Locations).

Spot Map Method

The spot map method involves the creation of a map showing clusters of symbols at spots and on segments of road network. The map is then examined for geographic clustering of crashes, and those having the greatest numbers of total crashes (or total crashes of a particular type) are identified as being high crash locations. The spot map method is extremely simple and easy to use; however, it only provides a very rough estimate of high-crash locations and does not provide a list of such locations. The spot map method is suitable for small areas and low numbers of crashes but fails for large areas or numbers of crashes. In the latter case, another high-crash identification method would be more advisable.

Crash Frequency/Crash Density Methods

Crash Frequency Method—Closely related to the spot map method, the crash frequency method summarizes the number of crashes for spot locations. Locations are ranked by descending crash frequency. Those with more than a predetermined number of crashes are classified as high-crash locations to be further scrutinized for statistical significance.

Crash Density Method—Closely related to the crash frequency method, the crash density method summarizes the number of crashes per mile for highway sections. Sections are defined as a minimum length of roadway with consistent characteristics, with the minimum distance used frequently being one mile. Locations are ranked by descending crash density. Those with more than a predetermined density of crashes are classified as high-crash locations to be further scrutinized for statistical significance.

Crash Rate Method

The crash rate method factors the risk of exposure into the determination of high-crash locations. The method uses crash rate (number of crashes divided by vehicle exposure) as a basis for ranking. Rates are given in crashes per million entering vehicles (crashes/MEV) for spot locations and crashes per million vehicle-miles (crashes/MVM) for sections. Locations with higher than a predetermined rate are classified as high-crash locations.

Frequency-Rate Method

The frequency-rate method is a combination of crash frequency/crash density methods and the crash rate method. Locations with more than the prescribed minimum crash frequency or crash density, and higher than the minimum crash rate are classified as high-crash locations. The crash frequency/crash density methods and the crash rate methods have deficiencies that limit their effectiveness. However, if these methods are combined, as they are in the frequency-rate method, it appears possible to eliminate or minimize the effects of the deficiencies.

Quality Control Methods
Similar to the frequency-rate method, the quality control methods consider various highway categories. These methods ensure quality control of the analysis by applying a statistical test for determination of unusual crash rates. The analysis involves testing the site crash rates to a predetermined average crash rate for sites with similar characteristics. The statistical tests are based on the often-accepted premise that crashes fit the Poisson distribution. The critical rate is determined using a function of systemwide average crash rate for various highway categories and vehicle exposures at the location being studied. This function incorporates some statistical control by inserting a Poisson distribution probability constant.

Number Quality Control Method—The number quality control method identifies those sites where crash frequency or crash density is greater or significantly greater than the average crash frequency or density for similar sites across the state or similar region. Similar to the crash frequency and crash density methods, the number quality control method adds some form of statistical control for selecting the critical crash frequency/crash density.

Rate Quality Control Method—The rate quality control method identifies those sites where crash rate is greater or significantly greater than the average crash rate for similar sites across the state or similar region. Similar to the crash rate method, the rate quality control method adds some statistical control for determining the critical crash rate.

Crash Severity Methods
Several methods exist that incorporate severity, either of the crashes or of the injuries, into the safety improvement candidate location identification process. These methods use a variety of methods to incorporate severity measures, including frequency/density of more severe crashes, rate of more severe crashes, and ratio of more severe crashes. Essentially, those crashes or injuries judged more severe are given more relative weight than those judged less severe. Sometimes the results for each site are then compared, as in the quality control methods, to systemwide averages for similar roadways. This inclusion of severity enables highway agencies to devote more of

their safety resources to locations with greater exhibited potential for injury or loss of life, thereby allowing the treatment of these locations for reducing overall system severity.

Equivalent Property-Damage-Only (EPDO) Method—The EPDO method weighs fatal and injury crashes against a baseline of property-damage-only crashes. Each of the injury levels (K, A, B, and C) are given a specific number weight that is compared against property-damage-only crashes, which are given a weight of 1. These weight coefficients are based on the relative average crash costs by severity. K-type and A-type crashes often have the same weight. The weights are incorporated into the candidate location identification process by either computing an EPDO index or an EPDO rate.

Relative Severity Index (RSI) Method—The RSI method incorporates the weighted average cost of crashes at sites. This method is best suited for the further evaluation of sites already identified by other methods as high-crash sites. In the RSI method, crash frequency at each severity level is multiplied by the average "comprehensive cost" for crashes at that severity level. The subtotals for each of these severity-specific costs are summed and the sum is divided by the total crash frequency.

Critical Rate in Combination with Number Criteria—The critical rate in combination with number criteria method is based on warrants. The warrants include a concentration criteria and a severity criteria. To meet the concentration criteria, a site has to have exceeded a certain frequency/density of crashes for a period of years and another frequency/density of crashes for one year. To meet the severity criteria, a site must have an EPDO rate exceeding a certain level (e.g., 2 crashes/MEV). Critical rates for total crashes, night crashes, fatal crashes, etc. can also be used to determine high-hazard sites.

Other Crash Severity Methods— Some agencies use the ratio of fatal crashes to total crashes. Others calculate fatal crash rates, fatal plus injury crash rates, and total crash rates for each facility type. They then use these average rates to determine a site's hazardousness.

Index Methods
Two index methods exist that attempt to incorporate severity indices with other previously described methods. These two index methods are the weighted rank method and the crash probability index (CPI) method.

Weighted Rank Method—The weighted rank method combines some of the previous methods in the calculation of a single index value for each site. Many times the weighted rank is created by giving equal weight to as many as five indicates, such as crash frequency/density, crash rate, percentage of wet crashes, percentage of night crashes, and crash severity (using a simple five-point scale). A ranked list is prepared for each of the five indicators, and then the ranks for each site within these lists are combined based on the weighting schema to produce a combined list. The list thus created is then ranked based on the weighted value. The premise of the weighted rank method is to retain some benefits from each of the different measures while simultaneously eliminating or minimizing the disadvantages. The method also allows agencies to change weightings based on their priorities. Obviously, using the weighted rank method requires more effort, as an agency is required to produce several lists in order to develop the final weighted list. Also, the weightings determined by the agency, if not carefully researched, can be highly subjective.

Crash Probability Index Method—The CPI method, much like the weighted rank method, combines the results from previous methods: frequency/density, rate, and severity. The combination, in theory, reduces the misleading results for high-volume and low-volume sites while also inserting severity. Again, like the weighted rank method, the CPI method allows analysts to adjust weightings to reflect agency priorities. As part of the CPI method, when a site has significantly worse than average crash frequency/density, crash rate, or severity distribution, it is assigned penalty points. The overall CPI for a site is a summation of the penalty points across these three measures. A ranked list of sites is generated by ranking analyzed sites by CPI.

Iowa Method—In Iowa, in an approach similar to that of the weighted rank method, three ranking lists are generated and then the ranks from these three lists are combined into a single rank. The three sublists are a frequency rank, a rate rank, and a severity rank. (See the Iowa DOT Office of Traffic and Safety Identification of High-Crash Locations section that follows for more details.)

Other Methods

Though all of the “state-of-the-practice” methods discussed above have proven useful, none addresses the identification of high crash locations thoroughly. In addition to the problems with each stated previously, all the methods ignore a significant majority of the systemwide sites in their analyses. Sites without any crashes in the time period analyzed are routinely ignored. This directs all mitigation measures to a reactive, rather than proactive, role.

Though all these methods develop lists for further consideration, they are not the only ways that sites can be identified as hazardous. Many noncrash-based methods exist that might aid in proactively determining hazardous locations prior to existence of a crash history. These methods may also complement the identification of hazardous sites by verifying the existence of problems or by clarifying those problems. Noncrash indicators that can be used to aid in identifying the most hazardous locations include the following:

- Results of road skid testing
- Hazard indicator reporting
- Observed minor crashes
- Observed near-crashes
- Evidence of potential hazards such as skid marks at intersection approaches
- Maintenance records
- Median or shoulder encroachment wheel marks
- Volume to capacity ratios
- Stopping and passing sight distance
- Access points (driveways)
- Traffic conflicts analysis
- Erratic maneuver observations
- Reports of hazardous locations by highway personnel, police, department personnel, motor clubs, motorists, and others

Data Representation

Data derived by these methods can be graphically represented in maps, graphs, tables, and charts that help the analyst further understand and communicate important elements affecting a site, a segment, or an area. As an example of the products produced by such analyses, an analyst may create a ranking list of crash rates and then display color-coded ranges on a spot map. See examples of data representation throughout this appendix.

For more information, contact Michael Pawlovich, Iowa DOT Office of Traffic and Safety, 515-239-1428.

Iowa DOT Office of Traffic and Safety Identification of Highway Safety Improvement Candidate Locations

Highway Safety Improvement Program

The Iowa DOT Office of Traffic and Safety is charged with the responsibility to "develop and implement, on a continuing basis, a Highway Safety Improvement Program (HSIP) which has the overall objective of reducing the number and severity of crashes and decreasing the potential for crashes on all highways" in the state of Iowa.

A comprehensive HSIP consists of three components: (1) planning, (2) implementation, and (3) evaluation:

1. The planning component should consist of processes that collect and maintain data (including crash, traffic, and roadway data); identify hazardous locations and elements; conduct engineering studies; and establish project priorities (i.e., utilize some type of benefit/cost analysis).
2. Implementation usually involves taking the results of the last two planning components and defining projects through design and specification. If these projects meet appropriate funding requirements (including benefit/cost requirements), they will then be constructed or implemented.
3. Evaluation is performed post-construction or implementation to determine the effectiveness of the projects and to improve future HSIP efforts. Evaluation can many times involve some of the same processes as the planning component—namely, data collection, identification, and engineering studies.

The identification part of the planning phase is perhaps the most important step in overall safety improvement efforts, whether they are reactive or proactive. In fact, the identification process is the basis for the further processes, in that identification of sites provides analysts and evaluators with a starting point for further study. Given this, the identification process needs to be as accurate and informative as possible, resulting in a defensible listing of the sites that are "most hazardous" or that have the "most promise" of crash frequency and severity reduction.

As part of its Highway Safety Improvement Program, the Iowa DOT Office of Traffic and Safety identifies the top 200 safety improvement candidate locations (SICL) in Iowa (see table of top 10 locations and the following description of Iowa's SICL method).

Iowa DOT Office of Traffic and Safety Top 10 Safety Improvement Candidate Locations*

Statewide Rank	Route	City	Location	Total Number of Crashes	Number of Crash Fatalities	Number of Crash Injuries	Calculated Value Loss
1	City Street	Des Moines	Porter Ave and SW 9th St	104	2	43	$3,666,776
2	US 69	Des Moines	Guthrie Ave and E 14th St	115	1	36	$2,546,700
3	US 6	Des Moines	Merle Hay Rd from Ovid Ave to Douglas Ave	98	1	24	$3,048,478
4	Eastbound IA 100	Cedar Rapids	Collins Rd and Northland Ave NE	140	1	34	$1,942,299
5	City Street	Sioux City	14th St and Douglas St	61	1	29	$1,911,180
6	US 69	Des Moines	Park Ave and SE 14th St	146	0	38	$1,792,923
7	Eastbound US 6	Davenport	US 6 and Welcome Way	183	0	45	$1,896,643
8	Eastbound US 6	Altoona	NB US 65 Ramp @ US 6	62	0	36	$1,370,851
9	City Street	Council Bluffs	24th St and 27th Ave	71	1	23	$1,365,854
10	US 6	Des Moines	Beaver Ave and Douglas Ave	122	0	35	$1,434,881

* 1995–1999 data.

Iowa's Safety Improvement Candidate Location Identification Method
In Iowa, in an approach similar to that of the weighted rank method (see description of state-of-the-practice methods under Iowa DOT Roadway Engineering Crash Analysis section), three ranking lists are generated and then the ranks from these three lists are combined into a single rank. The three sublists are a frequency rank, a rate rank, and a severity rank, this last based on "value loss" at the site.

The three subrankings have historically been generated using a link-node system for crash location. The link-node system involved the placement of nodes at locations including intersections, grade separations, bridges, ramp termini, severe curvature, and railroad crossings. These locations all have a unique identifier for its geographic location. Each crash at these locations is referenced to this unique location, or reference node. Crashes between these locations are referenced to both the nearest node (the reference node) and the node at the other end of the roadway link (the direction node), with a distance from the reference node specified as well. The total number of crashes that occur at each reference node and reference node/direction node pair can then be easily tabulated. However, only a list for reference node crashes is generated. To enter the first list the number of crashes must meet one of three certain criteria: a fatality, X number of injury crashes, or Y number of property damage crashes. Currently, X is set at 5 and Y is set at 8. This list typically results in 10,000 to 11,000 locations annually. However, the link-node system has been abolished, and a switch to a coordinate-based system is in effect. Adjusting the Iowa safety improvement candidate location identification method to reflect this is one of the challenges for the Iowa DOT Office of Traffic and Safety.

The first two rankings lists are generated much the same as the crash frequency/density methods and the crash rate method, respectively. Because Iowa has historically relied on a link-node system, the definition of a site, whether spot or section, is slightly affected. In fact, three different types of sites were generally defined:

1. **Intersections** include all road-to-road intersections, except alleys, ramp terminals, and complex intersection or interchange sites.
2. **Links** include sections of road between intersections or nodes.
3. **Nodes** include rail to road intersections, grade separations, bridges, road ends, 90 degree turns, county lines, and major signalized commercial entrances.

Steps involved in the candidate location development process are as follows:

1. The crash statistics are searched to identify all locations (intersections, links, and nodes) in the state that meet at least one of the following crash frequency requirements for the designated five-year time period to develop the candidate location file:
   a. at least one fatal crash, or
   b. at least four personal injury crashes, or
   c. at least eight total crashes
2. The candidate location file created in Step 1 is sorted by descending frequency of crashes and a frequency rank is assigned.
3. For each site in the candidate location file, the frequency of each category (as defined by the KABCO scale) of injury is determined. A value loss is determined using these injury severity frequencies using the following values (updated in 2001):

   a. Fatalities x $1,000,000, plus
   b. Major injuries x $160,000, plus
   c. Minor injuries x $10,000, plus
   d. Possible/unknown injuries x $2,500, plus
   e. Actual total property damage, or $2,500 if unknown.

   A value loss rank is then generated by sorting the value losses in descending order.

4. Crash rates per million entering vehicles are calculated for sites with known traffic exposure data. The sites are sorted by rank in descending order and a crash rate ranking is assigned to each site. Sites with no traffic exposure data are initially assigned a rank of 0 to give these sites the highest possible priority in the rate ranking. Traffic volumes are then determined, from any credible source, for sites with a rate rank of 0 that fall within the top 200. This process continues until all sites within the top 200 have valid rank values for rate.

   Crash rates per million entering vehicles are calculated as rate = (frequency) (1,000,000) / (DEV) (5 years) (365 days/year), where DEV is the actual DEV for spot locations and road segments up to 0.6 miles long. For road segments 0.6 miles long and longer the DEV is calculated as DEV = ABS [(Link Length / 0.3) (DEV)]. This calculation adjusts the daily entering vehicles by the number of 0.3-mile sections within the segment to correlate the crash rate for longer segments closer to that for a spot location or shorter segment. This is an attempt to enable comparisons between spot locations and segments and enables one rank list, rather than two or three, to exist.

5. The three rankings—frequency, value loss, and rate—are summed to create a composite rank factor. The sites are then sorted in ascending order by this composite rank factor and assigned a composite state ranking.

The Iowa method has many of the same positive features and negative features of those methods it incorporates: frequency, rate, and severity.

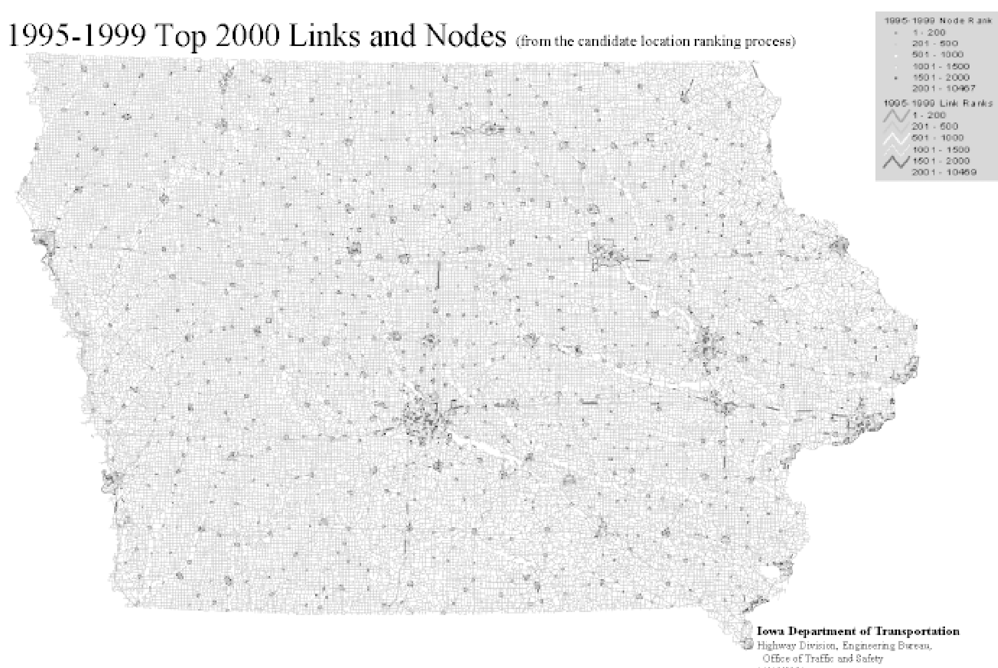
Traffic Safety Fund Program

Safety improvement candidate locations for each community are forwarded to Iowa DOT district offices and are available to cities, counties, metropolitan planning organizations, and regional planning affiliations through the district offices or through the Iowa DOT Office of Traffic and Safety to help them analyze and develop proposals for projects that will improve safety.

The locations identified are eligible for funding assistance to develop safety improvements under the Iowa Traffic Safety Fund program. Grant applications for funding are competitive. The Iowa DOT selects proposals that provide the greatest safety return on the dollars invested. Proposals must be submitted to the Iowa DOT by August 15 to qualify for funding next year. The Iowa Transportation Commission will consider and approve funding for selected locations during November and December 2001.

For more information, contact Tom Welch, state transportation safety engineer, 515-239-1267, or Michael Pawlovich, Iowa DOT Office of Traffic and Safety, 515-239-1557.

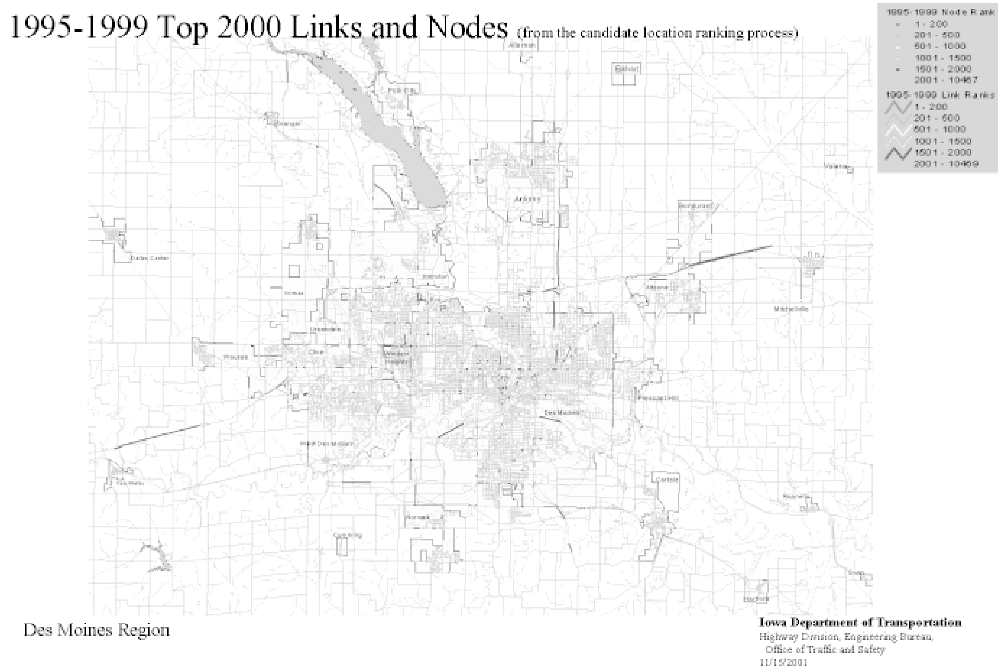
Iowa DOT Office of Traffic and Safety Map of High Crash Location Corridors in Iowa*



* 1995–1999 data.

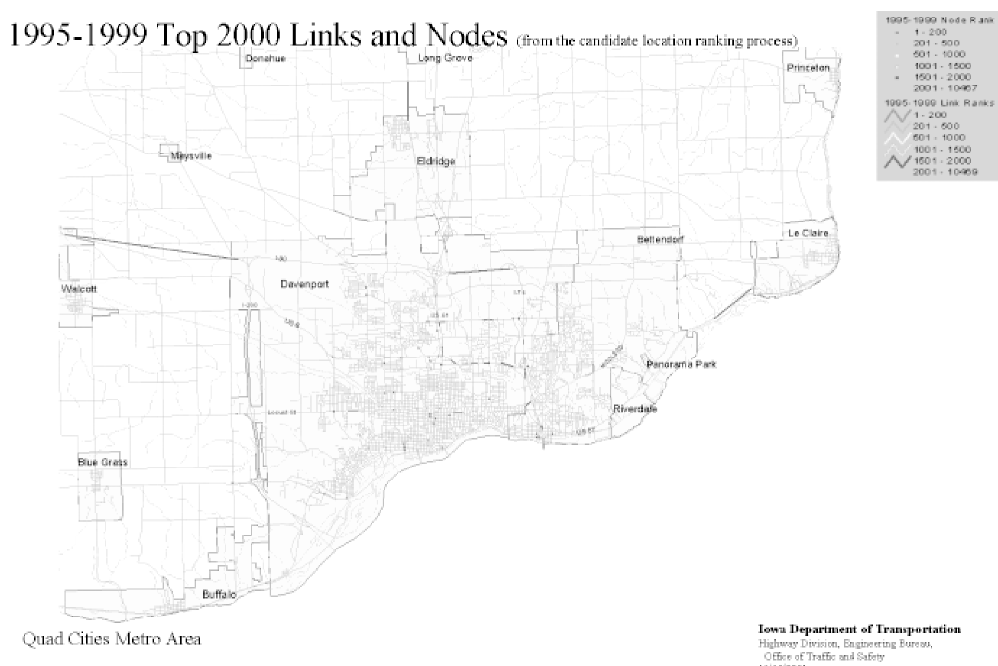
A. Iowa Data and Analysis

Iowa DOT Office of Traffic and Safety Map of High Crash Location Corridors in the Des Moines Area*



* 1995–1999 data.

Iowa DOT Office of Traffic and Safety Map of High Crash Location Corridors in the Davenport Area*



* 1995–1999 data.

Crash Outcome Data Evaluation System (Iowa Department of Public Health)

The Iowa Department of Public Health, in collaboration with other agencies, has started to link hospital and health care system information with actual crash occurrences in the system called the Crash Outcome Data Evaluation System (CODES). Thus far, Iowa has been able to link over 6,400 crashes from a three-year period with the related hospital records to more adequately track the economic costs and human suffering inflicted in various types of motor vehicle crashes.

Data utilized to develop CODES:

- crash data collected by police at the scene and reported on standard crash forms
- emergency medical services (EMS) data collected by emergency medical technicians (EMTs) who provide treatment at the scene and en route
- hospital discharge data collected by physicians, nurses, and others who provide treatment on hospital admissions

CODES forms a probabilistic linkage of the crash, hospital, and either EMS or emergency department data so that persons involved and injured in a motor vehicle crash can be tracked from the scene through the health care system. Linkage also makes it possible to evaluate the medical and financial outcome for specific event, vehicle and person characteristics.

Additional state data such as driver licensing, vehicle registration, citation/conviction records, insurance claims, HMO/managed care data are also useful for linkage. Data elements chosen for linkage must include sufficient identifiers to discriminate among the events and the persons involved.

Examples of the data analysis produced from CODES follow.

For more information, contact Dick Harmon, Bureau of Emergency Medical Services, Iowa Department of Public Health, 515-281-5737, dharmon@idph.state.ia.us.

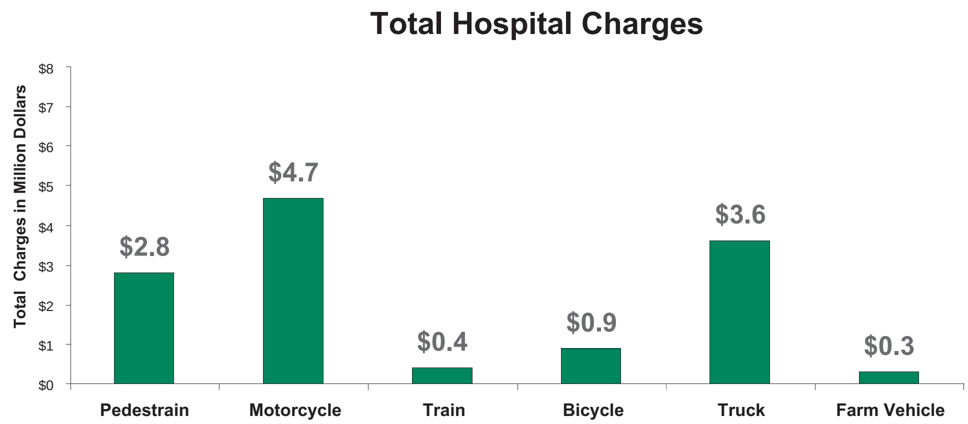
Iowa Department of Public Health CODES Hospital Charges Linked to Vehicle Crash Type*

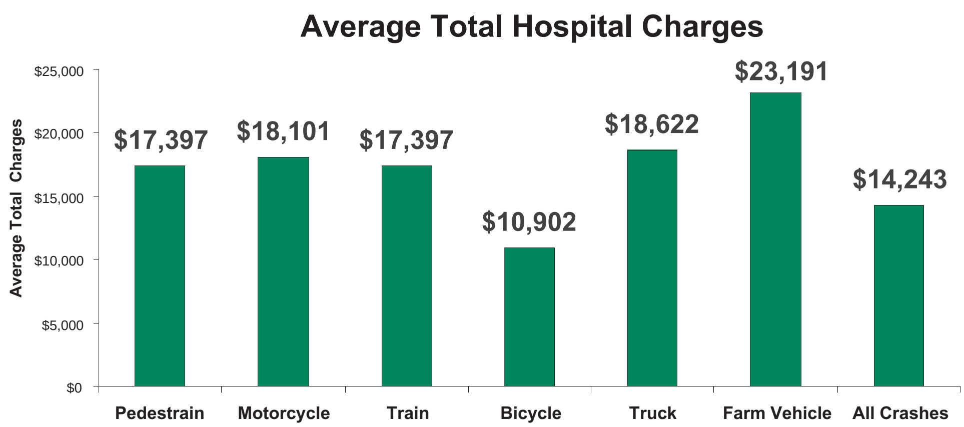
Iowa CODES Fact Sheet

Hospital Charges

Type of Crash

Three Year Period 1996-1998





Produced by the Iowa Department of Public Health, Bureau of EMS with data from the Iowa Crash Outcomes Data Evaluation System (CODES) project. The graphs presented are based on 6,004 crash records that were linked to a hospital discharge record.

Iowa Department of Public Health
Bureau of EMS
401 SW 7th Street, Suite D
Des Moines, IA 50309
(800) 728-3367

* 1996–1998 data.

Iowa Department of Public Health CODES Total Hospital Charges by Crash County and Age Group*

Iowa CODES Fact Sheet

Total Hospital Charges by Crash County & Age Group
Three Year Period 1996-1998

County	14 & Under	15-24	25-34	35-44	45-54	55-64	65-74	75 & Over	Total
Adair	$4,374	$63,402	$3,620	$24,457	$10,266	$288,983	$3,944	$3,154	**$402,200**
Adams	$0	$0	$0	$0	$27,849	$2,358	$0	$15,370	**$45,577**
Allamakee	$0	$5,230	$127,775	$2,200	$5,451	$8,144	$10,954	$0	**$159,754**
Appanoose	$0	$18,766	$37,683	$3,354	$1,993	$0	$58,516	$0	**$120,312**
Audubon	$0	$38,286	$4,548	$5,847	$0	$0	$0	$0	**$48,681**
Benton	$0	$15,959	$37,497	$32,134	$0	$16,103	$0	$0	**$101,693**
BlackHawk	$61,733	$479,024	$176,701	$222,983	$235,536	$207,664	$207,564	$144,076	**$1,735,281**
Boone	$2,079	$15,079	$40,545	$57,311	$39,470	$42,278	$38,693	$38,421	**$273,876**
Bremer	$0	$26,322	$157,080	$27,356	$0	$28,814	$24,595	$13,633	**$277,800**
Buchanan	$12,676	$29,046	$101,958	$25,982	$97,565	$2,839	$55,727	$0	**$325,793**
Buena Vista	$4,546	$11,461	$19,141	$64,556	$13,605	$15,654	$40,420	$37,040	**$206,423**
Butler	$0	$21,210	$38,162	$8,754	$14,028	$8,015	$13,668	$10,551	**$114,388**
Calhoun	$0	$28,524	$0	$6,877	$0	$6,091	$9,761	$5,188	**$56,441**
Carroll	$3,903	$106,662	$8,787	$61,059	$14,032	$27,521	$7,986	$32,390	**$262,340**
Cass	$0	$10,351	$5,808	$0	$90,085	$0	$0	$31,778	**$138,023**
Cedar	$6,934	$51,995	$37,438	$42,961	$31,911	$0	$37,289	$27,535	**$236,063**
Cerro Gordo	$38,037	$499,855	$147,477	$293,906	$301,451	$81,604	$211,370	$96,287	**$1,669,987**
Cherokee	$0	$23,670	$22,190	$21,566	$0	$8,700	$35,982	$36,389	**$148,497**
Chickasaw	$4,117	$46,893	$3,976	$124,586	$12,393	$38,084	$0	$7,575	**$237,623**
Clarke	$0	$9,106	$47,164	$76,970	$11,498	$7,636	$43,838	$0	**$196,213**
Clay	$3,947	$70,855	$55,754	$11,405	$38,671	$3,804	$79,825	$37,852	**$302,113**
Clayton	$0	$17,955	$134,598	$48,143	$16,218	$0	$3,419	$10,833	**$231,166**
Clinton	$21,999	$346,931	$110,689	$124,971	$31,277	$67,362	$29,826	$86,884	**$819,940**
Crawford	$13,256	$46,347	$39,763	$18,426	$28,324	$15,318	$57,092	$5,844	**$224,370**
Dallas	$0	$127,940	$205,963	$459,882	$38,613	$63,141	$57,731	$41,604	**$994,874**
Davis	$0	$6,477	$5,212	$22,318	$8,754	$0	$0	$30,937	**$73,698**
Decatur	$0	$46,966	$0	$21,962	$0	$16,238	$6,016	$0	**$91,181**
Delaware	$0	$37,265	$43,063	$6,782	$27,675	$370,532	$64,036	$177,280	**$726,634**
Des Moines	$18,040	$281,677	$94,050	$148,196	$132,208	$95,450	$190,282	$93,042	**$1,052,945**
Dickinson	$24,072	$8,544	$23,696	$3,547	$20,166	$13,192	$4,404	$28,529	**$126,151**
Dubuque	$154,068	$684,578	$351,915	$322,083	$275,587	$181,613	$266,436	$113,383	**$2,349,663**
Emmet	$0	$10,789	$41,928	$18,062	$6,693	$0	$17,593	$9,039	**$104,104**
Fayette	$4,628	$81,321	$14,475	$33,508	$20,011	$33,644	$0	$27,188	**$214,775**
Floyd	$0	$23,026	$56,084	$25,809	$5,120	$39,835	$31,894	$10,764	**$192,531**
Franklin	$0	$30,692	$7,428	$4,962	$142,312	$2,264	$3,004	$126,584	**$317,246**
Fremont	$1,319	$5,750	$2,044	$0	$23,993	$0	$41,325	$8,746	**$83,177**
Greene	$0	$0	$0	$8,033	$32,494	$24,505	$9,567	$0	**$74,599**
Grundy	$0	$18,433	$8,240	$18,548	$53,890	$19,323	$0	$24,002	**$142,436**
Guthrie	$14,357	$74,432	$22,366	$2,671	$233,440	$22,566	$48,694	$0	**$418,525**
Hamilton	$20,747	$28,050	$165,217	$19,743	$44,295	$59,172	$44,625	$13,081	**$394,930**
Hancock	$0	$9,708	$283,775	$6,173	$3,282	$0	$0	$0	**$302,938**
Hardin	$0	$20,834	$11,937	$70,563	$84,074	$30,291	$17,032	$48,664	**$283,395**
Harrison	$0	$27,242	$66,138	$103,165	$8,063	$98,063	$0	$0	**$302,671**
Henry	$0	$146,519	$61,420	$104,965	$19,725	$0	$70,799	$78,648	**$482,076**
Howard	$0	$0	$1,446	$18,326	$0	$20,255	$8,835	$0	**$48,862**
Humboldt	$4,907	$52,640	$16,002	$9,394	$16,660	$0	$6,327	$964	**$106,894**
Ida	$0	$4,013	$0	$9,449	$157,919	$4,707	$928	$0	**$177,016**
Iowa	$0	$52,150	$93,540	$363,107	$24,181	$40,079	$24,793	$15,900	**$613,749**
Jackson	$25,858	$52,763	$171,184	$15,302	$111,815	$45,116	$0	$0	**$422,037**
Jasper	$11,654	$370,743	$270,738	$248,830	$229,932	$37,100	$129,398	$53,837	**$1,352,233**
Jefferson	$0	$336,374	$49,395	$46,194	$26,309	$0	$74,962	$51,363	**$584,597**
Johnson	$138,575	$1,553,918	$1,511,729	$1,182,552	$1,982,381	$632,795	$603,327	$434,897	**$8,040,175**
Jones	$0	$30,254	$15,391	$101,898	$62,989	$13,300	$34,034	$2,546	**$260,412**
Keokuk	$0	$254,681	$65,304	$4,968	$7,045	$0	$37,520	$4,543	**$374,061**

* 1996–1998 data.

Total Hospital Charges by Crash County & Age Group (CONTINUED)
Three Year Period 1996-1998

County	14 & Under	15-24	25-34	35-44	45-54	55-64	65-74	75 & Over	Total
Kossuth	$0	$14,038	$41,400	$72,383	$138,542	$20,334	$62,882	$6,709	**$356,287**
Lee	$58,869	$194,674	$83,270	$84,066	$98,789	$66,889	$14,117	$17,836	**$618,510**
Linn	$319,890	$678,661	$677,929	$650,183	$462,276	$292,200	$428,978	$353,997	**$3,864,114**
Louisa	$5,779	$73,086	$42,979	$0	$1,344	$0	$57,807	$0	**$180,995**
Lucas	$0	$81,288	$18,045	$10,489	$7,318	$4,996	$0	$8,192	**$130,328**
Lyon	$0	$0	$50,369	$12,260	$5,892	$19,246	$6,046	$8,289	**$102,102**
Madison	$9,843	$94,287	$0	$7,657	$11,620	$67,562	$77,825	$7,581	**$276,376**
Mahaska	$27,887	$142,840	$35,775	$65,336	$4,049	$6,520	$53,556	$12,042	**$348,004**
Marion	$0	$83,201	$133,875	$48,656	$72,450	$78,502	$84,342	$48,513	**$549,540**
Marshall	$16,094	$120,815	$71,402	$116,715	$65,578	$38,268	$17,195	$60,736	**$506,802**
Mills	$0	$110,246	$46,388	$0	$6,286	$23,061	$37,183	$18,299	**$241,462**
Mitchell	$0	$22,891	$2,720	$24,082	$0	$2,973	$0	$9,609	**$62,274**
Monona	$3,077	$79,880	$55,605	$89,046	$47,024	$40,737	$16,866	$79,822	**$412,058**
Monroe	$0	$10,694	$21,142	$20,877	$0	$16,148	$34,297	$3,475	**$106,633**
Montgomery	$0	$3,293	$1,358	$17,763	$908	$17,832	$1,818	$22,015	**$64,988**
Muscatine	$51,708	$141,888	$347,805	$257,764	$111,812	$158,485	$166,057	$168,260	**$1,403,779**
O'Brien	$0	$16,512	$9,184	$43,498	$23,618	$30,951	$0	$0	**$123,763**
Osceola	$0	$0	$0	$0	$4,577	$0	$3,641	$2,098	**$10,316**
Page	$511	$12,508	$13,894	$13,459	$1,356	$48,875	$0	$82,479	**$173,083**
Palo Alto	$0	$0	$0	$15,888	$0	$0	$5,497	$64,303	**$85,688**
Plymouth	$0	$110,964	$11,118	$245,090	$4,970	$8,606	$0	$73,299	**$454,047**
Pocahontas	$0	$37,393	$0	$0	$66,806	$0	$0	$14,541	**$118,740**
Polk	$1,472,034	$4,571,692	$4,394,078	$4,629,357	$4,696,787	$2,660,222	$2,185,661	$2,093,855	**$26,703,686**
Pottawattamie	$116,934	$403,114	$349,692	$267,052	$325,260	$131,101	$120,590	$229,427	**$1,943,170**
Poweshiek	$10,336	$38,349	$47,617	$137,415	$0	$34,483	$14,676	$96,870	**$379,746**
Ringgold	$0	$7,113	$6,475	$112,933	$0	$1,821	$0	$0	**$128,342**
Sac	$0	$107,477	$29,693	$142,010	$6,677	$132,664	$6,999	$0	**$425,519**
Scott	$295,644	$783,502	$1,562,920	$1,012,856	$840,181	$501,507	$1,039,296	$576,833	**$6,612,737**
Shelby	$5,062	$0	$7,579	$5,973	$0	$23,767	$11,155	$22,699	**$76,235**
Sioux	$634	$55,024	$80,316	$13,924	$69,790	$3,608	$36,237	$102,134	**$361,667**
Story	$124,330	$217,866	$170,955	$114,833	$40,327	$169,667	$88,771	$56,093	**$982,841**
Tama	$0	$55,567	$20,564	$117,804	$69,196	$0	$45,088	$3,575	**$311,794**
Union	$18,800	$1,507	$4,999	$17,752	$14,735	$42,394	$4,740	$5,968	**$110,895**
Van Buren	$8,300	$85,797	$47,332	$33,858	$0	$0	$0	$18,176	**$193,464**
Wapello	$16,081	$145,440	$113,515	$81,124	$91,789	$95,906	$118,544	$35,132	**$697,531**
Warren	$26,762	$73,916	$42,405	$206,729	$98,050	$21,138	$4,996	$97,075	**$571,071**
Washington	$18,917	$117,161	$28,819	$66,959	$10,907	$54,503	$40,479	$19,420	**$357,165**
Wayne	$0	$34,641	$3,257	$16,541	$132,318	$62,688	$0	$0	**$249,445**
Webster	$31,431	$106,959	$118,815	$145,927	$96,609	$52,061	$284,372	$48,498	**$884,672**
Winnebago	$0	$10,641	$0	$12,459	$10,994	$0	$25,073	$0	**$59,167**
Winneshiek	$8,855	$84,246	$13,675	$21,302	$0	$9,370	$70,084	$40,318	**$247,851**
Woodbury	$169,425	$1,129,252	$674,895	$809,040	$480,133	$389,534	$835,714	$265,746	**$4,753,738**
Worth	$0	$37,179	$15,444	$10,593	$7,379	$0	$3,379	$7,313	**$81,286**
Wright	$13,503	$6,210	$4,890	$36,764	$4,146	$33,746	$16,765	$35,998	**$152,022**
Grand Total	**$3,426,531**	**$16,462,518**	**$14,420,231**	**$14,515,213**	**$12,951,741**	**$8,102,517**	**$8,784,758**	**$6,853,567**	**$85,517,076**

Produced by the Iowa Department of Public Health, Bureau of EMS with data from the Iowa Crash Outcome Data Evaluation System (CODES) project. The graphs presented are based on 6,004 crash records that were linked to a hospital discharge record.

Iowa Department of Public Health
Bureau of EMS
401 SW 7th Street, Suite D
Des Moines, IA 50309
(800) 728-3367

03/16/01

Iowa Traffic Safety Data Service

The Service

The Iowa Traffic Safety Data Service (ITSDS) is a quick-response service that provides easy-to-understand analyses and reports from many safety and geographic information system (GIS) tools developed by the Iowa DOT and the Center for Transportation Research and Education (CTRE).

ITSDS provides access to Iowa safety data tools and products for state and local agencies and researchers that do not have the time or expertise to perform safety data queries on their own. ITSDS fills the large gap that exists between what data users can get for themselves and what can only be obtained by experts with the best hardware and software.

ITSDS products help facilitate decision making, effective presentation of information, and education.

Past, Present, and Future of the Service

Iowa entered the GIS era expecting to continue broad, user-based desktop computing of safety data. However, the range of possibilities for what could be done with data using various new analysis tools grew so rapidly that few users could keep up. Recognizing the vastness new resources and the inability of time-strapped public agency staff to rapidly exploit these new options, the idea of the Iowa Traffic Safety Data Service was formed.

As public agency staff gain more competency with basic GIS and other technologies, the service will continue to utilize and demonstrate new technologies that are yet ahead of the state of practice. Another benefit will be the continual broadening of the user base to include advocacy groups, concerned citizens, students, and others who can raise awareness of traffic safety in their communities.

Requests

The service is primarily provided for requests from our sponsoring agencies—Iowa Governor's Traffic Safety Bureau, Iowa DOT, Iowa Department of Public Health, and Federal Highway Administration. Requests from county and local officials, university researchers, and other state agencies may qualify but must first be approved by one of the sponsoring agencies.

A. Iowa Data and Analysis

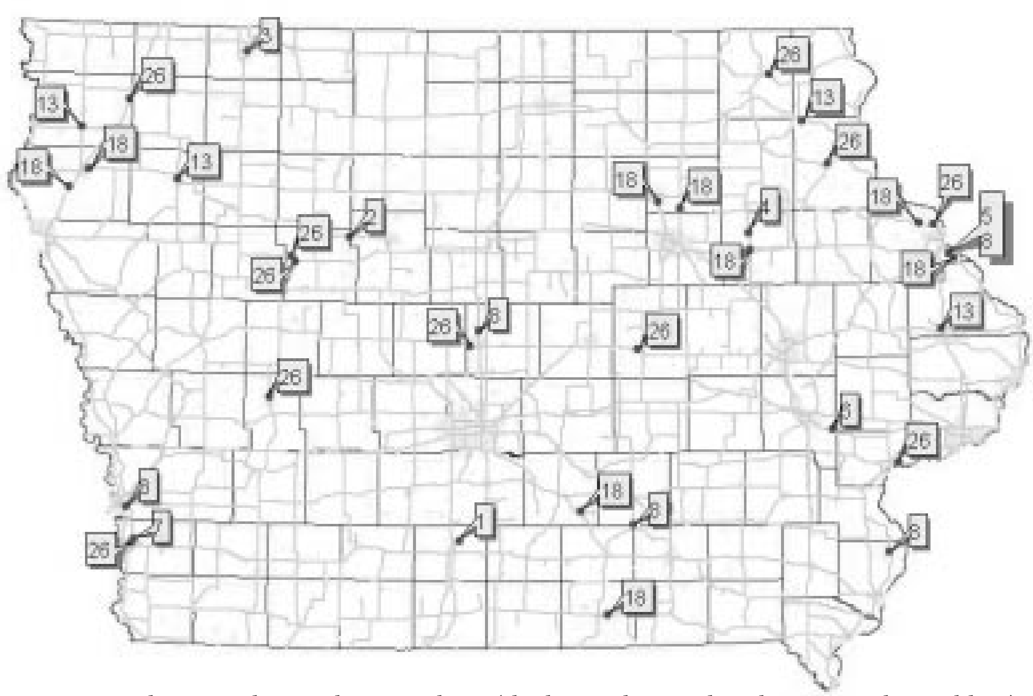
To request approval, please contact the agency most relevant to your request: for transportation-related requests contact Joyce Emery, Iowa DOT, joyce.emery@dot.state.ia.us; for EMS, hospital, or health-related requests, contact Dick Harmon, Iowa Department of Public Health, dharmon@idph.state.ia.us; and for enforcement-related requests contact Bob Thompson, Iowa GTSB, rthompso@dps.state.ia.us. Please copy all requests to itsds@iastate.edu.

In order to serve clients better, ITSDS has recently implemented a team approach to handle incoming requests. This team will encourage collaboration and integration of diverse staff backgrounds, including civil engineering, geographic information systems, management information systems, transportation planning, and transportation engineering.

If you have a qualifying request, use the online request form (available at www.ctre.iastate.edu/itsds/) to request a report or analysis. A record of current and past requests is also available from the ITSDS web site.

For more information, contact Zach Hans, CTRE, 515-294-2329, zhans@iastate.edu.

ITSDS Map of Curves on US and IA Highways in Iowa with the Greatest Non-Animal Crash Problems*



* 1989–1998 data; numbers indicate ranking (the lower the number the greater the problem).

IOWA DATA AND DATA ANALYSIS WEB SITES

CTRE: Traffic and Safety Information Series (answers to frequently asked questions)
www.ctre.iastate.edu/pubs/tsinfo/index.htm

Iowa DOT: Daily Traffic Maps
www.msp.dot.state.ia.us/trans_data/traffic/index.html

Iowa DOT Office of Traffic and Safety: Crash Analysis Tools
www.dot.state.ia.us/alas/index.htm

Iowa DOT Office of Traffic and Safety: Safety Improvement Candidate Locations
www.IowaSMS.org

Iowa SMS: Iowa SMS Data and Links to Member Organization Data Sites
www.iowasms.org

Iowa Traffic Safety Data Service
www.ctre.iastate.edu/itsds/