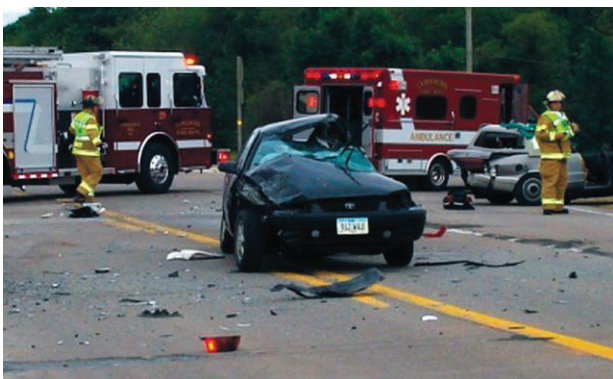


Improving Traffic Safety Culture in Iowa



Center for Transportation
Research and Education

Final Report
April 2011



IOWA STATE UNIVERSITY
Institute for Transportation

Sponsored by
Iowa Department of Transportation
(InTrans Project 09-357)

About CTRE

The mission of the Center for Transportation Research and Education (CTRE) at Iowa State University is to develop and implement innovative methods, materials, and technologies for improving transportation efficiency, safety, and reliability while improving the learning environment of students, faculty, and staff in transportation-related fields.

Iowa State University Disclaimer Notice

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the sponsors.

The sponsors assume no liability for the contents or use of the information contained in this document. This report does not constitute a standard, specification, or regulation.

The sponsors do not endorse products or manufacturers. Trademarks or manufacturers' names appear in this report only because they are considered essential to the objective of the document.

Iowa State University Non-Discrimination Statement

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Compliance, 3280 Beardshear Hall, (515) 294-7612.

Iowa Department of Transportation Statements

Federal and state laws prohibit employment and/or public accommodation discrimination on the basis of age, color, creed, disability, gender identity, national origin, pregnancy, race, religion, sex, sexual orientation or veteran's status. If you believe you have been discriminated against, please contact the Iowa Civil Rights Commission at 800-457-4416 or Iowa Department of Transportation's affirmative action officer. If you need accommodations because of a disability to access the Iowa Department of Transportation's services, contact the agency's affirmative action officer at 800-262-0003.

The preparation of this (report, document, etc.) was financed in part through funds provided by the Iowa Department of Transportation through its "Agreement for the Management of Research Conducted by Iowa State University for the Iowa Department of Transportation," and its amendments.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Iowa Department of Transportation.

Technical Report Documentation Page

1. Report No. InTrans Project 09-357	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Improving Traffic Safety Culture in Iowa		5. Report Date April 2011	
		6. Performing Organization Code	
7. Author(s) Michael Baird, Chris Albrecht, and Konstantina Gkritza		8. Performing Organization Report No.	
9. Performing Organization Name and Address Center for Transportation Research and Education Iowa State University 2711 South Loop Drive, Suite 4700 Ames, IA 50010-8664		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No.	
12. Sponsoring Organization Name and Address Iowa Department of Transportation 800 Lincoln Way Ames, IA 50010		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes Visit www.ctre.iastate.edu for color PDF files of this and other research reports.			
16. Abstract <p>Vehicle crashes rank among the leading causes of death in the United States. In 2006, the AAA Foundation for Traffic Safety “made a long-term commitment to address the safety culture of the United States, as it relates to traffic safety, by launching a sustained research and educational outreach initiative.”</p> <p>An initiative to produce a culture of safety in the state of Iowa includes the Iowa Comprehensive Highway Safety Plan (CHSP). The Iowa CHSP “engages diverse safety stakeholders and charts the course for the state, bringing to bear sound science and the power of shared community values to change the culture and achieve a standard of safer travel for our citizens.”</p> <p>Despite the state’s ongoing efforts toward highway safety, an average of 445 deaths and thousands of injuries occur on Iowa’s public roads each year. As such, a need exists to revisit the concept of safety culture from the diverse perspectives of disciplines, such as public health, education, public policy, social psychology, and civil engineering, in an effort to improve traffic safety.</p> <p>This study summarizes the “best practices” and effective laws in improving safety culture in the United States and abroad. Additionally, this study solicited the opinions of experts in public health, education, law enforcement, public policy, social psychology, safety advocacy, and traffic safety engineering in a bid to assess the traffic safety culture initiatives in Iowa. Recommendations for improving traffic safety culture are offered in line with the top five Iowa CHSP safety policy strategies, which are young drivers, occupant protection, motorcycle safety, traffic safety enforcement, and traffic safety improvement program, as well as the eight safety program strategies outlined in the CHSP.</p> <p>As a result of this study, 11 high-level goals were developed, each with specific actions to support its success. The goals are: improve emergency medical services (EMS) response, toughen law enforcement and prosecution, increase safety belt use, reduce speeding-related crashes, reduce alcohol-related crashes, improve commercial vehicle safety, improve motorcycle safety, improve young driver education, improve older driver safety, strengthen teenage licensing process, and reduce distracted driving.</p>			
17. Key Words emergency response—education—enforcement—engineering—Iowa CHSP—traffic safety culture		18. Distribution Statement No restrictions.	
19. Security Classification (of this report) Unclassified.	20. Security Classification (of this page) Unclassified.	21. No. of Pages 42	22. Price NA

IMPROVING TRAFFIC SAFETY CULTURE IN IOWA

**Final Report
April 2011**

Principal Investigator

Konstantina Gkritza

Assistant Professor of Civil, Construction, and Environmental Engineering
Center for Transportation Research and Education, Iowa State University

Co-Principal Investigator

Chris Albrecht

Transportation Research Specialist
Center for Transportation Research and Education, Iowa State University

Research Assistant

Michael Baird

Authors

Michael Baird, Chris Albrecht, and Konstantina Gkritza

The Midwest Transportation Consortium
provided funding for a graduate research assistant assigned to this project.

Sponsored by
the Iowa Department of Transportation.

Preparation of this report was financed in part
through funds provided by the Iowa Department of Transportation
through its research management agreement with the
Institute for Transportation
(InTrans Project 09-357).

A report from
Institute for Transportation
Iowa State University
2711 South Loop Drive, Suite 4700
Ames, IA 50010-8664
Phone: 515-294-8103
Fax: 515-294-0467
www.intrans.iastate.edu

TABLE OF CONTENTS

ACKNOWLEDGMENTS	vii
1. INTRODUCTION.....	1
1.1 Background and Problem Statement.....	1
1.2 Research Objectives and Tasks.....	1
1.3 Report Organization.....	3
2. LITERATURE REVIEW	4
2.1 Introduction.....	4
2.2 Education	4
2.3 Engineering	12
2.4 Enforcement.....	13
2.5 Emergency Medical Services.....	15
2.6 Literature Summary	16
3. EXPERT INPUT	18
3.1 Introduction.....	18
3.2 Critical Issues from Focus Group Meeting	18
3.3 Additional Interviews.....	22
3.4 Next Steps	24
4. CONCLUSIONS AND GOAL-ORIENTED ACTIONS.....	25
4.1 Improve EMS Response.....	25
4.2 Toughen Law Enforcement and Prosecution	25
4.3 Increase Safety Belt Use	25
4.4 Reduce Speeding-Related Crashes.....	26
4.5 Reduce Alcohol-Related Crashes.....	26
4.6 Improve Commercial Vehicle Safety.....	26
4.7 Improve Motorcycle Safety.....	26
4.8 Improve Young Driver Education.....	26
4.9 Improve Older Driver Safety.....	27
4.10 Strengthen Teenage Licensing Process	27
4.11 Reduce Distracted Driving.....	27
REFERENCES	30

LIST OF TABLES

Table 1.1. Tasks and corresponding report sections	3
Table 2.1. NHTSA countermeasure effectiveness rankings (by report subsection)	17
Table 4.1. Summary of goal-oriented actions	28

ACKNOWLEDGMENTS

The authors would like to thank the Iowa Department of Transportation (DOT) for sponsoring this research, and, in particular, Mary Stahlhut of the Office of Traffic and Safety, for her efforts in initiating the project.

The Technical Advisory Committee (TAC) members are also acknowledged for their comments and insights throughout the project. TAC members include:

- Katrina Altenhofen – Iowa Department of Public Health (IDPH) Office of Emergency Management Services (EMS)
- Randy Hunefeld – Iowa Department of Public Safety (DPS) Governor’s Traffic Safety Bureau (GTSB)
- Laura Johnson – Iowa-Illinois Safety Council (IISC)
- Mary Schaer – Iowa DOT Motor Vehicle Division, Office of Driver Services
- Jerry Roche – Federal Highway Administration (FHWA) Iowa Division

Finally, the authors would like to thank all of the subject experts for their valuable insights and input into this research.

1. INTRODUCTION

1.1 Background and Problem Statement

Vehicle crashes rank among the leading causes of death in the United States. In 2006, the AAA Foundation for Traffic Safety “made a long-term commitment to address the safety culture of the United States, as it relates to traffic safety, by launching a sustained research and educational outreach initiative.” Safety culture includes “the implicit shared values and beliefs that determine the way in which the society organizes and acts” in matters that affect safety (AAA 2007).

An improved traffic safety culture likely would be characterized by changes in three broad areas: highway and environment, human factors, and vehicles. Common strategies of success for creating a culture of safety include aggressive goal setting, prioritized engineering strategies, comprehensive behavioral programs, advanced data collections and analysis systems, reliance on data-driven planning and programming, and establishment of a broad base of partnerships (Mercer 2008).

An initiative to produce a culture of safety in Iowa is included in the Iowa Comprehensive Highway Safety Plan (CHSP). The 2006 Iowa CHSP “engages diverse safety stakeholders and charts the course for the state, bringing to bear sound science and the power of shared community values to change the culture and achieve a standard of safer travel for our citizens.”

Despite the state’s ongoing efforts toward highway safety, as of 2006, an average of 445 deaths and thousands of injuries were occurring on Iowa’s public roads each year. The concept of safety culture from the diverse perspectives of disciplines, such as public health, education, public policy, social psychology, and civil engineering, is important in helping to guide the state’s efforts to improve traffic safety in Iowa.

1.2 Research Objectives and Tasks

This study summarized the “best practices” and effective laws in improving safety culture in the United States and abroad. Additionally, this study assessed the traffic safety culture initiatives in Iowa compared to those of other states and made recommendations to the Iowa DOT toward improving traffic safety culture in Iowa.

The areas for improvement were examined in line with the top five Iowa CHSP safety policy strategies, which are young drivers, occupant protection, motorcycle safety, traffic safety enforcement, and traffic safety improvement program, as well as the eight safety program strategies outlined in the CHSP.

The research project included the following tasks.

Task 1: Establish a technical advisory committee (TAC) for the project

Potential Technical Advisory Committee (TAC) members were identified in consultation with representatives from the Iowa Department of Transportation (DOT) Office of Traffic and Safety. The members identified included representatives from the Iowa DOT, the Iowa Governor's Traffic Safety Bureau (GTSB), the Department of Public Health (DPH), the Iowa-Illinois Safety Council (IISC), and the Federal Highway Administration (FHWA) in Iowa.

A meeting of the TAC convened quarterly.

Task 2: Summarize the "best practices" and effective laws in improving safety culture in the United States and abroad

The research team synthesized the best practices in improving traffic safety culture that have been used in the United States and abroad and highlighted examples worth following in Iowa, mistakes to avoid repeating, and avenues yet unexplored.

"Best practices" resources for the review and synthesis included (but were not limited to) reports from the National Highway Traffic Safety Administration (NHTSA), FHWA, AAA Foundation for Traffic Safety, Insurance Institute for Highway Safety (IIHS), National Transportation Safety Board (NTSB), Governor's Highway Safety Association (GHSA), and the American Association of State Highway and Transportation Officials (AASHTO) 500 series.

Task 3: Conduct expert interviews

The research team solicited the opinions of additional experts on improving the traffic safety culture in Iowa. Candidate experts were knowledgeable persons in public health, education, public policy, social psychology, and civil engineering.

Iowa experts included (but were not limited to) representatives of the Department of Psychology at the University of Northern Iowa (UNI), the Department of Sociology at UNI, the University of Iowa (UI) Public Policy Center and Injury Prevention Center, the Iowa DOT, the Iowa Department of Public Safety (DPS), A Brotherhood Aimed Towards Education (ABATE) of Iowa, driver education instructors, and transportation safety experts at Iowa State University (ISU) and in the private sector.

Task 4: Present conclusions and recommendations

The research team synthesized the results of the review of the state-of the practice (Task 2) and expert interviews (Task 3) and offered recommendations to the Iowa DOT on ways to improve traffic safety culture in Iowa.

1.3 Report Organization

Table 1.1 lists the tasks for this project and the corresponding sections of this report.

Table 1.1. Tasks and corresponding report sections

Project task	Corresponding report section
1. Selection of TAC	1. Introduction
2. Literature review	2. Literature Review
3. Expert interviews	3. Expert Input
4. Conclusions and recommendations	4. Conclusions and Goal-Oriented Actions

2. LITERATURE REVIEW

2.1 Introduction

This section summarizes best practices and effective laws of improving traffic safety culture. These practices and laws are based on local, regional, national, and international resources. The basis for categorizing the policy areas is the traditional “Four Es” that are used to describe highway safety: Education, Engineering, Enforcement, and Emergency Medical Service.

2.2 Education

2.2.1 Safety Belts

Ever since the primary safety belt law was enacted in 1986, increasing the usage of safety belts has been a priority for transportation officials in Iowa. Multiple public education campaigns have been conducted by the Iowa GTSB to increase safety belt use. These campaigns have been in line with ongoing enforcement initiatives to increase the use of safety belts in the front seat (which are discussed under Enforcement later in this section).

Statewide safety belt use reached 93.1% in 2009 (NHTSA 2010). This is one of the highest safety belt usage rates in the country, and the highest of the states surrounding Iowa (with Illinois at 91.7%, Minnesota at 90.2%, Missouri at 77.2%, Nebraska at 84.8%, South Dakota at 72.1%, and Wisconsin at 73.8%). Even with this high usage rates, about half of Iowa’s motor vehicle fatalities are unbelted.

Of the surrounding states, most have a secondary law, which has been found to lead to lower compliance rates. (Only Illinois, Iowa, Minnesota, and Wisconsin have primary laws.) Iowa is also well above the national average of 84% (Iowa DOT, 2005). However, these numbers are based on daytime surveys. Compliance at night is known to be lower, but, nighttime surveys to calculate compliance percentages are more difficult to conduct.

The GTSB also distributes brochures and fact sheets to encourage the use of safety belts. Such facts on the data include many references to the number of unbelted drivers killed, number of lives saved due to safety belts, and the savings in insurance premiums due to the law being enacted (GTSB 2010a). A recent area of improvement in Iowa was the 2010 legislation expanding required usage for back seat for passengers 17 and under. (NHTSA 2011).

An area for improvement is safety belt usage by pickup drivers. A NHTSA study conducted focus groups with male pickup drivers in Georgia, Michigan, Texas, and Montana (Nitzburg and Knoblauch 2004). The study found that most of the male pickup drivers stated they would wear safety belts when riding with passengers or depending on different road and weather circumstances, but would rather not wear them when driving alone. The focus group then discussed messages to get the attention of the male drivers. They stated that humor should be

limited, but that short stories should be told of how their decision could affect them and their loved ones.

In addition, NHTSA (2009a) and NCHRP Report 622 (Preusser et al. 2008) reviewed countermeasures that work. In the NCHRP report, countermeasures were rated proven, likely, unknown, or proven not to work. In this report, the effectiveness of local primary safety belt laws was likely proven, while the effectiveness of primary safety belt laws was proven.

In the NHTSA report, different aspects were given 1 to 5 stars, with 5 stars being most effective. In this report, state primary safety belt laws were given 5 stars, local primary safety belt laws and increased penalties were given 3 stars, while unproven safety laws covering all seating positions were given 1 star.

2.2.2 Child Restraints

Child safety seats have been a point of emphasis in recent years. In 2004, Iowa passed new child restraint laws, with significant strengthening in 2010 (GTSB 2011):

- Children under one year of age and who weigh less than 20 pounds must be in a rear-facing child restraint system
- Children from 1 to 6 years old must be in a child restraint system
- Children from 6 to 10 years old must be in a child restraint system or wearing a safety belt
- All children up to age 17 must be using a safety belt in all seating positions (as of 2010), if one is available

This issue has been highly publicized by GTSB and children's hospitals in Iowa. Campaigns have been undertaken, in Iowa and in other states, to inform parents about the laws, their requirements, and recommendations by national experts in the field (GTSB 2006). Most of these campaigns also educate people on how to install the seats properly, which is fundamental to their proper function. There has also been a national effort to increase the use of child restraints. Most of these efforts are attempting to reduce the number of children killed in traffic crashes. It has been shown that booster seats reduce injuries and fatalities in children 4-8 years old (NHTSA 2005).

In another NHTSA study (Decina et al. 2009), focus groups were held for parents to examine their level of knowledge on child restraints. Most parents were not fully knowledgeable, but were aware that their children had to be restrained in some way. The parents participating in these focus groups stated: the reasons why they do not use seats (confusion about law, child does not like it, only going on a short trip, and so forth), where they learned how to use seats (events at shopping malls, fire/police departments, hospitals, car dealerships), and how to inform children about using a restraint system (police officers at school, sports celebrities, and so forth). Parents also learned where they can find details about the laws (doctor's offices, drivers licensing stations, and so forth) and how parents with low incomes can acquire the proper seats. The focus

group discussions offered valuable insight into the current efforts to educate the public on child restraint systems.

In the NCHRP report (Preusser et al. 2008), booster seat promotions were proven effective, while child safety clubs have unknown effectiveness. In the NHTSA report (2009a), implementation of laws and the coverage of these laws were given 5 stars, while distribution programs and inspection stations were given 2 stars.

2.2.3 Young Drivers

The safety of young drivers is an issue being addressed throughout the country. Young drivers only represent a small portion of the licensed driver population in Iowa (9%), and are disproportionally represented in traffic crashes (GTSB 2010b). Much of this is due to inexperience as drivers and distractions, such as the presence of other young passengers (NHTSA 2008). At the same time, the nationwide trend of drivers getting their license at 16 is dropping, down to 31% in 2008 from 45% in 1988 (St. George 2010).

One way that states are trying to reduce crashes involving young drivers is the implementation of graduated drivers licensing (GDL). Iowa's GDL went into effect in 1999. It allows for an instruction permit to be obtained at age 14, with the restriction of having to drive with a responsible adult. The age of 14 is the youngest a teen in any state in the nation can receive a permit, but many states require teens to be older (Copeland 2010).

In addition, Iowa is one of very few states that allows special unsupervised driving privileges to persons under the age of 16. The minor school license (MSL) allows a person as young as 14½, who has passed a driver education class and lives more than one mile from their school, to drive unsupervised to and from school, work, or school-related extracurricular activities within limited routes and timeframes. While the historic base for this provision was said to allow students to participate in school activities and still help with farm-related activities at home, the provision has long been used by both urban and rural students (Iowa DOT 2011). In an Iowa study of young driver crashes, analysis revealed that while only 6% of 14 year old drivers held an MSL, they were involved in almost 31% of the crashes for that age group and were more than seven times more likely to be involved in a crash than those operating under an instruction permit (Hallmark 2007).

To graduate to the intermediate license in Iowa, the driver must be at least 16, complete 20 hours of driving (2 hours at night), hold the supervised driving permit for 6 months, be crash- and violation-free for the 6 months preceding their application for the intermediate license, and complete driver education. The condition of the intermediate license is that the driver must be supervised when driving between 12:30 a.m. and 5:00 a.m. To graduate to the full license, the driver must be at least 17, complete 10 additional supervised driving hours (2 hours at night), hold the intermediate license for 12 months, and be crash- and violation-free for the 12 months preceding their application for the full license (Iowa DOT 2010).

While GDL restrictions exist to ensure young drivers have the skills they need to be good drivers, many national experts do not think that these are sufficient. This includes a study released by *U.S. News and World Report* (Flanigan et al. 2010). In this study, Iowa was ranked 49th out of the 50 states (including the District of Columbia) for the strength of its young driver licensing provisions. Although the ranking methodology is not the strongest, Iowa's low ranking is a reflection of both the presence of the MSL for Iowa's youngest legal drivers and weak GDL provisions that could be strengthened.

In contrast, here is what NHTSA recommends for the GDL (2008). For the instruction or learner's permit, it is recommended that the driver is not younger than 16, all occupants of the vehicle wear safety belts, and portable electronic devices are not used while driving.

The driver may graduate to the intermediate license at the minimum age of 16.5 with 30-50 hours of experience. The restrictions placed on the license include completion of driver education, use of safety belts by all occupants, supervision necessary between 10 p.m. and 5 a.m., prohibition of teenage passengers for the first 12 months and then limited to 2 teenage passengers until age 18, intervention for violations comes into effect at a lower point, and no use of portable electronic devices. For the full license, it is recommended that the minimum age is set to 18 years old (NHTSA 2008).

Crashes have been reduced as a result of GDL, and many studies attribute the reductions to the restrictions in the presence of passengers. One study found that passenger restrictions reduced the number of crashes, without offsetting them to other crashes (Chaudhary et al. 2007). In the NCHRP report (Preusser et al. 2008), GDL, night restrictions, and passenger restrictions are proven effective; parent guidance of teen licensing is likely effective; and high school driver education is proven not to work. In the NHTSA report (2009a), GDL, learner permit length, nighttime restrictions, and passenger restrictions were given 5 stars; belt use, cell phone restrictions, and parental roles were given 2 stars; post-licensure driver education was given 1 star; and pre-licensure driver education was given no stars.

2.2.4 Older Drivers

The median age of Iowa's population is increasing, and so is the age of Iowa's drivers. In 2010, 1 in 6 Iowa drivers were 65 or older. Older drivers are more likely to be injured in a crash and represent 15% of the fatalities nationwide (GTSB 2010c). While many of these drivers can continue to drive well into their later years, caution should be used so that they do not drive when their physical or mental/cognitive abilities no longer allow them to drive safely.

In a 2009 study, various examinations were tried to measure different abilities that would predict if an older person could still drive safely. While it was successful, more studies need to be conducted to investigate if the screening process is adequate (McCarthy et al 2009). In addition, when it is determined that a driver should no longer be driving, there are ways for families to help the older drivers transition to the new situation. This is especially important in areas without good public transportation, as older people are expected to be active and need to make trips after they have to stop driving (NHTSA 2009b).

In Iowa, drivers can work with the licensing authority to limit their driving privileges and still meet their capabilities and needs. Most of the time, a driver can get a daytime or local license that gives them proper mobility, but helps to keep them within their limits.

In the NCHRP report (Preusser et al. 2008), the effectiveness of licensing renewal policies for elderly drivers is likely proven, while the effectiveness of medical advisory boards for elderly drivers is unknown. In the NHTSA report (2009a), license station screening and referrals to the department of motor vehicles (DMV) was given 4 stars, license restrictions were given 3 stars, medical advisory boards, license renewal policies, formal courses, and general communication and education were given 2 stars.

2.2.5 Alcohol

Alcohol use is one of the leading causes of traffic crashes, both in Iowa and in the nation. GTSB statistics show that 23% of all fatalities in Iowa are alcohol-related. Of this number, 30% involved drivers under age 25 (GTSB 2010d). This overrepresentation of young drivers is especially alarming.

GTSB has conducted a number of campaigns against drunk driving, including those surrounding football and basketball games at University of Iowa and Iowa State University to prevent high alcohol consumption during such events (GTSB 2008).

The advocacy group Mothers Against Drunk Driving (MADD) has strongly pushed for legislation and enforcement of alcohol laws in the United States. They are strong advocates of having ignition interlocks for convicted drunk drivers, investing in the technology for all vehicles to have some sort of interlocking device, stronger penalties for drunk driving, and the elimination of the “catch and release” enforcement of drunk driving laws that is now the norm. The group has been highly successful in its 30 years of existence, having seen a 40% drop in fatalities in this time period (Dean-Mooney 2010).

In the NCHRP report (Preusser et al. 2008), sobriety checkpoints and mass media support of alcohol enforcement were proven effective. In the NHTSA report (2009a), alcohol screening and brief interventions, mass-media campaigns, and sobriety checkpoints were given 5 stars; responsible beverage service and alternative transportation were given 2 stars, and designated drivers were given 1 star.

2.2.6 Motorcycles

Motorcycle helmet use is a controversial issue in Iowa and the country. Iowa currently does not have any kind of mandatory helmet-use law. Motorcycle fatalities are increasing, as overall traffic fatalities are decreasing (NHTSA 2009c). In Iowa, 6 in 10 motorcycle riders (operators) are age 45 or older. This trend is growing, as a greater number of people from the baby boomer generation are buying motorcycles.

Iowa did have a helmet law from September 1, 1975 to July 1, 1976. This law was effective in reducing fatalities, but it was repealed. Today, 80% of motorcycle fatalities involve unhelmeted riders (GTSB 2010e). National statistics indicate use of helmets that meet federal safety regulations in states with mandatory helmet use was 86%, while the use of helmets in states without mandatory use was 55% in 2009 (NHTSA 2009d). The statistics show the notable difference in usage as a result of a helmet law.

In the NCHRP report (Preusser et al. 2008), helmet laws were proven effective. In the NHTSA report (2009a), state helmet laws were given 5 stars and helmet use promotion programs and helmet law enforcement for noncompliant helmets were given one star.

In addition, the concept of conspicuity of motorcycle riders is also an issue in Iowa. Motorcycles are difficult for drivers to see. By wearing more conspicuous clothing, riders can help drivers of other vehicles to see them. In addition, other modifications can be made, such as brighter headlights and headlight modulators, which make the bike itself more visible. The Institute for Transportation (InTrans) at ISU recently completed a project that made recommendations to the Iowa DOT about different campaigns and interventions that can be conducted to make riders more aware of conspicuity (Gkritza 2010).

2.2.7 Cell Phones/Distracted Driving

Cell phone use while driving has been a growing concern in the United States. This may be due in part to the proliferation of the devices, with 276 million subscribers in the United States alone (IIHS 2010). This study found that 40% of drivers admit to talking on their cell phones a few times, along with 19% who admit to talking on them daily. The study also found that the younger the drivers, the more likely they are to admit to calling or sending text messages on their phones while driving.

A survey conducted by Nationwide Insurance in 2009 found that most people (8 in 10) support some degree of restriction on cell phone use in vehicles. This support is across all regions and generations. However, the outcomes of the survey did not state that laws alone will change behavior, but that an education campaign should be carried out to teach drivers about the dangers. In other countries such as the United Kingdom, where using handheld phones while driving is illegal, highly graphic and blunt ads have been used to change attitudes toward using cell phones while driving (Sorrel 2007).

Many state governments have placed restrictions on cell phone use while driving. (Eight states have restrictions on hand-held use at this time.) While the idea behind these bans is to discourage use of these devices and to reduce crashes, the effectiveness of these laws has not been found as significant as envisioned. Although total cell phone use has decreased in these states, many people still use their phones through hands-free devices. The more surprising finding is that crashes have not decreased in line with the decreased phone usage in the jurisdictions where bans have been in place.

Another study quantified hand-held cell phone use in jurisdictions with cell phone bans: the District of Columbia, New York, and Connecticut (McCartt et al. 2009). This observational study recorded whether or not a hand-held cell phone was being used while a vehicle was in motion. While the study confirmed a decrease in hand-held use after the ban was enacted, it found that enforcement could be a contributing factor to different effectiveness rates among jurisdictions.

This study advocates high visibility enforcement, similar to safety belt laws, so that the same compliance issues do not occur (the spike in compliance and, then, the waning over time). The authors also noted that safety data is difficult to find due to the use of hands-free devices being legal for use under the current laws. The authors state that this is a topic for future research to address, since it will be in the public view for years to come.

A “push” has been placed on reducing distracted driving in general (especially on cell phone use while driving) by the United States Secretary of Transportation, Ray LaHood. It involved the creation of a government website devoted to distracted driving (US DOT 2010a). The website includes facts and public service announcements, as well as personal appeals from Secretary LaHood and popular talk show host Oprah Winfrey. This site also documents current news about legislation on state bans on texting and cell phone use.

In Iowa, one such ban went into effect July 1, 2010. This law bans almost all drivers from reading, writing, and sending texts (exceptions for law enforcement, truckers, and emergency medical services) and bans all teenage drivers on restricted licenses from any cell phone use. However, there appears to be little push from either side of the political aisle to strengthen the law next session, as, most of the time, legislators will take a “wait and see” approach to note if a law is working (Clayworth 2010).

2.2.8 Speed

Speed is one of the most common contributing factors in fatal and serious injury crashes in this country. In Iowa, speed is the third highest contributing factor in fatal crashes, behind alcohol and stop sign/traffic signal violations. Nationally, speed is second to alcohol.

Speed limits have increased since the federal repeal of the national maximum speed limit in 1995. This repeal allowed Iowa to increase speed limits from 55 to 65 mph on 252 miles of four-lane non-Interstate routes in 1996, and increase the Interstate speed limit from 65 to 70 mph in 2005 (GTSB 2010f).

Although not all drivers comply with it, the speed limit does help keep speeds lower with proper enforcement. This was evident in Montana from 1995-1999, when the state had no numerical speed limits. Once Montana posted speed limits, travel speeds dropped dramatically, especially among of the drivers who used to drive over 80 mph. The same thing happened in Texas when the urban speed limit was dropped from 70 to 65 mph. However, overall, the nation does not comply with speed limits.

In 2007, IIHS conducted a study that looked at speed limits in metropolitan areas of the United States. In most of these cases, mean speed was above the posted speed limit, indicating low respect for speed limits (IIHS 2008). However, documented studies in Minnesota showed that changing (raising or lowering) the speed limit did not significantly change the 85th percentile speed. This demonstrates that most drivers will drive at a speed they feel is proper and safe (Preston et al. 2008). Driver education to inform the public of the dangers of speed, along with visible enforcement, is recommended.

2.2.9 Driver Education

Driver education is an important part of the driver-licensing program for young drivers. As noted earlier, driver education is a requirement for young people to obtain a driver's license. However, the quality of driver education is a subject that concerns many people. Most of the time, driver education is taught in the schools and is required by law to be provided to all students, regardless of ability to pay (Iowa DOT 2003). The most recent manual outlining the Iowa driver education curriculum was put together in 1988 and it has not been updated since then. It is the responsibility of the provider to make sure their class is up-to-date with current law (Iowa DOT 1988).

This manual includes lesson plans for both the classroom and the behind-the-wheel portions of the class. According to a NHTSA publication (2009e), in April 2009, the American Driver and Traffic Safety Education Association (ADTSEA) driver education program has called for an expansion of the hours spent in driver education to 45 hours of classroom and 8 hours of driving, from the 30 and 6 hours, respectively, that Iowa requires today. However, few programs have adopted these recommendations; so, they cannot be tested for effectiveness (NHTSA 2009e).

Driver Improvement Programs (DIPs) have been widely used in the United States, as well as internationally. The objective of a DIP is to reduce the number of traffic offense convictions and crashes in a driver's history and help drivers correct their potentially dangerous driving behaviors. DIPs have been carried out in the United States for more than 60 years. Intervention strategies and programs vary across states, but they typically include warning letters, educational materials, courses, diagnostic reexaminations, individual counseling, and license suspension/revocation. A study was conducted by InTrans at ISU that evaluated the DIP in Iowa (Gkritza et al. 2009). Overall, the study found that DIP was effective in reducing convictions for drivers who successfully complete the program.

Although about 61% of Iowans live in urban areas (United States Census 2000, Iowa Data Center), most of its land area is rural. Many issues in rural driving differ from urban driving, including safety culture. A study investigated the different attitudes of rural drivers in Minnesota (Rakaukas et al. 2009). That study selected representative percentages of the population from both urban and rural areas of the state. It found urban drivers were more likely to admit that they speed, and rural drivers did not view safety belts to be as important as urban drivers. In addition, the study found a difference in the type of vehicle driven, with more rural drivers driving pickup trucks.

Pickup truck drivers admitted they drive after consuming alcohol more often than those in other vehicles. Safety belt use and alcohol use are areas targeted to the rural population to help reduce fatalities. In addition, statistically, rural drivers are less likely to have a college education, drive more pickup trucks, are more likely to have had their license suspended/revoked in their lifetime, are more likely to drive without a safety belt, believe driving while intoxicated is not that bad, and do not support raising the driving age as much as their urban counterparts (Kissinger 2009).

Also emergency service response time is much longer in rural areas than in urban areas, due to the less-dense population and larger coverage areas. Rural coverage can be as much as 50% greater than in urban areas according to the NHTSA Fatality Analysis Reporting System (FARS).

Educating drivers can be a challenging task to undertake. The changing media and generation gaps may lead to some people being missed, because they use different forms of media. With the rise of the Internet and social media, many people, especially younger people, use electronic rather than traditional media sources used by their parents. Being able to use this media is important to getting the message out to these people. The message must be communicated in a way that will get through to them. More work is needed to keep up with the ever changing media and to use the proper medium for the intended demographic (Figueroa et al. 2002).

2.3 Engineering

Rumble strips (unpainted) and rumble stripes (painted) are lower-cost measures that can be added to either the edge or center of roads to alert a driver when they are leaving their lane. Continuous rumble strips on shoulders were found effective in reducing single vehicle run off the road crashes in the state of Nevada (Nambisan et al. 2007). Within Iowa, rumble stripes were found to be an effective low-cost tool on low-volume roads (Hallmark et al. 2009). More research is currently being conducted on this countermeasure to explore its effectiveness in more applications.

Another low cost engineering measure is the use of median cable barriers. These barriers are meant to keep vehicles from crossing the median on high-speed roadways. The cable will still be effective after multiple hits, where the traditional barrier would be destroyed after the first. This is extremely useful in winter applications, where repair crews or conditions may not permit fixing a barrier immediately.

Iowa has installed cable barriers on higher-crash freeways, while Missouri has retrofitted the entire Interstate system with cable barriers. Washington State conducted a benefit-cost analysis of the safety effects and found that this measure was highly beneficial on medians less than 50 ft wide (WSDOT 2004).

While the funding is not available to rebuild every road, many low-cost improvements can be made to improve safety. Many of these improvements were outlined by George Rice from FHWA during a TRB subcommittee meeting (Rice 2010).

One low-cost countermeasure is improving signage and pavement markings. A crash reduction factor of up to 40% can be achieved by making signs oversized at approaches (both warning and regulatory), restricting parking, properly placing the stop bar, and improving sight distance, where possible, at intersections. In addition to these measures, other supplemental actions that can be taken include flashing LED beacons and reflective sign posts (FHWA, 2009).

Another improvement on high-speed divided road intersections is the J-Turn. In a J-Turn, all traffic on the major road can turn, as normal, but vehicles going through or turning left on the minor approach must turn right at the major road and, then, make a U-Turn, downstream, to get going in the other direction. Finally, the vehicle can turn right onto the other minor approach or continue down the major roadway in the opposite direction. J-Turns lead to fewer conflict points and a safer intersection (Maze et al. 2010).

Traffic signals can also be improved by making all lenses 12-inch LEDs, having a back plate present, making sure one signal head is over each approach, making sure timing is correct and current, and eliminating late-night flashing operations. These engineering measures can lead to a crash reduction factor of up to 30% (FHWA, 2009).

2.4 Enforcement

Traffic law enforcement can be effective in creating a safer road environment for all users. In the United States DOT Strategic Plan for 2010-2015, high visibility enforcement campaigns are cited as a reason that the United States has a lower fatality rate (based on distance traveled), when compared to other developed nations, such as Sweden, the United Kingdom, Germany, and Australia (US DOT 2010b).

A number of different campaigns have been undertaken to visibly enforce traffic laws. Many of these campaigns are part of national programs, but some are organized through the Iowa DPS and GTSB. These campaigns include the disbursement of federal grants and state funds to local, county, and state law enforcement agencies (to help fund enforcement).

The Iowa 2009 Highway Safety Plan outlines where targeted enforcement funds can be spent for the best effect (GTSB 2008). Research also exists on enforcement techniques and how to effectively conduct enforcement. One technique is higher nighttime enforcement. In Iowa, 50% of all fatalities happen at night, when only 12% of the traffic is present. This overrepresentation leads officers to believe that more must be done to improve traffic safety at night, including saturation and routine patrols.

An effective night safety belt enforcement program has been successful in Washington. In this enforcement, one officer sits in a well-lit intersection to check for compliance, while other officers are waiting downstream. If the officer spots a violation, the officer radios the waiting officer to conduct the traffic stop.

Another technique is sobriety checkpoints, which are not currently allowed under Iowa law. With sobriety checkpoints, random vehicles (every third car or similar) or sequence of vehicles (10 at a time or similar) are stopped at a predetermined location, where officers examine drivers to see if they are impaired. The purpose is not only to identify impaired drivers, but also to raise public awareness about drunk driving.

Sobriety checkpoints do not change the legal requirements for an impaired driver arrest, only the grounds to stop the vehicle. Checkpoints must be conducted with caution and should also involve representatives from the prosecuting attorney's office and the judicial branch. Also, the public should be aware of such checkpoints by signage, visible law enforcement officers, and through the media (NHTSA 2006). While sobriety checkpoints are illegal in Iowa, officers can conduct "safety checkpoints." These are run in a similar manner, but the purpose is to check vehicle safety, as well as the driver's license, vehicle registration, and proper insurance.

The GTSB controls grants that help agencies conduct campaigns, using federal dollars, to help pay for overtime expenses and/or enforcement equipment. These grants include ones for occupant-protection (safety belt enforcement) and alcohol enforcement, which are dispersed to different agencies throughout the grant period. These are in addition to the Iowa Special Traffic Enforcement Program (STEP) grant, which targets but is not limited to unbelted drivers. The initiatives under this reimbursement program are done in five enforcement waves throughout the year—during the St. Patrick's Day, Memorial Day, Independence Day, Labor Day, and Thanksgiving holidays.

Iowa relies on its crash data to pinpoint spots for targeted enforcement in high-fatality and injury corridors. In addition, there are regional enforcement corridors, which in 2009 had one-day saturation enforcement, including efforts called Southern Exposure (southern third of the state), Operation Midway (middle third of the state), Northern Lights (northern third of the state), Operation I's (Interstate system), Eastern Heat (eastern half of the state), Western Exposure (western half of the state) and Child Passenger Safety and Mobile Eyes (statewide). In each of these efforts, county and state enforcement agencies were asked to participate, within their jurisdictions, during the saturation day. In 2010, the plans were to make these saturation campaigns on a Friday and Saturday, the high-volume and high-crash days of the week.

Another program that was introduced by the Iowa State Patrol in 2009 was Operation Safe Saturdays, which stepped up enforcement in high-crash areas on Saturdays in June. This program proved to be successful and was conducted in June 2010 as well. The program was also adopted in Minnesota and Nebraska, which have reported similar results.

Another program that the Iowa DOT and GTSB conduct together is the road safety audit (RSA). These are done with a team including not only state personnel, but also local city and county engineers, road maintenance personnel, and state law enforcement. The purpose of these audits is to identify problems before they escalate. RSAs can pinpoint where low-cost improvements and saturated enforcement may effectively improve safety. The two pilot sites, US 52 in Dubuque County and US 61 in Scott and Muscatine counties, have proven successful in implementing the low-cost improvements and in reducing fatalities.

A newer law enforcement tool is automated enforcement, commonly-known as speed and red light running cameras. As of right now, they are legal in Iowa, and their use has been upheld by the Iowa Supreme Court (RadioIowa 2008).

In 2006, a study was conducted at the Center for Transportation Research and Education (CTRE) that outlined the benefits of red light running camera enforcement (Fitzsimmons et al. 2006). In the study, two cities in Iowa, Council Bluffs and Davenport, were selected to investigate if the installation of cameras would reduce crashes. The study found that red light running crashes were reduced by 40% at intersections with cameras in Davenport and 90% in Council Bluffs, while the total crashes were reduced by 20% and 44%, respectively. As more cities install these devices, more studies will have to be conducted to examine if red light running cameras can have a lasting effect.

Speed cameras are another automated enforcement tool that law enforcement can use. A study was done in Scottsdale, Arizona, putting up speed cameras for nine months on an eight-mile stretch of urban Interstate to see what effect they would have on speed. Before the cameras were put in place, the average speed was 70 mph, which decreased to 63 mph right after implementation. The speeds stayed around the posted 65 mph limit throughout the time period. After the cameras were removed, the speeds increased again to 69 mph (IIHS 2008). In Iowa, speed cameras are being implemented in Cedar Rapids, along Interstate 380 (KWWL 2009). An ongoing study by InTrans at ISU is evaluating their effectiveness.

Another enforcement tool that is becoming more viable is the use of ignition interlock devices that are designed to prevent individuals from operating a motor vehicle while under the influence of alcohol. Iowa law provides for certain individuals who have had their driver's license revoked for an OWI (i.e., operating while intoxicated or drugged) to be eligible for a temporary restricted license if an ignition interlock device is installed on all their vehicles. It prevents the vehicle from starting when the alcohol level of the driver's breath is above a preset limit.

A survey conducted by IIHS (2009) revealed that about two out of three people said it would be a good idea to have interlock devices in all vehicles, and 40% would want them in their cars if they were an option at a dealership. While this is a promising study, this tool needs to be evaluated from legal and public-perception points of view, and investigated in more depth before any action could take place.

2.5 Emergency Medical Services

Emergency medical services (EMS) can be critical to the survival of a person involved in a crash, since the golden hour (one hour after a crash) is the most important to the survival of an injured person. However, in many parts of Iowa, it can be difficult to get EMS to respond to the site of a crash, given that many crashes occur on lower-volume roads and in rural areas.

While the consensus is that rural EMS coverage is important (not only for traffic crashes, but for all medical emergencies), funding can be an issue. EMS funding has been decreasing in recent years due to budget cuts at various levels of government. Under Iowa statute, a county can

impose up to a 1% income surtax for EMS. As of tax year 2009, Appanoose County, in southeast Iowa, is the only county that has done so (Iowa DOR 2009).

Currently, EMS is not mandatory in Iowa, but fire and police service are, under state law. Most of the EMS providers in the state are staffed by non-compensated or volunteer personnel, with 75% of the total staff being non-compensated. This can be troublesome in areas, because many of these traditional “volunteer” responders may be unavailable when needed because they are employed or even commute a distance away from their community to work during the day (between 6AM and 6PM), when 65% of all calls for EMS take place. Statewide, only 57% of ambulances are staffed around the clock. The average response time from a 911 call is 11.4 minutes, with 69% of all calls being responded to in 10 minutes or less.

Motor vehicle crashes are the fourth highest reason for an EMS call; however, 66% of calls have no entry recorded, which means the ranking could be higher. EMS providers also conduct injury prevention programs, including car seat checks and other motor vehicle safety projects that are especially geared toward children (IDPH 2010).

2.6 Literature Summary

Safety is an increasingly important goal for our roadway officials. This literature review outlines what is being done in Iowa, across the country, and throughout the world to address roadway safety. Table 2.1 lists the effectiveness rankings outlined by NHTSA, as previously cited in this report (Preusser et al. 2008).

As detailed in the next section, expert interviews were conducted to identify the most important issues in Iowa, some possible techniques to mitigate the issues, and how the techniques could be implemented.

Table 2.1. NHTSA countermeasure effectiveness rankings (by report subsection)

Countermeasures	Effectiveness
<i>2.2.1 Seat Belt Use Laws</i>	
State primary enforcement belt-use laws	5
Local primary enforcement belt-use laws	3
Increased belt-use law penalties	3
Coverage: seating position, vehicle, ages	1
<i>2.2.2 Child Restraints</i>	
Child restraint use laws	5
Coverage: seating position, vehicle, ages	5
Child restraint distribution programs	2
Inspection stations	2
<i>2.2.3 Young Drivers</i>	
Learner permit length, supervised hours	5
Intermediate - nighttime restrictions	5
Intermediate - passenger restrictions	5
Belt-use requirements	2
Cell phone restrictions	2
Parent roles in teaching and managing	2
Post-licensure driver education	1
Pre-licensure driver education	None
<i>2.2.4 Older Drivers</i>	
License screening and testing	4
Referring older drivers to licensing agencies	4
License restrictions	3
Medical advisory boards	2
License renewal policies	2
General communications and education	2
Formal courses for older drivers	2
<i>2.2.5 Alcohol</i>	
Alcohol screening and brief interventions	5
Sobriety checkpoints	5
Mass-media campaigns	5
Responsible beverage service	2
Alternative transportation	2
Designated drivers	1
<i>2.2.6 Motorcycles</i>	
State motorcycle helmet-use laws	5
Motorcycle helmet-use promotion programs	1
Motorcycle helmet law enforcement: noncompliant helmets	1

3. EXPERT INPUT

3.1 Introduction

After reviewing the literature on the safety culture within the state of Iowa, the United States, and the international community, several experts in areas related to traffic safety were consulted. These experts were selected from multiple disciplines to assess the issues in safety culture from several points of view. Those being interviewed were asked to give their perspective on the safety culture, what issues should be addressed, and how to address them.

The first part of this section discusses the critical issues that were brought up at the interviews. The second section talks about translating these ideas into action items that can be addressed. None of the experts are cited by name in this section. Interviews were conducted as part of a focus group session, through discussions at the Iowa Traffic and Safety Alliance (ITSA) meeting in February 2010, and via telephone interviews.

3.2 Critical Issues from Focus Group Meeting

At the focus group meeting, participants were asked to detail their most critical issues concerning traffic safety culture in Iowa.

3.2.1 Expert 1: Safety Advocacy

The first expert was a representative of a safety advocacy group. This safety advocate's primary concern was the lack of personal responsibility. The second major issue identified was the politics behind different safety issues like GDL, youth seat belts, and distracted driving. It was noted that, while the facts may be stacked toward reform in these areas, the political environment is often indifferent and even hostile to these changes. It was also noted that traffic crashes and injuries are unfortunately accepted as a rare occurrence.

3.2.2 Expert 2: Injury Prevention Research

The second expert was a representative of an injury prevention research group. This expert agreed that issues of policy and politics, when addressing safety issues and injury prevention, are a problem. In addition, this expert explained risk tolerance, noting that risk assessment differs for urban versus rural populations. The third concern brought forward was the balance of safety versus the convenience of transportation. In other words, many people will accept some fatalities and injuries as the price we, as a society, pay for a transportation system. Finally, the lack of infrastructure for EMS was mentioned. The expert noted that EMS is normally one of the most overlooked pieces of injury prevention and is often one of the first services cut when funding is diminished. (Many experts agreed that EMS in Iowa needs improvements to be more effective.)

3.2.3 Expert 3: Commercial Vehicle Safety Enforcement

The next expert represented commercial vehicle safety enforcement. The first issue discussed was the impact of an ever-increasing amount of information available to drivers behind the wheel. In the commercial vehicle arena, drivers need to keep in touch with sources of information as a part of their jobs, while also driving safely. This increasing demand, the expert noted, is an issue of personal responsibility and is impacting safety. In addition, this expert noted the medical and fatigue criteria for commercial drivers. Many drivers do not report medical conditions, as some of the conditions can automatically disqualify a person from possessing a commercial driver's license (CDL) and, therefore, take away their livelihood. Fatigue is also an important issue because drivers might be within their hours of service, but their "rest" activities might not be adequate to keep them properly alert on the road. The third issue discussed was the need for all vehicles to share the road. It was agreed that the issue of passenger cars recognizing the different safety issues related to bicycles, motorcycles, and commercial vehicles is an area where a lot of driver education effort needs to be placed.

3.2.4 Expert 4: Motor Vehicle Enforcement

The next expert represented motor vehicle enforcement. This expert's main concern was changing driver behavior. It was noted that a lot of work has been done to improve vehicles themselves, but the number of fatal crashes is staying fairly stable. It was agreed that focus needs to move away from improving vehicles (which in and of themselves are very safe today) to improving driver behavior, as this is the one area that has the potential for the most impact.

3.2.5 Expert 5: Driver Education

A representative of driver education policy noted that the current driver education program in Iowa is a major concern. Many of this expert's concerns were with factors discussed in the literature review. It was noted that the entry level age to drive in Iowa is 14 years old, which is early for teenagers to become responsible drivers. In addition, it was noted that the minimum driving hours required to receive driver education in Iowa is well below national standards. In fact, driver education in Iowa can be completed in 10 days. Overall, the driver education program in Iowa needs to be revamped and specific requirements, such as gravel road driving, should be revised.

3.2.6 Expert 6: Traffic Safety Engineering

The next expert was a traffic safety engineer. The primary issue this expert brought up was a disconnect between motor vehicle violence and other types of violence. It was noted that people are more accepting if violence is carried out with a motor vehicle than with another weapon, and that the laws reflect this. In other words, people do not necessarily equate violent death resulting from a crash with violent death resulting from a crime.

3.2.7 Expert 7: Safety Advocacy

Another representative of a safety advocacy group was the next expert. This person's main concern was that people do not take driving seriously, noting that people bring their busy lives into their vehicles and continue to use cell phones and conduct business while driving. This translates into a dangerous acceptance of speeding and disrespect for work zone safety, with an overall lack of respect for driving as a very important and potentially fatal task that requires more attention.

3.2.8 Expert 8: Motorcycle Advocacy

The next expert represented a motorcycle rider advocacy group. This expert's first concern was distracted driving of all kinds, from texting to eating. Driver comfort with their vehicles' safety and security was noted as one reason distraction has become so prevalent. Concerning motorcycles, inadequate rider training and refresher training were major concerns. It was also noted that motorcyclists tend to exhibit more risky driving behavior, such as speeding and riding while impaired, especially when drinking establishments promote specials as part of motorcycle events. Finally, using the proper riding equipment; including helmets, clothing and other gear; was noted as a serious issue.

3.2.9 Expert 9: Law Enforcement

This law enforcement expert was concerned with younger drivers and the need for a strong GDL system, noting teen driving crash and fatality rates. In addition, safety belt use at night and in rural areas, the need for distracted driving legislation, and alcohol-related fatalities were noted.

3.2.10 Expert 10: Public Safety

An expert representing the public safety area focused on the need for targeting riskier behavior through sustained enforcement. In addition, it was noted that, in some areas, there is local political and social pressure on police to not enforce traffic laws. Also, the topic of continuing education was discussed, in particular safety training when updating/renewing a driver's license. This could be as simple as having each driver read a sheet of paper that lists all the updates to the traffic laws since the last time they renewed their license. Education is a key to improving behavior and improving motorist compliance with traffic laws.

3.2.11 Expert 11: Criminal Prosecution

The next expert was a representative from the Iowa Attorney General's Office. This expert noted that a recent change in state law requires medical officials to report vehicle crash injuries at the same level as gunshot wounds, which could lead to better injury data records. In addition, adequate funding for the Department of Criminal Investigation (DCI) Laboratory was discussed. This laboratory can test blood samples for both drugs and alcohol, but the staffing is not adequate. In most vehicular homicide cases, blood will be drawn and tested for alcohol, but drug

testing will be skipped to save money. To fully prosecute vehicular homicide, all samples should be tested for both alcohol and drugs. Another change to state law that could be pursued is to allow for video testimony to be admissible in court. Under the current law, officials from the lab must travel from Des Moines to the county where the crime is being prosecuted to testify, which leads to more staffing problems at DCI. If the criminalist cannot be available to testify in person, the case is put into jeopardy.

The last concern was how traffic violations are classified under Iowa law. Currently, traffic violations are considered criminal offenses. This means the defendant has the right to demand a jury trial. Jury trials take up a lot of time and funding and, therefore, some judges will have no choice but to throw out minor traffic offenses so that more major cases can be heard and tried with the time constraints. The expert suggested that traffic tickets could be changed to administrative violations (like parking tickets) so that this option is removed.

3.2.12 Expert 12: Public Safety

The main points of this public safety discussion were personal responsibility, distracted driving, and EMS. It was noted that 80% of EMS providers are non-compensated and that they currently cover about 20% of the calls. Because EMS is not a required service in the state, this percentage will only go up as funding continues to be cut. This would lead to the golden hour not being followed due to slower response times from non-compensated EMS. It was also noted that educating the public and EMS drivers on how to properly drive and yield in emergency situations needs more effort.

3.2.13 Expert 13: Traffic Engineering

This traffic engineering expert's first concern dealt with the lack of support for non-compensated EMS throughout the state, echoing what the public safety expert had said on the topic. The second topic discussed was the public's lack of understanding about safety countermeasures. The public oftentimes doesn't know the true safety benefit for countermeasures, such as roundabouts, rumble strips, and median cable barriers. The engineering community needs to show how these benefits are worth the inconvenience and cost of these improvements. Distracted driving, defining the true costs of traffic crashes, and reduced law enforcement staffing were also discussed. The expert also cited an increased enforcement campaign in Minnesota where, on select corridors, police were seen "around every corner." As a result of this campaign, drivers slowed down believing they would receive a ticket for speeding and speed-related traffic fatalities dropped.

3.2.14 Expert 14: Senior Citizen Driver Safety Advocacy

The next expert, representing senior citizen advocacy in driver safety, noted the need for continuing education for driving, especially for seniors, noting that driving is a privilege. It was noted that Iowa does not offer incentives for senior citizens to take continuing education, while 39 other states do. Such continuing education could help seniors drive more safely.

3.2.15 Expert 15: Human Behavior Research

It was noted that people do not see driving as a demanding task, but as a time to also complete other tasks. The idea of just driving hardly ever enters the mind of many drivers, which is a cultural attitude that needs to be altered. The second topic was that adults have not outgrown the “it will never happen to me” mentality of their teenage years. People tend to think they are better drivers than they really are and need a wake-up call as to what they have to improve. Overall, it was noted that safety needs to be more prominent in our culture.

3.3 Additional Interviews

Not all experts identified early in the study were present at the focus group meeting. So, experts were also interviewed at an ITSA meeting and by phone. These interviews are presented in this section.

3.3.1 Expert 16: Children’s Health Care

An expert from a children’s hospital noted the importance of both government and parents getting involved to improve traffic safety for children. It was noted that parents have a responsible role in keeping their children safe both riding as a passenger in a vehicle when they are young and as responsible drivers when they begin driving. Driving needs to be respected and cannot simply be a rite of passage. This expert felt that the whole driver education and GDL processes need to be revisited, with an emphasis on safety.

3.3.2 Expert 17: Psychology

The next interviewee was a psychologist, involved with a survey that evaluated people’s attitudes on safety. It was noted that people do not always use conventional logic to make decisions, which makes changing bad behavior more difficult. In addition, the expert felt that more public emphasis needs to be put on changing health behaviors in general, including traffic safety-related behaviors.

3.3.3 Expert 18: Commercial Vehicle Safety

This commercial vehicle safety expert’s main points were lowering fatalities and education. One major concern was that young people are not getting enough education about large truck safety and sharing the road with these drivers. The expert noted a need for a graduated commercial license and commercial vehicle crash reconstruction experts, so that lessons can be learned from these crashes. This expert added that bad habits cause bad results.

3.3.4 Expert 19: Rural Driving Safety

The next expert works with reducing crashes between motor vehicles and farm vehicles. It was noted that work needs to be done on the local system, especially gravel roads, which is where most of these crashes occur. It was also noted that working with farm advocacy groups is critical. Conspicuity of farm vehicles and rural lighting needs were also noted.

3.3.5 Expert 20: Safety Research

The next expert was a private sector consultant who performs safety research. The expert started off by noting that techniques of assessing safety are changing from chasing crash locations to a more proactive model of using performance measures and examining data more closely. This expert suggests that Iowa needs to fundamentally change the safety program by moving some safety and enforcement funds to the local system, as these roadways also have safety issues. In addition, more collaboration with public health officials and improving the driver education manual are needed.

3.3.6 Expert 21: Safety Training and Research

This expert noted the need for an attitude change in Iowa and the United States toward respecting the law and that there is much more respect for the law in other countries. The expert also noted a need for stronger laws, especially for speeding and drunk driving, as well as improved driver education and stressing safety at a younger age. It was noted this is the one big area left that needs improvement, and that will have the most impact in changing future driver safety attitudes and expectations.

3.3.7 Expert 22: Psychology

This psychology expert sees anger as a big issue leading to aggressive driving. It was noted that culture needs to be tapped into to change social norms. Safe driving needs to be made to be cool, through education. Issues have to also be made relevant to everyone, so that the “not me” attitude goes away. Social media should also be used to change attitudes, as this is how more and more people are getting their information.

3.3.8 Expert 23: Safety Education

Education of all types is this expert’s major concern on all types of vehicles, including mopeds. In addition, parental involvement in driver education needs to increase, because some parents believe that driver education alone will be sufficient to teach their children to drive. Other issues noted were motorcycle helmet use and driving on gravel roads.

3.3.9 Expert 24: Law Enforcement

This law enforcement expert noted three major concerns for enforcement as speed, impaired driving, and safety belts. The expert also note that targeted enforcement, such as night enforcement (between 9 p.m. and 3 a.m.), needs to be conducted to get through to the 7% of drivers who do not use safety belts. This expert also believes that doing impaired driving enforcement with a secondary objective of safety belts might also be more effective. Also, this expert would like to see more citations issued, because citations change behavior more effectively than warnings.

3.3.10 Expert 25: Rural Driving Safety

The last expert was involved with rural driving safety. Many issues are different with rural driving culture and conditions. Rural drivers are less likely to wear safety belts and different strategies need to be implemented to get through to these drivers. Gravel roads offer a different set of driving conditions that are not found with pavement. Most new drivers do not have any training on gravel, which needs to be addressed. Also, sharing the road with farm implements is a concerning issue, but is not given much consideration, due to low number of serious injury/fatality crashes. Education and signage also need to be improved. Another topic discussed was the lack of EMS service in rural areas.

3.4 Next Steps

After initial input from each expert area, “problems” were organized into general areas under the four Es. Next, the focus group attendees aggregated the issues again into high-level goals. Then, under each goal, more specific objectives and potential actions were discussed and refined.

4. CONCLUSIONS AND GOAL-ORIENTED ACTIONS

After compiling and aggregating the safety culture issues identified through the focus group meeting and the interviews, a list of 11 high-level goals was created. With considerable input from the experts, these goals were discussed in greater detail and potential actions to meet the objectives were identified for each goal. These potential actions summarize what experts believe will address the higher-level goals. The goals and subsequent objectives are presented below, followed by a summary table of potential actions for each goal.

4.1 Improve EMS Response

The first goal identified was improving EMS responsiveness throughout Iowa. To do so, it was agreed, would involve mandating minimum service levels by first requiring counties to provide EMS service by law. In addition, increasing the percentage of compensated EMS providers would help lead to better quality of service and shorter response times. The third way to reach this goal would be to increase public awareness of EMS (type of providers, coverage territories, and so forth), so the public understands why the changes need to be made. One way to do this is to incorporate EMS awareness into alcohol education as part of the Drug Abuse Resistance Education (D.A.R.E.) curriculum, which is already being funded.

4.2 Toughen Law Enforcement and Prosecution

Toughening enforcement and prosecution of traffic offenses involves changing the way these offenses are investigated and tried. The first objective identified is to increase funding to the DCI lab, so they can conduct all the proper testing to help ensure that those who drive impaired, whether because of drugs or alcohol, will be found and prosecuted. The second objective is to allow video testimony from DCI criminologists. This allows for a better use of resources at DCI and for more successful prosecution of those who break the law. The third objective is to change minor traffic offenses to administrative violations, instead of criminal violations, so the cases are not subject to time consuming jury trials or thrown out because of limited court time available.

4.3 Increase Safety Belt Use

The next topic addressed was safety belt use. To target drivers who are still not wearing safety belts, it was proposed that fines and the severity of the offence be increased. This would mean, for example, that safety belt violations could be moving violations that would affect the standing of one's driver's license. The second objective is to increase enforcement for commercial vehicles. The third way to increase use is to increase funding for enforcement, in general, and to tie this enforcement to crash statistics, so that enforcement can better staff high crash locations where more fatalities are occurring.

4.4 Reduce Speeding-Related Crashes

The next area discussed was speeding-related crashes. To decrease these crashes, it was proposed that more funding be made available to increase the presence of law enforcement. Another idea was to increase the fines and the prosecutions of these fines, as many people do not feel the fines are enough of a deterrent in their current form. Lastly, automated enforcement should be examined for future use as a supplement to traditional enforcement.

4.5 Reduce Alcohol-Related Crashes

The next area addressed was reducing alcohol related crashes. The first objective was to improve enforcement by using data to target key locations. An increase of funding for enforcement was also proposed to maintain high profile enforcement. Also, although Iowa's consequences for drunk driving are tougher than most states, many alcohol-related crashes still occur. Therefore, penalties could be higher to strengthen compliance. The last objective is to continue media campaigns to educate the public on this issue, as most drunk driving arrests are for first offenses.

4.6 Improve Commercial Vehicle Safety

The next goal discussed was improving commercial vehicle safety. The first objective identified was to push for a graduated CDL. This would allow for commercial drivers to have proper training and restrictions, similar to the ones for teenagers. The second objective identified was to increase enforcement funding and training for law enforcement agencies, other than the Iowa State Patrol. This would allow for officers to watch out for safety issues with large commercial vehicles and to enforce the laws so that truck drivers do not feel they can "get away with breaking the law" on less-traveled roadways.

4.7 Improve Motorcycle Safety

The next area of concern was increasing motorcycle safety. The first objective discussed was to improve rider training, as many people do not do much training beyond what is required for first obtaining a motorcycle operator license. The second objective was to organize an education campaign to decrease impaired riding. Most riders do not realize how much coordination is required to operate a motorcycle safely, as it requires active use of both arms and both legs. This led to a proposal that lowering the allowable blood alcohol content (BAC) for motorcycle riders should be investigated, as this is already in place for commercial drivers. The last objective was to increase usage of helmets and proper riding gear through education. Telling a rider to wear the gear or a helmet is one thing, but telling them why it is important is a key step to increasing use on a long-term basis.

4.8 Improve Young Driver Education

The next area that was examined was improving basic youth driver education. The first objective agreed upon was the need for one standardized curriculum for driver education throughout the

state. This would lead to more consistent programs and would make sure that all topics are covered. In addition, this should be done through a multidisciplinary approach, using the resources of the Iowa DOT and the Iowa Department of Education to develop an effective and usable curriculum. It was also agreed that increased hours in both the classroom and the field was needed to cover all the necessary material. The last objective was to pursue an increase in involvement of the insurance industry in driver education.

4.9 Improve Older Driver Safety

The next topic was increasing older driver safety. The first objective identified was to mandate continuing education for older drivers, with insurance incentives being made legal to reward successful completion. The second was to start requiring driving tests every four years, once a driver reaches the age of 70, to make sure they still have the skills to drive safely. The third proposal was to increase the use of wider, brighter lines and brighter signs, so that older drivers can see them more easily. The last proposal was to encourage physicians to report to the Iowa DOT drivers who are losing competence or experiencing other physical or mental inabilities that might affect their skills in operating a vehicle safely. This will allow for an intervention before an incident could occur.

4.10 Strengthen Teenage Licensing Process

The next goal identified was the teenage licensing process. The major objective was to strengthen GDL. This has been an emphasis for years in lobbying the Iowa General Assembly, but has not been successful. It was agreed that a legislative team should be set up, mainly with parental focus groups, to educate and persuade legislators as to why the changes have to be made. It was also noted that a change in teenager's attitudes toward driving is needed. Teens need to realize that driving is a privilege and that they are not invincible. The last topic was that greater parental involvement is needed in the licensing process. This could be anything, from having a designated parents' night during driver education classes to having them take a considerably more active role in the process.

4.11 Reduce Distracted Driving

The last topic discussed was reducing distracted driving. The first proposal was a strong general distracted driving law that would give law enforcement the ability to stop all types of distracted driving, not just those that deal with cell phones. The second was to encourage the redesign of vehicles in order to remove as many distractions as possible. In addition, it was agreed that increasing education to both professionals and the public is needed to show how dangerous all forms of distracted driving is.

The potential actions for each goal (not ranked by importance) are summarized in Table 4.1.

Table 4.1. Summary of goal-oriented actions

Goal	Potential actions
1. Improve EMS Response	<ul style="list-style-type: none"> • Mandate EMS within Iowa (“you shall have EMS in each county”) • Increase percentage of compensated EMS providers • Increase public information on needs of/for EMS (types of providers, etc.) • Possibly mandate EMS into alcohol education as part of D.A.R.E.
2. Toughen Law Enforcement and Prosecution	<ul style="list-style-type: none"> • Allow video testimony from DCI Lab • Increase funding for DCI testing • Change traffic violations to administrative instead of criminal violations
3. Increase Safety Belt Use	<ul style="list-style-type: none"> • Increase fines • Increase penalty “seriousness” (moving violation, impact license, etc.) • Increase enforcement of commercial vehicle operations • Increase funding for enforcement and use of data
4. Reduce Speeding-Related Crashes	<ul style="list-style-type: none"> • Increase funding for more officers/enforcement • Increase fines and prosecution of fines • Pursue automated enforcement
5. Reduce Alcohol-Related Crashes	<ul style="list-style-type: none"> • Improve enforcement through increased use of data • Increase funding for enforcement • Toughen consequences • Continue media campaigns
6. Improve Commercial Vehicle Safety	<ul style="list-style-type: none"> • Pursue graduated CDL • Increase enforcement funding and training
7. Improve Motorcycle Safety	<ul style="list-style-type: none"> • Increase rider training • Increase education campaign on impaired motorcycle driving • Pursue lower BAC for motorcyclists • Increase education to encourage helmet/gear usage

8. Improve Young Driver Education	<ul style="list-style-type: none"> • Develop a consistent curriculum across the state with multiple disciplines • Increase hours required for both classroom and driving • Investigate increased insurance industry involvement
9. Improve Older Driver Safety	<ul style="list-style-type: none"> • Mandate continuing education for older drivers (maybe insurance incentives) • Institute driving test for persons starting at 70 years of age • Increase use of wider and brighter markings and signs • Investigate/encourage physicians report when drivers are losing competence
10. Strengthen Teenage Licensing Process	<ul style="list-style-type: none"> • Pursue stronger GDL through legislative efforts • Change teen attitudes toward driving through education • Increase parental involvement in education and early driving
11. Reduce Distracted Driving	<ul style="list-style-type: none"> • Strengthen distracted driving laws • Address cockpit engineering • Increase education and marketing

REFERENCES

- AAA Foundation for Traffic Safety. 2006. *Traffic Safety Issues of the Future: A Long Range Research Agenda*. Washington, DC: AAA Foundation for Traffic Safety. Accessed at: www.aaafoundation.org/pdf/FuturesReport.pdf
- AAA Foundation for Traffic Safety. 2007. *Improving Traffic Safety Culture in the United States: The Journey Forward*. Washington, DC: AAA Foundation for Traffic Safety. Accessed at: www.aaafoundation.org/pdf/SafetyCultureReport.pdf
- Chaudhary, N.K., A.F. Williams, and W. Nissen. 2007. *Evaluation and Compliance of Passenger Restrictions in a Graduated Driver Licensing Program*. Washington, DC: NHTSA, September 2007.
- Clayworth, J. 2010. "Is an Iowa Cell Phone Ban in the Works?" Des Moines, Iowa: Des Moines Register Blogs, May 27, 2010. Accessed at <http://blogs.desmoinesregister.com/dmr/index.php/2010/05/27/is-an-iowa-cell-phone-ban-in-the-works/>.
- Copeland, L. 2010. "Age Requirements for Learner's Permits." Article Published in *USA Today*, May 4, 2010.
- Dean-Mooney, Laura. 2010. "Opportunities to Improve Transportation Safety." Testimony before the United States Senate Environment & Public Works Committee, April 14, 2010.
- Decina, L.E., K.H. Lococo, W. Ashburn, J. Rose. 2009. *Identifying Strategies to Reduce the Percentage of Unrestrained Young Children*. Washington, DC: NHTSA, January 2009.
- FHWA. 2009. *Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections*. Office of Safety, Federal Highway Administration, May 2009. Accessed at: <http://safety.fhwa.dot.gov/intersection/resources/fhwasa09020/index.cfm>
- Figueroa, M.E., D.L. Kincaid, M. Rani, and G. Lewis. 2002. *Communication for Social Change: An Integrated Model for Measuring the Process and Its Outcomes*. New York, New York: The Rockefeller Foundation, 2002.
- Fitzsimmons, E.J., S. Hallmark, T. McDonald, M. Orellana, and D. Matulac. 2007. *The Effectiveness of Iowa's Automated Red Light Running Enforcement Programs*. Ames, Iowa: Center for Transportation Research and Education, December 2007.
- Flanigan, D., R. Morse, and D. Burton. 2010. "Best States for Teen Driving Ranking Methodology." Article in *U.S. News and World Report*, March 18, 2010.
- Gkritza, K., W. Zhang, Z. Hans, and S. Nambisan. 2009. *Evaluation of Iowa's Driver Improvement Programs*. Ames, Iowa: Institute for Transportation, December 2009.
- Gkritza, K. 2010. "Enhancing Motorcycle Conspicuity in Iowa." Ames, Iowa: Institute for Transportation. Accessed at <http://www.intrans.iastate.edu/research/detail.cfm?projectID=66309117>.
- Governor's Traffic Safety Bureau. 2006. "A Guide to the Iowa Child Restraint Law." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, October 2006. Accessed at http://www.dps.state.ia.us/commis/gtsb/forms/English_CPS_Guide.pdf.
- Governor's Traffic Safety Bureau. 2008. *Iowa 2009 Highway Safety Plan*. Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, 2008.
- Governor's Traffic Safety Bureau. 2010a. "Safety Belt Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, October 2008. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-1safetybelt.pdf>.

- Governor's Traffic Safety Bureau. 2010b. "Iowa Young Driver Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, February 2010. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-8youngdriver.pdf>.
- Governor's Traffic Safety Bureau. 2010c. "Iowa Older Driver Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, February 2010. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-9elderlydriver.pdf>.
- Governor's Traffic Safety Bureau. 2010d. "Alcohol Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, February 2010. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-3alcohol.pdf>.
- Governor's Traffic Safety Bureau. 2010e. "Motorcycle Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, February, 2010. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-7motorcycle.pdf>.
- Governor's Traffic Safety Bureau. 2010f. "Speed Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, February, 2010. Accessed at <http://www.dps.state.ia.us/commis/gtsb/fact-4speed.pdf>.
- Governor's Traffic Safety Bureau. 2011. "Child Restraint Fact Sheet." Des Moines, Iowa: Governor's Traffic Safety Bureau, Iowa Department of Public Safety, March 2011. Accessed at http://www.dps.state.ia.us/commis/gtsb/pdfs/child_restraint_fact_sheet.pdf.
- Hallmark, S., D. Witt, and D. Veneziano. 2007. *Evaluation of Iowa's Graduated Driver's Licensing Program*. Ames, Iowa: Institute for Transportation, September 2007.
- Hallmark, S., T. McDonald, and R. Sperry. 2009. *Evaluation of Rumble Stripes on Low Volume Roads in Iowa-Phase I*. Ames, Iowa: Institute for Transportation, July 2009.
- Insurance Institute for Highway Safety. 2008. *Status Report-Special Issue: Speed*. Volume 43, Number 1. Arlington, Virginia: Insurance Institute for Highway Safety, January 31, 2008.
- Insurance Institute for Highway Safety. 2010. *Status Report*, Volume 44, Number 8. Arlington, Virginia: Insurance Institute for Highway Safety, September 17, 2009.
- Insurance Institute for Highway Safety. 2010. *Status Report-Special Issue: Phoning While Driving*. Volume 45, Number 2. Arlington, Virginia: Insurance Institute for Highway Safety, February 27, 2010.
- Iowa Data Center. 2000. "Male and Female by Age and Urban and Rural Status for Iowa: 2000." Des Moines, Iowa: Iowa Data Center, State Library of Iowa, 2000. Accessed at <http://iowadatacenter.org>.
- Iowa Department of Public Health. 2010. *2009 Bureau of EMS Status Report*. Des Moines, Iowa: Department of Public Health, 2010.
- Iowa Department of Revenue. 2009. "Iowa Taxes." Accessed at <http://www.iowa.gov/tax/taxlaw/taxtypes.html#ems>.
- Iowa Department of Transportation. 1988. "Guide to Curriculum Development in Driver Education." Ames, Iowa: Iowa Department of Transportation, 1988. Accessed at <http://www.iowadot.gov/mvd/ods/education/demanual/index.htm>.
- Iowa Department of Transportation. 2003. "2003 Iowa Code and Administrative Rules Pertaining to Driver Education." Ames, Iowa: Iowa DOT, 2003. Accessed at <http://www.iowadot.gov/mvd/ods/education/rules.htm#Information%20on%20Reduced%20Fee>.
- Iowa Department of Transportation. 2005. *2005 Seat Belt Usage Survey*. Ames, Iowa: Iowa Department of Transportation, 2005.

- Iowa Department of Transportation. 2006. *Iowa Comprehensive Highway Safety Plan*. Ames, Iowa: Iowa Department of Transportation, September 2006. Accessed at: <http://www.iowadot.gov/traffic/chsp/>
- Iowa Department of Transportation. 2010. "Iowa's Graduated Driver's Licensing System." Ames, Iowa: Iowa Department of Transportation, March 8, 2010. Accessed at <http://www.iowadot.gov/MVD/ODS/gdl.htm>.
- Iowa Department of Transportation. 2011. "Iowa Minor School License." Ames, Iowa: Iowa Department of Transportation, April 1, 2011. Accessed at <http://www.iowadot.gov/mvd/ods/msl.htm#myAnchor>
- Kissinger, P. 2009. "Rural Traffic Safety Culture." Presented at the 2009 National Rural Summit on Traffic Safety Culture, Big Sky, Montana, June 22, 2009.
- KWWL. 2009. "I-380 in Cedar Rapids to Get Speed Cameras." December 3, 2009. Accessed at <http://www.kwwl.com/global/story.asp?s=11614735>.
- Maze, T.H., J.L. Hochstein, R.R. Souleyrette, H. Preston, and R. Storm. 2010. *Median Intersection Design for Rural High-Speed Divided Highways*. Washington, DC: Transportation Research Board, NCHRP Report 650.
- McCarthy, D.P., W.C. Mann, and D. Lanford. 2009. *Process and Outcomes Evaluation of Older Driver Screening Programs: The Assessment of Driving-Related Skills (ADReS) Older-Driver Screening Tool*. Washington, DC: NHTSA, May 2009.
- McCartt, A.T., L.A. Hellinga, L.M. Strouse, and C.M. Farmer. 2009. *Long-Term Effects of Hand-Held Cellphone Laws on Driver Hand-Held Cellphone Use*. Arlington, Virginia: Insurance Institute for Highway Safety, October 2009.
- Mercer, B.J. 2008. Creating a Culture of Traffic Safety: Learning from Four States with Improved Safety Records. *Transportation Research News* 259, November–December 2008.
- Nambisan, S.S., M.R. Dangeti, V.K. Vanapalli, and A.K. Singh. 2007. "Effectiveness of Continuous Shoulder Rumble Strips in Reducing Single-Vehicle Ran-Off-Roadway Crashes in Nevada." *Proceedings of the 2007 Mid-Continent Transportation Research Symposium*. Ames, Iowa: Iowa State University, August 2007.
- Nationwide Insurance Company. 2009. "New Nationwide Insurance Survey Shows Overwhelming Support for Laws Banning Texting while Driving." Columbus, Ohio, August 31, 2009. Accessed at <http://www.nationwide.com/newsroom/twd-survey-results.jsp>.
- NHTSA. 2005. *Improving the Safety of Older-Child Passengers: A Progress Report on Reducing Deaths and Injuries Among 4- to 8-Year Old Child Passengers*. Washington, DC: NHTSA, November 2005.
- NHTSA. 2006. *Low-Staffing Sobriety Checkpoints*. Washington, DC: NHTSA, April 2006.
- NHTSA. 2008. *Graduated Driver Licensing System*. Publication No. DOT HS 810 888W. Washington, DC: NHTSA, January 2008.
- NHTSA. 2009a. *Countermeasures that Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices*. Fourth Edition. Washington, DC: NHTSA, January 2009.
- NHTSA. 2009b. *Driver Transitions Education: Tools, Scripts, and Practice Exercises*. Washington, DC: NHTSA, June 2009.
- NHTSA. 2009c. *2008 Traffic Safety Annual Assessment-Highlights*. Washington, DC: NHTSA, June 2009.
- NHTSA. 2009d. *Motorcycle Helmet Use in 2009-Overall Results*. Washington, DC: NHTSA, December 2009.

- NHTSA. 2009e. *Evaluating Driver Education in America*. Washington, DC: NHTSA, April 2009.
- NHTSA. 2010. *Seat Belt Use in 2009-Use Rates in the States and Territories*. Publication No. DOT HS 811 324. Washington, DC: NHTSA, May 2010.
- NHTSA. 2011. *Summary of Vehicle Occupant Protection Laws*. Ninth Edition. Publication No. DOT HS 811 458. Washington, DC: NHTSA, April 2011.
- Nitzburg, M. and R. Knoblauch. 2004. *Rural Pickup Truck Drivers and Safety Belt Use: Focus Group Report*. Washington, DC: NHTSA, April 2004.
- Preston, H., M. Barry, and W. Stein. 2008. *Traffic Safety Fundamentals Handbook*. St. Paul, Minnesota: Minnesota Department of Transportation, August 2008.
- Preusser, D.F., A.F. Williams, J.L. Nichols, J. Tison, and N.K. Chaudhary. 2008. *Effectiveness of Behavioral Highway Safety Countermeasures*. Washington, DC: Transportation Research Board, NCHRP Report 622.
- Radio Iowa. 2008. "Supreme Court Rules in Favor of Red Light Cameras." August 29, 2008. Accessed at <http://www.radioiowa.com/2008/08/29/supreme-court-rules-in-favor-of-red-light-cameras/>.
- Rakauskas, M.E., N.J. Ward, and S.G. Gerberich. 2009. "Identification of Differences Between Rural and Urban Safety Cultures." *Accident Analysis and Prevention* Volume 41, pp. 931-937.
- Rice, Jr., G.E. 2010. "Low-Cost Safety Enhancement for Stop-Controlled and Signalized Intersections." Presented at the TRB Intersection Joint Subcommittee, Transportation Research Board 89th Annual Meeting, Washington, DC, January 11, 2010.
- St. George, Donna. 2010. "Teens Not the Driving Force They Used to Be." Article published in *The Washington Post*, Washington, DC, January 24, 2010.
- Sorrel, C. 2007. "UK Increases Texting while Driving Penalties to 14 Years Jail Time." Accessed at <http://www.wired.com/gadgetlab/2007/09/uk-increases-te/>.
- United States Department of Transportation. 2010a. "Distraction.gov: Official US Government Website for Distracted Driving." Accessed at <http://www.distraction.gov/>.
- United States Department of Transportation. 2010b. *US DOT Strategic Plan FY 2010-FY 2015: Transportation for a New Generation*. Washington, DC: United States Department of Transportation, April 15, 2010.
- Washington State Department of Transportation. 2004. *Improving Highway Safety: Cable Median Barrier*. Olympia, Washington: Washington State Department of Transportation, January 2004.