NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Analysis of Fatal Accidents
RFP NUMBER: 2007-05	NJDOT RESEARCH PROJECT MANAGER: Edward S. Kondrath
TASK ORDER NUMBER:	PRINCIPAL INVESTIGATOR: Yusuf Mehta, Ph.D, P.E. Rowan University
Project Starting Date: 1/1/2007 **Original** Project Ending Date: 12/31/2007 **Modified Completion Date: 12/31/2007**	Period Starting Date: July 1, 2007 Period Ending Date: Sep 30, 2007

Task	**% of Total**	**% of Task this quarter**	**% of Task to date**	**% of Total Complete**
1. Literature Search	10	0	100	10
2. Identify Existing Fatality-Related Databases and Fatality Data Sets in New Jersey	10	0	100	10
3. Determine Current Practices for Maintaining Fatal Accident Records at Other Agencies	10	55	100	10
4. Develop and Report Recommendations for an Integrated System of Crash Data	10	10	10	10
5. Conduct Pilot Studies using the Prototype Integrated Database	50	10	20	10
Final Report	10	0	0	0
TOTAL	100			50

ANALYSIS OF FATAL ACCIDENTS

Quarterly Progress Report – Oct 2007

Project Objectives:

The goal of this study is to determine the feasibility of an integrated database for the analysis of fatal accidents in New Jersey. The specific objectives are to:

1) Determine how New Jersey fatal accident datasets can be integrated.

2) Demonstrate the value of this integrated database by the system in a series of pilot case studies

Project Abstract:

In 2005 there were 691 fatal crashes and 748 fatalities in New Jersey. Each of these tragic events occurred despite the millions of dollars expended by New Jersey each year on redesigned intersections, aggressive traffic law enforcement, driver education programs, EMS funding, and numerous other safety initiatives. Despite the success of these programs, the belief is that even greater fatality reductions are possible. If there were better data describing the driver-vehicle-road interactions which lead to fatal crashes, highway safety funds could be better targeted to reduce traffic fatalities.

Unfortunately, the data to adequately understand fatal crashes are simply not readily available to New Jersey policy makers. The encouraging fact is that New Jersey has extensive crash databases, exemplified by the New Jersey Crash Record system which contains summary records of over 300,000 police reported accidents each year. In addition, several state agencies in New Jersey maintain datasets which describe additional facets of the crash event. However, to date, for reasons ranging from privacy concerns to incompatible data formats, these datasets have been seldom linked for a comprehensive perspective of highway safety.

The research program will develop a pilot system which links fatal crash data with other associated state data files. By linking these databases, there is an opportunity to investigate the root causes of fatalities in ways that are not possible through analysis of a single database. This research project will consider the following four databases: (1) NJ Crash Records, (2) MVC Fatal Accident Database, (3) Fatal Analysis Reporting System (FARS), and (4) the NJ State Police Fatal Investigations Division database. The project will undertake two case studies to demonstrate the value of the linked data system.

1. **Progress this quarter by task:**

Task 1 –Literature Survey

- **The literature review was completed last quarter.**

Task 2 – Identify Existing Fatality – Related Databases and Fatality Data Sets in New Jersey.

- **This task was completed last quarter**

Task 3 – Determine Current Practices for maintaining Fatal Accident Records at other agencies.

- The research team met Don Borowski, Scott McNear, and Paul Southard of MVC on May 18, 2007. The objective of the meeting was to discuss MVC fatal accident data needs, current practices, and possible case studies for Phase 2 of the project. MVC outlined the flow of fatal accident data to their investigators. MVC also reported on the delays which they experience in receiving fatal accident reports. By statute, all NJ fatal accidents must be reported to MVC within 72 hours of the accident. Unfortunately, this frequently does not happen. The result is a potential delay in removing dangerous drivers from the highways. **The results of this analysis is attached in Appendix A**

  The research team presented three potential cases studies to MVC for possible further study under Phase 2 of this contract: (1) the relationship between alcohol impairment and fatal crashes, (2) seat belt use vs. fatalities, and (3) elderly occupants in fatal crashes. MVC was interested in all three of these cases, and also discussed two other issues of interest to their group: (1) teen driver fatalities and (2) medical review of elderly drivers. It is unclear if data describing either medical condition of drivers or their driving license status is publicly available for these studies, but the research team will investigate the feasibility of these cases. **The results of the Teen Study analysis is attached in Appendix B**

- The co-PI met with Dr. John Kindelberger, the NHTSA Team Leader for the CODES research program, to discuss our project. CODES is a NHTSA-state DOT cooperative study in which NHTSA is funding 27 states to link their crash data, EMS records, emergency department records and hospital discharge records to improve highway safety. New Jersey is not currently one of the 27 states. Dr. Kindelberger was very interested in our project. He suggested that we could make the program even stronger by linking in Hospital Discharge and Emergency Room Discharge room data to better the injuries which lead to fatal crashes. He also suggested that we should consider using the CODES2000 software package for probabilistic linking of our datasets.

Task 4 – Develop and Report Recommendations for an Integrated System of Crash Data

- Bill Beans, NJ Bureau of Safety Programs, has provided us with a description of the 22 field dataset provided five times a week to MVC by OIT (attached). The fields provide a brief description of police reported accidents. Conceptually, it should be possible for Paul Southard to build his MVC fatal accident dataset directly from this 22-field dataset export, however, the current 22-field dataset is not restricted to fatal accidents. At our June 4, 2007 Project Panel meeting, Bill Beans stated that it would be straightforward to add injury and fatality data to this dataset.

- At the June 5 STRCC meeting, OIT requested specifications for output reports that could be generated from the contents of their data warehouse project. In the long term, we believe that one excellent application for this data warehouse would be the automated generation of the MVC database used by Paul Southard to track drivers involved in fatal crashes.

- At the June 4, 2007 Project Panel meeting, the research team presented three potential cases studies to the Project Panel for possible further study under Phase 2 of this contract. Each was chosen for its impact on reducing fatal crashes in NJ. The three potential topics are (1) seat belt use (the 15% of occupants who are unbelted account for approximately half of all fatals), (2) alcohol involvement in fatal crashes, and (3) the relationship between driver age and risk of fatality focusing specifically on teen and/or elderly drivers. The project panel was in agreement that any two of these cases studies would be acceptable for a follow-on study in Phase 2 of the project.

2. Proposed activities for next quarter by task

- Field-by-field comparison of the contents of the NJSP Fatal Accident database, MVC, FARS and NJCRASH.

- Develop a white paper on the MVC Fatal Accident Database to include its contents, method of generation, and recommendations for automated updates to this database.

- Begin analysis of two pilot case studies using NJ fatal accident data.

3. List of deliverables provided in this quarter by task

- Demonstrated and delivered a Microsoft Access database using MVC data.

4. Progress on Implementation and Training Activities

- None Scheduled

5. Problems/Proposed Solutions

Total Project Budget	144527.83
Modified Contract Amount:	
Total Project Expenditure to date	72263.9
% of Total Project Budget Expended	50

Appendix A

According to NJTR1, the protocol for Fatal Crash Reporting is as follows

“

1. *Local Police Dept & medical examiner do preliminary crash investigation.*
2. *Local Police* ***Send NLETS Teletype Message*** *(Incident report)* ***to State Police Fatal Unit within 24 hours*** **on all** ***Fatal crashes***
3. ***Mail a copy of NJTR-1 only to, Motor Vehicle Commission, Fatal Accident Review Board and to NJDOT within 72 hours*** *(whether complete or no*t)”

The problems that we are encountering are that the NJTR-1 and Supervising Officer (SP) reports are not getting done and handed in on time. The time required by law is 72 hours of the accident that the reports have to be done and handed in to the Motor Vehicle Commission, Fatal Accident Review Board and to NJDOT.

The problem is not only that the reports are not being received within the 72 hour law but there is a substantial about of data that is not being recorded; this can be shown in Table 1 by N/A, a value that is close to 42%. The law states that the forms must be handed in within 72 hours whether completed or not. In this case, the forms are exceeding the 72 and not being completed. Less then one percent of the reports are getting handed in within the 72 hour dead line. These results are base solely on the data from the 2005 New Jersey Motor Vehicle Commission.

Table 1. Annual totals of time period that NJTR-1 and SP forms are received

	Annual Totals for 2005			
	NJTR	**SP**	**Total**	**Percentage of total**
Within 3 days	8	0	8	0.64
Within 7 days	18	0	18	1.44
7-14 days	42	0	42	3.37
Within 30 days	42	0	42	3.37
Within 90 days	60	8	68	5.46
Within 180 days	16	160	176	14.13
Within 365 days	7	320	327	26.24
Greater than 365 days	6	36	42	3.37
N/A	429	94	523	41.97
		SUM =	1246	

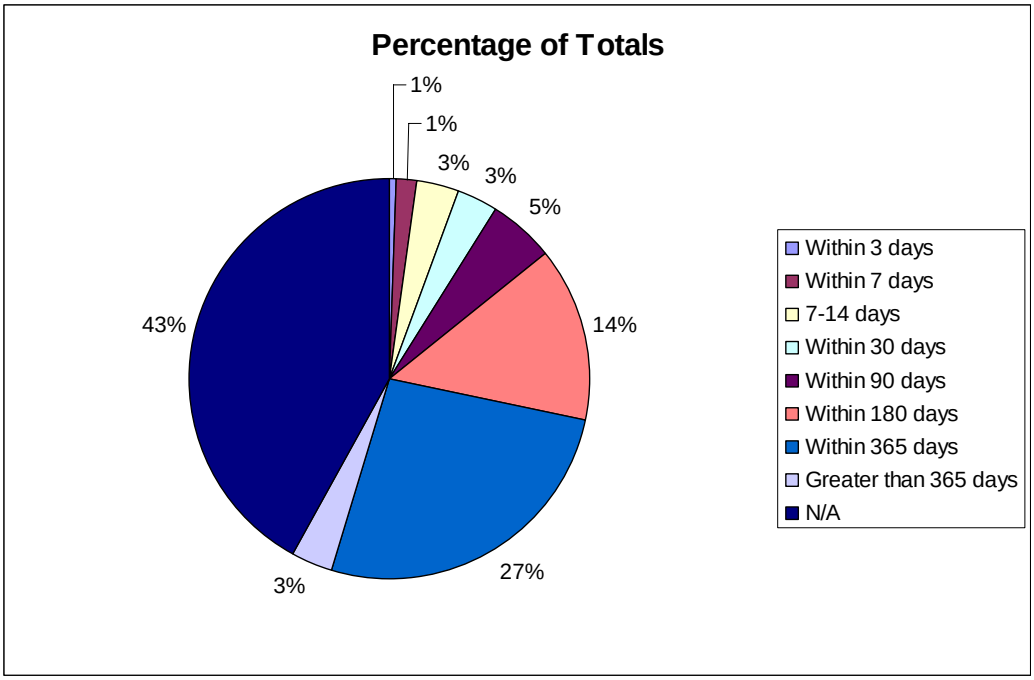

Figure 1. Annual percentages of time period that NJTR-1 and SP forms are received

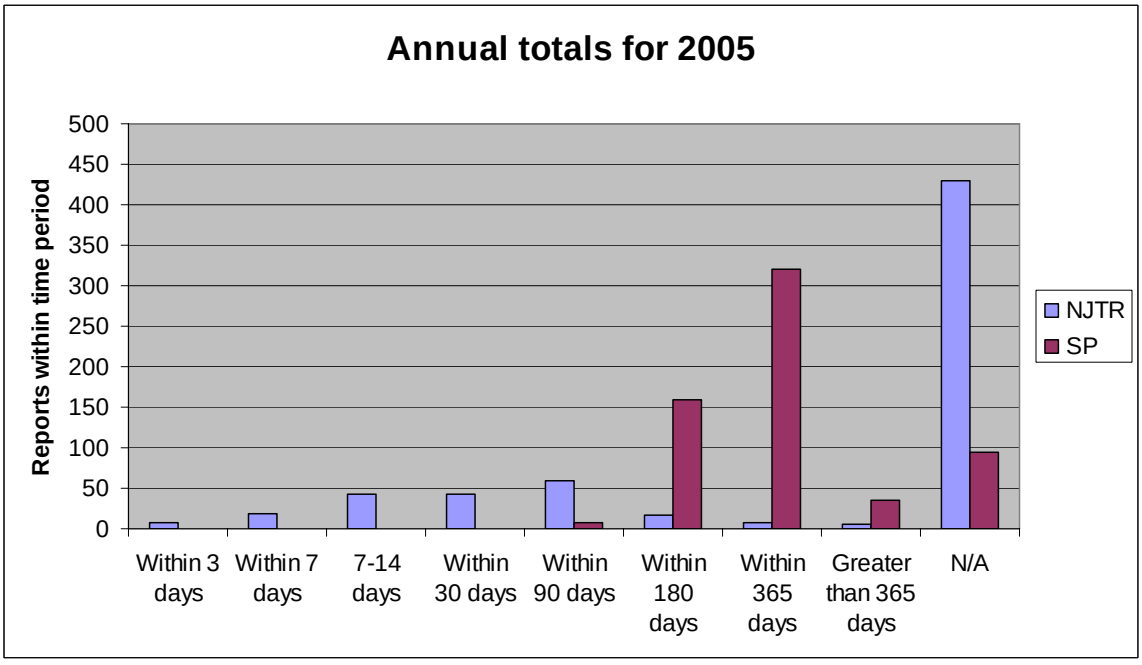

Figure 2. Annual totals of time period that NJTR-1 and SP forms are received

From the table and graphs of the annual numbers for 2005 Motor Vehicle Commission, a very small percentage of the NJTR-1 and SP reports are being received within the 72 hours that the law requires.

The data in the excel attachment are the values for New Jersey for Fatalities and Age based on each state case. Each state case for Age corresponds with a state case for Fatalities. There is problem though. Each state for Age is saying that the person was present in the car but it is not saying that that person was a fatality. As you can see in the few examples highlighted in red, the state case 340016 has persons with ages 18, 19, and 19 and the corresponding state case with Fatalities shows that 2 people dies in that state case but does not tell which two people died. I constructed graphs by sorting the Age column and summed up how many were in 16, 17 and 18-20 and again with 16, 17, 18, 19 and 20.

When graphing the numbers by each age, 17 had the most value and 16 with the least. These graphs more so show which age group get into the most accidents but not necessarily die from the accident. I feel that 17 year olds might get into the most accidents because they graduate to the next level and feel like they are more comfortable driving but may not be ready to drive with full responsibilities and get careless. I think that moving increasing the age to obtain a license will just shift the curve and not solve the problem. When driving, one is learning something new and it takes time to know how to drive and drive safely, unfortunately accidents happen.

Evaluation of Young Driver Fatality Risk in New Jersey

Clay Gabler
Virginia Tech

The objective of this study is to examine the risk of fatalities among young drivers in New Jersey. For this study, young drivers will be defined to from 15-20 years of age.

Approach

The evaluation was based upon the analysis of NJ highway fatality records extracted from the Fatality Analysis Reporting System (FARS) database for years 1991-2006. FARS is a national census of all highway fatalities which is maintained by the National Highway Traffic Safety Administration (NHTSA). Throughout the study which follows, the population has been separated into four age categories: 1) children defined to be 0-14 years of age, 2) young persons defined to be 15-20 years of age, 3) adults defined to be 21-64 years of age, and 4) older adults defined to be 65 years of age and older. We are using the age range of 15-20 years for young persons rather than simply teenagers in order to capture the effect of underage driving. Drinking is not permitted in NJ until age 21.

Results

Figure presents the traffic fatalities in New Jersey from 1991-2006 as a function of the age of the fatally injured persons. Fatalities among young persons have remained around 100 over this 16 year time span. Since 1998, the fatalities among older adults have declined by 29% (from 189 to 134 deaths). Fatalities among adults 21-64 have increased by 4% from 741 to 772 deaths over the same period.

Figure 4 displays the distribution of traffic fatalities between 2003-2005. Here the calendar range has been restricted to more recent years in order to focus on the most recent trends. Most young persons killed in traffic fatalities were occupants of a passenger vehicle (82%) in 2003-2005. Pedestrians accounted for 9% of the fatalities while motorcycle riders accounted for 7% of the fatalities for persons 15-20 years old. Although most safety initiatives rightfully focus on teens and other young persons in their cars, it is important to keep in mind that nearly 1 in 5 young persons is not an occupant of a car or light truck.

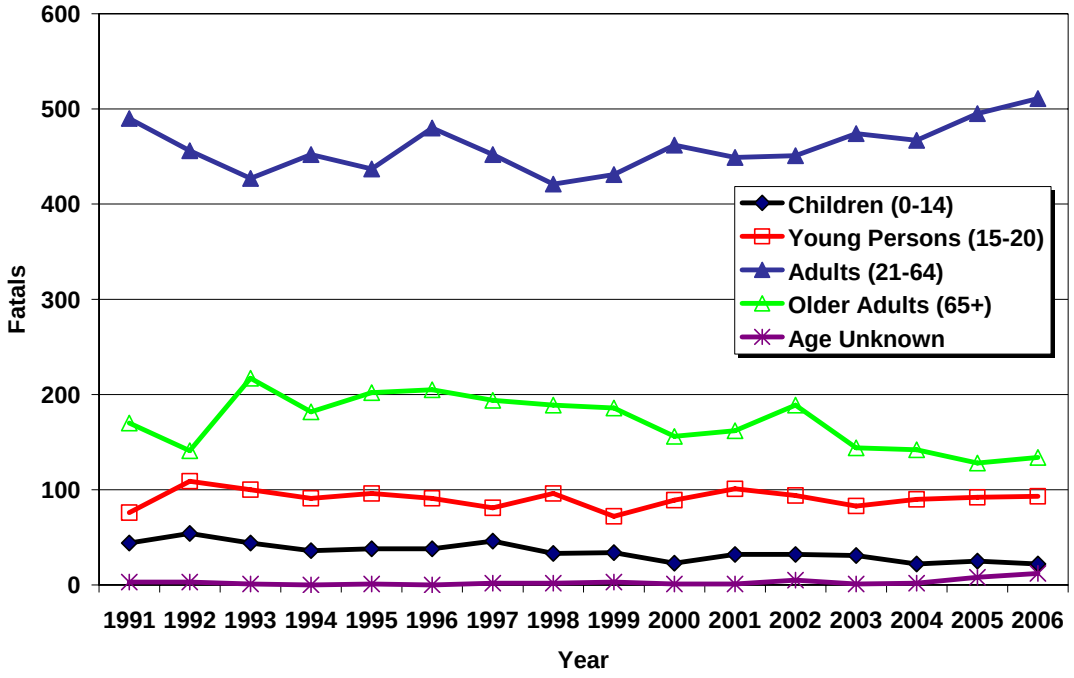

Figure 3. New Jersey Traffic Fatalities from 1991-2005

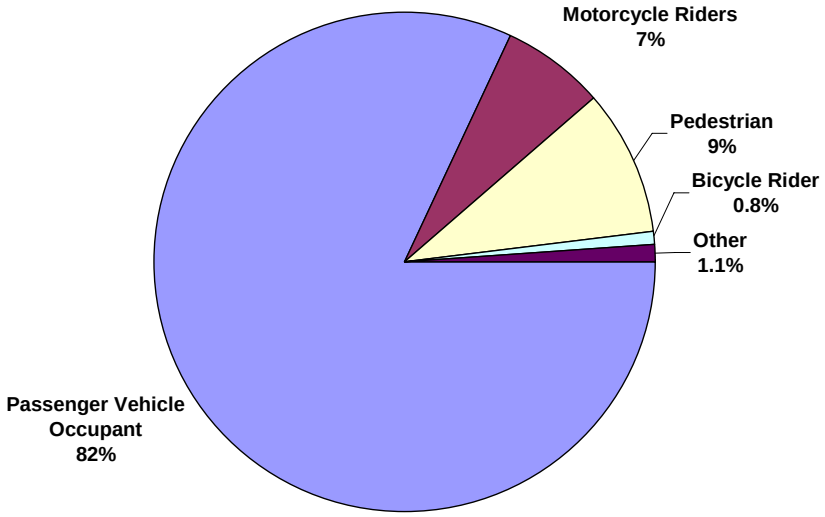

Figure 4 Distribution of NJ Traffic Fatalities incurred by persons 15-20 years old from 2003-2005

Figure presents traffic fatalities for each age group as a function of gender from 2004-2006. For all age groups, a fatality is more likely to be male than female. For teens, two-thirds of the fatalities are male while for adults 21-64 years old over three-fourths of the

fatally injured persons are male. This likely reflects the increased risk taking behavior which is characteristic of many male drivers.

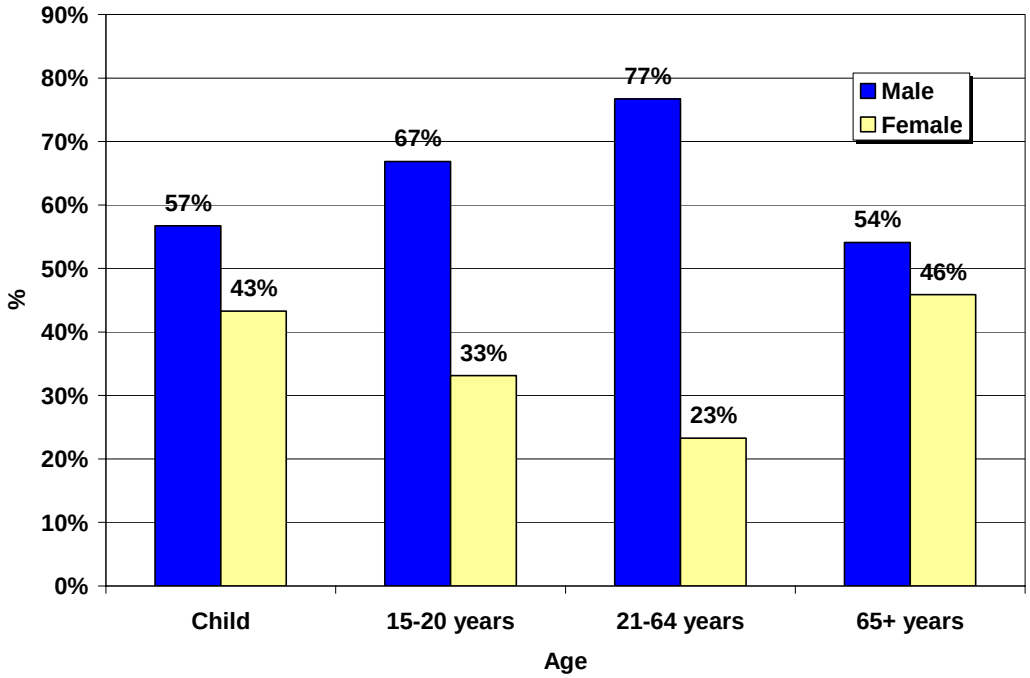

Figure 5. Distribution of NJ Traffic Fatalities by Gender for each age group from 2004-2006

In 2006, New Jersey belt use rates were 90% - among the highest in the nation. However, as shown in Figure , over half of all fatally injured younger persons were unbelted. Put another way 10% of vehicle occupants account for over half of the fatalities in New Jersey. This fatality rate was consistent with adults aged 21-64 suggesting that non-belt wearing behavior may carry over from the teen years to adulthood.

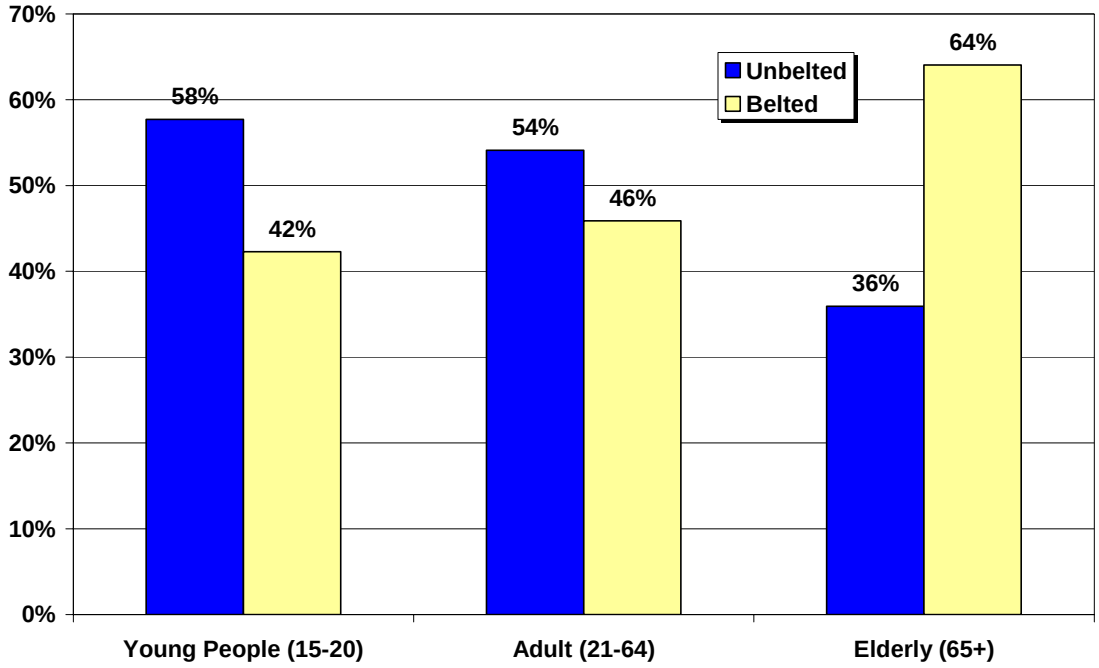

Figure 6. Distribution of NJ Traffic Fatalities by Belt Usage for each age group from 2004-2006

Young Drivers

Because of their inexperience, young drivers may not only be hazardous to themselves as well as other vehicles on the road. This section investigates the behavior of younger drivers involved in fatal crashes. In the analysis which follows, the younger driver was involved in, but not necessarily fatally injured, in the fatal crash.

As shown in Figure , approximately 20% of younger drivers involved in fatal crashes had been drinking. This fraction of drivers was consistent with adults aged 21-64. The presence of alcohol was obtained from police accident reports and does not necessarily mean that the driver was intoxicated. Drinking however is not permitted until age 21.

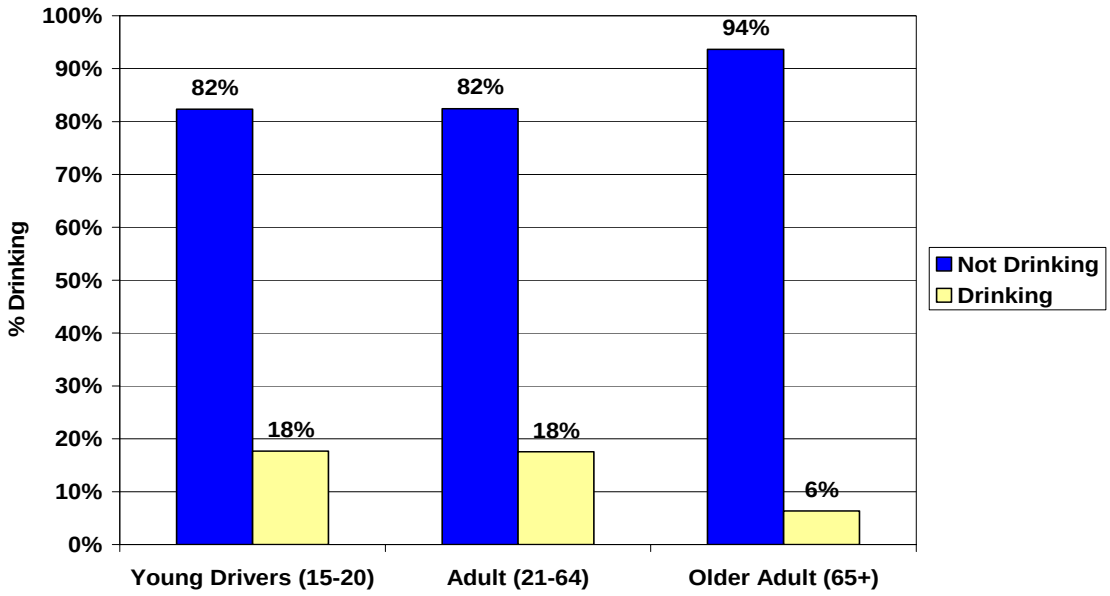

Figure 7. Drivers involved in fatal crashes in NJ by alcohol involvement and age (FARS2004-2006)

Since 2001, New Jersey has maintained a Graduated Driver Licensing (GDL) program to allow teens and younger drivers to safely obtain the experience necessary to become a safe driver. The program has three stages – learner's permit, an intermediate GDL, and a full driver's license. Each stage has a number of restrictions which when successfully met allow the driver to move onto the next licensing stage.

The analysis which follows examines the driver licensing status for younger drivers using data from 2004-2006. As shown in Figure 8, over 70% of licensed drivers involved in fatal crashes had a full license, while over 20% had either a learner's permit or intermediate GDL license. Lack of a license does not seem to be an issue for these younger drivers: 6% of all younger drivers involved in fatal crashes did not have a license.

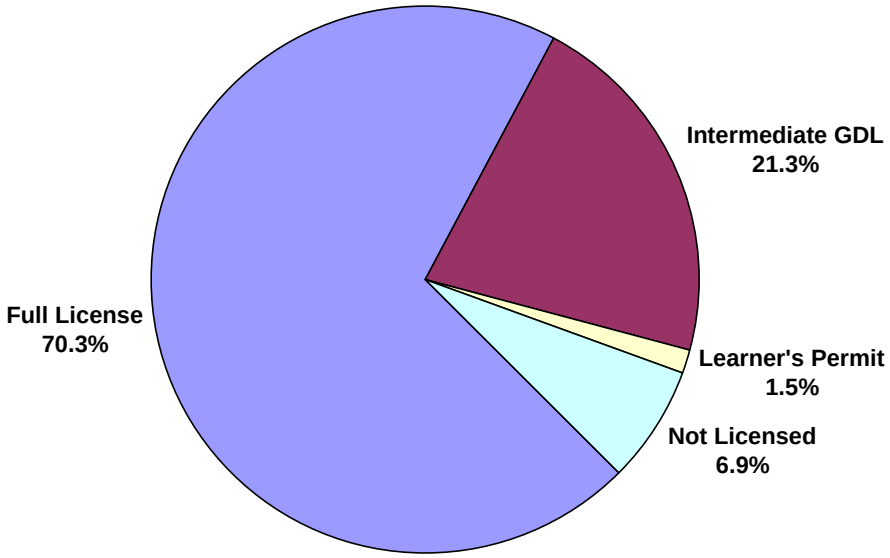

Figure 8. Distribution of License Type carried by Younger Drivers involved in fatal crashes in NJ (FARS2004-2006)

As shown in Figure 9, nearly 7% of all younger drivers involved in a fatal crash were unlicensed while an additional 8% were driving on a suspended license. This distribution is quite different than adults in which only 2% were unlicensed and 7% were driving on a suspended license. Clearly, lack of a valid license does not deter younger drivers from driving. Over 15% of all younger drivers involved in a fatal crash were either driving unlicensed or driving on a suspended license.

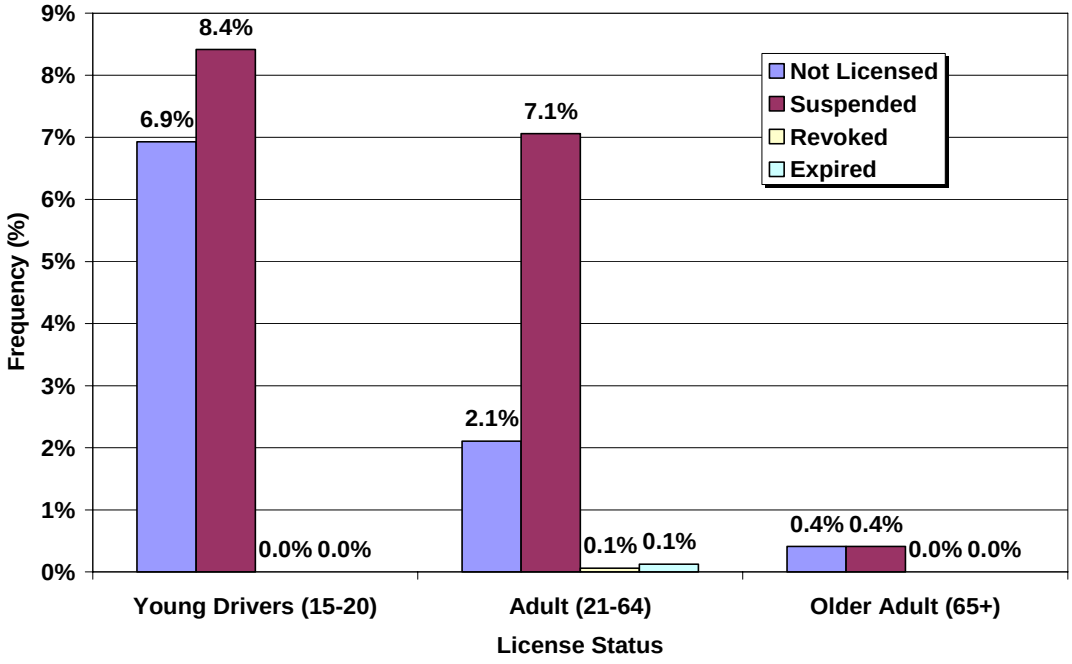

Figure 9. Status of License for Drivers involved in fatal crashes in NJ (FARS2004-2006)