Urban Seat Belt Usage Study for New Jersey

AUGUST, 2006

Submitted by

Janice Daniel, Athanassios Bladikas, Josh Curley
New Jersey Institute of Technology

NJ Department of Law and Public Safety
Research Project Manager
Robert Gaydosh

Acknowledgements

TABLE OF CONTENTS

List of Tables

INTRODUCTION

Seat belt usage among African Americans and Hispanics has been documented to be significantly lower than that of other population groups. In 1996, a National Highway Traffic Safety Administration (NHTSA) study showed low seat belt usage rates among the general population and among African-Americans especially. In 1999, Meharry Medical College published a report showing that African-American youth are 60 percent less likely than children from other racial or ethnic groups to be buckled up. The results of this study led to the establishment of a Blue Ribbon Panel by the then Secretary of Transportation Rodney E. Slater in 2000. The panel's goal was to identify strategies to increase seat belt use among African Americans.

Studies have continued to be performed to measure seat belt usage among African-Americans and Hispanics. The National Occupant Protection Use Survey (NOPUS) is a probability-based observational survey of safety belt use in the United States. Starting in 2002, the data collection performed as a part of this survey included demographic data. Front seat driver and passenger seat belt usage data are observed during daylight hours for passenger vehicles with the data collected at intersections that are controlled by a stop sign or traffic signal. NOPUS includes the first vehicle to stop at the intersection, although these occupants might tend to have higher levels of restraint use. Classifications of age, race, and urbanization are made according to the best judgment of the data collectors (Glassbrenner, 2002).

Vivoda et. al (2004) identified differences in safety belt use by race in the state of Michigan. Direct observation was used to determine usage rates of drivers and front-outboard passengers. In this study, trained observers also determined race visually. One of the problems with these types of studies is that the identification of age and race is left up to the judgment of the data collector. An alternative approach to gather race information is through the use of a questionnaire. The Insurance Institute for Highway Safety performed a study on seat belt usage rates among White, Black, and Hispanic drivers in cities with both primary and secondary seat belt laws. In this study, trained observers/interviewers noted shoulder belt use by drivers of non-commercial passenger vehicles as they entered gas stations with minimarts. Drivers were surveyed and asked their ethnic and racial background.

RESEARCH OBJECTIVE

The objective of this research was to develop a survey instrument and perform safety belt usage data collection to determine seat belt usage rates for African-Americans and Hispanics in New Jersey. Safety belt usage was obtained through direct observation. Race, ethnicity and socioeconomic data was also obtained through a questionnaire given to drivers and passengers of non-commercial motor vehicles. The questionnaire was administered in both English and Spanish as provided in Appendix I. The data were used to identify differences between safety belt usage for Black and Hispanic drivers, compared to overall safety belt usage obtained for the State of New Jersey.

METHODOLOGY

Data Collection Procedure

Safety belt usage was obtained using the approach taken by the Insurance Institute for Highway Safety study (Wells, 2002). In that study race/ethnicity and education level were obtained using a questionnaire administered at large gas stations with a minimart. Seat belt usage was obtained by direct observation. The study was conducted at 12 large gas stations on weekdays during the morning and evening peak periods. Gas stations were chosen based on census tract information on race/ethnicity and socioeconomic status in an attempt to get sufficiently large samples for each racial/ethnic and educational group. The study's goal was to obtain a minimum of 200 observations for each racial/ethnic group in three educational categories: less than high school, high school or some college, and college graduates. Dollar coupons, good for gas or for use in the minimart, were offered to drivers as incentives to participate in the study. The coupons also served as incentives to owners/managers of the stations, because the drivers were encouraged to spend the money at the time of their gas purchase (Wells, 2002).

In the Insurance Institute for Highway Safety study, trained observers/interviewers noted shoulder belt use by drivers of non-commercial passenger vehicles as they entered the gas stations. Drivers were then surveyed at the pump or when entering the minimart where they were asked about the last year of school completed and their ethnic and racial background. Only drivers older than 18 were included so that the less-than-high-school group would not consist of just young teenage drivers (Wells, 2002).

In this study, data were collected during peak periods at each location. To ensure precision in the data collection, each data collector was trained in both a laboratory setting and in the field. In the laboratory setting, the data collector was provided with background on the survey and the importance of the survey accuracy.

"In-Field" training was also be provided where data collectors were given an opportunity to perform a trial data collection along with a field supervisor. Quality control of the data involved reviewing the completed data collection forms to identify questionable data or problems with the data collection procedure or individual data collectors.

Data Size and Collection Locations

A total of 946 questionnaires were administered in six of the northern counties in New Jersey. The counties include Essex, Bergen, Passaic, Hudson, Union and Middlesex. Table 1 shows the number of surveys gathered within each of these counties. Data collection locations were selected in areas with high Black and Hispanic populations and at gas stations servicing a high number of vehicles.

Table 1. Number of Survey Responses by County

	Essex	Bergen	Passaic	Hudson	Union	Middlesex	Total
Number of Survey Respondents							
Asian	9	11	0	35	10	11	76
Black	201	15	0	27	46	19	308
Hispanic	169	8	57	50	24	51	359
White	51	30	0	35	36	39	191
Other	6	1	0	4	0	1	12
Total	436	65	57	151	116	121	946
Percent	46.1%	6.9%	6.0%	16.0%	12.3%	12.79%	
Percent of Survey							
Asian	2.1%	16.9%	0.0%	23.2%	8.6%	9.1%	8.0%
Black	46.1%	23.1%	0.0%	17.9%	39.7%	15.7%	32.6%
Hispanic	38.8%	12.3%	100.0%	33.1%	20.7%	42.1%	37.9%
White	11.7%	46.2%	0.0%	23.2%	31.0%	32.2%	20.2%
Other	1.4%	1.5%	0.0%	2.6%	0.0%	0.8%	1.3%
Total	100%	100%	100%	100%	100%	100.0%	

Statistical Analysis Approach

Statistical analyses were performed in this research to determine the impact of each factor studied on seat belt usage rate. Factors studied included: race, gender, vehicle type, frequency of seat belt usage, education level, marital status, age, whether the driver has kids and income. An overall seat belt usage rate was first determined for each factor. For example, to evaluate the impact of county on seat belt usage, an overall seat belt usage rate was first determined for each county. The overall seat belt usage rates by county were then compared to determine whether there is a statistically significant difference between these rates. The comparison was made using a chi-squared test that tests the plausibility or credibility of the null or alternative hypothesis. The null hypothesis states that "there is no difference between the seat belt usage rate for each county" and the alternative hypothesis state "there is a statistically significant difference between the seat belt usage rate for each county". The test is performed by comparing the chi-squared statistic (x^2) to the chi-squared distribution for a specified significance level and degree of freedom ($x^2_{\alpha, df}$). In this research a significance level of

0.05 is used to identify significant differences in seat belt usage rate. If χ^2 exceeds $\chi^2_{\alpha,df}$ then the null hypothesis is rejected and the test concludes that there is a statistically significant difference between the seat belt usage rates. If χ^2 does not exceed $\chi^2_{\alpha,df}$ then there is not sufficient evidence to conclude that there is a statistically significant difference between the seat belt usage rates. The p-value describes the probability $\chi^2_{\alpha,df} \geq \chi^2$. Using a significance level of 0.05, a p-value less that 0.05 rejects the null hypothesis and concludes that there is not sufficient evidence to conclude that there is a statistically significant difference between the seat belt usage rates. A p-value greater than 0.05 does not reject the null hypothesis and states that there is a statistically significant difference between the seat belt usage rates.

In addition to comparing the overall seat belt usage rate for each factor, the rates are also compared to determine differences between usage rates by race within each factor. For example, comparisons were not only made to determine whether there is a statistically significant difference between overall usage rates for each county, but comparisons were also made to determine whether there are significant differences between the usage rates by race within each county and between counties. Within county comparisons asks the question "Are the usage rates for Asians, Blacks, Hispanics, Whites, and Other in a particular County different?" Between county comparisons asks the question "Are the usage rates for a particular race in Essex, Bergen, Passaic, Hudson, Union and Middlesex different?" To answer these types of questions where comparisons of usage rates for race and a second factor are being made, a chi-squared test is also used where the null hypothesis states that there is "no association" or "independence" between the two factors. If the null hypothesis is not rejected, the conclusion is that there is no difference in the usage rates, if the null hypothesis is rejected, the conclusion is that there is a difference in the usage rates. The test is then performed similarly to the chi-squared test described above.

In some cases two usage rates are compared using a two-sided hypothesis test. In this test the null hypothesis states that the two usage rates are identical and a z-statistic with a standard normal distribution is calculated and compared to the standard normal distribution for a specified significance level. The test is then performed similarly to the chi-squared test described above, however, a standard normal distribution is used instead of the chi-square distribution.

SURVEY RESULTS

Usage Rate by Race

Table 2 shows the driver seat belt usage rate by race and by county $\pm$ a 95 percent confidence interval. The study found an overall driver usage rate of 76.74 $\pm$ 2.7% stating that there is a 95 percent probability that the true driver usage rate falls between 74.40% and 79.44%. A chi-squared test showed there is no statistically significant difference between the usage rates for Asians, Blacks, Hispanics and Whites. The chi-squared statistic for the test, χ^2, is calculated as 1.996 with 4 degrees of freedom and a

Table 2. Driver Usage Rate by Race and County (± 95% CI)

	Essex	Bergen	Passaic	Hudson	Union	Middlesex	Total
Asian	100.0 ± 0.0%	81.8 ± 22.8%	-	82.86 ± 12.5%	60.00 ± 30.4%	90.91 ± 17.0%	82.89 ± 8.5 %
Black	76.1 ± 5.9%	53.3 ± 25.2%	-	85.19 ± 13.4%	73.91 ± 12.7%	78.95 ± 18.3%	75.65 ± 4.8%
Hispanic	74.6 ± 6.6%	62.5 ± 33.5%	78.95 ± 10.6%	70.00 ± 12.7%	70.83 ± 18.2%	88.24 ± 8.8%	76.04 ± 4.4%
White	74.5 ± 12.0%	76.7 ± 15.1%	-	82.86 ± 12.5%	72.22 ± 14.6%	82.05 ± 12.0%	77.49 ± 5.9%
Other	83.3 ± 29.8%	100.0 ± 0.0%	-	75.00 ± 42.4%	-	-	75.00 ± 24.5%
Total	75.9 ± 4.0%	70.8 ± 11.1%	78.95 ± 10.6%	78.81 ± 6.5%	71.55 ± 8.2%	84.30 ± 6.5%	76.74 ± 2.7%

p-value of 0.7366 (x^2= 1.996, df=4, p ≤ 0.7366). As the p-value is greater than the significance level of 0.05, the null hypothesis that "there is no difference between the seat belt usage rate for each race" is not rejected. There is not a statistically significant difference in the overall usage rates between counties (x^2= 7.448, df=5, p ≤ 0.1894). The null hypothesis that there is independence between race and county is, however, rejected (x^2= 240.27, df=20, p ≤ 0.0000) indicating there are differences between usage rates by race and county.

Usage Rate by Gender

As shown in Table 3, almost two-thirds of survey respondents were male (66.63%). A lower percentage of Black drivers surveyed are male (61.18%), when compared with Hispanic (68.61%) and Whites (69.39%). Usage rates by race and gender are shown in Table 4. Overall, male and female drivers have a usage rate of 74.4 percent and 81.9 percent, respectively, with a statistically significant difference between the overall usage rates (p≤0.0105). As Table 4 shows, there is, no statistically significant difference between the usage rate of male and female drivers within each race. Black males had the lowest usage rate of 72.83%, followed by Hispanic and White males with a usage rate of 73.97% and 75.76%, respectively. For female drivers, Hispanic female drivers had the lowest usage rate of 80.36%, followed by Black and White females with a usage rate of 81.03% and 82.14% respectively. However, there is no statistically significant difference between the usage rate by race of female drivers (x^2= 2.777, df=4, p ≤ 0.5958) and there is no statistically significant difference between the usage rate by race of male drivers (x^2= 0.966, df=4, p ≤ 0.9149).

Usage Rate by Vehicle Type

Table 5 shows the vehicle types used by survey respondents. Passenger cars made up about sixty percent of the vehicles driven by survey respondents with Sports Utility Vehicles (SUVs) making up 28 percent of the vehicles. Vans and pick-up trucks make up a 9.5 percent and 2.9 percent of the vehicles in the survey, respectively. There is no statistically significant difference of usage rate by race and within each vehicle type. Table 6 shows the usage rate by vehicle type. The highest seat belt usage rate was 78.4 percent for van drivers, followed by SUVs with a usage rate of 77.5 percent. Passenger car drivers had a usage rate of 75.7 percent and pick-up vehicles had a usage rate of 70.4 percent. However there is no statistically significant difference between the overall usage rate by vehicle types (x^2= 1.047, df=3, p ≤ 0.7898).

Among passenger car drivers, Asians had the highest usage rate of 82.1 percent followed by Blacks with a usage rate of 77.1 percent. Whites had the highest usage rate among SUV drivers with a usage rate of 81.4 percent. However, there is no statistically significant difference between the usage rate by race within each vehicle type at a significance level of 0.05. For vans and pick-up trucks, there is a significant difference in usage rates by race at a higher significance level (Vans: x^2= 6.0980, df=3,

Table 3. Survey Responses by Driver Gender

	Male		Female	
Asian	57	73.08%	21	26.92%
Black	186	61.18%	117	38.82%
Hispanic	247	68.61%	113	31.39%
White	136	69.39%	60	30.61%
Other	6	58.33%	5	41.67%
Total	632	66.63%	316	33.37%

Table 4. Usage Rate by Gender (± 95% CI)

	Male	Female	Z-statistic	p-value
Asian	77.78 ± 11.1%	95.24 ± 9.1%	1.7936	0.0729
Black	72.83 ± 6.4%	81.03 ± 7.1%	1.6211	0.1050
Hispanic	73.97 ± 5.5%	80.36 ± 7.4%	0.9613	0.3364
White	75.76 ± 7.3%	82.14 ± 10.0%	1.3090	0.1905
Other	83.33 ± 29.8%	80.00 ± 35.1%	0.1427	0.8865
Total	74.43 ± 3.4%	81.94 ± 4.3%	2.5589	0.0105
X^2	2.7771	0.9662		
Df	4	4		
p-value	0.5958	0.9149		

Table 5. Vehicle Type

	PC		SUV		Van		PU	
Asian	41	52.56%	25	32.05%	12	15.38%	0	0.00%
Black	178	59.93%	84	28.28%	27	9.09%	8	2.69%
Hispanic	211	59.44%	88	24.79%	42	11.83%	14	3.94%
White	117	61.26%	62	32.46%	8	4.19%	4	2.09%
Other	8	66.67%	3	25.00%	0	0.00%	1	8.33%
Total	555	59.49%	262	28.08%	89	9.54%	27	2.89%

Table 6. Usage Rate by Vehicle Type (± 95% CI)

	PC	SUV	Van	PU
Asian	82.05 ± 12.0%	79.17 ± 16.2%	91.67 ± 15.6%	0.00 ± 0.0%
Black	77.27 ± 6.2%	77.38 ± 8.9%	73.08 ± 17.0%	37.50 ± 33.5%
Hispanic	73.17 ± 6.1%	73.86 ± 9.2%	83.33 ± 11.3%	85.71 ± 18.3%
White	76.79 ± 7.8%	81.36 ± 9.9%	50.00 ± 34.6%	75.00 ± 42.4%
Other	62.50 ± 33.5%	100.00 ± 0.0%	-	100.00 ± 0.0%
Total	75.74 ± 3.6%	77.52 ± 5.1%	78.41 ± 8.6%	70.37 ± 17.2%
X^2	2.6369	2.0815	6.0980	6.1886
df	3	3	3	3
p-value	0.4511	0.5557	0.1069	0.1028

Table 7. How Often Do You Use Your Seatbelt?

	Always	Sometimes	Never	Total
Asian	84.81%	11.39%	3.80%	8.26%
Black	80.07%	16.99%	2.94%	32.01%
Hispanic	79.05%	16.20%	4.75%	37.45%
White	86.57%	9.95%	3.48%	21.03%
Other	66.67%	16.67%	16.67%	1.26%
Total	81.28%	14.75%	3.97%	100.00%

$p \leq 0.1069$; pick-up trucks: $\chi^2 = 6.189$, df=3, $p \leq 0.1028$). Table 6 shows the statistics associated with the chi-squared test for each vehicle type. The null hypothesis that there is independence between race and vehicle type is rejected ($\chi^2 = 28.417$, df=12, $p \leq 0.0048$) indicating that although there are no differences between the usage rates of races within each vehicle type, differences exists between usage rate by race and between vehicle types.

Frequency of Seat Belt Usage

Survey respondents were asked "How often do you use your seatbelt?" Table 7 shows the response rate for each racial group. Overall, 81.3 percent of respondents stated that they "Always" used their seat belts, 14.8 percent responded that they "Sometimes" used their seatbelt and 3.9 percent responded that they "Never" used their seat belt. Whites responded the highest stated that they "Always" used their seat belt (86.57 %). Blacks and Hispanics stated at a lower rate that they "Always" used their seat belts. Blacks had a 80 percent response rate that they "Always" used their seat belts and Hispanics had a 79 percent response rate. Blacks (16.99%) and Hispanics (16.20%) responded similarly in their response rate that they "Sometimes" used their seat belt. About 10 percent of White drivers responded that they "Sometimes" used their seat belts. There is little difference between the races in their response of "Never" using seat

belts. Blacks, Hispanics and Whites responded that they "Never" used their seat belt at rates of 2.94 percent, 4.75 percent and 3.48 percent, respectively. At a higher significance level, the null hypothesis of independence between race and frequency of seat belt is not rejected, indicating a statistically significant difference in usage rate by race and frequency of seat belt use (χ^2= 13.084, df=8, p ≤ 0.1090).

Reason for Use and Non-Use of Seatbelt

Survey respondents were asked to identify reasons why they did not use their seat belt. This question was asked to all respondents including those responding that they "Always" use their seat belt. The reasons from which survey respondents could select include:

- I'm only driving a short distance or slow
- I'm in a rush/forgot it
- The seat belt is uncomfortable/inconvenient
- I don't worry about accidents
- Other (specify)

Overall, the reason with the highest percent of respondents was "I'm only driving a short distance or slow" with a response rate of 38.27 percent. The next highest reason offered was that "I'm in a rush/forgot it" with a response rate of 30.52 percent. Sixteen percent of respondents stated that "The seat belt is uncomfortable/inconvenient" was the reason for not using their seat belt. Table 8 shows the response to this question by race. There is independence between race and the reason for not using a seat belt, indicating that there is not a statistically significant difference between the usage rates by race and reason for not using a seat belt (χ^2= 10.785, df=20, p ≤ 0.9516).

Survey respondents were also asked to identify reasons for using their seat belts. The reasons provided from which survey respondents could select included:
- It's a habit
- I don't want to get a ticket
- I want to avoid serious injury
- My vehicle has a buzzer, or light that reminds me
- Other (specify)

The highest response was "I want to avoid serious injury" with a response rate of 44.6 percent, followed by "It's a habit" with the second highest response rate of 32.6 percent. "I don't want to get a ticket" was the third highest response with a rate of 18.8 percent. Table 9 shows the responses given for use of a seat belt by race. There is independence between race and reason for use of seat belts for Blacks, Hispanics and Whites, indicating that there is not a statistically significant difference between the usage rate by race and reasons for using seat belts (χ^2= 10.489, df=8, p≤0.2323).

9

Table 8. Reasons for Non-Use of Seatbelt

	Short-Distance	Rush/Forgot	Uncomfortable	Don't Worry	Other	Total
Asian	41.03%	33.33%	12.82%	2.56%	10.26%	8.88%
Black	33.85%	32.31%	16.15%	3.85%	13.85%	29.61%
Hispanic	37.65%	29.63%	20.99%	2.47%	9.26%	36.90%
White	43.56%	29.70%	12.87%	1.98%	11.88%	23.01%
Other	42.86%	14.29%	14.29%	14.29%	14.29%	1.59%
Total	38.27%	30.52%	16.86%	2.96%	11.39%	

Table 9. Reasons for Use of Seatbelt

	Habit	Avoid Ticket	Avoid Injury	Buzzer Reminder	Other	Total
Asian	50.00%	10.00%	38.75%	1.25%	0.00%	8.28%
Black	29.00%	22.67%	44.00%	3.00%	1.33%	31.06%
Hispanic	28.49%	19.73%	47.12%	3.56%	1.10%	37.78%
White	37.80%	15.79%	43.54%	1.91%	0.96%	21.64%
Other	41.67%	8.33%	41.67%	0.00%	8.33%	1.24%
Total	32.61%	18.84%	44.62%	2.80%	1.14%	100.00%

Usage Rate by Education Level

Survey respondents were asked their education level. Table 10 shows the education level by race. About 60 percent of respondents stated that they completed "Some College" or "College Graduate or Higher". About thirty-five percent of respondents stated that they completed "12th Grade/GED". Only about five percent of respondents stated they completed "8th Grade or less". Among the races Asians and Whites had significantly higher rates of "Some College" or "College Graduate or Higher" with a rate of 81.3 percent and 77 percent, respectively when compared to Blacks and Hispanics with response rates of 57.4 percent and 46.2 percent, respectively.

Table 11 shows the usage rate by education level. The highest overall usage rate is 77.78 percent for drivers completing 8th grade or less and the lowest usage rate is 76.4 percent for drivers who are college graduates or higher. The results are surprising and appear to deviate from previous conclusions that seat belt usage is related to educational levels. However, there is no statistically significant difference between the overall usage rate by education level (χ^2= 0.1524, df=3, p≤0.9849).

Table 10. Education Level

	8th Grade or less		12th Grade/GED		Some College		College Graduate or Higher	
Asian	1	1.33%	13	17.33%	13	17.33%	48	64.00%
Black	12	3.96%	117	38.61%	85	28.05%	89	29.37%
Hispanic	32	9.07%	158	44.76%	108	30.59%	55	15.58%
White	1	0.51%	44	22.45%	65	33.16%	86	43.88%
Other	0	0.00%	1	9.09%	4	36.36%	6	54.55%
Total	46	4.90%	333	35.50%	275	29.32%	284	30.28%

Table 11. Usage Rate by Education level (± 95% CI)

	8th Grade or less	12th Grade/GED	Some College	College Graduate or Higher
Asian	-	100.00 ± 0.0%	76.92 ± 22.9%	80.43 ± 11.5%
Black	83.33 ± 21.1%	77.39 ± 7.6%	78.57 ± 8.8%	71.59 ± 9.4%
Hispanic	80.65 ± 13.9%	76.13 ± 6.7%	75.47 ± 8.2%	77.78 ± 11.1%
White	-	76.74 ± 12.6%	75.00 ± 11.0%	80.72 ± 8.5%
Other	-	100.00 ± 0.0%	75.00 ± 42.4%	66.67 ± 37.7%
Total	77.78 ± 12.1%	77.68 ± 4.5%	76.40 ± 5.1%	76.90 ± 5.0%
X^2	7.3618	4.2644	0.3419	2.7795
Df	3	4	4	4
p-value	0.0612	0.3714	0.9870	0.5954

Table 11 shows the statistics for chi-squared tests performed to determine differences in the usage rates by race within each of the education levels. As the table shows, there is not a statistically significant difference in the usage rates by race within each education level at a significance level of 0.05. At a higher significance level, significant differences exist between the usage rates of Blacks and Hispanics at an "8th Grade or Less" education level (x^2= 7.3618, df=3, p≤0.0612). Chi-squared tests were also performed to determine the differences in the usage rates by educational level within each race. For Blacks, Hispanics and Whites, no significant differences were found between the usage rates by education levels. The null hypothesis of independence between race and education level is rejected indicating that although there are no differences between the usage rates by race within each education level, differences exists between usage rates by race and between all education levels (x^2= 94.410, df=12, p≤0.0000).

Table 12. Are you Married?

	Yes	No	Total
Asian	69.74%	30.26%	8.09%
Black	56.44%	43.56%	32.23%
Hispanic	59.49%	40.51%	37.55%
White	66.33%	33.67%	20.85%
Other	75.00%	25.00%	1.28%
Total	60.96%	39.04%	100.00%

Table 13. Usage Rate by Marital Status (± 95% CI)

	Married	Not Married	Z-Statistic	p-value
Asian	88.00 ± 9.0%	69.57 ± 18.8%	1.9125	0.0558
Black	81.66 ± 5.8%	69.23 ± 7.9%	2.5031	0.0123
Hispanic	80.19 ± 5.4%	71.43 ± 7.5%	1.8935	0.0583
White	79.03 ± 7.2%	73.02 ± 11.0%	0.9241	0.3554
Other	77.78 ± 27.2%	66.67 ± 53.3%	0.3849	0.7003
Total	81.04 ± 3.2%	70.75 ± 4.7%	3.6145	0.0003
X^2	2.1022	0.3722		
Df	4	4		
p-value	0.7170	0.9847		

Usage Rate by Marital Status

Survey respondents were asked to identify their marital status. Table 12 shows the percent of married and unmarried survey respondents by race. About sixty percent of respondents indicated that they were married. Blacks had the lowest percent of married respondents at 56.4 percent with Asians having the highest percentage at 69.7 percent. Table 13 shows the usage rate by marital status and race. There is a statistically significant difference between the seat belt usage rate for married drivers (81%) compared to unmarried drivers (70.8%) (p≤0.0003). There is a statistically significant difference in usage rate for married and unmarried Asians (p≤0.0558), Hispanics (p≤0.0583) and Blacks (p ≤0.0123). There is not a statistically significant difference in usage rate for married and unmarried Whites (p≤0.3554). There is not a statistically significant difference between the usage rate by race for married drivers (x^2= 2.102, df=4, p≤0.7170) and no statistically significant difference between the usage rate by race for unmarried drivers (x^2= 0.372, df=4, p≤0.9847).

Table 14. How Old Are You?

	Age					
	21	22-29	30-49	50-64	65+	Total
Asian	2.53%	17.72%	60.76%	17.72%	1.27%	8.40%
Black	3.65%	19.60%	56.48%	15.95%	4.32%	31.99%
Hispanic	4.86%	29.43%	51.14%	11.71%	2.86%	37.19%
White	2.01%	21.11%	45.23%	22.61%	9.05%	21.15%
Other	16.67%	8.33%	58.33%	16.67%	0.00%	1.28%
Total	3.83%	23.27%	52.50%	15.94%	4.46%	100.00%

Usage Rate by Age

The age of respondents was also evaluated as an indicator of the use or non-use of seat belts. Table 14 shows the percent of survey respondents by age. Over half of survey respondents fell in the age category of "30-49". Twenty-three percent fell in the age category of "22-29" and 16 percent in "50-64". Table 15 shows the usage rate by age. Overall, the highest usage rates occurred for drivers in the age category "30-49" with a usage rate of 79.24 percent. The next highest usage rate occurred for drivers in the age category "50-64" with a usage rate of 76.7 percent followed by drivers in the category "22-29" with a usage rate of 72.2 percent. There is a statistically significant difference between overall usage rates by age category (x^2= 14.680, df=4, p≤0.0054).

For Blacks and Hispanics the usage rate increases with age with the highest usage rates occurring in the age category "30-49". The usage rate in this age category is 79.5 and 80.1 percent for Blacks and Hispanics, respectively. Table 15 shows the statistics for chi-squared tests to determine differences in usage rates between races in each age category. For Hispanics there is no statistically significant difference between the usage rates by age (x^2= 3.725, df=4, p≤0.4445). For Whites, the highest usage rate occurs in the age category "22-29" with a usage rate of 78 percent. There is a statistically significant difference between the usage rate by age for Blacks and Whites at a higher significance level (x^2= 7.417, df=4, p≤0.1154 for Blacks, x^2= 8.366, df=4, p≤0.07991 for Whites). At a higher significance level, there is a statistically significant difference between the usage rate by race for drivers in the age category of "65+" (x^2= 7.4100, df=4, p≤0.07991).

Usage Rate by Parental Status

Survey respondents were asked "How many kids do you have?" The respondents were not asked the age of kids or whether the kids lived in the household. Table 16 shows the distribution of survey respondents with kids. Overall, 68.9 percent of respondents stated that they had kids. Whites and Asians had a higher percent of respondents with kids with 47.4 percent of Whites and 42.3 percent of Asians responding that they had kids. Blacks and Hispanics responded that they had kids with 19.3 percent Blacks and 30.7 percent Hispanics stating that they had kids.

Table 15. Usage Rate by Age (± 95% CI)

Race	Age					X^2	Df	p-value
	21	22-29	30-49	50-64	65+			
Asian	100.00 ± 0.0%	71.43 ± 23.7%	82.98 ± 10.7%	91.67 ± 15.6%	100.00%	2.5445	4	0.6367
Black	63.64 ± 28.4%	67.80 ± 11.9%	79.52 ± 6.1%	83.33 ± 10.5%	61.54 ± 26.4%	7.4165	4	0.1154
Hispanic	64.71 ± 22.7%	73.27 ± 8.6%	80.11 ± 5.9%	80.00 ± 12.4%	70.00 ± 28.4%	3.7252	4	0.4445
White	25.00 ± 42.4%	78.05 ± 12.7%	75.29 ± 9.2%	86.05 ± 10.4%	76.47 ± 20.2%	8.3659	4	0.0791
Other	50.00 ± 69.3%	-	85.71 ± 25.9%	100.00 %	-	4.7619	3	0.1901
Total	61.11 ± 15.9%	72.22 ± 6.0%	79.42 ± 3.6%	84.14 ± 5.9%	70.73 ± 13.9%	17.2440	4	0.0017
X^2	3.6934	3.9292	1.4718	1.5405	7.4100			
Df	4	4	4	4	4			
p-value	0.4491	0.4157	0.8316	0.8194	0.0599			

Table 16. Distribution of Survey Respondents by Parental Status

	Parents		Not Parents		Total
Asian	30	58.8%	21	41.2%	51
Black	160	80.4%	39	19.6%	199
Hispanic	193	69.2%	86	30.8%	279
White	58	52.3%	53	47.7%	111
Other	4	57.1%	3	42.9%	7
Total	445		202		647

Table 17. Usage Rate by Kids (± 95% CI)

	Parents	Not Parents	Z-Statistic	p-Value
Asian	86.67 ± 12.2%	80.95 ± 16.8%	0.5523	0.5808
Black	78.13 ± 6.4%	82.05 ± 12.0%	0.5388	0.5900
Hispanic	78.76 ± 5.8%	77.91 ± 8.8%	0.1595	0.8733
White	74.14 ± 11.3%	79.25 ± 10.9%	0.6346	0.5257
Other	75.00 ± 42.4%	66.67 ± 53.3%	0.2415	0.8091
Total	78.43 ± 3.8%	79.21 ± 10.9%	0.2247	0.8222
X^2	1.871	0.517		
Df	4	4		
p-value	0.7595	0.9718		

Table 17 shows the usage rate by the driver's parental status. The seat belt usage rate for respondents having kids is 78.4 percent compared to the usage rate for those without kids at 79.2 percent. There is no statistically significant difference between the overall usage rate of drivers with and without kids (p≤0.8222). For each racial group there was also no statistical difference found between the usage rates of drivers with and without kids. There is also no statistically significant difference between the usage rate by race for drivers who are parents and no difference between the usage rate by race for drivers who are not parents(Parents: χ^2= 1.871, df=4, p≤0.7595; Not Parents: χ^2= 0.571, df=4, p≤0.9718). Usage Rate by Income

Survey respondents were asked to identify their household income. Table 18 shows the distribution of income for the respondents reporting household income. A larger percent of Blacks (59.3%) and Hispanics (66.6%) responded to having incomes below $50,000 compared to Asians (44.3%) and Whites (36%). Table 19 shows the usage rate by income. In general, the usage rates increase with the total household income for Asians, Blacks, Hispanics and Whites. There is no statistically significant difference between the overall usage rate between income categories (χ^2= 3.518, df=3, p≤0.3184). Table 19 also shows the statistics for chi-squared tests to determine differences in usage rate by race within each income category and to determine differences between

15

Table 18. Income by Race

| | Total Household Income | | | | |
	<$25,000	$25,000 - $49,999	$50,000 - $99,999	>$100,000	Total
Asians	9	26	29	7	79
Blacks	55	130	66	22	312
Hispanics	89	154	69	8	365
Whites	17	55	76	24	200
Others	3	5	1	3	12
Total	173	370	241	64	848
Percent	20.40%	43.63%	28.42%	7.55%	

Table 19. Usage Rate by Income

	<$25,000	$25,000 - $49,999	$50,000 - $99,999	>$100,000	χ^2	Df	p-value
Asian	75.00%	80.77%	81.48%	100.00%	1.8566	3	0.6027
Black	70.91%	82.03%	79.69%	59.09%	7.2834	3	0.0634
Hispanic	74.42%	75.82%	77.61%	87.50%	0.7966	3	0.8503
White	70.59%	66.67%	81.43%	91.30%	7.0437	3	0.0705
Other	33.33%	100.00%	100.00%	66.67%	3.6508	3	0.3017
Total	72.19%	77.20%	79.91%	79.37%	3.5183	3	0.3184
χ^2	2.567	6.341	0.616	9.962			
Df	4	4	4	4			
p-value	0.6327	0.1751	0.9613	0.0411			

usage rate within each race. For Blacks, the usage rates increase until $100,000 and then decreases for incomes greater than $100,000. For Blacks and Whites, there is a significant difference in usage rate between income categories at a higher significance level (χ^2= 7.2834, df=3, p≤0.0634 for Blacks; χ^2= 7.0437, df=3, p≤0.0705 for Whites). There is no difference in usage rates by race within each income category for incomes less than $99,999, but there is a significant difference in usage rate by race for ">$100,000" ($\chi^2$= 9.962, df=4, p≤0.0411). The null hypothesis of independence between usage rates by race and income is rejected, indicating a statistically significant difference in usage rate by race and all income categories (χ^2= 82.017, df=12, p≤0.0000).

LOGISTIC REGRESSION MODEL

A seat belt usage model describing the relationship between seat belt use and other characteristics, such as driver and vehicle characteristics, was also developed in this research. Seat belt use is regarded as the dependent variable with two levels of usage:

$$Y_i = \begin{cases} 1 & \text{driver used a seatbelt} \\ 0 & \text{driver did not use a seatbelt} \end{cases}$$

The independent variables used included: gender (GNDR); vehicle type (VEH); racial/ethnic group (RACE); education level achieved (EDU); marital status (MRRD); age(AGE); parental status (KIDS); and the total household income (INC). The logistic regression model uses the logit transformation of the probability of an event's occurrence as a linear function of a set of independent variables. A binary logistic model was used as the dependent variable is dichotomous or binary. Table 20 defines the variables and levels within each variable.

Using the statistical package Limdep Version 7.0, a logistic regression model was developed to estimate the probability of seat belt usage. The coefficient estimates and p-values for each variable are shown in Table 21. Using a 95% confidence interval to identify significant variables, the variables identified as significant include gender (GNDR) and age (AGE). Whether the driver is married (MRRD) has a p-value of 0.0764, which is not considered to be significant at a 95% confidence interval, but is significant at a 90% confidence interval. Race was not found to be a significant factor in estimating the probability of seat belt usage.

Separate models were developed for each racial group including Asians, Blacks, Hispanics and Whites. The coefficient estimates and p-values for each model are shown in Table 22. The models were not found to be significant, with the exception of the model developed using the responses of Black drivers. In that model the variables found to be significant at a 95 percent confidence interval are gender (GNDR) and age (AGE). The marital status of the driver (MRRD) and the age of the driver (AGE) are also significant at a higher significance level with p-values of 0.1253 and 0.0833, respectively.

Table 20. Model Variables

Variable	Description	Levels	Level-Description	Number	Percent (%)
COUNTY	County	1	Essex	441	45.1%
		2	Bergen	66	6.8%
		3	Passaic	57	5.8%
		4	Hudson	167	17.1%
		5	Union	125	12.8%
		6	Middlesex	121	12.4%
Y	Driver's Use of seatbelt	1	Used	731	74.8%
		0	Not Used	246	25.2%
GNDR	Gender	0	Female	320	32.8%
		1	Male	657	67.2%
VEH	Vehicle Type	1	PC	559	57.2%
		2	SUV	262	26.8%
		3	Van	89	9.1%
		4	PU	28	2.9%
RACE	Racial/Ethnic Group	1	Asian	79	8.1%
		2	Black	312	31.9%
		3	Hispanic	365	37.4%
		4	White	200	20.5%
		5	Other	12	1.2%
EDU	Educational Level	1	8th	46	4.7%
		2	12th	334	34.2%
		3	Some College	275	28.1%
		4	Graduate	288	29.5%
MRRD	Marital Status of Driver	1	Married	577	59.1%
		0	Not Married	368	37.7%
AGE	Driver's Age	1	<22	36	3.7%
		2	22-29	221	22.6%
		3	30-49	498	51.0%
		4	50-64	150	15.4%
		5	65+	42	4.3%
KIDS	Parental Status	0	Parents	524	53.6%
		1	Not Parents	453	46.4%
INC	Income	1	$25,000	174	17.8%
		2	$49,000	368	37.7%
		3	$99,999	244	25.0%
		4	$100,000	64	6.6%

Table 21. Binary Logit Seat Belt Model

Parameter	Estimate	P-Value
B	**1.6666**	**0.0017**
COUNTY	0.0024	0.9539
GNDR	**-0.5123**	**0.0024**
VEH	-0.0484	0.5961
RACE	-0.0302	0.7048
EDU	-0.0076	0.9223
MRRD	**-0.2485**	**0.0764**
AGE	**0.2393**	**0.0023**
KIDS	0.1970	0.2167
INC	0.0227	0.7645
No. of Observations	977	
Chi-square	26.1166	
Significance Level	0.0020	
Degrees of Freedom	9	
Log Likelihood Function	-538.26	
Restricted Log Likelihood	-551.32	

Table 22. Binary Logit Model for Separate Models by Race

Parameter	Asian Model		Black Model		Hispanic Model		White Model	
	Estimate	P-Value	Estimate	P-Value	Estimate	P-Value	Estimate	P-Value
B	7.9527	0.0326	2.4094	0.0056	0.6134	0.4542	1.5537	0.2358
COUNTY	-0.2417	0.2847	-0.0134	0.8601	0.0588	0.3958	-0.0117	0.8934
GNDR	-1.7071	0.1241	-0.6031	0.0397	-0.2901	0.3026	-0.3501	0.3603
VEH	0.0745	0.8592	-0.2830	0.0833	0.0908	0.5385	-0.1041	0.6386
EDU	-0.1601	0.6120	-0.1474	0.3066	0.0248	0.8537	0.1607	0.3900
MRRD	-1.0348	0.2059	-0.3809	0.1253	-0.1053	0.6416	-0.5380	0.1373
AGE	-0.3542	0.4909	0.3045	0.0357	0.2398	0.0560	0.1217	0.5198
KIDS	0.0669	0.9338	0.2256	0.4201	0.3996	0.1314	-0.3104	0.4189
INC	0.1510	0.6501	0.0512	0.7131	-0.0418	0.7636	0.0952	0.5126
No. of Obs.	79		312		366		201	
Chi-square	9.0756		14.3634		10.2519		5.2926	
Significance Level	0.3360		0.0728		0.2478		0.7259	
Degrees of Freedom	8		8		8		8	
Log Likelihood Function	-35.2697		-169.3570		-200.9462		-111.9651	
Restricted Log Likelihood	-39.8075		-176.5387		-206.0722		-114.6114	

SUMMARY OF FINDINGS

This study examined differences in seat belt usage by race for drives in urban areas in New Jersey. The following summarizes the findings of the research:

- The study found an overall driver usage rate of $76.74 \pm 2.7\%$;

- No difference between the usage rates for Asians, Blacks, Hispanics and Whites;

- No difference between the overall usage rates of each county;

- Differences in usage rate by race and county;

- Differences between usage rates of male and female drivers;

- No difference between the usage rate of male and female drivers within each race;

- No difference between the usage rate by race of female drivers;

- No difference between the usage rate by race of male drivers;

- No difference between the overall usage rate by vehicle types;

- No difference in usage rate by race within each vehicle type;

- Differences in usage rate by race for vans and pick-up trucks at a higher significance level than 0.05;

- Differences in usage rate by race between all vehicle types;

- Differences between frequency of seat belt use and race at a higher significance level;

- No difference between usage rate by race and reason for not using a seat belt;

- For Blacks, Hispanics and Whites, no difference between the usage rates by race and reasons for using seat belts;

- No difference between the overall usage rates by education level;

- No difference in the usage rates by race within each education level;

- Differences exist between the usage rates of Blacks and Hispanics at an "8th Grade or Less" education level at a higher significance level;

- Differences exists between usage rates by race and all education levels

- Differences between the usage rate for married and unmarried drivers

- Differences in usage rate for married and unmarried Asians, Hispanics and Blacks;

- No difference in usage rate for married and unmarried White;

- No difference between the usage rate by race of married drivers;

- No difference between the usage rate by race of unmarried drivers;

- Differences between overall usage rates by age category;

- For Hispanics no difference between the usage rates by age;

- For Blacks and Whites, differences between the usage rate by age at a higher significance level;

- Differences between the usage rate by race for drivers in the age category of "65+" at a higher significance level;

- No difference between the overall usage rate of drivers with and without kids;

- No difference between the usage rate of drivers with and without kids within each race;

- No difference between the usage rate by race for drivers with kids;

- No difference between the usage rate by race for drivers without kids;

- No difference in overall usage rates between income categories;

- Difference in usage rate between income categories for Blacks and Whites at a higher significance level;

- No difference in usage rate by race within each income category for incomes less than $99,999;

- Differences in usage rate by race for incomes greater than $100,000;

- Difference in usage rate by race for all income categories.

CONCLUSIONS

Based on the research performed, there is no difference in the seat belt use of Blacks and Hispanics, compared with Asians and Whites. This finding supports recently published research that concludes that the black-white disparities in states with primary seat belt laws, such as New Jersey, are less marked than in states with secondary laws (Briggs, 2006). The study indicates that campaigns designed for increasing seat belt usage should not necessarily be targeted to specific races but should cover all racial groups in New Jersey. The study did, however, show an association between race and county suggesting differences in usage rate by race and county. This finding states that although there are no differences in the overall usage rates between races, there may be some differences between races of differing counties.

The logistic regression model developed to estimate the probability of seat belt usage found that driver's gender, age and marital status significantly impact seat belt usage rate more than race. Unmarried male drivers between the ages of 21 and 29 should be targeted in campaigns designed to increase seat belt usage. Overall, the two highest responses given for not using a seat belt were "I'm only driving a short distance or slow" and "I'm in a rush/forgot it". Based on these responses, there is still need for educating drivers to the need for using a seat belt even when driving short distances and for stressing the importance of the seat belt in saving lives. Although the "Click-It or Ticket" campaigns have shown to increase seat belt usage, avoiding a ticket was the third highest reason given for using a seat belt. The first and second reasons given were "I want to avoid serious injury" and "It's a habit". Given these results, more research should be performed in focus group settings to better understand targeted population groups. In a focus group setting, more details can be gathered on the attitudes of New Jersey drivers toward seat belt usage and information can be gathered on how this usage rate can be increased.

REFERENCES

Briggs NC, Schlundt DG, Levine RS, Goldzweig IA, Stinson N Jr, Warren RC (2006), Seat Belt Law Enforcement and Racial Disparities in Seat Belt Use, American Journal of Preventive Medicine 31(2): 135-41, August 2006.

Glassbrenner, Donna, *Safety Belt Use in 2002 – Demographic Characteristics*, Research Note, U.S. Department of Transportation, National Highway Traffic Safety Administration, DOT HS 809 557, March 2003).

Vivoda, Jonathon M., David W. Eby and Lidia P. Kostyniuk, Differences in Safety Belt Use By Race, *Accident Analysis and Prevention*, 36(2004), pp. 1105-1109.

Wells, Jo Ann K., Allan F. Williams, and Charles M. Farmer, Seat Belt Use Among African Americans, Hispanics, and Whites, *Accident Analysis and Prevention*, 34(2002), pp. 523-529.

SAFETY BELT QUESTIONNAIRE

Location: _____   □ **U**   □ **NU**

Observer: _____   Date:

_____

The New Jersey Institute of Technology is doing a survey for the New Jersey Office of Highway Safety on seat belt usage. By completing this confidential survey you have a chance to win an Ipod player. May I ask you a few questions?

Questions 1-2 should be completed by the observer:

1. The driver is:
   - □ Female
   - □ Male

2. Type of Vehicle
   - □ PC
   - □ SUV
   - □ Van
   - □ Pick-up

The driver should be asked the following:

3. How often do you use your seat belt?
   - □ Always
   - □ Sometimes
   - □ Never

4. If you do not always wear your seat belt, what are the biggest reasons that you do not? (Include all that apply)
   - □ I'm only driving a short distance or slow
   - □ I'm in a rush/forgot it
   - □ The seat belt is uncomfortable/inconvenient
   - □ I don't worry about accidents
   - □ Other (specify) _____

5. If you always wear your seat belt, what are the biggest reasons that you do? (Include all that apply)
   - □ It's a habit
   - □ I don't want to get a ticket
   - □ I want to avoid serious injury
   - □ My vehicle has a buzzer, or light that reminds me
   - □ Other (specify) _____

6. Which of the following racial/ethnic categories describes you? You may select more than one.

- ☐ Asian
- ☐ Black or African-American
- ☐ Hispanic/Latino
- ☐ White
- ☐ Other (specify): _____

7. What is the highest grade or year of school you completed?

- ☐ 8th grade or less
- ☐ 12th grade/GED
- ☐ Some college
- ☐ College graduate or higher

8. Are you?

- ☐ Married
- ☐ Not Married

9. What is your age?

- ☐ Under 21
- ☐ 22 to 29
- ☐ 30 to 49
- ☐ 50 to 64
- ☐ Over 65

10. How many children age 15 or younger are living in your household?_____

11. Which of the following categories describes the total income of all persons in your household before taxes in 2005?

- ☐ Less than $25,000
- ☐ $25,000 to $49,999
- ☐ $50,000 to $99,999
- ☐ $100,000 or more

12. What is your zip code?

_____

That completes the survey.
Thank you very much for your time and cooperation.

Questionario Acerca de Cinturones de Seguridad

Localizacion: : _____   ☐ U   ☐ NU

Observador: :_____   Fecha:_____

El Instituto de Tecnologia de Nueva Jersey esta haciendo una encuesta para la Oficina de Seguridad de Avenidas de Nueva Jersey sobre el uso del cinturon de seguridad. Por completar esta encuesta confidencial tiene usted la oportunidad de ganarse un IPOD. Puedo yo hacerle algunas preguntas?

Pregunta 1 y 2 deben ser contestadas por el observador.

1. **El conductor es:**
   ☐ Mujer
   ☐ Hombre

2. **Clase de vehiculo:**
   ☐ Automovil
   ☐ Camioneta deportiva
   ☐ Van
   ☐ Camioneta

El conductor debe contestar lo siguiente:

3. **Con que frequencia usa usted el cinturon de seguridad?**
   ☐ Siempre
   ☐ Algunas veces
   ☐ Nunca

4. **Si usted no usa siempre el sinturon de seguridad, explique las rezones pricipales para no hacerlo? (Indique todas las que aplican)**
   ☐ Solamente condusco cortas distancias o voy despacio
   ☐ Cuando voy deprisa/ lo olvido
   ☐ El sinturon de seguridad es incomodo e inconveniente
   ☐ No me preocupo por accidentes
   ☐ Otros: (Explique) _____

5. **Si usted siempre usa el sinturon de seguridad, explique las rezones principales para hacerlo? (Indique todas las que aplican)**
   ☐ Es un habito
   ☐ No quiero pagar multas
   ☐ Quiero evitar heridas serias
   ☐ Mi vehiculo tiene un sistema de informacion que me indica que debo usarlo
   ☐ Otros: (Explique)

_____

6. Cual de las siguientes categories etnicas/raciales se identifica? (Usted puede seleccionar mas de una)
   - ☐ Asiatico
   - ☐ Negro o Afro-Americano
   - ☐ Hispano/Latino
   - ☐ Blanco
   - ☐ Otros: (Explique)

   _____

7. Cual es el grado de estudios mas alto que ha completado?
   - ☐ Tercero de bachillerato o menos
   - ☐ Segundaria
   - ☐ Algunos estudios universitarios
   - ☐ Graduado universitario o mas

8. Es usted:
   - ☐ Casado
   - ☐ Soltero

9. Cual es su edad?
   - ☐ Menor de 21
   - ☐ Entre 22 y 29
   - ☐ Entre 30 y 49
   - ☐ Entre 50 y 64
   - ☐ Mayor de 65

10. Cuantos ninos menores de 15 anos viven en su vivienda? _____

11. En cuales de las siguientes categorias se encuentra el valor de las entradas financieras de toda las personas que viven en su casa antes de impuetos, de el ano 2005?
    - ☐ Menos de $25,000
    - ☐ Entre $25,000 y $49,999
    - ☐ Entre $50,000 y $99,999
    - ☐ $100,000 o mas

12. Cual es su codigo postal?

_____

Esto completa la encuesta. Gracias por su tiempo y colaboracion.