

**Report No. CDOT-DTD-R-2004-7  
Final Report**

**IDENTIFICATION OF APPROPRIATE  
INVESTMENT LEVELS TO IMPROVE AND  
MAINTAIN SEAT BELT USAGE RATES IN  
THE STATE OF COLORADO**

**G. James Francis**



**April 2004**

**COLORADO DEPARTMENT OF TRANSPORTATION  
RESEARCH BRANCH**

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16. Abstract <p>The study was designed to gather data from both primary and secondary states regarding investments in informational and educational messages on the use of seat belts. This investment data was correlated to seat belt usage rates. Within secondary states, the coefficient of determination was .99, indicating that most of the variability in usage rate change was due to the investments made in media and educational campaigns. While the coefficient of determination was much lower for primary states (.46 vs .99), the average seat belt usage rate is 11 percent higher. This suggests that the law itself as well as other variables has more to do with changes in usage rate in primary states.</p> <p>Although Colorado has made impressive improvements, the data points to the possibility that diminishing returns may be close at hand.</p> <p>Implementation: In the immediate future, it appears that additional investment increments of approximately \$35,000 over the current expenditures will yield about a 1 percent improvement in usage rates. This approximation may be diluted in its impact as rates improve and the State moves closer to the point of diminishing returns. However, continued gains among juvenile seat belt usage hold enough potential to warrant the increases in investment levels.</p> <p>Remaining a secondary state will require increasingly greater investments to maintain an acceptable rate of improvement in seat belt usage. As the marginal utility of each dollar invested drops, more funds will be needed to get the same results of the preceding year. To offset this decline, CDOT will need to invest very judiciously and be as knowledgeable as possible regarding the impact of various messages and media.</p>					
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# IDENTIFICATION OF APPROPRIATE INVESTMENT LEVELS TO IMPROVE AND MAINTAIN SEAT BELT USAGE RATES IN THE STATE OF COLORADO

by

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## **EXECUTIVE SUMMARY**

Investment in educational and public announcements for the purpose of informing people about the importance of using seat belts is an essential element of improving safety on the streets, roads, and highways of the nation. However, there has been no attempt to evaluate these investment levels in terms of measurable results.

This study was designed to gather data from all states regarding investment levels in education and informational campaigns and determine the correlation between the funds invested and the seat belt usage rates. The needs for primary and secondary states are obviously different as the laws, enforcement, and fines are important variables which could influence seat belt usage rates. Thus, data were divided between primary and secondary states with comparative analyses performed in order to learn levels of effectiveness and to discover points of diminishing returns.

The research design and methodology were focused upon the objective of finding the optimal investment levels for the State of Colorado. This optimal level would allow a continued improvement in seat belt usage rates while moving toward the ceiling of what could be considered the maximum rate for secondary states. Although Colorado has demonstrated dramatic improvement over the last three years and has the eighth highest usage rate among secondary states, the flip side of this success is that the ceiling is fast approaching. Due to personal habits and beliefs and the culture of independence that exists within Colorado, the ceiling for seat belt usage is a very real phenomenon.

The coefficient of determination of nearly .99 for secondary states suggests that most of the variability in seat belt usage rates is due to the funds spent on education and campaign efforts. Therefore, improvement upon the current usage rate of 77.7 percent will likely require additional dollars to be invested. While there may be some time lag with respect to dollars invested and their impact, lower levels of investment will probably not sustain current usage rates.

## **Implementation Statement**

In the immediate future, it appears that additional investment increments of approximately \$35,000 above the current expenditures will yield about a 1 percent improvement in usage rates. This approximation may be diluted in its impact as rates improve and the State moves closer to the point of diminishing returns. Again, given the extraneous variables such as the culture of the State, this point may be very near. However, continued gains among juvenile seat belt usage hold enough potential to warrant the increases in investment levels.

Given that average seat belt usage for primary states is approximately 11 percent higher than secondary states, a change in laws would be the most economically efficient and effective means of improving usage rates. Remaining a secondary state will require increasingly greater investments to maintain an acceptable rate of improvement in seat belt usage. As the marginal utility of each dollar invested drops, more funds will be needed to get the same results of the preceding year. Colorado is at the cusp of this investment phenomenon. To offset this decline, CDOT will need to invest very judiciously and be as knowledgeable as possible regarding the impact of various messages and media.

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## INTRODUCTION

The study was designed to assist the State of Colorado in the determination of appropriate investment levels in media and public education efforts for the improvement of seat belt usage. An important objective was to examine the impact of dollars spent to educate the public on seat belt usage in both primary and secondary law states. Although the data on media expenditures are incomplete for both primary and secondary states, some tentative conclusions can be drawn. While primary states consistently report higher rates of seat belt usage, the correlation between dollars invested in media and seat belt usage is much stronger for secondary states. The fact that primary states can spend less money for awareness and education and still have significantly higher seat belt usage rates can most likely be attributed to the influence of the law and public perception.

The proposition that investment in education and media will continue to improve usage, but at a declining rate, appears true for some states; however, most programs have not been in existence long enough for generalizability. Recent improvements of some significance have occurred within 23 of the 31 secondary states indicating that to this point the “ceiling” for improvement for the states mentioned has probably not been reached. No secondary state experienced a decline in usage from 2002 to 2003 while two primary states had decreases and two remained the same.

A plateau of usage rates followed by a slight decline for some of the primary states indicates that there is indeed a “ceiling” for these states which may be difficult to surpass. The average usage rate for primary states, however, is over 11 percent higher than that of the secondary states. The effectiveness of the investment and the impact of the educational efforts will determine if the secondary states can close the gap. Currently, only four secondary states have usage rates that approximate the average for the primary states. These four states (Arizona – 86.2%, Utah – 85.2%, Vermont – 82.4%, North Dakota – 81.2%) are potential benchmarks in terms of how they achieved rates which are well above the rest of the secondary states.

## **NATIONAL SEAT BELT USAGE**

Exhibit 1 presents the data for seat belt usage for 1998-2003. The data presented in the Exhibit were gathered by NHTSA from all the states. All states are represented over the six years with the exception of Maine, which reported statistics for only 1998, and New Hampshire, which reported data for only 2003. Maine has a secondary law, and New Hampshire has no seat belt laws.

The bar chart graphically illustrates the growth and the plateau effect of seat belt usage. The improvement “spurt” in 2003 could be due to any number of factors, but the awareness programs such as “Click It or Ticket” and other paid media promotions are certainly key variables.

### **Primary Law States**

Exhibit 2 illustrates the seat belt usage rates for the 18 primary law states. The states of California, Hawaii, Oregon, and Washington are the states to be benchmarked among the primary states. Just as with the total U.S. figure, the data presented in Exhibit 2 illustrate the growth, the plateau, and the significant jump in improvement for 2003.

### **Secondary Law States**

Similar to the primary state data, the secondary usage rates over the six-year period demonstrate a moderate growth with some leveling and a large gain in usage rates for 2003. The bar chart in Exhibit 3 very clearly illustrates this pattern.

For the most part, secondary states made steady gains over the six-year period. The rates of improvement varied greatly, but data presented later in this report will support the proposition that awareness and education efforts had a direct impact upon the improvements in the seat belt usage.

**Exhibit 1. Seat Belt Usage for 1998-2003.**

State	Seat Belt Usage Past 6 Years					
	1998	1999	2000	2001	2002	2003
<b>ALABAMA</b>	<b>52.0</b>	<b>57.9</b>	<b>70.6</b>	<b>70.6</b>	<b>79.4</b>	<b>77.4</b>
ALASKA	57.0	60.6	61.0	61.0	62.6	78.9
ARIZONA	61.5	71.1	75.2	75.2	74.4	86.2
ARKANSAS	52.6	57.2	52.4	52.4	54.5	62.8
<b>CALIFORNIA</b>	<b>88.6</b>	<b>89.3</b>	<b>88.9</b>	<b>88.9</b>	<b>91.1</b>	<b>91.2</b>
COLORADO	66.0	65.2	65.1	65.1	72.1	77.7
<b>CONNECTICUT</b>	<b>70.1</b>	<b>72.9</b>	<b>76.3</b>	<b>76.3</b>	<b>78.0</b>	<b>78</b>
DELAWARE	62.3	64.4	66.1	66.1	67.3	74.9
FLORIDA	57.2	59.0	64.8	64.8	69.5	72.6
<b>GEORGIA</b>	<b>73.6</b>	<b>74.2</b>	<b>73.6</b>	<b>73.6</b>	<b>79.0</b>	<b>84.5</b>
<b>HAWAII</b>	<b>80.5</b>	<b>80.3</b>	<b>80.4</b>	<b>80.4</b>	<b>82.5</b>	<b>91.8</b>
IDAHO	57.3	57.9	58.6	58.6	60.4	71.7
ILLINOIS	64.5	65.9	70.2	70.2	71.4	76.2
<b>INDIANA</b>	<b>61.8</b>	<b>57.3</b>	<b>62.1</b>	<b>62.1</b>	<b>67.4</b>	<b>82.3</b>
<b>IOWA</b>	<b>76.9</b>	<b>78.0</b>	<b>78.0</b>	<b>78.0</b>	<b>80.9</b>	<b>86.2</b>
KANSAS	58.7	62.6	61.2	61.6	60.8	63.6
KENTUCKY	54.3	58.6	60.0	60.0	61.9	65.5
<b>LOUISIANA</b>	<b>65.6</b>	<b>67.0</b>	<b>68.2</b>	<b>68.2</b>	<b>68.1</b>	<b>73.8</b>
MAINE	61.3					
<b>MARYLAND</b>	<b>82.6</b>	<b>82.7</b>	<b>85.0</b>	<b>85.0</b>	<b>82.9</b>	<b>87.9</b>
MASSACHUSETTS	51.0	52.0	50.0	50.0	56.0	61.7
<b>MICHIGAN</b>	<b>69.9</b>	<b>70.1</b>	<b>83.5</b>	<b>83.5</b>	<b>82.3</b>	<b>83.9</b>
<b>Primary Apr 2000</b>						
MINNESOTA	64.2	71.5	73.4	73.4	73.9	
MISSISSIPPI	58.0	54.5	50.4	50.4	61.6	62.2
MISSOURI	60.4	60.8	67.7	67.7	67.9	72.9
MONTANA	73.1	74.0	75.6	75.6	76.3	79.5
NEBRASKA	65.1	67.9	70.5	70.5	70.2	76.1
NEVADA	76.2	79.8	78.5	78.5	74.5	78.7
NEW HAMPSHIRE						49.6
<b>NEW JERSEY</b>	<b>63.0</b>	<b>63.3</b>	<b>74.2</b>	<b>74.2</b>	<b>77.6</b>	<b>81.2</b>
<b>primary May 2000</b>						
<b>NEW MEXICO</b>	<b>82.6</b>	<b>88.4</b>	<b>86.6</b>	<b>86.6</b>	<b>87.8</b>	<b>87.2</b>
<b>NEW YORK</b>	<b>75.3</b>	<b>76.1</b>	<b>77.3</b>	<b>77.3</b>	<b>80.3</b>	<b>84.6</b>
<b>NORTH CAROLINA</b>	<b>76.7</b>	<b>78.1</b>	<b>80.5</b>	<b>80.5</b>	<b>82.7</b>	<b>86.1</b>
NORTH DAKOTA	40.0	46.7	47.7	47.7	57.9	63.7
OHIO	60.6	64.8	65.3	65.3	66.9	74.7
<b>OKLAHOMA</b>	<b>56.0</b>	<b>60.7</b>	<b>67.5</b>	<b>67.5</b>	<b>67.9</b>	<b>76.7</b>
<b>OREGON</b>	<b>82.6</b>	<b>82.7</b>	<b>83.6</b>	<b>83.6</b>	<b>87.5</b>	<b>90.4</b>
PENNSYLVANIA	67.8	69.7	70.7	70.7	70.5	79
RHODE ISLAND	58.6	67.3	64.4	64.4	63.2	74.2
SOUTH CAROLINA	64.8	65.2	73.9	73.9	69.6	72.8
SOUTH DAKOTA	45.7		53.4	53.4	63.3	69.9
TENNESSEE	56.7	61.0	59.0	59.0	68.3	68.5
<b>TEXAS</b>	<b>74.4</b>	<b>74.0</b>	<b>76.6</b>	<b>76.6</b>	<b>76.1</b>	<b>84.3</b>
UTAH	66.7	67.4	75.7	75.7	77.8	85.2

**Exhibit 1 (Cont'd)**

VERMONT	62.7	69.8	61.6	61.6	67.4	82.4
VIRGINIA	73.6	69.9	69.9	69.9	72.3	74.6
WASHINGTON	79.1	81.1	81.6	81.6	82.6	94.8
WEST VIRGINIA	56.5	51.9	79.5	49.8	52.3	79.6
WISCONSIN	61.9	65.1	65.4	65.4	68.7	69.8
WYOMING	50.1		66.8	66.8		
Average Seat Belt Usage	64.9	66.3	69.8	69.2	71.7	77.2
	1998	1999	2000	2001	2002	2003

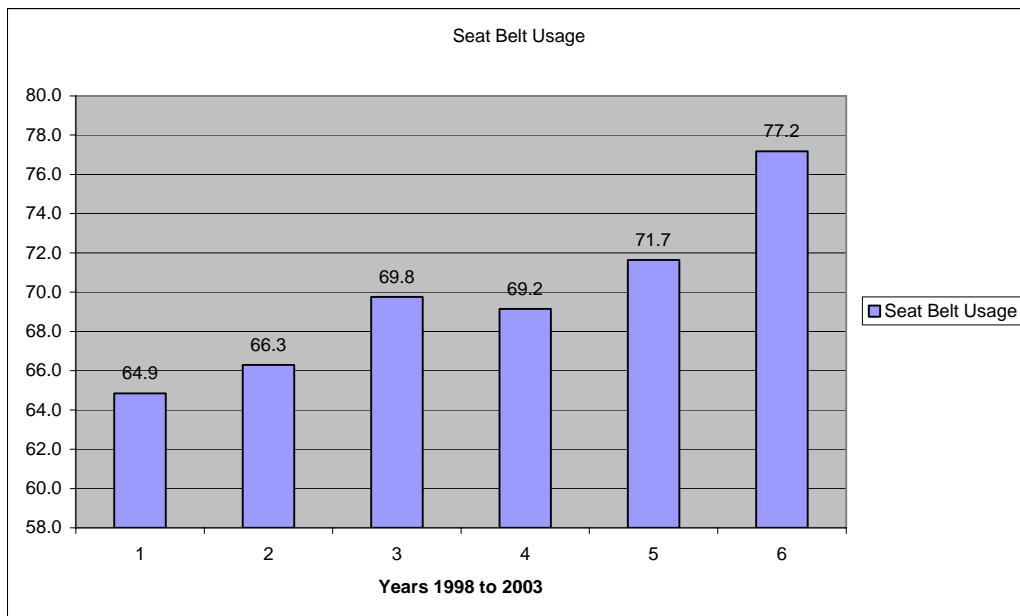
\* Bold type are primary states

Seat Belt use surveys conducted in accordance with section 157 of title 23, United States Code

NEW HAMPSHIRE has no seat belt law.

1998 – 2002 state restraint use are based on the National Occupant Protection Use Survey(NOPUS)

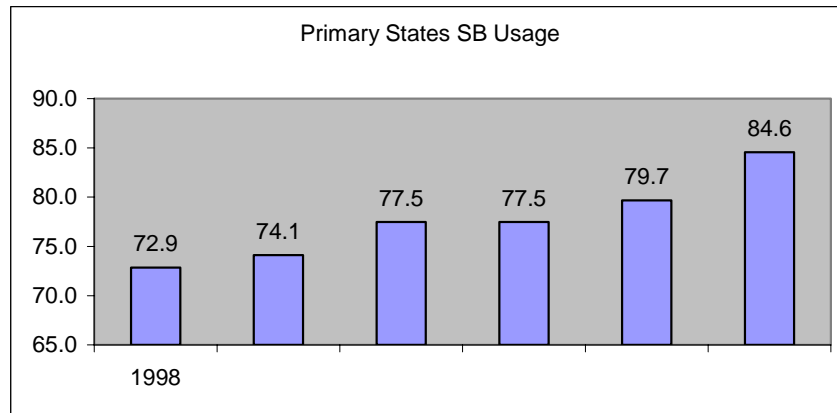
2003 state restraint usage are derived from data collected by the states through their own surveys.



**Exhibit 2. Seat Belt Usage Rates for Primary Law States.**

Primary Restraint Law States	Seat Belt Usage Past 6 Years					
	1998	1999	2000	2001	2002	2003
ALABAMA	52.0	57.9	70.6	70.6	79.4	77.4
CALIFORNIA	88.6	89.3	88.9	88.9	91.1	91.2
CONNECTICUT	70.1	72.9	76.3	76.3	78.0	78.0
GEORGIA	73.6	74.2	73.6	73.6	79.0	84.5
HAWAII	80.5	80.3	80.4	80.4	82.5	91.8
INDIANA	61.8	57.3	62.1	62.1	67.4	82.3
IOWA	76.9	78.0	78.0	78.0	80.9	86.2
LOUISIANA	65.6	67.0	68.2	68.2	68.1	73.8
MARYLAND	82.6	82.7	85.0	85.0	82.9	87.9
MICHIGAN primary Apr 2000	69.9	70.1	83.5	83.5	82.3	83.9
NEW JERSEY primary May 2000	63.0	63.3	74.2	74.2	77.6	81.2
NEW MEXICO	82.6	88.4	86.6	86.6	87.8	87.2
NEW YORK	75.3	76.1	77.3	77.3	80.3	84.6
NORTH CAROLINA	76.7	78.1	80.5	80.5	82.7	86.1
OKLAHOMA	56.0	60.7	67.5	67.5	67.9	76.7
OREGON	82.6	82.7	83.6	83.6	87.5	90.4
TEXAS	74.4	74.0	76.6	76.6	76.1	84.3
WASHINGTON	79.1	81.1	81.6	81.6	82.6	94.5
<b>Primary State Seat Belt Usage</b>	<b>72.9</b>	<b>74.1</b>	<b>77.5</b>	<b>77.5</b>	<b>79.7</b>	<b>84.6</b>

- Note 1. Seat belt use surveys conducted in accordance with section 157 of title 23, United States Code
- Note 2. 1998-2002 state restraint use is based on the National Occupant Protection Use Survey (NOPUS).
- Note 3. State restraint usage is derived from data collected by the states through their own surveys.
- Note 4. Primary State Seat Belt Usage is derived from averages of corresponding year.



**Exhibit 3. Seat Belt Usage Rates for Secondary Law States.**

Secondary Restraint Law States	Seat Belt Usage Past 6 Years					
	1998	1999	2000	2001	2002	2003
ALASKA	57.0	60.6	61.0	61.0	62.6	78.9
ARIZONA	61.5	71.1	75.2	75.2	74.4	86.2
ARKANSAS	52.6	57.2	52.4	52.4	54.5	62.8
COLORADO	66.0	65.2	65.1	65.1	72.1	77.7
DELAWARE	62.3	64.4	66.1	66.1	67.3	74.9
FLORIDA	57.2	59.0	64.8	64.8	69.5	72.6
IDAHO	57.3	57.9	58.6	58.6	60.4	71.7
ILLINOIS	64.5	65.9	70.2	70.2	71.4	76.2
KANSAS	58.7	62.6	61.2	61.6	60.8	63.6
KENTUCKY	54.3	58.6	60.0	60.0	61.9	65.5
MAINE	61.3					
MASSACHUSETTS	51.0	52.0	50.0	50.0	56.0	61.7
MINNESOTA	64.2	71.5	73.4	73.4	73.9	
MISSISSIPPI	58.0	54.5	50.4	50.4	61.6	62.2
MISSOURI	60.4	60.8	67.7	67.7	67.9	72.9
MONTANA	73.1	74.0	75.6	75.6	76.3	79.5
NEBRASKA	65.1	67.9	70.5	70.5	70.2	76.1
NEVADA	76.2	79.8	78.5	78.5	74.5	78.7
NORTH DAKOTA	40.0	46.7	47.7	47.7	57.9	81.2
OHIO	60.6	64.8	65.3	65.3	66.9	74.7
PENNSYLVANIA	67.8	69.7	70.7	70.7	70.5	79
RHODE ISLAND	58.6	67.3	64.4	64.4	63.2	74.2
SOUTH CAROLINA	64.8	65.2	73.9	73.9	69.6	72.8
SOUTH DAKOTA	45.7		53.4	53.4	63.3	69.9
TENNESSEE	56.7	61.0	59.0	59.0	68.3	68.5
UTAH	66.7	67.4	75.7	75.7	77.8	85.2
VERMONT	62.7	69.8	61.6	61.6	67.4	82.4
VIRGINIA	73.6	69.9	69.9	69.9	72.3	74.6
WEST VIRGINIA	56.5	51.9	79.5	49.8	52.3	73.6
WISCONSIN	61.9	65.1	65.4	65.4	68.7	69.8
WYOMING	50.1		66.8	66.8	66.6	
<b>Secondary State Seat Belt Usage</b>	<b>60.2</b>	<b>63.6</b>	<b>65.1</b>	<b>64.2</b>	<b>66.7</b>	<b>73.8</b>

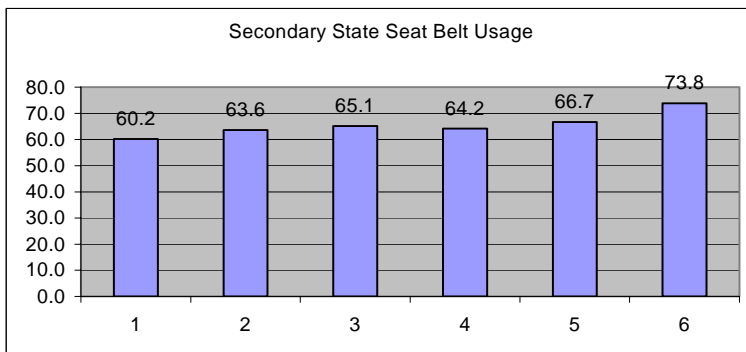
Note 1. Seat belt use surveys conducted in accordance with section 157 of title 23, United States Code

Note 2. NEW HAMPSHIRE has no seat belt law.

Note 3. 1998-2002 state restraint use is based on the National Occupant Protection Use Survey (NOPUS).

Note 4. 2003 state restraint usage is derived from data collected by the states through their own surveys.

Note 5. Secondary State Seat Belt Usage is derived from averages of corresponding year.



## **Primary Versus Secondary Usage Rates**

Although the impact of investing dollars in awareness and educational programs is more obvious for secondary states, primary states consistently have a higher percentage of seat belt usage. For 2003 the “average” usage rate for primary states is approximately 85 percent compared to 74 percent for secondary states (Exhibit 4). Secondary states have closed the gap slightly over the six-year period, but the average difference for the time period is over 12 percent.

## **MEDIA EXPENDITURES**

While the data for media expenditures is limited and somewhat “suspect”, there is enough information to draw some conclusions regarding the impact of the investment in educating the populace through the media. The “suspect” nature of the data is born out of the fact that some states meticulously track media expenditures while others choose to lump together many of the funds earmarked for safety. The survey conducted for this study revealed that some states actually diverted funds intended for media expenditures to enforcement. Thus, while the data is somewhat mixed, the differences that may exist in actual dollars invested in media are not significant enough to represent much of a statistical difference. Exhibits 5 and 6 provide the media expenditures reported by the responding primary and secondary states respectively.

The amount of funds available to the various states for media expenditures may appear to have a vast array, but differentials in population as well as in miles of highways and vehicle miles traveled serve as moderating influences that level the investments to some extent.

In order to determine the impact of the media investment on seat belt usage, an equation was formulated using linear regression that is accurate within a range of  $\pm 3\%$  points. It should be noted that the correlation between dollars spent on media and actual seat belt usage is lower for primary states than for secondary states. The power of the law and enforcement ironically appears to override the effectiveness of public education beyond stating that seat belt usage is

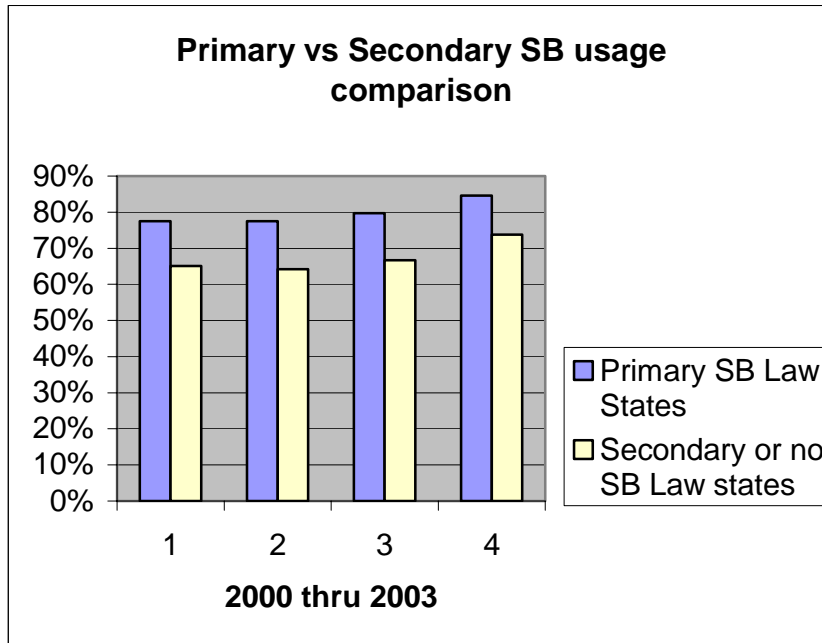


**Exhibit 4. Primary State Seat Belt Usage vs Secondary State Seat Belt Usage.**

Year	Primary	Secondary	Difference
2000	78%	65%	13%
2001	78%	65%	14%
2002	80%	67%	13%
2003	85%	74%	11%
<b>Number of states in each group</b>	18	31	

Seat Belt Usage	Year			
	2000	2001	2002	2003
<b>Primary State Seat Belt Usage</b>	78%	78%	80%	85%
<b>Secondary State Seat Belt Usage</b>	65%	64%	67%	74%
<b>US Average</b>	70%	70%	73%	79%

US average is weighted by number of states providing data in each of the primary and secondary law states.

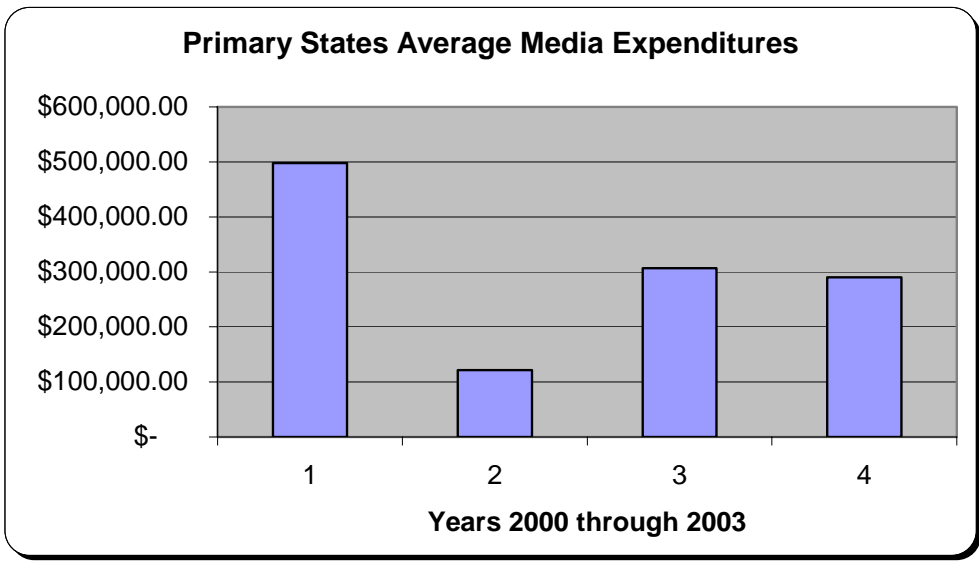


**Exhibit 5. Funding Support for Primary Seat Belt Restraint Usage.**

State	Year			
	2000	2001	2002	2003
ALABAMA				
CALIFORNIA		\$18,462.00	\$618,548.00	
CONNECTICUT				
GEORGIA				
HAWAII	\$1,000,000.00		\$350,000.00	
INDIANA				
IOWA	\$155,000.00	\$80,000.00	\$230,000.00	\$170,088.00
LOUISIANA				\$400,000.00
MARYLAND				
MICHIGAN, primary Apr 2000				
NEW JERSEY, primary May 2000	\$150,000.00	\$150,000.00	\$175,000.00	\$487,000.00
NEW MEXICO				
NEW YORK				\$340,000.00
NORTH CAROLINA	\$1,054,570.00	\$199,860.00		\$270,000.00
OKLAHOMA				
OREGON	\$129,345.00	\$158,577.00	\$160,000.00	\$72,000.00
TEXAS				
WASHINGTON				

**Blank cells, no data**

**Average for Reporting States**                      \$497,783.00      \$121,379.80      \$306,709.60      \$289,848.00

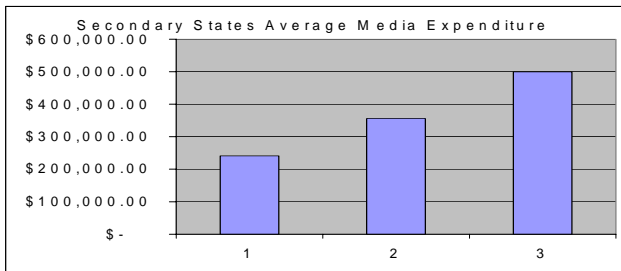


**Exhibit 6. Funding Support for Secondary Seat Belt Restraint Usage.**

State	Year			
	2000	2001	2002	2003
ALASKA	\$66,600.00	\$66,600.00	\$120,000.00	\$120,000.00
ARIZONA				
ARKANSAS			\$337,140.00	
COLORADO			\$221,075.00	\$473,120.00
DELAWARE				
FLORIDA				
IDAHO				\$23,190.00
ILLINOIS		\$500,000.00	\$1,163,065.00	\$2,000,000.00
KANSAS			\$50,000.00	\$80,000.00
KENTUCKY			\$301,948.49	\$301,948.49
MAINE no media investment				
MASSACHUSETTS				\$1,000,000.00
MINNESOTA	\$6,270.00	\$4,658.00	\$214,318.00	\$208,138.00
MISSISSIPPI				
MISSOURI				
MONTANA				
NEBRASKA				
NEVADA 2001, 2003 media \$ unknown	\$37,686.00		\$265,000.00	
NEW HAMPSHIRE *	\$24,300.00	\$48,800.00	\$40,000.00	
NORTH DAKOTA no media				
OHIO		\$1,168,000.00	\$1,168,000.00	\$1,168,000.00
PENNSYLVANIA		\$180,000.00	\$500,000.00	\$900,000.00
RHODE ISLAND				
SOUTH CAROLINA				
SOUTH DAKOTA				
TENNESSEE		\$60,000.00	\$60,000.00	\$60,000.00
UTAH		\$65,000.00	\$105,000.00	\$95,000.00
VERMONT				
VIRGINIA no media				\$425,000.00
WEST VIRGINIA		\$75,000.00	\$250,000.00	\$113,000.00
WISCONSIN				
WYOMING				
<b>Average</b>	<b>\$33,714.00</b>	<b>\$240,895.33</b>	<b>\$342,539.03</b>	<b>\$497,671.67</b>

Average media expenditure is computed from only the states that reported media expenditures. Those states not reporting media expenditures either had no expenditures or reported none.

\* New Hampshire has no seat belt laws.



required by law. This suggests that in primary states reminders of the law probably have a higher impact value than more traditional educational efforts on the value of using seat belts.

Primary states have a fairly strong relationship between media expenditure and seat belt usage with a .6813 correlation coefficient, but the connection is not nearly as “tight” as it is for secondary states. The correlation coefficient of .9961 for secondary states demonstrates a very close relationship between the investment in media expenditures and seat belt usage.

## **Fines**

Besides investment levels in educational and informational efforts, fines were also considered as a potentially critical factor in seat belt usage. Fines for failure to use seat belts vary among the primary states from \$20 to \$101 for adults (Exhibit 7). Secondary states range from a low of \$10 to \$85 (Exhibit 8). However, regardless of the amount of the fines, there appears to be no correlation to seat belt usage. In other words, fines in and of themselves do little to improve overall seat belt usage.

The correlation coefficient for primary states of .47 indicates that there is little relationship between usage rates and fines (Exhibit 9). For secondary states, the correlation coefficient of -.02 shows no relationship between seat belt usage and fines (Exhibit 10). When comparing the two, it can be hypothesized that the awareness of seat belt laws within primary states contributes to a higher usage rate with a small, but identifiable relationship to the level of fines.

As with other kinds of performance measures, it is important to benchmark those organizations or in this case the states that have excellent or outstanding performance results. The top eight states in both the primary and secondary categories were thus used for a correlation analysis of fines and seat belt usage. The eight primary states with the highest usage rates have a correlation coefficient of .31 (Exhibit 11). The correlation coefficient for the top eight secondary states is .21 (Exhibit 12).

**Exhibit 7. Fines for Primary States.**

<b>State</b>	<b>Fine/ Adult \$</b>	<b>Fine/ Juvenile \$</b>
<b>Alabama</b>	<b>25</b>	<b>25</b>
<b>California</b>	<b>20</b>	<b>100</b>
<b>Connecticut</b>	<b>37</b>	<b>60</b>
<b>Georgia</b>	<b>15</b>	<b>25</b>
<b>Hawaii</b>	<b>45</b>	<b>65 + 12 court cost</b>
<b>Indiana</b>	<b>25</b>	<b>25</b>
<b>Iowa</b>	<b>25</b>	<b>25 + court cost</b>
<b>Louisiana</b>	<b>25</b>	<b>1<sup>st</sup> 50, 2<sup>nd</sup> 100, 3<sup>rd</sup> 150</b>
<b>Maryland</b>	<b>25</b>	<b>48</b>
<b>Michigan</b>	<b>65</b>	<b>65</b>
<b>New Jersey</b>	<b>75</b>	<b>45</b>
<b>New Mexico</b>	<b>75</b>	<b>25</b>
<b>New York</b>	<b>50</b>	<b>100+</b>
<b>North Carolina</b>	<b>75</b>	<b>125 includes court cost</b>
<b>Oklahoma</b>	<b>20</b>	<b>10, max 15</b>
<b>Oregon</b>	<b>94</b>	<b>94</b>
<b>Texas</b>	<b>25</b>	<b>100 to 200</b>
<b>Washington State</b>	<b>101</b>	<b>101</b>

### Exhibit 8. Fines for Secondary States.

STATE	FINE/ADULT	FINE/CHILD	NOTES
Alaska	\$13	\$50	Or donation to Emergency Assistance Fund (with receipt)
Arizona	\$10	\$50	Primary offense for children. Each city can assess a surcharge to a child violation and costs with surcharge can range from \$100-150.
Arkansas	\$30	\$155 min	
Colorado	\$17+	\$56 min	Primary offense for children
Delaware	\$20	\$28.75	
Florida	\$80-85	Same	No distinction between driver and passenger
Georgia	\$15	\$50 min	Second child violation \$100 min
Idaho	\$10	See note	\$10 plus court costs if under 18 YOA (\$42.50)
Illinois	\$55	\$75	
Iowa	\$25	\$25	Plus court costs on both
Kansas	\$10	\$10	
Kentucky	\$25	\$60	Child fine: \$50 & \$10 for Traumatic Brain Injury Trust Fund
Maine	\$62.50	\$62.50	
Massachusetts	\$25	\$25	
Minnesota	\$75	\$100+	
Mississippi	\$25+	See note	Dependent on court
Missouri	\$10	\$10	No court costs may be associated
Montana	\$10	\$100 max	
Nebraska	\$25	\$25	
Nevada	\$25	?	Or community service hours
New Hampshire	\$0	\$25	\$50 for second or subsequent child offense
North Dakota	\$0	See note	1 point from driver's license for child offense
Ohio	\$58	\$48	
Pennsylvania	\$10	\$100	Plus court costs
Rhode Island	\$75	\$75	
South Carolina	\$10	\$25	
South Dakota	\$20	\$20	Considered "petty" offense
Tennessee			
Utah	\$40+	\$40+	Depends on court
Vermont	See note	?	\$10 added to primary offense
Virginia	\$25	\$50	
Wisconsin	\$10	See note	4-8 YOA = \$10-25, <4 YOA = \$30-75
West Virginia	\$25	\$115	Plus court costs (usually \$115+)
Wyoming	\$10	\$25	
<b>AVERAGE FINES</b>	<b>\$28.64</b>	<b>\$46.00</b>	

**Exhibit 9. Primary States Correlation of Seat Belt Usage and Fines.**

States	2003	
	Seat Belt Usage	Fines
WASHINGTON	94.5	\$101.00
HAWAII	91.8	\$45.00
CALIFORNIA	91.2	\$20.00
OREGON	90.4	\$94.00
MARYLAND	87.9	\$25.00
NEW MEXICO	87.2	\$75.00
IOWA	86.2	\$25.00
NORTH CAROLINA	86.1	\$75.00
NEW YORK	84.6	\$50.00
GEORGIA	84.5	\$15.00
TEXAS	84.3	\$25.00
MICHIGAN primary Apr 2000	83.9	\$65.00
INDIANA	82.3	\$25.00
NEW JERSEY primary May 2000	81.2	\$75.00
CONNECTICUT	78.0	\$37.00
ALABAMA	77.4	\$25.00
OKLAHOMA	76.7	\$20.00
LOUISIANA	73.8	\$25.00

Correlation of Seat Belt Usage and Fines for All Primary States .47

**Exhibit 10. Secondary States Correlation  
of Seat Belt Usage and Fines.**

States	2003	
	Seat Belt Usage	Fines
ARIZONA	86.2	\$10.00
UTAH	85.2	\$40.00
VERMONT	82.4	\$10.00
MONTANA	79.5	\$20.00
PENNSYLVANIA	79.0	\$10.00
ALASKA	78.9	\$13.00
NEVADA	78.7	\$25.00
COLORADO	77.7	\$17.00
ILLINOIS	76.2	\$55.00
NEBRASKA	76.1	\$25.00
DELAWARE	74.9	\$20.00
OHIO	74.7	\$58.00
VIRGINIA	74.6	\$25.00
RHODE ISLAND	74.2	\$75.00
WEST VIRGINIA	73.6	\$25.00
MISSOURI	72.9	\$10.00
FLORIDA	72.6	\$80.00
IDAHO	71.7	\$10.00
SOUTH DAKOTA	69.9	\$20.00
WISCONSIN	69.8	\$10.00
KENTUCKY	65.5	\$25.00
KANSAS	63.6	\$10.00
ARKANSAS	62.8	\$30.00
MISSISSIPPI	62.2	\$25.00
MASSACHUSETTS	61.7	\$25.00

Correlation of Seat Belt Usage and Fines for All  
Secondary States           -0.02



**Exhibit 11. Primary States  
with Highest Usage Rate.**

States	2003 Seat Belt Usage	2003 Fines
WASHINGTON	94.5	\$101.00
HAWAII	91.8	\$45.00
CALIFORNIA	91.2	\$20.00
OREGON	90.4	\$94.00
MARYLAND	87.9	\$25.00
NEW MEXICO	87.2	\$75.00
IOWA	86.2	\$25.00
N. CAROLINA	86.1	\$75.00

Correlation Seat Belt/Fines      **0.31**

**Exhibit 12. Secondary States  
with Highest Usage Rate.**

States	2003 Seat Belt Usage	2003 Fines
ARIZONA	86.2	\$10.00
UTAH	85.2	\$40.00
VERMONT	82.4	\$10.00
MONTANA	79.5	\$20.00
PENNSYLVANIA	79.0	\$10.00
ALASKA	78.9	\$13.00
NEVADA	78.7	\$25.00
COLORADO	77.7	\$17.00

Correlation Seat Belt/Fines      **0.21**

In secondary states, it is interesting to note that the higher the fine, the lower the seat belt usage. However, it is possible that the higher fines were initiated because of low seat belt usage and may not have been in effect long enough to have had an impact. While longitudinal studies could provide more insight into this phenomenon, at this point in time fines seem to make no difference in seat belt usage rates in either primary or secondary states.

It should be mentioned that there is an obvious symbiotic connection between fines and the enforcement effort. Although not a variable examined for this study, the aggressiveness of the enforcement effort could be a significant factor in making people aware of the need to wear seat belts. It would be difficult to measure accurately, but the enforcement effort is worthy of examination at some point in the future.

## **Effective Investment Levels**

The need to invest in media to educate the public in seat belt usage is more compelling for secondary states than for primary states. On one level of analysis, it is obvious that the lack of a primary law requires greater effort on the part of states to improve the usage rate as secondary states on the average have approximately an 11 percent lower usage rate.

On a second level of analysis, the correlation between dollars spent on media education and improvements in the usage rate is nearly 1.0. Thus, the investment in media so far has provided positive results. This will continue, at a declining rate of improvement, until the point of diminishing returns is reached. Given the results of states like Arizona, North Dakota, Utah, and Vermont, this “point” may be higher than thought. Unfortunately, without media investment figures from these states and others which have made dramatic improvements, it is difficult to project at what point the marginal utility of investing one more dollar on media announcements approaches zero.

Aggregate data for both primary and secondary states suggest that there is a time lag in order for media investment to contribute to improved usage rates. In other words, the impact of media expenditures is not always immediate, and some amount of redundancy may be necessary

to gain acceptable improvements. For example, primary states improved 2 percent from 2001 to 2002 but increased the usage rate by 5 percent in 2003. Similarly, the secondary states average went up by 2 percent from 2001 to 2002 but jumped 8 percent in 2003.

Future investment levels in media and future seat belt usage rates will provide more insight in terms of macro analyses for the U.S. At this juncture, however, it may be possible to perform a state by state analysis when media expenditures for the past three years are available.

## **Investment Levels for Colorado**

As the seat belt usage rate for the State of Colorado is slightly above the average for the secondary states (77.7% vs 73.8%), and the expenditure on media is close to the average, it appears that there are other variables contributing to the changes (improvements) in seat belt usage. One possibility is that nearly 85 percent of the State's population lives in the Front Range Corridor where the average level of education and disposable income are among the highest in the U.S. Given the demographics, some of the seat belt usage improvement may be attributed to the knowledge of and the concern for safety among the populace.

Even with the demographics and the concerns for safety in the Front Range Corridor where seat belt usage is well above the rest of the State, it is still possible to improve upon those rates. The coefficient of determination for secondary states is .9921, which suggests that there is over a 99 percent chance that the variability in the change (improvement) in seat belt usage is due to the additional dollars spent. In primary states this coefficient of determination is only .4641. Thus, for primary states 46 percent of the variance in change is likely due to media expenditures.

The data on a macro level would seem to support the fact that secondary states can continue to invest in media with a very positive expected ROI up to the point wherein the usage rate at least matches the average of the primary states. But, it is doubtful that the State of Colorado can maintain the rate of improvement it has enjoyed the past two years without investing in the educational effort at a higher level. Expenditures surpassing the average

secondary state investment (nearly \$500,000) may be required to continue improvements of 3 to 4 percent. Without knowing the specific reasons for a 12 percent improvement in two years, it is difficult to project future success. However, in the short run, it appears that an additional investment of \$35,000 could provide a return on investment of a 1 percent improvement in the usage rate.

It is obvious though that the point of diminishing return is close at hand for the State. In order to achieve results that would be equivalent to the average rate for primary states, the State of Colorado will either have to continue to invest more money in the media to gain a 7 to 8 percent improvement in the usage rate, or it could opt to become a primary law state. For the latter case, more of the investment would likely go toward enforcement, but the usage rate would probably improve faster even with lower levels of investment. Revenues from the enforcement effort would also be generated, further enhancing the economies of such a decision.

## **CONCLUSIONS**

Colorado appears to be approaching an optimal investment level given the proximity of the ceiling or maximum usage rates of secondary states. In order to improve usage rates, the State will have to increase investments knowing that the ratio of results to dollars expended will continue to drop. When considering that the tradeoffs are often expressed in terms of lives saved, medical costs, and opportunity costs for lost income, the decision becomes more onerous. Societal and cultural costs associated with individual freedoms and choices versus the costs of safety create decisional points that are both social and economic in nature. Even with relatively low investment levels in media and education, the State of Colorado's marginal utility of investing additional dollars is dropping from this point forward. Therefore, investments will have to increase to maintain the current level of improvement. Keeping investment levels at current levels will not likely support present usage rates in the long run. This prediction could be mediated somewhat by learning and exploiting the most effective and efficient ways to use media to reach the public. The other option of becoming a primary law state would require lower levels of investment with potentially greater gains, but the decision ultimately becomes one of values and priorities and goes beyond economic considerations.

## **RECOMMENDATIONS**

As budgets needed for continued improvement in usage rates are quite tenuous for the future, it would seem that impact studies to determine the effectiveness of various messages and media could be critical. To have this kind of information is crucial in making media investment decisions. The likelihood of the State reaching a point of diminishing returns exacerbates the impact of this decision.

Continuing to track the results of investments in media will be important to all states. The more longitudinal data available the greater the likelihood of making informed choices in the future.

The alternatives of continuing to “throw money” at the problem until improvements are no longer possible or to become a primary state depend upon contingencies that CDOT cannot control. CDOT does not have the option of channeling more funds from federal agencies or from the State in order to more effectively meet safety goals. Neither does CDOT have control over the legislature to make the State a primary law state to insure investment levels are more efficient with greater ROI. The one thing CDOT can control is how best to get results for the funds invested. In this regard impact studies would be most beneficial.

## **APPENDIX A**

Research Study Proposal for the Colorado Department of Transportation

Study Title:

Identification of Appropriate Investment Levels to Improve and Maintain Seat Belt Usage Rates in the State of Colorado

Study Number: 98.10

Background:

States with secondary seat belt laws continually seek ways to achieve higher seat belt usage rates. Without the enforcement level of states with primary seat belt laws, there must be an ongoing attempt to find the most effective means to positively influence the population to wear seat belts. At the same time, the most efficient approach is also critical. In this case, efficiency is determined by the return on investment of educational efforts and campaigns which target the population of individuals who will either be driving or riding in private vehicles. The efficiency rating will be influenced by several different factors that must be taken into account. One of the most critical factors will be the annual rate of improvement. When trends can be identified that indicate a steady decline in the increased usage of seat belts, there may be evidence that the state is approaching a “ceiling” of usage that may be most difficult to surpass and indeed may be too costly in terms of the return on investment. There must also be recognition of when a condition of dominance is reached in terms of realistic alternatives in educational and campaign approaches.

The “bottom line” for states with secondary laws is that there will be a point in time wherein the dollars spent on educational and informational efforts will have a decreasing value in terms of results earned by such investments. States with primary laws will undoubtedly have a different set of parameters with regard to investment and even the nature of the campaigns. Of primacy for secondary states is the determination of the “ceiling” of seat belt usage and the requisite investment to maintain certain levels of usage. While some comparative analyses could prove interesting, a direct comparison of primary and secondary states will not yield the information most needed for secondary states to reach a level that will be both effective and efficient. Thus, the research should first be concerned with the State of Colorado and the comparison with other secondary states. Data from the primary states can then be incorporated to assist in establishing realistic investment levels and goals for future seat belt usage.

Approach:

The tasks that relate to the substantive research dimensions are so closely intertwined that treating them separately as listed would be most difficult. The following brief description will therefore address the tasks as they relate to one another and as such will not deal with each one in numeric sequence.

Task number one will be accomplished through primary and secondary research efforts to collect the data from the other secondary states. A similar research design will be implemented to gather data from the primary states. Ideally, a longitudinal study would be conducted to learn the actual “ceiling” for seat belt usage. However, a study, which extrapolates data from the states, can be used for some prognostication of a “most likely” ceiling and a projection of what year it might occur given current trends.

Because task number one will be related to most all other tasks, it must be accomplished before the others can be achieved. The results from task number one will be used to determine the level of investment needed to provide a constant rate of improvement (task number six). Again, extrapolation of the data and various statistical analyses (multiple regression, et al.) will be used to provide this rate of improvement as well as the projected ceiling.

Tasks two through four will make use of the data collected in task number one. In reality, the determination of the effectiveness of the programs (task number four) may be most difficult as there could be numerous factors within the various states that could make one particular campaign very successful in one state while it could be a failure in another state. Even given that particular issue, results of campaigns can be compared from state to state. The most useful approach may be to first compare secondary states to other secondary states and primary states to other primary states. A macro comparison could then be accomplished.

Tasks five and seven can be completed as related items. Maintenance levels of investment will be determined by examining what has been spent to this point taking into consideration the movement of the rate of usage over the years. Colorado has been involved with tracking seat belt usage. Task number seven will make use of the results from task five as well as the data regarding the projected ceiling for seat belt usage.

Task eight is the prerogative of CDOT, but recommendations will be made to incorporate the findings of tasks one through seven.

Task nine through eleven will involve the drafting of the final report and seeking guidance and feedback from the study panel before producing a final product.

#### Schedule:

It is estimated that the project can be successfully completed within a six month time period. The first month will be devoted to finalizing the research design, accessing software to assist in secondary research, and testing the instruments to be used in the collection of data.

Months two through five will be devoted to the collection and analysis of data. Primary and secondary research data will be integrated as well as the information on programs from the various states.

Tasks one and six are estimated to consume 20% of the effort: tasks two through four, 50%; five and six would require approximately 10% of the time; task eight, 5%; and tasks nine through eleven, the remaining 15%.

Costs:

The costs outlined below are estimates and the overhead figure used (48%) is considered negotiable and subject to change. As the study is very labor intensive, most of the costs are personnel costs and could be adjusted depending upon the actual amount of work that will be done toward the project. The submission of a final proposal through the Office of Sponsored Programs of Colorado State University will contain more precise figures for the study.

Personnel Costs (including fringe benefits):		
G.J. Francis, Principal Investigator	\$ 12,000	
Bud Hivner, Project Coordinator	9,000	
Brenda Ogden, Research Assoc.	5,000	
Mike Gould, Research Assoc.	4,000	
Graduate Student	2,500	
		\$ 32,500
Statistical Laboratory		2,000
Supplies		1,500
Clerical and Printing (surveys & reports)		1,500
Travel		1,000
Indirect Costs		18,960
TOTAL:		\$ 58,460

Education and Experience:

G.J. Francis, Ph.D., University of Nebraska, Business and Economics, P.I. for over 20 seat belt surveys for the State of Colorado, NHTSA, and the National Safety Council.

Bud Hivner, Ph.D., University of California, Statistics, Project Director and/or Coordinator of Seat Belt Surveys for CDOT for the past 12 years. Also, has been responsible for the statistical analyses for studies conducted for NHTSA and the National Safety Council.

Brenda Ogden, M.S., Colorado State University, Management, Project Coordinator for the 2002 CDOT seat belt survey.

Mike Gould, Ph.D., Colorado State University, Human Resources, Project Coordinator for CDOT Seat Belt Surveys from 1995-2002.

CDOT and Other Relevant Work:

Dr. Francis and The Institute of Transportation Management have been the primary contractor with CDOT and the adult seat belt survey since the inception of the Institute in 1992. Prior to that time, the surveys were done by the CSU Department of Management. The Institute has also



been responsible for the juvenile and child restraint surveys as well as the motorcycle helmet usage surveys.

Studies of seat belt usage have also been conducted for the National Highway Safety Administration and the National Safety Council. One such study included the entire State of Colorado and three others were done for the Denver Metro area.