Alaska Seat Belt Cost Analysis

Alaska Injury Prevention Center

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EXECUTIVE SUMMARY

OBJECTIVES

An average of more than 39,000 Alaskans are involved in motor vehicle crashes every year. It is an expensive and painful problem with no single cause. For the citizens of Alaska, the medical costs alone are estimated to be over $14.5 million per year, while property damage and long-term disabilities add millions more to this figure. Alaskans pay a significant portion of these costs through publicly funded programs.

It is well documented that wearing a seat belt significantly reduces the severity of injury and decreases the risk of death in a motor vehicle crash. The *Alaska Seat Belt Cost Analysis* attempted to quantify the medical costs associated with restrained and unrestrained occupants involved in motor vehicle crashes and the sources of payment for these hospitalizations.

RESULTS

With data supplied by the Alaska Department of Transportation and Public Facilities and the Alaska Trauma Registry (ATR), a thorough analysis of the health care costs to treat restrained and unrestrained vehicle occupants was undertaken. The data covered the years 1996 through 1999.

The study revealed that the decision not to wear a seat belt has economic consequences for everyone:

- ✓ During the time period analyzed, medical costs for those who were not wearing a seat belt at the time of the crash totaled $13 million. Of this amount, 50% was paid with public funds.
- ✓ Victims of crashes in Alaska spent a cumulative average of 2,672 days in the hospital each year. The majority of these individuals - 58% - were unrestrained at the time of the crash.
- ✓ Medicaid costs to treat 83 crash victims under the age of 20 totaled $1.6 million.
- ✓ Post-hospitalization care for victims of motor vehicle crashes is also expensive. Nineteen crash survivors were placed in "skilled nursing facilities" at a cost of $1 million, of which 77% was paid by public sources. Of those 19 individuals, 13 were not wearing a seat belt at the time of their crash.

More than $2.6 million in public funds is spent each year to care for unbuckled victims of motor vehicle crashes, and these are just the documented economic costs. Death and long-term disabilities involving the brain or spinal cord take their own toll on individuals and families and are very difficult to quantify.

CONCLUSIONS AND RECOMMENDATIONS

The *Alaska Seat Belt Cost Analysis* makes a compelling economic case for the use of seat belts. The most recent observational survey of seat belt use conducted in July 2003 showed that Alaskans are buckling up at a rate of 78.9%. While higher than previous years, there is a substantial segment of the population who is still not wearing a seat belt. Introduction and implementation of programs and public policies to encourage seat belt use will result in fewer injuries and deaths, ultimately reducing the financial burden on the taxpayers of Alaska.

Introduction

Motor vehicle crashes are the leading cause of death for Americans between the ages of 2 to 33 years.[1] Every 13 minutes, someone in America dies in a traffic crash, and every 10 seconds, someone is injured.[2] Each year in the U.S., traffic crashes claim about 42,000 lives and result in approximately three million injuries. These crashes cost every person in the U.S. an average of $820 each.[3] The financial costs are minor compared with the pain and suffering of the victims or the loss of a loved one.

According to the National Highway Traffic Safety Administration (NHTSA), in the year 2002, 42,815 people were killed in motor vehicle-related crashes and 2.92 million were injured. The total cost was $230.6 billion.[4] NHTSA also reported that failure to wear seat belts led to approximately 9,200 deaths and 143,000 injuries, costing the U.S. economy $26 billion.

In 1999, Alaska had the highest unintentional injury death rate of all the 50 states. Of these deaths, motor vehicle-related fatalities were over twice as high as the next leading cause.[5] Seat belts are the single most effective safety device in preventing serious injuries and reducing fatalities in motor vehicle crashes. Research has shown that lap and shoulder safety belts, when used properly, reduce the risk of fatal injury to front-seat occupants by 45% and the risk of moderate-to-critical injury by 50%. Child safety seats, when used properly, reduced infant fatalities in passenger cars by 71%.[6]

A 1995 NHTSA study, *Safety Belt Use Laws: An Evaluation of Primary Enforcement and Other Provisions,* showed that states with primary enforcement laws have significantly higher safety belt usage than states with secondary laws. Belt use was about 15% higher in the states with primary enforcement laws. Primary enforcement allows a police officer to stop a vehicle when occupants are unrestrained, while secondary enforcement allows for citing the unbelted motorist only if another infraction resulted in the stop.

Given the documented effectiveness of seat belts in reducing fatalities, the severity of injuries in traffic crashes and, therefore, medical costs associated with those injuries, the Alaska Injury Prevention Center decided to investigate the economic implications of unrestrained vehicle occupants involved in crashes.

This report attempts to quantify the hospital costs associated with seat belt use and non-use in Alaska, as well as to determine what portions of those costs are borne by taxpayers. The research was conducted by the Alaska Injury Prevention Center with funding support from the Automotive Coalition for Traffic Safety, Inc.

Methods

The *Alaska Seat Belt Cost Analysis* project used data from the Alaska Department of Transportation and Public Facilities (ADOT&PF) from 1990-2001, to compare seat belt usage patterns for all Alaskan motor vehicle occupants. The ADOT&PF data are taken from police reports that document seat belt use, property damage, fatalities, time of day, weather conditions, passenger seat belt use, contributing factors, etc.

The Alaska Trauma Registry (ATR) was used extensively for this study because it documents every trauma case resulting in at least one overnight stay in an Alaskan hospital. The ATR contains information about the length of stay, costs for treatment, source of payment, reported seat belt use, age, sex, injury severity, etc. The ATR does not contain information about outpatient visits, scene deaths, private physician contacts, chiropractor visits, and other costs for motor vehicle-related injuries.

Another database maintained by Medicaid, was explored but found to be of limited use because it did not track the cause of injury. If the Medicaid data could be linked with ADOT&PF and ATR by age, sex, date of injury, etc., some of the long-term expenses beyond the hospital stay could potentially be tracked.

Hospitalization costs (from the Alaska Trauma Registry) for belted and unbelted occupants injured in a motor vehicle crash in Alaska, for the years 1996 – 1999 were compared. Hospital costs were analyzed by seat belt use or non-use, source of payment, days spent in the hospital, discharge location, and fatalities.

Restraint use was categorized into either the YES group or the NO group in the following manner:

YES	NO
Air Bag and Seat Belt	Air Bag Only (not restrained)
Seat Belt only	None
Infant/Child Restraint	

Many of the entries listed restraint use as UNKNOWN. The case narrative field in the ATR was used to re-categorize a few of the unknowns, but restraint use or non-use could not be determined for most of the unknowns, therefore they were analyzed separately.

In a landmark publication, *The Cost of Injury in the United States*, Rice and MacKenzie documented motor vehicle-related injuries per victim as the most costly of all unintentional injury categories. The average cost for each person hospitalized

for motor vehicle-related injuries was calculated to be $43,409.[7] Several studies have estimated the loss of productivity or quality of life costs for various types of injury, but for this analysis only the quantifiable hospital related costs were examined.
Costs attributed to the "general public" included payments from programs such as Medicaid, Medicare, Indian Health Service, military, CHAMPUS (military dependents), and no-pay patients. We could not adequately define uninsured motorists' costs which could also be attributed to public costs.

Results

Observational surveys completed by the University of Alaska's Institute for Social and Economic Research showed that in the Year 2000, 62% of the front seat occupants of motor vehicles were wearing seat belts. In the Year 2001, 63% of the front seat occupants of motor vehicles were wearing seat belts. These statistically valid surveys represent the driving population of the state and are important when examining seat belt use percentages among motor vehicle crash victims who are injured, hospitalized, or merely involved in a crash.

According to ADOT&PF data from 1998 through 2000, an annual average of 39,613 motor vehicle occupants were involved in traffic crashes, and approximately 62 of these occupants lost their lives each year.[8] Of all the motor vehicle occupants involved in a crash, only 6% reported not wearing a restraint, 66% were wearing a restraint, and 28% had unknown restraint use (see Table 1). When all of the cases with documented restraint use were analyzed separately, 9% were reportedly not wearing a seat belt, while 60% of the fatalities were unrestrained.

Table 1
Alaska Seat Belt Use (ADOT&PF Data)
1998, 1999, 2000 Combined and Averaged

	All Motor Vehicle Occupants	All Occupants Where Seat Belt use Documented	All Fatals	Fatals Where Seat Belt use Documented	Major Injuries	Minor Injuries	No Injuries
No Restraint	6% (7,641)	**9%**	54% (34)	**60%**	37%	15%	5%
Restraint Used	66% (77,936)	**91%**	37% (23)	**40%**	49%	74%	65%
Unknown Use	28% (33,263)		9% (5)		12%	11%	31%
Annual Average	39,613		62				

The Alaska Trauma Registry provided additional information on the more seriously injured occupants after they were admitted to a hospital. Of all the motor vehicle occupant hospitalizations, 48% were not wearing a restraint, 43% were wearing a restraint, and 9% had unknown restraint use (see Table 2). When all cases with documented restraint use were analyzed separately, 53% were unrestrained, and of the fatals who died in the hospital, 56% were unrestrained.

Table 2

Alaska Trauma Registry Data

Hospitalizations

1996 – 1999 Combined

	All Motor Vehicle Occupant Hospitalizations	Cases with Seatbelt Use Documented	Fatals	Fatals with Seatbelt Use Documented
No Restraint	48% (887)	**53%**	49% (30)	**56%**
Restraint Used	43% (790)	**47%**	39% (24)	**44%**
Unknown Use	9% (167)	0%	11% (7)	0%

Another measure of severity used in this analysis was total number of hospital days for restrained and unrestrained occupants. An average of 2,672 days was spent in hospitals every year for motor vehicle occupant injuries in Alaska. Of the total hospital days where restraint use was documented, 58% of the patients had been unrestrained at the time of their crash and 42% were restrained (Table 3).

Table 3

Hospital Days

1996 – 1999 Average

	Avg. Hospital Days per Year	%	% by "Known" Use
No Restraint	1402	52%	**58%**
Restraint Used	1009	38%	**42%**
Use Unknown	261	10%	

In 1994, the Federal Highway Administration published a technical report, *Motor Vehicle Accident*, and included the following lifetime injury costs by Abbreviated Injury Severity (AIS) score:

Severity	Descriptor	Cost per Injury
AIS 1	Minor	$ 5,000
AIS 2	Moderate	$ 40,000
AIS 3	Serious	$ 150,000
AIS 4	Severe	$ 490,000
AIS 5	Critical	$1,980,000
AIS 6	Fatal	$2,600,000

When correlating the AIS scores with seat belt use in Alaska, 60% of the patients with the lowest score of AIS 1, were wearing restraints at the time of their crash. The most severely injured patients, having scores of AIS 5, had the lowest percentage of restraint use at 45%.

Post-hospitalization costs are substantial, but difficult to measure. The most severe non-fatal cases are discharged to "skilled nursing" facilities which typically require round-the-clock monitoring. Of the patients discharged to skilled nursing, 13 had been unrestrained and 6 were restrained during the motor vehicle crash. The hospital costs for these 19 patients before they were discharged were nearly $1 million, of which 77% was derived from public sources. Unfortunately, it was impossible to track post-hospitalization costs.

Costs

The costs for hospitalized motor vehicle occupants in Alaska were analyzed by the source of payment data in the ATR. These costs are not considered to be complete, since some of the costs are billed by sources outside of the hospital, such as medical specialists, chronic care facilities, pharmacies, medical and prosthetic equipment companies, etc. Generally, costs were paid by one or more of the following sources: motor vehicle property and casualty insurance, private health and medical insurance, CHAMPUS insurance for military dependents, military branches, Medicaid, Medicare, IHS for Alaska Native beneficiaries, and workers compensation insurance.

The Alaska Department of Health and Social Services, Section of Community Health and EMS recently completed a research project that analyzed injuries among Medicaid-eligible youth ages 0-20. [9] The report compiled hospital costs for various types of injuries for the years 1995-1999.

Motor vehicle occupant injuries are the most expensive injury category for Medicaid. During the four-year period, there were 83 Medicaid-eligible Alaskans who were 0-20 years old and involved in motor vehicle crashes.

Some facts about the medical costs to treat these individuals included:

- The average cost per case was $20,000.
- Average cost per hospital day was $3,300.
- Average number of days in the hospital was 6 days per case.
- Total number of Medicaid patients was 83, with a total estimated cost of $1.6 million.

For the years 1996 through 1999, an analysis of hospital costs documented in the ATR for motor vehicle occupant injuries was undertaken. Only 66% of the patients had medical costs reported in the ATR because several of the hospitals serving federal beneficiaries and a few of the public hospitals did not report costs associated with individuals. Of the cases where costs were reported, over $22.2 million was spent on direct medical care. When extrapolating average costs per case, the four-year costs were:

- $21.8 million for unrestrained occupants and
- $15.8 million for restrained occupants.

When including the "unknowns," an additional $6.1 million is added, for a total of $43.6 million. Of the total hospital costs reported, 59% represented unrestrained occupants (see Table 4).

Table 4

Alaska MV Hospital Costs

1996 - 1999

	Total Costs	Total Cases	Average Costs per Case	% of Total
No Restraint Used	**$13,039,797**	**534**	**$24,419**	**59%**
Restraint Used	**$9,177,849**	**460**	**$19,952**	**41%**

Of the total ATR costs for motor vehicle-related hospitalizations, 44% was paid by the general public through programs such as Medicaid, Medicare, Indian Health Service, military, CHAMPUS, and no-pay patients. Of this 44% paid by the public, 69% of the costs were for unrestrained occupants (see Table 5).

Table 5

Public Costs for Alaska MV Hospitalizations

1996 - 1999

	Total Costs	Total Cases	Average Costs per Case	% of Total
No Restraint Used	**$6,514,907**	**181**	**$35,994**	**69%**
Restraint Used	**$3,226,035**	**263**	**$12,266**	**31%**

There is well over $2.6 million dollars spent each year on beneficiaries of public programs who are hospitalized for motor vehicle-related injuries. This number excludes the very costly pedestrian and bicycle victims injured by motor vehicles.

Conclusions

A substantial body of research demonstrates that seat belt use greatly reduces the number of traffic crash-related fatalities and the severity of injuries. In general, the more severe the injury, the less likely it will be that the individual was buckled up. The *Alaska Seat Belt Cost Analysis* shows that restraint use or non-use also affects the number of hospitalizations, length of stay in the hospital, and the overall cost of hospitalizations for motor vehicle occupants involved in crashes.

The analysis also shows that 44% of motor vehicle crash-related hospital costs are borne by the citizens of Alaska. Close to 40,000 vehicle occupants are involved in traffic crashes each year in Alaska. More than $2.6 million dollars is spent each year for beneficiaries of public programs who are hospitalized for motor vehicle related injuries. Thus, the decision to wear or not wear a seat belt is not just a matter of personal choice, but a decision that has economic implications for all Alaskans.

This study only analyzed hospitalization costs of vehicle occupants involved in crashes. For those suffering some types of injuries, including those to the brain and spinal cord, long-term care and rehabilitation costs vastly exceed the initial hospitalization costs. Thus, the total cost to the public is significantly higher than those documented in this study.

Fortunately, seat belt use in Alaska is on the rise. The most recent observed seat belt use survey found that belt use was 78.9% in 2003 up from 66% in 2002. Still, experience from other states and Canada suggests that the largest reductions in

fatalities, injury severity (and thus medical costs) do not occur until belt use rates reach the 90 percent range.[10]

Most frequently, those who refuse to buckle up also tend to exhibit other high-risk behaviors like speeding and driving while impaired. It is critical that all drivers and passengers use seat belts and child restraints, as appropriate, if hospital and other medical costs resulting from motor vehicle crashes are to be substantially reduced. Programs and policies that result in higher restraint use will reduce traffic crash fatalities as well as the severity of injuries and costs to individuals and to the taxpayers of Alaska.

References

[1] NHTSA, Traffic Safety Facts, 2002
[2] NHTSA, Status of Occupant Protection in America, Buckle Up America Report, Nov. 2001.
[3] USDOT, News Release, July 17, 2003.
[4] Ibid.
[5] CDC, WISQARS, Injury Mortality Report, All Injury Deaths and Rates per 100,000 by State.
[6] NHTSA, Traffic Safety Facts 2001 – Occupant Protection, ADOT&PF HS 809 474.
[7] Rice DP, MacKenzie EJ, et. al., Cost of Injury in the United States, Report to Congress 1989.
[8] Alaska Traffic Accidents, Annual reports from the Alaska DOT&PF.
[9] Report on Injury Prevention Activities of Community Health and EMS Targeting Medicaid-Eligible Youth, by Martha Moore and the State Injury Prevention staff, 2003.
[10] NHTSA, Status of Occupant Protection in America, Buckle Up America Report, Nov. 2001.

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