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Impacts of Minnesota's Primary Seat Belt Law

Authors:
Frank Douma
Nebiyou Tilahun
Humphrey School of Public Affairs
University of Minnesota

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16. Abstract (Limit: 250 words)

In the spring of 2009, the Minnesota Legislature changed the state's seat belt law, making not wearing a seat belt a "primary" offense, where officers can ticket drivers for not wearing a seat belt even if no other traffic law is broken.

Using data from the Minnesota Crash Records Database provided by the Department of Public Safety, the study utilized two methods of analysis, first comparing actual crash data from July 2009 – June 2011 to expected data based upon trends from July 2004 - June 2009, and second, comparing the expected post law change injury types estimated from the July 2006 – June 2009 crash data to the actual post primary crash data from July 2009 through June 2011. Results of seat belt use and public opinion surveys were also reviewed.

This study estimates that there have been 68 - 92 fewer fatalities from motor vehicle crashes, and 320 - 550 fewer serious injuries since the primary seat belt law went into effect. This improved safety record translates into at least $45 million in avoided hospital charges, including a direct savings of nearly $10 million or more tax dollars that would have paid for expenses charged to government insurers. The primary seat belt law has enjoyed the support of over 70% of all Minnesotans and observed use of seat belts statewide has risen from 86.7% in 2008 to an all-time high of 92.7% in 2011.

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Prepared by:

Frank Douma
Nebiyou Tilahun

Humphrey School of Public Affairs
University of Minnesota

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University of Minnesota
301 19th Avenue South

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Executive Summary

In the spring of 2009, the Minnesota Legislature changed the state's seat belt law. Until June of that year, not wearing a seat belt was a "secondary" offense, which allowed law enforcement officers to ticket for failure to wear seat belts, but only when there was another citable moving violation. On June 9, 2009, not wearing a seat belt became a "primary" offense, where officers can ticket drivers for not wearing a seat belt without any other law being broken. Currently, 32 states have primary seat belt laws.

The University of Minnesota's Center for Excellence in Rural Safety (CERS), housed at the Humphrey School of Public Affairs, conducted an analysis of the impacts of the new law, examining the changes in roadway crash fatalities, seat belt use, and support for the law.

Impact of law on crash fatalities and injuries in Minnesota

Using data from the Minnesota Crash Records Database provided by the Department of Public Safety, the study utilized two methods of analysis, first comparing actual crash data from July 2009 – June 2011 to expected data based upon trends from July 2004 - June 2009, and second, comparing the expected post law change injury types estimated from the July 2006 – June 2009 crash data to the actual post primary crash data from July 2009 through June 2011. Given the overall downward trend in fatalities and serious injuries, the former method gave a more conservative estimate, and those figures are used here.

The results indicate there have been 68 fewer deaths, 320 fewer severe injuries, and 432 fewer moderate injuries since the law became effective. However, minor injuries did increase by 442; suggesting injuries moved down to less severe categories.

Impact of law on Minnesota's economy

In addition to their significant emotional and societal toll, traffic crashes also have economic consequences. Using data from the Minnesota Department of Health's Crash Outcomes Data Evaluation System (CODES), the reductions above translate into at least $45 million in avoided hospital charges, including a direct savings of nearly $10 million or more tax dollars that would have paid for expenses charged to Medicare, Medicaid and other government insurers.

Impact of law on seat belt use

The public has also responded to the Legislature's action by buckling up at increased rates. The statewide observational survey of seat belt use showed observed use rose from 86.7% in 2008 to 92.7% in 2011, and results of self-reported seat belt use from random telephone surveys showed use rose from less than 85% in 2008 to 92% in 2011.

Public support for primary seat belt law

Finally, support for primary enforcement of Minnesota's seat belt law was high before the law change and has increased since. Support of Minnesotans surveyed has increased from 62% just before the law was passed to over 70% since it was passed.

I. Introduction

In the spring of 2009, the Minnesota Legislature changed the state's seat belt law. Until June of that year, not wearing a seat belt was a "secondary" offense, which allowed law enforcement officers to ticket for failure to wear seat belts, but only when there was another citable moving traffic violation. Beginning on June 9, 2009, not wearing a seat belt became a "primary" offense, where officers could ticket drivers for not wearing a seat belt without any other traffic law being broken. Currently, 32 states have primary seat belt laws.

The safety impact of enacting and enforcing primary seat belt laws has been the focus of a number of research studies in the U.S. Those studies estimated a potential seven to eight percent reduction in fatalities among unbelted outboard front seat occupants age 13 and greater in passenger vehicles (Knapp 2009).[1]

In the fall of 2011, the Minnesota Department of Public Safety asked the University of Minnesota's Center for Excellence in Rural Safety (CERS), housed at the Humphrey School of Public Affairs, to analyze the impacts of the changed law, examining the changes in roadway fatalities, seat belt use and support for the law. This report documents the methods and results of that effort.

It should be noted that while previous work examined similar questions, the results of this work are specific to Minnesota and relied on different databases, selections of data and dates than used in the research discussed above.

[1] Knapp's paper includes a much more detailed discussion of previous research that lead to this estimate.

II. Before-After Comparison of Crash Outcomes

Before and after comparisons in traffic safety were performed to determine the effect of engineering, technological, legal and other changes, to the driving environment. In this study, the evaluator's interest was to determine whether the passage of the primary seat belt law in Minnesota has led to changes in crash outcomes to vehicle occupants. Crash reports indicate the outcome of a crash (type of injury or fatality) for each individual involved in an incident. Injury outcomes for a person involved in a crash are classified into one of five categories: Type K (fatality), Type A (Incapacitating), Type B (non-incapacitating serious), Type C (minor), or Type N (no injuries).

Comparison of before and after studies cannot be done by simply comparing the before counts of particular injuries to the numbers observed in the after period. Hauer (1997), cautions that many factors including traffic, weather, user behavior, fleet, etc., change over time, making direct comparison of before and after numbers a naïve approach. In addition, other treatments and programs may alter the number of crashes that direct comparisons, say between number of individuals experiencing type A injuries in the after period to that in the before period, may overestimate the effect of a given intervention. Therefore, rather than directly comparing the before numbers to current outcomes, the comparison of after period outcome estimates should be to the unobserved (but predicted) expected count of a given injury type in the after period. This estimate has the benefit of controlling for other factors known to affect the expected number of crashes or injuries of interest. In this framework, an attempt is made to control factors that may have changed from the period before primary.

The data for this analysis came from the Minnesota Crash Records Database for the period 07/2004 to 06/2011 and was supplied by the Minnesota Department of Public Safety. The crash data is kept in three separate databases, one containing information on each crash, a second containing information on each person in a crash and their injury outcome, and a third component containing information on each vehicle involved. The three are linked through crash identification, person identification, and vehicle identification variables. For this analysis, only injuries sustained by people travelling in a motor vehicle (cars, vans, trucks, and SUVs) normally equipped with seat belts are considered since these are the individuals whose injury outcomes the seat belt law can affect. Two methods were applied that provided estimates of the changes in different injury types over the two-year period since the primary seat belt law came into effect. Method 1 accounted for an underlying time trend in the number of each injury type that had started in the period prior to the seat belt law change. Here each injury type is analyzed independently of the others. Separate models are estimated for each injury type using data from before the primary law went into effect, and these models are used to predict what would have been expected to happen in the after (post June 2009) period if the seat belt law had remained a secondary offense and no other changes to the pre-primary circumstances occurred. These predictions are then compared to what was observed after June 9, 2009 through June 30, 2011.

Method 2 looks at data from June 2006 – June 2009 and used the counts of those years to project out what the expected injury types of each class would be after that time while also accounting for the total number of crashes that occurred during that period. While method 1 required estimating a time trend using limited years of data (5 years), it provides a conservative estimate of the changes in fatalities and injuries over the two years after passage of the primary seat belt law.

CERS made the assumption that the effect of the seat belt law is to increase the rate of wearing a seat belt, which alters what would have happened to the driver/passengers in vehicles involved in a crash, which in turn alters the likelihood of a person getting into one of the classes of injuries referenced above. This effect, would express itself through an increase/decrease in the count of injuries of a given type that is observed post primary after controlling for other factors that may change the number of injuries observed. CERS also made the assumption that the seat belt law had no impact on whether a vehicle was actually involved in a crash.

Method 1. Accounting for time-trends in the injury/fatality data

A plot of the counts of each injury type for the five years preceding the primary seat belt law suggests that there is a time trend where annual counts of severe injury and fatalities have been declining. For this analysis, CERS made the assumption that the annual count of each injury/fatality is a Poisson random variable with mean Y_t which depends on the time period of observation. This assumes that over time, different factors (policy, enforcement or otherwise) have from year to year been affecting the frequency of different injury types at some rate. Instead of trying to account for these factors explicitly, CERS estimated the pace of change through a best-fit model for the period before primary. This model was then used to estimate the count of each injury type in the period after primary.

The model used was for the expected count of a particular injury level at period *t* is$\ln(Y_t) = \alpha + \beta f(t)$, with *f(t)* being either equal to *t* or $\ln(t)$. The variables α and β are estimated using the pre-06/2009 data by a generalized linear model. These models are then used to estimate the number of crash/injury types expected in the after period had no changes been made. We define, the following variables, following Hauer (1997):

- π_{it}: the expected number of target injuries *i* in the after period t had the passage of the seat belt law not occurred. This value is predicted based on the estimated model.
- λ_{it}: the expected number of target injuries *i* in the after period t after passage of the seat belt law. This value is estimated by using the observed counts in the after period.
- δ_{it} the expected change in the number of injury type *i* in time period t.

The estimated model's predictions along with the observed injury/fatality counts are shown in Figure 1. For a given injury type, the model's predictions for the after period are then estimated by $\hat{\boldsymbol{\pi}}_t$ for each period *t*. The counts for the after period serve as the estimates for the mean crashes in the after periods ($\hat{\lambda}_t$). The expected change δ is estimated by $\widehat{\delta_t} = \widehat{\pi_t} - \widehat{\lambda}_t$.

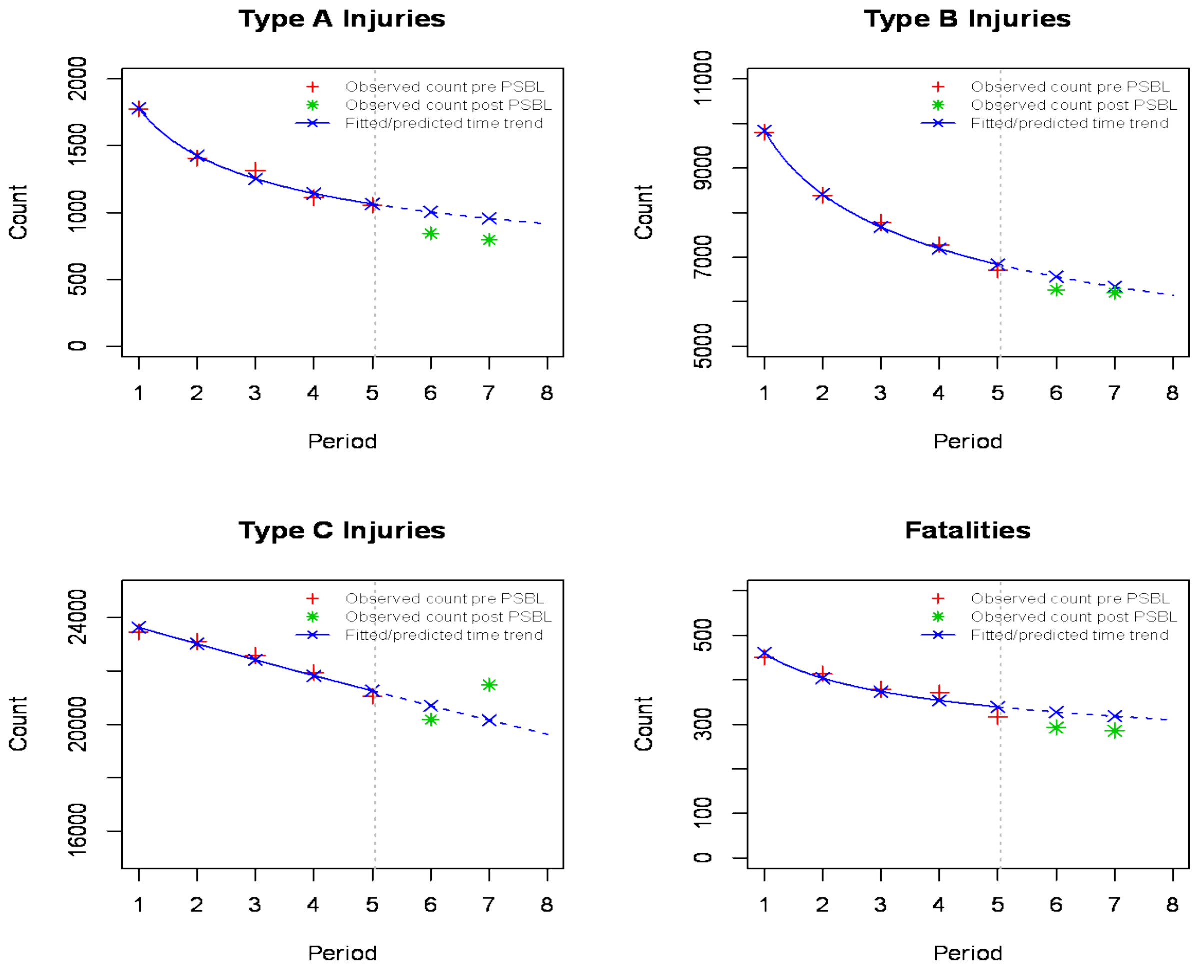


Figure 1. Observed and predicted injury and fatality counts on a yearly basis from 07/2004 – 06/2011. Each year spans the 12 months from July to end of June of the next year. Periods 1 through 5 are the pre-primary seat belt law (PSBL) years. Periods 6 and 7 are the post PSBL periods.

Table 1 summarizes the predictions from the model and the estimated changes in each injury type in the period after primary as a result of the change in the seat belt law. Positive values in Table 1 imply a reduction in the indicated injury type while negative numbers indicate an increase in the indicated injury type. As can be seen from the table, estimates of change for fatalities and injuries types A and B are positive. A large increase in Injury type C is also estimated. Specifically, the estimates are:

- 68 ± 34 fewer fatalities;
- 321± 60 fewer Type A injuries; and
- 432±159 fewer Type B injuries.

The number of no-injury cases has decreased by 722±760. The estimates indicate that the number of Type C injuries experienced is larger by 810±284 than would have been expected.

Table 1. Estimated safety effects of the primary seat belt law accounting for a potential time trend

	Type K	Type A	Type B	Type C	Type N
$\hat{\pi}_{year1}$	327.8	1,005.5	6,561.3	20,702.2	148,312.9
$\hat{\pi}_{year2}$	318.4	957.2	6,336.5	20,016.2	143,262.5
$\hat{\lambda}_{year1}$	293.0	845.0	6,266.0	2,018.3	138,082.0
$\hat{\lambda}_{year2}$	286.0	797.0	6,200.0	2,148.9	150,014.0
$\hat{\pi}_{tot}$	646.2	1,962.8	12,897.8	40,862.4	28,817.1
$\hat{\lambda}_{tot}$	579.0	1,642.0	12,466.0	4,167.2	288,096.0
$\hat{\delta}$	**67.7**	**320.8**	**431.8**	**-809.6**	**721.7**
SD($\hat{\delta}$)	**34.0**	**60.0**	**159.3**	**284.3**	**759.5**

Method 2: Analysis based on injury data for the three years pre-primary

The period before primary for this analysis spans the three year period from 07/2006 to 06/2009 and the period after primary spans the two year period from 07/2009 to 06/2011. The three year time period before primary was chosen so that there was sufficient data to predict what the injuries for the period after primary would have been while limiting the effect of confounding factors, such as vehicle fleet turnover, impacting the results. The two year period after primary was a result of the maximum time period for which data was available. While the analysis did adjust for the total number of crashes in the after period which may have resulted from different environmental and policy interventions, it assumed that the proportion of crashes that fall into any of the categories is relatively stable and can be used to estimate future injury proportions given total crashes. The effect of the seat belt law is assumed to be expressed through an increase/decrease in the count of injuries of a given type relative to the total injuries observed post primary.

The unit of analysis in this study was the number of injuries of each type observed in this period. The numbers of injuries sustained in the periods before and after primary are given in Table 2.

Table 2. Count of different injury types in the study periods before and after primary

Period	Type K	Type A	Type B	Type C	Type N	Total
7/2006-6/2007	379	1,316	7,774	22,584	156,486	188,539
7/2007-6/2008	371	1,113	7,282	21,945	152,202	182,913
7/2008-6/2009	317	1,059	6,703	21,067	147,420	176,566
7/2009-6/2010	293	845	6,266	20,183	138,082	165,669
7/2010-6/2011	286	797	6,200	21,489	150,014	178,786

The basic analysis here followed Hauer (1997) for before-after studies. The estimation of changes in the after period involved estimating the following variables:

π_i: the expected number of target injuries *i* in the after period had the passage of the seat belt law not occurred. This value is predicted based on the observed counts in the before period (K) along with some adjustment factors.

λ_i: the expected number of target injuries *i* in the after period after passage of the seat belt law. We estimate this value by using the observed counts (L) in the after period.

$\delta_i=\pi_I - \lambda_I$: is the expected change in the number of injury type.

In addition, estimates of the variance of π, λ, and δ were made. The counts of each injury type were treated as a Poisson random variable. The estimation of π for injury type i was done by taking the before period count and adjusting for factors that may have affected the total numbers observed in the after period in addition to the seat belt law. Duration of the before and after periods, as well as weather conditions and other factors such as total Vehicle Miles Traveled (VMT), and occupancy in vehicles, played a role in contributing to crashes. While such variables can be used as part of the adjustment factors, since they eventually express themselves in the total count of injuries observed in the before and after periods, the adjustment factor used here employed the total number of crashes reported for the before and after periods.

Thus we estimate λ and π by $\hat{\boldsymbol{\lambda}}$and $\hat{\boldsymbol{\pi}}$ for any injury type to be:

$$\hat{\boldsymbol{\lambda}}= \text{L and } \hat{\boldsymbol{\pi}} =\widehat{\boldsymbol{r_c}}*\text{K, where } \widehat{\boldsymbol{r_c}}=C_a/C_b,$$

The variable $\widehat{\boldsymbol{r_c}}$ is an estimator of r_c, which is an adjustment factor that incorporates the changes in other factors that may have led to a reduction in total number of injuries, and hence injuries of each kind. C_a and C_b are the after and before total injury counts. L is the observed counts of the injury type under consideration in the after period, K is the count of injury type under consideration in the before period. An additional assumption is that the effect of the different factors that have led to lower crash numbers in the after period, which we attempt to capture by r_c, affects each injury type in the same way. A method which would lead to the same estimates is to treat the distribution of outcomes as a multinomial variable with probabilities k_i/C_b for each injury type and to use these probabilities to estimate the number of injuries in the after period by multiplying by C_a.

Since injury numbers are counts observed over a given time period, we treat them as Poisson random variables. The Poisson distribution has the property that its mean and variance are equal. Thus our variance estimates will be $\text{var}(\hat{\boldsymbol{\delta}})=\text{var}(\hat{\boldsymbol{\pi}})+\text{var}(\hat{\boldsymbol{\lambda}}) = \text{var}(r_c*K)+L$. Since the prediction of $\hat{\boldsymbol{\pi}}$ involves the multiplication by r_c, which is itself derived from other random variables, its variance estimate also enters into the estimation of the variance of $\hat{\boldsymbol{\delta}}$ (see Hauer (1997) pp. 95-113 for details).

Applying this analysis to the values given in Table 2 provided estimates of reduction (or increase) in each injury type in the after period as shown in Table 3. Negative values in Table 3 suggest that there has been an increase in period after primary for the particular injury type. Positive numbers suggest there has been a decrease in the injury type under consideration.

Table 3. Estimated safety effects of the primary seat belt law (using average of 3 year prior data)

	Type K	Type A	Type B	Type C	Type N
π_{hat}	670.7	2,192.4	13,676.6	41,230.2	286,685.3
λ_{hat}	579	1,642.0	12,466.0	41,672.0	288,096.0
$Var(\pi_{hat})$	423.7	1,400.7	9,480.7	33,952.2	568,773.4
$Var(\lambda_{hat})$	579	1,642.0	12,466.0	41,672.0	288,096.0
δ_{hat}	**91.7**	**550.4**	**1,210.6**	**-441.8**	**-1,410.7**
$SD(\delta_{hat})$	**35.3**	**61.7**	**158.6**	**270.0**	**308.6**

CERS estimated, after adjusting for changes in total number of crashes in the after period, that there have been

- 92 $\pm$ 35 fewer fatalities;
- 550 $\pm$ 62 fewer Type A injuries; and
- 1,211 $\pm$ 159 fewer Type B injuries

since the mandatory seat belt law went into effect. While these serious injury types have seen a decline, other minor (type C) and no injury (type N) cases have increased. We estimate that there has been an increase of:

- 442$\pm$ 270 minor injuries
- 1,411 $\pm$ 208 no injuries.

The next section reviews the potential economic impacts from belted and unbelted injured vehicle occupants as well as the hospital and total economic impacts of vehicle injuries. These values, along with the changes in expected injury types are used to estimate the economic impacts of the primary seat belt law.

III. Charges by Injury Type and Differences in Hospital Charges between Belted and Unbelted Injuries

The effectiveness of wearing a seat belt in terms of changing the likely crash outcome has implications beyond the personal wellbeing of those persons who experience a crash. Medical expenses for serious injuries are considerable to the injured as well as other stake holders, including public institutions which may end up covering part or all of the costs. The analysis in this section looks first at the differences in costs between belted and unbelted injured persons. Second, it looks at the difference in costs by injury type. Third, it estimates the total change in economic costs as a result of injuries/death sustained in a vehicle crash.

Differences in hospital charges between belted and unbelted travelers

The data used for this exercise is from 2004 and 2005 Crash Outcome Data Evaluation System (CODES) which is linked to traffic crash records and provided by the Minnesota Department of Health. The data has been preprocessed to handle missing values through multiple imputations. Five imputations of each record are present in this data. Analysis was performed using Proc Mianalyze in the SAS system. Records in the data where injury and medical records could not be linked are assigned a $0.00 medical charge. In the analysis in this section, only records for which injury and charge information is available, with the injured having been inside a motor vehicle or truck, is used in calculating these average charges. CERS made the assumption that cases where injury classifications of A, B, or C are given and charges of $0.00 were reported are not likely. CERS allowed for charges of $0.00 for persons for whom no injuries were reported or in the case of a fatality report allowing for persons who may have died either on site or at a hospital.

Average hospital charge values for 2004 and 2005, separated by whether or not the person was wearing a seat belt, is provided in Table 4. The dollar figures for 2004 and 2005 are expressed in 2011 dollars using the Consumer Price Index (CPI) for these years.

Table 4. Estimate of hospital charges for belted and unbelted injured persons in Minnesota (in 2011 $ values)

Year	Belted	Unbelted	# of Cases
2004	$461	$5,074	207,315
2005	$493	$4,518	197,196
Average (Weighted)	**$477**	**$4,820**	

For this period, the average unbelted injury charges were over 10 times larger than the average belted injury.

Differences in hospital charges by persons sustaining different injury types

Data from the Crash Outcome Data Evaluation System (CODES) for hospital-treated motor vehicle traffic injuries, excluding pedestrians, pedal cyclists and motorcyclists between July 1, 2007, and June 30, 2011, was also supplied by the Minnesota Department of Health. The data included each visit by an injured person, the type of injury as indicated by the Injury Severity Score (ISS) and the associated charges with these injuries. Total charges for each person were first aggregated over the several visit records. In addition, injury severity scores were converted into one of the classifications based on the following ranges (ISS=1-4 as C, ISS=5-15 as B and ISS 16+ as A). Average charges from the post-June 2009 data by injury type are given in Table 5.

Table 5. Average hospital charges by injury type

Injury Type	Average Hospital Charges
A (Incapacitating injury)	$118,139
B (Serious injury)	$22,238
C (Minor injury)	$3,022

The National Safety Council (2009) estimates a comprehensive cost of motor vehicle crashes by injury type, which includes such costs as medical expenses, wage and productivity losses, vehicle damage, employers' uninsured costs for 2009 as well as a measure of the value of lost quality of life which are considerably larger than the above estimates. These numbers, adjusted for inflation and expressed in 2011 dollars, are given in Table 6.[2]

Table 6. Average comprehensive costs by injury severity

Injury Type	Comprehensive costs
K (Fatality)	$4,508,500
A (Incapacitating injury)	$227,300
B (Serious injury)	$58,000
C (Minor injury)	$27,600
N (No injury)	$2,500

Estimates of savings as a result of the seat belt law

The discussion in the preceding sections allows the calculation of *i*) how much was saved as a result of the different mix of injury outcomes that require hospitalization since the passage of the primary seat belt law, and *ii*) what the total change in comprehensive economic costs were in the state of Minnesota using the comprehensive cost estimates from the NSC. Table 7 summarizes these results.

[2] While the terminology for injury severity level that is assigned by hospitals or assigned by officers at the scene of the crash is the same, the two sets of people (hospital staff and peace officers) assigning the severity level have significant differences in training and general outlook. Consequently the differences in findings may be due in part to the differences in assignment of injury level. This also explains why the average cost for an A injury in hospital charges alone is nearly the same as the total cost for an A injury from the NSC.

Table 7. Estimated net savings since the passage of the 2009 primary seat belt law (based on post June 2009 CODES data and NSC estimated comprehensive costs)

	Injury Type	Change in Number of Injuries	Total Hospital Charges	Comprehensive Costs
Estimate 1 (Accounting for Time Trends)	Type K	67.7		$305,225,450
	Type A	320.8	$37,898,991	$72,917,840
	Type B	431.8	$9,602,368	$25,044,400
	Type C	-809.6	($2,446,611)	($22,344,960)
	Type N	721.1		$1,802,750
Net Estimate 1:			**$45,054,748**	**$382,645,480**
Estimate 2 (Average Estimates)	Type K	91.7		$413,429,450
	Type A	550.4	$65,023,706	$125,105,920
	Type B	1210.6	$26,921,323	$70,214,800
	Type C	-441.8	($1,335,120)	($12,193,680)
	Type N	-1,410.7		($3,526,750)
Net Estimate 2:			**$90,609,909**	**$593,029,740**

Even under the more conservative estimate, over the two-year period since passage of the primary seat belt law, the estimated reduction in medical charges is over $45,000,000. In addition, the comprehensive economic costs avoided as a result of a reduction in severe injuries and fatalities, based on the NSC's estimates of average comprehensive costs, is estimated at $382 million.

IV. Hospital Charge Payers

This section reviews who paid for the injury charges that are recorded in the CODES data to get a sense of what proportion of these charges are reimbursed by public programs. For these purposes, records from the CODES data starting from June 2009-June 30, 2011 were used. The total hospital charges summed over all visits of persons in the database was $465,298,318. About 78% of the $465 million in hospital charges has at least one payer listed. An additional 5% has the payer listed as unknown, and the remaining 17% has no payer listed. In addition, no charges are reported for trauma centers in the data, making the $465 million figure above lower than the actual hospital charges.

After dividing the different payers into a smaller set of categories, and assigning all hospital charges to the primary payer (payer1 in the data), the breakdown of the $387 million with a payer listed is as shown in Table 8.

Table 8. Breakdown of hospital charges by payer

Payer	Charges	Percent of Charges with a listed Payer
Medicaid	$41,509,585	11%
Medicare	$32,899,709	8%
Commercial/nonprofit Insurance	$247,628,479	64%
Other Government	$13,119,381	3%
Self/other	$21,703,560	6%
Workers comp	$6,978,758	2%
Unknown	$23,450,685	6%
Total	$387,290,157	100%

For this analysis, Medicare, Medicaid and Other Government payers are of particular interest, as their payments come from tax revenues. As the table shows, Medicaid covers about 11%, Medicare another 8%, and government or government-related insurers/entities cover another 3% of these hospital charges. Assuming that the medical charges foregone would have been applied in similar proportions to these payers, the estimated reductions in charges to Medicaid, Medicare, and Other Government payers range from just under $10 million to nearly $20 million, as shown in Table 9.

Table 9. Estimated reductions in charges to Medicaid, Medicare, and other government payers (to the nearest 100)

Payer	Estimate 1	Estimate 2
Medicaid	$4,956,000	$9,967,100
Medicare	$3,604,400	$7,248,800
Other Government Insurance	$1,351,600	$2,718,300
Total	$9,912,000	$19,934,200

V. Impact of Law on Seat Belt Use

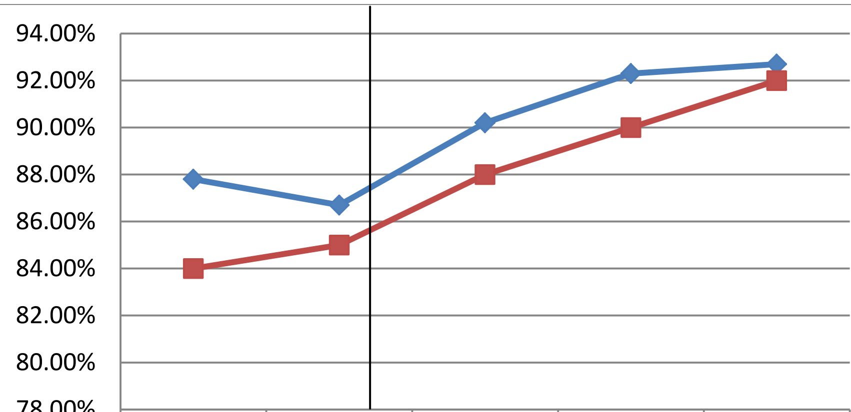
Since Minnesota changed its seat belt law by making it a primary reason for an officer to ticket, the public has responded by buckling up at increased rates. The Minnesota Department of Public Safety (DPS) measures seat belt use in two different ways. The primary method is through an observational survey, where a sample of vehicles is observed on various roadways, and use of seat belts by the occupants is noted by the surveyor. This method and results are reported to and certified by the National Highway Traffic Safety Administration (NHTSA). In addition, DPS also conducts a random telephone survey of Minnesota residents to obtain information about the effectiveness of various safety campaigns, including the seat belt laws. As part of this survey, respondents are asked to state their seat belt use. As shown in Table 10, the statewide observational seat belt use rate has continually risen from 86.7% in 2008 to 92.7% in 2011. During this same time period, respondents to the telephone survey who stated they used seat belts "all of the time" has also risen from less than 84% in 2007 to 92% in 2011 (Corona Research 2007, 2011).

Table 10. Seat belt usage, observed and self-reported, 2007 – 2011

Seat Belt Use	Observed	Self-reported
2007	87.8%	84%
2008	86.7%	85%
2009 (after primary passed)	90.2%	88%
2010	92.3%	90%
2011	92.7%	92%

Figure 2 shows how these rates have changed over time.

In addition, the Minnesota Department of Health reports that children under 18 reporting "always" using a seat belt (regardless of where seated in car) rose from approximately 60% before the law (2007) to 70% after (2010). This information was part of that Department's periodic statewide student survey (State of Minnesota Student Survey).



	2007	2008	2009 After Primary	2010	2011
Observed	87.80%	86.70%	90.20%	92.30%	92.70%
Self-reported	84%	85%	88%	90%	92%

Figure 2. Seat belt usage, observed and self-reported, 2007 – 2011

VI. Public Support for Primary Seat Belt Law

In the DPS telephone survey discussed above, support for the primary seat belt law was also measured. Respondents were asked, "In your opinion, SHOULD police be allowed to stop a vehicle if they observe a seat belt violation when no other traffic laws are being broken?" (Corona Research, 2007 – 2011). Table 11 shows that support increased from 62% just before the law was passed to over 70% since it was passed. However, unlike the use of seat belts, support for the primary seat belt law has varied over time. While the most recent level of support, 70%, is not much different from the level in 2007 (68%), the low point of 62% occurred shortly before the law was passed in 2009, returning to 68% after the law was passed and reaching a high of 75% in 2010 before falling back to 70% in 2011. It is interesting to note that most of these changes occurred at the same time that the law was most prominently debated in the legislature. It was introduced as a bill in 2007 and 2008, before passing in 2009, after which time it enjoyed its greatest popularity. However, the support dwindled a bit in 2011, when a bill to repeal the law was introduced, putting the concept up for public debate once again. Regardless of this volatility, however, the concept of allowing police to stop a vehicle for an occupant not wearing his or her seat belt has always been supported by a strong majority of Minnesotans surveyed.

Table 11. Support for primary seat belt law

Support for Primary Seat Belt Law	
2007 (both):	68%
2008 (pre-campaign):	70%
2008 (post-campaign):	**65%
2009 (before primary passed, pre-campaign):	62%
2009 (after primary passed, post-campaign):	**68%
2010 (pre-campaign):	74%
2010 (post-campaign):	75%
2011 (pre-campaign):	74%
2011 (post-campaign):	*70%

*significant change from previous survey at 90%
**significant change from previous survey at 95%

Minnesota is not unique in its level of support for a primary seat belt law. In a national survey conducted by CERS in 2010, 72% of respondents supported primary seat belt laws (41% "very supportive," 31% "somewhat supportive"), (Munnich and Loveland). Consequently, it is not surprising that Minnesota is with the majority of U.S. States in having a primary seat belt law.

VII. Conclusions

It is clear that, after several years of debate and numerous statewide and national studies, Minnesota's primary seat belt law is having its intended effect. Fatalities and serious injuries from automobile crashes have decreased more than would have otherwise been predicted since the law went into effect in June 2009, which translates into at least $45 million in avoided hospital charges, plus a great deal more in benefits from continued productivity and earnings. This includes a direct savings of nearly $10 million or more Minnesota tax dollars that would have paid for expenses charged to Medicare, Medicaid and other government insurers. Consequently, it is of little wonder that the primary seat belt law has enjoyed the support of over 70% of all Minnesotans.

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