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Estimated Minimum Savings to the Medicaid Budget in Florida by Implementing a Primary Seat Belt Law

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16. Abstract A 2003 study estimated that if all States had primary laws from 1995 to 2002, over 12,000 lives would have been saved. Failure to implement a primary belt law creates a real cost to a State's budget for Medicaid and other State medical expenditures. This study estimates the minimum dollars Florida can expect to save on direct medical costs (primarily paid through Medicaid) by the implementation of a primary seat belt law. The current study analyzed Florida's 2005 Hospital Discharge Data, including only cases where the external cause of injury was a motor vehicle crash. The total estimated costs to Medicaid, including Traumatic Brain Injury and Spinal Cord Injury costs, from motor vehicle crashes for the first year the injury was incurred for Florida is \$105.5 million for the first year and \$21.4 million for each year after. In 2005, Florida's seat belt use rate was 73.9%. Based on the conversion rate one would expect belt use to increase by 10.44% and of those newly belted individuals, at least 50% would avoid injury (based on seat belt effectiveness in reducing injury). The 2005 Federal Government reimbursement rate for Florida's Medicaid expenditures was 58.76%. Accounting for this reimbursement, the first-year savings to the State by implementation of a primary seat belt law would be about \$ 2.3 million dollars. By the fifth year, the savings would be \$4.1 million for that year alone. Florida could expect to save \$15.9 million in the first 5 years and \$43.1 million over 10 years.			
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INTRODUCTION

On Friday, January 21, 2005, at 1:20 p.m., a 67-year-old man was driving on an urban local street in Jacksonville, Florida. A vehicle driven by a 36-year-old man hit the man. The 67-year-old, unbelted, was completely ejected from the vehicle and died; the 36-year-old man was wearing his seat belt and sustained no visible injuries.

On Sunday, March 13, 2005, at 7:40 a.m., a 52-year-old female was driving on SR-200 in Marion County, Florida, when she was involved in a collision. A 34-year-old male drove the other vehicle. The crash killed the unbelted woman. The man, who wore a seat belt, survived the crash.

On Wednesday, June 29, 2005, at 3:09 p.m., two vehicles were involved in a crash on I-4 in Hillsborough County, Florida. The driver of one vehicle, an unbelted 32-year-old male, was killed. The other vehicle's driver, a 40-year-old female wearing her belt, survived.

On Friday, September 16, 2005, at 8:57 p.m., two vehicles were traveling on US-1 in Key Largo, Florida. The driver of the first vehicle, a 21-year-old male, was belted and survived the crash with no injuries. The 27-year-old and 22-year-old male passengers, both belted, survived. The driver of the other vehicle, a 67-year-old man, unbelted, was killed in the crash.

Seat belts can reduce the risk of death for front-seat occupants of passenger cars by 45%. Similarly, belt use reduces the risk of serious non-fatal injuries by 50% for front-seat occupants of passenger cars. Belts are associated with a 60% decreased risk of injury while in light trucks (e.g., SUVs, minivans, and pickup trucks).¹

There are two types of belt laws. Primary or "standard enforcement" seat belt laws allow a police officer to enforce a violation of a seat belt law after observing a belt use infraction by itself. That is, the police can treat a seat belt violation as they would any other violation. Secondary laws prevent the police from enforcing the seat belt law unless they observe a second violation along with the seat belt infraction. That is, if the belt violation is the only visible infraction, then the police cannot issue a seat belt violation.

According to the National Highway Traffic Safety Administration, the passage of primary seat belt laws would likely induce 40% of current nonusers to wear seatbelts. One study by the National Safety Council estimated that had all States had primary laws from 1995 to 2002 more than 12,000 lives would have been saved.²

Additionally, there is a real cost to the State's budget in terms of Medicaid and other State medical expenditures associated with failure to implement a primary seat belt law. Specifically, this study estimates the *minimum* dollars Florida can expect to save on direct medical costs (primarily paid through Medicaid) by the implementation of a primary seat belt law.

METHODS

Florida's 2005 Hospital Discharge Data were used for the analyses. Only cases where the external cause of injury was a motor vehicle crash were included. There were 16,691 such patients discharged from Florida hospitals in 2005. The cost of these motor-vehicle-generated injuries was \$788,643,219 in direct hospital costs alone. Of that, \$83,321,947 were costs billed to the State of Florida as Medicaid and other sources paid directly by the State.

Of the 16,691 patients discharged, 4,134 injuries were classified as Traumatic Brain Injuries (TBI) and/or Spinal Cord Injuries (SCI). These particular injuries are likely to lead to long-term post-hospitalization medical costs. That is, the costs continue over an injured person's lifetime. These costs cannot be looked at over a single year but need to be accumulated annually to gain an understanding of their financial impact to the State. Injuries occurring this year will cost taxpayers money next year on top of the injuries occurring next year. In three years time, the costs will be for both the prior two years' injuries plus that year's injuries.

Traumatic Brain Injury Cost Estimates

The long-term direct medical costs for various types of injuries differ greatly. None of our estimates includes peripheral costs such as lost wages and productivity. Post-hospitalization TBI costs per person are estimated at \$40,000 for rehab and other medical costs during the first year, according to the Craig Hospital.³ Additional year costs were estimated from the National Institute of Health values pertaining to traumatic brain injuries, lifetime costs for such injuries and average lifespan of people with TBI. The average direct medical cost beyond the first year was estimated to be \$26,871 per person per year in addition to initial direct hospital costs. Having a TBI lessens life expectancy by an average of 7 years.⁴

Spinal Cord Injury Cost Estimates

SCI costs were based on the University of Alabama's National Spinal Cord Injury Statistical Center report showing first-year cost per injury severity and additional year costs per injury severity. These costs were matched using ICD-9 codes to the injured people in the Florida Hospital Discharge Database to estimate the costs for spinal cord injured individuals (see Table 1 for post-discharge costs). Note that the costs indicated in Table 1 are *per injury*. It is only in a minority of cases that life expectancy is less than 10 years for SCI survivors; in fact, 85% of SCI patients who survive the first 24 hours are still alive 10 years later.^{5,6}

Table 1: Average Yearly Expenses

Injury Severity	First year	Each year thereafter
High Quadriplegia	\$ 741,425	\$ 132,807
Low Quadriplegia	\$ 478,782	\$ 54,400
Paraplegia	\$ 270,913	\$ 27,568
Incomplete motor function at any level	\$ 218,504	\$ 15,313

Source: The National SCI Statistical Center⁵

Medicaid Estimates

Estimating the percentage of TBI and SCI patients who are likely to become Medicaid recipients is difficult. The Craig Hospital showed that the proportion of those with TBI on Medicaid doubles in the year following injury. For SCI, one estimate is that there is a 24-% increase in

Medicaid-covered patients from the time of injury to the time of release from the hospital. That is, according to the Missouri Model Spinal Cord Injury Center,⁷ 25% of SCI patients were covered by Medicaid at the time of injury and this figure increased to 31% upon release from the acute care facility (for SCI, the average length of stay in the acute care unit is 18 days⁵). Furthermore, the Craig Hospital estimates that 25.4% of all SCI will become Medicaid patients. Specifically, this was the percentage of SCI people on Medicaid five years after injury.

RESULTS

In 2005, there were 332 Traumatic Brain Injury patients on Medicaid discharged from Florida hospitals. Thirty-one of these patients died from their injuries and only contributed to acute hospital care costs. The actual hospital charges were \$ 28,774,111. In addition, the 301 remaining patients each generated an estimated \$40,000 first-year health care cost. For each additional year post-injury, each of these patients is expected to generate another \$26,871 in health care costs. The cost to Medicaid for the first year is estimated to be \$40.8 million and each additional year (assuming the percentage on Medicaid doubles as per the Craig Hospital) will cost about \$16.2 million (see Table 2).

There were 13 SCI patients on Medicaid discharged from Florida Hospitals in 2005. Their actual hospital charges were \$3,984,019. In total, there were 238 patients with SCI stemming from motor vehicle crashes (27 died). We estimated that, post-hospitalization, an additional 24% of these survivors would become Medicaid recipients, and that 25.4% would be on Medicaid in the years following. Thus, using estimated medical expenditures (see Table 1) the costs to Medicaid would be about \$14.1 million in the first year and \$5.2 million each year thereafter (see Table 2). One and a half% of the additional year cost (see Table 2) of SCI was subtracted for each subsequent year in order to account for the 85-percent survival rate after 10 years (assuming a linear change).

Additionally, there were \$50.6 million in non-TBI/SCI injury costs billed directly to Medicaid or the State (see Table 2).

Table 2. Estimated and Actual Costs to Medicaid From MV Injuries

	Year 1	Each additional year
Traumatic Brain Injury	\$40,814,111	\$16,176,342
Spinal Cord Injury	\$14,079,121	\$5,219,638
Other	\$50,563,817	
Total	\$105,457,049	\$21,395,980
Saved By Primary Law	\$2,270,203	\$460,597

The total first-year cost to the State of Florida for motor vehicle crashes is therefore \$105.5 million for the first year and \$21.4 million for each year after. According to NHTSA, a primary law would likely convert 40% of the non-belt users to belt users. In 2005, Florida's seat belt use rate was 73.9%. Based on the conversion rate one would expect belt use to increase by 10.44% and of those newly belted individuals, at least 50% would avoid injury (based on seat belt effectiveness in reducing injury). However, the Federal Government reimburses States a portion of their Medicaid expenditures. The 2005 reimbursement rate for Florida was 58.76%. Accounting for this reimbursement, the first-year savings to the State by implementation of a

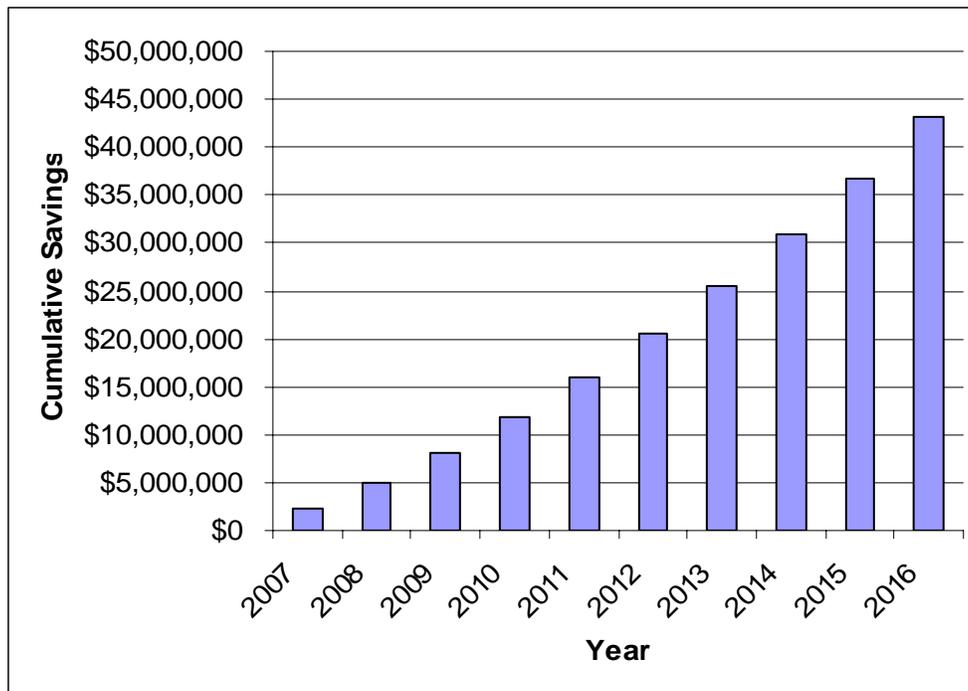
primary seat belt law would be about \$ 2.3 million dollars. By the fifth year the savings would be \$4.1 million for that year alone (see Table 3).

Table 3. Savings for each year by passing a primary law in 2007

Year	Values	\$ Saved
2007	Acute \$	\$2,270,203
2008	Acute \$ + Prior 1 Years LT\$	\$2,729,115
2009	Acute \$ + Prior 2 Years LT\$	\$3,186,342
2010	Acute \$ + Prior 3 Years LT\$	\$3,641,882
2011	Acute \$ + Prior 4 Years LT\$	\$4,095,738
2012	Acute \$ + Prior 5 Years LT\$	\$4,547,908
2013	Acute \$ + Prior 6 Years LT\$	\$4,998,392
2014	Acute \$ + Prior 7 Years LT\$	\$5,447,191
2015	Acute \$ + Prior 8 Years LT\$	\$5,894,305
2016	Acute \$ + Prior 9 Years LT\$	\$6,339,733

Considering the cumulative savings (adding up each year’s savings), the State could expect to save \$15.9 million in the first 5 years and \$43.1 million over 10 years (See Figure 1).

Figure 1. Cumulative Minimum Savings by Implementation of Primary Law in 2007.



CONCLUSION

The estimates reported here are *minimum* savings associated with implementation of a primary seat belt law. In this study, we do not explore the peripheral costs (loss of wages and tax revenues, productivity, loss of life, etc.). Additionally, research has shown that the costs of unbelted injuries are 25% higher than belted injuries⁸ and that unbelted occupants are more likely to be Medicaid patients. Furthermore, the assumption here is that injuries other than TBI or SCI

incur no cost beyond immediate direct hospital costs (i.e. possible follow-up treatments such as surgery or physical therapy are absent from our analyses). Accounting for these ancillary expenses would drastically raise the estimates presented here.

There is also no attempt to project cost increase over time. Medical cost increases have traditionally far outpaced inflation. Costs reported here are merely small portions of the likely savings. Clearly, the State can expect to reduce other associated costs by implementation of a primary law. For example, unemployment is much higher among disabled persons and family members frequently need to defer employment to become caretakers. These costs not only reduce the tax base for the State but may also add to the number of persons on other State dependent monies (e.g., welfare). We also do not address the savings to private business and citizens of the State. Lastly, we do not attempt to place a price on human life, pain, and suffering.

All the costs in this study are based on the conservative values. The goal was to produce **an absolute minimum value**. Whenever multiple credible values existed for an estimate, we chose the lowest value.

It should be noted that some of the estimates in this report are different from those stated in previous reports (e.g., Chaudhary & Preusser, 2003). In those earlier documents, figures reported indicated *gross* costs to the State whereas the current document indicates *net* costs to the State. Implementation of a primary seat belt law would promote gross savings (i.e., not considering the Federal reimbursement) of \$5.5 million in the first year, \$36.6 million by the fifth year, and \$104.6 million over the next 10 years.

In sum, the State of Florida could expect to save at least \$43.2 million dollars (\$104.6 million gross) over the next 10 years on its annual budget in medical costs alone by implementing a primary seat belt law in 2007.

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APPENDIX
Calculations**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
2007	\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50	\$21,004,506.94	\$20,926,212.37	\$20,847,917.80	\$20,769,623.24	\$20,691,328.67
2008		\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50	\$21,004,506.94	\$20,926,212.37	\$20,847,917.80	\$20,769,623.24
2009			\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50	\$21,004,506.94	\$20,926,212.37	\$20,847,917.80
2010				\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50	\$21,004,506.94	\$20,926,212.37
2011					\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50	\$21,004,506.94
2012						\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07	\$21,082,801.50
2013							\$105,457,049.20	\$21,317,685.20	\$21,239,390.64	\$21,161,096.07
2014								\$105,457,049.20	\$21,317,685.20	\$21,239,390.64
2014									\$105,457,049.20	\$21,317,685.20
2015										\$105,457,049.20
Total	\$105,457,049.20	\$126,774,734.40	\$148,014,125.04	\$169,175,221.11	\$190,258,022.61	\$211,262,529.55	\$232,188,741.92	\$253,036,659.73	\$273,806,282.96	\$294,497,611.64
Cumulative	\$105,457,049.20	\$232,231,783.60	\$380,245,908.64	\$549,421,129.75	\$739,679,152.37	\$950,941,681.92	\$1,183,130,423.84	\$1,436,167,083.57	\$1,709,973,366.53	\$2,004,470,978.17
Saved per year *	\$2,270,203.43	\$2,729,115.20	\$3,186,341.51	\$3,641,882.35	\$4,095,737.73	\$4,547,907.63	\$4,998,392.06	\$5,447,191.02	\$5,894,304.52	\$6,339,732.55
Saved Cumulative	\$2,270,203.43	\$4,999,318.63	\$8,185,660.14	\$11,827,542.50	\$15,923,280.22	\$20,471,187.85	\$25,469,579.91	\$30,916,770.93	\$36,811,075.45	\$43,150,808.00

U = Expected change in unbelted pop. By implementing primary law: 40%

O = Statewide observed belt use (S. 157): 73.9%

C = Expected percentage change in population: (U *(1-O))

E = Effectiveness of seat belts to reduce injury: 50%

* = Total * E*C

** Discount rates of .03 and .07 would reduce the 10-year estimate to \$36.4 M and \$29.5 M respectively.

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