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Estimated Medical Cost Savings in Massachusetts By Implementing a Primary Seat Belt Law

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16. Abstract <p>This report examines 2006 hospital discharge data reporting cases where the external cause of injury to a vehicle occupant was a motor vehicle crash to predict the estimated savings to Massachusetts if a primary seat belt law is implemented. The savings are calculated using costs based on the report Economic Impact of Motor Vehicle Crashes (DOT HS 809 446). In Massachusetts, there is an expectation of a primary law reducing the burden of insurance companies by about \$55.8 million from crashes occurring in a single year alone. The crash victims in Massachusetts would benefit by a reduction of more about \$3.9 million while the Federal Government would also reduce its costs by about \$3.9 million before reimbursing Massachusetts for a portion of Medicaid expenditures. Massachusetts would also reduce its spending by \$5.7 million (\$3.6 million after reimbursement).</p>					
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INTRODUCTION

On Saturday April 8, 2006, at 8:29 a.m., a 17-year-old male was involved in a crash on Bardwell Street in South Hadley, Massachusetts. The driver of the other vehicle was a 16-year-old male. The 17-year-old man, unbelted, was killed in the crash. The 16-year-old was uninjured in the crash. He was belted.

On Tuesday February 7, 2006, at 11:45 a.m., an 18-year-old female was driving on Blackstone Street in Uxbridge, Massachusetts, when she struck another vehicle. The other vehicle was driven by a 69-year-old man. The 18-year-old woman, belted, did not suffer any injury. The 69-year-old man, unbelted, was completely ejected from the vehicle and died. His 65-year-old female passenger, belted, survived.

On Thursday, December 14, 2006, at 9:29 a.m., a 68-year-old female was driving on State Route 27 in Hanson, Massachusetts, when she was involved in a crash. The other vehicle was driven by a 34-year-old female. The 34-year-old woman, properly restrained, was uninjured in the crash. Her two passengers, a 2-year-old girl and a 5-year-old boy, were in child safety seats and suffered no injury. The 67-year-old woman, 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 65% decreased risk of injury while in light trucks (SUVs, minivans, and pickup trucks).¹

There are two types of seat belt laws. "Primary" seat belt laws allow police officers 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 police from enforcing the belt law unless it is observed in association with another violation. That is, if the belt violation is the only visible infraction, police are not allowed to enforce the law in a secondary law State.

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

Additionally, there are real financial costs to a secondary law State. These costs associated with failure to implement a primary seat belt law are dispersed to the State's budget in terms of Medicaid and other State medical expenditures, the individual residents of the State injured in crashes, private insurance companies and Federal Government. This study estimates the *minimum* dollars saved, including direct medical costs (primarily paid through Medicaid), by the implementation of a primary seat belt law in Massachusetts.

METHODS

Medical Cost Estimates

Values from Massachusetts's 2006 Hospital Discharge data were used to estimate the complete medical costs of such motor vehicle related injuries. This data includes diagnosis and cost information, payer information, and status at discharge (e.g., deceased) for each person discharged from Massachusetts's hospitals. For diagnoses that describe injuries, there are also "E-codes" which describe the external cause of the injuries. E-codes can indicate whether the cause of the injury was a motor vehicle crash and whether the person injured was an occupant of a motor vehicle. It should be noted that "in theory" every injury diagnosis should have an associated E-code, but this is rarely the case. Using this information we identified which patients were occupants of motor vehicles (excluding motorcycles) and received injuries as a result of a crash.

The costs listed in the database represent only the tip of the iceberg in terms of total medical costs from injuries. Often, especially with more severe injuries, there are extensive medical costs incurred after the hospitalizations. There are likely follow-up medical visits, future surgeries, and even rehabilitation. As such, hospital costs may grossly underestimate actual medical costs for injuries. We therefore use estimated medical costs provided by Blincoe et al.³ These estimates, calculated specifically for injuries associated with motor vehicle crashes, include lifetime costs for the specific injuries associated with a crash. For each level of injury severity in the Maximum Abbreviated Injury Scale (MAIS), costs are estimated for specific body parts. The MAIS identifies the severity of the worst injury (noting that individuals may have multiple injuries) on a scale of 0 to 6. Zero indicates no injury, 1 is minor injury, up to 5 is severe injury, and 6 is not survivable (or fatal) injury. Using diagnosis codes we are able to map injuries to specific body parts but discharge data do not indicate the severity of injury. Therefore we used the distribution of injury severity by body part for MAIS 1 to 5 (excluding fatal injuries) to calculate an average cost per body part. The distribution was calculated by the National Center for Statistical Analysis using an average distribution from 2002 to 2006 Crashworthiness Data System (CDS). Fatal injuries were excluded because they have no future medical costs and therefore actual hospital charges are used.

According to the Bureau of Labor Statistics medical costs have increased 35% from 2000 to 2007. We therefore adjusted the Blincoe et al. costs by this amount to make them better reflect 2009 medical costs. Table 1 shows the final estimated costs per body region in 2006 dollars. These estimates were used to calculate costs of motor vehicle crash related injuries in Massachusetts.

Additional adjustments are necessary to make the estimates more reflective of actual medical costs. E-codes do not identify whether a hospital patient is an occupant of a passenger vehicle or a large truck. Primary seat belt laws would not be expected to affect injuries sustained to occupants of large trucks. Therefore we used the proportion of large trucks in NHTSA's Fatality Analysis Reporting System (FARS), a census of all fatal crashes on public roadways in the United States, to estimate the proportion of hospitalizations in the State that were likely occupants of large trucks and

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