2014 Massachusetts Safety Belt Usage Observation Study

Prepared for

Highway Safety Division
Office of Grants & Research
Executive Office of Public Safety & Security
10 Park Plaza, Suite 3720
Boston, MA 02116
Phone: (617) 725-3301

Prepared by

University of Massachusetts Traffic Safety Research Program

University of Massachusetts Amherst
142 Marston Hall
Amherst, MA 01003
Tel 413.545.0228
UMassSafe@ecs.umass.edu

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Introduction

This report presents the results of the 2014 safety belt observation study conducted within the Commonwealth of Massachusetts. The observations and report were completed by the University of Massachusetts Traffic Safety Research Program (UMassSafe) located at the University of Massachusetts Amherst. This observational study was conducted as part of an effort to evaluate safety belt usage in the Commonwealth as directed by the Executive Office of Public Safety and Security's Highway Safety Division (EOPSS-HSD).

The reported safety belt usage rate in Massachusetts, a secondary law state, has been consistently lower than the national average. The results of the safety belt observation usage surveys in Massachusetts from 2000 – 2013 are presented in Table 1 below.

Table 1 Massachusetts Safety Belt Usage Rates, 2000-2013

Observation Year	Observed Safety Belt Usage Rate (Weighted and Rounded)
2000	50%
2001	56%
2002	51%
2003	62%
2004	63%
2005	65%
2006	67%
2007	69%
2008	67%
2009	74%
2010	74%
2011	73%
2012	73%
2013	75%

Source: Highway Safety Division, 2013 Massachusetts Safety Belt Usage Observation Survey

In 2014, the safety belt study consisted of a single stage statewide survey that assessed safety belt usage in the Commonwealth of Massachusetts in compliance with the federal requirements of Uniform Criteria for State Observational Surveys of Seat Belt Use (23 CFR Part 1340).

The sampling model used in this effort was developed and approved by the National Highway Traffic Safety Administration (NHTSA) prior to the 2012 study. The sampling plan adopted in 2012 was a departure from the previous protocol which had been employed since 2009. The most significant difference in the new protocol is the sampling of segments for inclusion based upon roadway lengths proportional to the total length within the given stratum. The previous model utilized the Massachusetts Statewide Travel Demand Model in order to stratify roadways with the probability of a segment being selected dependent on the proportion of road segment traffic volumes to the total volumes of all segments in the corresponding stratum. Roadways were stratified based on roadway classification and geographic region, with the observation time period randomly selected to ensure adequate representation of daylight hours.

Review of Sampling and Observation Approach

Massachusetts is composed of 14 counties, 12 of which account for approximately 99 percent of the passenger vehicle crash-related fatalities in the state, according to the Fatality Analysis Reporting System (FARS) data average for the period of 2007 to 2011. The regions for the safety belt observations were initially identified using both geographic proximity to one another and the annual traffic fatality count (a measure of importance within the revised sampling guidelines). As a result, the sampling plan included a selection of roadways from 7 regions that are comprised of 12 counties (all but Nantucket and Dukes) as presented in Table 2 and Figure 1. Within each region, 20 or 21 hour-long observations were made at randomly assigned time of day/day of week combinations. In total, the observation teams visited 145 locations across the Commonwealth.

Table 2 Passenger Vehicle Fatality Counts by Developed Region (2007 to 2011)

Region	County	County		Region	
		Number of Fatalities	Percent of Statewide Fatalities	Number of Fatalities	Percent of Statewide Fatalities
1	Berkshire	65	4%	291	16%
	Franklin	27	1%		
	Hampden	159	9%		
	Hampshire	40	2%		
2	Worcester	269	15%	269	15%
3	Middlesex	278	15%	278	15%
4	Essex	180	10%	180	10%
5	Norfolk	163	9%	298	16%
	Suffolk	135	7%		
6	Bristol	230	13%	230	13%
7	Barnstable	98	5%	271	15%
	Plymouth	173	9%		
Non-Sampled Counties	Dukes	4	0%	5	0%
	Nantucket	1	0%		

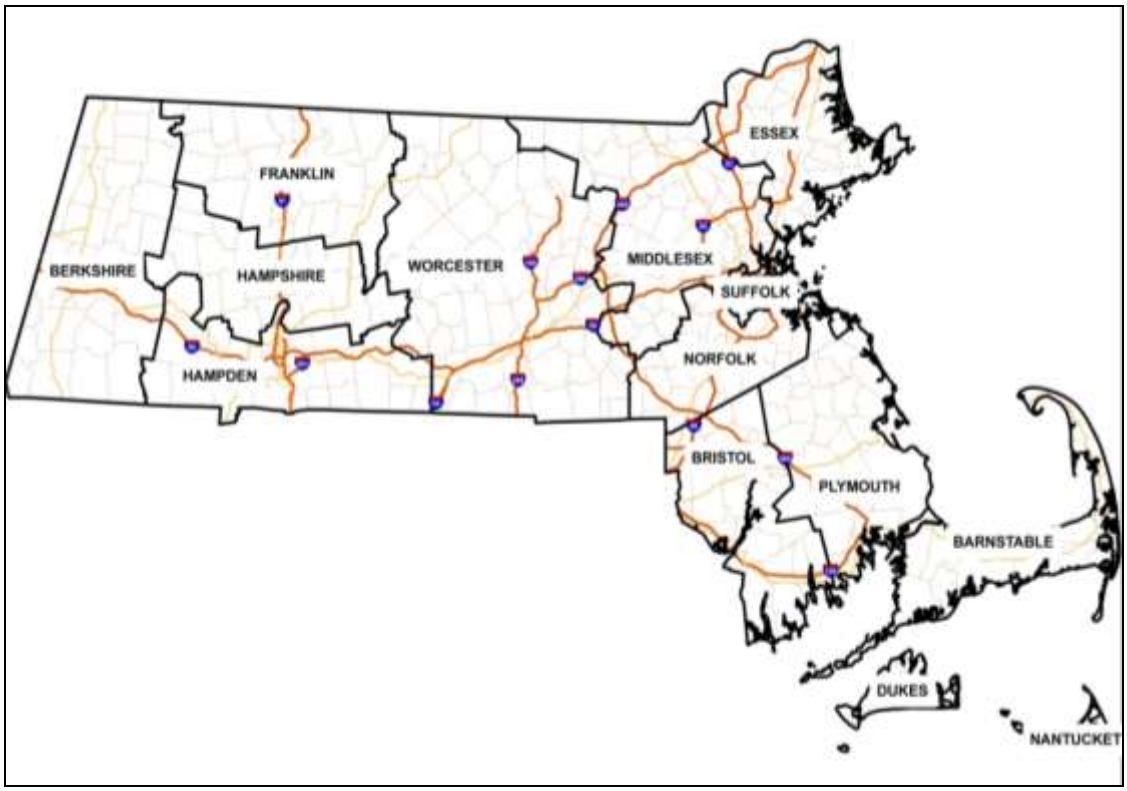

Figure 1 Massachusetts Counties

Using 2010 TIGER data developed by the U.S. Census Bureau, a listing of road segments was selected which have been classified by the U.S. Census Bureau using the MAF/TIGER Feature Class Code (MTFCC). There are primarily three roadway classifications: 1) Primary Roads, 2) Secondary Roads, and 3) Local Roads (See Table 3 for detailed definitions). In addition, the listings include segment length as determined by TIGER. This descriptive information allowed for stratification of road segments and a systematic probability proportional to size (PPS) sample was employed to select the road segments that would be used as observation sites.

Table 3 Massachusetts MTFCC Codes Included by Default in the Road Segment File

Code	Name	Definition
S1100	Primary Road	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways.
S1200	Secondary Road	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway System. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number.
S1400	Local Neighborhood Road, Rural Road, City Street	These are generally paved non-arterial streets, roads, or byways that usually have a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads.

Although not a variable used for sampling, the day of week/time of day observations were aggregated for analysis consistent with previous years for comparison purposes. The aggregation was as follows and corresponds to the observation periods:

- Weekday A.M. Peak Period (7 am to 10 am)
- Weekday Midday Peak Period (10 am to 3 pm)
- Weekday P.M. Peak Period (3 pm to 7 pm)
- Weekend Period (7 am to 7 pm)

Once they arrived at a given location, the two-person teams observed and recorded the following attributes for occupants of passing vehicles:

- Vehicle information:
  - Vehicle type (passenger, pickup truck, SUV, minivan, small commercial passenger vehicle)
  - State of vehicle license plate (MA, NH, other)
- Shoulder belt usage:
  - Driver seat belt usage
  - Front seat outboard passenger seat belt usage
- Vehicle occupant information
  - Driver gender
  - Driver age category (teenager, adult, elderly adult)
  - Driver apparent race (White, Black, Hispanic, other)
  - Passenger gender
  - Passenger age category (child, teenager, adult, elderly adult)
  - Passenger apparent race (White, Black, Hispanic, other)

Please note that although it was not needed, the approved sampling plan allowed for the addition of sites should the calculated variance not achieve plus/minus 2.5 percent as required with NHTSA protocol. The majority of sites observed in 2014 were consistent with those observed during the previous year.

Results and Discussion

Between June 3 and June 26, 2014 a total of 22,239 drivers and front outboard passengers in a total of 18,728 vehicles were observed at 145 observation locations. The statistically weighted percentage of front seat occupants properly using seat belts during the observation study was **76.57 percent.** Based upon the variation in the sampling plan, the 95% confidence interval ranges between 75.25 and 77.90 percent, with a relative error well below the required 2.5 percent threshold. This number is representative of the highest observed seat belt usage rate in Massachusetts. In an un-weighted format, the percentage of belt usage was 77.79, an increase from the value of 74.77 percent in 2013. Table 4 presents a breakdown of observed variables in a weighted format and provides a comparison to both 2012 and 2013. Also presented in Table 4 is the change in percent (i.e., not percent change) of usage by variable from 2013 to 2014.

Given the nearly 2 percentage point increase (74.77% to 76.57%) in the observed weighted seat belt usage rate, additional consideration across variables is warranted. Some of the interesting findings include, but are not limited to the following:

- By gender, both male and female occupants had an increase of approximately 2 percentage points from 2013 to 2014. Females continue to have a higher observed belt usage rate than males at 82.91 percent and 71.23 percent, respectively. Within the observation sample with known belt status, males accounted for 54.16 percent of the total occupants observed, with females accounting for 46.67 percent of the occupants observed.
- Although all age groups saw an increase in belt usage, the group with the lowest weighted percent belted (75.22%) were adults, while the group with the highest percent belted (94.13%) were children. Teens had the largest increase in belt usage from 2013, a difference of 5.07 percentage points.
- In the category of apparent race, Hispanic occupants had a significant increase of belt usage, increasing from 52.86 percent in 2013 to 68.54 percent in 2014. However, this group continues to have the lowest usage rate in comparison to Black, White, and other occupants. This significant change may be partially attributed to the fact that this group was only composed of 879 occupants in 2013 but 1,449 occupants this year. Additionally, all apparent race categories had an observed increase in usage from 2013.
- For State of Vehicle Registration, 93.15 percent of occupants were observed in Massachusetts registered vehicles, with a belt use of 76.35 percent. Only 2.21 percent of occupants were observed in New Hampshire registered vehicles (with a lower belt use of 68.96%) and Out of State (other) occupants had the highest usage with 84.81 percent.
- Occupants from all vehicle types had an increase in belt use. Passenger cars accounted for slightly more than half of all occupants observed, with 27.56 percent of occupants in SUVs, 9.34 percent in pick-ups, 5.85 percent in vans and 3.99 percent in commercial vehicles. Again, pick-up truck and commercial vehicle occupants had the lowest belt usage rates at 60.04 percent and 55.49 percent respectively. SUVs had the highest rate of belt use at 82.61 percent.
- According to this year's data, at 78.52 percent, the rate of belt use is highest during the P.M Peak – Weekday, up 1.78 percentage points from last year, and is lowest during the A.M. Peak – Weekday at 73.49 percent. Belt use on the weekend was slightly higher than the average at 76.99 percent.
- Regionally, four out of seven saw an increase from 2013, with Region 2 ranking the highest at 80.68 percent. Region 6 (Bristol County) saw the largest increase of 7.40 percentage points, but still remained the lowest ranked region from previous years. Regions 1 (Berkshire, Franklin, Hampden, and Hampshire Counties), 3 (Middlesex County) and 7 (Barnstable and Plymouth County) all saw slight decreases in their belt usage.
- In regard to passenger presence, 81.31 percent of drivers were observed to be alone and 18.69 percent were accompanied by a passenger. Drivers with a passenger had a significantly higher belt usage rate than drivers without a passenger, at 80.89 percent compared to 74.64 percent. By comparison, front outward passengers had a belt usage rate of 80.66 percent.
- Belt use increased across all three of the observed roadway types. Similarly to 2012 and 2013, belt use on Primary (Interstate) roadways was the highest, reporting 9.64 percentage points higher than belt use on Local roads. However, belt use on Local roads saw the largest increase from last year of 2.04 percentage points, 73.00 percent in 2013 to 75.04 percent in 2014.

Table 4 Summary of Weighted Study Data by Observation Variable with Known Belt Status

Observation Variable	2014 Data		2013 Data	2012 Data	Change in Percentage (2014 vs. 2013)
	Total Observed Occ. with Known Belt Status	Weighted Percent Belted	Weighted Percent Belted	Weighted Percent Belted	
All Vehicle Occupants	22,239	76.57	74.77	72.74	1.80
Gender					
Male	12,045	71.23	69.12	65.16	2.10
Female	10,157	82.91	81.19	81.08	1.71
Status Unknown	37	77.15	80.82	68.71	-3.67
Apparent Age					
Child (passenger <12)	252	94.13	91.91	88.81	2.23
Teen	839	80.25	75.18	71.88	5.07
Adult	17,740	75.22	73.71	71.14	1.51
Elder Adult (>65)	3,377	81.61	81.85	83.43	-0.24
Status Unknown	31	57.15	96.08	73.94	-38.92
Apparent Race					
Black	973	74.86	70.57	59.01	4.29
Hispanic	1,449	68.54	52.86	53.41	15.68
White	18,858	76.91	75.88	74.46	1.03
Other	843	83.72	80.92	78.43	2.80
Status Unknown	116	84.85	73.91	70.11	10.94
State of Vehicle Registration					
Massachusetts	20,715	76.35	74.30	72.21	2.05
New Hampshire	491	68.96	65.89	72.60	3.07
Out of State (Other)	1,026	84.81	85.29	80.46	-0.48
Unknown	7	70.31	94.92	85.18	-24.62
Vehicle Type					
Passenger Car	11,834	77.48	76.19	74.62	1.29
Pick-Up Truck	2,077	60.04	57.30	57.18	2.74
SUV	6,130	82.61	80.34	77.95	2.28
Van	1,302	80.74	80.74	79.93	0.00
Commercial Vehicle	887	55.49	51.30	43.69	4.18
Unknown	9	54.68	N/A	N/A	54.68
Time of Day/Day of Week					
A.M. Peak – Weekday	2,644	73.49	73.94	73.45	-0.45
Midday Peak – Weekday	9,990	75.94	73.12	70.37	2.82
P.M. Peak – Weekday	6,855	78.52	76.74	74.34	1.78
Weekend	2,750	76.99	77.79	75.22	-0.80
Observation Region					
Region 1	2,425	76.63	79.28	71.69	-2.65
Region 2	2,973	80.68	77.97	76.11	2.72
Region 3	4,003	78.22	78.25	76.87	-0.03
Region 4	2,864	74.82	70.41	69.39	4.41
Region 5	4,089	78.38	78.10	74.64	0.28
Region 6	4,091	72.93	65.53	68.18	7.40
Region 7	1,794	72.97	76.00	70.24	-3.03
Occupant Role					
Driver Alone	15,227	74.64	73.52	71.00	1.12
Driver with Passenger	3,501	80.89	76.42	75.49	4.46
Passenger	3,511	80.66	76.82	75.78	3.83
Roadway Classification					
Primary (Interstate)	2,191	84.68	82.91	79.93	1.77
Secondary (Arterial)	4,148	78.14	76.93	74.47	1.22
Local (All others)	15,900	75.04	73.00	71.13	2.04