2022 Massachusetts Safety Belt Usage Observation Study

Prepared for

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Introduction

This report presents the results of the 2022 Safety Belt Usage 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 Office of Grants and its Office of Grants and Research, Highway Safety Division (EOPSS/OGR/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 usage observational surveys in Massachusetts from 2012 – 2022 are presented in Table 1 below. It is important to note that safety belt usage data was not conducted in 2020 due to the COVID-19 pandemic.

Table 1 Massachusetts Safety Belt Usage Rates, 2012-2022

Observation Year	Observed Safety Belt Usage Rate (Weighted and Rounded)
2012	73%
2013	75%
2014	77%
2015	74%
2016	78%
2017	74%
2018	82%
2019	82%
2020	No Survey – COVID 19
2021	78%
2022	77%

Source: Highway Safety Division, 2021 Massachusetts Safety Belt Usage Observation Survey

In 2022, the Safety Belt Usage Observation Study consisted of a single stage statewide survey assessing 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).
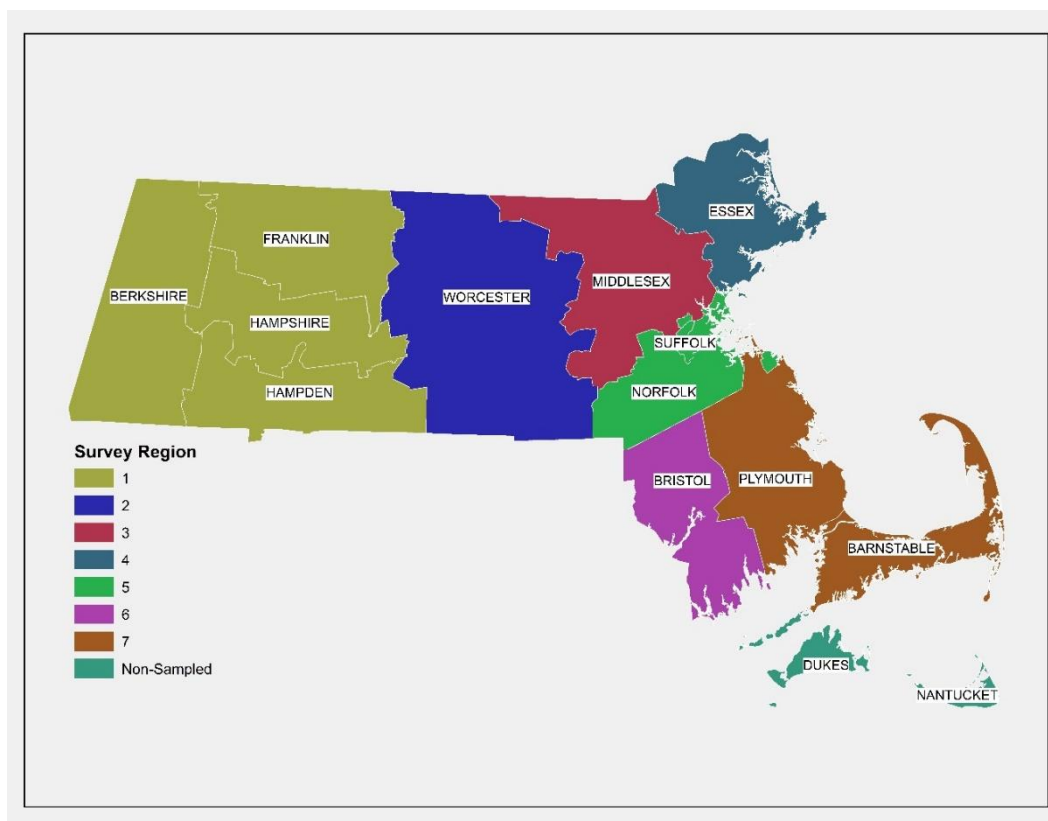
The sampling model used in this effort was developed and approved by the National Highway Traffic Safety Administration (NHTSA) prior to the 2018 study. The sampling plan adopted in 2018 was a departure from the previous protocol that had been employed since 2012. Similar to the previous protocol, current protocol includes the sampling of segments for inclusion based upon roadway lengths proportional to the total length within the given 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.

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Review of Sampling and Observation Approach

Massachusetts is composed of 14 counties, 12 of which account for over 99% of the passenger vehicle crash-related fatalities in the state, according to the Fatality Analysis Reporting System (FARS) data average for the period of 2010 to 2014. 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 include d 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, 21 hour-long observations were made at randomly assigned time of day/day of week combinations. In total, the observation teams visited 147 locations across the Commonwealth.

Table 2 Passenger Vehicle Fatality Counts by Developed Region (2010 to 2014)

Region	County	County		Region	
		Number of Fatalities	Percent of All Statewide Traffic Fatalities	Number of Fatalities	Percent of All Statewide Traffic Fatalities
1	Berkshire	57	3%	286	16%
	Franklin	26	2%		
	Hampden	164	9%		
	Hampshire	39	2%		
2	Worcester	268	15%	268	15%
3	Middlesex	232	13%	232	13%
4	Essex	176	10%	176	10%
5	Norfolk	166	9%	293	16%
	Suffolk	127	7%		
6	Bristol	231	13%	231	13%
7	Barnstable	100	6%	291	16%
	Plymouth	191	11%		
Non-Sampled Counties	Dukes	7	0.4%	7	0.4%
	Nantucket	0	0%		

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Figure 1 Massachusetts Counties and Study Regions

Using 2016 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 principally 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, while a systematic probability proportional to size (PPS) sample was employed to select the road segments to 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.

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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 a.m. to 10 a.m.)
- Weekday Midday Peak Period (10 a.m. to 3 p.m.)
- Weekday P.M. Peak Period (3 p.m. to 7 p.m.)
- Weekend Period (Saturday/Sunday 7 a.m. to 7 p.m.)

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

- Vehicle information:
    - Vehicle type (passenger, SUV, pick-up, mini-van, small commercial vehicle)
    - State of vehicle registration (MA, NH, other)
- Shoulder belt usage:
    - Driver seat belt usage
    - Front seat outboard passenger seat belt usage
- Vehicle occupant information
    - Driver apparent sex
    - Driver apparent age (teen, adult, elder adult)
    - Driver apparent race (White, Black, Hispanic, other)
    - Passenger apparent sex
    - Passenger apparent age (child, teen, adult, elder adult)
    - Passenger apparent race (White, Black, Hispanic, other)

It should be noted that although it was not needed, the approved sampling plan allowed for the inclusion of additional sites if the calculated variance did not achieve plus/minus 2.5% as required with NHTSA protocol.

Results and Discussion

Between the 1st and 30th of June 2022, a total of 22,486 drivers and front outboard passengers in a total of 19,765 vehicles were observed at 147 observation locations statewide. The statistically weighted percentage of front seat occupants properly using safety belts during the observational study was 77.00%. Based upon the variation in the sampling plan, the 95th percent confidence interval ranges between 75.68% and 78.33%, with a relative error well below the required 2.5% threshold. This number is just over a half percentage point lower than the same rate observed in 2021. In an unweighted format, the percentage of belt usage was 81.84, which was actually an increase from the value of 81.07% in 2021. Table 4 presents a breakdown of observed variables in a weighted format while providing a comparison to both 2021 and 2019. The change in percent (i.e. not percent change) of usage by variable from 2021 to 2022 is also present in Table 4.

Given the half percentage point decrease (77.53 to 77.00) in the weighted safety belt usage rate, additional consideration across variables is warranted. Some of the interesting findings include, but are not limited to, the following:

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- Female occupants continue to have a higher observed belt usage rate than males at 83.6% and 71.5%, respectively. Comparing 2022 results to 2021, female and male safety belt rates dropped by 0.6 and 1.1 percentage points, respectively. Within the 2022 observation sample of those with known belt status and apparent gender, males accounted for 54.5% and females accounted for 45.2%.

- Of the various age groups, child passengers and teen occupants had the largest decrease in belt usage compared to 2021, with 4.5 and 5.7 percentage points respectively. Despite this decrease, children and teens are still belted at a much higher rate than adults, with 89.2 percent of children and 81.2 percent of teens in compliance, compared to 76 percent of adults.

- In the attribute category of apparent race, Hispanic and Black occupants had the most significant increase in observed safety belt usage, at 7.5 and 3.0 percentage points, respectively. That said, Hispanic occupants continue to have the lowest belted rate in comparison to other apparent races, with an observed usage of 65.1%.

- Examining trends by state of vehicle registration, 92.7% of occupants were observed in a vehicle with Massachusetts plates, representing a safety belt usage rate of 76.8%, a 0.8 percentage point reduction from 2021. Comparatively, the occupant belt usage of vehicles registered in New Hampshire was 74.1%, a decrease of 3.6 percentage points from 2021. The highest safety belt usage was found for vehicles registered outside of Massachusetts and New Hampshire, and represented an increase compared to 2021, from 81.0 to 81.9 percent.

- Occupants from passenger cars, which represented 34.2% of total observations, experienced an increase of belt usage of just over two percentage points to a rate of 79.1%. Pick-up truck occupants saw the largest decrease from 2021 at 7.3 percentage points, down to a rate of 60.4 percent. Small commercial vehicle occupants had the lowest rate at 53.7 percent.

- Examination by observation time periods illustrated that seat belt usage on Saturdays & Sundays resulted in the most significant loss compared to the prior year, with a decrease of 3 percentage points to 78.7%. Interestingly, the PM peak period resulted in an increased belt usage of 2.7 percentage points to 78.5%.

- Geographically, region 2 (Worcester) and region 7 (Barnstable/Plymouth) had the largest reduction of safety belt usage from 2021 to 2022, with 3.0 and 2.2 percentage point decreases, respectively. Region 3 (Middlesex) was the only region which saw an increase in their belt usage rate.

- Front outboard passengers were present in 14.4 percent of observed vehicles. Passenger presence was a significant belt usage factor for drivers; those driving alone had a belted rate of five percentage points less than drivers with a passenger, at 75.7% and 80.9%, respectively. Though, passenger belt use experienced a 3.4 percentage point decrease compared to their safety belt usage rate in 2021.

- In the category of roadway classification, safety belt usage on secondary (arterial) roadways had the largest decrease of 3 percentage points, while belt usage on primary (interstate) roadways increased by 3.7 percentage points. Belt usage on local roads continues to be the lowest at 75.6%.

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

Observation Variable	2022 Data		2021 Data	2019 Data	Change in Percentage (2022 vs. 2021)
	Total Observed Occupants	Weighted Percent Belted	Weighted Percent Belted	Weighted Percent Belted	
All Vehicle Occupants	22,486	77.00%	77.53%	81.63%	-0.53%
Apparent Sex					
Male	12,221	71.49%	72.59%	76.81%	-1.10%
Female	10,142	83.60%	84.17%	86.95%	-0.57%
Status Unknown	123	82.62%	84.29%	87.23%	-1.67%
Apparent Age					
Child (passenger <12)	156	89.27%	93.78%	93.25%	-4.51%
Teen	850	81.15%	86.83%	84.09%	-5.68%
Adult	18,856	76.05%	76.45%	80.88%	-0.40%
Elder Adult (>65)	2,554	82.13%	82.29%	85.34%	-0.16%
Status Unknown	70	71.25%	84.73%	83.57%	-13.48%
Apparent Race					
Black	1,229	75.88%	68.38%	79.12%	7.50%
Hispanic	714	65.11%	62.10%	71.56%	3.01%
White	19,288	77.41%	78.82%	82.18%	-1.41%
Other	1,043	78.67%	82.68%	84.17%	-4.01%
Status Unknown	212	79.01%	76.77%	81.05%	2.24%
State of Vehicle Registration					
Massachusetts	20,855	76.83%	77.63%	81.48%	-0.80%
New Hampshire	410	74.13%	77.75%	77.08%	-3.62%
Out of State (Other)	1,137	81.85%	81.02%	85.70%	0.83%
Unknown	84	71.70%	75.87%	83.77%	-4.17%
Vehicle Type					
Passenger Car	7,684	79.11%	77.05%	83.04%	2.06%
Pick-Up Truck	2,598	60.42%	67.75%	68.44%	-7.33%
SUV	9,986	82.57%	84.22%	87.16%	-1.65%
Van	797	80.40%	86.39%	84.33%	-5.99%
Small Commercial Vehicle	1,340	53.65%	54.14%	57.72%	-0.49%
Unknown (other)	81	79.00%	81.91%	76.58%	-2.91%
Time of Day/Day of Week					
A.M. Peak – Weekday	8,018	75.71%	75.36%	80.21%	0.35%
Midday Peak – Weekday	7,258	76.91%	78.07%	82.44%	-1.16%
P.M. Peak – Weekday	5,847	78.54%	75.87%	82.57%	2.67%
Weekend	1,363	78.70%	81.74%	78.12%	-3.04%
Observation Region					
Region 1	1,986	74.77%	75.17%	79.06%	-0.40%
Region 2	1,809	72.46%	75.50%	76.02%	-3.04%
Region 3	3,702	81.49%	78.73%	82.64%	2.76%
Region 4	4,282	77.79%	78.58%	84.38%	-0.79%
Region 5	3,040	80.76%	81.88%	83.98%	-1.12%
Region 6	4,004	74.41%	75.39%	79.46%	-0.98%
Region 7	3,663	74.78%	76.95%	82.46%	-2.17%
Occupant Role					
Driver Alone	16,919	75.70%	75.53%	81.00%	0.17%
Driver with Passenger	2,846	80.87%	83.35%	83.46%	-2.48%
Passenger	2,721	81.13%	84.50%	78.68%	-3.37%
Roadway Classification					
Primary (Interstate)	1,784	80.81%	77.12%	84.42%	3.69%
Secondary (Arterial)	6,854	78.90%	81.93%	86.09%	-3.03%
Local (All others)	13,848	75.59%	75.49%	78.94%	0.10%

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