Night Seat Belt Use in Maine

June 2025

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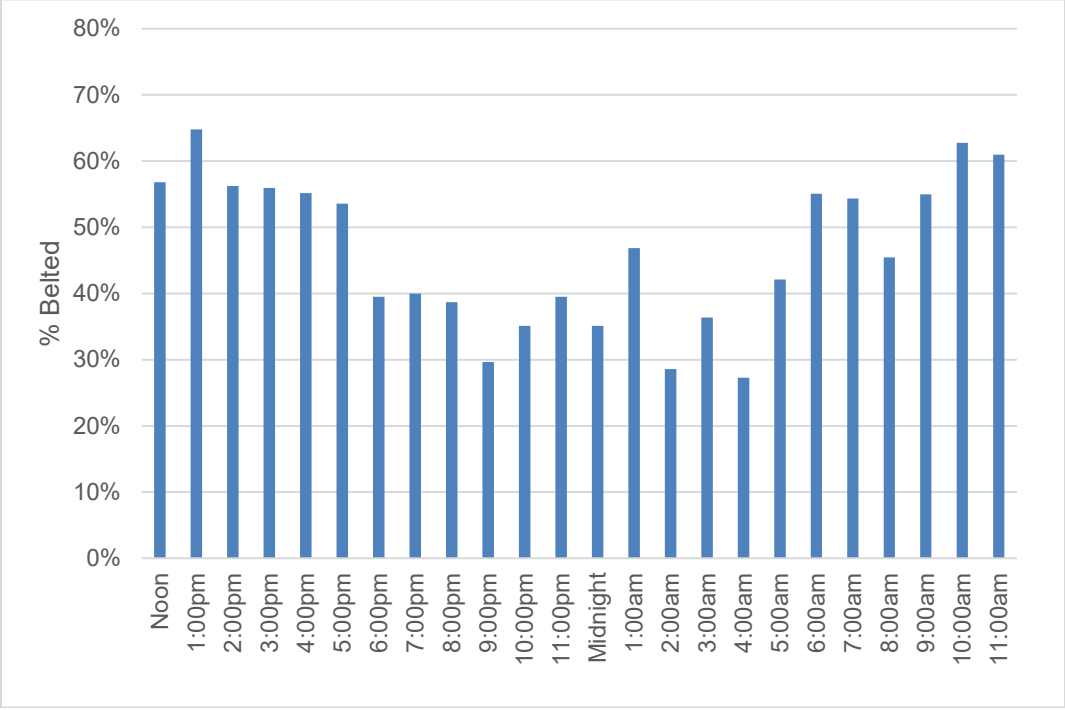
Introduction

There are compelling reasons for addressing nighttime seat belt use for the betterment of highway safety. Nighttime belt use rates are consistently lower than daytime belt use rates. Chaudhary and Preusser (2006) compared daytime and nighttime seat belt use in Connecticut, using the State's Section 157-compliant sites, and found that daytime belt use was about 6 percentage points higher than nighttime (83% vs. 77%). Solomon, Chaudhary, and Preusser (2007) showed a similar day to night difference (6.2 percentage points) in New Mexico using similar observation techniques.

In addition, nighttime fatalities are disproportionately frequent compared to the amount of nighttime driving that is actually done. The most recent FARS data (2023) indicates that 24 percent of all motor vehicle fatalities in the U.S. occurred between the hours of 10:00 p.m. and 3:59 a.m. but according to Hallenbeck (1997), this time period likely has less than 15 percent of daily traffic volume. Maine shows the same pattern or overrepresentation of nighttime fatalities. Figure 1 shows this effect using 2014-2023 FARS data. Belt use among fatally injured occupants (in outboard seating positions) is uniformly highest during daytime hours, with the lowest rates found from 8:00 p.m. to 4:59 a.m. In Maine over the past 10 years about 23 percent (22.6%) of the fatalities occurred between the hours of 9:00 p.m. and 2:59 a.m.

Figure 1. Percent Belt Use Among Fatally Injured Front Seat Outboard Occupants of Passenger Vehicles, By Hour, Maine, 2014-2023



The current study continues a previously employed methodology. Nighttime sites were originally sampled from those selected for the 2012 daytime statewide survey (Chaudhary et al., 2012). It should be noted that new statewide (daytime) sites are selected every five years based on Federal Register guidelines. New night sites were selected from the resample in 2017 for use in the 2018 night survey. New sites were selected again for the 2022 statewide daytime belt use study but, for the sake of consistency, Maine's current night belt sites are still the same selection from the 2017 daytime sample (i.e., identical sites have been used for the last 5-years of night belt data collection).

Methods

Maine's pre-2012 statewide Section 157-compliant seat belt use survey design included 120 observation sites in 10 of the 16 counties; the design was developed in 2004. A subset of 40 of those sites in 6 counties was used for "mini" surveys from 2008 - 2010. The 40 sites were chosen to be representative of the full 120-site design in terms of urban and rural locations and road function categories. Chaudhary et al. (2010) used those 40 sites for daytime and nighttime observations in 2008 in order to be able to directly compare day and night belt usage. They found that 13 of the sites, at night, had fewer than 5 observations per 45-minute observation period in each of the three observation waves. In order to minimize the impact of these very low volume sites on the overall measures, they were dropped from nighttime belt use calculations (and day-night belt use comparisons were based only on the remaining 27 sites). Those 27 sites were used in 2009, 2010, 2011, and 2012.

Starting in 2012, the daytime statewide seatbelt survey was modified as per NHTSA regulations. Using observation data from the 2012 daytime survey, a "mini" sample of 35 sites was selected from the non-local roadways to be part of the new night sample. Local roadways were excluded because late night traffic volume on local roadways is typically too low to reach a minimum number of observations. Local roadways were also not included in previous night observations, so their exclusion makes the current observation sample more comparable to previous nighttime measurements. The same criteria used for pre-2013-night observations of at least 5 vehicle observations for data to be included in the analyses was used for the 2013 observations. Six of the 35 sites were removed from the data set because of this criterion, rendering the final analysis to be based on 29 sites. These 29 sites were repeated for 2015 through 2017-night belt observations.

In 2017, NHTSA required a "resample of sites" used in the 2012 design. Using the same method described above, 35 of these new sites were selected for nighttime observations. Four of these sites had fewer than 5 observations. These 4 sites were excluded from analysis. All results from the 2019 nighttime observations are based on the remaining 31 sites. There were no observations conducted in 2020 due to the COVID-19 pandemic, but observations resumed in 2021. All 35 sites were observed, and all 35 sites had at least 5 observations and were included in the analyses. Another resample of the daytime sites occurred in 2022, but, for the sake of a consistent year-to-year comparison, the night sites did not change with the most recent daytime resample.

Site information, including county name, city/town/area identifier, exact roadway location, date, day of week, time, weather condition, direction of traffic flow and roadway lane(s) was documented by observers. Each one-page data collection form had space to record information on 70 vehicles, the driver of that vehicle, and the outboard front seat passenger, if one was present. Multiple pages could be used to record belt use in any observation session as needed.

Preusser Research Group, Inc. (PRG) provided experienced observers to collect the data. All were trained to follow the procedures shown in Appendix A. Specifically, observers were trained to observe proper shoulder belt use (vs. improper or no use) of the driver and, if present, a right "outboard" (aka window-adjacent) front seat passenger. Observations were made for passenger vehicles and certain commercial vehicles. These same methods have been used in Maine since 2012 for both daytime and nighttime belt use observations and in numerous other states where PRG conducts similar work.

Observers were given descriptions of the road segment and the direction of traffic to be observed. Guidance was also provided as to the exact location from which observations should be made. Observers had the option of adjusting their location within the road segment if conditions made the recommended location unusable or unrepresentative (e.g., construction, nearby traffic rerouting, traffic crash, etc.), but they did not need to make such adjustments in 2025. Many roads had two or more lanes of traffic. In such situations, the observation period (45 minutes) was divided by the number of lanes, each lane being observed for the proportional length of time. For example, a road with three lanes would require that each lane be observed for 15 minutes.

Observations were made for 45 minutes at each location. Each observer was given a detailed schedule that included site description, mapping/location information, observation times and a structured schedule of observation times and days. The schedule was designed to maximize the opportunity to study variations in restraint use by time of day and by day of week (e.g., day/night, weekday/weekend). Nighttime observation assignments were made across a schedule beginning at 9:00 p.m. and ending at 2:45 a.m. Road segments were randomly assigned to a day of week and time of day for observations, although geographical proximity was given some consideration for travel to locations that required substantial drive times. Each day and time had an equal probability of selection.

When needed (e.g., in zero overhead lighting locations), military grade night vision goggles and 2 million candle-power handheld infrared spotlights were used. Two staff members were needed when using this specialized night vision equipment during observations. One staff member (observer) would observe belt use through the night vision goggles while shining the infrared light at the vehicle. This person would also call out the data while the other staff member (recorder) would write down information on the observation data sheet.

Results

Data were collected post-CIOT, from June 22-25, 2025 (Observation Team 1) and July 6-13, 2025 (Observation Team 2). In all, there were 1,200 passenger vehicle drivers along with 426 passengers, for a total of 1,626 vehicle occupants (including 2 occupants with unknown use rates). The numbers of observed occupants at the sites ranged from 3 to 179; data from three sites were excluded from the weighted use calculation because they had fewer than 5 occupants observed. Weighted belt use was calculated using an average of belt use percentages at 32 sites, resulting in an overall nighttime statewide belt use rate of **90.2%**. Table 1 places these observations in context with those made in 2008 (Chaudhary et al., 2010) through 2025. Night belt use in 2025 was 0.6 percentage points higher than during the comparable time period in 2024 (89.6%).

Table 1. Statewide Night Belt Use, by Wave (Weighted)

	Obs. Dates	***Night Belt Use***
Wave 1	2/24 – 3/1/2008	69.3%
Wave 2	4/25 – 5/3/2008	76.9%
Wave 3	5/30 – 6/12/2008	81.2%
Wave 4	5/30 – 6/13/2009	80.1%
Wave 5	6/6-6/12/2010	77.1%
Wave 6	6/3-6/11/2011	79.0%
Wave 7	6/4-6/9/2012	87.6%
Wave 8	6/1-6/9/2013	87.2%
Wave 9	5/30-6/12/2014	84.3%
Wave 10	5/29-6/1/2015	84.0%
Wave 11	6/4-6/17/2016	81.6%
Wave 12	6/8-6/15/2017	86.8%
Wave 13	6/6-6/22/2018	88.3%
Wave 14	6/7-6/20/2019	90.6%
Wave 15	6/15-6/24/2021	83.8%
Wave 16	6/15-7/13/2022	84.8%
Wave 17	6/17-6/29/2023	77.5%
Wave 18	6/20-7/13/2024	89.6%
Wave 19	**6/22-7/13/2025**	**90.2%**

Table 2 shows belt use rate differences (using raw unweighted data) by roadway type, vehicle type, sex, and person type (driver or passenger). Seat belt use did not vary significantly across roadway types. Belt use was highest on rural arterials and lowest urban arterials. There was a significant effect with vehicle type (χ^2 (3) = 49.920, $p < 0.001$); pickup trucks showed much lower belt use rates when compared to the other vehicle types. Nighttime vehicle type results mimic typical daytime patterns where pickup truck use rates (77.9%) were the lowest of

all vehicle types. Belt use was highest in SUVs (92.9%), followed by Vans (92.7%), and Cars (90.7%).

Female occupants had significantly higher use rates (94.6%) than male occupants (85.3%) (χ^2 (1) = 38.157, $p < 0.001$). The difference between driver (88.9%) and passenger seat belt use (92.2%) was *approaching* statistical significance (χ^2 (1) = 3.787, $p > 0.05$).

Table 2. Night Belt Use, June 2025, by Road Type, Vehicle Type, Person Type, and Role[1]

Road Functional Class Category*	**N**	**Night Belt Use**
Expressways	241	89.6%
Urban Other Arterials	702	88.2%
Rural Other Arterials	358	91.6%
Collectors	325	91.4%
Vehicle Type*		
Passenger Cars	507	90.7%
Pickups	263	77.9%
SUVs	774	92.9%
Vans	82	92.7%
Sex**		
Male	844	85.3%
Female	777	94.6%
Occupant Type (Driver/Passenger)		
Driver	1200	88.9%
Passenger	426	92.2%

[1] Raw (unweighted) percentage

* Significance level p< .05

** Significance level p< .001

Discussion

The observed nighttime seat belt use rate in 2025 is the highest since 2019 (the highest recorded nighttime seat belt use rate in Maine to date). Nighttime non-belt use has been associated with alcohol use while driving and could be indicative of a change in this behavior. Nighttime crashes resulting in fatalities are overrepresented (i.e., higher than the traffic volume would account for compared to daytime crashes). These factors make a decline in nighttime seat belt use an important value to watch.

Typically, we do not see much difference in nighttime use rates by roadway functional classes; this was the case in 2025. Belt use was highest on rural arterials and lowest on urban arterials. The most notable differences in belt use 2025 were observed between males and females, and pickup truck drivers versus SUV/Van/Car drivers. Both trends were similar in daytime observations as well. Female drivers had a significantly higher use rate (94.6%) than male drivers (85.3%) at night (χ^2 (1) = 38.157, $p < 0.001$). Pickup trucks showed much lower belt use rates when compared to the other vehicle types during 2025 night observations (χ^2 (3) = 49.920, $p < 0.001$)

There was a similar pattern of use at night and during the day based on sex and vehicle type. Both daytime (2025) and nighttime (2024) observations showed lower use among men and pickup truck drivers. While not quite statistically significant at night this year, another similarity is the higher use among passengers than drivers (this may be attributable to more females being passengers than men at night).

The 2025 nighttime seat belt use in Maine was lower than the daytime rates in 2025 (92.2%), 2024 (93.8%), and 2023 (94.5%), by 2.0, 3.6, and 4.3 percentage points, respectively. The 2025 nighttime belt use rate was slightly higher than the 2024 night belt rate (by 0.6%). Incidentally, there was an unusually high nighttime rate observed in 2019 (that was higher than the 2019 daytime rate), but the recent nighttime surveys suggest that the 2019 nighttime rate may have been artificially inflated due to some unknown anomaly. It is important to note that there are relatively few night observations (i.e., low N) overall so some variability in the year-to-year rate can be expected.

Since 2012, night belt use rates in Maine have failed to show any consistent pattern. It might be useful to consider increasing the time spent during observation periods to boost the Ns (e.g., observing for 60 or 90 minutes vs. the current 45 minutes) or adding more site locations at which data collection occurs. The 2026 survey, if it occurs, may be updated with new sites selected from the resampled statewide daytime sites that occurred in 2022. Alternatively, the current sites may be left in to maintain some level of consistency for historical comparison purposes. A hybrid method of site selection that incorporates both existing and brand new night sites may be beneficial to consider in the future.

Interestingly, while night belt use has continued to increase over the past few years, daytime belt use appears to be on a gradual but steady decline. Further exploration into the possible reason why may be helpful to the state when planning future programming efforts. If the State would like to fund additional rounds of observations at different times of year, perhaps some questions could be answered. It is important to note that Maine is still above the (daytime) national average of 91.2% seat belt use (NHTSA, 2024).

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Appendix A. Maine Seat Belt Observation Instructions

Qualifying vehicles include passenger automobiles, pickup trucks, recreational vehicles, jeeps, and vans (private, public, and commercial). Pickup trucks should be coded as "trucks." Jeeps, Broncos, Blazers, and other vehicles of that type should be coded as sport utility vehicles (SUVs). Recreational vehicles that are pickup or van "conversions" should be coded as a pickup or van. Do not include large trucks or buses. Eligible vehicles should be observed regardless of the state in which they are registered.

Emergency vehicles such as police, fire and ambulance, vehicles with mounted colored lights, government vehicles and taxis are to be recorded as long as they qualify as one of the above listed eligible vehicles. Ex. Fire department or Police SUV=SUV; Police cruiser=car.

Belt use will be observed for front seat occupants only. Observe and record data for the driver and passenger in the right front seat. If there is more than one front seat passenger, observe only the "outside" passenger. Do not record data for passengers in the back seat or for a passenger riding in the middle of the front seat.

If a child is present in the front seat in a child restraint seat, do not record anything. However, children riding in the right front seat, regardless of age, who are not in child restraint seats should be observed as any other right front seat passenger. Children in booster seats should be observed.

Each observation period will last for exactly 45 minutes.

The following procedures will be used in conducting observations of seat belt use:

As you observe a qualifying vehicle, record the type of vehicle (car, truck, SUV, van), the occupants' sex (male, female, unknown), and shoulder restraint use (yes, no, unknown) of the front seat occupants (driver and front seat "outside" passenger only). If there is no qualified passenger, leave the passenger fields blank. If you cannot tell whether there is a qualified right front seat passenger, code "U" in the passenger gender box.

Code restrained if you observe the shoulder belt properly positioned over the shoulder. If you notice a lap belt in use without a shoulder belt, it should be recorded as not restrained. Only shoulder belts are to be counted. Even if the vehicle likely has no shoulder belts, code the occupant(s) as not restrained.

If the person is using the shoulder belt improperly, e.g., has the shoulder strap under his/her arm or behind the back, this should be recorded as not restrained. If you can't tell shoulder belt use at all, code unknown.

If there are multiple lanes in the "observed direction" and traffic is too dense to code all lanes at once, observe traffic in each lane for an equal amount of time, and in the direction specified, throughout the 45-minute observation time period.

In many situations, it will be possible to observe every vehicle in the designated lane(s). However, if there is too much traffic for you to observe every vehicle, you should determine a reference point up the road in the appropriate lane. Observe the next vehicle to pass the reference point after the last vehicle has been coded.

Do not observe if rain, fog, or other inclement weather makes it impossible to do so safely or accurately. If you arrive at a site and it begins to rain, do not collect data in the rain. Find a dry place and wait up to 15 minutes to see if the rain stops. If the rain does stop, begin observing again and extend the observation period accordingly to make up for the time missed. Otherwise, you will have to contact your supervisor to reschedule the site. (Note: you may continue observations in light fog, drizzle, or mist).

If more than one data sheet is used, staple or paper clip the sheets together at the end of the observation period and note the number of sheets used at the top of the first data page.

It may happen that the site you are assigned is seriously compromised due to construction or other special activity. If this occurs, you may move one block in either direction on the same street such that you are observing the same stream of traffic that would have normally been observed had there been no obstruction. If moving one block will not solve the problem, then do not conduct the observation. Notify your supervisor; an alternate site will be selected and observed at a future time.

The following procedures will be used in rescheduling observations of seat belt use.

If the site is temporarily unusable, e.g., due to bad weather or temporary traffic congestion, etc.:

- Inform your supervisor of the problem as soon as practical.
- With your supervisor's assistance, reschedule the same site to be observed at the same time of day/day of week.

If the site cannot be used during this observation schedule, e.g., due to construction:

- Inform your supervisor of the problem as soon as practical.
- With your supervisor's assistance, schedule an equivalent alternate site to be observed at the same time of day and day of the week. The alternate site must be in the same county and of the same roadway type. Your supervisor will provide a specific alternate site to be observed; you may not simply pick any other roadway to observe.

Appendix B. Maine Seat Belt Observation Form

SITE NUMBER:_____ **SITE:**_____

NOTES:_____

DATE: _____ - _____ - _____ **DAY OF WEEK:** _____

WEATHER CONDITIONS
1 Clear / Sunny **4 Fog**
2 Light Rain **5 Clear but Wet**
3 Cloudy

DIRECTION OF TRAFFIC FLOW (Circle one): N S E W

START TIME:_____ **(Observation period will last exactly 45 minutes)**

	DRIVER			PASSENGER			DRIVER			PASSENGER	
Veh. #	Vehicle C = car T = truck S = suv V = van	Sex M = male F = female U = unsure	Use + = yes - = no U = unsure	Sex M = male F = female U = unsure	Use + = yes - = no U = unsure	Veh. #	Vehicle C = car T = truck S = suv V = van	Sex M = male F = female U = unsure	Use + = yes - = no U = unsure	Sex M = male F = female U = unsure	Use + = yes - = no U = unsure
1						36					
2						37					
3						38					
4						39					
5						40					
6						41					
7						42					
8						43					
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