U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Crash • Stats

NHTSA

DOT HS 813 522 | A Brief Statistical Summary | November 2023

Early Estimates of Motor Vehicle Traffic Fatalities and Fatality Rate by Sub-Categories Through June 2023

Introduction and Summary

NHTSA has recently issued a projection report of traffic fatalities and the fatality rate per 100 million vehicle miles traveled (VMT) for the first half of 2023 (*Early Estimate of Motor Vehicle Traffic Fatalities for the First Half (Jan–Jun) of 2023,* Report No. DOT HS 813 514). That report shows an estimated 19,515 people died in motor vehicle traffic crashes during the first half of 2023, a decrease of about 3.3 percent as compared to 20,190 fatalities projected to have occurred in the first half of 2022. The estimated fatality rate for the first half of 2023 is 1.24 fatalities per 100 million VMT, down from the projected rate of 1.31 fatalities per 100 million VMT in the first half of 2022.

This NHTSA report is being issued after conducting a special analysis of the fatalities and the fatality rates per 100 million VMT by key sub-categories through June 2023. The analysis is based on ratio-adjusted estimates of 2023 fatal crash data coded thus far into NHTSA's Fatality Analysis Reporting System (FARS), as described in the Data and Methodology section.

There are decreases across most of the sub-categories. The trends of traffic fatalities in the first half of 2023 as compared to the first half of 2022 in the key sub-categories are summarized as follows.

- on rural interstates (down 14%), rural arterials (up 3%), rural collectors/local (up 4%), and urban collectors/local (down 10%)
- at night (down 3%)
- during weekends (down 3%)
- during out-of-State travel (up 3%)
- in older (vehicle age ≥ 10 years) passenger vehicles (down 5%)
- in passenger vehicle rollover crashes (down 6%)
- ejected (down 11%)
- in single-vehicle crashes (down 6%)
- in on-roadway (not roadway departure) crashes (up 1%)
- in speeding-related crashes (down 8%)
- in the 15–24 age group (up 6%) and the 65 and older age group (up 3%)
- males (down 3%) and females (down 5%)
- unrestrained occupants of passenger vehicles (down 7%)
- drivers (down 3%) and passengers (remained flat)
- passenger vehicle occupants (down 5%)
- motorcyclist fatalities (down 4%)
- pedestrian fatalities (down 4%)
- pedalcyclist fatalities (down 3%)
- in crashes involving at least one large truck (down 11%)

Additionally, the trend of the total fatality rate per 100 million VMT in the first half of 2023 was strongly driven by the trends in the fatality rates per 100 million VMT on the rural arterials, rural local/collector/street roadways, and urban arterials.

Data and Methodology

NHTSA uses the Early Notification (EN) data and Monthly Fatality Counts (MFC) data for the early estimate of motor vehicle traffic fatalities every month. However, EN data and MFCs do not include detailed crash characteristics and information necessary to compute fatality counts and fatality rates by sub-categories. NHTSA's FARS data includes such detailed information but is incomplete at this point since not every case has been entered into FARS. This analysis adjusts fatal crash cases currently coded for 2023 into NHTSA's FARS and scales it up to the most recent estimates of fatality counts in 2023 (see cited 2023 early estimates report above, DOT HS 813 514).

The estimates of fatalities by sub-categories are carried out in two steps. The first step is to inflate current 2023 total cases coded into NHTSA's FARS data (FARS_23) to the estimated total fatalities (F_Est_23) that are from the early estimated fatalities based on latest EN and MFC data. In general, the inflation rate (IR) is calculated by the formula here.

$$IR = \frac{F\_Est\_23}{FARS\_23}$$

Inflation rates are computed for each month (m) and region (r) for a total of 60 inflation rates (6 months x 10 regions).

$$IR_{mr} = \frac{F\_Est\_23_{mr}}{FARS\_23_{mr}}$$

Generally, the earlier the crash month the smaller the inflation rate as the data has relatively stabilized. In the second step, the inflation rate (IR_{mr}) is then used as the *weight* in the frequency calculation for the estimate of fatalities by each sub-category variable. For instance, to compute the estimated male fatalities in month m and region r, the count of male fatalities in FARS, $FARS\_23\ (Sex_{male})_{mr}$, is weighted by the inflation rate IR_{mr} as follows, $F\_Est\_23\ (Sex_{male})_{mr} = FARS\_23\ (Sex_{male})_{mr} \times IR_{mr}$. For a different interpretation, the estimated number of male fatalities in month m and region r can also be seen as the estimated fatalities in month m and region r multiplied by the fraction of male fatalities in FARS data ($FARS\_23$) for month m and region r.

$$F\_Est\_23\ (Sex_{male})_{mr} = F\_Est\_23_{mr} \times \left(\frac{FARS\_23(Sex_{male})_{mr}}{FARS\_23_{mr}} \right)$$

The two metrics NHTSA mainly examined are the relative proportion of fatalities in each level of the sub-category variables (i.e., the *percentage distribution* of fatalities) or the *percentage* of the total fatalities, and the actual yearly fatality counts (fatalities) and the percentage change in fatalities from the first half of 2022 [2022 H1] to the first half of 2023 [2023 H1] for each level of the sub-category variables.

Estimated fatalities by sub-categories may vary due to the continuous updating of 2023 FARS data ($FARS\_23_{mr}$), especially for several sub-category variables (e.g., speeding, roadway departure, and rollover[1]) that may take extra time to report and code (see "Limitations" section). However since the results (the percentage distribution of fatalities or the percentage of the total fatalities) have been nearly identical in each of the 3 months prior to publication, the estimates are considered to be relatively stable.

[1] Further adjustments of these three factors in this report have been made.

Results

This report examines the same major factors that NHTSA previously reviewed and investigated in 2021, and the results were published in *Early Estimates of Motor Vehicle Traffic Fatalities and Fatality Rate by Sub-Categories in 2021* (DOT HS 813 298). These key factors may be linked to changes in driving and travel patterns and transportation options owing to COVID-19 emergency measures.

The study results of projected fatalities for the first half of 2023 compared with the projected fatalities during the first half of 2022 are presented below. The data for 2022 are from the sub-categories analysis report in 2022 (*Early Estimates of Motor Vehicle Traffic Fatalities and Fatality Rate by Sub-Categories in 2022,* DOT HS 813 448). Note that beginning in 2021, NHTSA changed to vPIC-based vehicle classifications for data extractions, analysis, projections and reporting.

Fatalities

The findings for the trends of sub-category variables are based on the comparison of two metrics.

1. The *percentage distribution* of fatalities or the *percentage* of total fatalities, between the same month of 2022 and 2023 (labeled by [22] and [23] in the comparison of 2-year results).
2. The estimated fatality counts (fatalities) and the percentage change in fatalities from 2022 H1 to 2023 H1 for each sub-category variable.

They are summarized as follows (see Tables 1 and 2 and Figure 1 for details).

Roadway and Environmental Factors

- The proportion of estimated fatalities in *rural* areas increased from March to June (Figure 1). The greatest increase occurred in June (49% [23] *versus* 45% [22]) and March (43% [23] *versus* 39% [22]). Total estimated fatalities increased by 1 percent in *rural* areas from 2022 H1 to 2023 H1.

  Specifically, as shown in Table 1, the share of estimated fatalities increased on *rural arterials* in January, March and June, and on *rural collector/local* roads from February to June. Total estimated fatalities increased on *rural arterials* (up 3%), and *rural collector/local* roads (up 4%) from 2022 H1 to 2023 H1. Conversely, the estimated fatalities on *rural interstate* and *urban collector/local* roads decreased by 14% and 10%, respectively, from 2022 H1 to 2023 H1.

- The proportion of estimated fatalities during *nighttime* (6 p.m. to 5:59 a.m.) increased in April (56% [23] *versus* 53% [22]) (Figure 1). Total estimated fatalities during *nighttime* decreased by 3 percent from 2022 H1 to 2023 H1. Note that the total estimated fatalities during *daytime* also decreased by 4 percent from 2022 H1 to 2023 H1.
- As displayed in Figure 1, the proportion of estimated fatalities that occurred during *weekends* (6 p.m. Friday to 5:59 a.m. Monday) increased in June (43% [23] versus 39% [22]). Total estimated fatalities decreased by 4 and 3 percent during the *weekdays* and the *weekends,* respectively, from 2022 H1 to 2023 H1.
- The proportion of estimated passenger vehicle (PV) occupant fatalities that occurred during *out-of-State* travel increased from January to April and in June, indicating that more people traveled long distances during these months of 2023 compared to the same months of 2022. Total estimated passenger vehicle occupant fatalities that occurred during *out-of-State* travel increased by 3 percent from 2022 H1 to 2023 H1.

Vehicle-Related Characteristics

- The estimated PV occupant fatalities decreased by 5 percent in *older vehicles* (vehicle age ≥ 10 years) from 2022 H1 to 2023 H1 (Figure 1). Note that the estimated PV occupant fatalities in *newer vehicles* (vehicle age < 10 years) also decreased by 7 percent.
- The estimated PV occupant fatalities in *rollover* crashes decreased by 6 percent from 2022 H1 to 2023 H1 (Table 2).
- As displayed in Figure 1, the estimated fatally injured PV occupants *who were ejected,* as a proportion of all fatalities, decreased in most months from January to June. Total estimated fatalities for PV occupants *who were ejected* decreased by 11 percent from 2022 H1 to 2023 H1. This is partially due to a decrease in estimated *unrestrained* PV occupant fatalities, as described in the person-related characteristics section.
- As shown in Table 1, total estimated fatalities in *single-vehicle* crashes decreased by 6 percent from 2022 H1 to 2023 H1.
- Total estimated fatalities in *roadway departure/on-roadway* crashes decreased and increased by 8 and 1 percent, respectively, from 2022 H1 to 2023 H1, as shown in Table 1.
- The *speeding-related* fatalities decreased by 8 percent from 2022 H1 to 2023 H1 (Table 2).

Person-Related Characteristics

- As shown in Table 1, total estimated traffic fatalities among people *25 to 64 years old* decreased from 2022 H1 to 2023 H1. However, total estimated fatalities increased by 6 and 3 percent for people *15 to 24 years old* and *65 and older,* respectively, from 2022 H1 to 2023 H1.
- As displayed in Table 1, the total estimated *male* and *female* fatalities decreased by 3 and 5 percent, respectively, from 2022 H1 to 2023 H1.
- As shown in Figure 1, total estimated *unrestrained* PV occupant fatalities decreased by 7 percent from 2022 H1 to 2023 H1.

Fatalities by Person Type and in Crashes Involving Large Trucks

As shown in Table 2, the following results for the percentage change of estimated fatalities from 2022 H1 to 2023 H1 are observed:

- Total estimated *driver* fatalities decreased by 3 percent.
- Total estimated *passenger* fatalities remained flat.
- Total estimated *PV occupant* fatalities decreased by 5 percent.
- Total estimated *motorcyclist* fatalities decreased by 4 percent.
- Total estimated *pedestrian* fatalities decreased by 4 percent.
- Total estimated *pedalcyclist* fatalities decreased by 3 percent.
- Total estimated fatalities in crashes *involving at least one large truck* decreased by 11 percent. A large truck is defined as any medium or heavy truck, excluding buses and motor homes, with a gross vehicle weight rating (GVWR) greater than 10,000 pounds. These large trucks include both commercial and non-commercial vehicles.

Table 1: Relative Proportion of Fatalities by Roadway Function Class, Age Group, Sex, and Crash Type for 2022–2023

Fatalities		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (H1)	% change
2022		3,230	3,045	3,370	3,230	3,680	3,635	3,860	3,900	3,930	4,015	3,450	3,450	20,190	
2023		3,015	2,900	3,080	3,360	3,600	3,560							19,515	-3.3%
Roadway Function Class															
Rural Interstate	2022	5%	5%	6%	4%	5%	5%	6%	5%	4%	5%	4%	6%	1,025	
	2023	4%	5%	5%	5%	5%	4%							884	-14%
Urban Interstate	2022	10%	9%	9%	8%	8%	9%	8%	8%	8%	7%	9%	9%	1,755	
	2023	10%	8%	8%	9%	8%	8%							1,665	-5%
Rural Arterial	2022	18%	19%	17%	20%	19%	19%	18%	19%	22%	22%	21%	21%	3,751	
	2023	20%	18%	21%	19%	19%	21%							3,874	3%
Urban Arterial	2022	39%	40%	40%	39%	37%	33%	34%	34%	34%	34%	36%	37%	7,640	
	2023	40%	38%	37%	38%	36%	32%							7,189	-6%
Rural Collector/Local	2022	15%	16%	16%	17%	19%	21%	22%	21%	19%	19%	17%	17%	3,550	
	2023	15%	17%	18%	19%	20%	25%							3,688	4%
Urban Collector/Local	2022	13%	11%	13%	12%	12%	12%	12%	13%	12%	12%	12%	11%	2,469	
	2023	11%	13%	11%	10%	12%	10%							2,215	-10%
Age Group															
<15	2022	2%	3%	3%	3%	3%	3%	4%	3%	3%	3%	2%	2%	522	
	2023	2%	2%	3%	3%	3%	2%							516	-1%
15–24	2022	15%	15%	17%	16%	16%	16%	16%	16%	15%	17%	17%	15%	3,228	
	2023	17%	16%	16%	19%	18%	19%							3,416	6%
25–34	2022	19%	21%	19%	19%	20%	20%	20%	19%	19%	18%	19%	18%	3,965	
	2023	19%	20%	19%	18%	18%	18%							3,655	-8%
35–44	2022	18%	16%	16%	16%	15%	15%	17%	16%	16%	16%	15%	16%	3,225	
	2023	15%	15%	15%	15%	15%	15%							3,059	-5%
45–54	2022	14%	14%	14%	13%	14%	12%	14%	13%	14%	13%	13%	12%	2,728	
	2023	12%	13%	13%	13%	12%	14%							2,506	-8%
55–64	2022	14%	14%	13%	15%	15%	16%	13%	14%	14%	13%	13%	14%	2,912	
	2023	14%	13%	13%	14%	14%	14%							2,652	-9%
65+	2022	18%	18%	19%	18%	18%	17%	17%	19%	19%	20%	20%	23%	3,610	
	2023	20%	20%	21%	17%	19%	18%							3,712	3%
Sex															
Male	2022	71%	72%	71%	73%	72%	74%	73%	73%	73%	73%	72%	72%	14,581	
	2023	71%	72%	70%	72%	74%	74%							14,165	-3%
Female	2022	29%	28%	29%	27%	28%	26%	27%	27%	27%	27%	28%	28%	5,609	
	2023	29%	28%	30%	28%	25%	26%							5,350	-5%
Crash Type 1: Single- Versus Multi-Vehicle															
Multi-Vehicle	2022	44%	45%	46%	47%	48%	46%	46%	45%	47%	45%	44%	44%	9,279	
	2023	46%	47%	47%	47%	50%	46%							9,233	0%
Single-Vehicle	2022	56%	55%	54%	53%	52%	54%	54%	55%	53%	55%	56%	56%	10,911	
	2023	54%	53%	53%	53%	50%	54%							10,282	-6%
Crash Type 2: Roadway-Departure-Related															
Departure	2022	49%	49%	47%	50%	47%	49%	47%	47%	47%	47%	47%	48%	9,779	
	2023	46%	46%	47%	46%	46%	46%							9,013	-8%
On-Roadway	2022	51%	51%	53%	50%	53%	51%	53%	53%	53%	53%	53%	52%	10,411	
	2023	54%	54%	53%	54%	54%	54%							10,502	1%

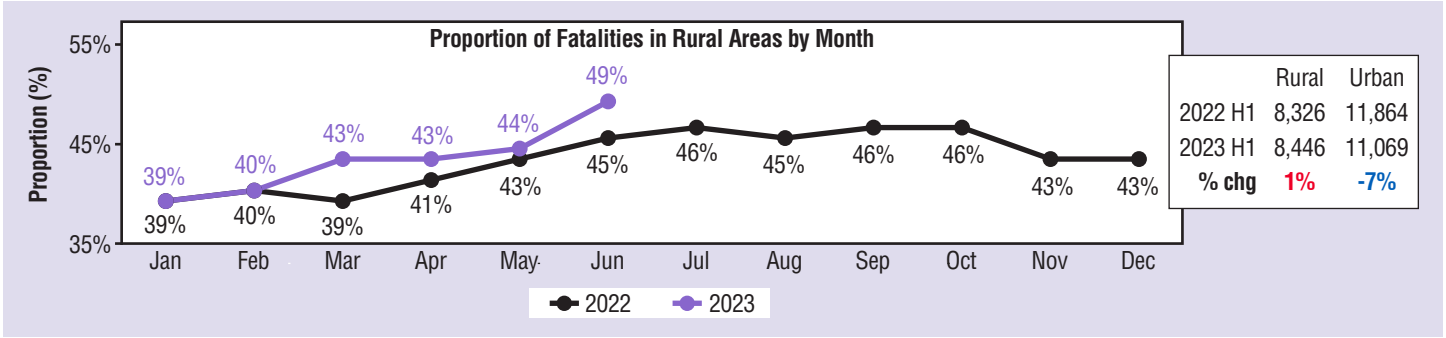
Notes: The last two columns contain fatalities and percentage change from 2022 H1 to 2023 H1. Unknown cases are proportionally imputed. Numbers in red/blue indicate the increase/decrease in the month (or the first half) of 2023 as compared to the same month (or the first half) of 2022 (in bold black).
Source: 2022 and 2023 statistical projections.

Table 2: Fatalities by Person Type, in Large-Truck-Related/Speeding-Related/PV Occupant in Rollover Crashes, as a Percentage of Total Fatalities for 2022–2023

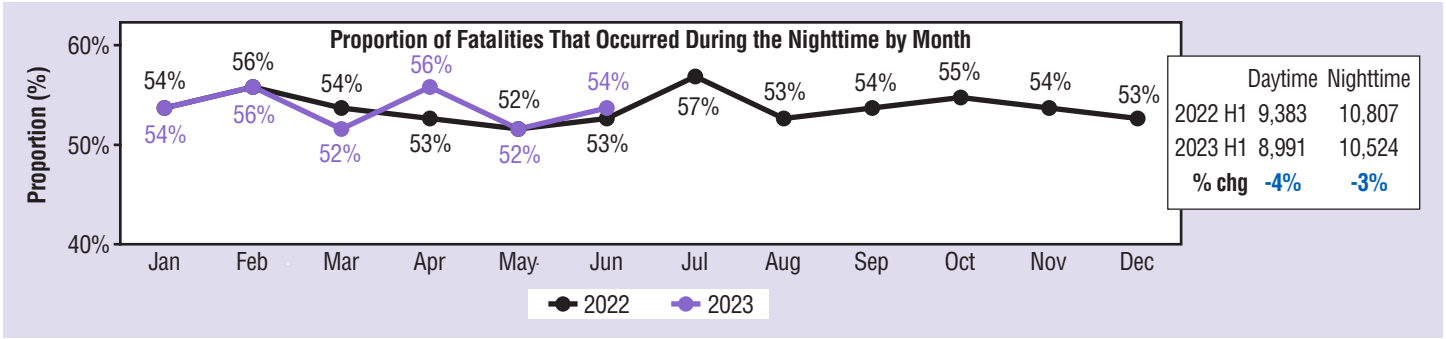
Fatalities		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% change
2022		3,230	3,045	3,370	3,230	3,680	3,635	3,860	3,900	3,930	4,015	3,450	3,450	20,190	
2023		3,015	2,900	3,080	3,360	3,600	3,560							19,515	-3.3%
Driver	2022	55%	52%	51%	50%	47%	48%	47%	47%	47%	50%	52%	55%	10,205	
	2023	54%	51%	52%	49%	48%	50%							9,882	-3%
Passenger	2022	15%	15%	14%	14%	16%	14%	17%	14%	14%	14%	15%	15%	3,002	
	2023	16%	16%	15%	16%	15%	15%							3,008	0%
PV Occupant	2022	68%	64%	61%	60%	58%	56%	57%	54%	55%	57%	60%	61%	12,259	
	2023	63%	62%	61%	59%	56%	57%							11,593	-5%
PV Occupant Rollover	2022	18%	17%	15%	18%	17%	17%	16%	17%	16%	16%	16%	17%	3,455	
	2023	17%	18%	15%	17%	17%	17%							3,243	-6%
Motorcyclist	2022	6%	9%	12%	16%	20%	21%	19%	18%	18%	13%	9%	5%	2,866	
	2023	6%	10%	11%	16%	20%	19%							2,757	-4%
Pedestrian	2022	21%	20%	19%	16%	14%	13%	13%	16%	17%	19%	20%	20%	3,406	
	2023	21%	20%	19%	16%	14%	13%							3,280	-4%
Pedalcyclist	2022	2%	3%	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	468	
	2023	3%	2%	3%	2%	2%	2%							455	-3%
Involving Large Trucks	2022	14%	14%	15%	14%	13%	14%	12%	14%	14%	14%	13%	13%	2,862	
	2023	14%	13%	13%	12%	13%	12%							2,549	-11%
Speeding Related	2022	29%	28%	28%	28%	28%	28%	26%	26%	27%	26%	27%	27%	5,682	
	2023	26%	26%	26%	27%	28%	26%							5,202	-8%

Notes: The last two columns contain fatalities and percentage change from 2022 H1 to 2023 H1. Unknown cases are proportionally imputed. Numbers in red/blue indicate the increase/decrease in the month (or the first half) of 2023 as compared to the same month (or the first half) of 2022 (in bold black).
Source: 2022 and 2023 statistical projections.

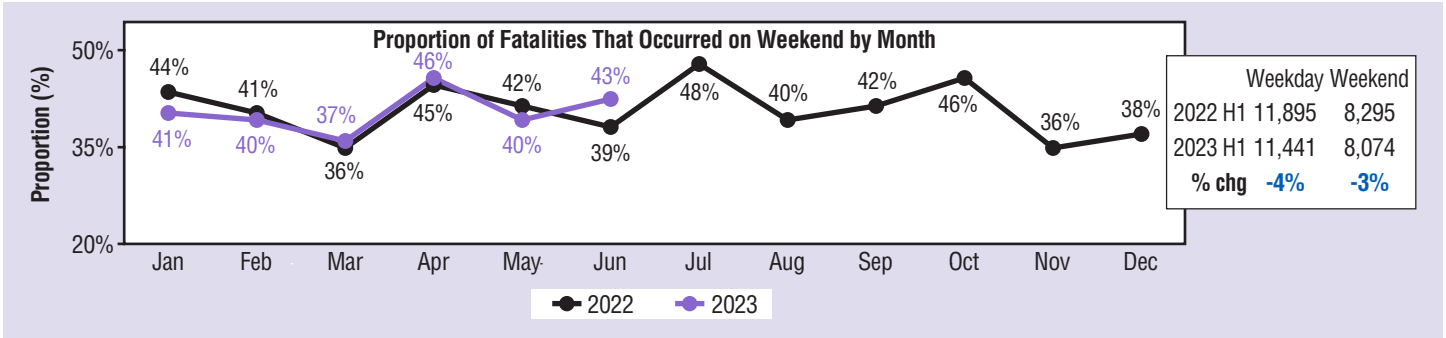
Figure 1: Relative Proportion of Total Fatalities by Rural/Urban, Time of Day, Day of the Week, and PV Occupant Fatalities by Vehicle Travel Pattern, Vehicle Age, Ejection Status, and Restraint Use for 2022–2023



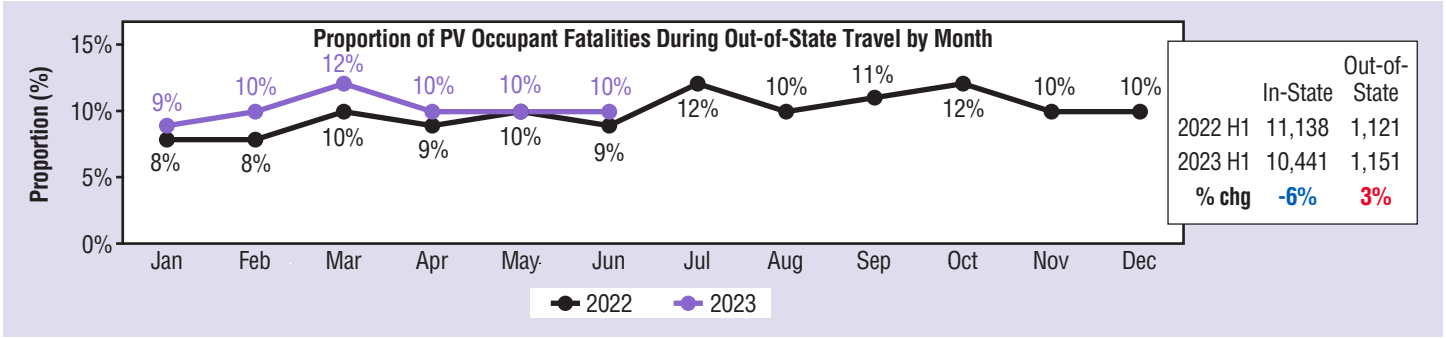
	Rural	Urban
2022 H1	8,326	11,864
2023 H1	8,446	11,069
% chg	1%	-7%



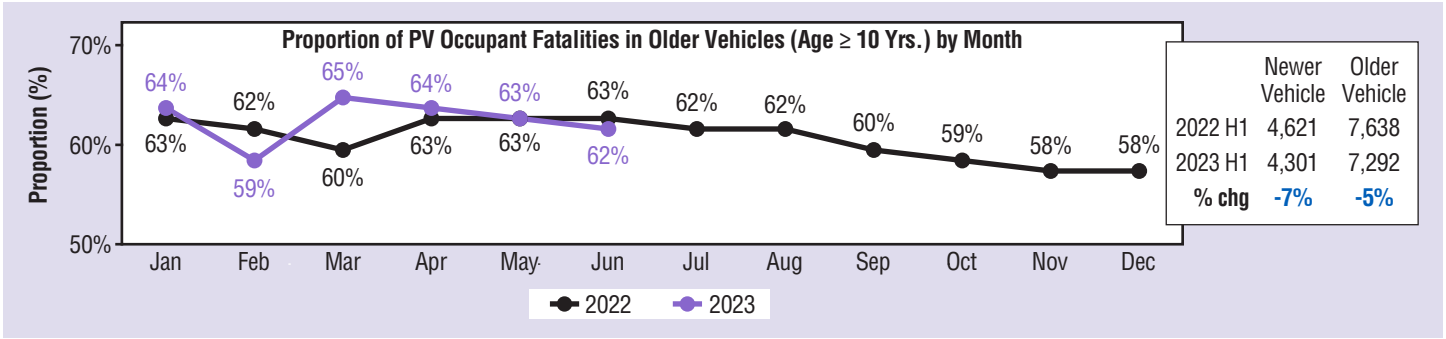
	Daytime	Nighttime
2022 H1	9,383	10,807
2023 H1	8,991	10,524
% chg	-4%	-3%



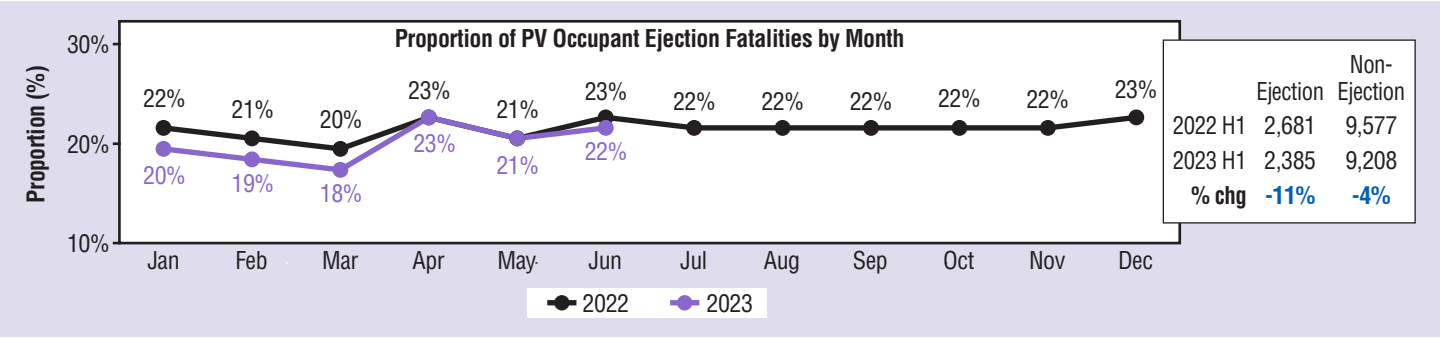
	Weekday	Weekend
2022 H1	11,895	8,295
2023 H1	11,441	8,074
% chg	-4%	-3%

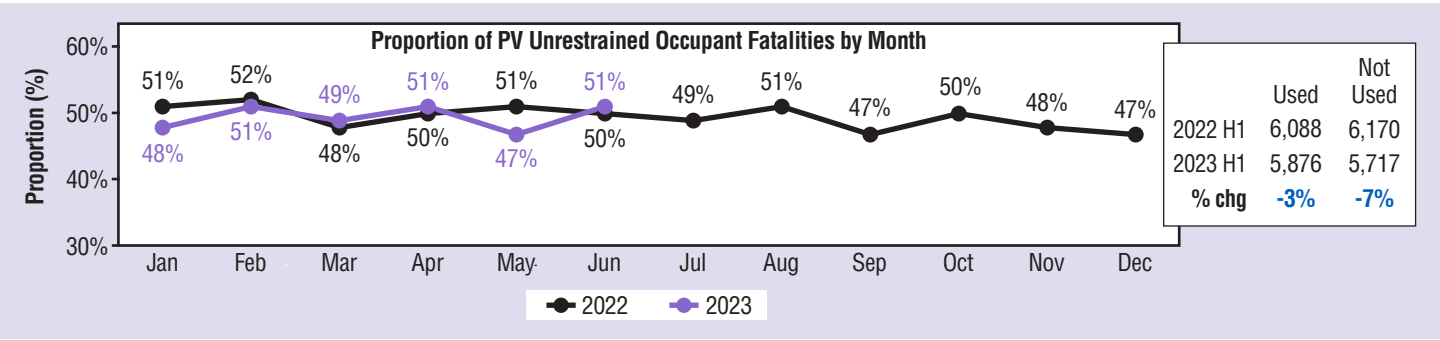


	In-State	Out-of-State
2022 H1	11,138	1,121
2023 H1	10,441	1,151
% chg	-6%	3%



	Newer Vehicle	Older Vehicle
2022 H1	4,621	7,638
2023 H1	4,301	7,292
% chg	-7%	-5%



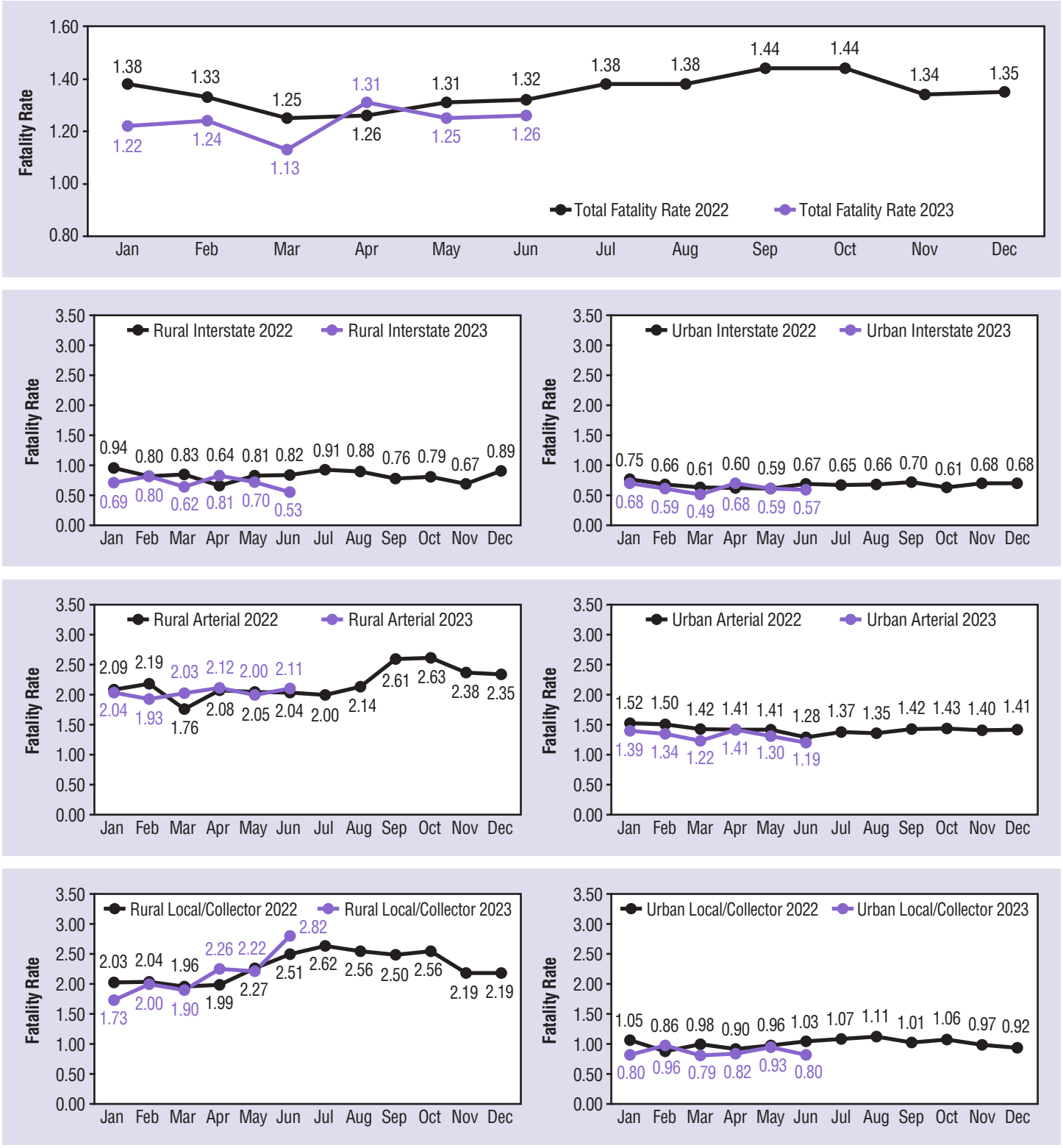


Notes: The text box in the chart contains fatality counts and the percentage change from 2022 H1 to 2023 H1. Unknown cases are proportionally imputed.
Source: 2022 and 2023 statistical projections.

Fatality Rate

The total fatality rate per 100 million VMT is broken down by roadway function class: rural versus urban interstates, arterials, local/collector/streets. The results shown in Figure 2 indicate that the trend of the total fatality rate per 100 million VMT from January to June 2023, is mainly driven by the fatality rate per 100 million VMT on the *rural arterials, rural local/collector/street* roadways, and *urban arterials,* based on the magnitude of the fatality rate by roadway function class. Overall, the estimated fatality rate for the first half of 2023 was 1.24 fatalities per 100 million VMT, down from the projected 1.31 fatalities per 100 million VMT during the first half of 2022.

Figure 2: Total Fatality Rate per 100 Million VMT and the Fatality Rate per 100 Million VMT by Roadway Function Class for 2022–2023



Note: Unknown cases are proportionally imputed.
Source: 2022 and 2023 statistical projections. FHWA June 2023 TVT for 2022 & 2023 VMT.

Limitations

In this study the fatal crashes currently coded for 2023 into NHTSA's FARS are used as a basis for constructing the gross estimates of traffic fatalities by sub-categories. The results from this analysis can be affected by two factors. First, any post-COVID-19 pandemic-related lag to fatal crash investigation and reporting are unknown and not captured in these projections. Second, the traditional FARS identification and reporting lag issue could also affect these estimates (e.g., the speeding-related, the roadway departure, and rollover crashes reporting and coding). The estimates for the month and the sub-categories for particular regions with higher inflation rate (IR_{mr}) are more likely to affect the sensitivity of the overall projections. Also, these calculations assume that the cases not yet coded into 2023 FARS are similar in the sub-categories to those that are already in the 2023 FARS. In short, the estimated results are subject to change as more information gets coded into these cases as well as when more cases are entered into 2023 FARS ($FARS\_23_{mr}$). These results may also change as the annual report file for 2023 (replace $F\_Est\_23_{mr}$) are available next year.

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For questions regarding the information presented in this report, please contact NCSARequests@dot.gov. This Crash•Stats and other general information on traffic safety can be found at https://crashstats.nhtsa.dot.gov/