

Government Status Report, 2023

Cem Hatipoglu, Ph.D., Associate Administrator,
Vehicle Safety Research

National Highway Traffic Safety Administration
(NHTSA)

United States

Crash Incidence Status

For years, NHTSA celebrated success in the downward trend of motor vehicle-related fatalities on America's roadways. There was a relatively steady decline in fatalities from 43,510 in 2005, to 32,744 fatalities in 2014. A slight uptick, though, in 2015 introduced uncertainty in the trends in motor vehicle-related fatalities and a concerted effort to understand changes in trends and identify potential new agency priorities. The nation experienced the loss of 36,355 people in 2019 before the greatest upending of societal and cultural norms most generations experienced due to the Coronavirus Pandemic (COVID-19). The Pandemic that began in early 2020 introduced change in a multitude of areas including roadway transportation, most notably in driving behavior.

After the declaration of the public health emergency in March 2020, driving patterns and behaviors in the United States changed significantly. Of the drivers who remained on the roads, some exhibited riskier behavior, including speeding, failure to wear seat belts, and driving under the influence of alcohol or other drugs.

In 2020 there were an estimated 5,250,837 police-reported traffic crashes in which 38,824 people were killed and an estimated 2,282,015 people were injured. Compared to 2019, this was a 6.8-percent increase in fatalities, but a 16.7-percent decrease in the estimated number of people injured in 2020. The estimated

number of police-reported crashes declined 22.3 percent from 2019 to 2020.

In 2020 there were 11,654 people killed in alcohol-impaired-driving crashes. Fatalities in alcohol-impaired-driving crashes increased by 14.3 percent from 2019 to 2020.

The number of speeding-related fatalities in 2020 increased by 17 percent from 2019, from 9,592 to 11,258.

The question became whether the increase in riskier behavior would continue? Would the return to more normal routines for individuals bring a return to expected behaviors and subsequently lower the number of fatalities on U.S. roads?

Projections for the number of fatalities in 2021 increased over 2020. The projections for the year show an estimated 42,915 people lost their lives in motor vehicle-related crashes. On top of the 6.8% increase from 2019 to 2020, the nation is expected to see an additional 10.5% increase in fatalities from 2020 to 2021, when the data are finalized.

Reaching into 2022, statistical projections of traffic fatalities for the first half of 2022 show that an estimated 20,175 people died in motor vehicle traffic crashes. This represents a marginal increase of about 0.5 percent as compared to 20,070 fatalities projected to have occurred in the first half of 2021. However, there is a hint of a potential turn or plateau in the data. The second quarter of 2022 represents the first decline in fatalities after seven consecutive quarters of year-to-year increases in fatalities, beginning with the third quarter of 2020.

Final data and analysis of crash characteristics and individuals involved in the crashes for 2021 are expected prior to the ESV Conference in April 2023 and will be included in the Global Focal Point presentation, along with more

current projections for 2022. These additional data will better inform NHTSA and efforts into countermeasures and programs to reduce motor vehicle crashes and the deaths, injuries, and societal and economic impacts that result from those crashes.

BIL Implementation

On November 15, 2021, President Joe Biden signed the Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law or BIL, into law. BIL is the largest long-term investment in America's infrastructure and economy in the Nation's history. This commitment makes historic investments in the transportation sector by improving public safety and climate resilience, creating jobs, and delivering a more equitable transportation future.

Specific to NHTSA, BIL increased NHTSA's budget by more than 50 percent, allowing NHTSA to make its most historic and largest investment into vehicle and highway traffic safety. In addition to the funding increases, BIL included a number of provisions targeting improved roadway safety such as mandated research studies, new vehicle safety requirements, considerations of advanced vehicle technologies, and increased data collection efforts.

The following provides an overview of a selection of provisions included in the Bipartisan Infrastructure Law. Many of these areas involve activities that NHTSA has been focusing on in recent years through hazard identification, previous research, and data analysis.

Crash Data

- Revise the crash data collection system to include collection of data elements that distinguish personal conveyance vehicles

such as scooters and bikes, from other vehicles involved in a crash.

- Change crash data collection systems to include collection of data elements relating to vulnerable road user safety.
- Coordinate with states to update the Model Minimum Uniform Crash Criteria.
- Coordinate with Centers for Disease Control and Prevention to develop and implement a plan for states to combine highway crash data with injury health data to produce a national database of pedestrian injuries and fatalities with demographic characteristics.
- Increase participation in the Electronic Data Transfer protocol via a new state grant program and internal investment.
- Expand the Crash Investigation Sampling System by adding sites, broadening the scope, and adopting on-scene investigation protocols.

Risky Driving Behavior

- Conduct research regarding the installation and use of driver monitoring systems on motor vehicles.
- Fund advanced drunk and impaired driving prevention technology research through 2025.
- Require states that have legalized marijuana to consider programs to educate people and reduce injuries and deaths resulting from marijuana-impaired driving.
- Allow states to use open container and repeat offender transfer funds for drug-impaired driving countermeasures.
- Identify all illegal passing laws in each state relating to school buses, as well as methods used by states to address school bus stop-arm violations and best practices to address illegal passing of school buses.
- Evaluate effectiveness of various technologies for enhancing school bus safety.

Child Safety

- Issue a final rule requiring all new passenger motor vehicles weighing less than 10,000 pounds gross vehicle weight to be equipped with a system to alert the operator to check rear-designated seating positions after the vehicle engine or motor is deactivated by the operator.
- Conduct a study on and report on:
 - The potential retrofitting of existing passenger motor vehicles with one or more technologies that may address the problem of children left in rear-designated seating positions after deactivation of the motor vehicles by an operator.
 - The potential benefits and burdens, logistical or economic, associated with widespread use of those technologies.
- Conduct a study to review the status of child car seat accessibility for low-income families and underserved populations, in coordination with other relevant federal agencies.
- Require states to use at least 10% of occupant protection grant funds for child restraint expenditures for low-income and underserved populations.

Vehicle Technologies

- Complete rulemakings that require the following on new passenger vehicles:
 - Lane departure warning
 - Lane keeping assist
 - Forward collision warning
 - Automatic emergency braking
- Work to issue a final rule prescribing an FMVSS that requires passenger motor vehicles, manufactured after the effective date of that standard, to be equipped with advanced drunk- and impaired-driving prevention technology.
- Complete a rulemaking to require automatic emergency braking on heavy

vehicles subject to FMVSS 136 (electronic stability control systems). And complete a study on equipping vehicles not subject to FMVSS 136 with automatic emergency braking, including feasibility, benefits and costs.

Data Collection for Vehicles with Automation

In June 2021, NHTSA has issued a Standing General Order (SGO) requiring identified manufacturers and operators to report to the agency incidence of certain crashes involving vehicles equipped with Automated Driving Systems (SAE Levels 3-5) and Advanced Driver Assistance Systems (SAE Level 2). The SGO allows NHTSA to obtain timely and transparent notification of real-world crashes associated with ADS and Level 2 ADAS from manufacturers and operators. With these data, NHTSA can respond to crashes that may raise safety concerns about ADS and ADAS Level 2 systems through further investigation and enforcement.

Prior to the implementation of the SGO, NHTSA's sources of timely crash notifications were limited and generally inconsistent across manufacturers, including developers.

Reporting requirements are specific to the type of system in use. For ADS, entities in the SGO must report a crash if the ADS was in use at any time within 30 seconds of the crash and the crash resulted in property damage or injury. For ADAS Level 2 systems, entities in the SGO must report a crash if the ADAS Level 2 system was in use at any time within 30 seconds of the crash and the crash involved a vulnerable road user or resulted in a fatality, a vehicle tow-away, an air bag deployment, or any individual being transported to a hospital for medical treatment.

Summary incident report data submitted to NHTSA under the SGO are available for download. Publicly available information is updated on a monthly basis.

Advancing Equity

ADS Accessibility for All Road Users

NHTSA is currently conducting two projects examining accessibility and Automated Driving Systems – Dedicated Vehicles (ADS-DV). To improve mobility for all Americans, these vehicles are expected to be designed with usability in mind for a broad spectrum of travelers who need multiple means of expression, interaction, and engagement.

- *Considerations for Making ADS Vehicles Accessible for All Road Users.* Awarded in 2019, the goal is to develop knowledge about user needs for the design of ADS-DV with a particular focus on road users with disabilities and vulnerable road users (e.g., pedestrians, bicyclists).
- *Additional Considerations for Making ADS Vehicles Accessible for All Road Users.* Awarded in 2021, the goal is to understand how to establish situation awareness for travelers during unexpected events and identify needs for interface customization, standardization, and common configurations (for both the vehicle and individual devices).

Female Crash Safety Plan

In alignment with the Departmental Strategic Goal of Equity, NHTSA is working to address sex inequalities in crash safety outcomes. Although more male motor vehicle occupants are killed in motor vehicle crashes than females, recent studies suggest that female occupants have higher injury and fatality risk in comparable motor vehicle crashes.

NHTSA seeks to better understand the possible sex inequalities in crash safety outcomes, particularly those not addressed in vehicles with modern crashworthiness countermeasures. Further, NHTSA is interested in evaluating the

potential benefits of improved female anthropomorphic test devices (ATDs), as well as finite element (FE) human body models (HBM), to provide the tools necessary to develop effective safety countermeasures. To do so, a comprehensive research plan has been developed. The primary objective of this research plan is to generate information to support overall knowledge on sex equity in crashworthiness and to support future agency decisions.

The plan identifies four core research areas:

- Field Data Analysis
- Advanced ATDs and Experimental Biomechanics
- Human Body Modeling
- Fleet Testing and Countermeasure Studies

Female Crash Risk Data Analysis

NHTSA recently updated the results of a 2013 study that compared relative fatality risk for females versus males. The update includes the most recent fatal crash data and found that the observed relative risk of fatality between females and males has been reduced, especially when considering newer vehicles. The incremental fatality risk for females relative to males for model year 2010-2020 vehicles was found to be $6.3 \pm 5.4\%$ and is statistically significantly less than for model year 1960-2009 vehicles ($18.3 \pm 1.2\%$). For model year 2015-2020 vehicles, the estimated difference in fatality risk between females and males appears further reduced to $2.9 \pm 9.8\%$ percent for the average of drivers and right-front passengers; however, due to data scarcity, this statistic will need further observation.

NHTSA is currently conducting a data analysis that compares the odds of female injury occurrence to males in motor vehicles. The two main questions for this analysis are:

- Do female occupants of passenger vehicles have different serious injury risk (MAIS 2+ and MAIS 3+) than males as a result of motor vehicle crashes?
- Does female injury risk vary by body region?

While the full analysis and report are forthcoming, preliminary results show a mix of higher and lower injury odds for “All Crashes” and crash type specific models (frontal, near-side, far-side, rear-impact, and rollover). Overall, as compared to males, females see lower odds of injury for head, neck, and torso and higher for upper and lower extremities.

Disparities in Fatalities

In 2022, NHTSA published a report titled *Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income*, prompted by Executive Order 13985 on January 20, 2021, on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. In accordance with this Executive order, the study aimed to assess disparities with respect to traffic fatalities based on race, ethnicity, and income. The published report presents a summary of prior research, analysis, data and methodology, and the study’s findings regarding the questions.

- Are there racial-ethnic disparities in travel outcomes?
- If so, have these disparities changed in recent years?
- What factors might be contributing to racial-ethnic disparities?
- Are there economic disparities in travel outcomes?

The findings from this study – too plentiful to be summarized here – can be found within the document with the aforementioned title and searchable document reference number DOT HS 813 188.

Key Research Programs

NHTSA’s research programs are in alignment with the USDOT’s strategic goals of safety, economic growth, equity, climate solutions, and transformation, as well as the Agency’s safety mission to save lives, prevent injuries, and reduce economic costs due to road traffic crashes, through education, research, safety standards, and enforcement activity. NHTSA’s research focuses heavily on safety -- prioritizing the reduction of death and injuries on our nation’s roadways.

Vehicle Electronics and Cybersecurity

With the increasing proliferation of computer-based control systems, software, connectivity, and onboard data communication networks, modern vehicles need to consider additional failure modes, vulnerabilities, and threats. Additionally, connectivity and safety technologies that can intervene to assist drivers with control of their vehicle could also raise the cybersecurity stakes, and without proactive measures taken across the vehicle lifecycle, risks could rise accordingly. Identification of potential issues and proactive management of increased risks related to advanced electronic and software-controlled systems are essential to designing vehicle architectures that will respond safely even when there are electronic system failures, software errors, or malicious software attacks.

Advanced Safety Technology

Advanced Safety Technology research focuses on both traditional motor vehicle crash avoidance technologies (i.e., tires, brakes, lighting) and ADAS features (collectively SAE driving automation Levels 0-2) that assist drivers in avoiding crashes. The research program covers passenger vehicles, medium and large trucks, buses, motorcycles, and vulnerable road users.

Automated Driving Systems

Vehicles equipped with ADS continue to be progressed through the various stages of development, testing, and limited deployment. A vehicle equipped with ADS, when engaged, is expected to be capable of performing the full driving task without a driver. ADS-equipped vehicles hold the potential to improve safety substantially at their maturity; however, they also introduce complex challenges, including those that relate to their safety assurance. As a result, ADS research continues to be an important emphasis area for NHTSA.

Crashworthiness

Crashworthiness research focuses on vehicle safety countermeasures to better protect the occupants and crash partners in motor vehicle crashes. This research program is responsible for exploring test procedures for the assessment of motor vehicle crashworthiness safety, and for developing evaluation tools (e.g., crash test dummies and human body computer models) and appropriate injury metrics. Crashworthiness research encompasses new and improved vehicle designs, equipment, and safety countermeasures; biomechanics and injury causation; real-world field data collection and analysis of serious injury cases; and computer modeling-based research all aimed at enhancing outcomes for motor vehicle occupants and vulnerable road users.