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## Characteristics of Commercial Motor Vehicle Crashes Reported in the New Hampshire State Police Commercial Crash Dataset for Years 2015 through 2017

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### Introduction

Work-related commercial motor vehicle crashes (CMVC) and exposure to road traffic hazards can result in serious injury and often in a worker's death. According to the National Institute for Occupational Safety and Health,<sup>1</sup> in 2017, "motor vehicle crashes made up 35% of all work-related injury deaths in the United States, and were the first or second leading cause of death in every major industry group<sup>2</sup> and 45% of the crash-related deaths involved workers employed as motor vehicle operators, with the remaining 55% employed in a range of other occupations."<sup>3</sup>

While there are many reasons behind a CMV crash (weather, driver inexperience, excessive speed, fatigue), there is growing concern over the effects of distracted driving on workers who spend their workdays on the road. One study has shown that drivers at work are more likely to be in a hurry, be tired, use a cell phone or are otherwise distracted while driving.<sup>4</sup>

The following study explores the New Hampshire (NH) State Police crash dataset of commercial motor vehicle crashes to better understand the contributing factors and actions/events that increase risk of motor vehicle crashes and resulting injuries.

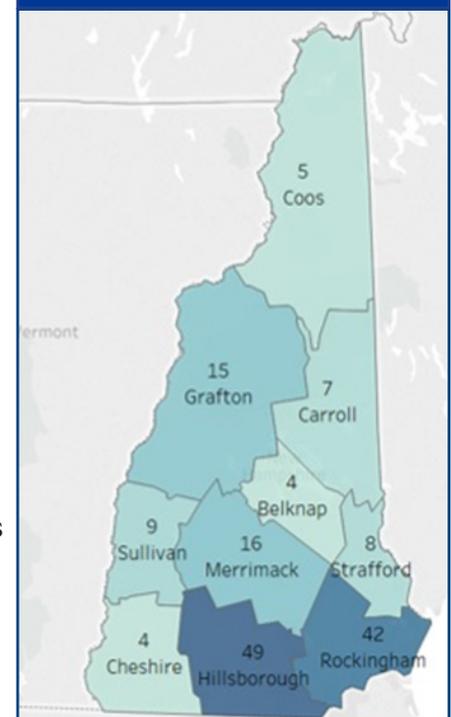
### Methods

Data Source: The NH State Police commercial crash dataset for years 2015 through 2017. A commercial vehicle, according to the [U.S. Department of Transportation's \(USDOT\) Federal Motor Carrier Safety Administration \(FMCSA\)](#), is a motor vehicle or

combination of motor vehicles used in commerce to transport passengers or property, in New Hampshire. Analysis was focused on vehicles weighing 10,001 lbs through 26,000 lbs and vehicles weighing over 26,000 lbs.

Only information necessary to do this study was included in the analysis. Motor vehicle crashes are reported to state and local police, who file a report to the State. Variables from the reports used in our analysis included county where crash occurred, driver age, time of day and day of week the crash occurred, vehicle weight (indicated by the government vehicle weight rating or GVWR), road surface (weather related), and cause. The number of fatalities was too small to report. Any personal identifiers were excluded from the data analyzed. All results were aggregated. Output of charts and graphs were created in Microsoft Excel.

**Commercial Data 2015-2017**  
Number of Incidents by County

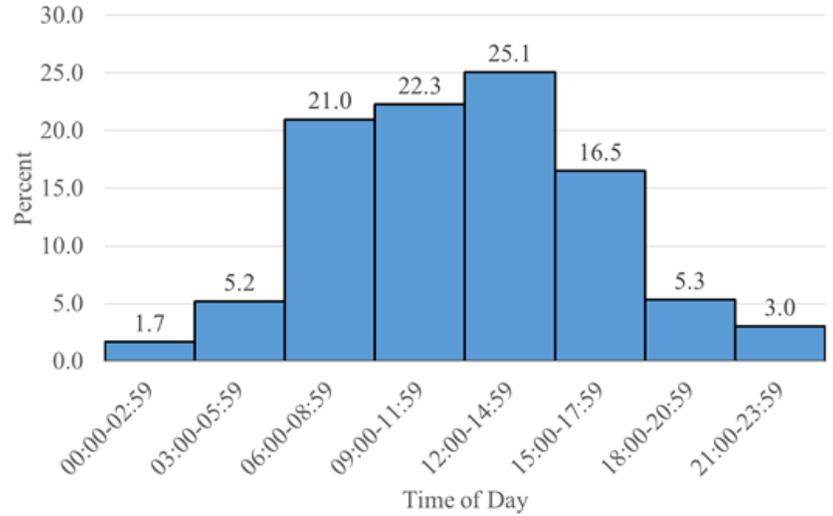


## Results

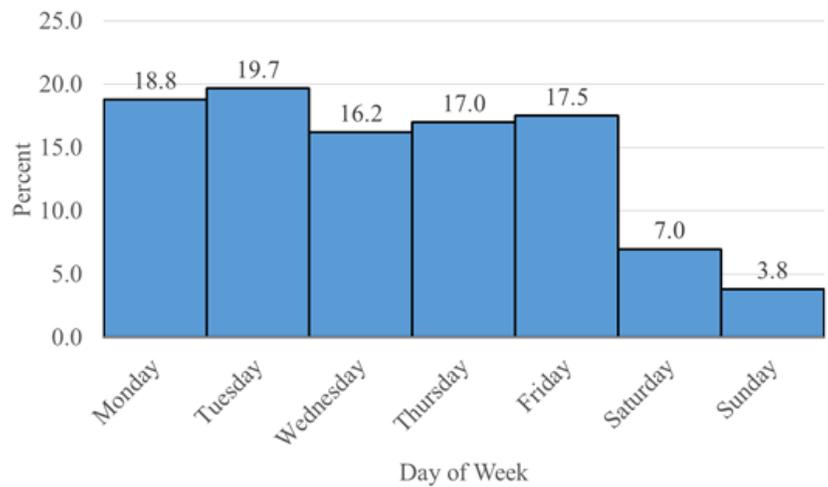
### Commercial Motor Vehicle Crash Characteristics

Most CMCV occurred in the south-east area of New Hampshire, during the day Monday through Friday among middle-aged drivers in vehicles weighing more than 26,000 pounds and on dry roads with no adverse weather conditions. More specifically, most CMVC occurred between 6am-6pm (84.9%, see Figure 1) and Monday through Friday (89.2%, see Figure 2). The greatest percentages of crashes were between 9am-12pm and 12pm-3pm (22.3% and 25.1%, respectively) and Monday and Tuesday (18.8% and 19.7%, respectively). The majority of CMVC also occurred with drivers between ages 26-65 (88.5%, see Figure 3) and in vehicles weighing more than 26,000 pounds (68.1%, see Figure 4). The greatest percentages of crashes were among drivers ages 36-45 and 46-55 (20.2% and 29.5%, respectively). For road and weather conditions, 62.8% of CMVC occurred on dry roads (see Figure 5) and 71.9% of CMVC occurred with no adverse weather conditions (See Figure 6). Secondarily, 36.7% of crashes occurred on icy or wet roads and 26.4% of crashes occurred when it was snowing, sleeting, hailing, or raining.

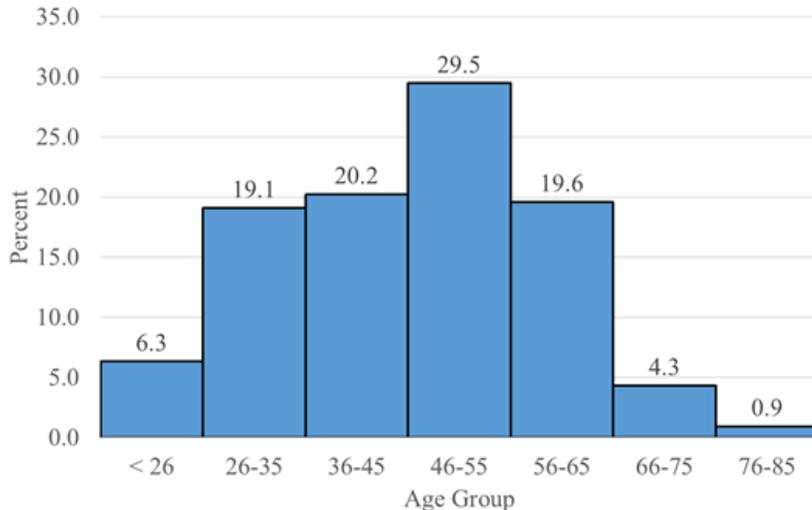
**Figure 1. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Time of Day**



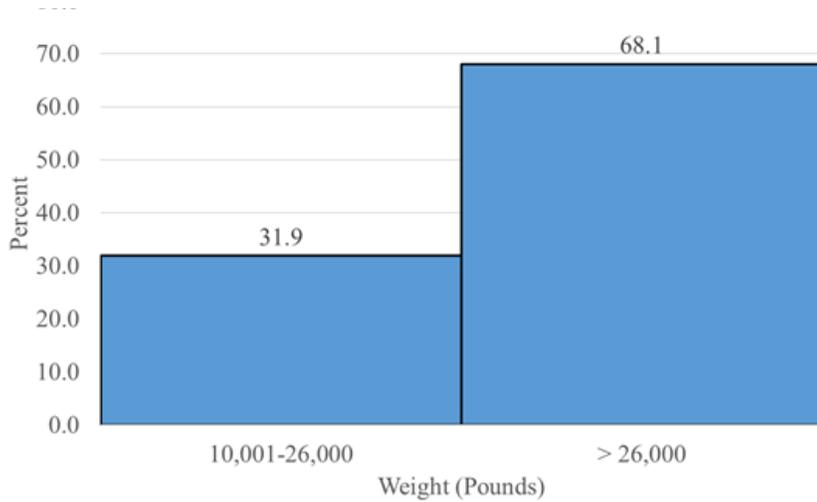
**Figure 2. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Day of Week**



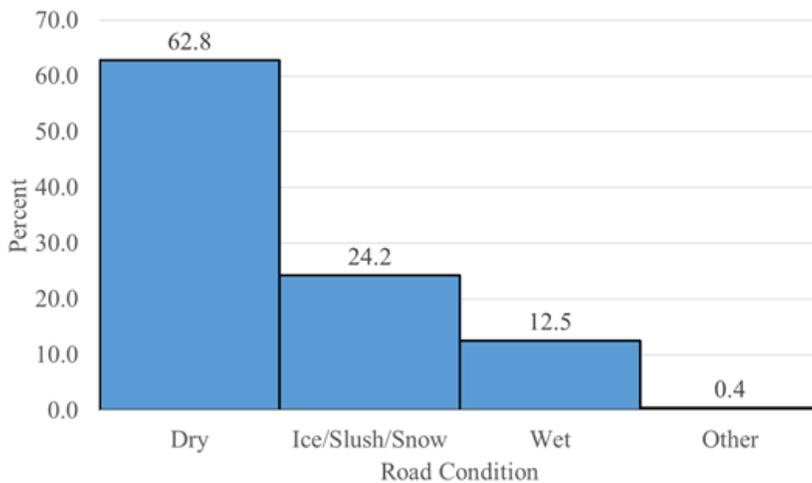
**Figure 3. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Age**



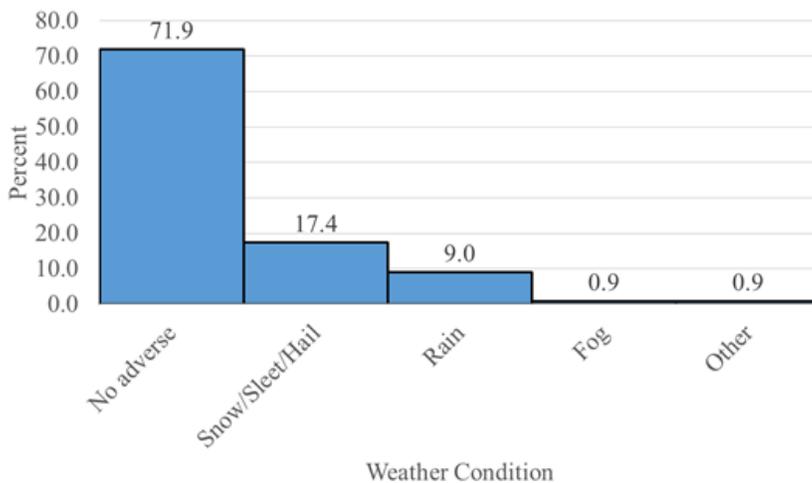
**Figure 4. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Weight**



**Figure 5. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Road Condition**



**Figure 6. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Weather Condition**



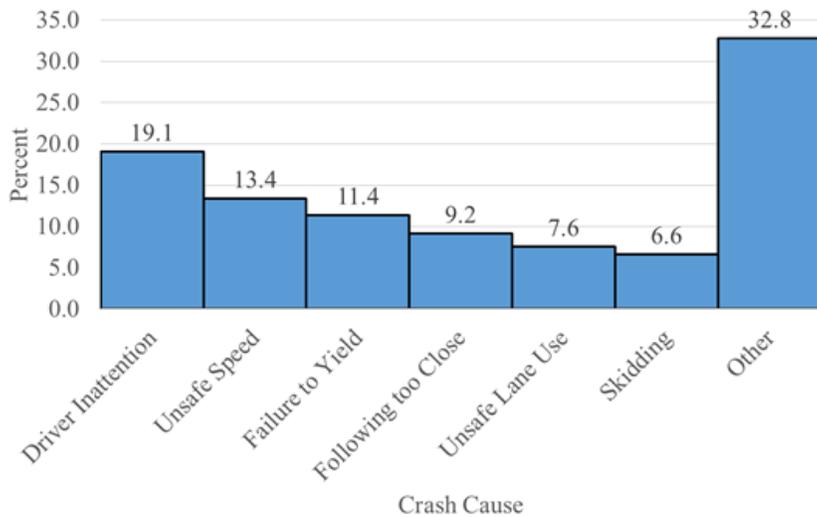
## Cause of Commercial Motor Vehicle Crashes

The most prevalent cause of CMVC varied by road and weather conditions. Overall, the top three causes of CMVC were driver inattention/distraction, unsafe speeds, and failure to yield (19.1%, 13.4%, and 11.4%, respectively, see Figure 7). Driver inattention/distraction can include talking or texting on the phone, eating and drinking, talking to people in the vehicle, fiddling with the stereo, entertainment or navigations

system – anything that takes attention away from the task of safe driving.

Driver inattention/distraction only remained the most prevalent cause on dry roads with no adverse weather (15.2% and 16.1%, respectively, see Figures 8 and 9). On roads with ice, slush, or snow, or when it was snowing, sleeting, or hailing, the most prevalence crash cause was unsafe speed (8.6% and 6.7%, respectively see Figures 8 and 9).

**Figure 7. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Crash Cause**



**Figure 8. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Road Condition and Crash Cause**

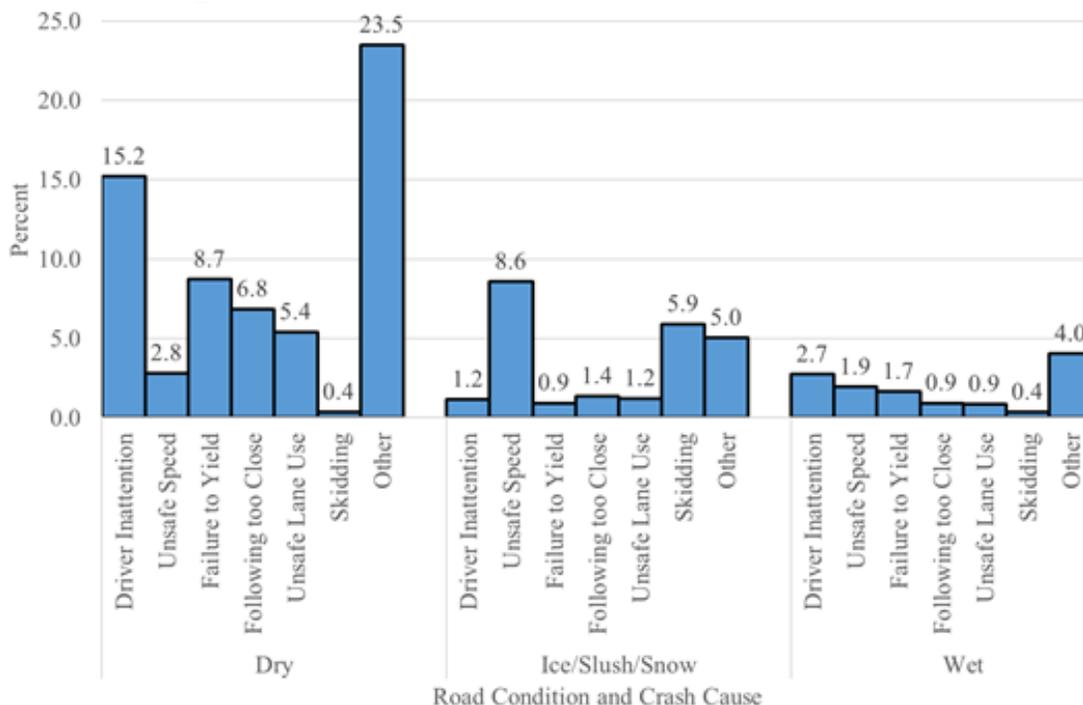
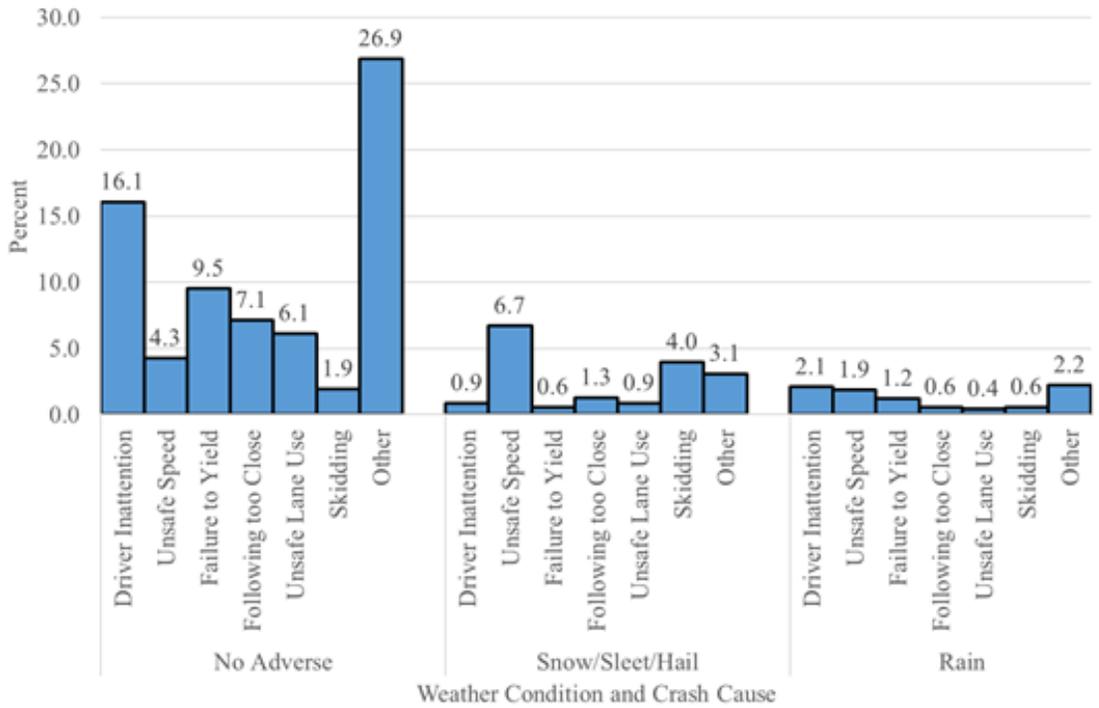


Figure 9. Percent of Commercial Motor Vehicle Crashes in New Hampshire 2015-2017, by Weather Condition and Crash Cause

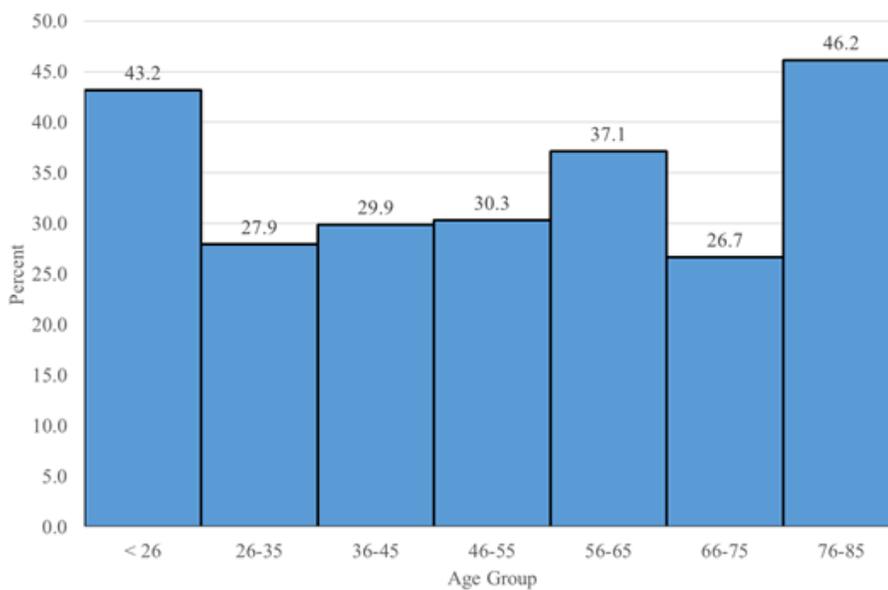


## Injuries Resulting from Commercial Motor Vehicle Crashes

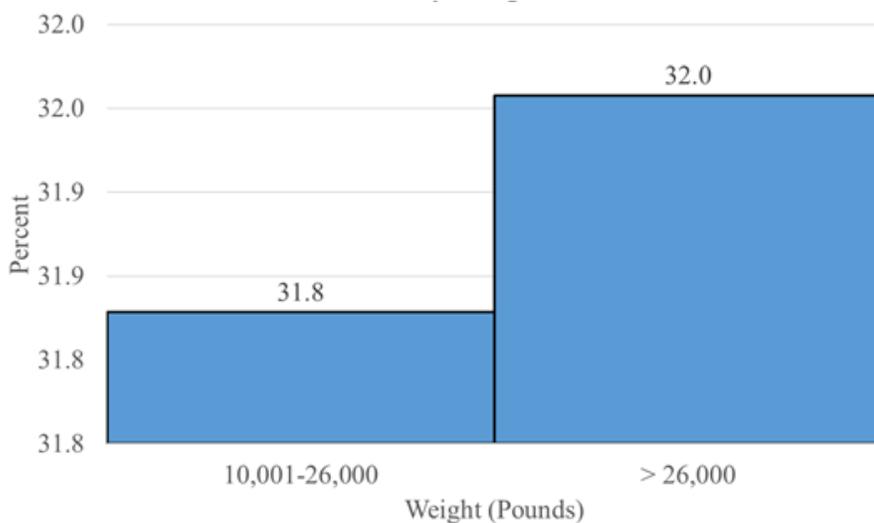
The percentage of CMVC resulting in injury varied with age but not greatly by vehicle weight, road condition, or weather condition. The greatest percentages of CMVC resulting in injuries were found among drivers less than 26 years of age or drivers ages 76-85 (43.2% and 46.2%, respectively, see Figure 10). For drivers ages 26-75, the percentages of crashes resulting in injuries ranged from 26.7% to 37.1%. The percentages of crashes resulting in injuries for vehicles weighting 10,001-26,000 pounds and greater than 26,000 pounds were 31.8% and 32.0%, respectively

(see Figure 11). For road conditions, the percentages of crashes resulting in injuries ranges from 28.6%-37.9% on roads that were dry; had icy, slush, or snow; or were wet (see Figure 12). The percentage of injuries for roads with other conditions was not reported due to small sample size (n=6). For weather conditions, the percentages of crashes resulting in injuries with no adverse weather conditions; snow, sleet, or hail; or rain were 32.1%, 29.0%, and 35.2%, respectively (see Figure 13). The percentages of injuries for fog or other weather conditions was not reported due to small sample sizes (n=12 and n=12, respectively).

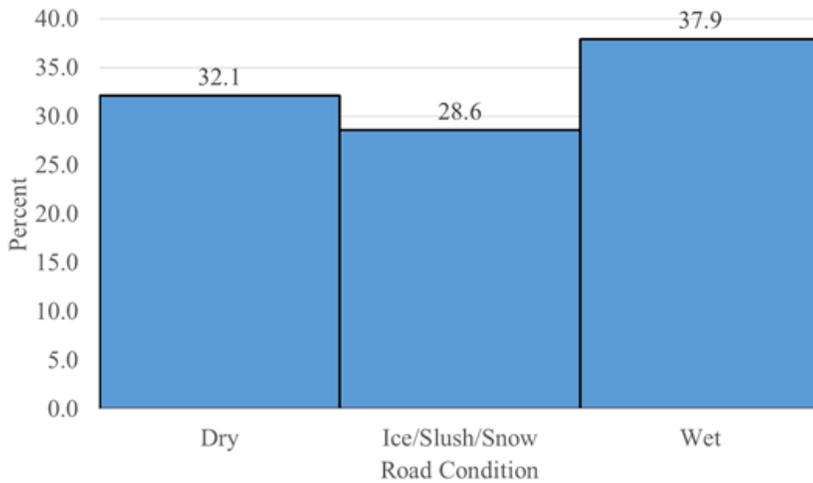
**Figure 10. Percent of Commercial Motor Vehicle Crashes Resulting in Injuries in New Hampshire 2015-2017, by Age**



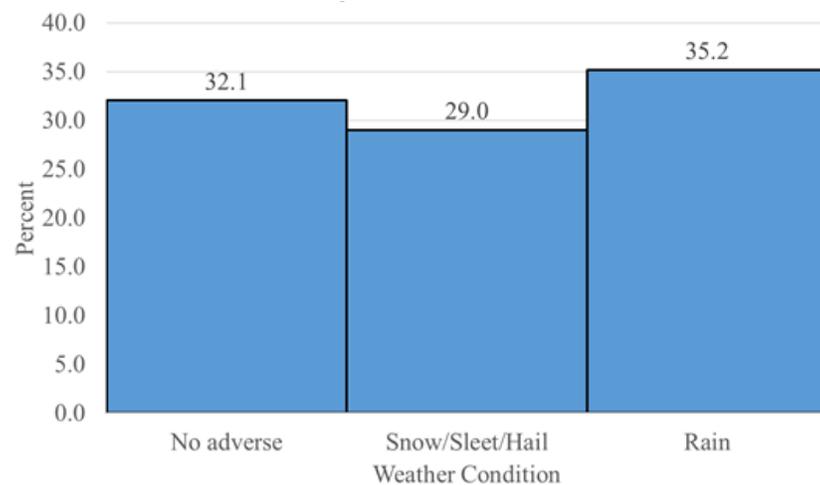
**Figure 11. Percent of Commercial Motor Vehicle Crashes Resulting in Injuries in New Hampshire 2015-2017, by Weight**



**Figure 12. Percent of Commercial Motor Vehicle Crashes Resulting in Injuries in New Hampshire 2015-2017, by Road Condition**



**Figure 13. Percent of Commercial Motor Vehicle Crashes Resulting in Injuries in New Hampshire 2015-2017, by Weather Condition**



### Limitations

The data are based on self-report and limited by recall and observation bias. Reporting may be influenced by what observers remember or find salient and the observation and interaction of people involved in the crash with each other and the individual detailing the crash report.

Although the dataset used for this report includes multiple years of data, it only includes crashes occurring in NH and may not be generalizable to

other states in New England or across the nation. A substantial majority of crashes occurred during the work week, daylight hours, on dry roads with no adverse weather conditions and a larger data sample is needed to better understand, characterize, and generalize to other crash times and conditions.

Finally, details of the cause type of “driver inattention/distracted” are not defined further in the report for injuries and therefore cannot provide additional information about the event.

## Conclusion

The characteristics of common commercial motor vehicle crashes in the New Hampshire State Police commercial crash dataset for years 2015 through 2017 vary. However, most crashes occurred in the southeast area of New Hampshire, during the week and daylight hours, during no adverse weather conditions, involving a collision with another moving vehicle, dry road surface, and on a two-way undivided road. The highest percent of crashes occurred in the age group 46-55. The main contributing factor (besides other) of the crashes was driver inattention/ distraction overall; however, the main contributing factor for poor road and weather conditions (ice/slush/snow and snow/sleet/hail) was unsafe speed. Injuries occurred more often in crashes involving vehicles weighing more than 26,000 pounds, and among workers with ages < 26 years and ages over 76 years. Injuries were relatively evenly distributed across road and weather conditions.

## Recommendations

As stated by Dr. John Howard, Director of the National Institute for Occupational Safety and Health, in the NIOSH Center for Motor Vehicle Safety Strategic Plan for Research and Prevention, 2014-2018, “millions of workers in the United States are exposed to hazards of motor vehicle traffic, as vehicle operators, passengers, or pedestrians. For some of these workers, notably drivers of large trucks and buses, federal safety regulations provide a level of protection through rules that govern hours of driving, vehicle inspection, load safety, fitness to drive, and numerous other areas. For many other workers, especially those who operate light vehicles, safety regulations that cover driving for work are limited. Whatever the regulatory environment, the safety of workers who drive on the job is a responsibility shared by many: employers, workers, policy makers, vehicle manufacturers, and the research community. The efforts of all these stakeholders are critical if we are to make meaningful progress in reducing the burden of work-related crashes.”<sup>5</sup>

The NIOSH Center for Motor Vehicle Safety Strategic Plan suggests that “employers have the opportunity to leverage the employer-employee relationship to complement and enforce government policies that will reduce work-related crashes and injuries. Safe-driving policies implemented in the workplace can promote

safer driving for workers and family members away from work.”<sup>6</sup>

## NIOSH Recommends the Following Prevention Strategies

Preventing Worker Injuries and Deaths from Traffic-Related Motor Vehicle Crashes

*If you employ motor vehicle operators, take the following steps:*

- Set and enforce mandatory seatbelt use policies for both drivers and passengers.
- Conduct driver’s license background checks before hiring drivers.
- Establish schedules that allow drivers enough time to obey speed limits and to limit their hours of service according to regulations.
- Train drivers in safe driving practices and the proper use of vehicle safety features.
  - Prohibit texting while driving
  - Establish work procedures and rules that do not make it necessary for workers to text while driving in order to carry out their duties.
  - Incorporate safe communications practices into worker orientation and training.
  - Incorporate training on fatigue management and the dangers of distracted driving into safety programs.
- Establish procedures to ensure proper maintenance of all vehicle systems.
- Make sure that newly purchased vehicles are equipped with appropriate occupant protection and other safety features.
- Address factors that contribute to crashes, such as drowsy and distracted driving, in the company driver safety programs.
- Adopt the U.S. Department of Transportation regulations for commercial motor carriers as part of your motor vehicle safety program.

*If driving is part of your job, take the following steps:*

- Use seat belts at all times. Let other workers ride with you only when the vehicle has a seat belt for each person.
- Always drive within the speed limit.

- Do not drive if you are fatigued.
- Avoid distracting activities such as eating, drinking, and adjusting radio and other controls while driving.
- Stop the vehicle before using a cell phone.
- Be familiar with the maintenance procedures for all vehicle systems.
- Use detailed maps to determine your route before you leave or use a GPS.
- Carry an emergency kit containing a flashlight, extra batteries, flares, a blanket, and bottled water.

## Resources

### New Hampshire State Police

The Department of Safety (NH DOS), as the lead agency for the Motor Carrier Safety Assistance Program in New Hampshire, authorizes NH Division of State Police (NHSP) Troop G to enforce Federal Motor Carrier Safety Regulations and Federal Hazardous Material Regulations.

<https://www.nh.gov/safety/>

### NH Motor Transport

<http://www.nhmta.org/safety/>

### NIOSH

The National Institute for Occupational Safety and Health is the only federal agency whose mission encompasses the prevention of work-related motor vehicle crashes and resulting injuries for all worker populations, work vehicles, and work settings. NIOSH is part of the Centers for Disease Control and Prevention, within the Department of Health and Human Services. The NIOSH Center for Motor Vehicle Safety (CMVS) is the focal point for activities within the Institute that address this pressing occupational safety problem.

<https://www.cdc.gov/niosh/motorvehicle/ncmvs/default.html>

### OSHA - The Occupational Safety and Health Administration

OSHA requirements for the motor vehicle industry are addressed in specific OSHA standards for Agriculture and Marine Terminals.

<https://www.osha.gov/SLTC/motorvehiclesafety/>

### OSHA Consultation – WorkWISE NH

WorkWISE NH at Keene State College, provides free, on-site occupational safety and health consultation services to eligible employers.

<https://www.keene.edu/academics/conted/safety/workwise/>

### FMCSA - Federal Motor Carriers Safety Administration

<https://www.fmcsa.dot.gov/>

## Acknowledgements

UNH Data Analytics Student Team

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Eric Lauer, Epidemiologist, NH Occupational Health Surveillance Program, Institute on Disability, University of New Hampshire



## Citations

1 NIOSH Center for Motor Vehicle Safety at: <https://www.cdc.gov/niosh/motorvehicle/ncmvs/bni.html>

2 BLS [2018]. Table A-2. Fatal occupational injuries resulting from transportation incidents and homicides, all United States, 2017. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics

3 BLS [2018]. Table A-6. Fatal occupational injuries resulting from transportation incidents and homicides by occupation, all United States, 2017. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics

4 Salminen S, Lähdeniemi E [2002]. Risk factors in work-related traffic. Transportation Research Part F 5(1): 77-86

5 NIOSH [2014]. NIOSH Center for Motor Vehicle Safety: Strategic plan for research and prevention, 2014-2018. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication 2014-122., at: <https://www.cdc.gov/niosh/docs/2014-122/pdfs/2014-122.pdf?id=10.26616/NIOSH PUB2014122>

6 Preventing Worker Injuries and Deaths from Traffic-Related Motor Vehicle Crashes, DHHS (NIOSH) Publication Number 98-142, July 1998.

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## About the New Hampshire Occupational Health Surveillance Project

The NH OHSP provides meaningful statistics to identify priority occupational safety and health issues in the state. This includes reports on a variety of core occupational health indicators based on measures of health (work-related disease, injury, or disability) or factors associated with health, such as workplace exposures, hazards or interventions.

## Contact

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