



Motor Vehicle Accidents in Workers Compensation

INTRODUCTION

Workers compensation (WC) motor vehicle accident (MVA) frequency has increased recently after an extended period of declines. This runs counter to the overall frequency decline in workers compensation, but is in line with an increasing frequency of injuries caused by MVAs in the United States since 2011.

In this research brief, we will examine recent trends in the frequency and severity of MVA lost-time claims for all NCCI states combined.

KEY FINDINGS

- The frequency of claims from MVAs increased, while the frequency of all claims decreased from 2011 to 2016
- MVA frequency increases from 2011 to 2016 occurred in the majority of classes where MVAs are most common (e.g., trucks, taxis, salespersons)
- MVA claims cost 80% to 100% more than the average claim because they involve severe injuries (i.e., head, neck, multiple injuries)
- Over the last five years, over 40% of WC fatal claims involved an MVA
- The rapid expansion of smartphone ownership since 2011 may have been a factor in the rise in MVA frequency

STUDY DESIGN

This research brief is subdivided into the following sections:

- I. Data Source
- II. Overview
- III. MVA Frequency
- IV. Factors Affecting MVA Frequency
- V. MVA Severity
- VI. Closing Remarks

I. DATA SOURCE

The source of data for this study is NCCI's *Statistical Plan*. This database contains detailed policy information, which allows us to analyze WC frequency and severity by various claim characteristics. We have elected to include large deductible (LD) policies in order to maximize the number of MVA claims under review. We also reviewed the data excluding LD policies and our findings are similar.¹ This study focuses on lost-time claims (excluding medical-only claims).

¹ NCCI also publishes WC frequency and severity results based on NCCI's *Financial* data, which excludes information on large deductible policies (see Frequency and Severity Results by State on ncci.com).

Definitions

For this analysis we define the following terms:

- Motor Vehicle Accidents—Accidents involving cars, trucks, buses, and motorcycles but excluding those involving boats, trains, or planes; the associated injuries may be to an occupant of a vehicle or to a person or cyclist struck by a vehicle²
- Frequency—Reported, undeveloped lost-time claims at first report per million dollars of earned premium, on-leveled to NCCI approved pure loss cost level by state and adjusted for changes in average weekly wages by state^{3, 4}
- Severity—Reported, undeveloped average cost per lost-time claim (paid losses and case reserves) at first report

Throughout this report, “claims” will refer to lost-time claims (excluding medical-only claims) and “losses” will refer to paid losses and case reserves at first report on lost-time claims.

II. OVERVIEW

WC has experienced a long-term decline in overall claim frequency. NCCI points to automation, robotics, and continued advances in safety as contributing factors. Since 2000, the only increase in claim frequency for all NCCI states combined occurred in 2010, following a larger-than-usual decline in 2009 during the Great Recession.⁵ Following the 2010 uptick, frequency has resumed its long-term decline.

For WC MVA claims, the story is quite different, with frequency declining for many years and then suddenly turning upward. Exhibit 1 displays the relative frequency of all claims and MVA claims from Exposure-Accident Years (EAYs) 2000–2016, indexed to EAY 2000. From 2000 to 2011 both series are decreasing, although the MVA frequency decline is not as sharp. Subsequent to 2011, however, there is a noticeable divergence. From EAY 2011 to 2016, the frequency of all claims declined by 17.6%, while the frequency of MVA claims increased by 5.0%.

Our data allows us to determine whether an accident involved a motor vehicle occupant vs. a person struck by a vehicle (e.g., pedestrian, cyclist). Over the 2000–2016 period, the split of “occupant vs. struck by” claims has remained very consistent at approximately 85%/15%.

² Ridesharing drivers are not considered employees and are not covered by WC in NCCI states.

³ First report for each policy is 18 months from the policy effective date. Earned Premium is on an “exposure year” basis in that audited payroll (at first report) for each policy is spread to the appropriate calendar year (CY). Earned Premium is on-leveled by extending payroll for each year by the approved NCCI pure loss costs by state.

⁴ Source of average weekly wages by state: US Bureau of Labor Statistics: Quarterly Census of Employment and Wages.

⁵ The Great Recession spanned December 2007 through June 2009, according to the National Bureau of Economic Research.

Exhibit 1—MVA vs. All Claim Frequency (Indexed to 2000)

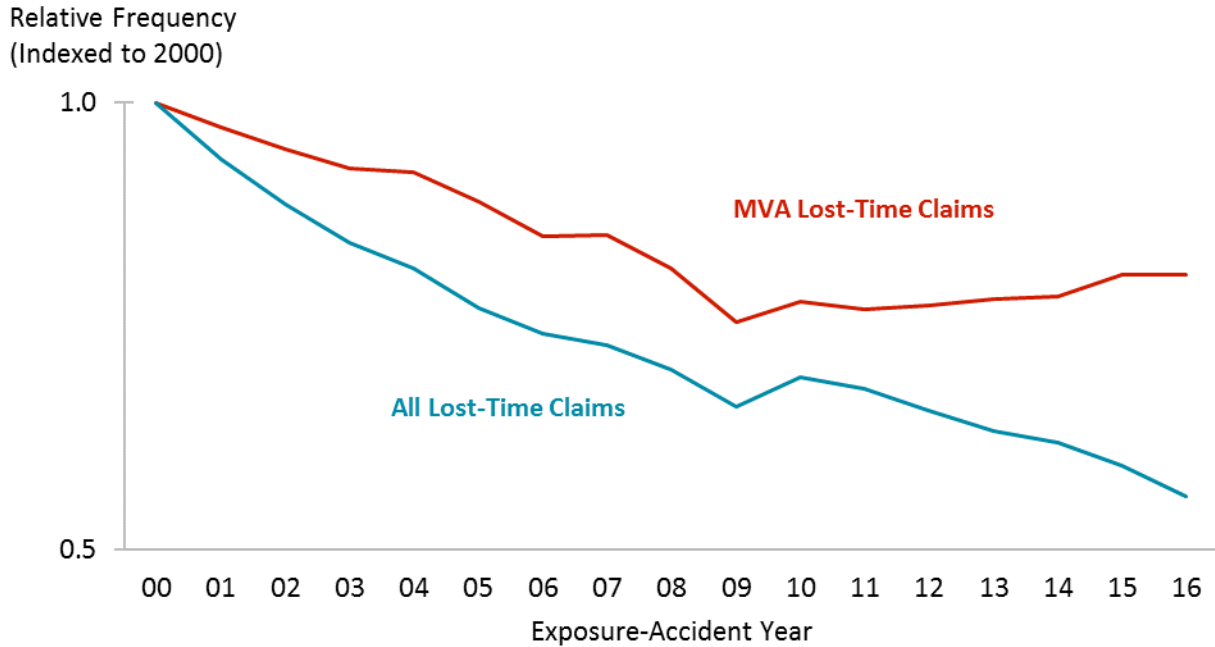
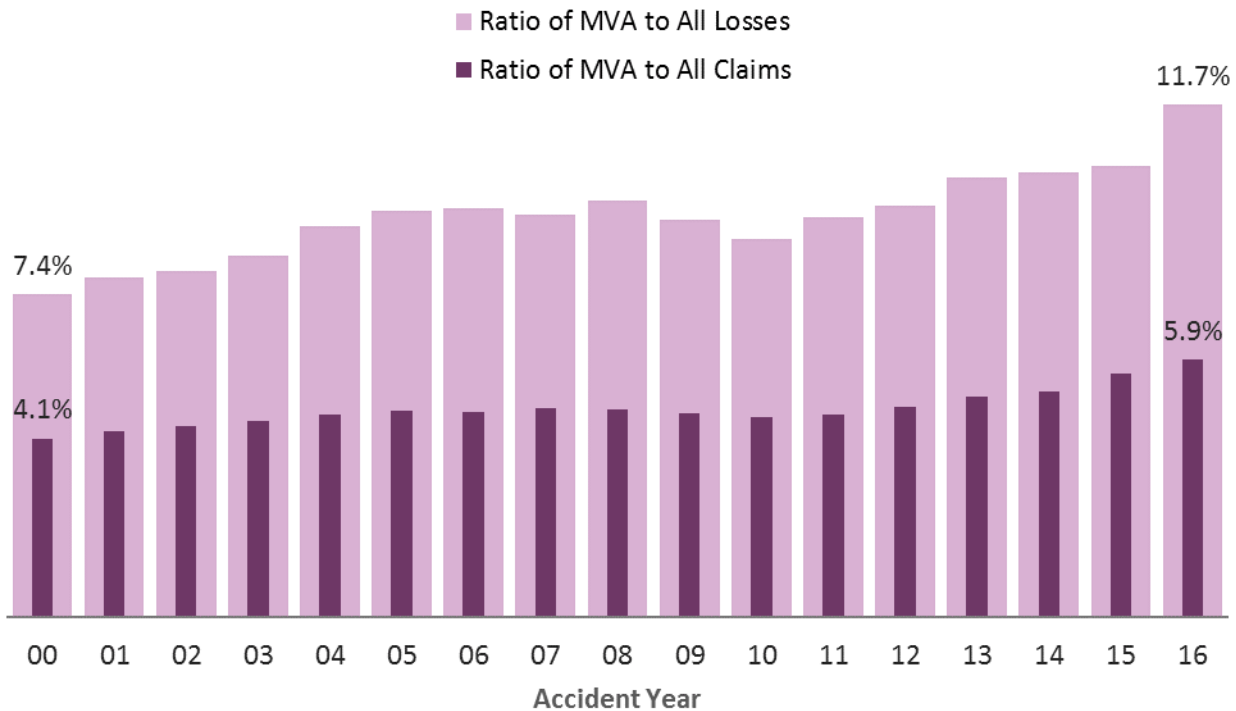


Exhibit 2 tells a similar story. The MVA share of all claims (and losses) began to rise considerably following a dip during the Great Recession. By 2016, MVA claims represented nearly 6% of claims and, since MVA claims involve more serious injuries, nearly 12% of total losses (see MVA Severity section below).

Exhibit 2—Ratio of MVA to All Claims (Counts and Losses)

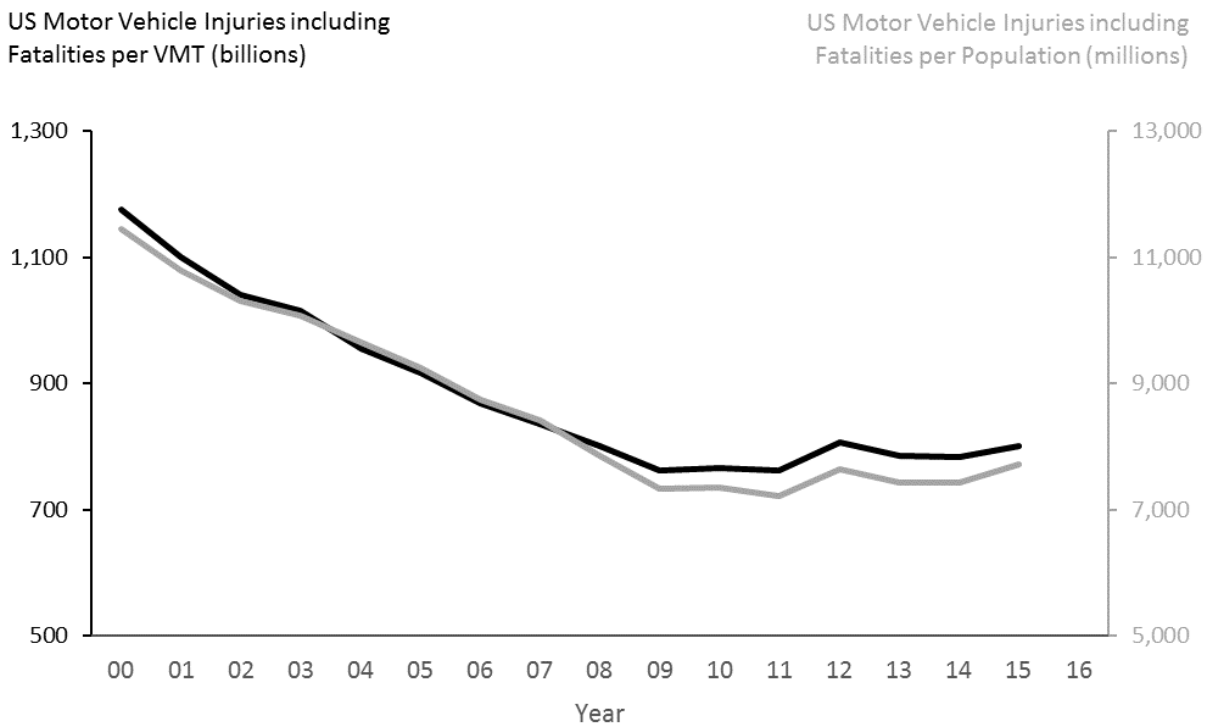


Motor Vehicle Accidents in the General Population

The increase in MVAs is a phenomenon that is not confined to WC. We found that vehicle accident patterns in the general population are very consistent with those observed in WC. As shown in Exhibit 3, according to data from the National Highway Traffic Safety Administration (NHTSA),⁶ traffic crash injuries per vehicle miles traveled and per population decreased through 2009 and have generally increased since 2011.

More alarming is that traffic accident fatalities are also on the rise and have gained national attention. According to the NHTSA, the number of fatalities in the United States increased by over 14% from 32,744 in 2014 to 37,461 in 2016.⁷

Exhibit 3—Motor Vehicle Injuries per Vehicle Miles Traveled and per Population



Source: National Highway Traffic Safety Administration.

III. MVA FREQUENCY

In this section we will focus our attention on WC MVA claim frequency during the 2011–2016 period. As expected, certain classifications, which are predominantly based on the use of motor vehicles (e.g., trucks, taxis, salespersons), generate the majority of MVA claims.

⁶ Source: Traffic Safety Facts Annual Report from the National Highway Traffic Safety Administration, which is part of the US Department of Transportation.

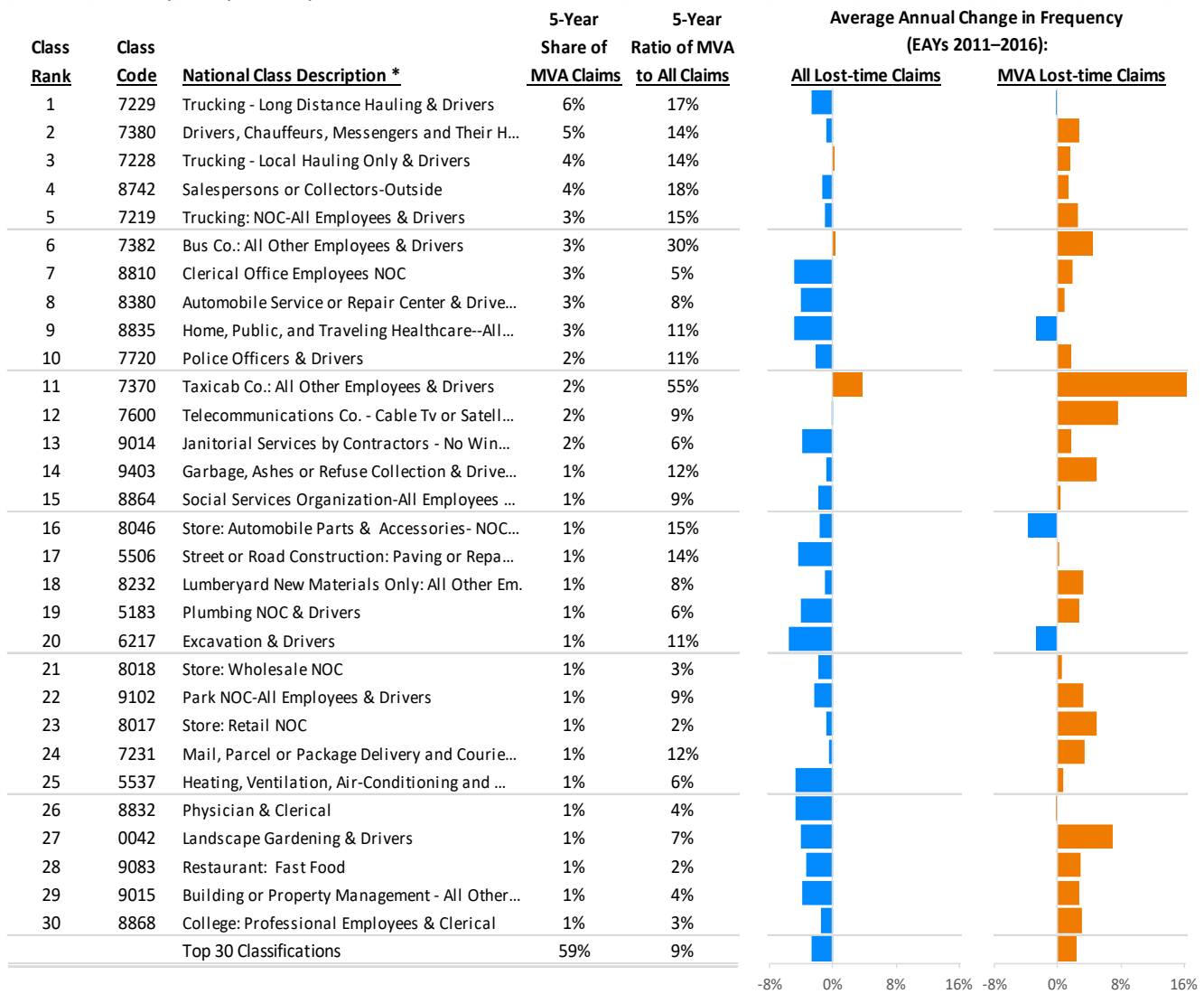
⁷ The NHTSA defines a fatality as occurring within 30 days of the accident. The National Safety Council, which tracks fatalities that occur within one year of the accident, estimated over 40,000 fatalities in both 2016 and 2017.

Exhibit 4 displays the Top 30 MVA classes ranked by each class’s share of MVA claims over the last five years. These 30 classes account for almost 60% of all MVAs in the last five years. Further, about 14% of all MVA claims occurred in the trucking classes (7219, 7228, and 7229).

The exhibit compares the average annual change in MVA vs. all claim frequency for each class from EAY 2011 to 2016. We observe the following:

- For 29 of the 30 classes, the change in MVA frequency was greater than the change in all claim frequency
- Of the top 30 classes, 25 experienced an increase in MVA frequency
- For the top 30 classes combined, the average annual changes in MVA and all claim frequency were +2.3% and –2.7%, respectively.

Exhibit 4—Frequency for Top 30 MVA Classes



Note: Average annual changes above based on an exponential fit.

* Not to be used for classification purposes. Please see Appendix for full national class caption for the class codes listed above. Also note that the captions in some states may differ.

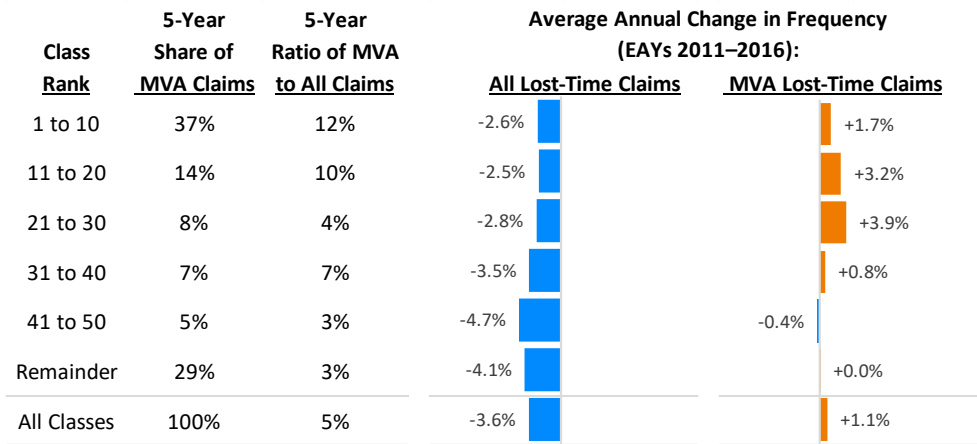
Class Mix

We examined changes in the mix of classes from 2011 to 2016. These 30 classes are not growing in volume relative to other classes. Hence, our conclusion is that the observed increase in MVA frequency (for all classes combined) is not driven by shifts in the mix of classes (occupations) over the period.

Exhibit 5 summarizes the average annual changes in MVA frequency for various class groupings from EAY 2011 to 2016. As noted above, each class was ranked by its share of MVA claims over the last five years. For all groupings, the change in MVA frequency is greater than the change in overall claim frequency. It follows that the ratio of MVA to All claims has increased for each grouping over the period.

As shown in the chart, MVA frequency increases are generally occurring across the board in classes that generate the majority of MVA claims.

Exhibit 5—Frequency for MVA Class Groupings

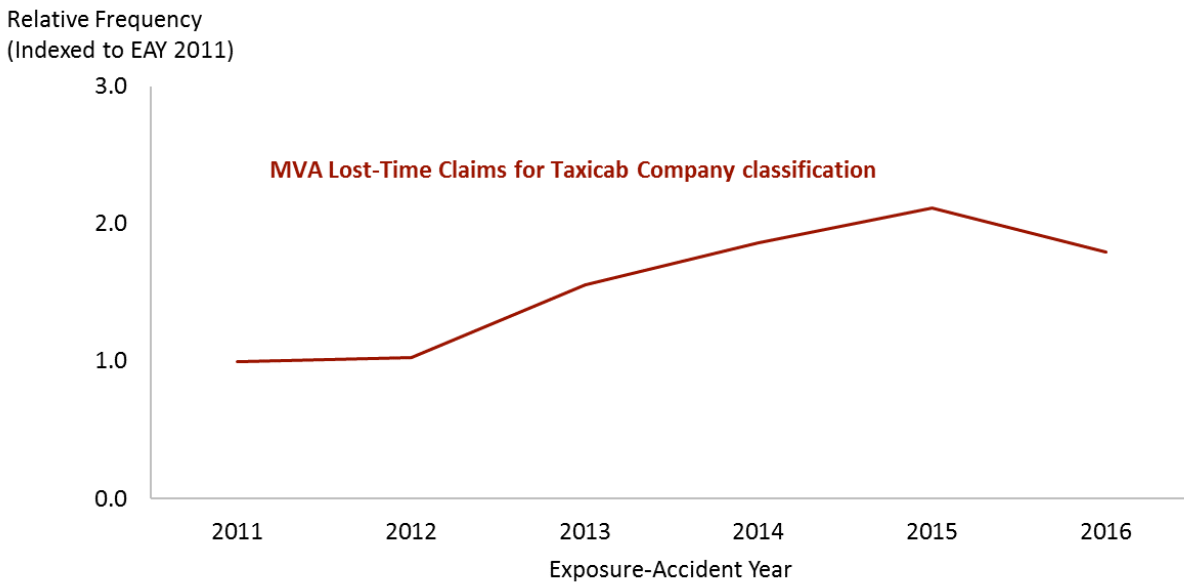


Note: Average annual changes above based upon an exponential fit.

Taxicabs

Of the top 30 MVA classes that we reviewed, the largest increase in MVA frequency occurred in the Taxicab Company class, 7370. Exhibit 6 illustrates the dramatic rise in frequency for the class, more than doubling through 2015 before settling back a bit in 2016. Payroll for the Taxicab Company class increased by nearly 25% from 2012 through 2014. This is probably due to new drivers and/or an increase in taxicab usage, both of which may have contributed to the rise in frequency.

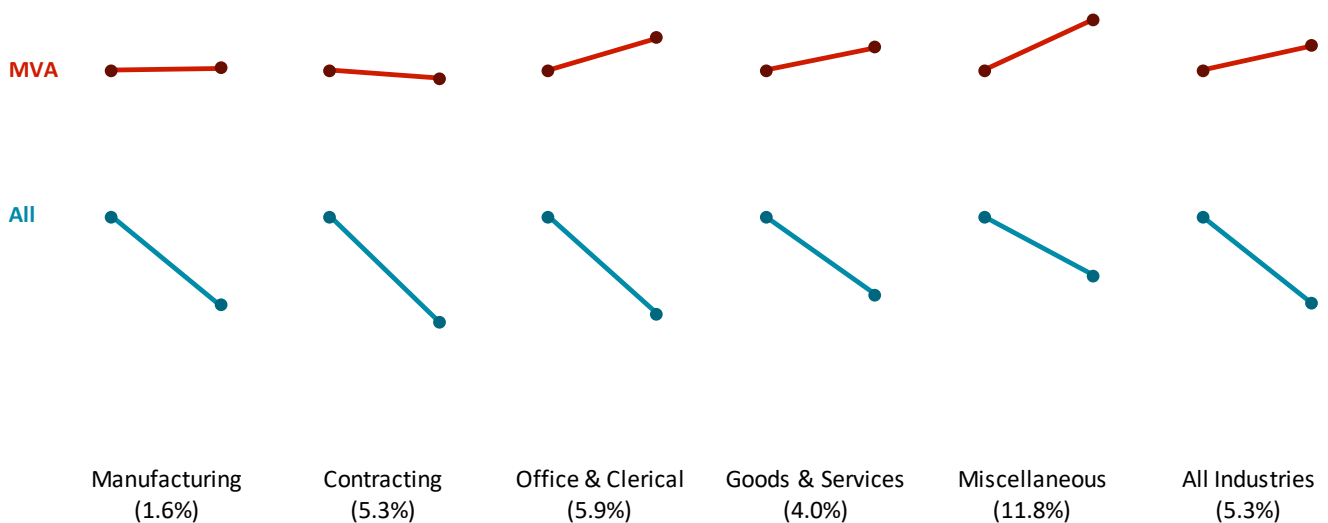
Exhibit 6—Relative MVA Frequency for Class 7370 (Taxicab Co: All Other Employees & Drivers)



Industry Group

Exhibit 7 illustrates that MVA frequency is generally increasing for all NCCI major industry groups (IG) from EAY 2011 to 2016. Not surprisingly, the increase is most evident in the Miscellaneous IG, which includes several of the top motor vehicle classifications such as truckers and taxicabs. Also, the high share of MVA to total claims of 11.8% for this IG is contributing to a less dramatic overall decline in frequency. MVA frequency for the Manufacturing and Contracting IGs was relatively flat over the period.

Exhibit 7—Relative Frequency by Industry Group From EAY 2011 to 2016



Note: Ratio of MVA to All claims shown in parentheses above.

IV. FACTORS AFFECTING MVA FREQUENCY

A wide variety of external factors may influence the occurrence of MVAs including driving while under the influence, failure to use seatbelts, fatigue, and failure to obey traffic laws. In this section, NCCI discusses the following three factors:

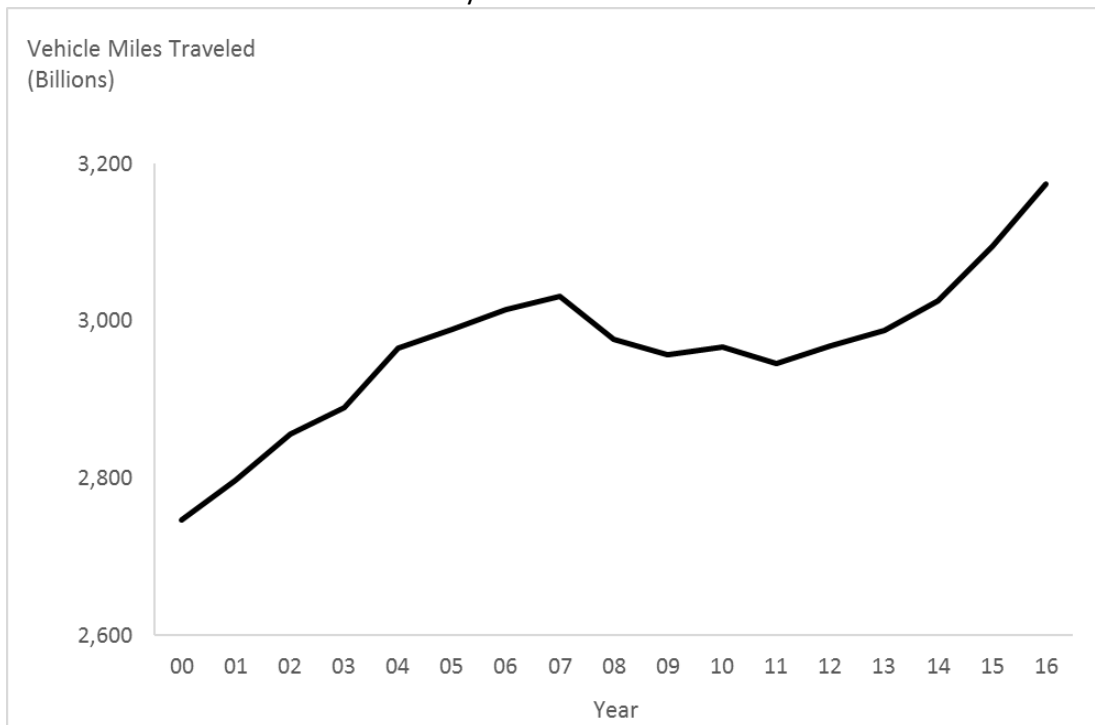
- Vehicle miles traveled
- Vehicle safety improvements
- Smartphone usage

Quantifying the impact of these factors on MVA frequency in WC may warrant additional study.

Vehicle Miles Traveled

Exhibit 8 displays vehicle miles traveled in the United States since 2000. Following a decrease during the Great Recession, vehicle miles traveled has increased during the subsequent recovery. A drop in average US gas prices from 2011 to 2016 was also a likely contributor. This measure includes recreational as well as business travel.

Exhibit 8—US Vehicle Miles Traveled by Year



Source: National Highway Traffic Safety Administration. Fatality Analysis Reporting System: 2000–2016.

Vehicle Safety Improvements

Auto makers have made great strides in improving motor vehicle safety through cutting-edge technologies that allow cars to steer themselves, maintain safe following distances, brake automatically, and warn drivers of nearby vehicles.⁸ Today’s automobiles often come equipped with a multitude of features including adaptive

⁸ Source: 11 Cars With the Best Safety Features, *U.S. News & World Report*, May 19, 2017.

cruise control, automatic front and rear braking, lane keeping and lane centering assists, and warnings for forward collisions, blind spots, rear crossing traffic, and lane departures.⁹

Vehicles used for both personal and commercial use are getting safer. Trucking companies have been adding safety features for many years and, as the price of advanced safety systems has come down, many are more eager to invest in the technology.¹⁰

Improvements in vehicle safety may have contributed to the historical declines in traffic accidents (despite the increase in vehicle miles traveled shown in Exhibit 8 above), but this favorable trend has not held since 2011.

Smartphone Usage

Exhibit 9 shows that in 2006 smartphones made up only 3% of all mobile phones in the US. Further, these consisted of stylus-based phones (e.g., Palm Pilot) and non-touchscreen smartphones (e.g., BlackBerry). The release of the iPhone in 2007 resulted in smartphone shares doubling to 6% by the end of that year. In 2008, BlackBerry and Nokia announced touch-based smartphones and Android debuted in the market with a touchscreen smartphone. By the end of 2010, 27% of all cell phones were smartphones. The trend does not end here.

In 2011, mobile data speeds and data access were increased dramatically due to the introduction of the Long-term Evolution (LTE) network, which was approximately 10 times faster than the previous “3G” network. In addition, the availability of mobile talk-time minutes increased when carriers started to introduce free mobile-to-mobile calling. The smartphone share of cell phones exploded, nearly doubling from 42% at Year-End 2011 to 81% by the end of 2016.

Further, while the smartphone share was increasing, so was cell phone ownership. By the end of 2010, approximately 80% of all US adults owned a cell phone¹² and by the end of 2016, the figure had grown to 95%.

**“If cars are better—
and they clearly are—
drivers must be
worse.”**

—Warren Buffett¹¹

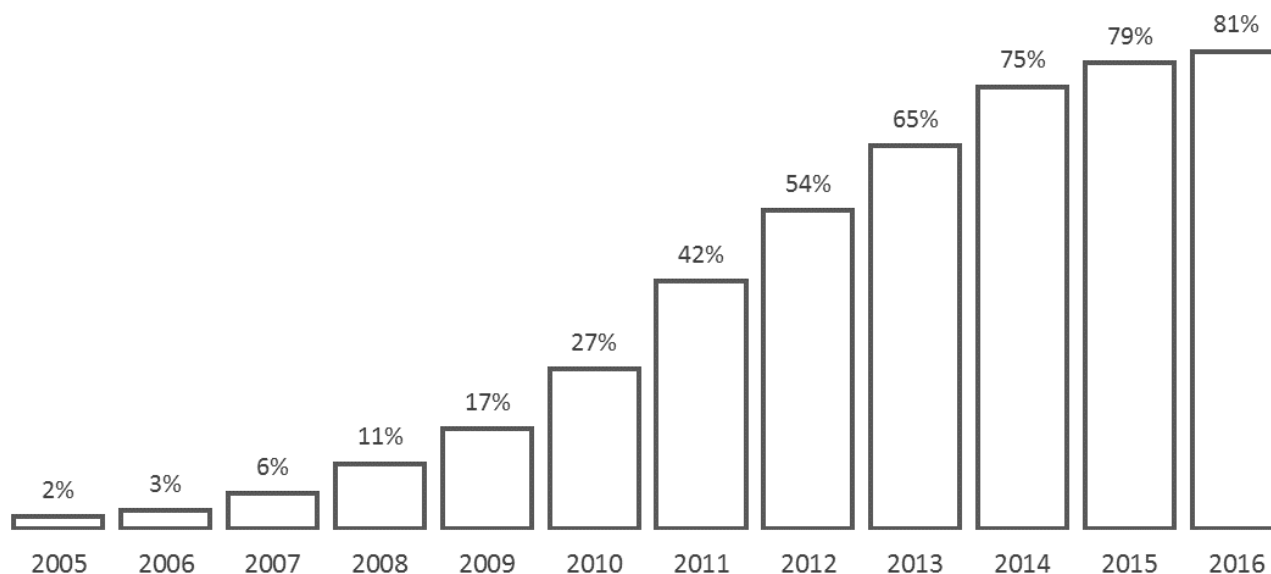
⁹ Source: “Cars With Advanced Safety Systems,” *Consumer Reports*, May 8, 2018.

¹⁰ Source: “Trucking Fleets Get Closer to Automation, Add Advanced Safety Features,” Jan. 20, 2017, www.trucks.com/2017/01/20/trucking-companies-automated-safety-features.

¹¹ Source: *The Wall Street Journal*; 2015 interview with Warren Buffett.

¹² Source: Surveys conducted by the Pew Research Center.

Exhibit 9— US Smartphone Penetration by Year-End



Source: "Smartphone Penetration of Mobile Phone Market," comScore MobiLens

What effect might the expansion of smartphone ownership have on the occurrence of MVAs?

According to a publication by the National Safety Council, a minimum of 27% of crashes involve drivers talking and texting on cell phones.¹³ However, the report also states that "there is strong evidence to support that underreporting of driver cell phone use in crashes is resulting in a substantial underestimation of the magnitude of the public safety threat."

A study by Cambridge Mobile Telematics (CMT) in April 2017 may shed some light on the extent of the underreporting.

CMT tracked driving behavior through its phone app in several categories including phone in use while driving, speeding, and braking acceleration. The study found that phone distractions, averaging more than two minutes, occurred during 52% of trips that resulted in a crash.¹⁴ In 29% of the crashes, the distraction occurred at speeds in excess of 56 miles per hour.

Several efforts are already underway to discourage distracted driving:

- Cell phone blocking is a promising technology available through smartphone apps that prohibits calls or texts while a vehicle is in motion.
- Several states have implemented bans on cell phone use and/or text messaging. However, such bans may only apply to teenagers or school bus drivers, who are held to a stricter standard. Penalties vary from state to state and increase with repeat offenses, ranging from monetary fines to jail time if the offense causes bodily injury to another person.
- Self-driving autonomous vehicles are already being tested in various cities and states across the country. Will removing distracted drivers from our roadways reduce accidents? An article in *USA Today* suggests

¹³ Source: National Safety Council, "Cell Phone Policy Kit," 2015.

¹⁴ Source: www.cmt telematics.com/press/new-data-cambridge-mobile-telematics-shows-distracted-driving-dangers.

that there may be over 50 million self-driving cars in use around the world by 2035.¹⁵ There are still a number of hurdles to overcome. Recent accidents involving self-driving cars have undoubtedly had an adverse effect on consumer acceptance levels.

V. MVA SEVERITY

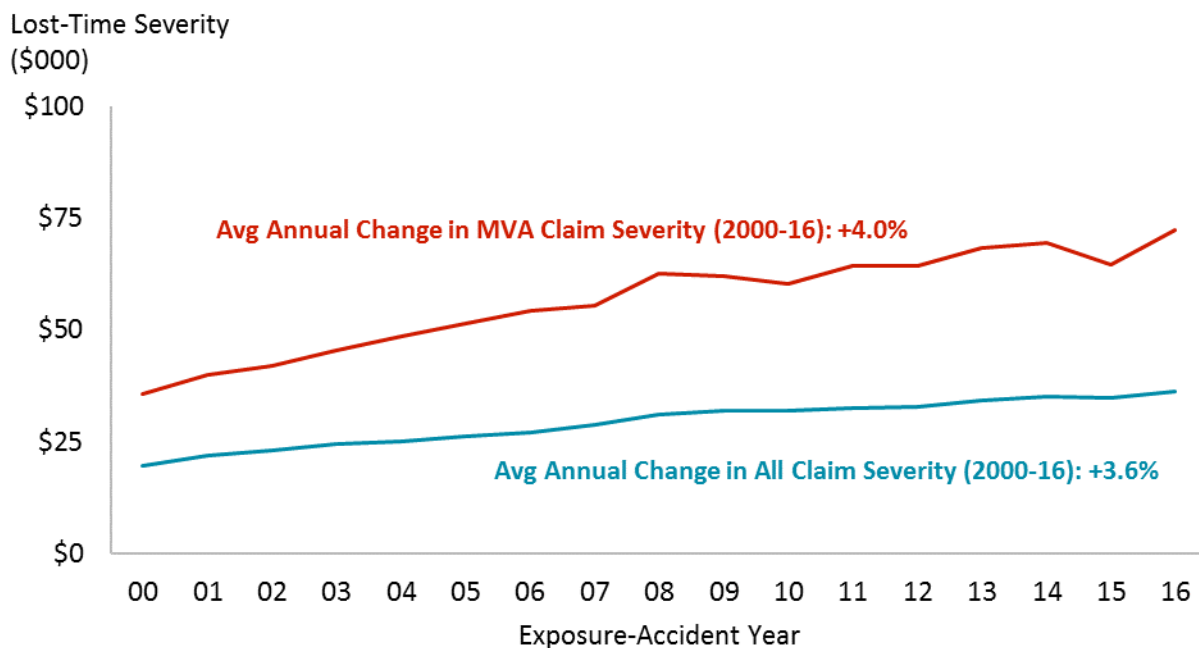
The recent increase in MVA frequency is a cause for concern, since MVA claims commonly involve far more serious injuries than other claims. These claims can take a serious toll on injured individuals and their families.

Exhibit 10 shows that, on average from EAY 2000 to 2016, the severity of MVA claims has exceeded the severity of all claims combined, ranging from 80% higher to 100% higher over the period reviewed.¹⁶ The dollar figures shown are undeveloped as of first report and therefore, likely to develop upward before reaching their ultimate levels.

The exhibit also illustrates that MVA severity has grown at a slightly faster pace than all claim severity and has been more volatile from year to year.

In AY 2015, MVA total severity declined by 7%, driven by a decline in MVA medical severity of 9%. This coincided with a decline in medical severity for all claims in AY 2015.¹⁷

Exhibit 10—MVA vs. All Claim Severity



The section below examines a few of the unique characteristics of MVA claims.

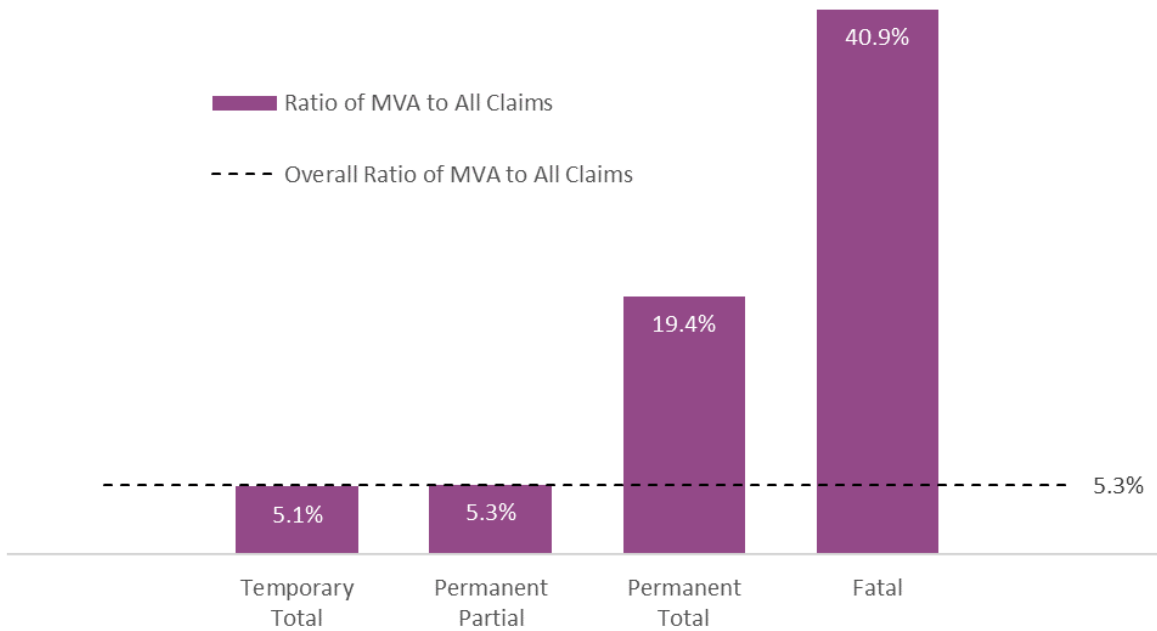
¹⁵ Source: *USA Today*, “Study: Self-Driving Car Sales Will Explode,” Jan. 2, 2014.

¹⁶ Severity in this instance represents reported, undeveloped paid losses plus case reserves for medical and indemnity combined as of first report.

¹⁷ See “Medical Cost Trends: Then and Now” on ncci.com.

Exhibit 11 displays the MVA share of all claims by NCCI type of injury¹⁸ for the latest five years combined. Motor vehicle claims accounted for about 41% of fatal claims and nearly 20% of claims involving permanent total disability. An MVA claim is 12 times more likely to result in a fatality than a non-MVA claim.

Exhibit 11—Ratio of MVA to All Claims by Type of Injury



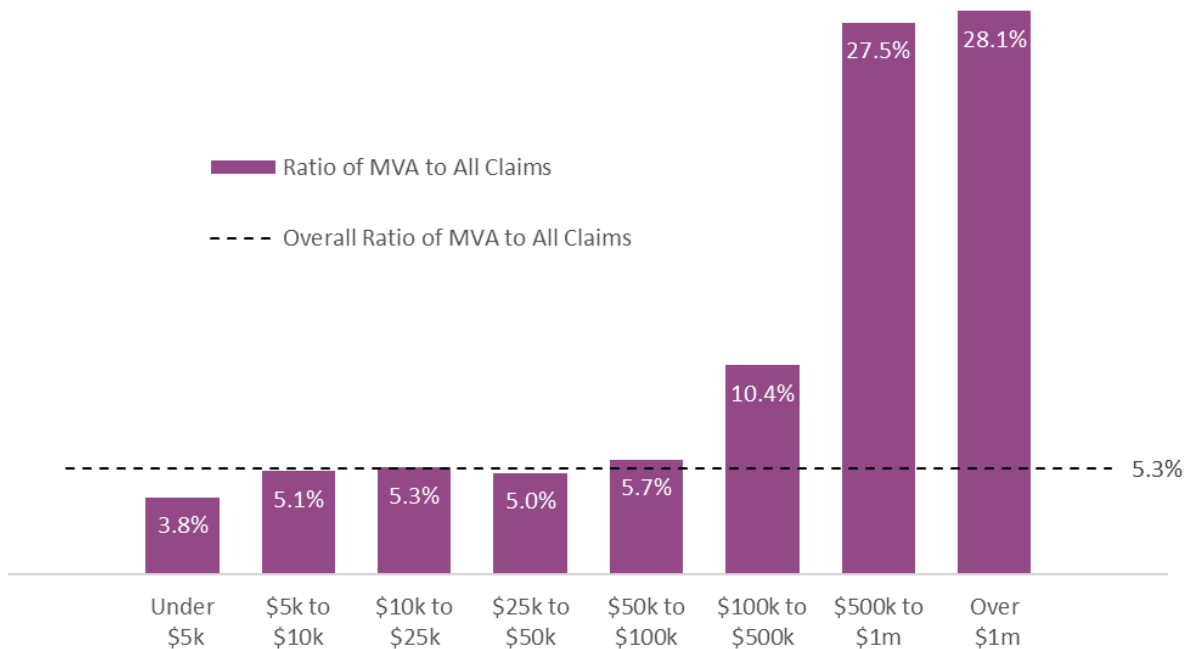
¹⁸ NCCI Type of Injury: Fatal, Permanent Total, Permanent Partial, Temporary Total, Medical-Only.

Exhibit 12 displays the MVA share of all claims by total size of loss range for the latest five years combined.

MVA claims tend to represent a higher share of the costliest claims. As shown in the chart, MVA claims accounted for 28% of claims above \$500K, versus 5% of all claims over the five-year period.

In a separate study, NCCI also found that almost 40% of the claims with losses of at least \$10 million were due to injuries to occupants in motor vehicle accidents.¹⁹

Exhibit 12— Ratio of MVA to All Claims by Size of Loss



Note: Loss amount for each claim was inflation-adjusted prior to the claim being placed in a size of loss group above²⁰

¹⁹ See “Efficacy of Medical Networks” on ncci.com.

²⁰ The indemnity portion of each claim was adjusted for changes in average weekly wages by state (US Bureau of Labor Statistics: Quarterly Census of Employment and Wages) and the medical portion was adjusted for changes in medical inflation (Personal Health Care Chain-Weighted Price Index).

Exhibit 13 displays the ratio of MVA claims to all claims by NCCI’s part of body groupings. In addition, the distribution of MVA claims vs. all claims is displayed for the latest five accident years combined. As shown in the exhibit, MVA claims account for 21% and 18% of all neck/spine and multiple body part injuries, respectively, vs. 5.3% of all claims. This is because neck/spine and multiple body part injuries are far more likely to occur in the case of an MVA. These injuries combine to account for 45% of MVA claims as compared to 13% of all claims.

Exhibit 13— Ratio of MVA to All Claims by Part of Body

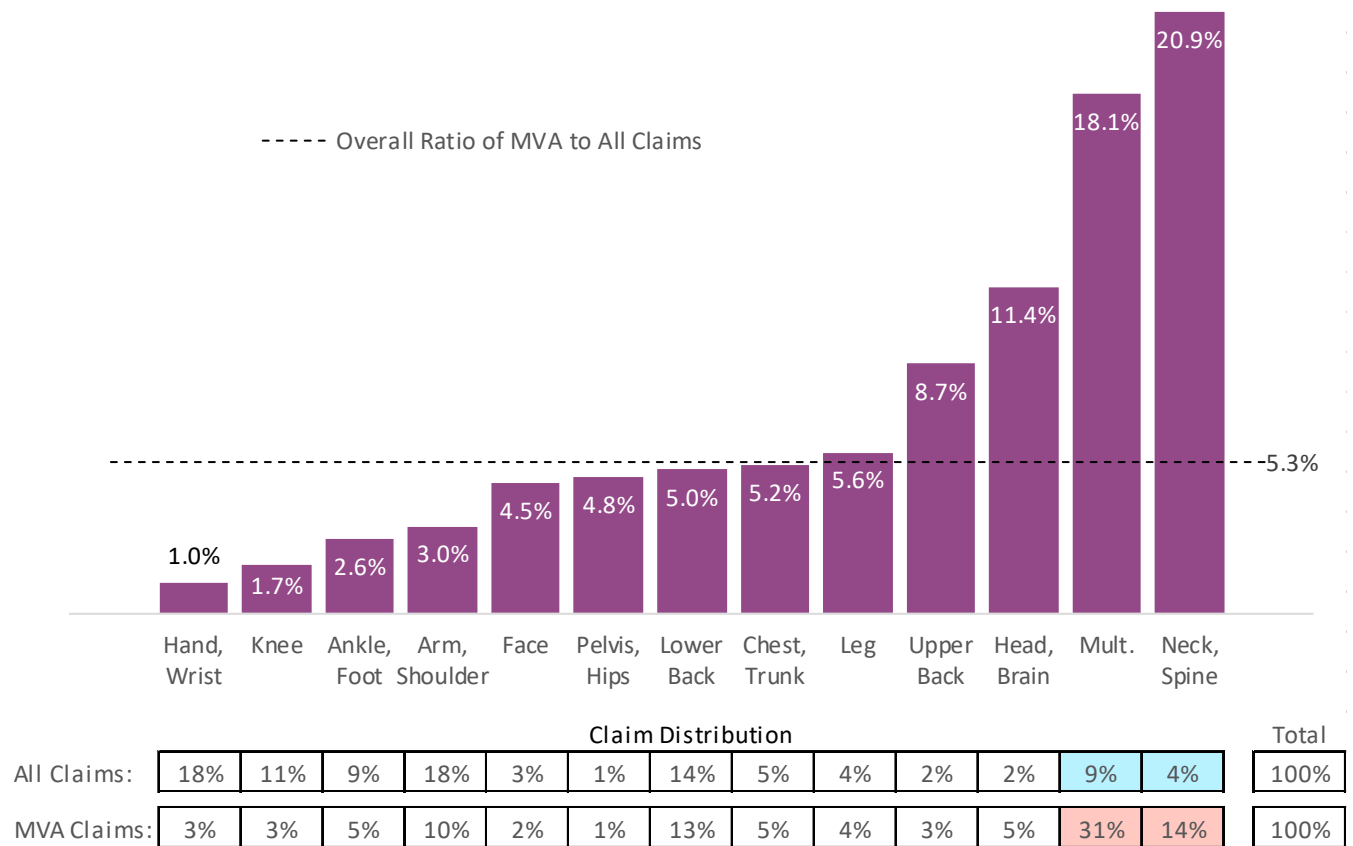
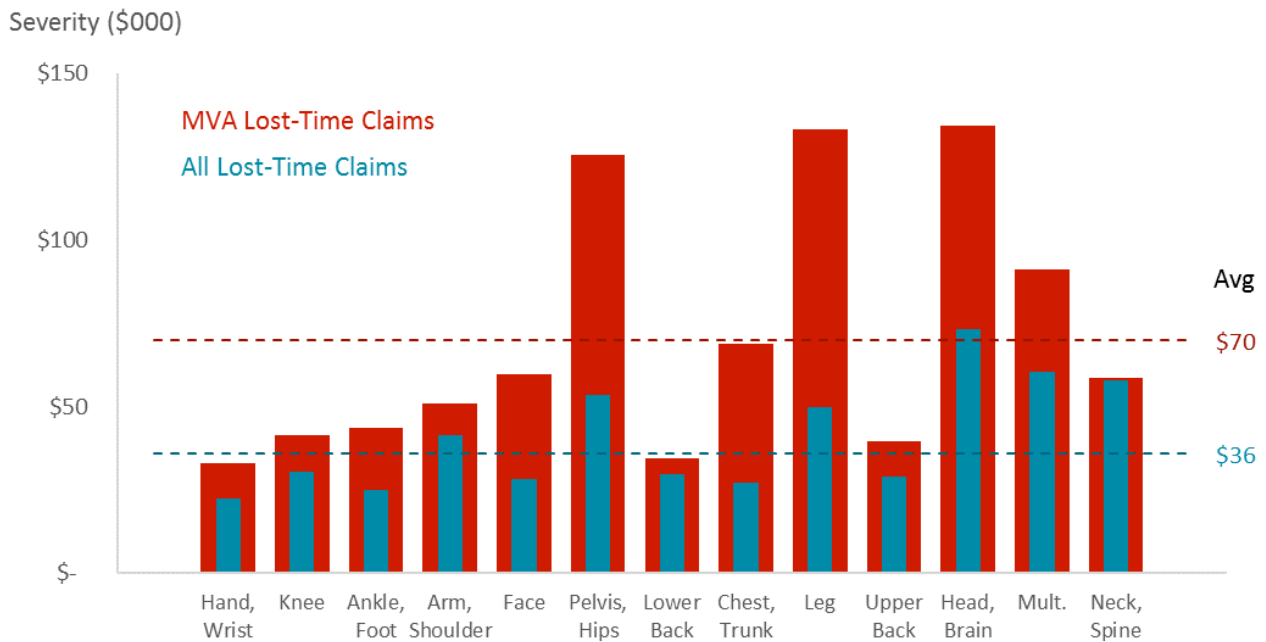


Exhibit 14 compares the five-year average severity of MVA claims versus all claims by part of body grouping. The dollar figures shown are undeveloped as of first report and therefore, likely to develop upward before reaching their ultimate levels.

MVA claims are costlier than the average claim across all part of body groupings. MVA claims involving the pelvis/hips, leg, head/brain, face and multiple body parts are far more costly.

Persons struck by a vehicle (e.g., pedestrians and cyclists) made up only 15% of all MVA claims, but accounted for approximately 40% of MVA injuries to the lower half of the body (i.e., pelvis/hips, leg, knee, and ankle/foot).

Exhibit 14—MVA vs. All Claim Severity by Part of Body



Note: Loss amount for each claim was inflation-adjusted prior to determining the five-year averages²¹

Below are additional observations that are consistent with the higher than average severity of MVA claims. Over the latest five years as of first report:

- The share of MVA claims that NCCI defines as likely to develop²² was 71%, as compared to 35% for all claims. Generally, the likely category involves more serious injuries (e.g., head, brain, back, neck, hip, internal organs, multiple parts) and the not-likely category includes less serious injuries (e.g., toe, foot, hand, finger, arm, leg).
- About 58% of MVA claims were still open, vs. 42% of all claims.

²¹ The indemnity portion of each claim was adjusted for changes in average weekly wages by state (US Bureau of Labor Statistics: Quarterly Census of Employment and Wages) and the medical portion was adjusted for changes in medical inflation (Personal Health Care Chain-Weighted Price Index).

²² NCCI groups POB claims into two categories (likely and not-likely to develop), which distinguish the potential for the claim to develop upward from first report to ultimate level.

Subrogation

As noted above, MVA claims cost from 80% to 100% more than the average claim as evaluated at first report. At ultimate level, MVAs are still far costlier than the average claim, but by a slightly lower amount. This is due, in part, to the effect of subrogation recoveries.

When a worker is injured in an MVA, the employer/insurer may have subrogation rights against an at-fault third party, for example, the driver of another motor vehicle and/or his auto liability insurer. The WC insurer's decision to pursue subrogation depends on a number of factors including

- Whether the state has a comparative or contributory negligence law
- The degree of negligence (i.e., contribution to the accident) by the third party
- The statute of limitations for tort actions in the state
- Whether the third party is sufficiently insured or self-insured
- The extent of injuries to the worker

A WC insurer might wait until the injured worker has reached Maximum Medical Improvement (MMI) before seeking subrogation. This may often be two to three years from the date of accident when the extent of injury and amount of compensation is more clearly established.

VI. CLOSING REMARKS

Despite technological improvements in vehicle safety, MVAs in WC and in the general population have been on the rise over the last five years. A dramatic rise in smartphone ownership over this period may have been a contributing factor. More alarming is that these accidents often involve very serious and costly injuries that can take their toll on injured workers and their families. What solutions does the future hold? Will efforts to reduce distracted driving be successful? Will autonomous vehicles reduce the frequency of MVAs? NCCI will continue to monitor trends in MVAs closely and share our findings.

ACKNOWLEDGMENTS

Ken Brown contributed to this study.

APPENDIX

National Class Descriptions

| Class Code* | |
|-------------|---|
| 0042 | Landscape Gardening & Drivers |
| 5183 | Plumbing Not Otherwise Classified (NOC) & Drivers |
| 5506 | Street or Road Construction: Paving or Repaving & Drivers |
| 5537 | Heating, Ventilation, Air-Conditioning and Refrigeration Systems-Installation, Service and Repair, Shop, Yard & Drivers |
| 6217 | Excavation & Drivers |
| 7219 | Trucking: NOC-All Employees & Drivers |
| 7228 | Trucking - Local Hauling Only & Drivers |
| 7229 | Trucking - Long Distance Hauling & Drivers |
| 7231 | Mail, Parcel or Package Delivery and Courier or Messenger Service Companies -- All Employees & Drivers |
| 7370 | Taxicab Co.: All Other Employees & Drivers |
| 7380 | Drivers, Chauffeurs, Messengers and Their Helpers NOC-Commercial |
| 7382 | Bus Co.: All Other Employees & Drivers |
| 7600 | Telecommunications Co. - Cable Tv or Satellite - All Other Employees & Drivers |
| 7720 | Police Officers & Drivers |
| 8017 | Store: Retail NOC |
| 8018 | Store: Wholesale NOC |
| 8046 | Store: Automobile Parts & Accessories- NOC & Drivers |
| 8232 | Lumberyard New Materials Only: All Other Employees & Yard, Warehouse, Drivers |
| 8380 | Automobile Service or Repair Center & Drivers |
| 8742 | Salespersons or Collectors-Outside |
| 8810 | Clerical Office Employees NOC |
| 8832 | Physician & Clerical |
| 8835 | Home, Public, and Traveling Healthcare--All Employees |
| 8864 | Social Services Organization-All Employees & Salespersons, Drivers |
| 8868 | College: Professional Employees & Clerical |
| 9014 | Janitorial Services by Contractors - No Window Cleaning Above Ground Level & Drivers |
| 9015 | Building or Property Management - All Other Employees |
| 9083 | Restaurant: Fast Food |
| 9102 | Park NOC-All Employees & Drivers |
| 9403 | Garbage, Ashes or Refuse Collection & Drivers |

* Not to be used for classification purposes. See NCCI's *Basic Manual for Workers Compensation and Employers Liability Insurance* for all the latest national class code captions related to each code. Also note that the captions in some states may differ from the national class captions.

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