

DRIVER FATIGUE AND RISK OF DEATH OR INJURY:

A TEN YEAR ANALYSIS OF FATIGUE-RELATED COLLISIONS ON ONTARIO ROADS FROM 2002 – 2011 USING AN OPERATIONAL DEFINITION OF FATIGUE

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Outline

- ▣ Background
- ▣ Challenges in Measuring Fatigue
- ▣ Ontario Collision Data
- ▣ Methods
- ▣ Results
- ▣ Conclusion
- ▣ References
- ▣ Appendix

Background

Fatigue:

a combination of symptoms such as impaired performance and feelings of drowsiness, as well as contributory factors, such as prolonged activity, insufficient sleep and disruption of circadian rhythm

Background

- ▣ Fatigued drivers: slower reaction time, less alert, as impaired as drunk driver
- ▣ Young drivers, commercial drivers and shift workers have heightened risk
- ▣ 1 in 5 Canadian drivers admitted to nodding off or falling asleep at the wheel

Challenges in Measuring Fatigue

- ▣ Fatigue is difficult to observe and measure on the road or after a collision occurs
- ▣ Lack of standardized measure
- ▣ Fatigue collisions largely underreported
- ▣ Surrogate measures usually relied upon to understand magnitude of fatigued driving

Ontario Collision Data

- ▣ In 2012, fatigue contributed to:
 - 2.2% of all fatal collisions
 - ▣ 3.7% of all fatalities
 - 0.8% of all injury collisions
 - ▣ 1.4% of all injuries

Methods

▣ Include All:

- Fatal and Injury collisions
- Collisions where drivers were determined by police or coroner reports to be fatigued
- Drivers who initiated the crash
- Collisions that occurred on dry pavement
- Single vehicle collisions where the initial impact was head-on or rear-end, and the driver was not overtaking at the time of collision

Methods

▣ Exclude All:

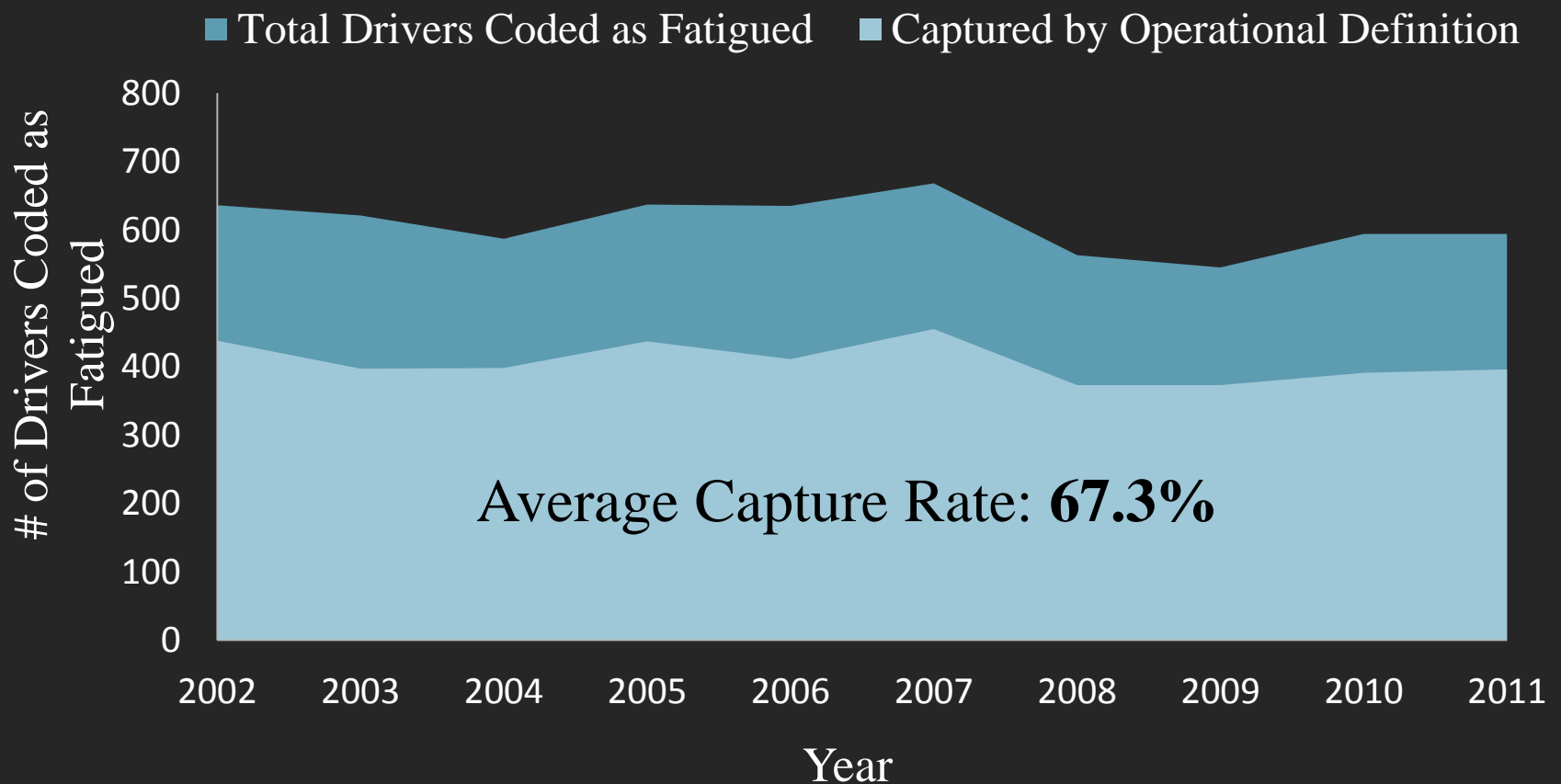
- Vehicles with a mechanical defect
- Bicycles and Off-Road Vehicles
- Drivers that were speeding
- Drivers that were impaired by drugs or alcohol
- Drivers that had a medical or physical disability
- Unlicensed drivers
- Collisions involving striking a pedestrian or animal

Results

- ▣ Overall, the operational definition identified between 11,000 and 16,000 drivers as fatigue-related from 2002 to 2011.
- ▣ Driver condition for most of the drivers identified by the operational definition were coded on the Motor Vehicle Accident Report (MVAR) form as normal or unknown

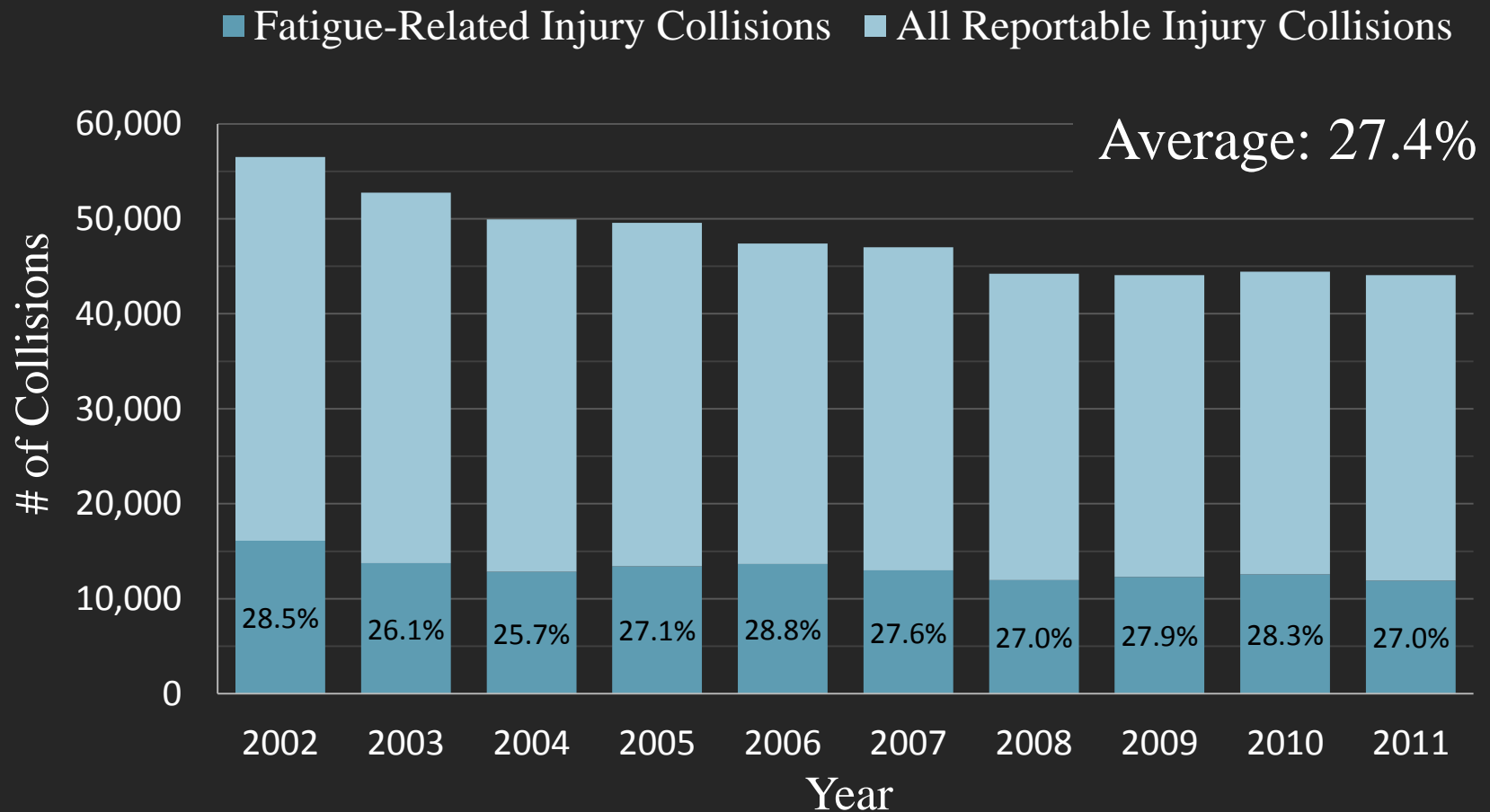
Results – Model Validation

Figure 1 – Proportion of Drivers Coded as Fatigued Captured by the Operational Definition



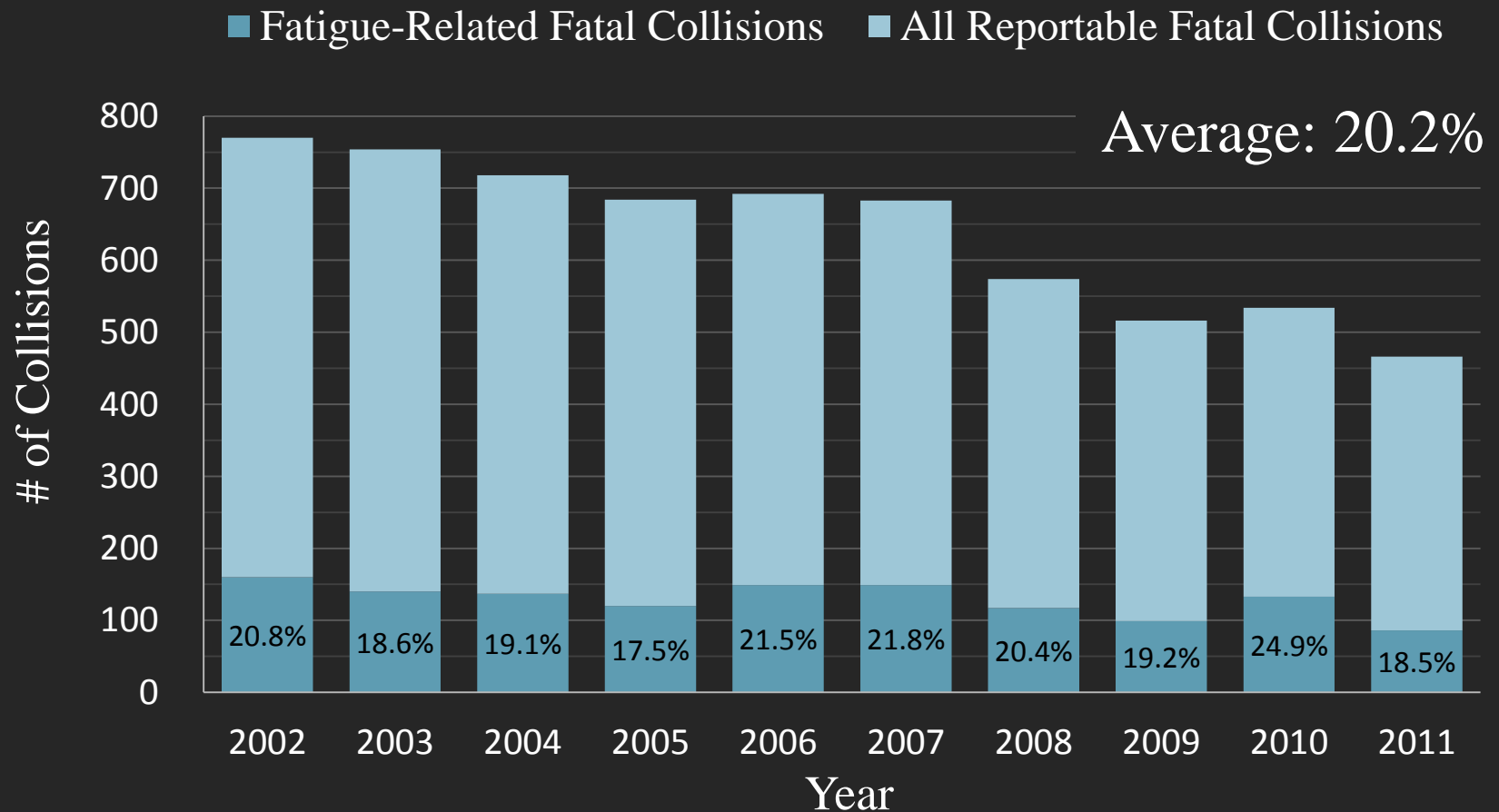
Results

Figure 2a: 2002 - 2011 Fatigue-Related Injury Collisions as a Proportion of All Injury Collisions



Results

Figure 3b: 2002 - 2011 Fatigue-Related Fatal Collisions as a Proportion of All Fatal Collisions



Results

Table 4a: Class of Vehicle Involved in Fatal and Injury Collisions, 2002-2011

Vehicle Type	Vehicles Involved in Fatigue-Related Collisions			Vehicles Involved in All Reportable Collisions		
	Fatal	Injury	Total	Fatal	Injury	Total
Passenger Vehicles*	69%	80%	80%	64%	81%	80%
Large Trucks	9%	4%	4%	12%	3%	3%
Pick Up Trucks	12%	8%	8%	12%	7%	8%
Others	10%	7%	8%	11%	8%	8%
Unknown	0%	0%	0%	1%	1%	1%
Total	100%	100%	100%	100%	100%	100%

*Passenger vehicles include passenger cars and vans

Results

Table 4b: Class of Vehicle Involved in Fatal and Injury Collisions, 2002-2011

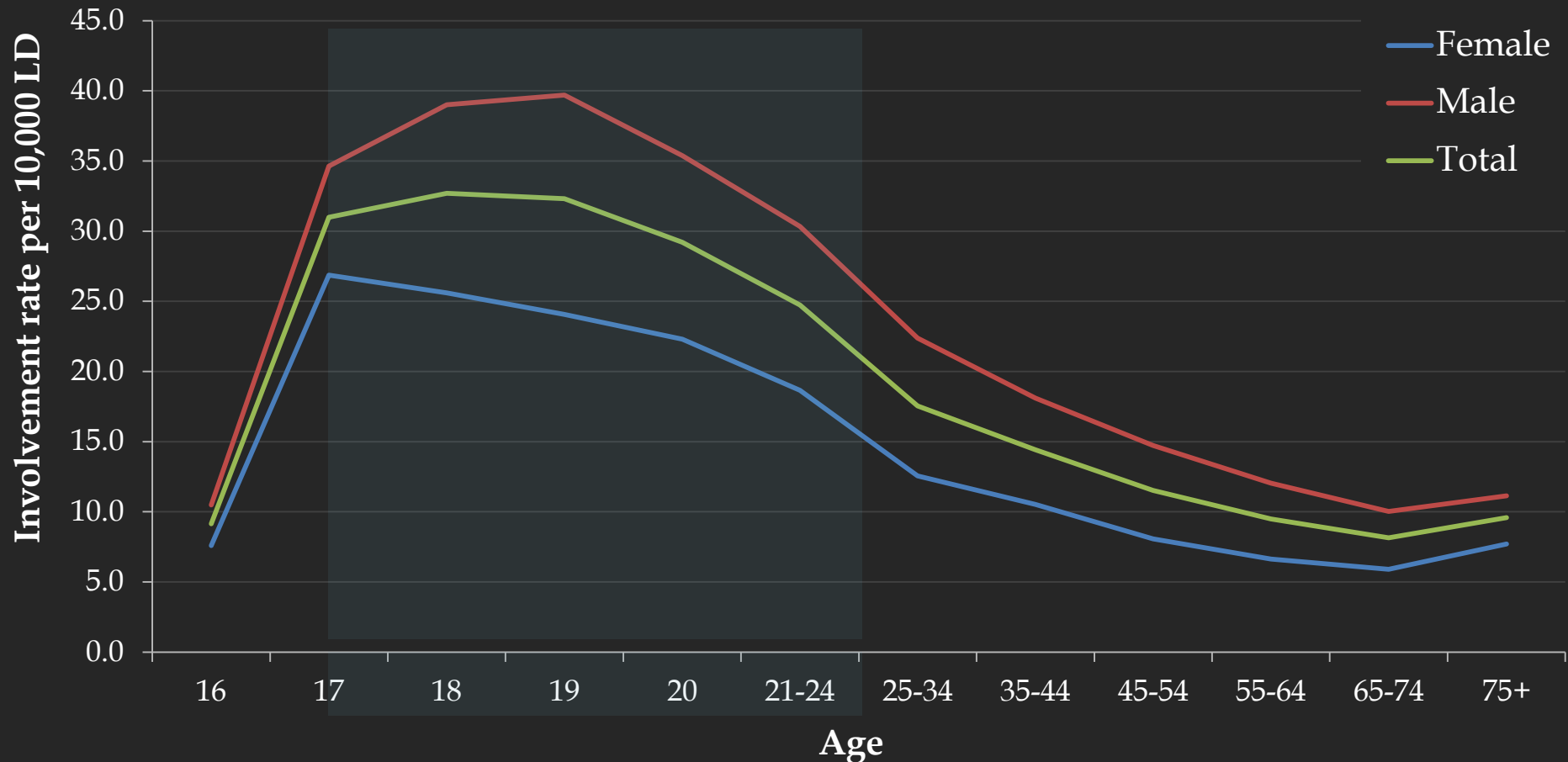
Vehicle Type	Vehicles Involved in Fatigue-Related Collisions			Vehicle Registrations**	Risk Ratio (% vehicle registrations/ % fatigue related collisions)		
	Fatal	Injury	Total	%	Fatal	Injury	Total
Passenger Vehicles*	69%	80%	80%	81%	0.85	0.99	0.99
Large Trucks	9%	4%	4%	3%	2.92	1.22	1.23
Pick Up Trucks	12%	8%	8%	11%	1.06	0.73	0.74
Others	10%	7%	8%	5%	2.13	1.60	1.61
Unknown	0%	0%	0%	-	-	-	-
Total	100%	100%	100%	100%	1.00	1.00	1.00

*Passenger vehicles include passenger cars and vans

**Average number of vehicles registered over 10 years

Results

Figure 5: Drivers Involved in Fatigue-Related Fatal and Injury Collisions by Driver Age Group and Gender, 2002-2011



Conclusion

- ▣ Fatigue contributed to approximately 1 in 4 injuries and 1 in 5 fatalities over ten years
- ▣ Even with changes in collision trends over time, operational definition consistently captured two-thirds of collisions reported by police and coroner to be fatigue-related
- ▣ Continues to be a foremost road safety issue in Ontario, especially with truck drivers and young drivers

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Appendix

Table 1A: Category of Person Injured in Fatigue-Related Fatal and Injury Collisions by Severity of Injury, 2002-2011

Involved Person	Severity of Injury				
	Minimal	Minor	Major	Fatal	Total
Driver	64.5%	66.4%	66.3%	69.3%	65.3%
Passenger	35.0%	32.7%	30.6%	27.4%	33.9%
Pedestrian	0.4%	0.7%	2.3%	2.6%	0.6%
Hanger On	0.1%	0.3%	0.8%	0.6%	0.2%
Others	0.0%	0.0%	0.0%	0.1%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Figure 1A: Severity of Injury in Fatal and Injury Collisions, 2002 - 2011

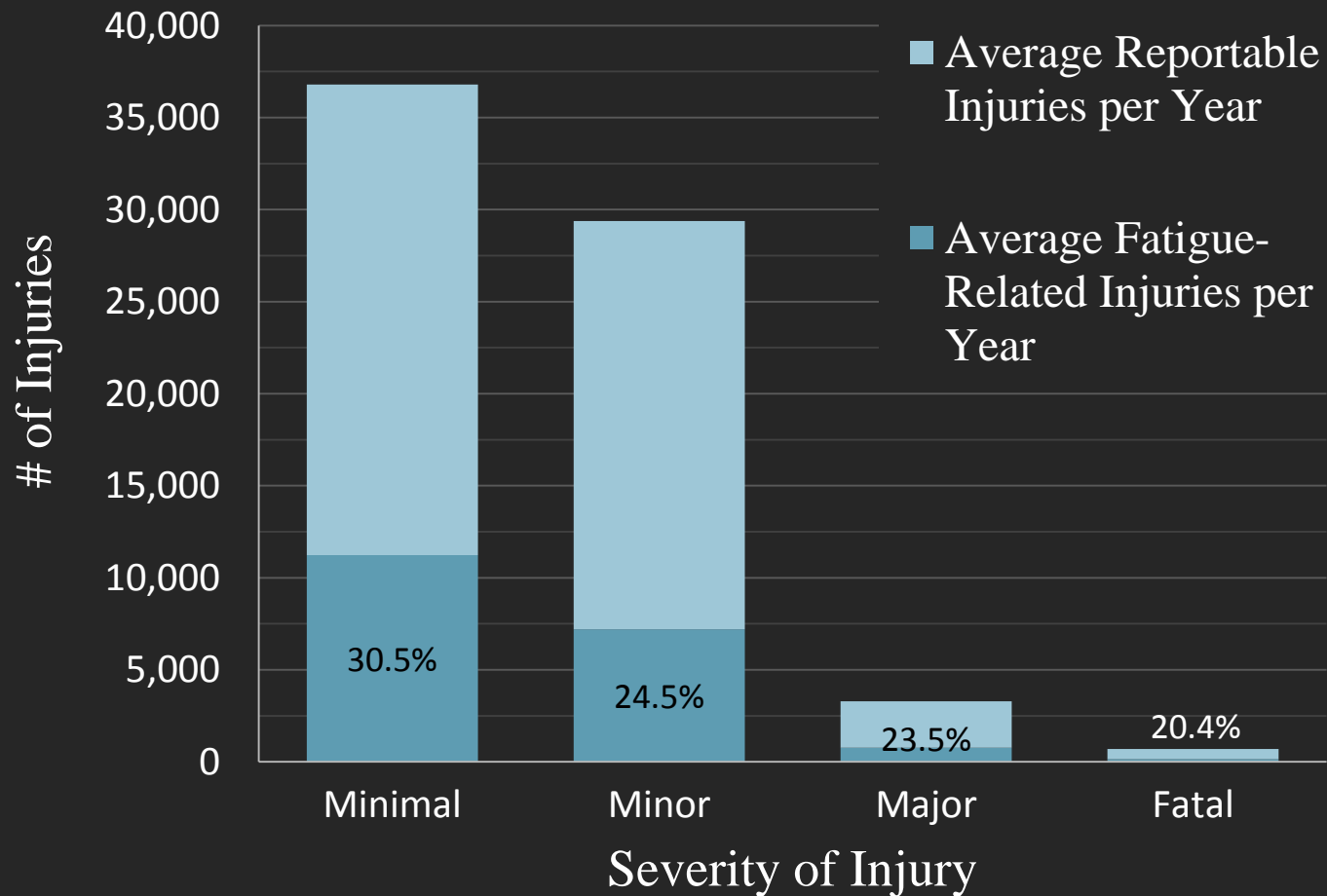


Figure 2A: Drivers Involved in Fatigue-Related Fatal and Injury Collisions by Day of Week, 2002-2011

