Truck Safety in Ontario: Past, Present and Future

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Today's Presentation

- Road Safety Research Office – An Overview
- Current Large Truck Collision Statistics
- Evaluation of Ontario's Speed Limiter Legislation
- Trucking Technology – The Future
- Questions and Answers

Road Safety Research Office – core activities

The Road Safety Research Office conducts applied research to support:

- Policy Making
- Enforcement
- Public Education

Large Truck Collisions in Ontario

- Large truck drivers are generally safe
  - In 2015, 69% of large truck drivers involved in a fatal collision were coded as “driving properly”
- In 2015, 18% of fatalities on Ontario’s roads were due to collisions involving a large truck
  - Collisions involving a large truck are more dangerous than those involving only passenger vehicles

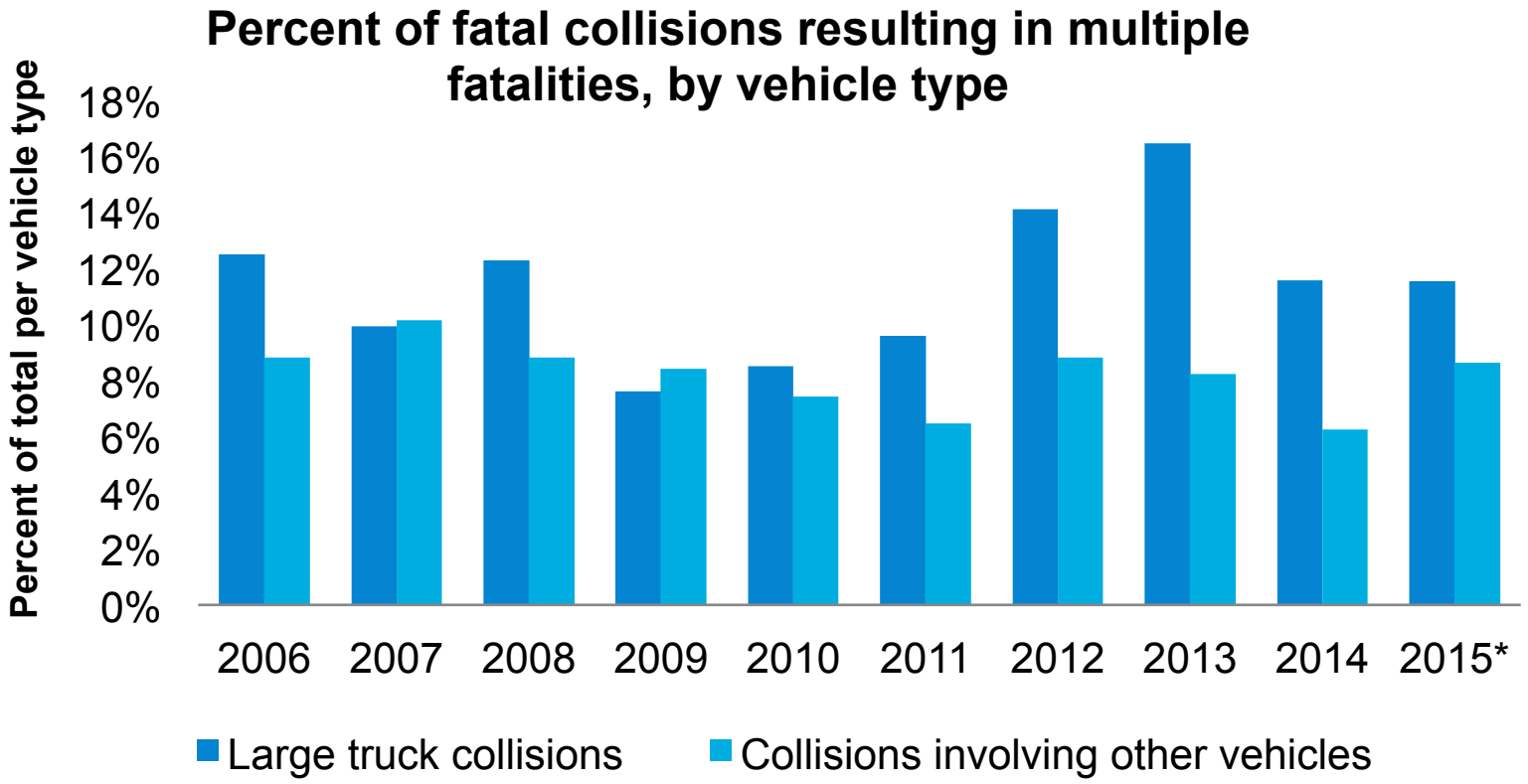
Large truck collision statistics

LARGE TRUCK COLLISION STATISTICS

Outline

- Large truck size = severe collisions. The worst outcome:
  - Multiple fatalities
- Understanding large truck driver behaviour and the risk involved
  - Single motor vehicle collisions
- Who is most vulnerable?
  - Pedestrian in fatal and major injury large truck collisions

COLLISIONS RESULTING IN MULTIPLE FATALITIES



- Large trucks collisions are 38% more likely to result in more than one fatality
  - Compared to collisions involving “no large trucks”

*2015 data is preliminary

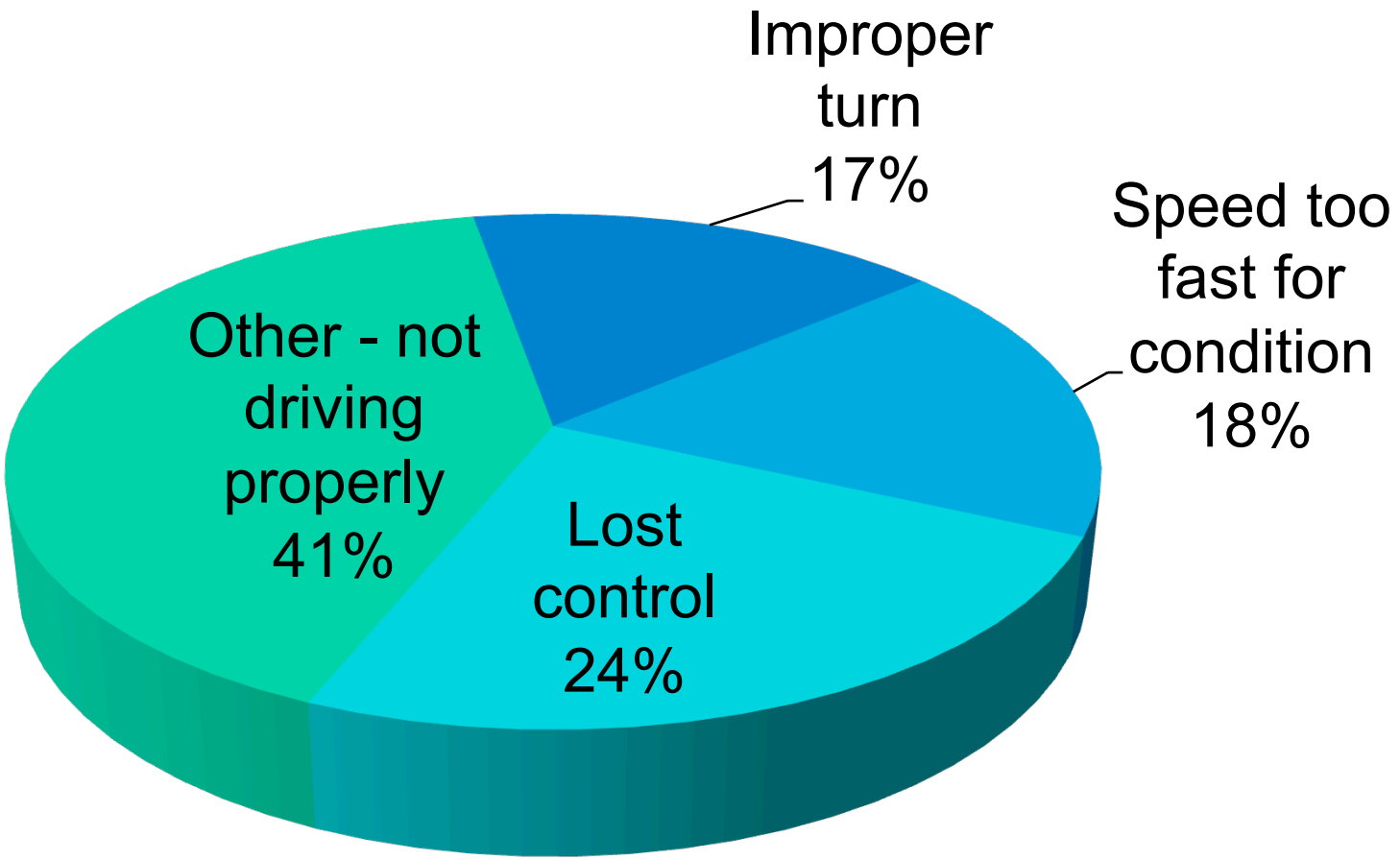
Multiple Fatalities: Factors

- 64% of all large truck collisions involving multiple fatalities occurred on a provincial highway.
  - Almost half of these collisions (46%) were head-on
  - Rear-end collisions were the second most common crash type (19%)
  - In the 10-year period (2006-2015), the largest number of fatalities recorded in a single large truck collision was eleven (2012)

Understanding large truck collisions: Single motor vehicle collisions

- Single motor vehicle (SMV) collisions offer an unambiguous view of driver fault in a collision
- Contributing factors in a collision: driver action + driver condition + vehicle manoeuvre

Large truck single motor vehicle collisions: driver action



*2015 data is preliminary

Proportion of all large truck driver actions in an SMVC - not "driving properly", 2006-2015*

Large truck SMV collisions: Driver and vehicle condition

- If large truck drivers were coded as driver action "driving properly" in an SMV, how are driver condition and vehicle condition coded?

  - Driver condition*, top 3:
    - Inattentive 86%
    - Medical or physical disability 4%
    - Fatigue 3%

  - Vehicle condition**, top 2:
    - Tire puncture blowout 9%
    - Wheels/suspension defective 4%

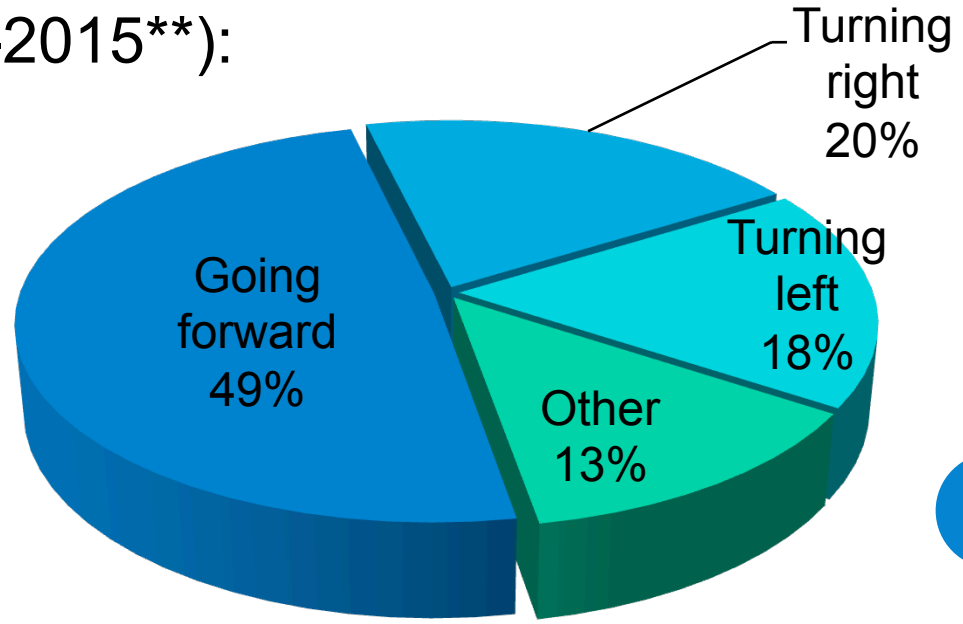
*excludes driver condition unknown or driving properly
**excludes vehicle condition unknown or no defect

Large truck SMVC analysis: Fatigue

- SMV collisions at night can be used as a proxy for impaired/fatigue collisions (2006-2015):
  - 67% of large truck drivers in SMV crashes at night were coded with a driver error

Pedestrians in fatal and major injury* large truck collisions

- 69% of all pedestrian fatalities and major injuries in large truck collisions occurred on municipal roads (31% on provincial highways)
- Top 3 large truck manouevres by drivers on municipal roads that resulted in a pedestrian fatality or major injury (2006-2015**):



*Involved an overnight hospital stay
**2015 data is preliminary

Evaluation of the road safety impact of Ontario's speed limiter legislation for large trucks

SETTING THE CONTEXT

- 2009 Ontario legislation mandates electronic speed limiters for most large trucks (>11,793 kg*) to be set to a maximum of 105 km/h

- We wanted to know:
  - What was the effect on the frequency of collisions involving speeding large trucks on 100 km/h highways?
  - Were there been unintended consequences in large truck driver behaviour?

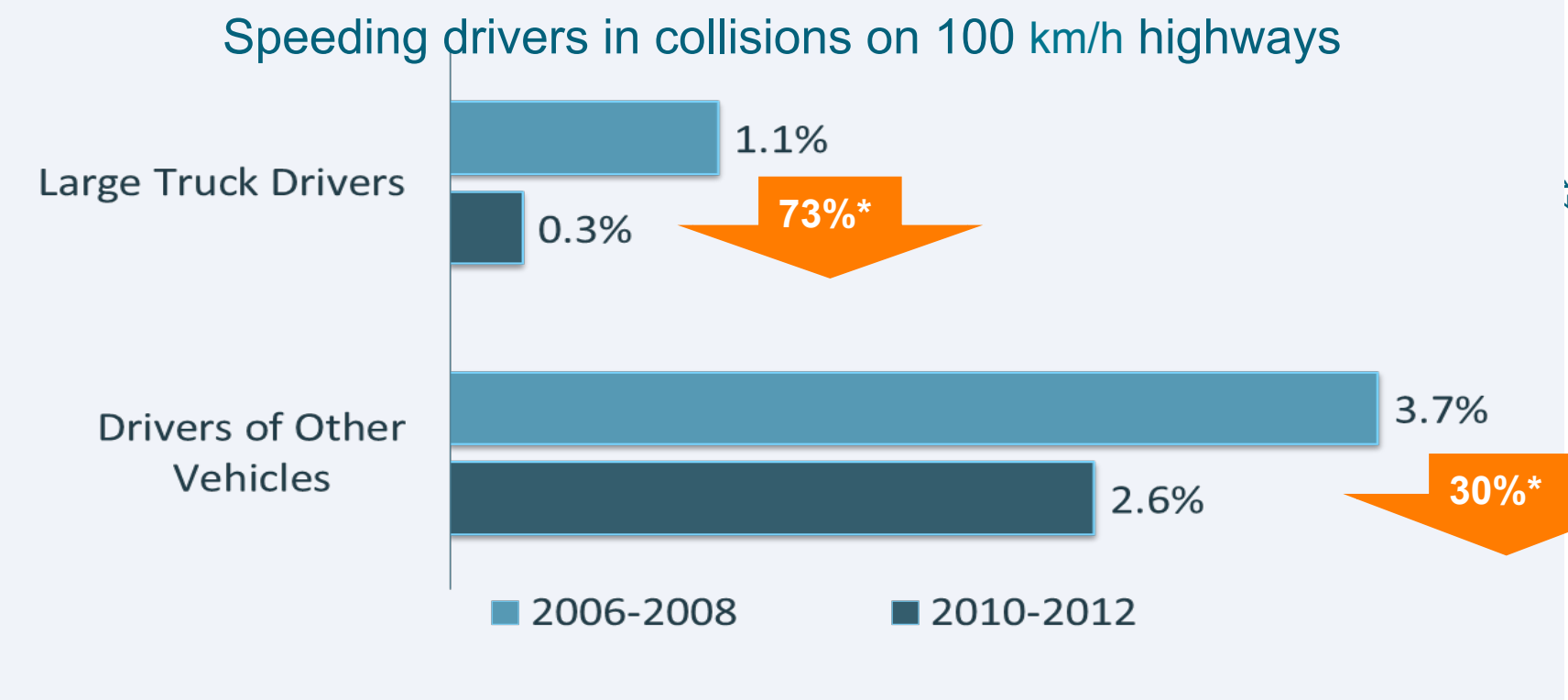
Targeted outcome measure

- Isolate the intended effect of speed limiters
  - Speed is the only “at-fault” collision measure we expect to be affected by speed limiters

- Control for changes in exposure before and after implementation

$$Outcome = Number\ of\ drivers\ at\ fault\ for\ speeding / Number\ of\ drivers\ at\ fault$$

What did we find? Speed collisions



- Large truck drivers produced fewer at-fault speed collisions *relative to all at-fault driver actions*, post 2009.

*significant finding

LARGE TRUCK DRIVER BEHAVIOUR

- Question: Do large truck drivers adjust their driving behaviour in an attempt to compensate for time lost?
  - Answer: No evidence to indicate worse collision outcomes for large truck drivers post 2009
- Question: Does the speed differential created between large trucks and the general flow of traffic lead to an increase in rear-end crashes?
  - Answer: No evidence of change in proportion of large truck drivers rear-ended post 2009 on 100 km/h roads
    - Percent of total collisions, Pre: 10.03; Post: 10.47

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Trucking technology – the future

What is platooning?

- Using V2V communication, advanced driver assistance tech, to automate some control of trucks to create a convoy or platoon of 2+ vehicles
  - E.g. local area networking, dedicated short range communication, cellular

Why platooning?

- Potential to:
  - Improve vehicle efficiency, tests show fuel savings of 4.5-21%
  - Improve truck safety, respond faster than human drivers
  - Increase traffic density, and decreasing congestion

How does platooning work?

What makes a platoon safe?

- Reliable equipment, fast communication, adequate spacing, human factors
- Theoretical safe gaps of 1.2-2m have been suggested
- Relies on
  - Approximately equal truck weights
  - Mid and rear, equal or better braking ability

How are platoons efficient?

- Largely reduced wind resistance
- Greater fuel savings for second and third vehicles in platoon, little savings for first vehicle.
- Greater fuel savings with closer distances (e.g.
  - 8 % avg. at 10 m
  - 15% at 4.7 m

Ontario's platooning pilot

- Updating regulation to allow testing of truck platooning in Ontario
  - with a driver present in each vehicle
  - under strict conditions
  - at locations to be determined by MTO.
- MTO will evaluate:
  - Safety
  - Compatibility with other road users
  - Compatibility with infrastructure

International platooning demonstrations

- PATH project, California, 2003-present
  - With drivers present
  - Tested close to off-the shelf tech
- Energy ITS, Japan, 2008-2012
  - Highly automated heavy and light trucks
- European Truck Platooning Challenge, Netherlands, North & South Germany, Sweden, Belguim, Denmark, 2016
  - Regulatory consistency highlighted

Canadian platooning demos

- In Blainville, Quebec, October 2016
- Used PATH Volvo vehicles, modified CACC systems
- Fuel savings greatest at shorter following distances, plateau around 22m at 5.2% across platoon
  - Aerodynamic trailers, 5.7% at 34m

The future of platooning

- Longer term testing will help to clarify safety of platooning
- No unified regulatory approach across jurisdictions
- Ontario taking a conservative approach to testing regulations to minimize risk
- As technology converges, industry standards will emerge (e.g. 5.9 Ghz DSRC)


QUESTIONS
ANSWERS

THANK YOU!

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