
Young Drivers in Fatal Crashes: The Puzzles They Pose

Washington Traffic Safety Commission In-depth Report Series

http://wtsc.wa.gov/wp-content/uploads/dlm_uploads/2018/08/Young-Drivers.pdf



WASHINGTON
Traffic Safety
COMMISSION

Why Care About Young Drivers Ages 16-25?

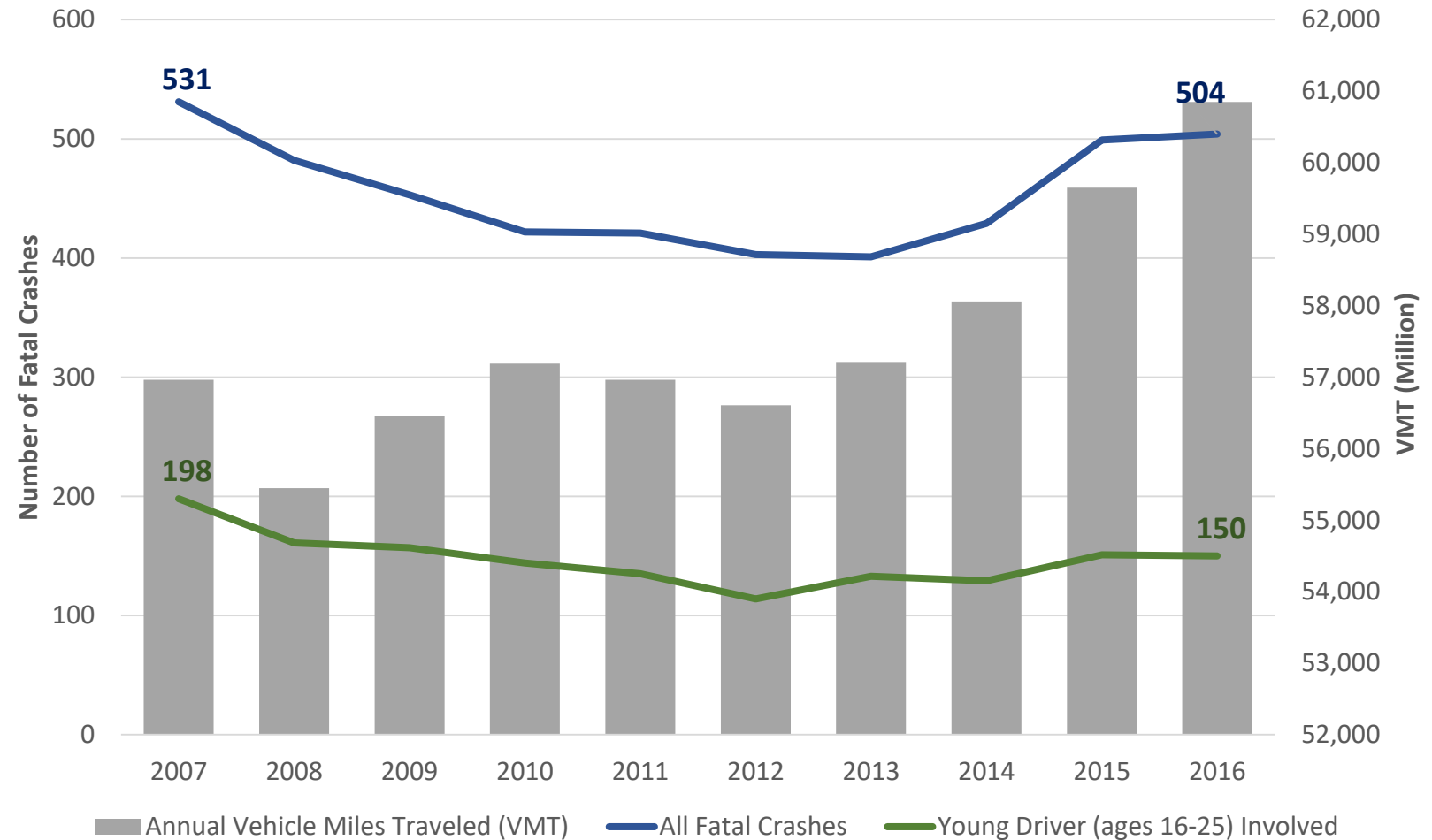
- ❑ Young drivers are a high-risk driver group
 - 14 percent of all licensed drivers
 - 30 percent of all fatal crashes in Washington State



An Emerging Upward Trend After 2012

- A combination of factors could be responsible for the rise in fatal crashes, including the recent increase in Vehicle Miles Driven (VMT).
- The annual VMT started rising in 2013 after a stable period following the 2007 Great Recession.

Fatal Crash Trends, 2007-2016



Brain Developments

Why are young drivers SO risky?

Because they have V-8 engines with bicycle brakes!

Even before puberty, young brains are changing dramatically. A process called *synaptic pruning* proceeds quickly to eliminate many earlier neural connections and thereby create room for *new* connections:

- ❖ Reward and emotional circuitry ramps up at puberty: the *socioemotional reward prediction* (SERP) system pushes the accelerator
- ❖ The brain develops sequentially, from back to front, so prefrontal executive functions, analytic processes, and behavioral controls mature last: the *cognitive control* (CC) system

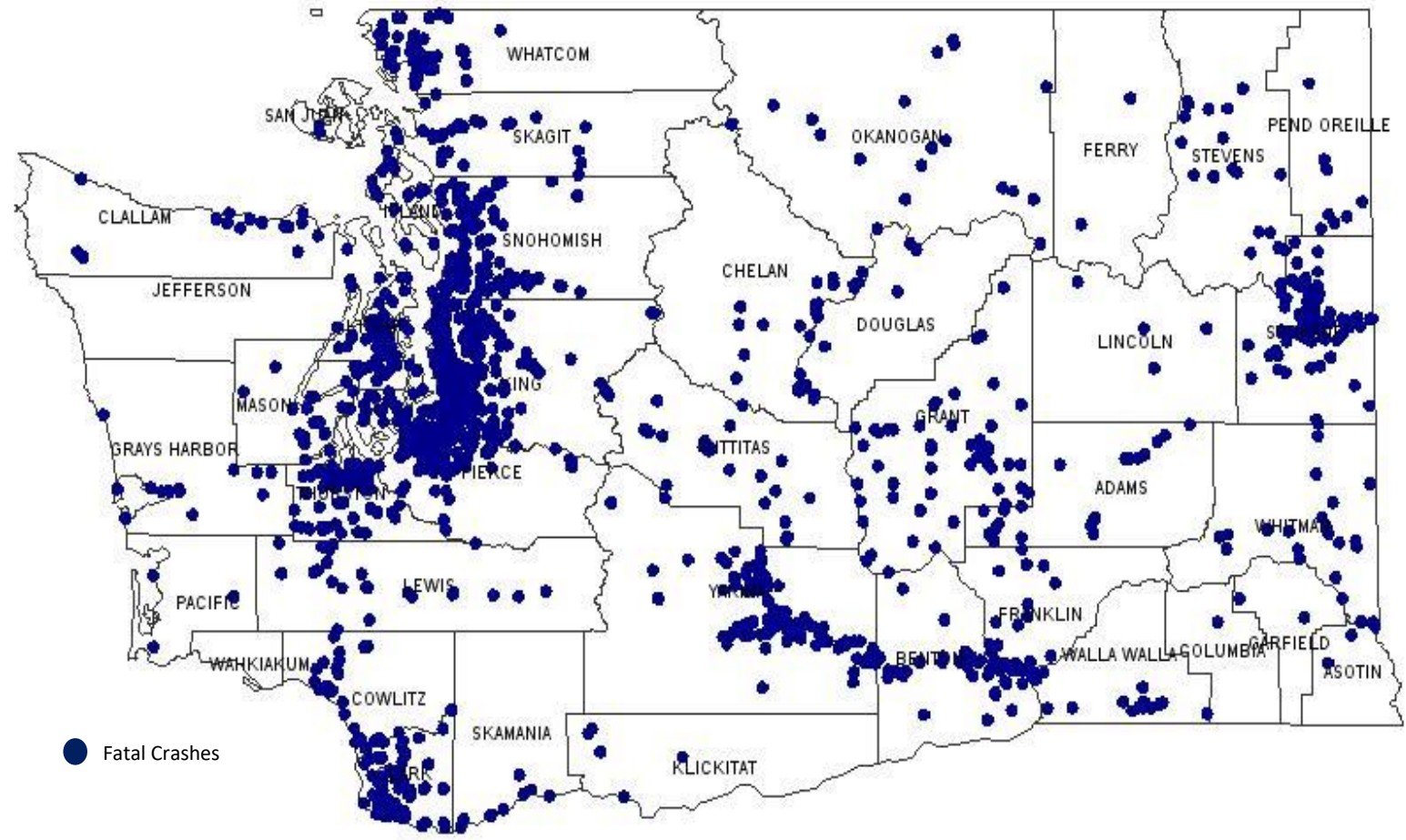
Crash Characteristics



Each blue dot represents a fatal crash in which at least one driver was 16-25 years old.

- Blue dots are concentrated along state highways and in counties with large cities and dense populations.
- The county comparisons of young driver-involved fatal crash rates to the state rate did not reveal any county with a significantly higher or lower rate than the state rate ($p < 0.05$).

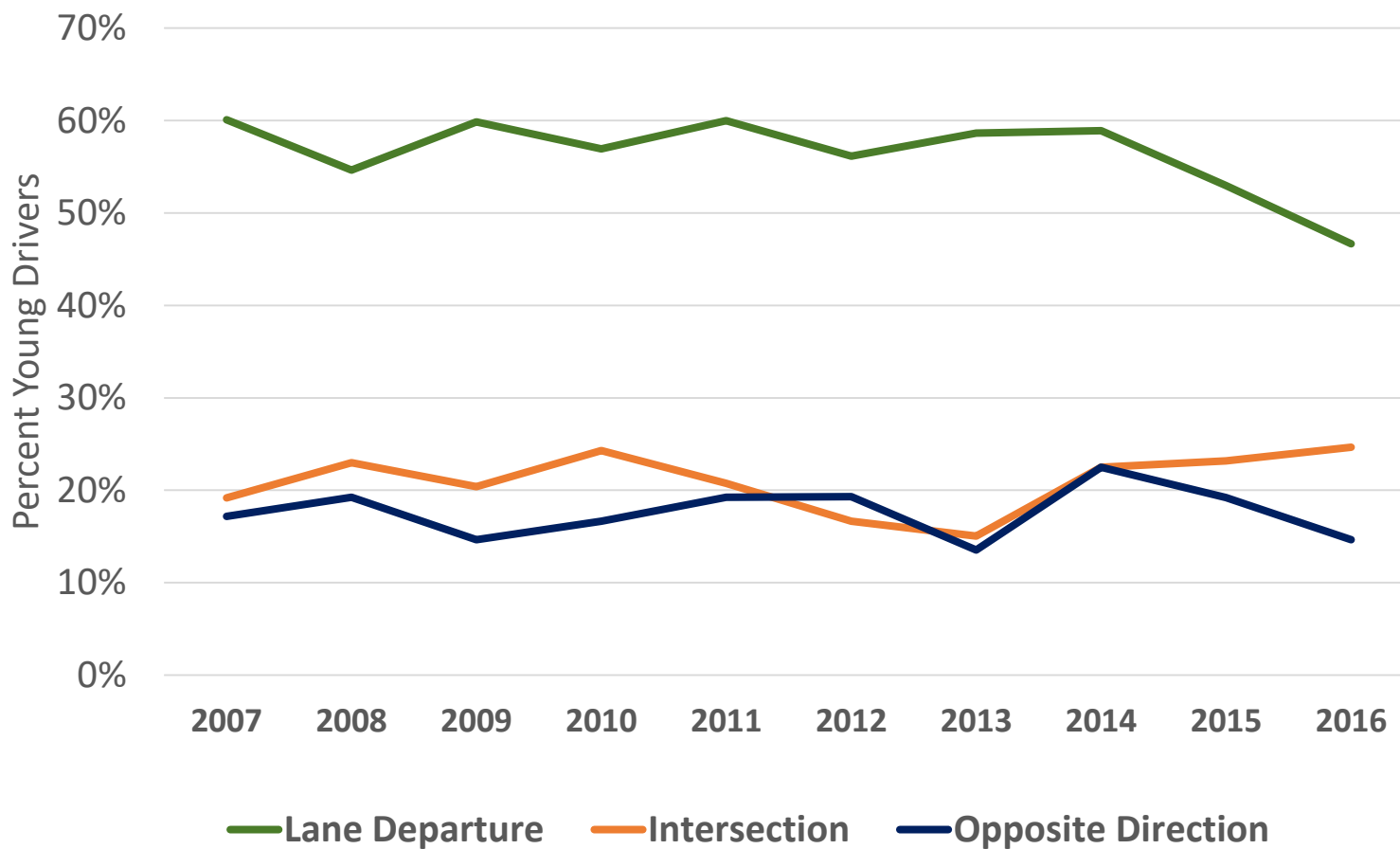
Young Driver (Ages 16-25) Involved Traffic Crashes During 2007-2016



Lane Departures are the Most Common Fatal Crash Type in Young Drivers.

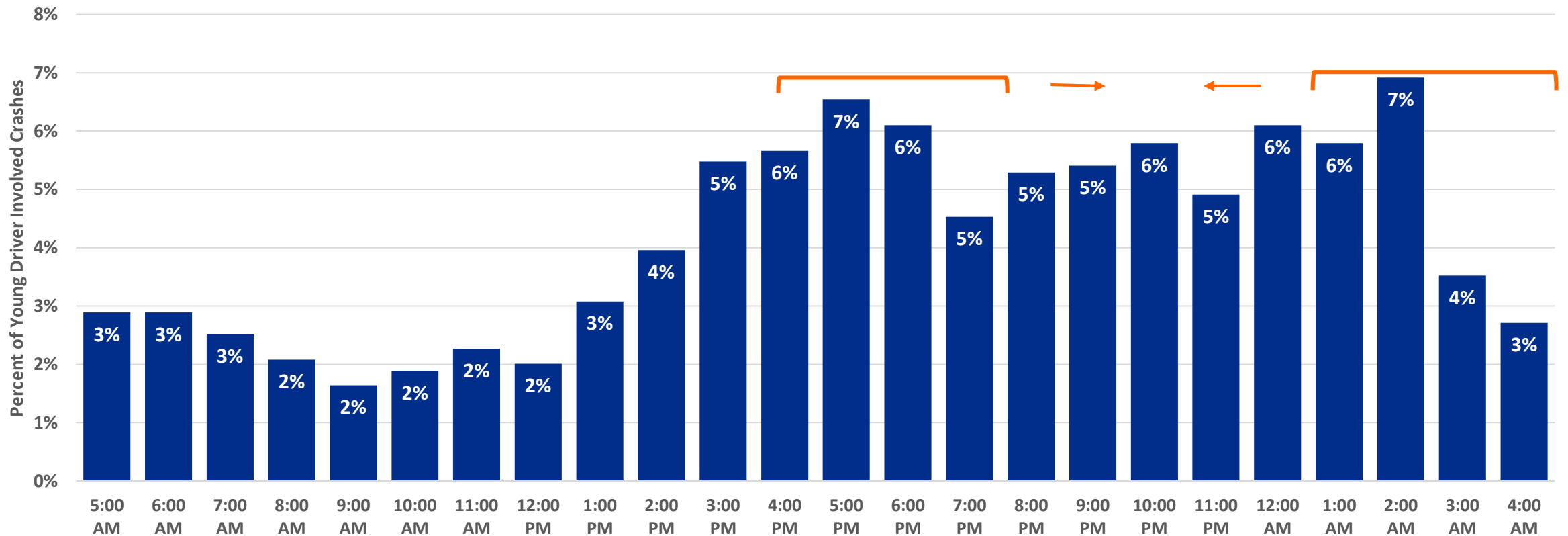
- 63 percent of lane departures were single vehicle crashes with no other road users involved.
- Examples include skidding off or leaving the road, overturning, hitting another object, or entering a ditch.

Young Driver (Ages 16-25) Involved Fatal Crashes by Crash Type, 2007-2016



Evening and Early Morning Hours Have the Highest Concentration of Young Driver Crashes

Young (Ages 16-25) Driver Involved Fatal Crashes by Crash Time, 2014-2016



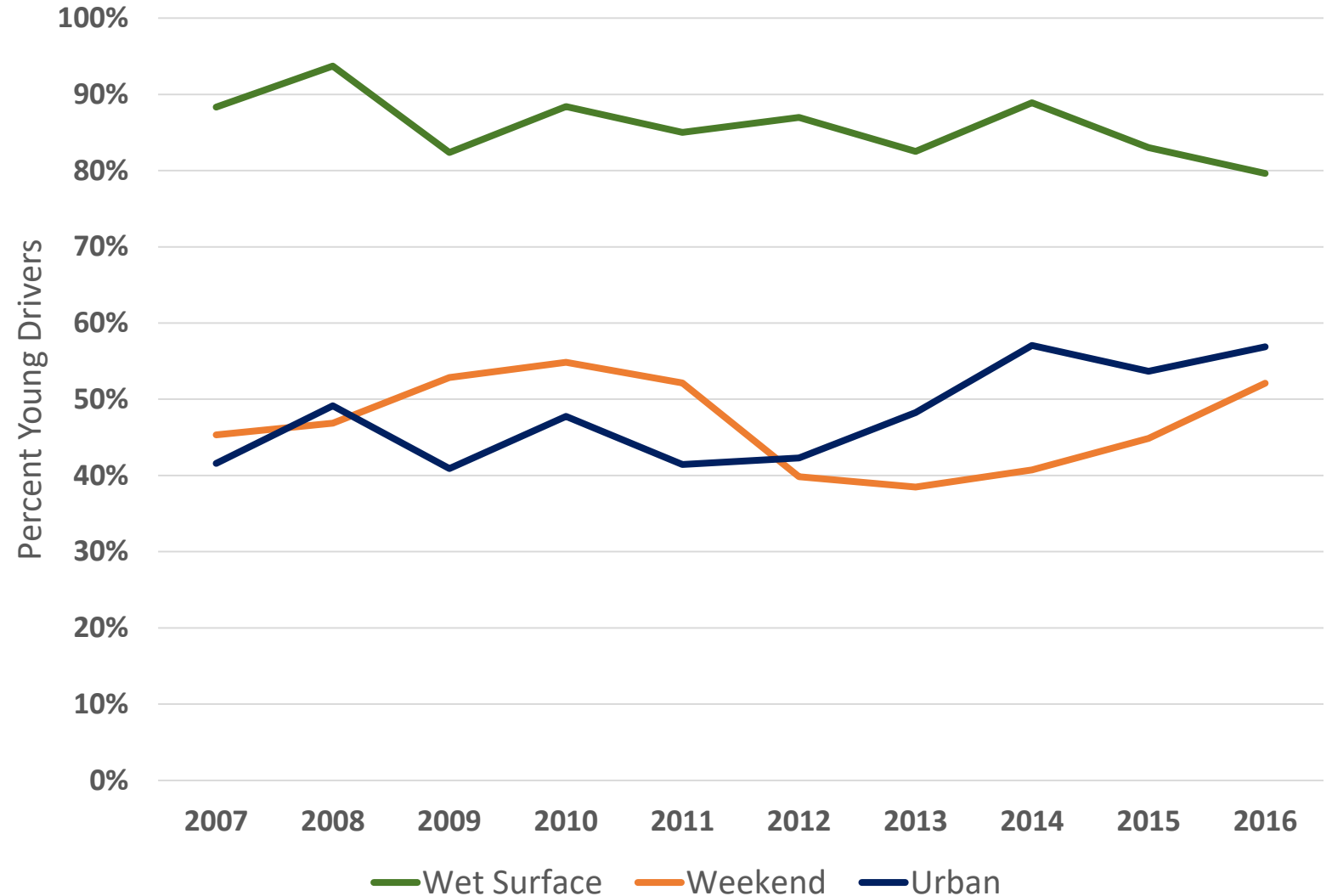
Over-confidence meets inexperience

- ❖ At about the same time that young drivers suddenly become aware of the many potential rewards life offers, they still lack the benefits of experience. In other words, the SERP is overwhelming the CC, and so their driving choices will reflect that condition.
- ❖ They must go through the process of learning, using the SERP (*ventral striatum*) as a reward predictor, and comparing their anticipatory arousal against the results of their actions. This learning process is what bolsters and strengthen *cognitive control*.
- ❖ Our task is to help them with this process so they make better choices and...*survive*.

... Mostly Occur on Wet Road Surfaces, Weekends, and Urban Roads

- From 2014 to 2016, 83% of fatal crashes involving young drivers occurred on wet road surfaces.
- This correlates to the high numbers of young driver-involved fatal crashes due to lane departures.

Young Driver (Ages 16-25) Involved Fatal Crashes by Various Crash Factors, 2007-2016



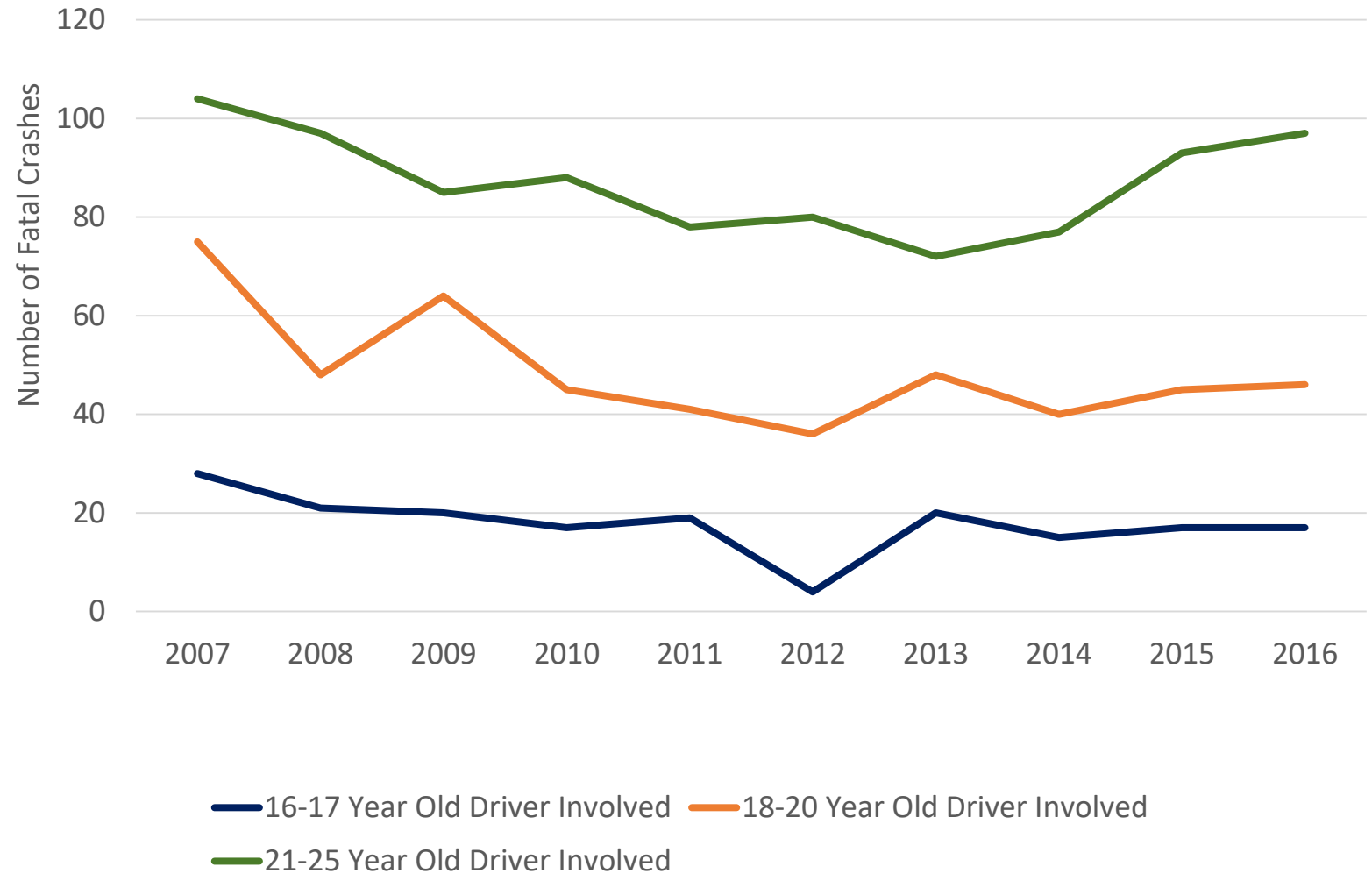
Young Driver Demographics



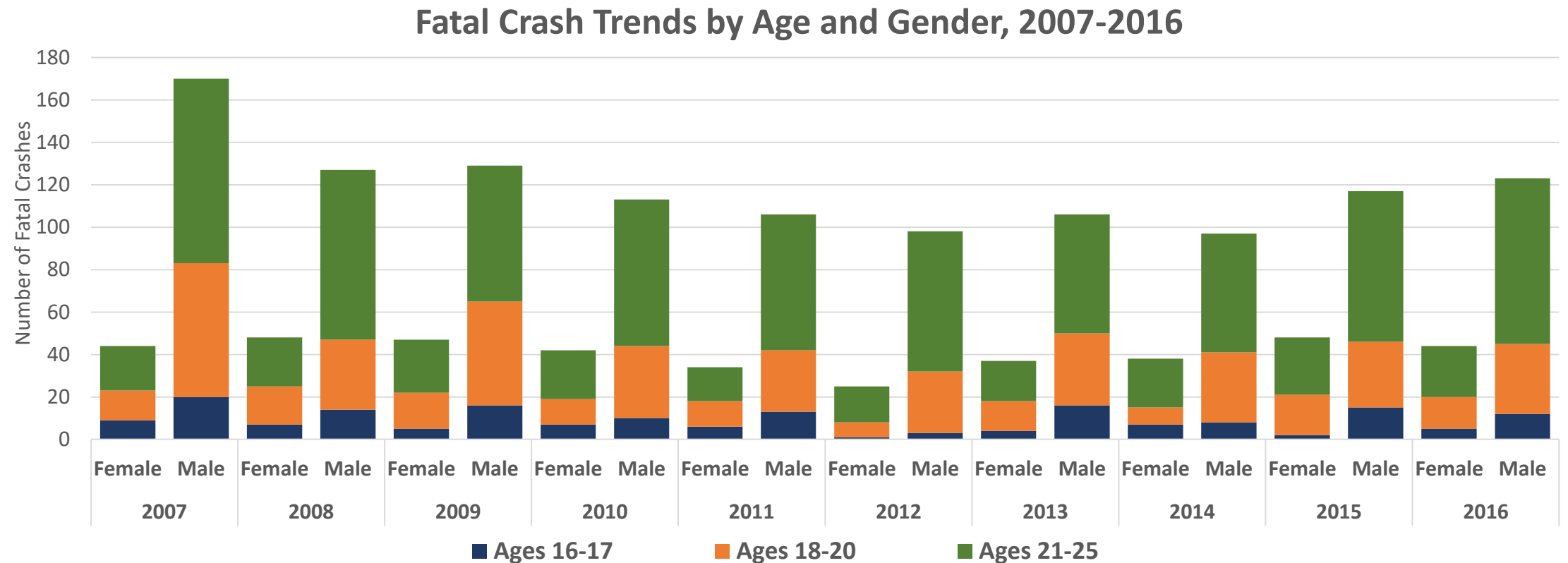
Fatal Crash Trends Vary by Age

- The steady rise in the fatal crashes involving drivers ages 21-25 between 2014 and 2016 suggests that this age group could be the major driver behind the recent increase in young driver-involved crashes after 2012.

Fatal Crash Trends by Age Groups, 2007-2016



Young Male Drivers in All Age Groups Are More Likely to Be Involved in Fatal Crashes Than Young Female Drivers



And now a deeper dive into brain changes

- ❖ The ventral striatum is alert to the potential for **reward**. It is also highly sensitive to social context: age peers suddenly displace parents and other family members in importance.
- ❖ In the early stages of adolescent development, virtually any activity involving peers may seem like a good idea (e.g., setting your hair on fire?). Even most five year-olds wouldn't hesitate to call that a really **bad** idea!
- ❖ For some adolescents in particular, i.e., “risky reactors,” (vs. “risky deliberators” and “little adults”), cognitive control is a problem.

Risky Behaviors



High Risk Behaviors

One in three young drivers in fatal crashes during 2007-2016 were:

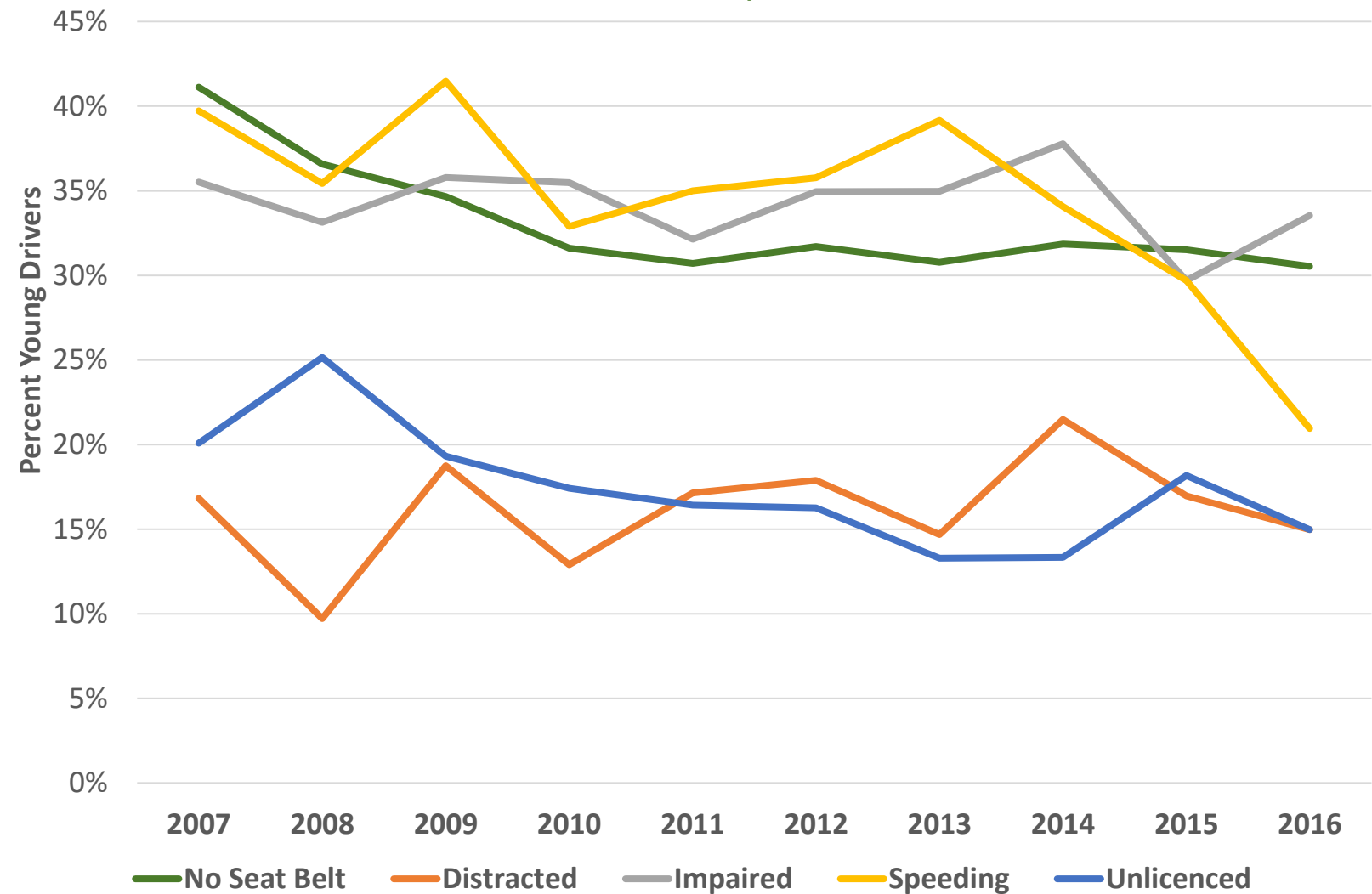
Not wearing a Seat Belt.

Went down from 41 percent in 2007 to 31 percent in 2016.

Speeding. Went down from 40 percent in 2007 to 21 percent in 2016.

Impairment: Remained steady around 35% between 2007 and 2016.

High Risk Behaviors of Young Drivers Ages 16-25 Involved in Fatal Crashes, 2007-2016

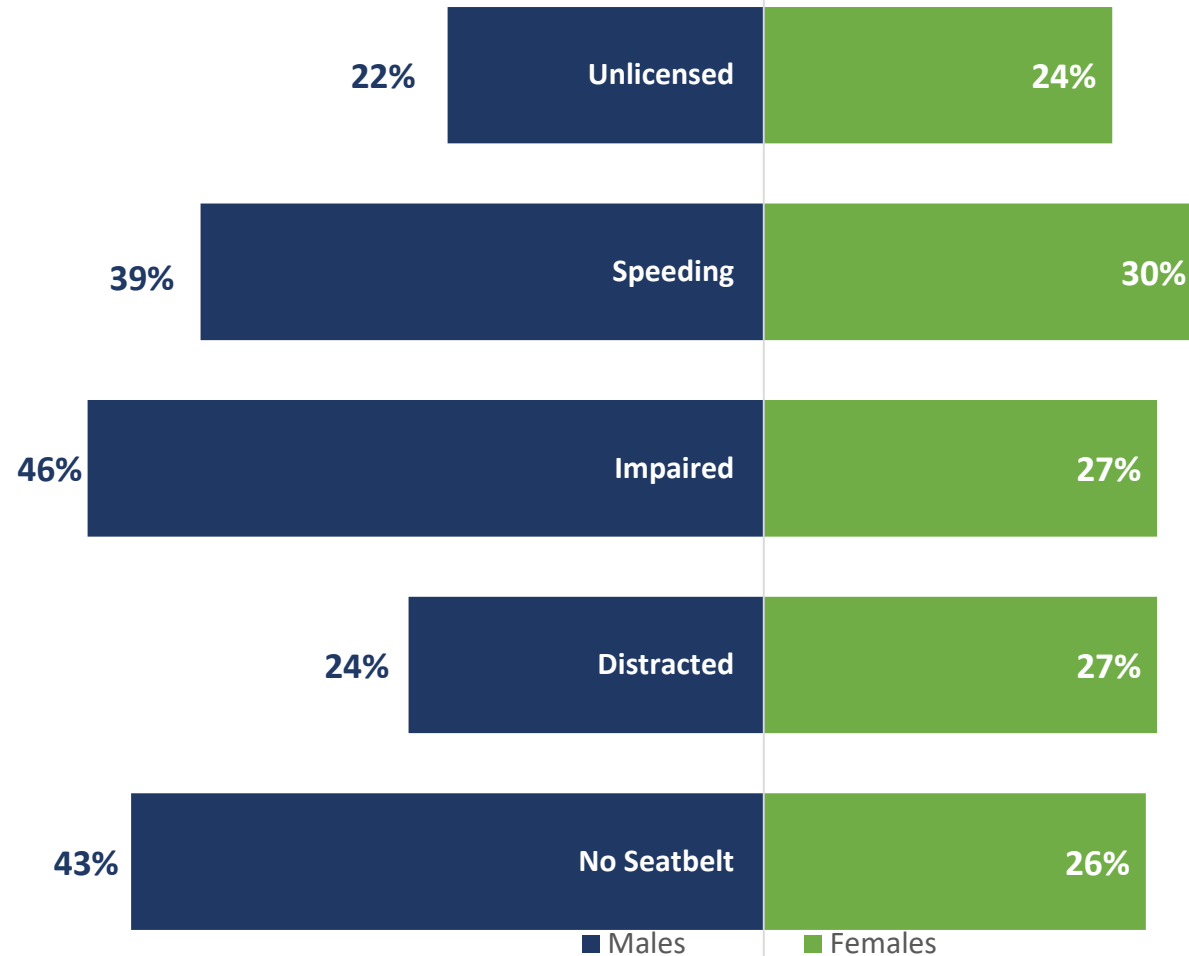


Risky Behaviors and Gender

In fatal crashes:

- *Young male drivers are more likely to be impaired, speeding or not wearing a seat belt than young female drivers.*
- *Young female drivers are more likely to be distracted than young male drivers.*

Gender Differences in Young Driver (Ages 16-25) Behaviors, 2014-2016



High Risk Behaviors of Young Male Drivers Involved in Fatal Crashes, 2014-2016

Figure 12a: Young Male Drivers Ages 16-17

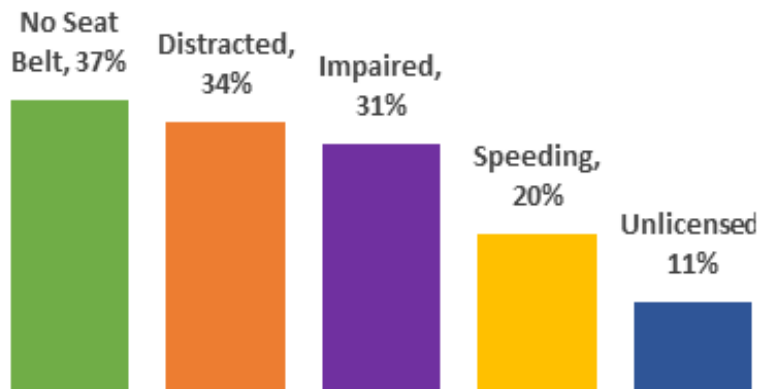


Figure 12b: Young Male Drivers Ages 18-20

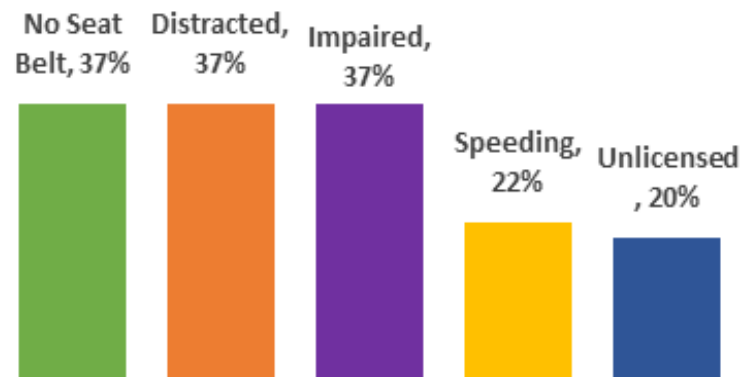
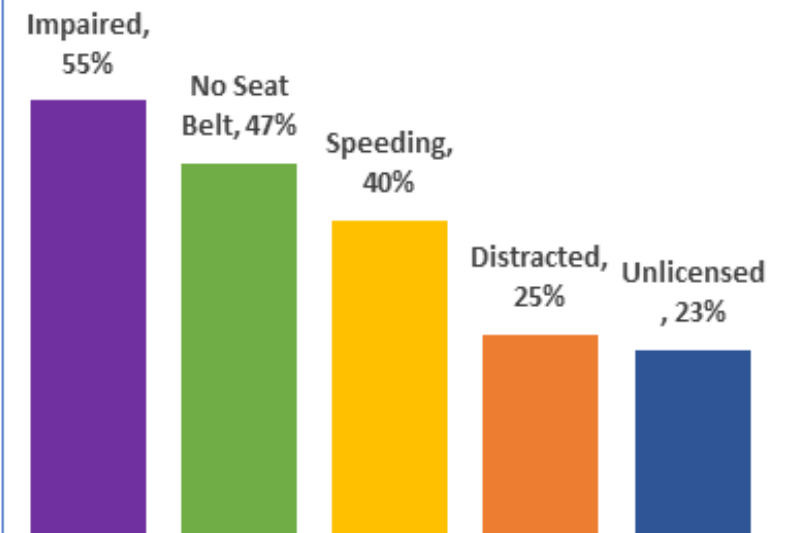


Figure 12c: Young Male Drivers Ages 21-25

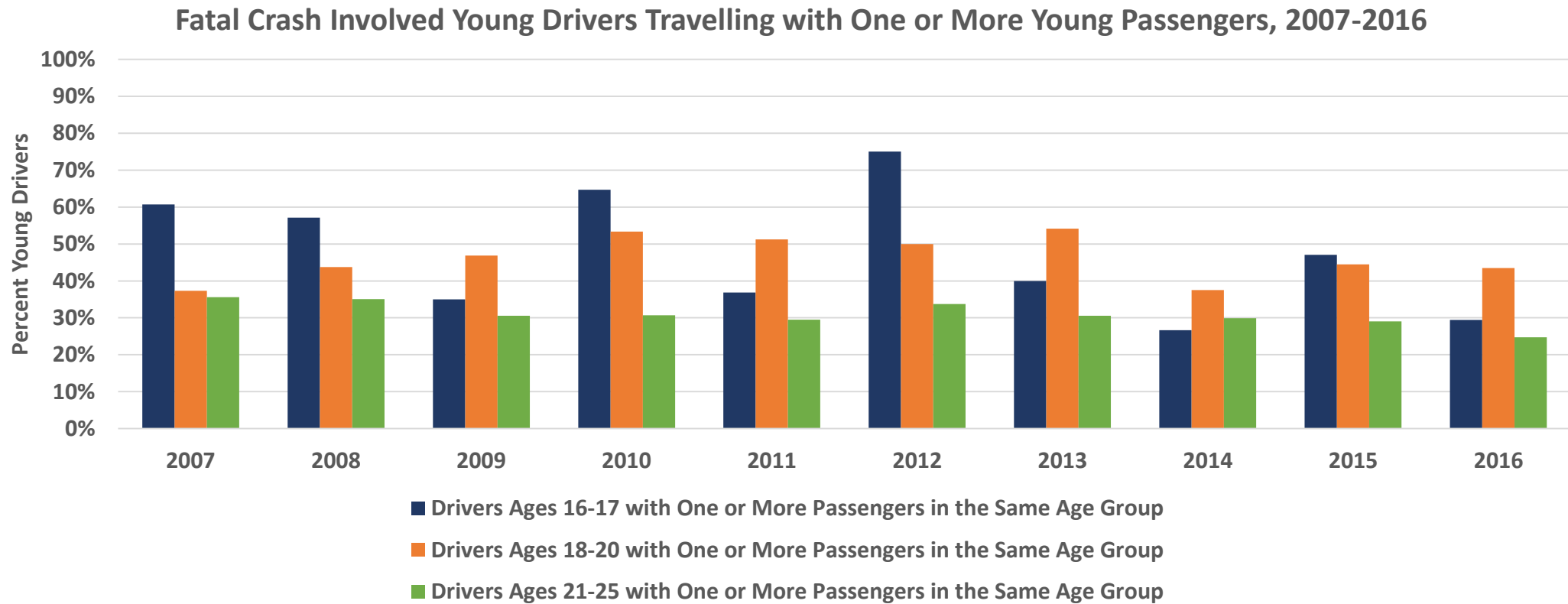


Top Risky Behaviors in Young Male Drivers:

- ❑ Young drivers tend to have the lowest rates of continuous seat belt use when compared with other age groups.
 - The sporadic use of seat belts among some teens and young male drivers in Washington may explain why so many young motor vehicle occupant fatalities are unbelted.
- ❑ Among young male drivers ages 21-25, impairment is the major fatal crash factor - 55 percent.
- ❑ Young male drivers ages 21-25 were likely to be positive for poly drug use.
 - Between 2014 and 2016, 17 percent of young drivers ages 21-25 in fatal crashes were positive for multiple drugs or drug(s) mixed with alcohol, compared to 14 percent between 2011 and 2013.



Interactions with Young Passengers



Young Drivers (Ages 16-25) with young Passengers

[. . . Studies on fatal crashes showed increased risk, compared with solo driving, for young drivers with at least one passenger (significant risk estimates ranging from 1.24 to 1.89) and two or more passengers versus solo driving (1.70 - 2.92) . . .]

Published in final edited form as:

J Adolesc Health. 2015 July ; 57(1 0): S24–S35.e6. doi:10.1016/j.jadohealth.2015.03.010.

Young Drivers and Their Passengers: A Systematic Review of Epidemiological Studies on Crash Risk

Marie Claude Ouimet, Ph.D.^{a,b,*}, Anuj K. Pradhan, Ph.D.^c, Ashley Brooks-Russell, Ph.D.^d, Johnathon P. Ehsani, Ph.D.^e, Djamal Berbiche, Ph.D.^b, and Bruce G. Simons-Morton, Ed.D., M.P.H.^e

In Sum . . .

Five young driver (ages 16-25) behaviors that are likely to increase fatal crash risk:

- ☐ Night time driving
- ☐ Driving with young passenger(s)
- ☐ Driving with no seat belt
- ☐ Impaired driving – i.e., alcohol positive, drug positive or positive for multi-drugs
- ☐ Distracted driving – i.e., cell phone use while driving

Questions



CONTACT:

ZEYNO NIXON, PhD MPH

DICK DOANE, MA MPA

DICKDOANE@WTSC.WA.GOV

360.725.9894



WASHINGTON
Traffic Safety
COMMISSION