

Testimony of Robert Wunderlich  
Texas A&M Transportation Institute  
before the  
Texas State Senate  
Transportation Committee  
February 26, 2020

Good morning Chairman Nichols and committee members. My name is Robert Wunderlich. I appear before you today in my capacity as a Senior Research Engineer at TTI and in my specific role as Director of the Center for Transportation Safety. I am here to provide testimony on the interim charge related to safety and the causes of traffic-related crashes and fatalities. I appreciate the opportunity to appear before you today to provide some brief remarks and respond to any questions you may have.

This testimony focuses on the most serious traffic crashes – those which result in death or serious injury. These severe crashes are the focus of the Texas Strategic Highway Safety Plan ([texasshsp.com](http://texasshsp.com)) which provides strategies and countermeasures in seven emphasis areas to address them. We have provided a summary brochure on the Texas SHSP in your materials.

#### **Overall Trend in Fatal and Serious Injury Crashes**

Texas traffic fatalities grew steadily, by 24% from 2011 to 2016. However, fatalities decreased in 2017, 2018 and 2019. Although the overall trend has risen and fallen, fatalities have remained at more than 3500 each year since 2014. Serious injuries on Texas roadways increased by 15% from 2010 to 2017 but then dropped by 17% in one year from 2017 to 2018. They rose again in 2019, but not to the level experienced in 2017. Figure 1 is a graphic depiction of the trends in fatalities and serious injuries in Texas from 2017 to 2019. The 2019 data should be considered preliminary as more reports may be filed and processed. Additionally, there was a change nationally in the labeling of serious injury crashes between 2017 and 2018 from “incapacitating” to “suspected serious injury.” Several other states also experienced larger than expected swings in this category of crashes from 2017 to 2018, which may explain the large fluctuation in Texas serious injuries.

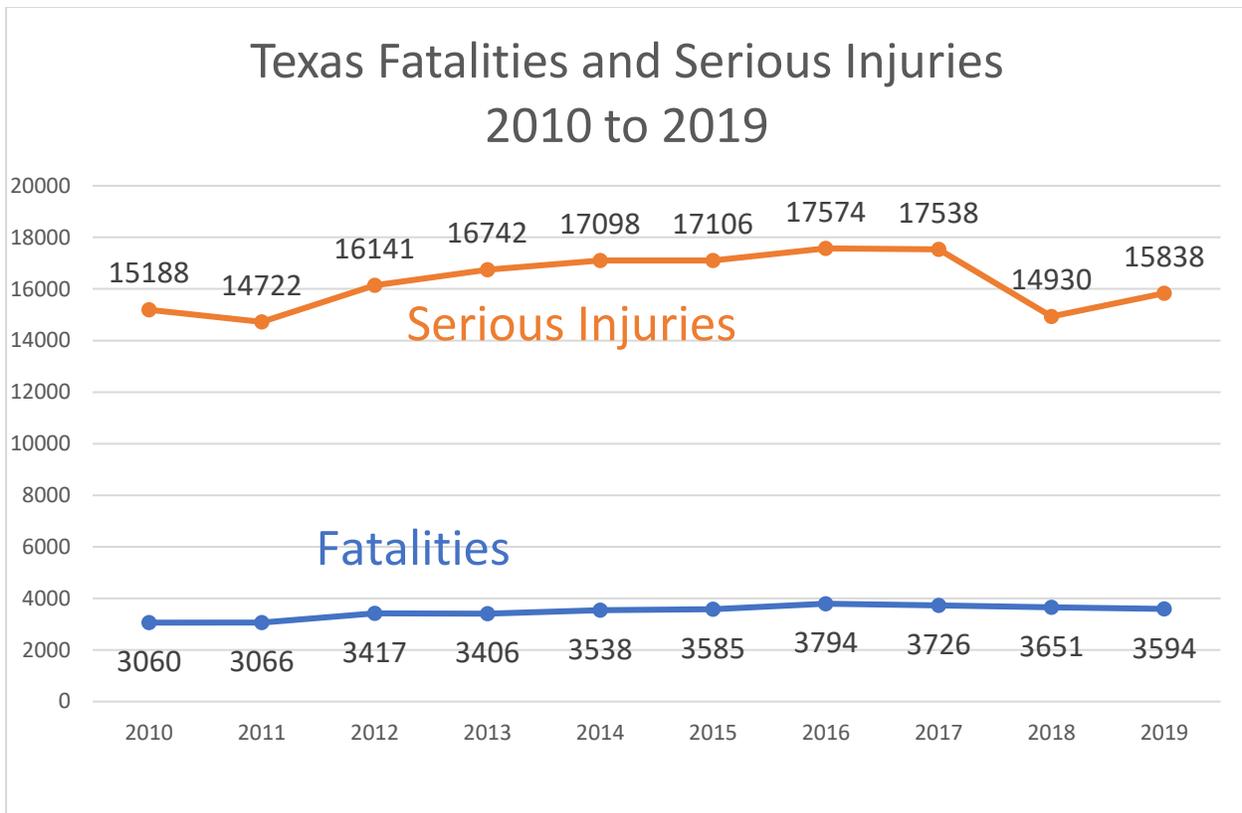


Figure 1. Texas Fatalities and Serious Injuries – 2010 to 2019

Texas traffic crashes are associated with three high risk behaviors, two high risk crash types, and three high risk roadway user groups. These categories overlap, and some crashes fall into more than one of these risk categories.

### High Risk Behaviors

The three high risk behaviors are impaired driving, distracted driving and speeding.

### Impaired Driving

The trend in fatalities and serious injuries related to impaired driving is shown in Figure 2. Fatalities rose after 2011 but have declined since a peak in 2017. The share of all fatalities associated with impairment has declined from 43% in 2010 to 32% in 2019. Serious injuries have been on a downward trend since 2012. Nonetheless, they still make up a major portion of the Texas traffic safety issue. About 60% of these crashes occur between 9 PM and 4 AM. Half of severe impaired driving crashes occur in rural areas. Males between 17 and 60 years of age are over-represented in these severe crashes compared to their proportion of the population, with a peak at 21 years which diminishes with age. Females between 21 and 24 years of age are over-represented compared to their proportion of the population. About 60% involve only a single vehicle.

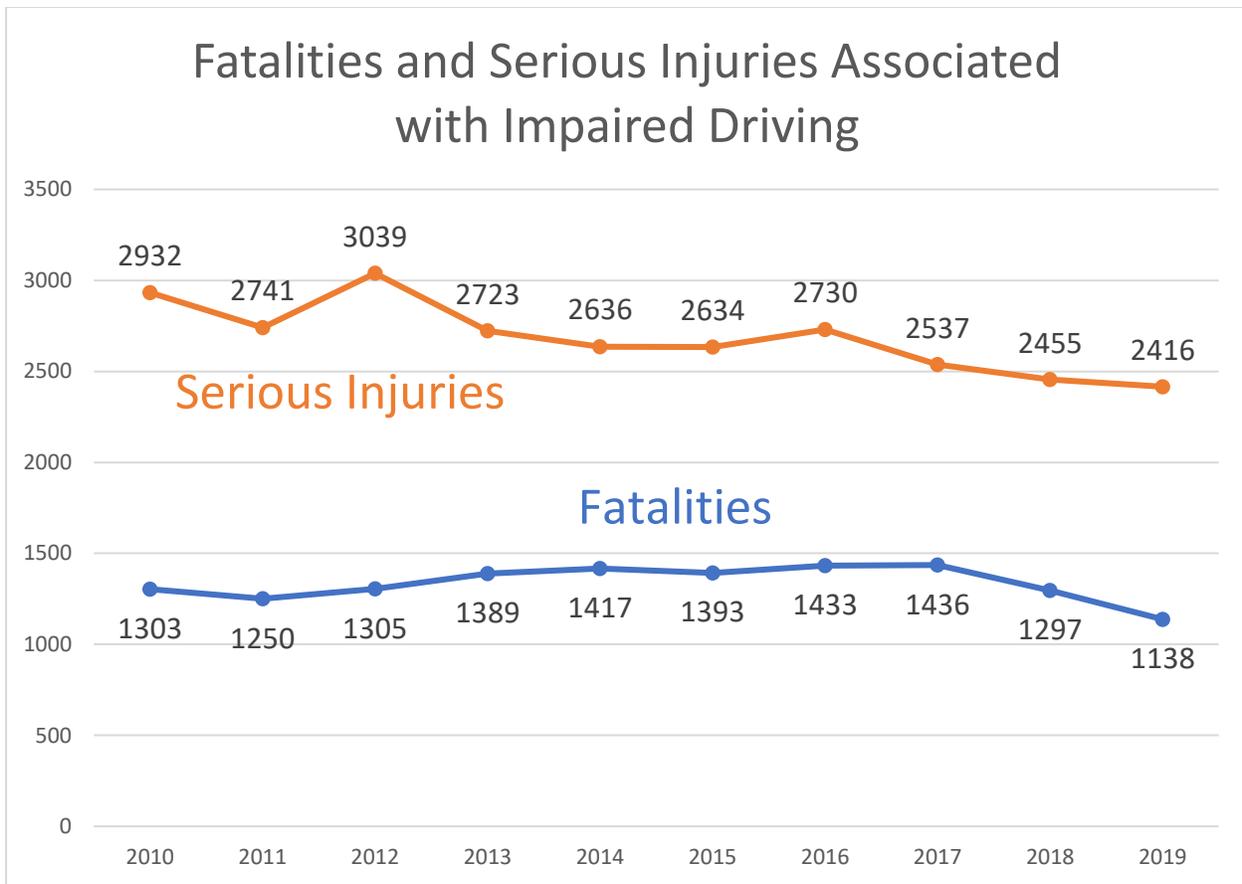
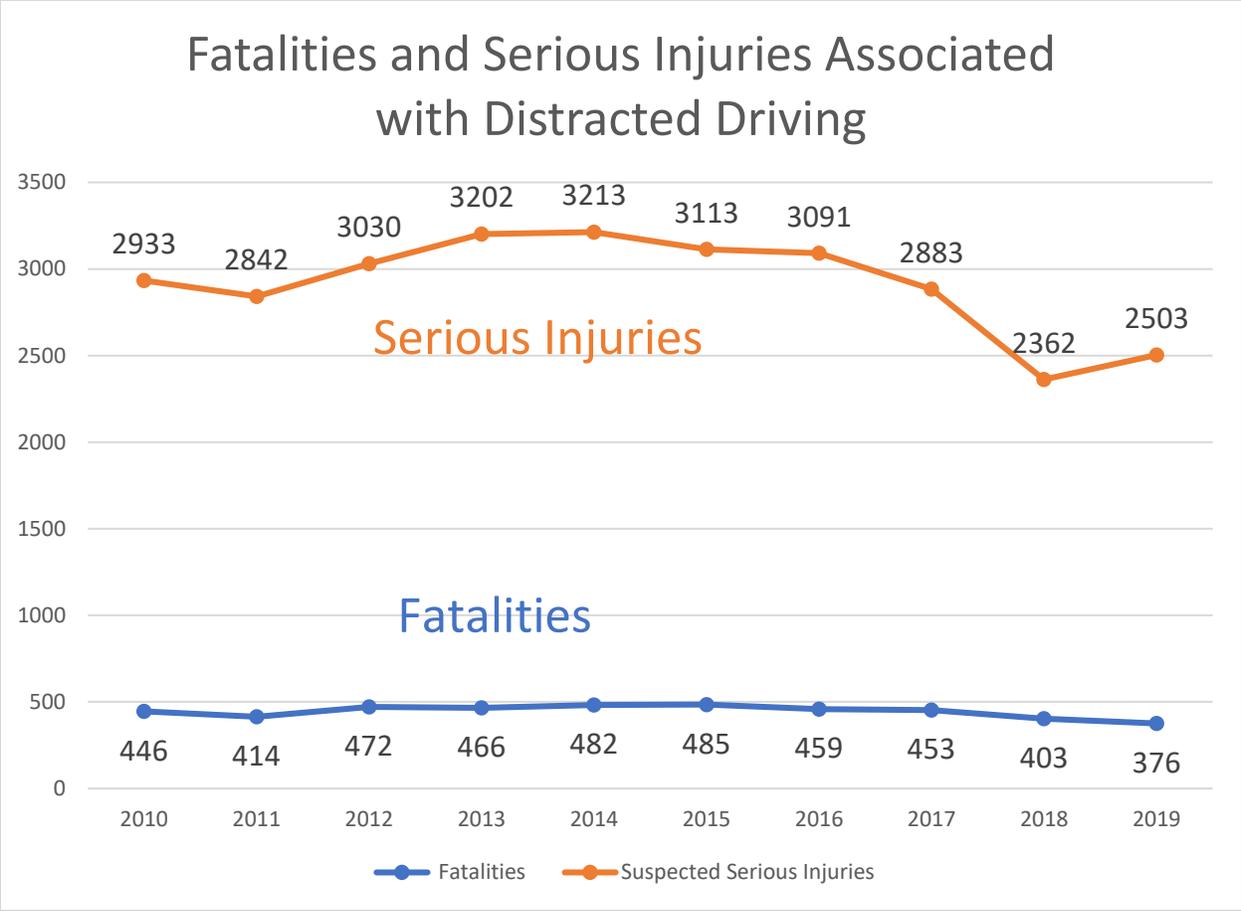


Figure 2. Fatalities and Serious Injuries Associated with Impaired Driving –  
2010 to 2019

The average blood alcohol concentration of tested drivers in a fatal crash in 2019 was twice the legal limit of 0.08. About 18% of impaired drivers were unlicensed. Nearly 60% of impaired driving involved only alcohol. About 20% involved both alcohol and drugs. The percentage of drug-only fatal crashes has increased since 2011.

#### Distracted Driving

The trend in fatalities and serious injuries related to distracted driving are shown in Figure 3. It is generally believed that distracted driving crashes are under-reported, because it is often difficult to determine if drivers were distracted prior to the crash. Fatalities associated with reported distraction increased somewhat after 2011 but have decreased each year since 2015. Serious injuries rose from 2011 to 2014 by 13% and then declined 22% by 2019. The percentage of total traffic fatalities associated with distracted driving has declined from 15% in 2010 to 10% in 2019. About 60% of these crashes involve one vehicle striking another and over 60% occur in urban areas.



**Figure 3. Fatalities and Serious Injuries Associated with Distracted Driving – 2010 to 2019**

TTI regularly conducts observational studies across the state to determine mobile communication device use while driving. The trend in overall use and texting and talking is shown in Figure 4.

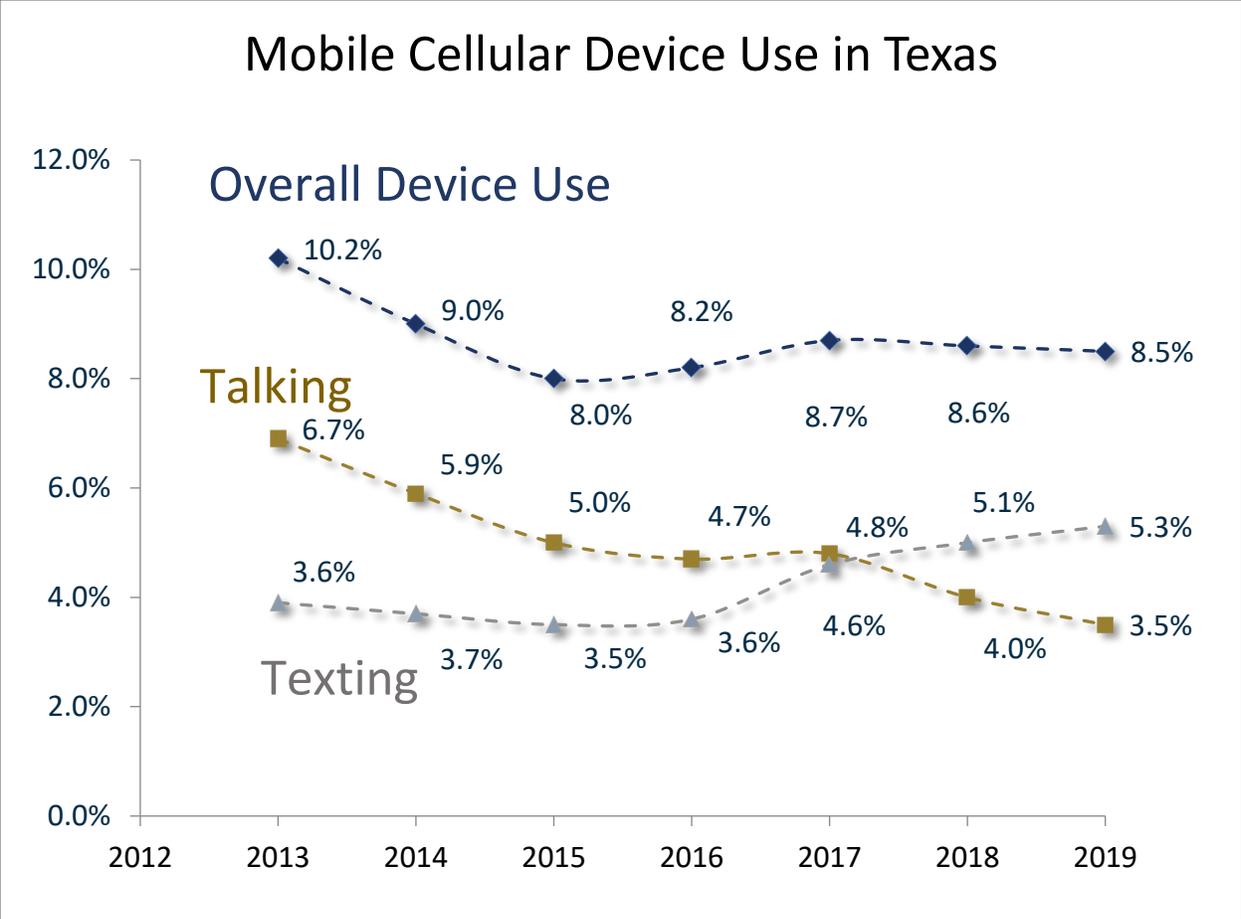


Figure 4. Mobile Cellular Device Use While Driving in Texas – 2013 to 2019

Overall use has declined, but texting has grown while talking has fallen. TTI also observed that overall use was proportionally higher for drivers without front seat passengers, females, and drivers under 60 years of age. Groups that were more likely to be observed texting than talking were younger drivers, drivers not in a pickup truck, and drivers without a front seat passenger.

Speed and Speeding

Figure 5 shows the trend in fatalities and serious injuries associated with speeding over the limit or driving at a speed unsafe for conditions. Fatalities reached a peak of 814 in 2014 after rising from 716 in 2011. Since then they have generally been stable with a decrease in 2019. The percentage of all fatalities associated with speed and speeding has fallen from 25% in 2010 to 20% in 2019. Serious injuries rose to a peak of 2295 in 2013 and rose by 4% in 2019 after a decrease of 17% in 2018.

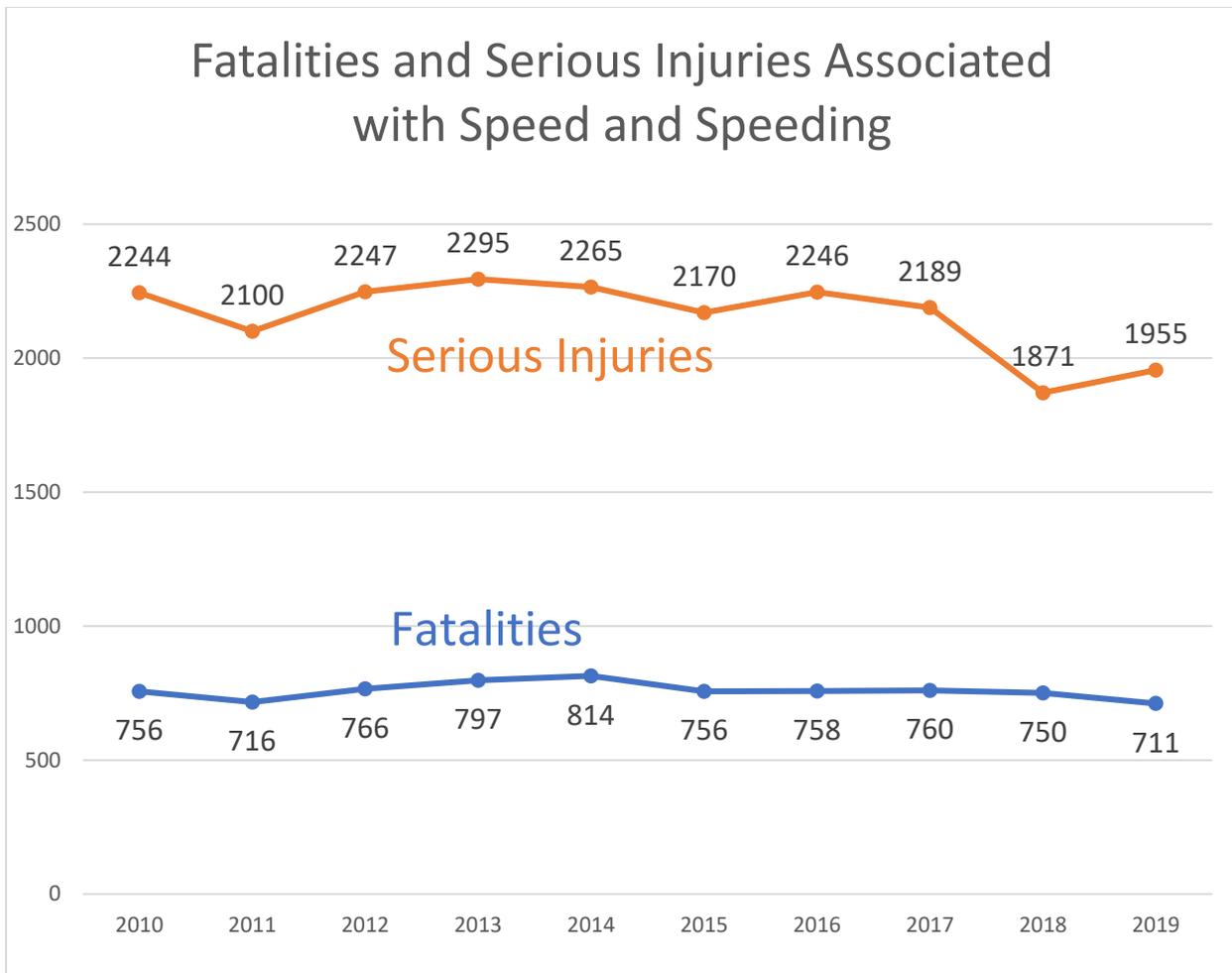


Figure 5. Fatalities and Serious Injuries Associated with Speed and Speeding – 2010 to 2019

Over 70% of the unsafe speed crashes occur in rural areas, whereas over 60% of the speeding over the limit crashes occur in urban areas. Of fatal and serious injury speeding crashes, 70% are either road departure or head-on crashes. Males between 16 and 60 years of age are over-represented compared to their proportion of the population with the greatest over-representation occurring at younger ages.

#### High Risk Crash Types

There are two categories of high-risk crash types; roadway/lane departures and intersections.

##### Roadway and Lane Departures

This crash category represents 43% of all fatal crashes over the past 10 years, but the percentage has declined from 47% to 39%. Both single-vehicle run-off-the-road and head-on crashes are included in this category. Single-vehicle crashes are the predominant crash type, with over 80% of the total. Impairment is reported in about 32% of these crashes. About 80% occur in dry weather, although wet conditions can

contribute to the occurrence of road and lane departure crashes. Speeding is cited as a factor in over 40% of severe crashes. Males are over-represented compared to their percentage of the population between 16 and 70 years of age with a peak at 21 years of age and with declining over-representation as age increases. Females between 18 and 25 years of age are over-represented in these crashes compared to their proportion of the population.

The trends for roadway and lane departure crashes are shown in Figure 6. Fatalities rose from 2011 to a peak of 2415 in 2014. Since then, they have generally fallen, and now are at level about 12% less than the peak.

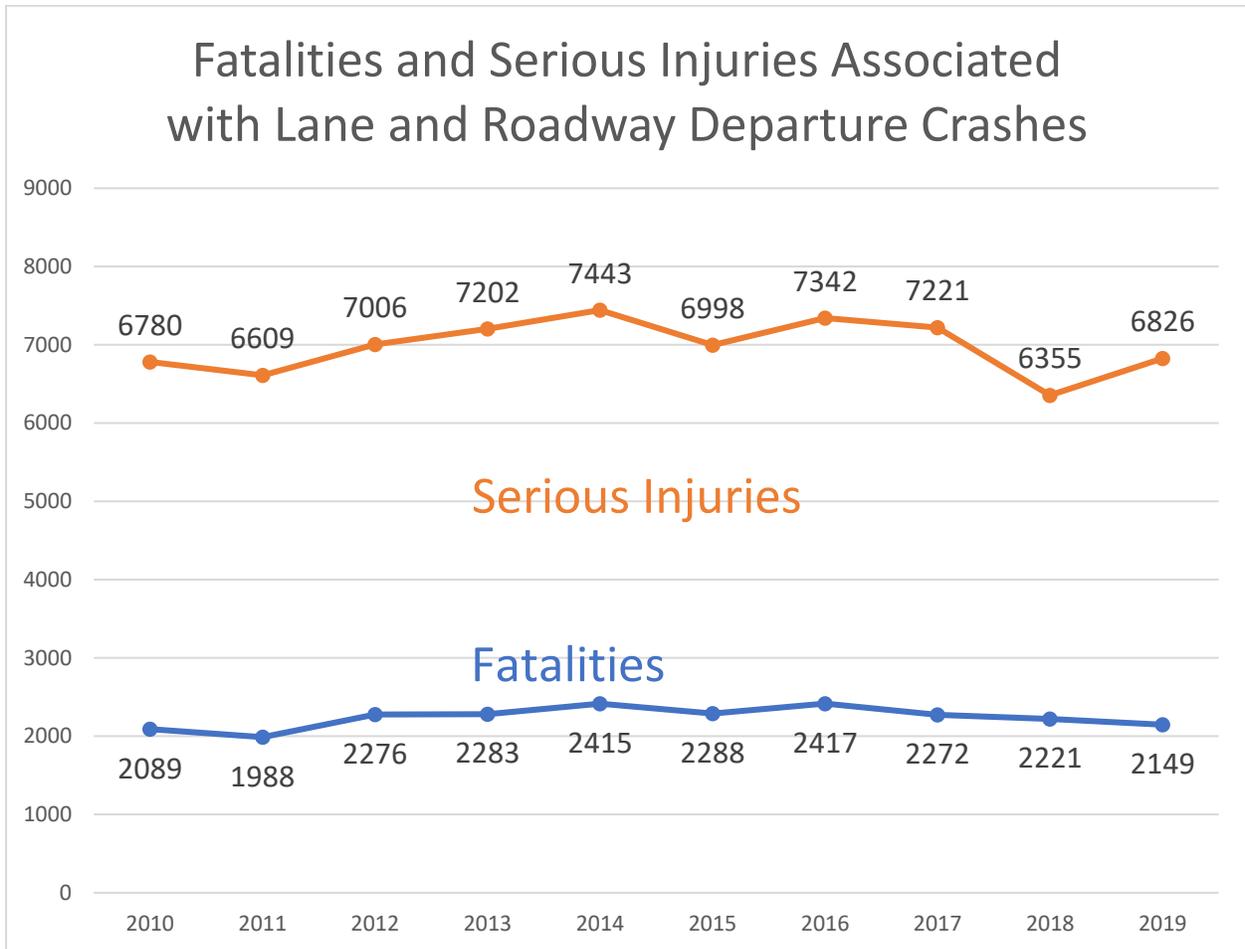


Figure 6. Fatalities and Serious Injuries Associated with to Speeding – 2010 to 2019

## Intersection Crashes

Fatal and serious injury intersection crashes are more prevalent in urban areas (74%) and are split evenly between state and city or county roads. Over the past 10 years, about 22% of all fatalities have occurred at intersections, but this level has been declining slightly and held at 20% in 2019. Impairment was cited in 14% of these crashes – distraction in 20%. Males of all ages are over-represented based on their proportion of the population as are females between 18 and 36 years of age.

The trend of fatalities and serious injuries is shown in Figure 7.

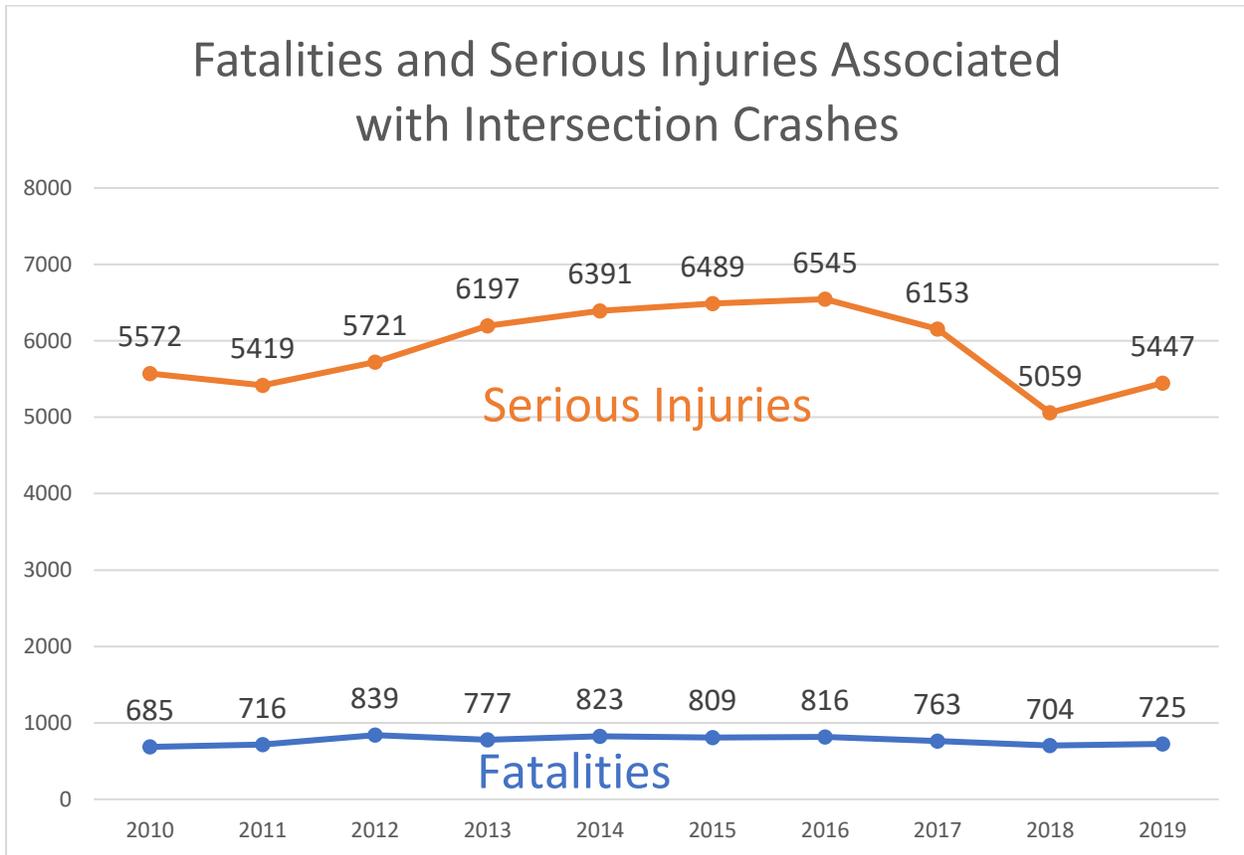


Figure 7. Fatalities and Serious Injuries Associated with to Speeding –  
2010 to 2019

## **High Risk Groups**

The three high-risk groups of roadway users are pedestrians, young people and older people.

### Pedestrians

Since 2011, pedestrian deaths have increased over 80%, and the proportion of all traffic deaths has risen from 12% to 18%. These crashes represent an emphasis area that continues to grow in both fatalities and serious injuries (Figure 8). Nearly 80% of the fatalities occur at night and nearly 80% occur in urban areas. Only about 30% are reported to occur at intersections. In the vehicle/pedestrian crashes that

involve impairment, about two-thirds involve an impaired pedestrian. Males of all ages are over-represented compared to their proportion of the population as both pedestrians and drivers. Since 2011, death and serious injury among older pedestrians has more than doubled.

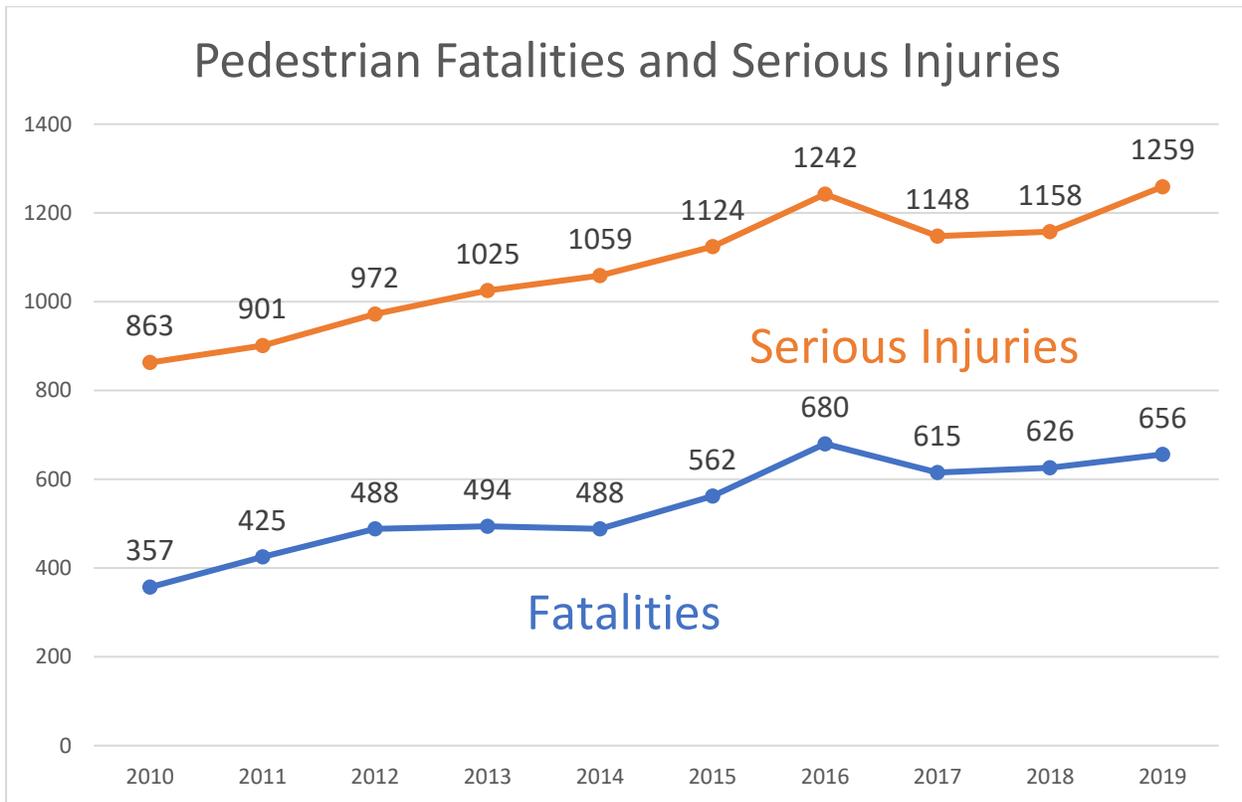


Figure 8. Pedestrian Fatalities and Serious Injuries – 2010 to 2019

#### Young Drivers 16-24

Young drivers of both genders are over-represented in traffic crashes compared to their proportion of the population. The trend in fatalities and serious injuries in this age group is shown in Figure 9. About 20% of all Texans that died in traffic crashes were in this age group. In general, young drivers have less experience, have a tendency to take risks, and have less development in the portion of their brains that govern judgement. The risk factors, based on national data, associated with younger drivers are:

- Distractions – including cell phone use and other teen passengers
- Driving at night – Almost 60% of teen crash deaths occur between 6 PM and 6 AM.
- Speeding and street racing – males and females 15 to 20 years of age had the highest representation in speed related fatal crashes compared to all other age groups in 2017.
- Not wearing a seat belt – About half of the teenagers involved in a fatal crash were not wearing a seatbelt.
- Driving under the influence – Teen crash risk is higher than adults, especially at lower BAC levels. Most of those killed in alcohol-related crashes involving teen drivers are the young drivers and their passengers.

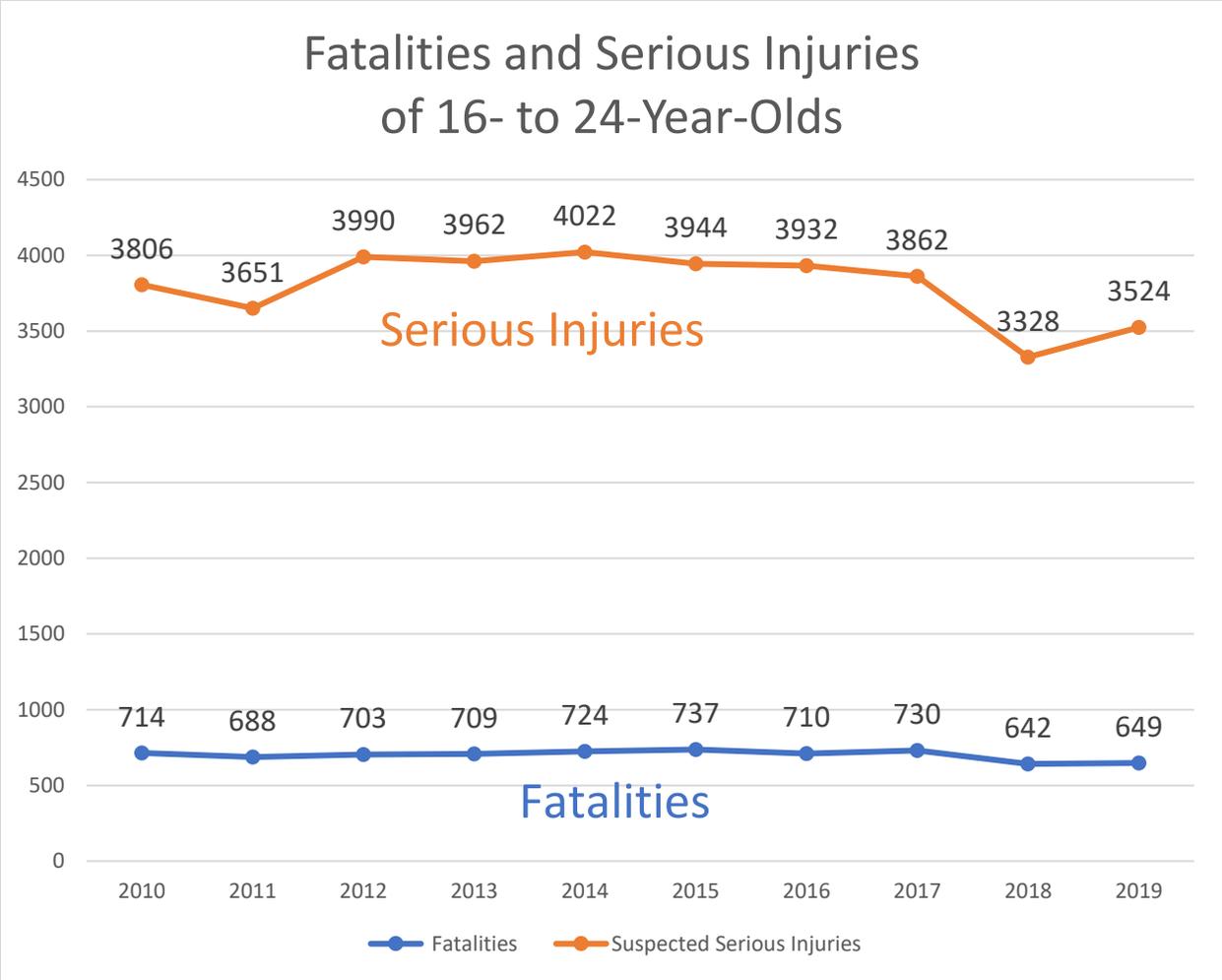


Figure 9. Fatalities and Serious Injuries of 16- to 24-Year-Olds –  
2010 to 2019

Older Drivers

Fatalities and serious injuries in crashes involving older drivers (65+ years of age) are rising as shown in Figure 10. This is in part due to the increase in fragility as people age. Males 75 years of age and older and females 80 years of age and older are over-represented in these crashes. Older drivers are more likely to have a crash with another vehicle and are less likely to run off the road compared to younger drivers.

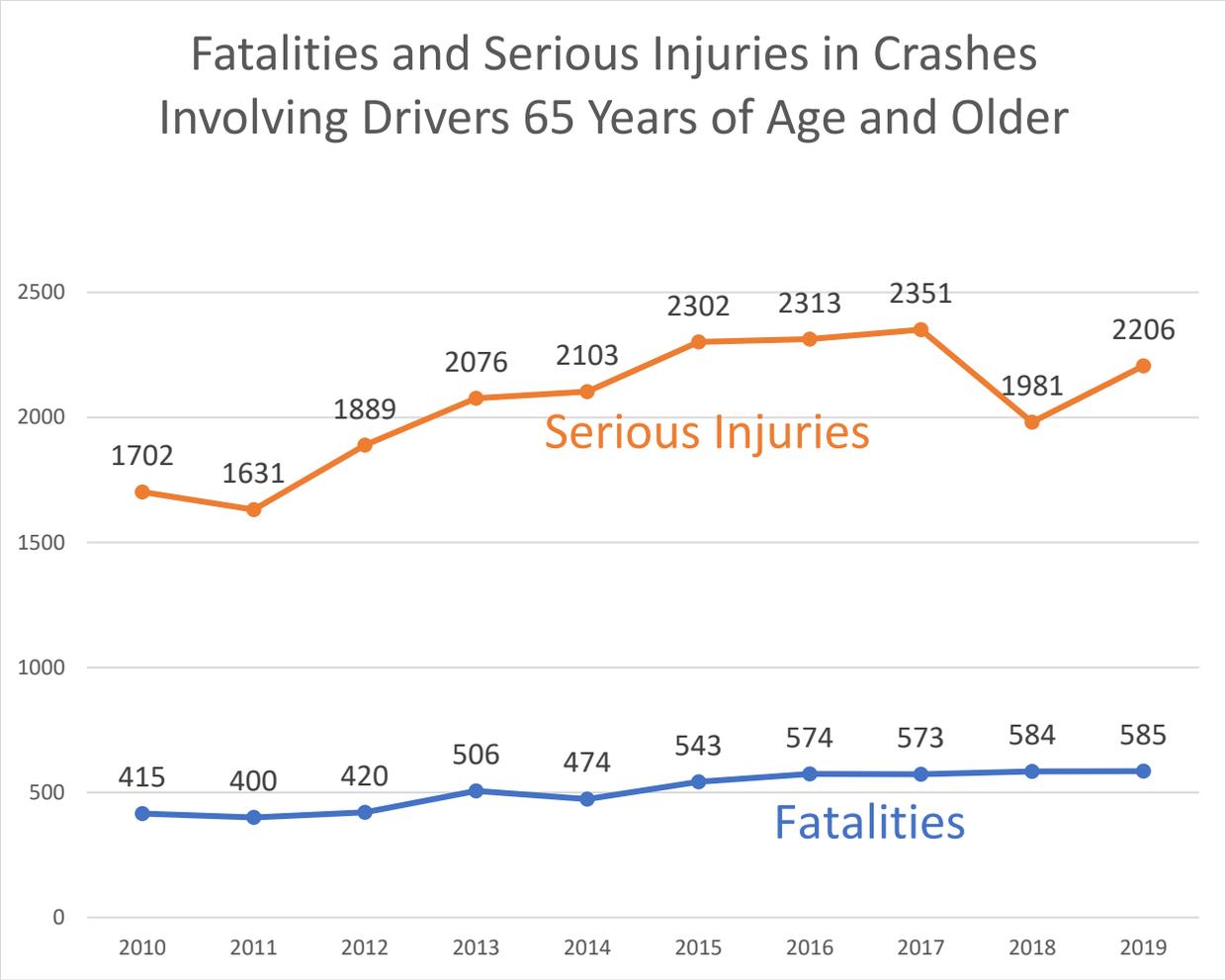


Figure 10. Fatalities and Serious Injuries in Crashes involving Drivers 65 Years of Age and Older – 2010 to 2019

**Safety Initiatives at TTI**

TTI analyzes data to identify traffic safety issues and develop countermeasures to address them. Our researchers combine information on crash data, roadway characteristics, vehicle types and user behaviors to discover relationships and develop potential countermeasures. Working with the health community, we have investigated the methods to match trauma data and crash data to improve health outcomes; the need for this understanding is indicated by the unexpected and unexplained drop in serious injuries in 2018. TTI is also at the forefront of analyzing new data sources, such as vehicle on-board sensor data to help understand and prevent traffic crashes.

Safer Roadways

To improve our roadway safety, professionals and stakeholders need ways identify locations where there is a high probability that safety can be enhanced, either because a location’s crash experience is

greater than expected or because the location has characteristics associated with crashes. Traffic Safety professionals also need methods to evaluate the opportunities to maximize safety in roadway projects.

At TTI, we are developing tools to help TxDOT and other transportation professionals identify segments and intersections that have high potential for safety improvement and providing potential countermeasures to implement at these locations. We have also developed a number of tools that can be used to select locations for safety improvement based on a preponderance of characteristics associated with unconcentrated crashes such as pedestrian and rural road departure crashes.

TTI has worked with TxDOT over the past year to develop a tool that shows roadway project developers how changes in design elements, such as shoulder width, curvature, clear zones and slopes along the roadside affect safety, and provides a safety score to evaluate different design alternatives.

### **Safer Behaviors**

Although the number of fatalities and serious injuries related to impaired driving is declining, this behavior still represents over 30% of all motor vehicle crash fatalities. TTI is funded by TxDOT to facilitate the work of the Texas Impaired Driving Task Force and the development of the Impaired Driving Plan, which provides actions that can be taken to reduce the level of impaired driving.

The Impaired Driving Plan covers:

- Prevention
- Criminal Justice
- Communication
- Screening, Assessment, Treatment and Rehabilitation for Alcohol and Drug Misuse
- Program Data and Evaluation
- Program Management and Strategic Planning

The Plan also includes recommendations from the National Highway Traffic Safety Administration assessment of the Texas Impaired Driving Program, some of which would require legislative action. The action plan can be found at: <https://www.texasimpaireddrivingtaskforce.org/>. Additionally, we have provided a factsheet about impaired driving in your materials.

TTI works with medical examiners, toxicologists, and county officials to help improve the reporting of blood alcohol and drug concentrations for crashes where toxicology reporting is required. We conduct crash report training and training, outreach and evaluations on the use of ignition interlock devices across the state.

### Distraction

As noted above, TTI performs observational studies of cellular device use over time to help inform safety stakeholders about the extent and characteristics of this issue. Results of recent research on texting and driving showed that drivers who were more aware of the statewide ban were generally less likely to text and drive. Drivers in Wichita Falls had the highest awareness of the anti-texting law (76%), and the lowest texting-while-driving rate (3% of drivers there are texting at any given time). Houston motorists were found to be the least compliant, with 9.1% of those drivers texting at any given time. The existence of a local law that requires hands-free cell phone use in Wichita Falls may influence awareness and behavior.

## **Safer Groups**

### Pedestrians

Pedestrian fatalities and injuries continue to increase in Texas, in part reflecting the concentration of growth in urban areas. To combat this trend TTI is working on methods to identify locations where safety may be improved, and effective countermeasures deployed. We are also working to educate both motorists and pedestrians of safety measures and the laws that pertain to pedestrian movement. We are developing materials and conducting training for law enforcement officers on pedestrian and bicycle laws and to improve the quality and accuracy of pedestrian and bicycle crash data.

### Youth Traffic Safety

TTI has a long-standing initiative to deter impaired driving and underage drinking among youth through a statewide peer-to-peer program in colleges, high schools and junior/middle schools. TTI's peer-to-peer programs teach a cadre of youth leaders in the risk factors associated with impaired driving and drinking and provides them an opportunity to lead culture change within their school. TTI's Teens in the Driver Seat peer-to-peer program covers safety for drivers, passengers, pedestrians and cyclists and has been recognized as a national best practice for this target audience. This year, TTI youth traffic safety programs will have activities on about 250 campuses throughout Texas.

### Older Users

TTI provides educational outreach materials to address the challenges faced by the most senior of older drivers and provide educational outreach to improve their safety on Texas roads. TTI is identifying the risk factors that are likely to increase the probability of being involved in a crash and will prepare materials that help senior drivers select safer routes. Educational sessions will be held in five Texas communities with higher than expected senior driving crashes.

Thank you for the opportunity to present this material today. I'll be happy to try to answer whatever questions you may have.

# Texas A&M Transportation Institute

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Traffic Safety in Texas

Senate Committee on Transportation  
Interim Hearing



**Robert Wunderlich**

Director,  
Center for  
Transportation Safety

# Focusing on Severe Crashes

Texas Strategic Highway Safety Plan



**TEXAS TOGETHER**  
on the Road to Zero

LEARN MORE:  
[www.texasshsp.com](http://www.texasshsp.com)

# Texas Fatalities and Serious Injuries 2010 to 2019



Since 2010



Serious Injuries  
Up 4%



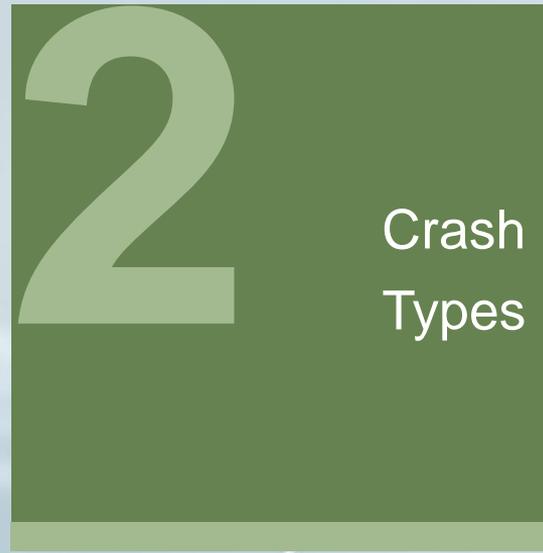
Fatalities  
Up 22%

# High Risk Categories



1 Behaviors

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2 Crash Types

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3 User Groups

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# High Risk Behaviors

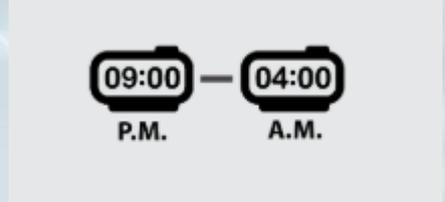
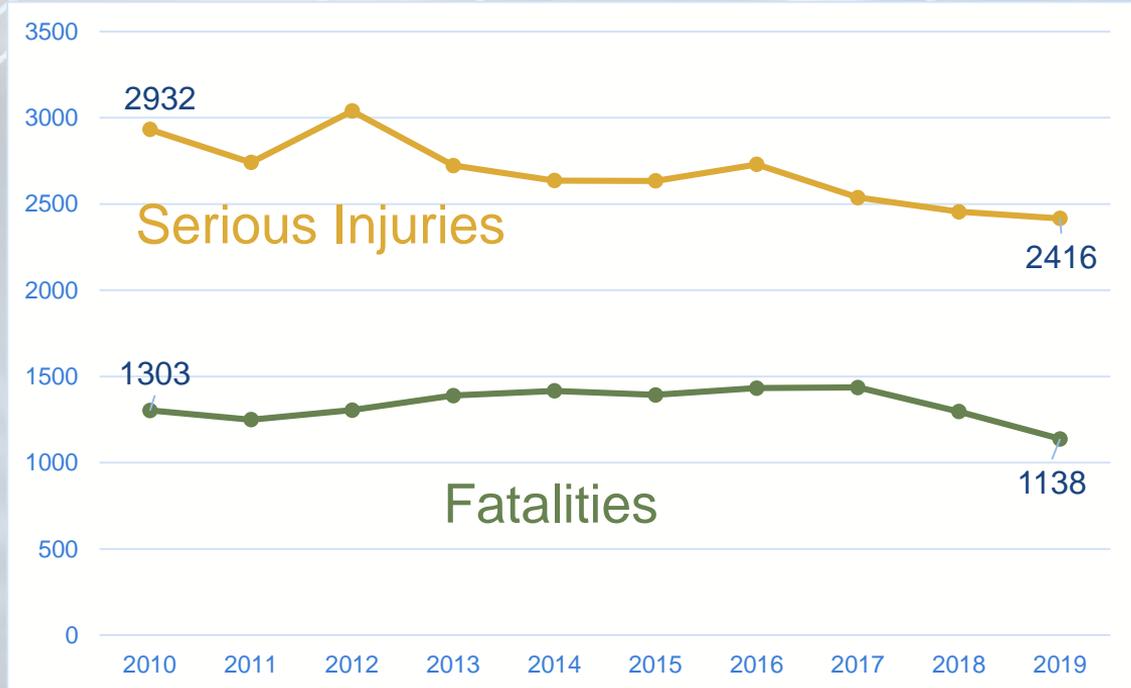
Impaired Driving

Distracted Driving

Speed and Speeding

# Impaired Driving

% of Fatal: 32%

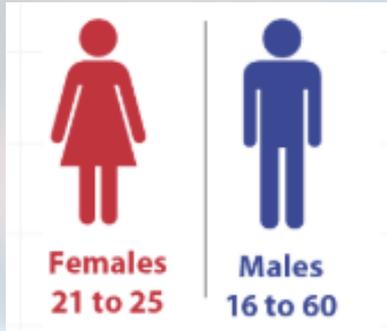


61%

50% Rural



# Impaired Driving



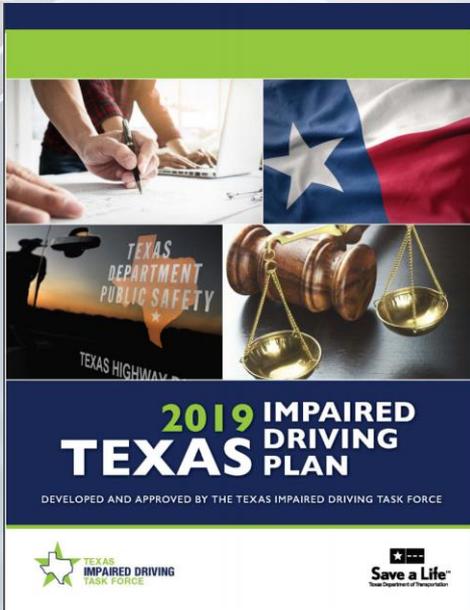
over-  
represented



60%  
Single  
vehicle

average  
**BAC:**  
2X limit

# TTI Efforts



## Impaired Driving Plan and Task Force

- Prevention
- Criminal Justice
- Communication
- Screening, Assessment, Treatment and Rehab
- Data and Evaluation
- Management and Strategic Planning

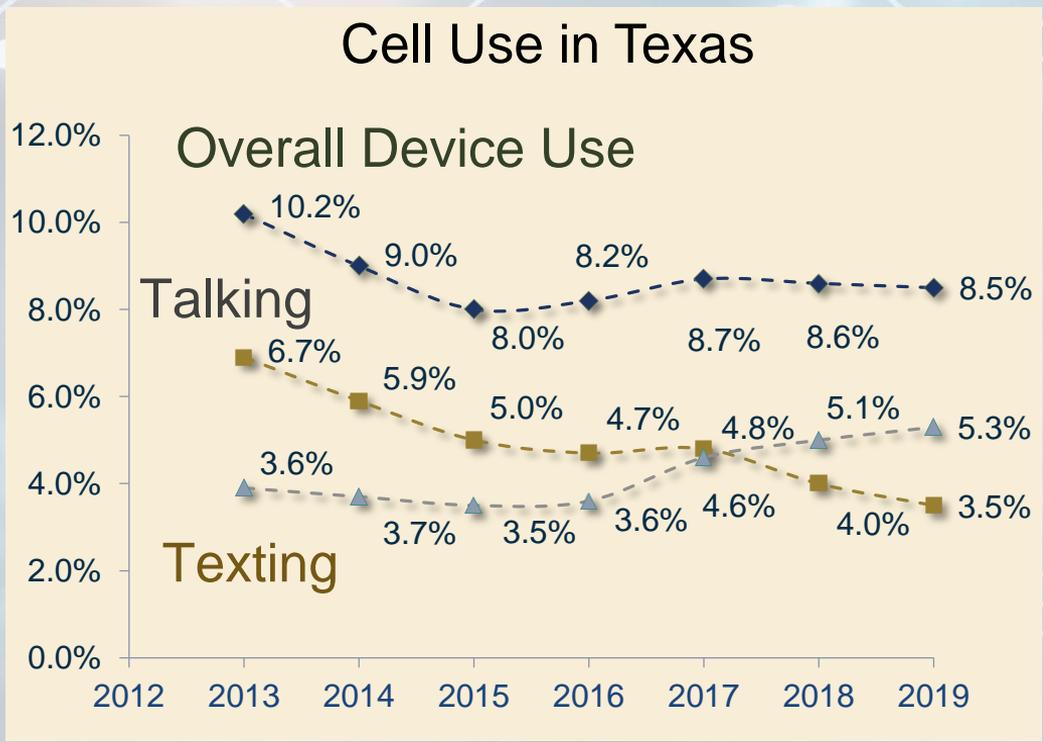


Improve BAC and  
drug concentration  
reporting



# Distracted Driving

**% of Fatal: 10%** ↘  
trend



**60%**  
Urban



**60%**  
Strike  
another  
vehicle



# Awareness of Statewide Texting Law

Drivers more aware of the ban generally less likely to text and drive

Wichita Falls: Highest Awareness – 76%  
Lowest Texting rate – 3%

Houston: Lowest Awareness – 60%  
Highest Texting rate – 9%

# Speed and Speeding

**% of Fatal: 20%**

Since 2010

Fatalities



6%



Younger  
Females



All Ages  
of Males

Unsafe for  
conditions:  
70% Rural

Over the Limit:  
60% Urban

# High Risk Crash Types

Lane and Road  
Departures

Intersections

# Roadway and Lane Departures

**% of Fatalities: 39%**

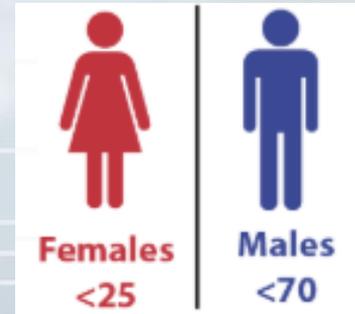
Since 2010

Fatalities



3%

80%  
Single  
Vehicle



Over-representation based on  
proportion of population

# Intersections

# % of Fatalities: 20%

Since 2010  
Fatalities ↑ 6%

74%  
Urban



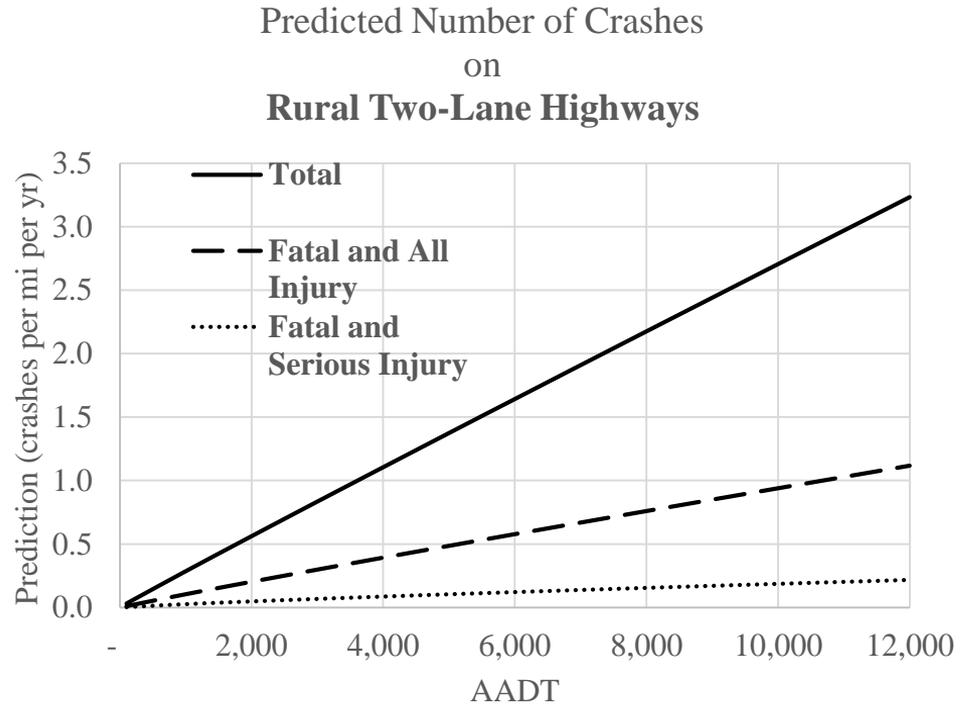
In Urban Areas

49%	51%
<b>State Roads</b>	<b>City and County Roads</b>
Signalized: 52%	Signalized: 39%
Unsignalized: 48%	Unsignalized: 61%

# What TTI is working with TxDOT: Data Driven Safety Analysis

Establish Benchmarks for  
Segment and Intersection  
Safety Performance

Identifies Segments and  
Intersections with High  
Potential for Safety  
Improvement

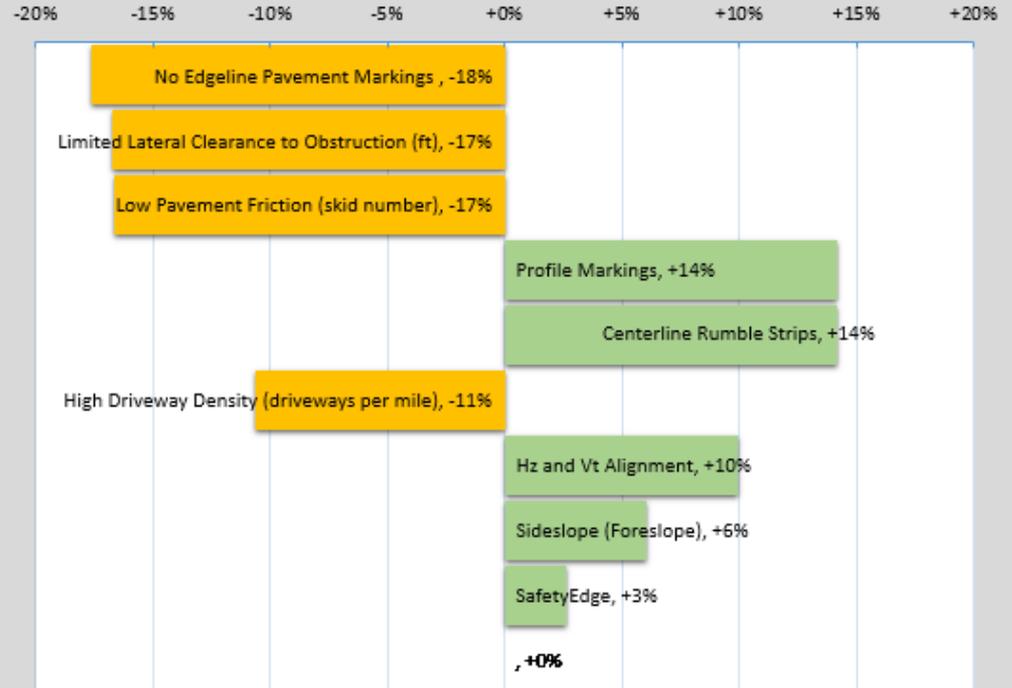


# Safety Scoring Tool

Developing Tools to Score  
New Projects on Safety  
Performance

Rural Roads – Completed  
Urban Intersections – Next

## Unadjusted Marginal Safety in Existing relative to Standard



# High Risk User Groups

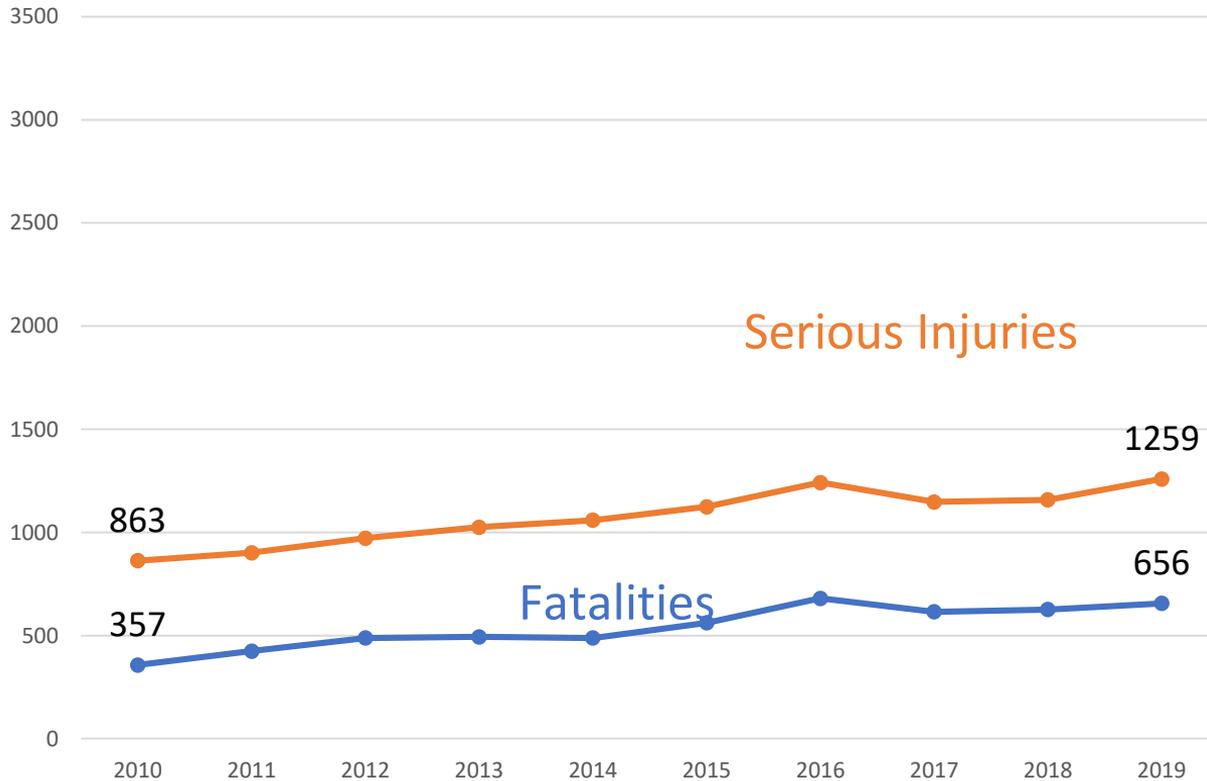
Pedestrians

Young People

Older People

# Pedestrians

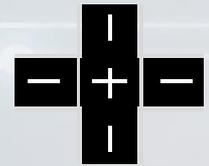
% of Fatalities: 18% ↗



80% of Fatalities

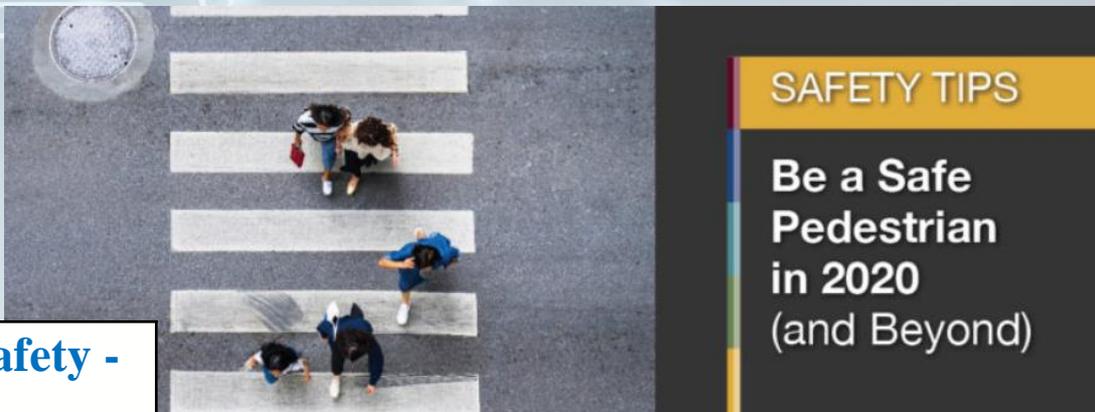


Urban and Dark



30% at intersections

# TTI Efforts in Pedestrian Safety



## Systemic Approach for Pedestrian Safety - Segments

### Input data

Variable	Value	Notes
Area type	Rural	Enter the area type from drop-down menu
AADT	3000	Enter the daily traffic volume, vehicles per day
Median type	Curbed	Enter the median type from drop-down menu
Number of lanes	5	Enter total number of lanes on the segment
Pavement Width	50	Enter total pavement width, feet
Truck percentage	20%	Enter percentage of trucks in the daily traffic volume, %

**Total weight**

**93**

**80th Percentile**

Materials and Training  
on Pedestrian and  
Bicycle Laws

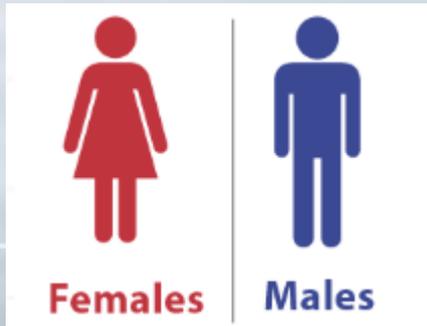


# Young People (16-24) % of Fatalities: 28%

Less experience

Tendency to take risks

Judgment not fully developed



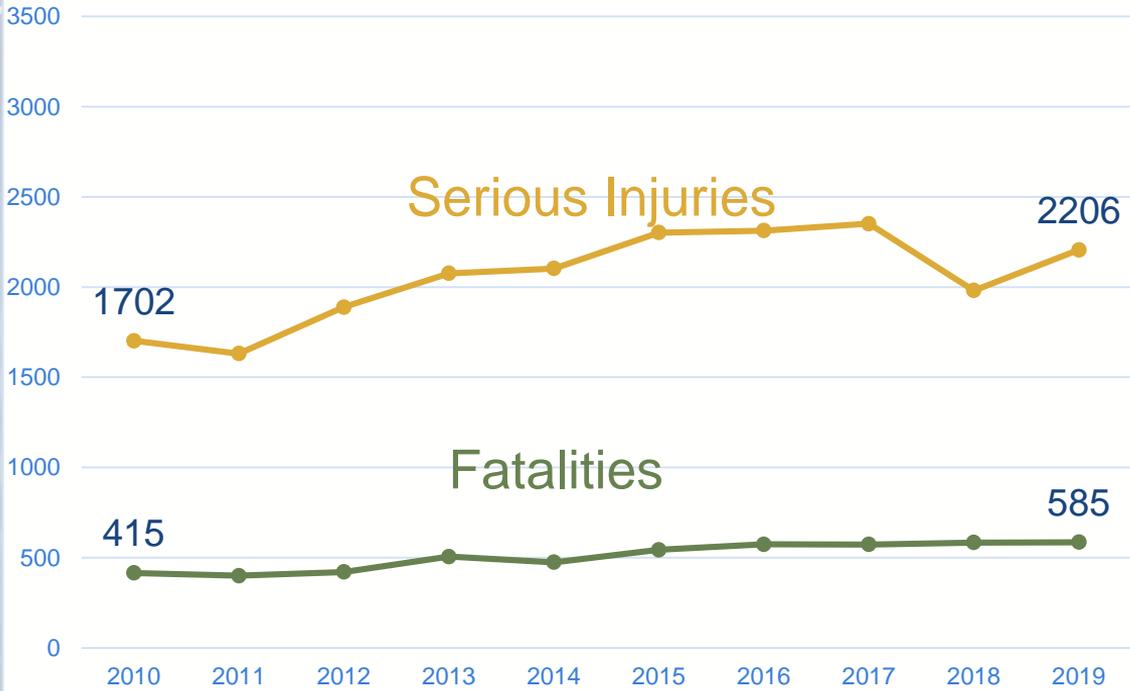
## Risk Factors

- Distractions
- Driving at Night
- Speeding/Racing
- Not Belted
- Impairment

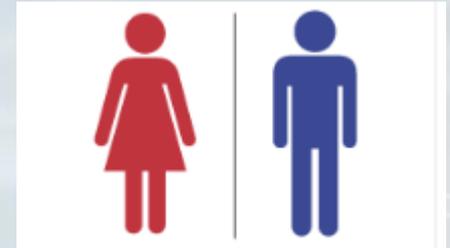
# Older People (65+)

# % of Fatalities: 16%

## Fragility and Growing Population



More likely to hit another vehicle than depart roadway alone

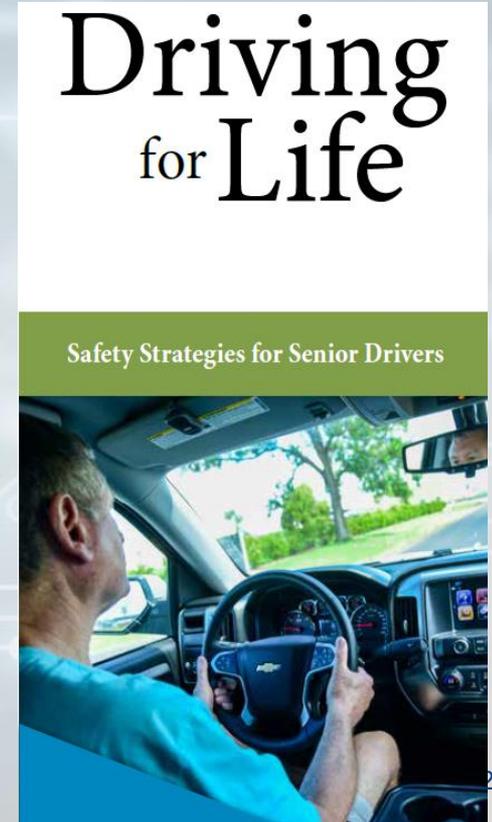
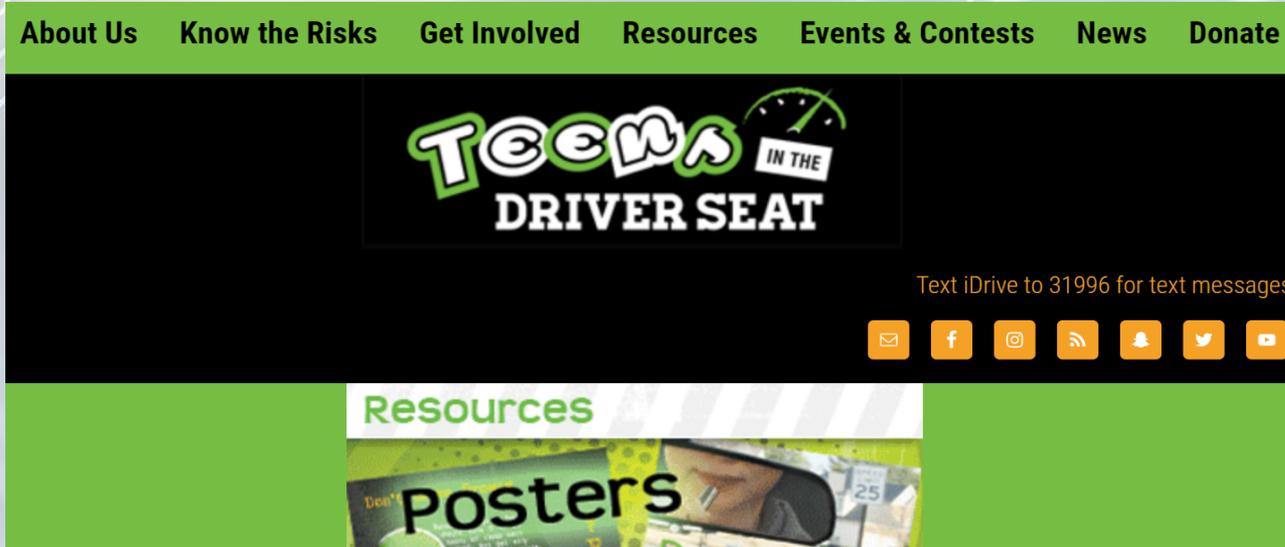


Females 80+ Males 75+

Pedestrian Deaths up 2X



# TTI Efforts – Young and Old



# The TTI Approach



# Questions?

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