



# Improving CMV Safety on Rural Roads in Texas: From Data to Information for Law Enforcement and Large Truck Drivers

PI: Eva Shipp, PhD

Srinivas Geedipally, PhD, PE; Robert Wunderlich, PE,  
Lingtao Wu, PhD, PE, Amber Trueblood, DrPH,  
Marcie Perez, Jake McDonald

Funding Agency: Federal Motor Carrier Safety  
Administration

# Agenda

Background



```
graph TD; A[Background] --> B[Project Goals]; B --> C[Preliminary Findings]; C --> D[Next Steps]
```

Project Goals

Preliminary Findings

Next Steps

# Background

Trucks  
>10% VMT

[TxDOT 2017]

Rural, large truck crashes are increasing in Texas and are more severe.

Rural roadways: higher speeds, less congestion, fewer engineering controls for reducing crash risk/severity.

High speed + fewer controls + heavy vehicle weight = higher severity crashes.

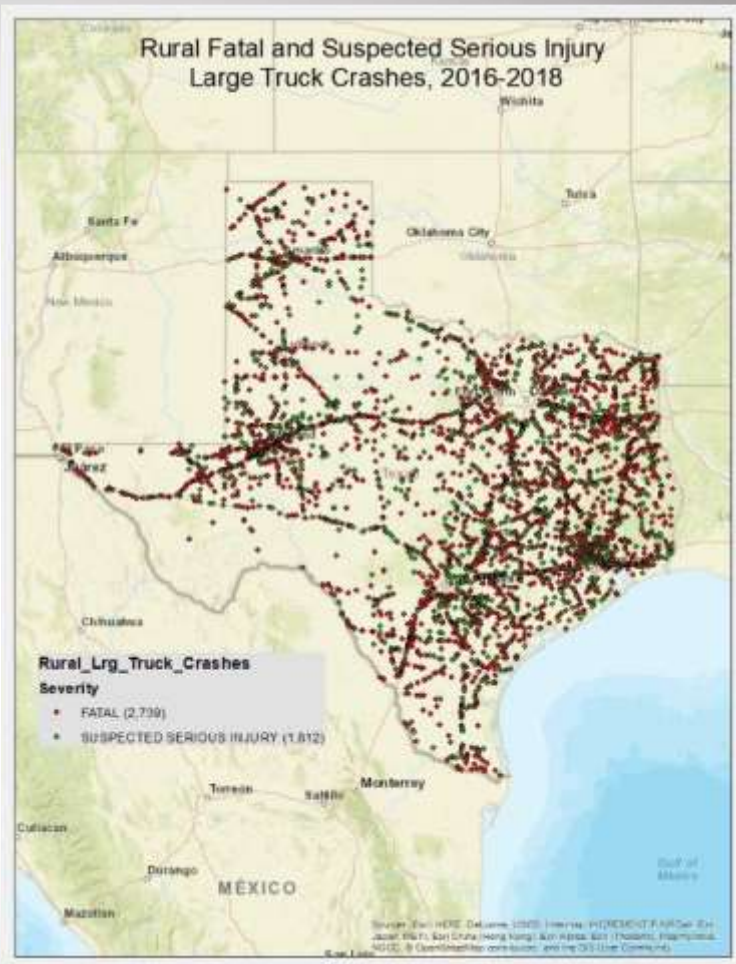
Rural, large truck crashes in Texas are 2.5x as likely to be fatal/serious (vs. urban).

# Background

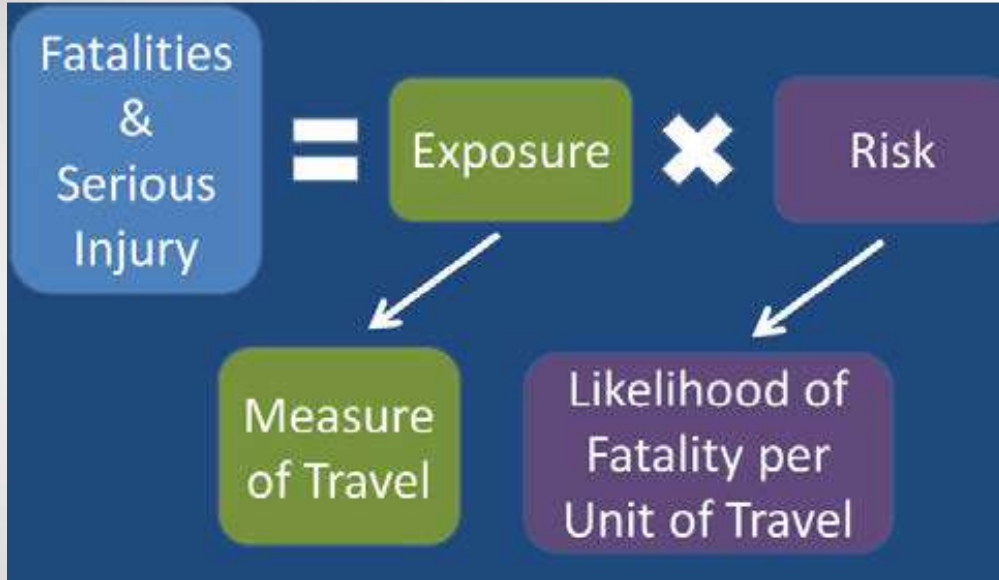
## Rural Texas

15% population  
27% daily VMT  
52% of daily truck VMT

[US Census nd; TxDOT 2020]



# Background



- Seatbelt use
  - 39% nationally in 2016, large truck occupants with fatal injuries [FMCSA 2017]
- Impairment
- Fatigue
- Distraction/inattention
- Illegal maneuvers
- Following too close
- Too fast for conditions [FMCSA 2007]

# Project Goal

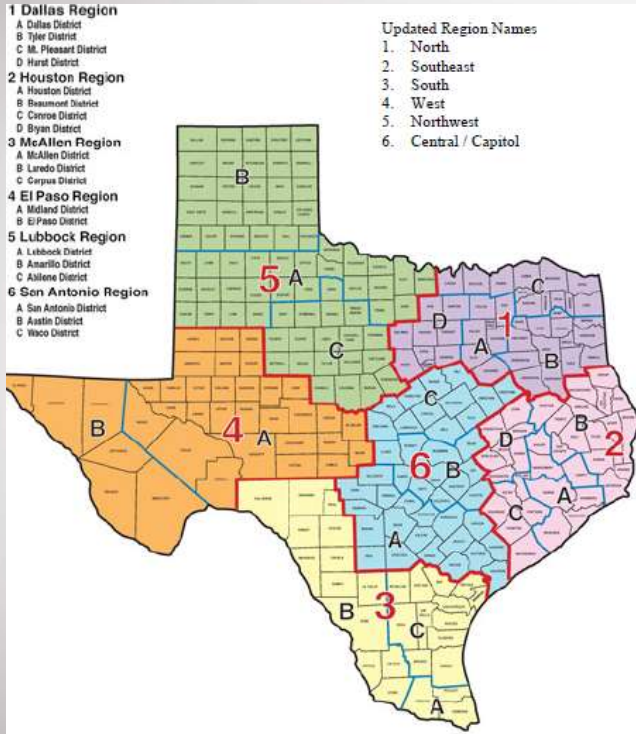
Prevent crashes and reduce crash severity for large truck crashes by improving law enforcement and driver knowledge of hazardous rural roadways and driving behaviors.

# Approach

Innovative analysis  
of crash and  
roadway data.

Outreach and  
education  
materials.

# Data Analysis



Crash profiles  
by DPS Region

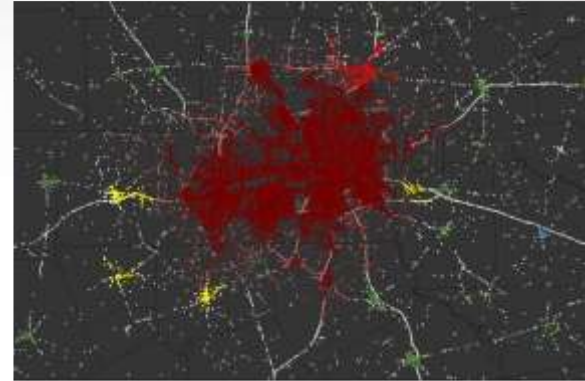
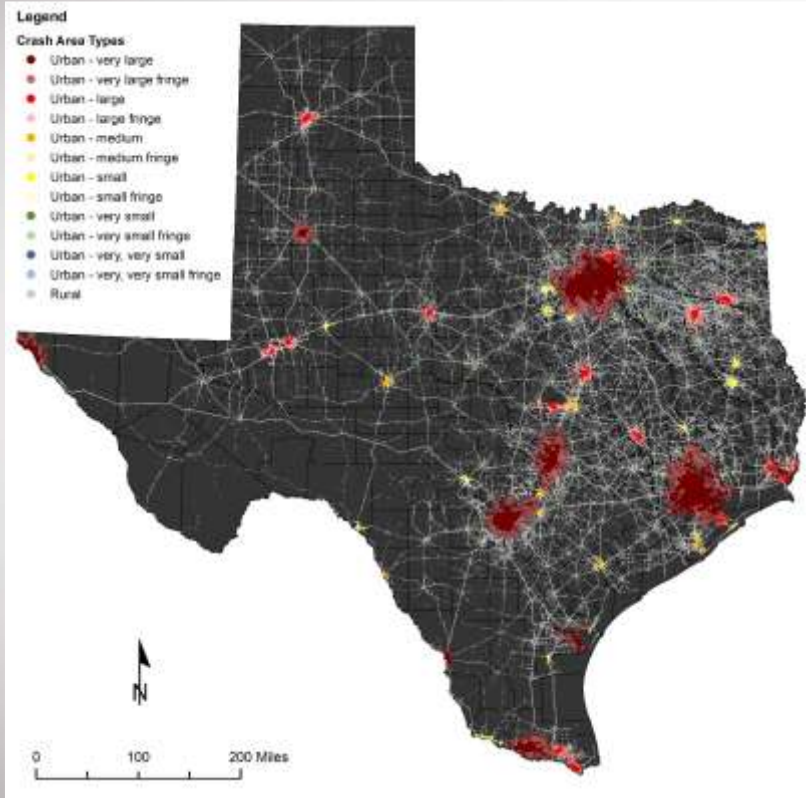
ID behavioral  
factors  
associated with  
fatal and serious  
crashes

Roadway  
characteristics  
associated with  
fatal and serious  
crashes

- Visualize findings



# Data Analysis: Classifying Rural



**Close-up View of Crash Assignment  
by Area Type for the Dallas/Ft. Worth  
Area.**

Label	Population Category	Fringe Buffer
Urban - Very large	> 250K population	5 miles
Urban - Large	100K-250K	5 miles
Urban - Medium	50K-100K	3.5 miles
Urban - Small	25K-50K	2 miles
Urban - Very Small	5K-25K	1 mile
Urban - Very, Very Small	<5K	0.5 mile
Rural	everywhere else	n/a

# Data Analysis: Classifying Trucks

2014 – 2018, TxDOT reportable crashes

121,186 truck tractor

44,158 heavy truck/pick-up  
10,000+ lbs

2,252,889 passenger

- CRIS vehicle body style
- CRIS vehicle body style and VIN weight
- VIN body class
- VIN body class and VIN weight
- CRIS vehicle body style and VIN body class
- VIN vehicle model
- VIN make
- VIN model
- VIN model and VIN weight (10,000+ lbs.)
- VIN weight (10,000+ lbs.)

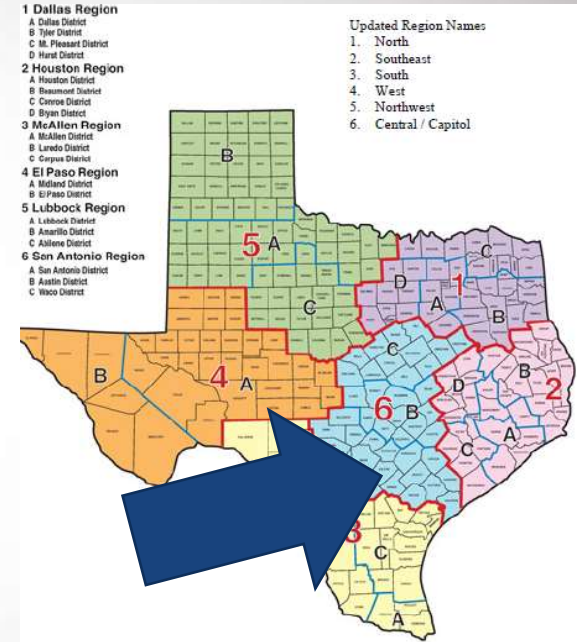
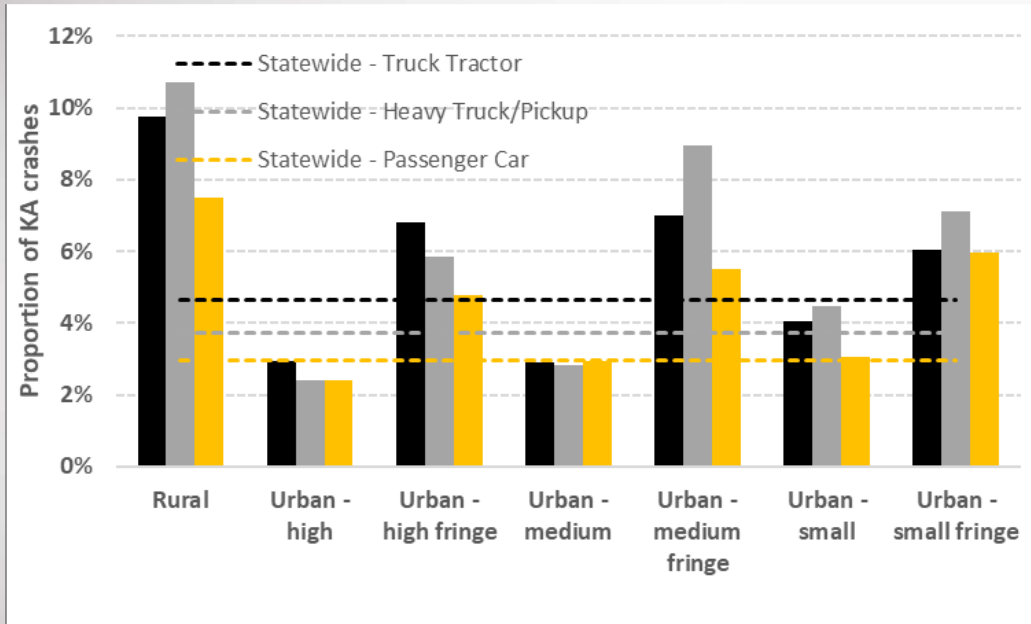


NHTSA VIN  
Decoder  
API

# Data Analysis



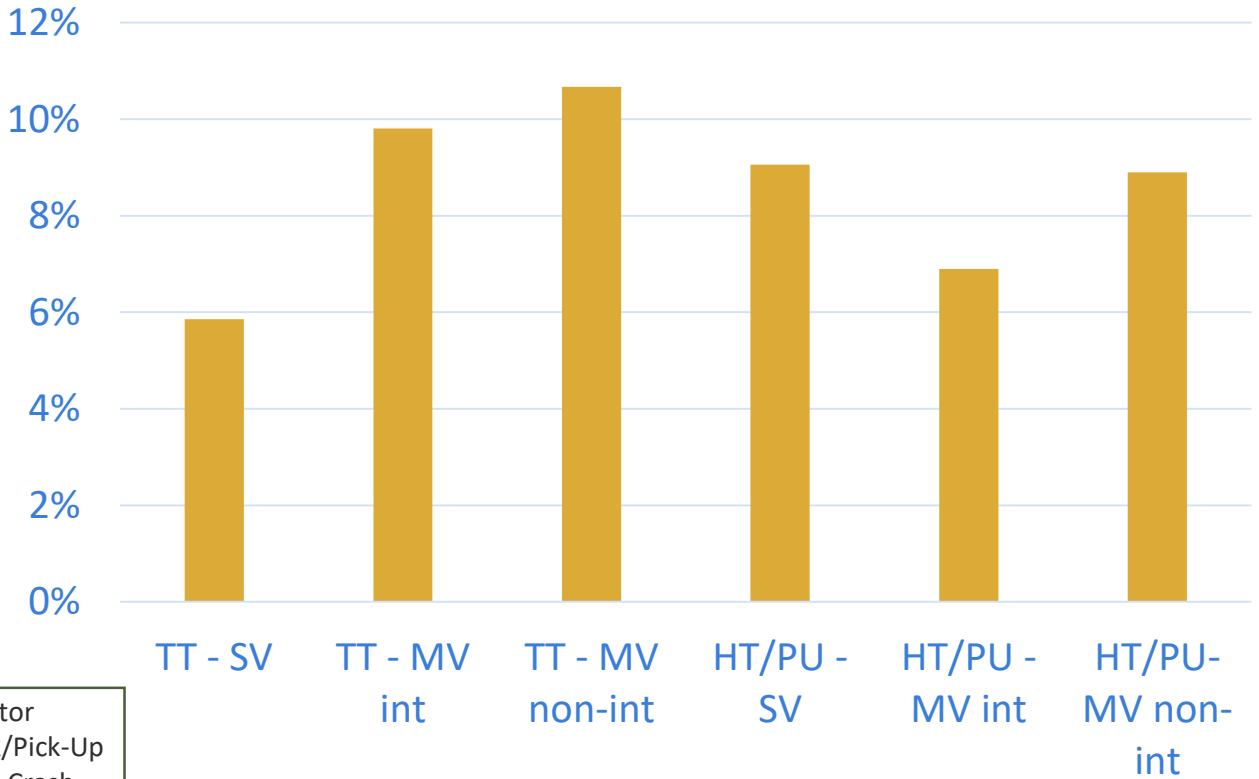
# Data Analysis: Central Region



# Data Analysis: Fatal and Serious Crashes

TT: Truck Tractor  
HT/PU: Heavy Truck/Pick-Up  
SV: Single Vehicle Crash  
MV: Multi-vehicle Crash  
Int: Intersection

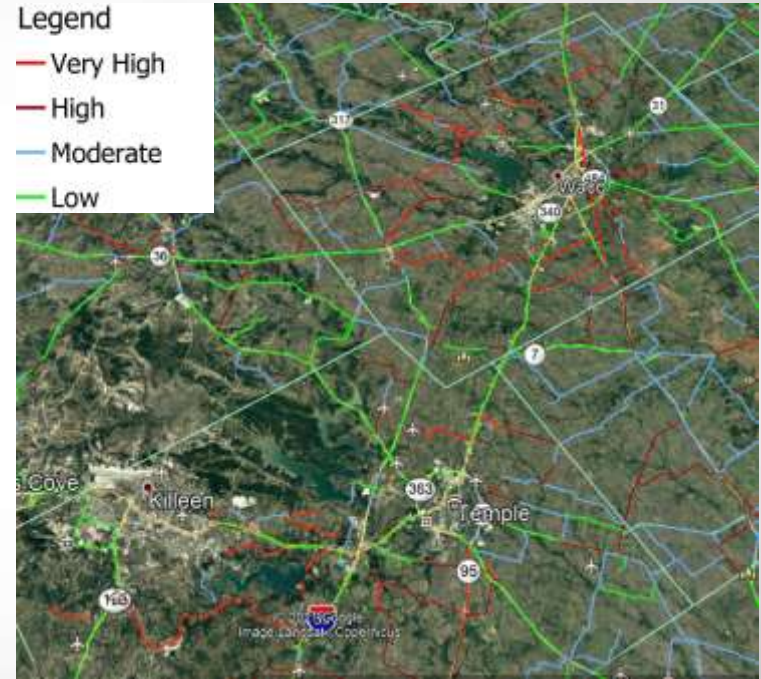
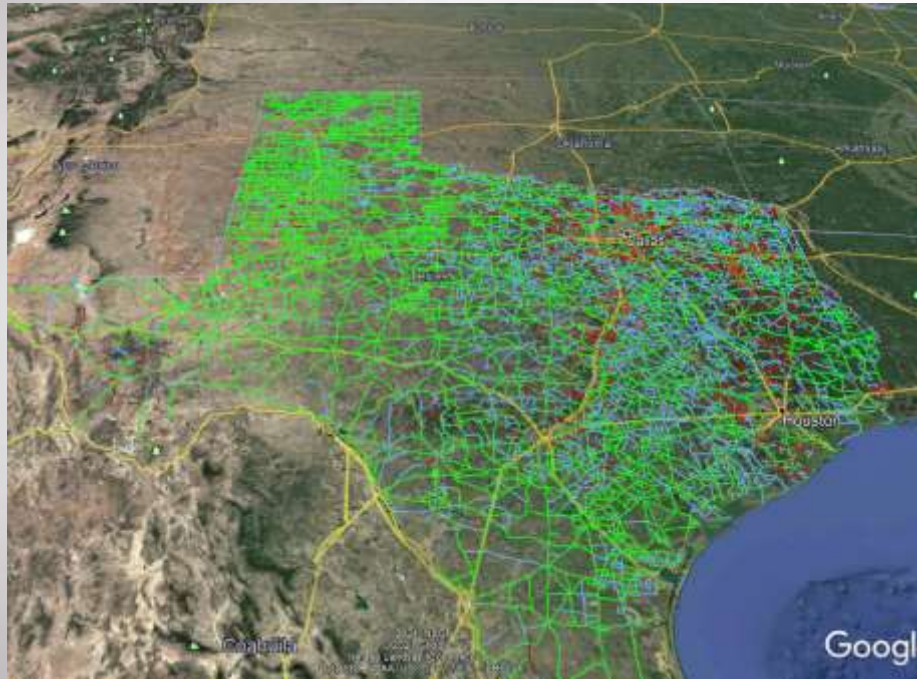
### Percentage of Crashes -Fatal / Serious



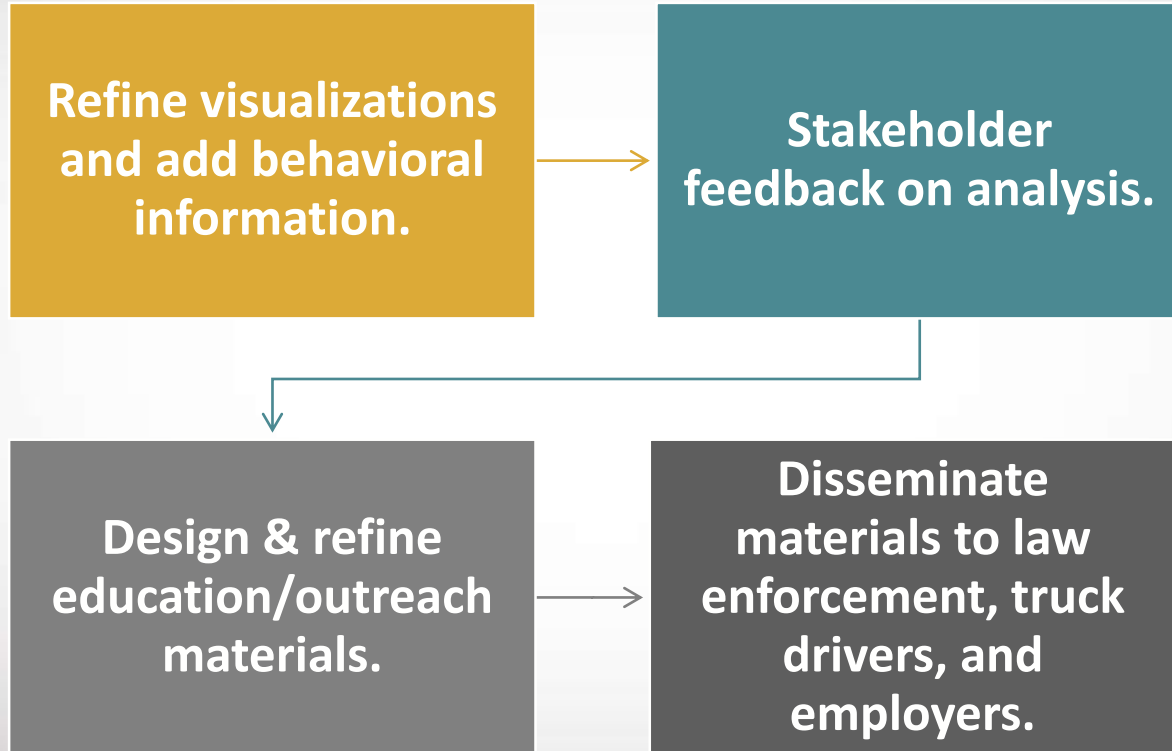
# Data Analysis: Factors Associated with Fatal/Serious Crashes

Variable	Single Vehicle		Multi-vehicle Intersection		Multi-vehicle Non-intersection	
	TT	HT/PU	TT	HT/PU	TT	HT/PU
→ Rural (vs Fringe)		X	X	X	X	X
<b>TRUCK DRIVER</b>						
→ Impaired	X	X	X	X	X	X
Distracted					X	X
→ FTYROW			X	X	X	
FT Keep in Lane	X	X				
Faulty Evasive Action	X			X		X
Improper Turn					X	
Male				X	X	X
<65 Years (vs 65+ Years)			X	X		
40-65 Years (vs <40 & 65+ Years)						X
65+ Years (vs. <65 Years)	X					
<b>OTHER DRIVER</b>						
→ Impaired			X	X	X	X
Distracted					X	
→ Speeding			X	X	X	X
FTYROW			X	X		
Improper Turn					X	X
Improper Passing						X
>65 years					X	X

# Data Analysis: High Risk Roadways (Systemic Approach)



# Next Steps







---

**Eva M. Shipp**

[E-shipp@tti.tamu.edu](mailto:E-shipp@tti.tamu.edu)