



## COLORADO Transportation Commission

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**DATE:** September 6, 2019

**FROM:** Charles Meyer, Branch Manager, State Traffic and Safety Engineer  
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**SUBJECT:** Colorado Transportation Crashes Causality

### Purpose

The Colorado Transportation Commission has made transportation safety a top priority for Colorado, and as such, has made safety a standing item at its monthly workshop. In August, the Commission requested more information from CDOT staff on the causality of crashes. This discussion item will give the Commission an overview of the common causalities of crashes in Colorado, how CDOT and other agencies analyze those causal factors, and how the analysis is used to plan and deliver programs and projects to address these causal factors of crashes.

### Action

Information only

### Details

Federal, state, and local agencies in Colorado are responsible for building and operating transportation systems that function as safe as possible. The transportation industry follows the latest standards for roadway safety through incorporation of current design standards, specifications, products, and best practices into their business practices. While agencies do their best to build the safest transportation systems, human error still occurs - by all users, drivers, pedestrians, bicyclists, and others - and this is evident by the annual occurrence of over 100,000 crashes, 600 of them resulting in fatalities and 3000 of them in severe injuries.

Recognizing this, agencies dedicate themselves to study the human interaction of users with the transportation system to prevent these crashes from occurring where known or to build a forgiving transportation system that lessens the severity of crashes where they might occur. This study depends on crash data analysis and system attributes and risk factors analysis. Crash data analysis depends on reliable and accurate crash data collected by law enforcement officers around the state following a national standard, the Model Minimum Uniform Crash Code (MMUCC), that is delivered to agencies via an integrated, timely system. This complete set of data enables transportation safety professionals within federal, state, and local agencies to conduct causality analysis to determine what are the most effective mitigations/strategies, where they would be most effective, and who is responsible for implementing those strategies.

Given the extensive need in Colorado, and all states around the country, for transportation safety improvements and given the recent increases in roadway fatalities across the nation in recent years, a strategic, prioritized approach is necessary to focus agency efforts on where resources can be most effective in reducing the loss and impact to human life, and consideration can be given to increasing resources toward doing so. Further, agencies and a variety of other stakeholders have varying contributions, responsibilities, and influences on transportation safety - and are all necessary as a network of professional to improve safety. The coordinated process to strategically use resources most effectively is known as the Strategic Transportation Safety Plan. This plan process is used nationally by every state to gather stakeholders, get



executive vision and direction, assess transportation safety, determine most effective actions, and implement and monitor those strategies.

Colorado's current strategic safety plan was adopted in 2015, and is currently in the process of being updated. A multi-agency steering committee will be meeting on September 20<sup>th</sup> to decide on vision and direction, and guide the process to update the STSP. Later in September and October, dozens of safety stakeholders around the state with multiple agencies and transportation safety groups will meet to assess Colorado transportation safety and form teams to develop plans to improve safety over the next 3 to 5 years. This will then be implemented into deliverable, actionable plans for specific focus areas, making up the overall Strategic Transportation Plan for Colorado, anticipated in early 2020.

At the same time, DRCOG, Denver, Boulder, Fort Collins have or are developing region or city-specific transportation safety vision zero plans. The STSP process is coordinating closely with these partners to capitalize on their efforts and align our work.

Next Steps (if applicable)

The Transportation Commissioners will be invited to the regional stakeholder workshops.

Attachments

Power Point presentation on Colorado Crash Causalities and Safety Stakeholders





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**ZERO**  
DEATHS

# Transportation Commission Meeting

# Crash Causalities

September 18, 2019



# Colorado Crashes

- Causalities
- Crash Results
- Mitigation
- Stakeholders



# Causal and Contributing Factors

- Crash Data Collection
  - Causal Factor > Driver Contributing Factor > First Harmful Event
- Causalities Different for:
  - Severity of crash
  - Facility Type
- Consistent year to year

TRAFFIC ACCIDENT REPORT		OVERLAY A	
<b>A. LOCATION</b> 01. On Roadway 02. Ran Off Left Side 03. Ran Off Right Side 04. Ran Off T Intersection 05. Vehicle Crossed Center Median 06. Opening Lane 07. On Street Crossing		<b>K. VEHICLE / VEHICLE COMBINATION</b> (SWC Overlay C) Required 01. Motor Vehicle Combination (15,001 lbs. and over) 02. School Bus (all school buses) 03. Non-schd Bus (if applicable or more including driver) in commerce 04. Travel Bus GVWT 10,000 lbs. or Less 05. Passenger Car / Passenger Van 06. Passenger Car / Passenger Van W Trailer 07. Pickup Truck / Utility Van	
<b>B. HARMFUL EVENT SEQUENCE</b> <b>NON-COLLISION ACCIDENT</b> 01. Obstructing 02. Other Non-Collision <b>COLLISION WITH OBJECT</b> 01. Light Pole / Utility Pole 02. Traffic Signal Pole <b>COLLISION WITH PEDESTRIAN</b> 01. Sign 02. Guard Rail 03. Cable Rail 04. Concrete Highway Barrier 05. All Other Traffic <b>COLLISION WITH MOTOR VEHICLE</b> 01. Front to Front 02. Front to Rear 03. Front to Side 04. Rear to Side 05. Rear to Side 06. Side to Side 07. Side to Side 08. Side to Side Same Direction 09. Front to Front 10. Light Pole / Utility Pole 11. Traffic Signal Pole 12. Sign 13. Guard Rail 14. Concrete Highway Barrier 15. All Other Traffic 16. Vehicle Driver or Cargo 17. Culvert or Overhead 18. Embankment 19. Curb 20. Detention Post 21. Fence 22. Tree		<b>L. DIRECTION OF TRAVEL - PRIOR TO IMPACT</b> 01. North 02. South 03. Northeast 04. Southwest 05. East 06. West 07. West 08. Northwest 09. Southeast	
<b>Q. DRIVER ACTIONS (Officer Opinion Only)</b> 00. No Action 01. Exceeded Safe/ Posted Speed 02. Impeded Traffic 03. Failed to Yield ROW 04. Disregard Stop Sign 05. Failed to Stop at Signal 06. Disregarded Other Device 07. Improper Turn 08. Turned from Wrong Lane or Position 09. Other Improper Turns 10. Lane Violation 11. Improper Passing on Left 12. Improper Passing on Right 13. Followed Too Closely 14. Improper Backing 15. Signaling Violation 16. Reckless Driving 17. Careless Driving (if used, block R can not be coded "00")		<b>M. VEHICLE MOVEMENT - PRIOR TO IMPACT</b> 01. Going Straight 02. Turning Left 03. Turning Right 04. Stopped in Traffic 05. Making Right Turn 06. Making Left Turn 07. Other (Describe in Narrative)	
<b>R. DRIVER - MOST APPARENT HUMAN CONTRIBUTING FACTOR (Officer Opinion Only)</b> 00. No Apparent Contributing Factor 01. Asleep at the Wheel 02. Driver Fatigue 03. Illness / Medical 04. Driver Inexperience 05. Aggressive Driving 06. Driver Unfamiliar With Area 07. Driver Emotionally Upset 08. Evading Law Enforcement Officer 09. Physical Disability 10. DUI, DWAI, DUID 11. Distracted / Passenger 12. Distracted / Cell Phone 13. Distracted / Radio 14. Distracted / Other 15. Other Factor (Describe in Narrative)		<b>N. VEHICLE SPEED - Vehicles Only</b> Traffic Unit #1 or _____ Traffic Unit #2 or _____ <b>VEHICLE SPEED - Vehicles Only</b> Traffic Unit #1 or _____ Traffic Unit #2 or _____ <b>IONS (Officer Opinion Only)</b> Posted Speed 01. Lane Violation 02. Improper Passing on Left 03. Improper Passing on Right 04. Improper Backing 05. Signaling Violation 06. Reckless Driving (if used, block R can not be coded "00") 07. Careless Driving (if used, block R can not be coded "00")	
<b>S. APPARENT HUMAN CONTRIBUTING FACTOR (Officer Opinion Only)</b> Contributing Factor 00. Physical Disability 01. DUI, DWAI, DUID 02. Distracted / Passenger 03. Distracted / Cell Phone 04. Distracted / Radio 05. Distracted / Other 06. Other Factor (Describe in Narrative)		<b>T. VEHICLE DEFECT / CONDITION (Officer Opinion Only)</b> 00. No Vehicle Defect 01. Defective Head Light(s) 02. Defective Brake Light(s) 03. Defective Signaling Device 04. Broken Detached/Car of Adjustment 05. Defective Tires 06. Sudden Tire Failure 07. Improper Tires for Conditions 08. Mechanical Failure 09. Obscured View(s) 10. Improper Load 11. Spilled Load - Commercial 12. Spilled Load - Passenger 13. Spilled Load - Commercial Non-Appealing 14. Spilled Load - Other 15. Missing Equipment 16. Spilled Load - Commercial 17. Other Defect(s) (Describe in Narrative)	



# Most Common

- Causal Factors

- Driver Error - 50%
  - Lane violation
  - Failure to Yield ROW
  - Inattentive
  - Traffic Control Device Violation
  - Turn Lane or Passing Violation
  - Wrong Side of Road
  - Asleep
- DUI - 16%
- Speeding - 15%
- Pedestrian - 11%

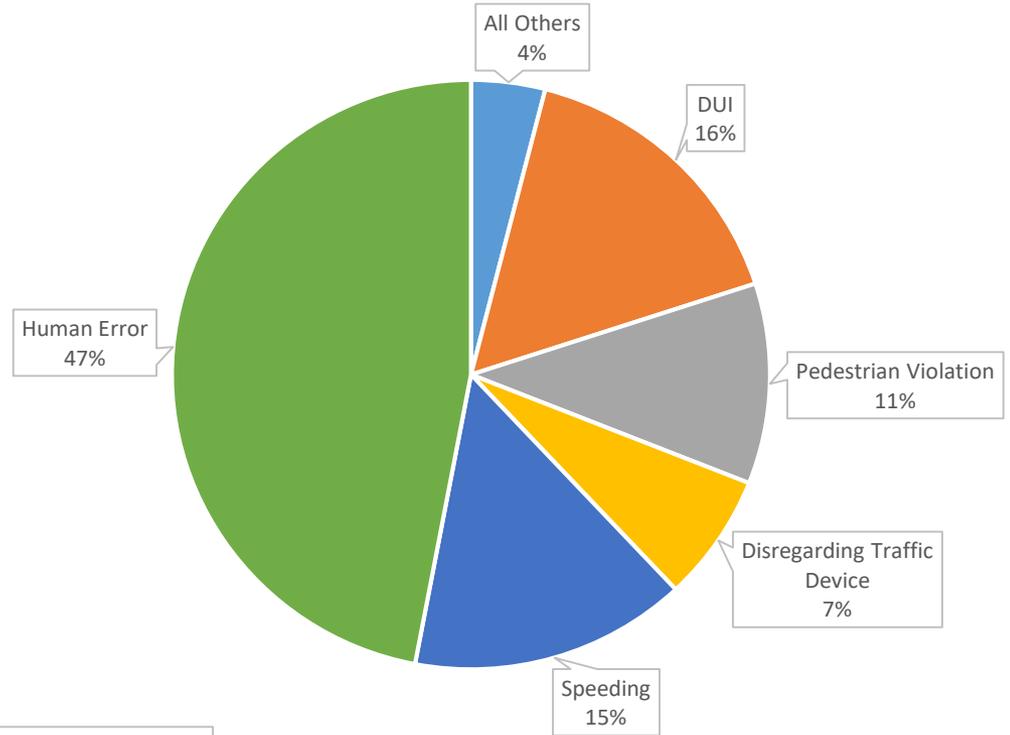
- Contributing Factors

- DUI/DWAI/DUID - 30%
- Aggressive - 16%
- Distracted - 9%
- Inexperience - 5%
- Fatigue/Asleep - 4%

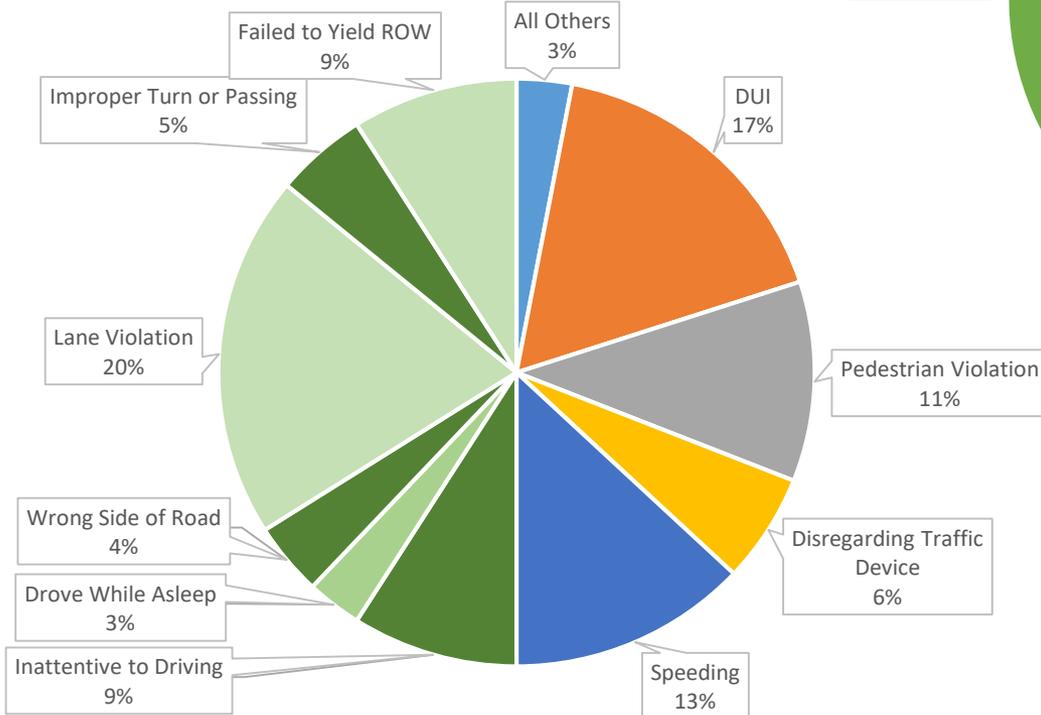


# Fatality Causal Factors by Year

2018 Fatal Causal Factors



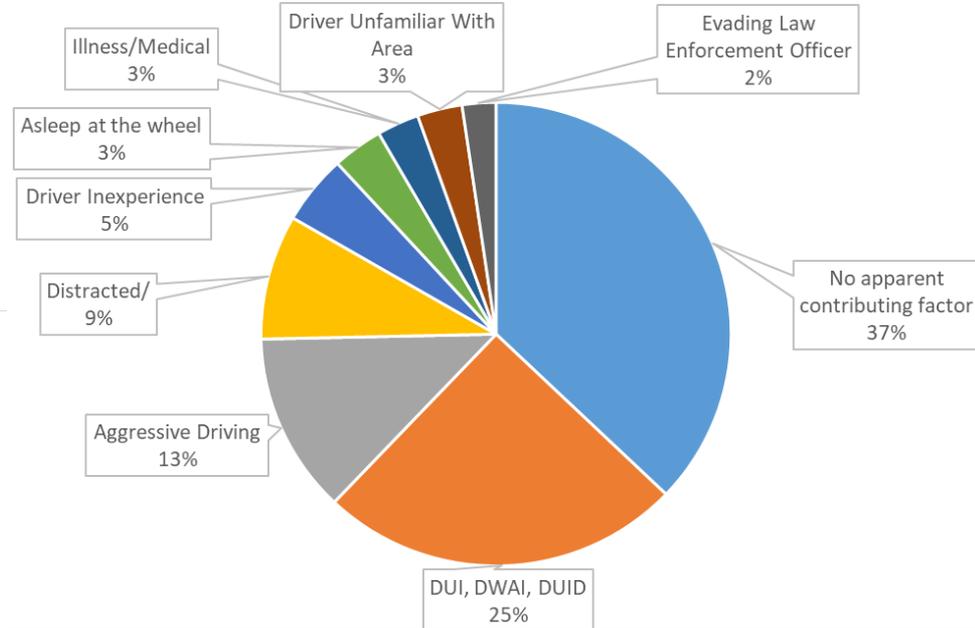
2017 Fatal Causal Factors



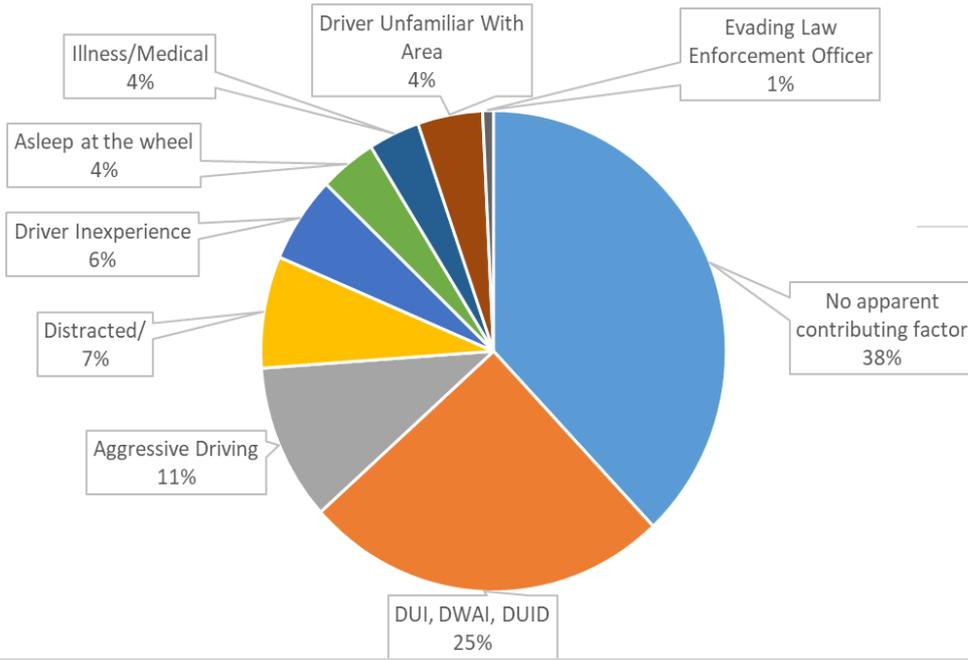


# Fatality Contributing Factors by Year

Driver Contributing Factors  
2018 Fatalities



Driver Contributing Factors  
2017 Fatalities





# Results of Crashes

- Harmful Event/Results -
  - Collision (rear end, broadside), fixed object, overturn, vulnerable users, etc.
- Location- intersection, run off road, median, etc.
- Analysis
  - Statewide and Regional Trends
  - Regional crash tree diagrams
  - Regional corridor analysis
  - LOSS / Pattern Listings and Mapping



# Mitigations

- Depending on Patterns of Causal, Contributing Factors and Harmful Events
  - Education
  - Enforcement
  - Engineering
- Prevention / “Forgiving Roadway” - standards, specifications, design manual
- Risk analysis - factors analysis, likelihood/consequences, examples - wildlife fencing, rumble strips, cable rail, guardrail, safety edge
- Hot spot mitigation

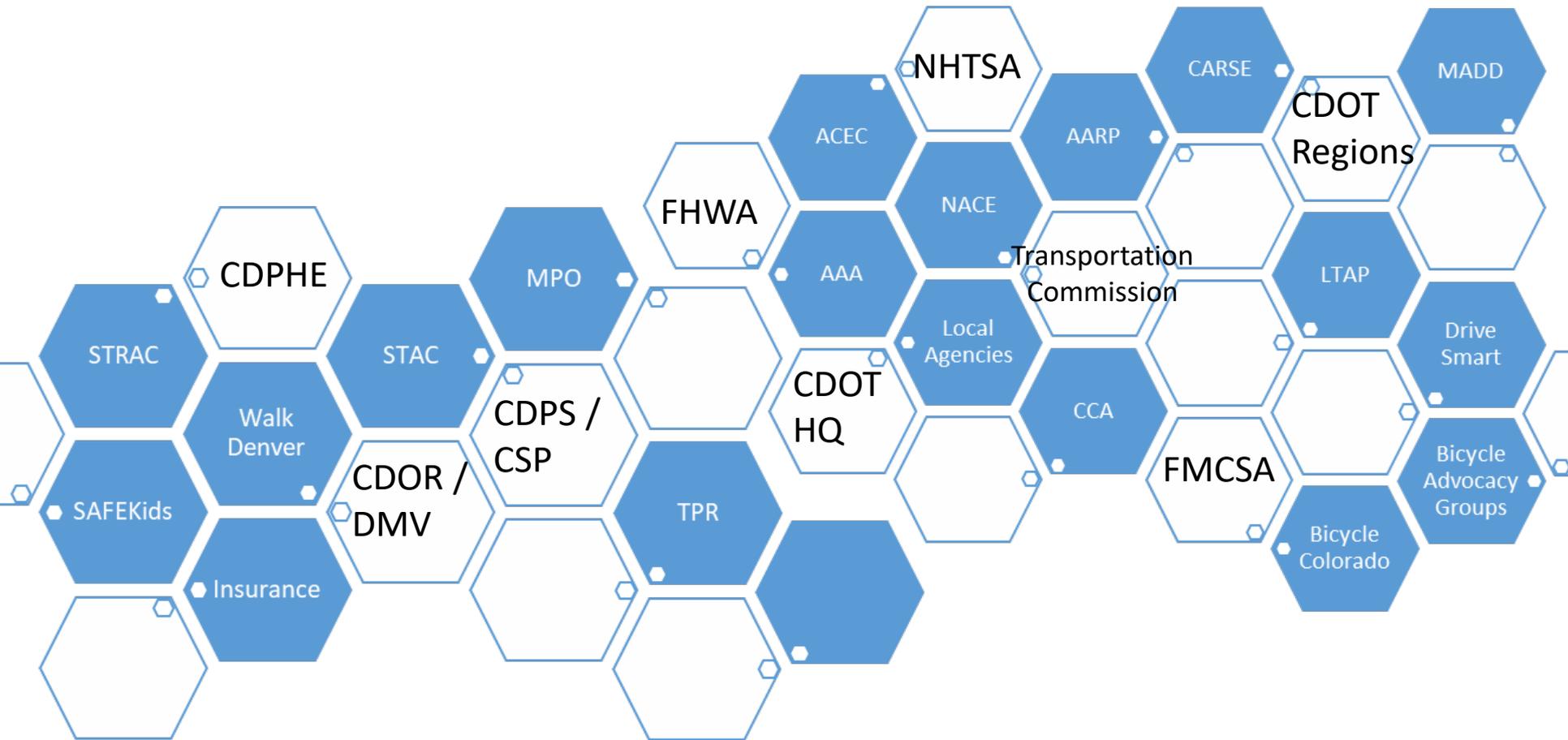


# Stakeholders

- Engagement
  - Partnerships day to day
    - HQ Programs - campaigns, targeted enforcement, Local Safety Liaison
    - Regional partnerships
  - Strategic engagement and planning process
    - SWP
    - STSP
- Federal, state, local, agencies, citizens
- Enforcement, Education, Engineering



# Stakeholders





# Stakeholder Outreach

- Schedule of STSP meetings
  - Sept 20<sup>th</sup> – Agency Steering Committee
  - Sept 23<sup>rd</sup> - Region 3 East Workshop – Silverthorne
  - Sept 24<sup>th</sup> - Region 3 West Workshop – Grand Junction
  - Sept 25<sup>th</sup> - Region 5 West Workshop – Durango
  - Sept 26<sup>th</sup> - Region 5 East Workshop – Poncha Springs
  - Sept 30<sup>th</sup> – Region 4 Workshop – Greeley
  - Oct 1<sup>st</sup> - Region 1 Workshop – Denver
  - TBD - Region 2 Workshop – Pueblo



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# Discussion