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Methods

• Data from the Arizona Department of Transportation (ADOT) Accident Location Identification Surveillance System for years 2007-2014\(^2\) were analyzed.

• Based on geocoded locations, MVCs were classified as on or off Tribal land.

• Analysis was conducted using SAS v. 9.3.
Total Crashes: 900,720

On Tribal Land: 20,568 (2%)
- Fatal Crashes: 661 (3%)
  - Number Killed: 774
  - Incapacitating Injury: 1,338 (3%)*
  - Non-Incapacitating Injury: 4,019 (8%)
  - Possible Injury: 5,372 (11%)
- Injury Crashes: 6,915 (33%)
  - Number Injured: 11,280

Off Tribal Land: 880,152 (98%)
- Fatal Crashes: 5,523 (0.6%)
  - Number Killed: 6,076
  - Incapacitating Injury: 37,178 (2%)*
  - Non-Incapacitating Injury: 143,744 (6%)
  - Possible Injury: 233,448 (10%)
- Injury Crashes: 279,049 (32%)
  - Number Injured: 413,810

* Percentages are out of the number injured
# Results

## Odds of a Fatality or Injury by Crash Location: On vs Off Tribal Lands

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatality</td>
<td>5.9</td>
<td>5.4-6.3</td>
</tr>
<tr>
<td>Injury - Any</td>
<td>1.5</td>
<td>1.4-1.5</td>
</tr>
<tr>
<td>Injury - Incapacitating</td>
<td>1.8</td>
<td>1.6-1.8</td>
</tr>
</tbody>
</table>
Injury by Person Type, On and Off Tribal Lands

- **Driver**: 60% on Tribal Land, 60% off Tribal Land
- **Pedestrian**: 10% on Tribal Land, 10% off Tribal Land
- **Pedalcyclist**: 5% on Tribal Land, 5% off Tribal Land
- **Passenger**: 30% on Tribal Land, 30% off Tribal Land
Results

Fatality by Person Type, On and Off Tribal Lands

- **Driver**: On Tribal Land (45%) vs. Off Tribal Land (55%)
- **Pedestrian**: On Tribal Land (10%) vs. Off Tribal Land (20%)
- **Pedalcyclist**: On Tribal Land (1%) vs. Off Tribal Land (2%)
- **Passenger**: On Tribal Land (35%) vs. Off Tribal Land (45%)
## Results

### Behavioral Risk Factors by Crash Location: On vs Off Tribal Lands

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Appropriate Safety Device</td>
<td>0.83</td>
<td>0.8-0.9</td>
</tr>
<tr>
<td>Alcohol Involvement</td>
<td>1.6</td>
<td>1.5-1.6</td>
</tr>
<tr>
<td>Drug Involvement</td>
<td>1.2</td>
<td>1.0-1.4</td>
</tr>
<tr>
<td>Fatigue</td>
<td>2.4</td>
<td>2.2-2.6</td>
</tr>
<tr>
<td>Violation/Citation</td>
<td>0.9</td>
<td>0.93-0.97</td>
</tr>
<tr>
<td>Distracted Driving</td>
<td>0.9</td>
<td>0.88-0.93</td>
</tr>
</tbody>
</table>
# Results

## Vehicle & Environmental Risk Factors by Crash Location: On vs Off Tribal Lands

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Condition Contributed to Crash</td>
<td>1.8</td>
<td>1.8-1.9</td>
</tr>
<tr>
<td>Vehicle Defect Contributed to Crash</td>
<td>1.6</td>
<td>1.1-2.3</td>
</tr>
<tr>
<td>Single Vehicle Crash</td>
<td>2.6</td>
<td>2.5-2.7</td>
</tr>
<tr>
<td>Single Vehicle Crash Among Injury MVCs</td>
<td>2.6</td>
<td>2.5-2.8</td>
</tr>
<tr>
<td>Fatality in Single Vehicle Crash Among Fatal MVCs</td>
<td>1.6</td>
<td>1.4-2.0</td>
</tr>
</tbody>
</table>
Strengths

• All records are geocoded

• All crash reports, including individual person and vehicle data, for time period of analysis

• All information in the incident, person and unit files available for analysis
Limitations

- Tribal law enforcement does not report MVCs to ADOT due to Tribal government concerns about sharing names of tribal members.
- Data in many fields missing or “Unknown”
Conclusion

• The odds of a MVC resulting in injury or fatality is higher on Tribal lands than off Tribal lands

• Fatigue, alcohol and drugs had a higher odds of being involved in MVC on Tribal land than off Tribal land

• Road conditions and vehicle defects had a higher odds of contributing to MVC crashes on Tribal lands than off Tribal lands

• Among injury and fatality MVCs, single vehicle crashes had a greater odds of occurring on Tribal lands as compared to off Tribal lands
Recommendations

• Data Completion & Quality:
  – Develop agreements that allow Tribes to report to ALISS system without sharing unique identifiers or develop alternate reporting mechanism to improve data completeness
  – Increase training on completion of the crash report forms to improve data quality

• Repair and improve roads on Tribal lands to include shoulders, turn lanes, retroreflective markings, etc. to reduce crashes due to road conditions

• Increase public education on hazards of impaired and fatigued driving in remote, rural areas
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Co-authors

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