**Introduction**

**Oklahoma** ("Indian Territory")

American Indians - 10% of state population

**Risks** – opioid epidemic, smoking, obesity, poverty

**Aim** – determine if Oklahoma American Indian mortality rates have been worsening during the opioid epidemic

**Objective** – characterize American Indian mortality trends in advance of collecting opioid sales data

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**Methods**

**Databases**

CDC Wonder Detailed Mortality
- All-cause
- Medical-cause
- External cause

**Statistics (Stata 15.1)**

Time trend graphs
- single-Y and double-Y axes
- Augmented Dickey Fuller tests for stationarity (lag = 1)
- de-trending (using first differences)
- Spearman Rank testing

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**Results**

**American Indian mortality in Oklahoma: An ecological study of the 45-54-year-old age group (1999-2016)**

**Mark A. Brandenburg, MD, MSc**

**Tulsa, Oklahoma**

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**Conclusions**

1. Oklahoma American Indian mortality is increasing; both Medical-cause & External-cause
2. American Indian and NHW Male 45-54 mortality period effects are very similar – indicating misclassification or non-random variability (i.e., common causes)
3. The greatest driver of increasing mortality in Oklahoma American Indians is medical disease

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**Future Research**

1. Case control studies – using death certificate and medical record data
2. Geographical death data & risk prevalence

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**Table 1. Augmented Dickey Fuller test results analyses for non-stationarity American Indian/Alaska Native 45-54**

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Female All-Cause</th>
<th>Male All-Cause</th>
<th>Female Medical-Cause</th>
<th>Male Medical-Cause</th>
<th>Female External-Cause</th>
<th>Male External-Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-Value</td>
<td>0.0423</td>
<td>0.0180</td>
<td>0.0286</td>
<td>0.0362</td>
<td>0.7946</td>
<td>0.0245</td>
</tr>
</tbody>
</table>

**Table 2. Spearman Rank Correlation Coefficients – American Indian/Alaska Native 45-54**

*Applying first differences before Spearman rank correlation testing

<table>
<thead>
<tr>
<th>Year</th>
<th>Female All-Cause</th>
<th>Male All-Cause</th>
<th>Female Medical-Cause</th>
<th>Male Medical-Cause</th>
<th>Female External-Cause</th>
<th>Male External-Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.000</td>
<td>1.000</td>
<td>0.833</td>
<td>0.99</td>
<td>0.005</td>
<td>1.000</td>
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<tr>
<td>2016</td>
<td>-0.025</td>
<td>0.026</td>
<td>1.000</td>
<td>0.018</td>
<td>0.338</td>
<td>0.047</td>
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<tr>
<td>2015</td>
<td>0.7946</td>
<td>0.0245</td>
<td>0.985</td>
<td>0.003</td>
<td>0.0286</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2005</td>
<td>0.001</td>
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<tr>
<td>2000</td>
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</tbody>
</table>

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**American Indian 45-54 mortality rate time trends (1999 – 2016)**

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