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

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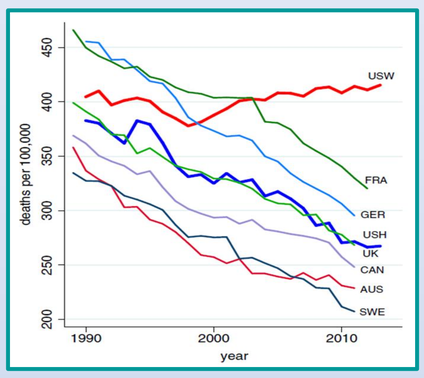
Introduction

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



All-cause mortality of non-Hispanic whites 45–54-years-old

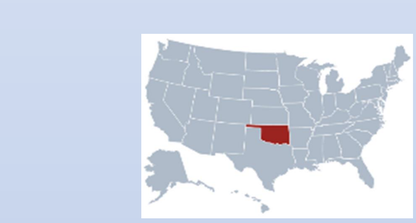
Case A, Deaton A. Rising Morbidity and Mortality in Midlife among White Non-Hispanic Americans in the 21st Century. Proc. Natl. Acad. Sci. U.S.A. 112, 15078–83 (2015).

Methods

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

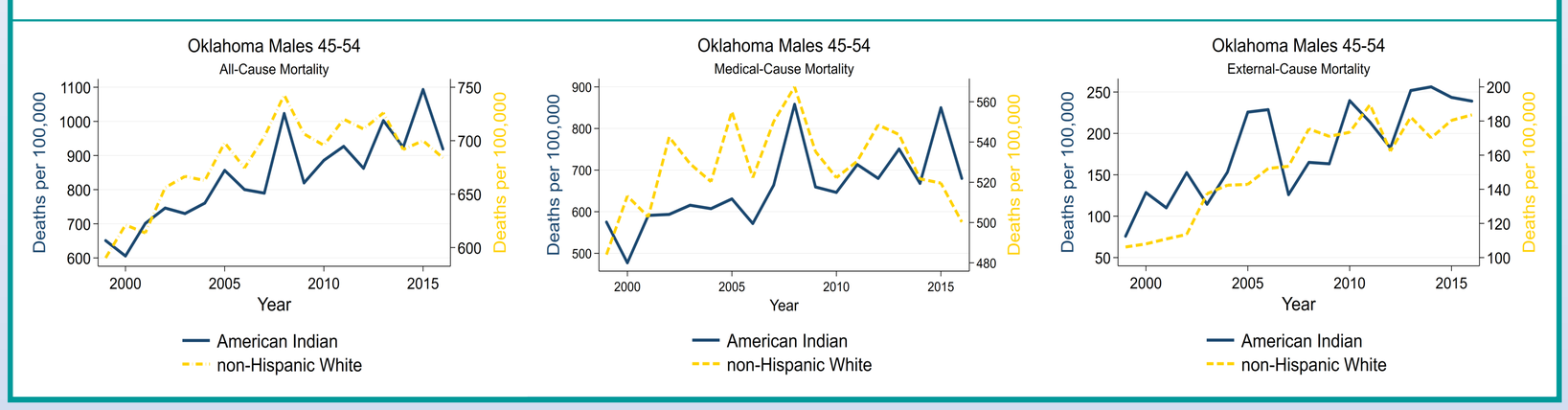
Statistics (Stata 15.1)
Time trend graphs
single-Y and double-Y axes
Augmented Dickey Fuller tests for stationarity (lag = 1)
de-trending (using first differences)
Spearman Rank testing

Results



	Female All-Cause	Male All-Cause	Female Medical-Cause	Male Medical-Cause	Female External-Cause	Male External-Cause
Test Statistic	-3.474	-3.773	-3.617	-3.531	-1.594	-3.669
5% Critical Value	-3.600	-3.600	-3.600	-3.600	-3.600	-3.600
MacKinnon P-value	0.0423	0.0180	0.0284	0.0362	0.7946	0.0245

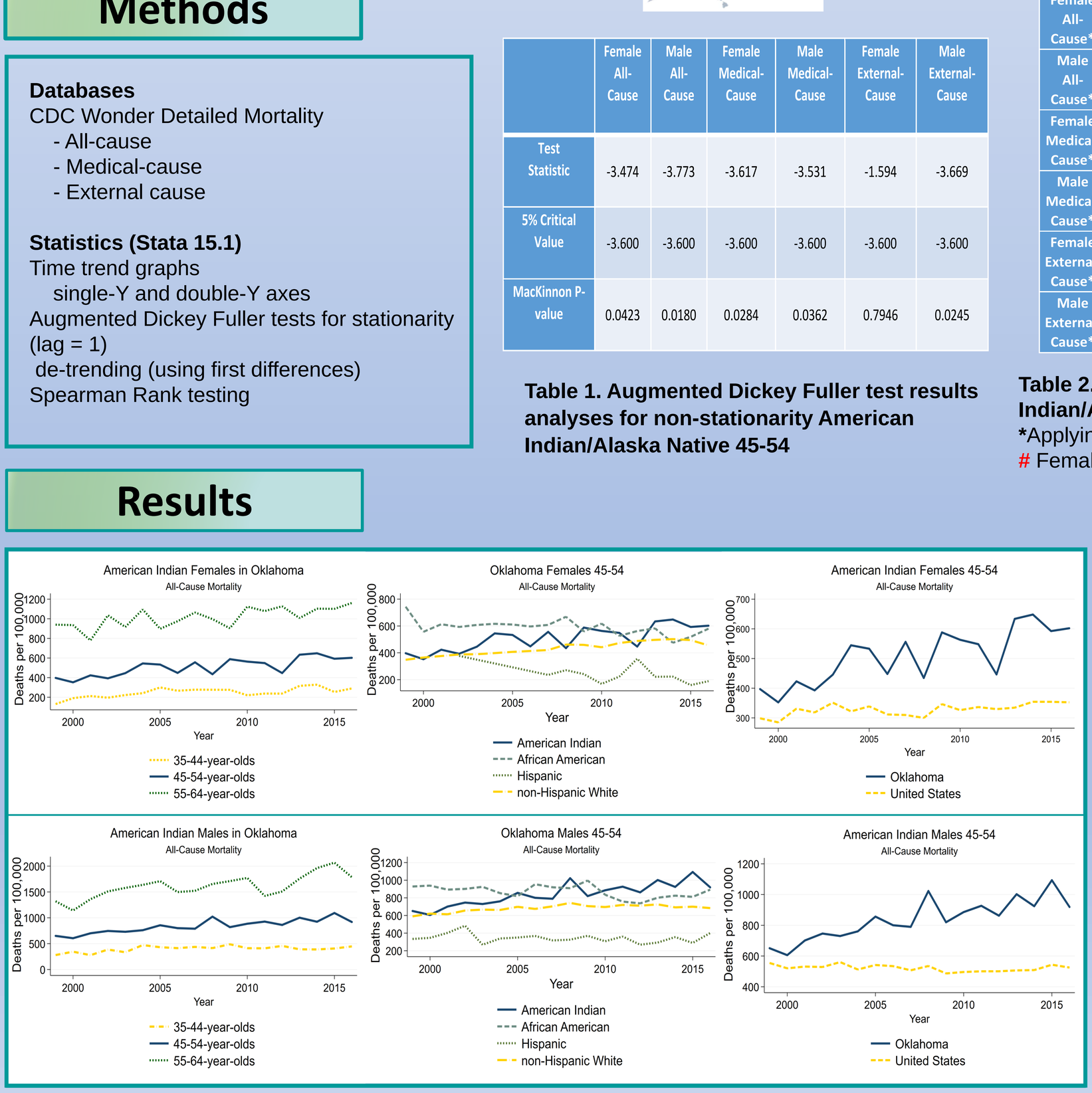
Table 1. Augmented Dickey Fuller test results analyses for non-stationarity American Indian/Alaska Native 45-54



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

	Year (Crude)	Year (*)	Female All-Cause*	Male All-Cause*	Female Medical-Cause*	Male Medical-Cause*	Female External-Cause*	Male External-Cause*
Year	1.000	1.000						
Female All-Cause*	0.833 p<0.001	-0.025 p=0.926	1.000					
Male All-Cause*	0.863 p<0.001	-0.108 p=0.680	-0.157 p=0.548	1.000				
Female Medical-Cause*	0.6838 p=0.003	-0.039 p=0.881	0.956 p<0.001	-0.044 p=0.866	1.000			
Male Medical-Cause*	0.814 p=0.001	-0.0735 p=0.779	-0.044 p=0.867	0.865 p<0.001	0.003 p=0.993	1.000		
Female External-Cause*	#	#	#	#	#	#	1.000	
Male External-Cause*	0.806 p=0.001	0.005 p=0.985	-0.108 p=0.680	0.338 p=0.184	0.047 p=0.859	-0.142 p=0.586	#	1.000

Table 2. Spearman Rank Correlation Coefficients – American Indian/Alaska Native 45-54
*Applying first differences before Spearman rank correlation testing
Female External-Cause data were sparse and unreliable



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

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

Future Research

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