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# Income Inequality and Health in Washington State\*\* and Concluding Remarks

Donald L. Patrick, Jesse Plascak, Shirley Beresford  
University of Washington

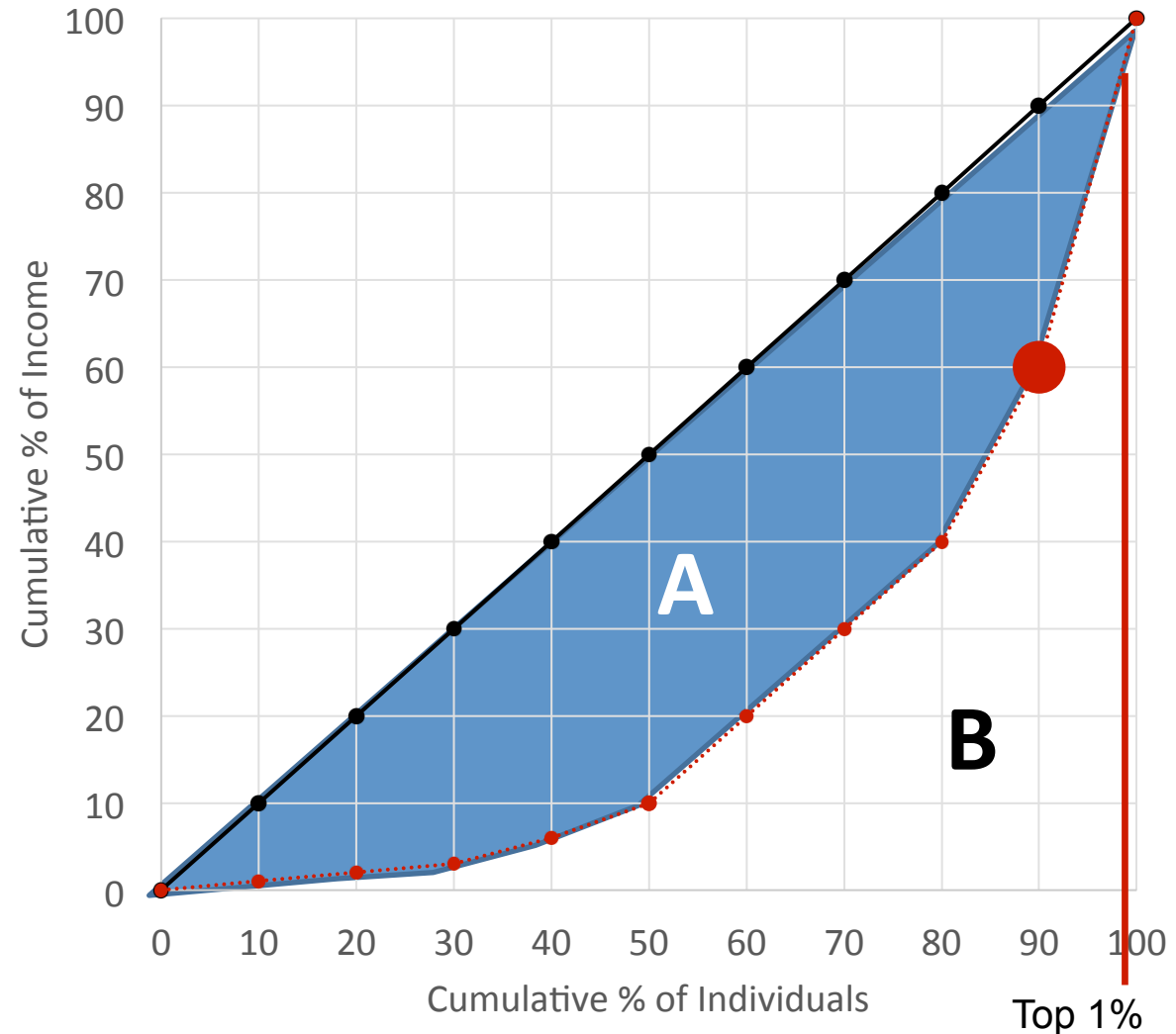
*7<sup>th</sup> Annual Meeting and Symposium  
Washington State Academy of Sciences  
September 18, 2014 Museum of Flight*

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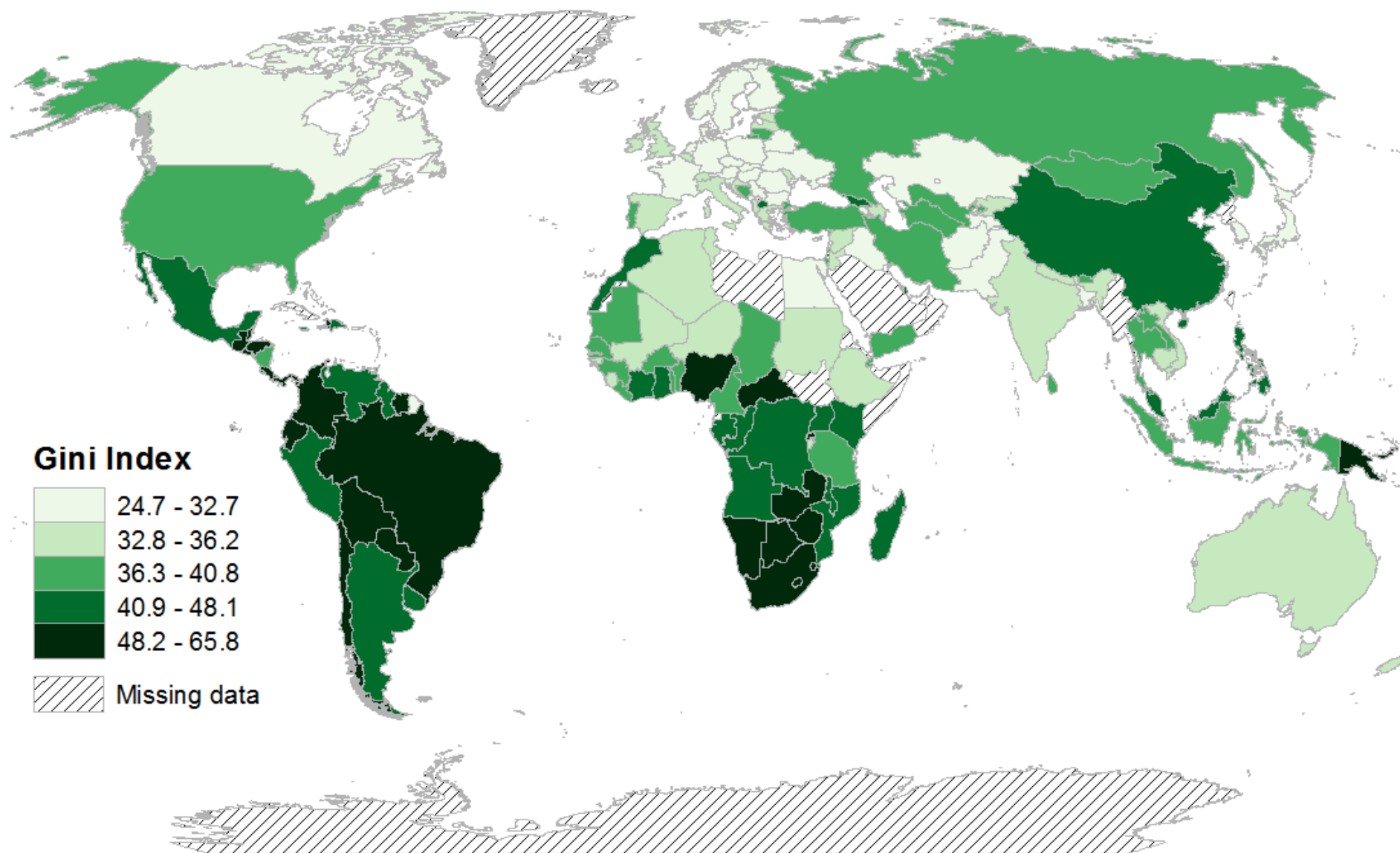
Funded in part by National Cancer Institute Biobehavioral Cancer  
Prevention and Control Training Grant (R25CA092408) and P50CA148143

# Gini Index and the Lorenz Curve

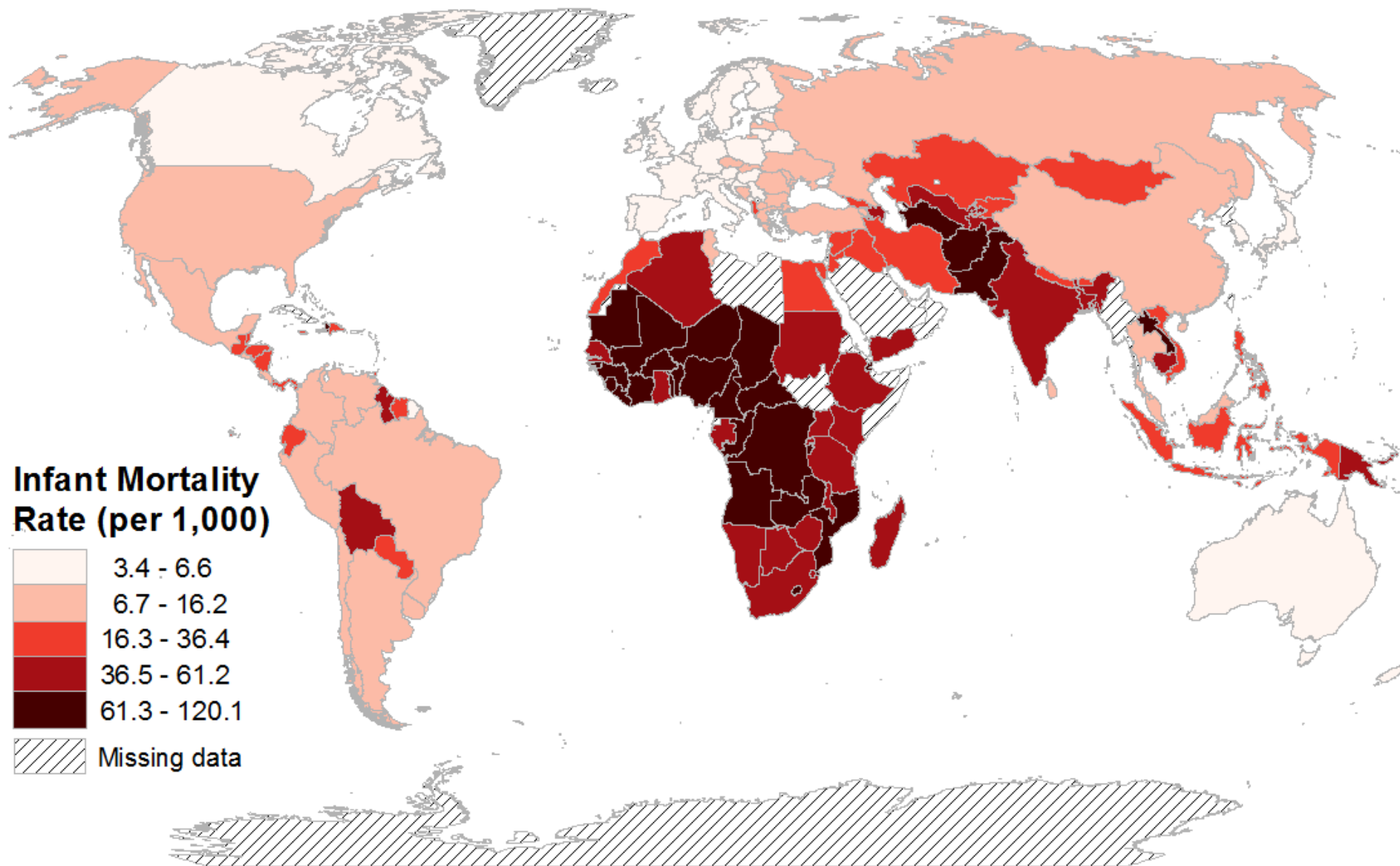
- “The average of the absolute differences between all pairs of scores, divided by twice the mean”
- $Gini = A/(A+B)$



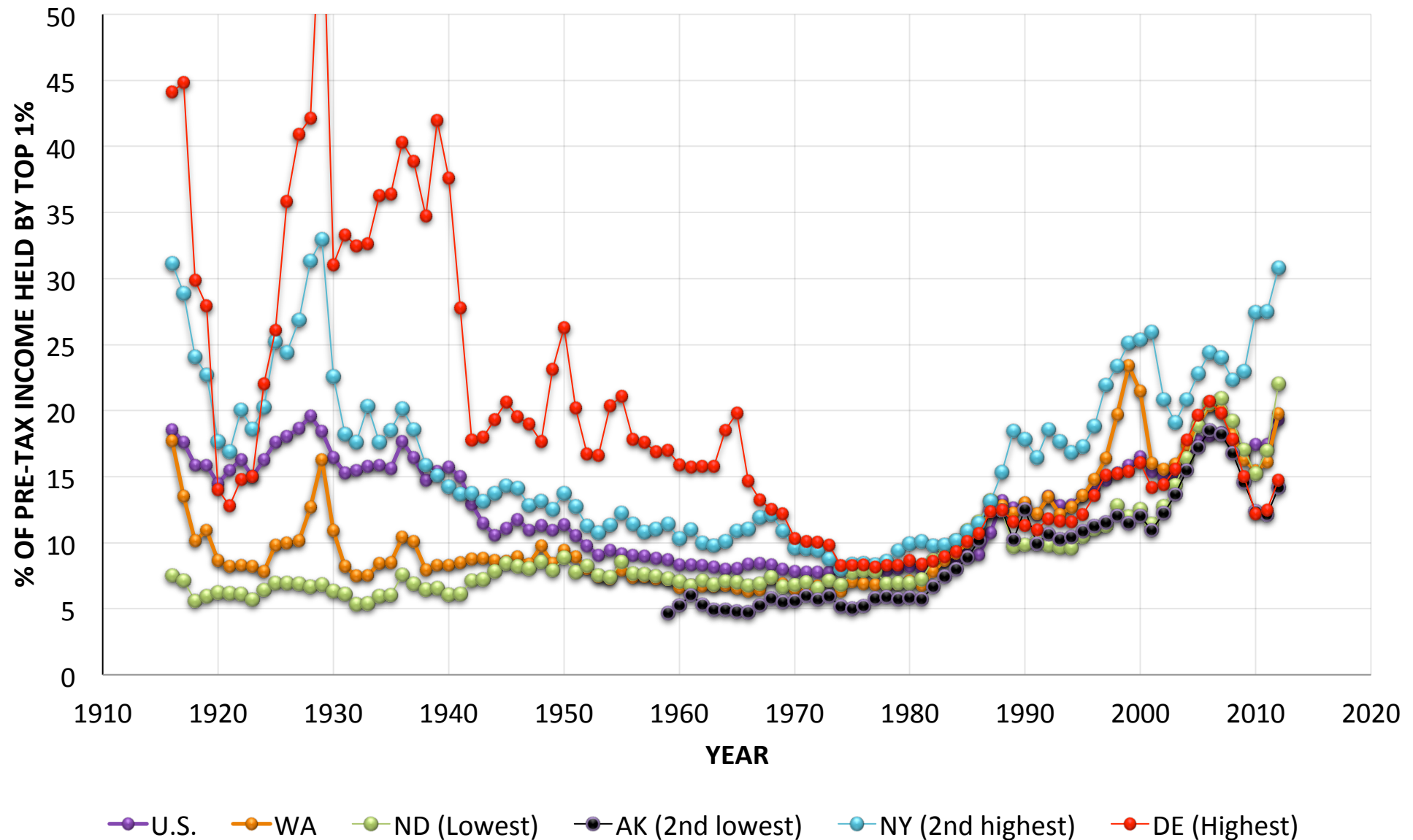
# Gini Index, by Country



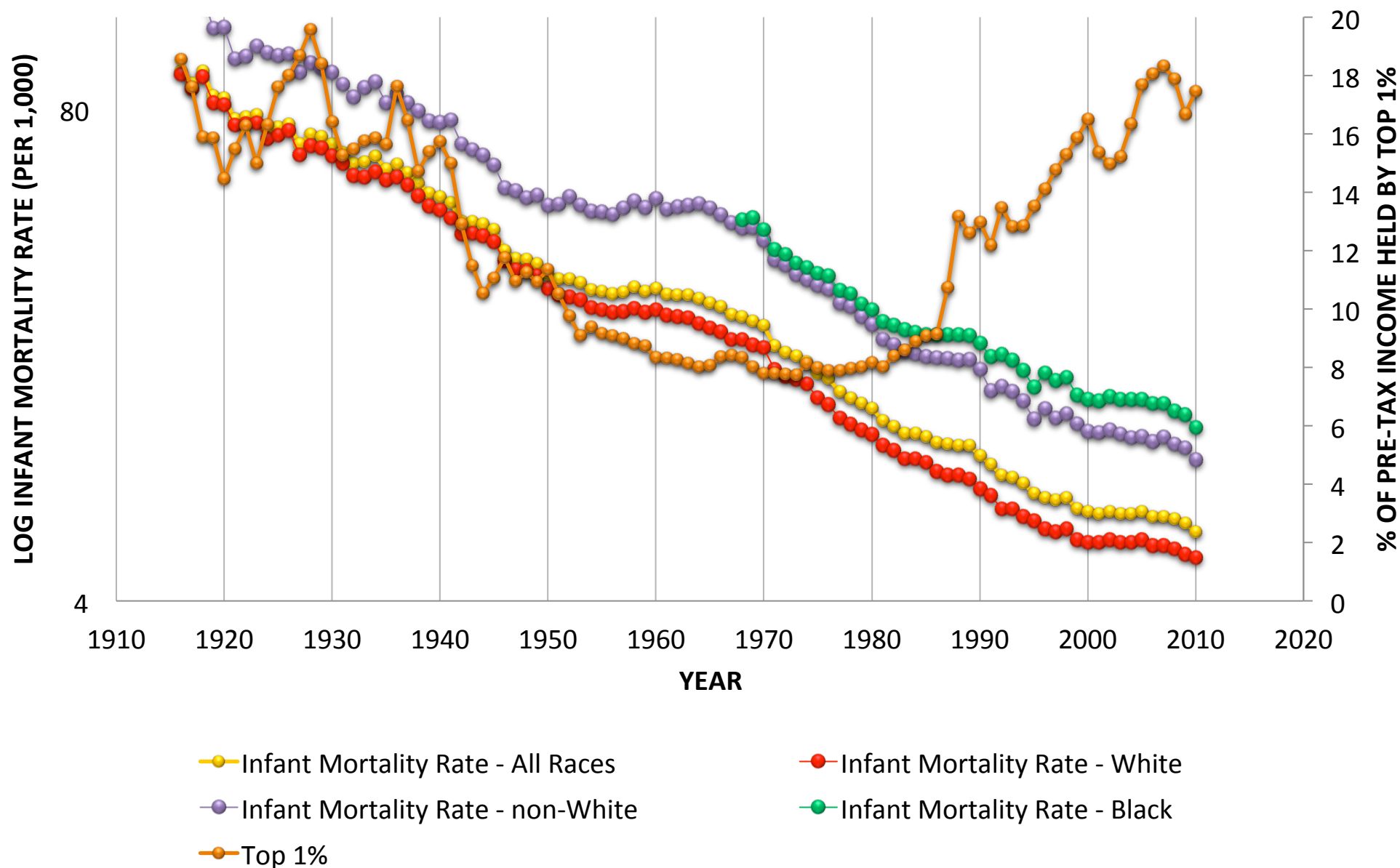
# Infant Mortality Rate, by Country



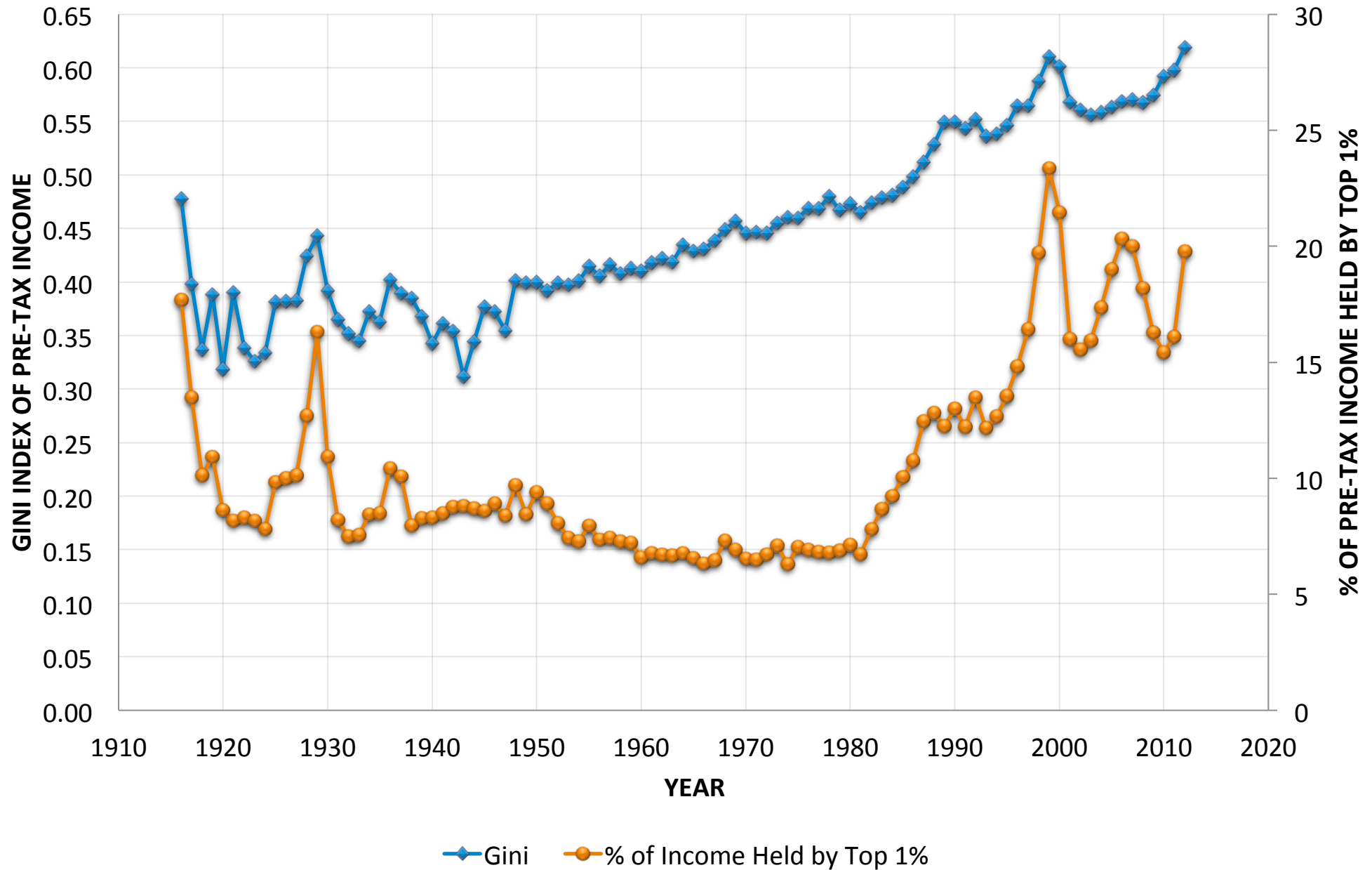
## Income Inequality (Top 1%) in the U.S., Washington, North Dakota, Alaska, New York, and Delaware, 1916-2012



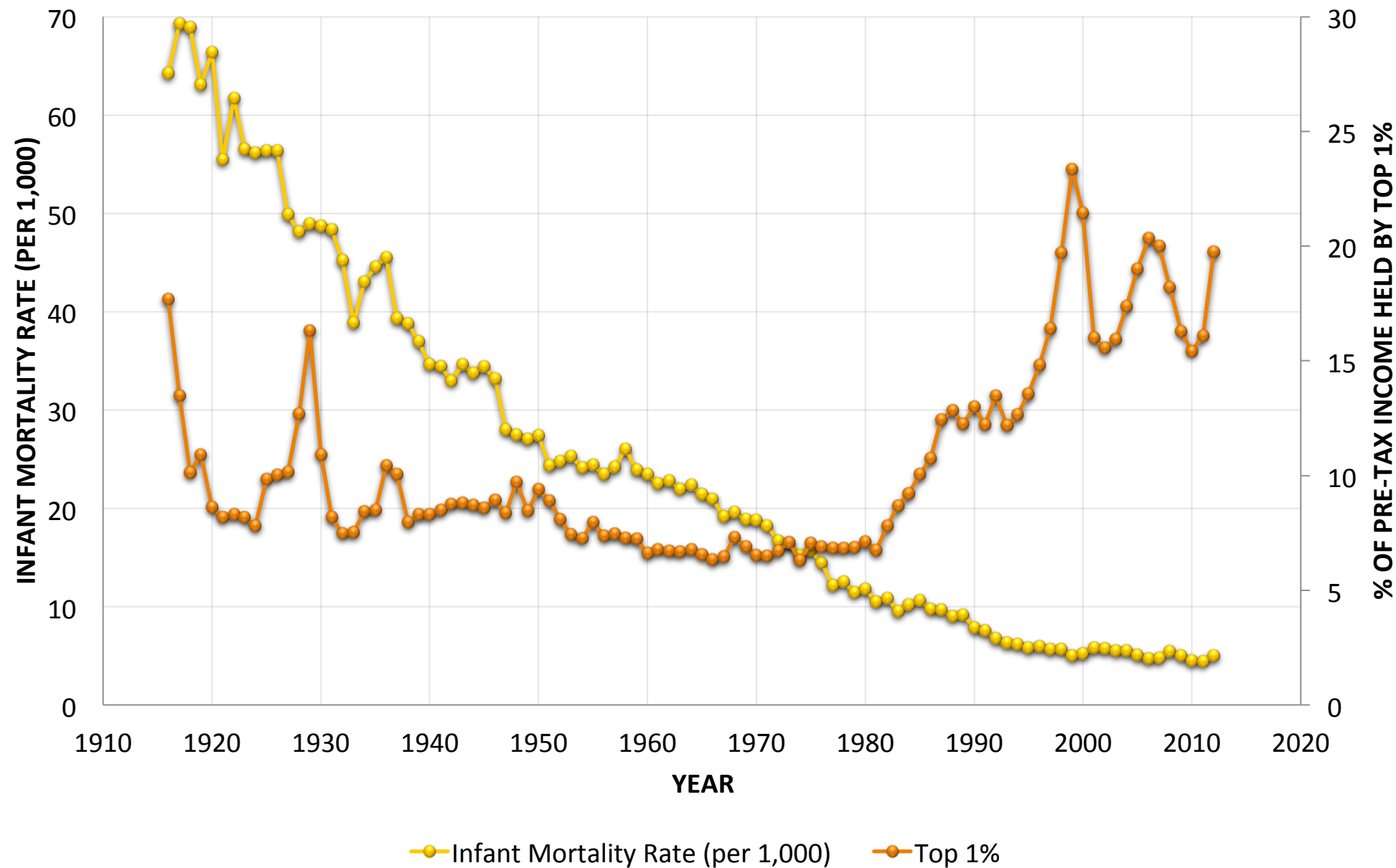
## Top 1% and Infant Mortality Rate by Race, 1916-2010, United States



## Income Inequality 1916-2012, Pre-tax Washington State

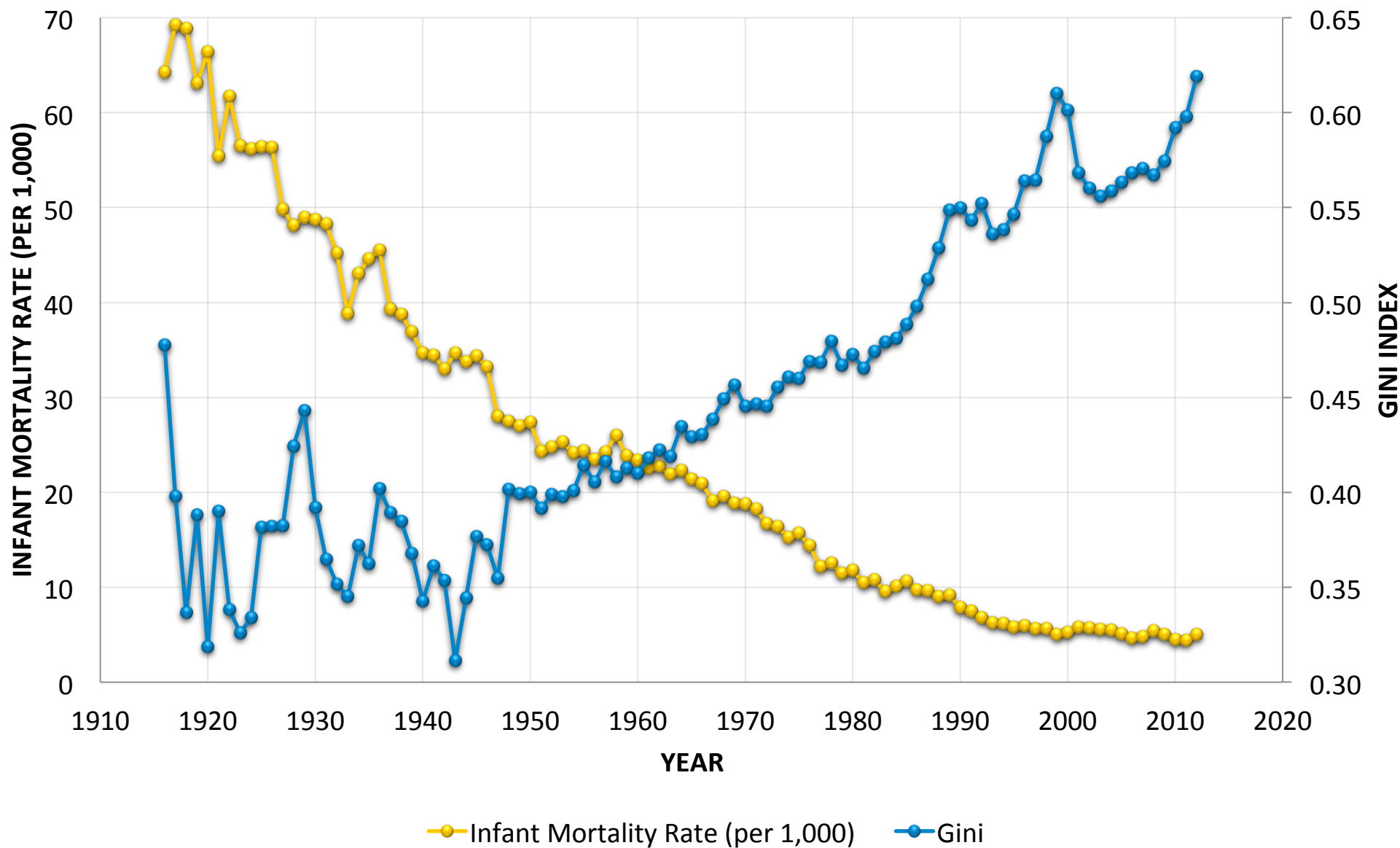


# Top 1% and Infant Mortality Rate 1916-2012, Washington State

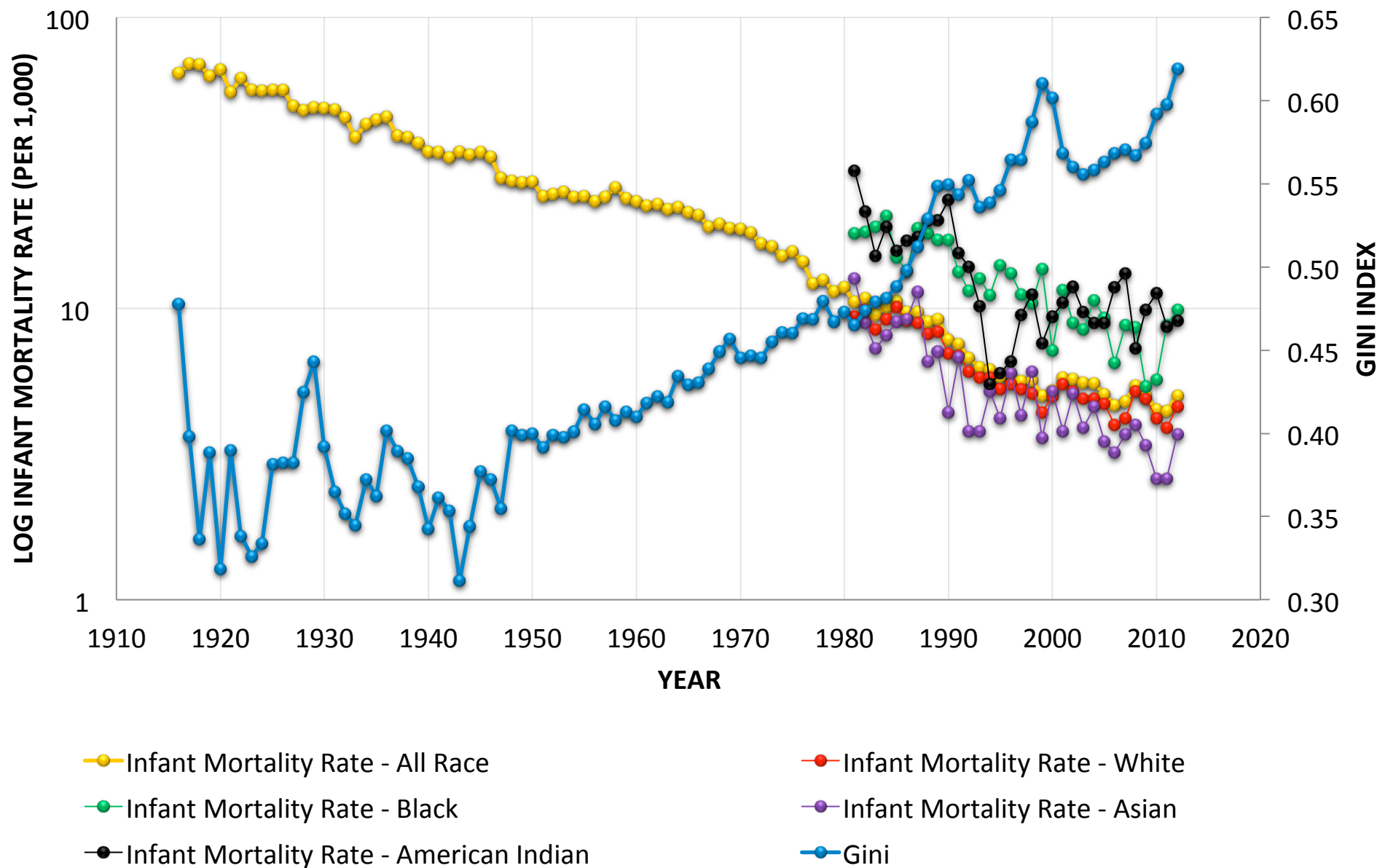




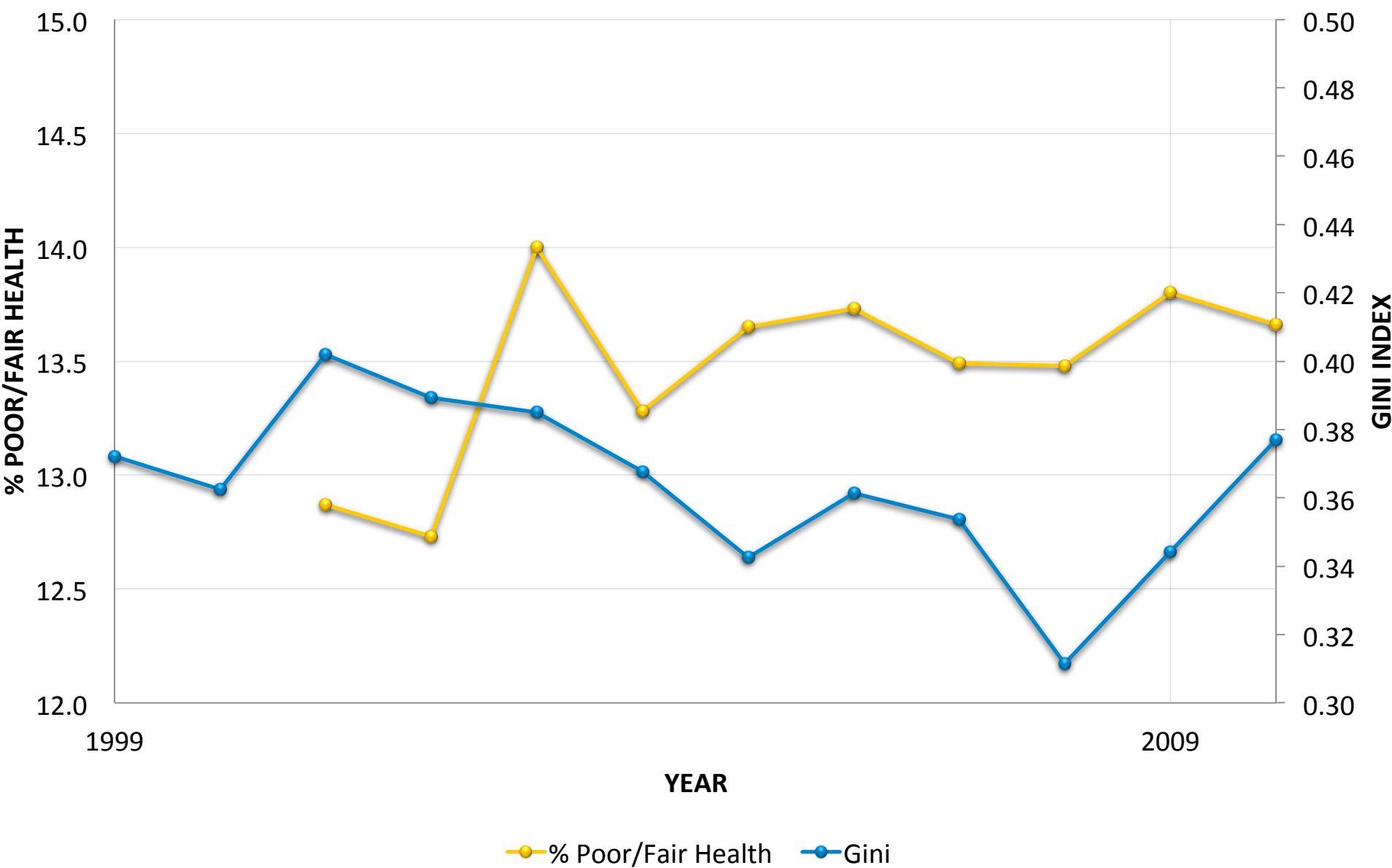
## Gini Index and Infant Mortality Rate 1916-2012, Washington State



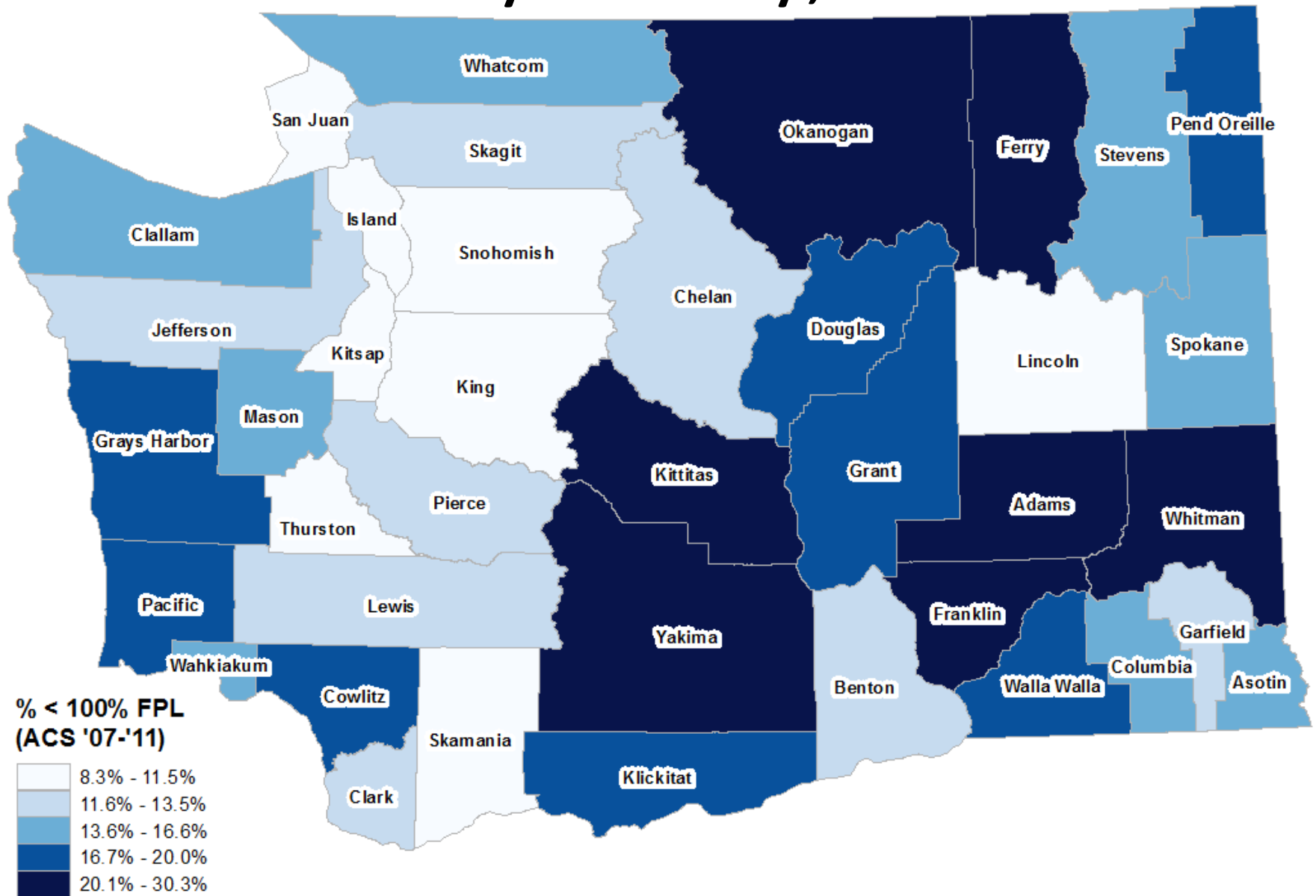
## Gini Index and Infant Mortality Rate (Log) by Race, 1916-2012, Washington State



### Gini index and % Poor/Fair Health, Washington State



# % < 100% FPL by County, 2007-2011



# County Level Washington State Health Disparity Indicators by SES

	% Poor/Fair Health (N=39)	Low Birth Weight (<2500 g) (N=36)	Teenage Birth Rate (N=39)
	Corr Coefficient (P-value)	Corr Coefficient (P-value)	Corr Coefficient (P-value)
% < 100% FPL	0.38 (0.015)	0.29 (0.082)	0.38 (0.017)
Median Household Income	-0.45 (0.004)	-0.10 (0.567)	-0.27 (0.101)
% < High School Diploma	0.74 (<.001)	0.48 (0.003)	0.93 (<.001)

# Associations with Poor/Fair Health, Washington State, 2001-2010

	OR (95% CI)	P-value
Household Income		
< \$15,000	1.00	
\$15,000 - \$25,000	0.58 (0.54 – 0.63)	< 0.001
\$25,001 - \$35,000	0.31 (0.29 – 0.34)	< 0.001
\$35,001 - \$50,000	0.22 (0.20 – 0.24)	< 0.001
≥ \$50,000	0.11 (0.11 – 0.12)	< 0.001

# Associations with Poor/Fair Health, Washington State, 2001-2010

	OR (95% CI)	P-value
Education Attainment		
< High School Diploma	1.00	
High School Diploma	0.42 (0.37 – 0.43)	< 0.001
Some College / Associate's Degree	0.30 (0.27 – 0.32)	< 0.001
≥ Bachelor's Degree	0.14 (0.13 – 0.15)	< 0.001

# Conclusions

- Internationally, higher income inequality → higher infant mortality
- In the US, income inequality has steadily risen over the last 40 years
- In the US, income inequality is not consistently associated with infant mortality disparities by race in different time epochs
- In WASHINGTON STATE, income inequality not consistently associated health indicators in multilevel analyses
- HOWEVER< lower SES indicators (poverty, median income, and education) are associated with poor/fair health at both a county and individual level
- Multilevel studies of income inequality are difficult or impractical yet Income inequality is important to our notions of equity and justice
- Interventions at policy and individual level may be best directed toward reducing poverty and increasing education for all



# Data Sources

- Internal Revenue Service - household income inequality by year
  - Mark Frank of Sam Houston State University (State data)
  - Immanuel Saez of University of California, Berkeley (U.S. data)
- U.S. Census Bureau American Community Survey
  - County-level % < 100% federal poverty level, median household income, % < high school diploma, income Gini
  - 2007-2011
- Behavioral Risk Factor Surveillance System
  - Individual-level % poor/fair health, household income, education attainment, age, sex
  - 2001-2010
- National Center for Health Statistics
  - Infant mortality rate by race and year (U.S.)
  - Low birth rate, teenage birth rate 2005-2011 (Washington State)
- Washington State Department of Health, Center for Health Statistics
  - Infant mortality rate by race and year
- The World Bank (international data)
  - Infant mortality and income Gini