Geographic Variation in Opioid Mortality in the United States by Race/Ethnicity, 1999–2016

Identifying epidemic hotspots

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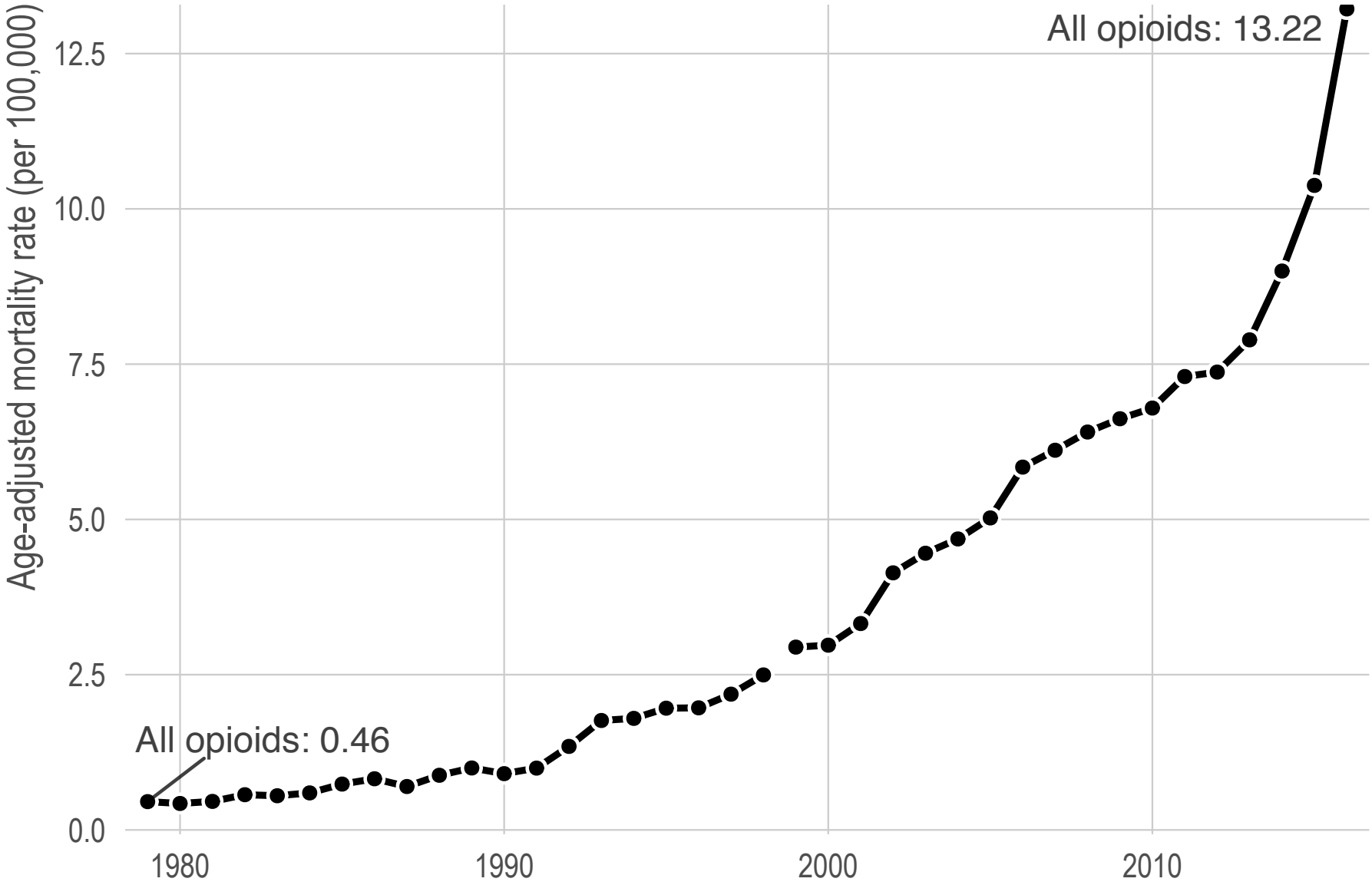
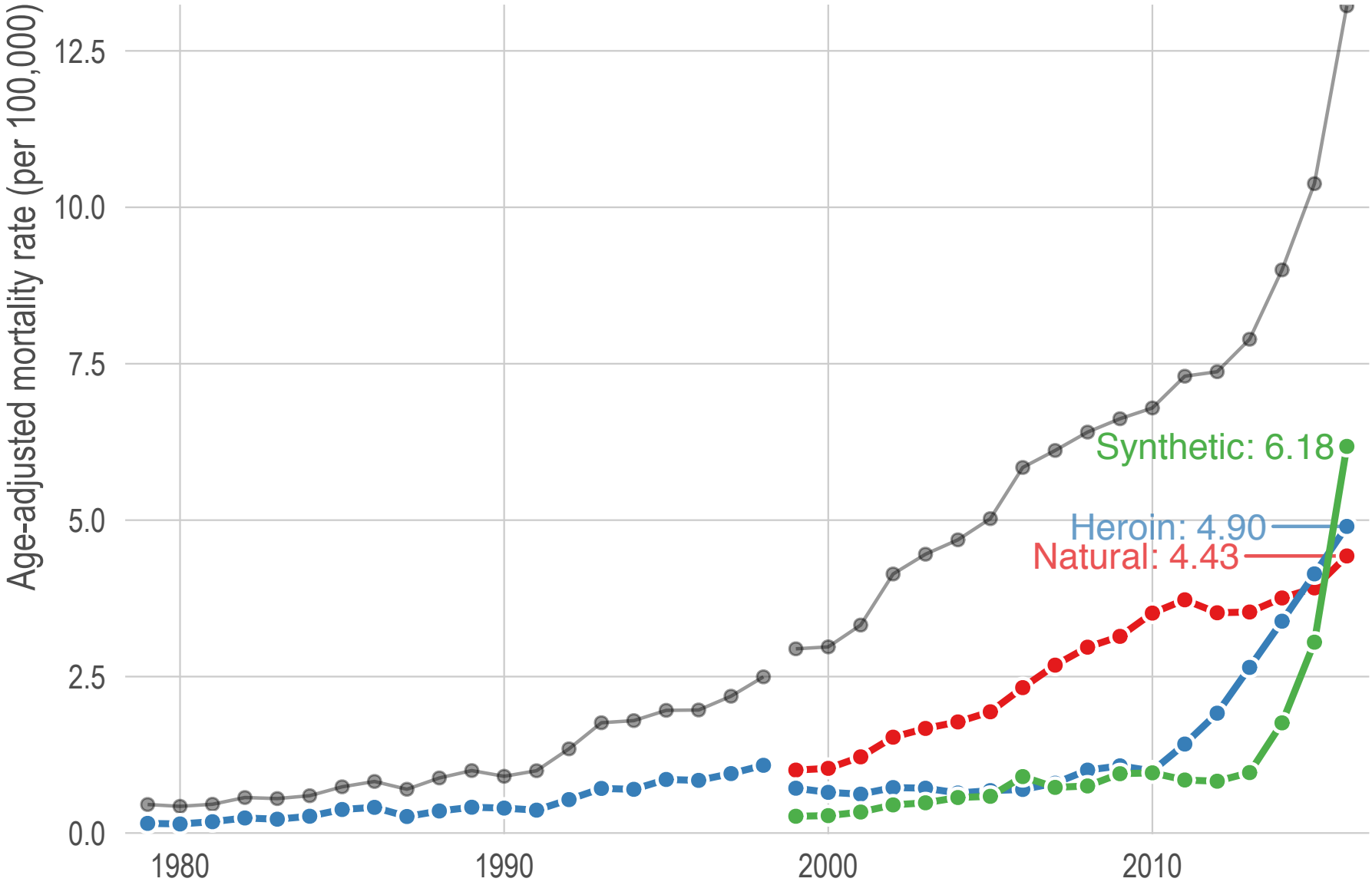
Background: the national US opioid epidemic

Almost 30x increase since 1980

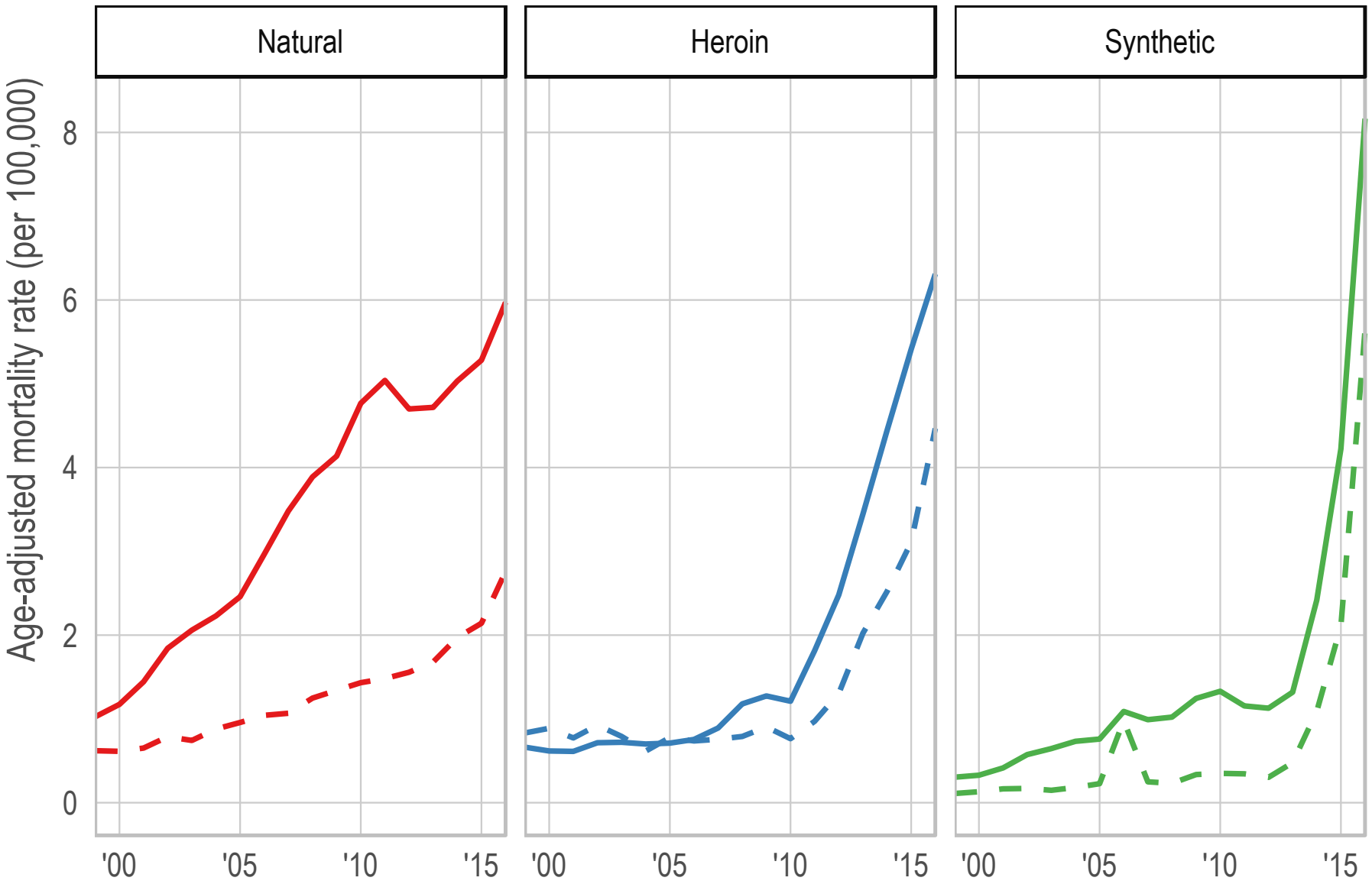


Variation in the opioid epidemic

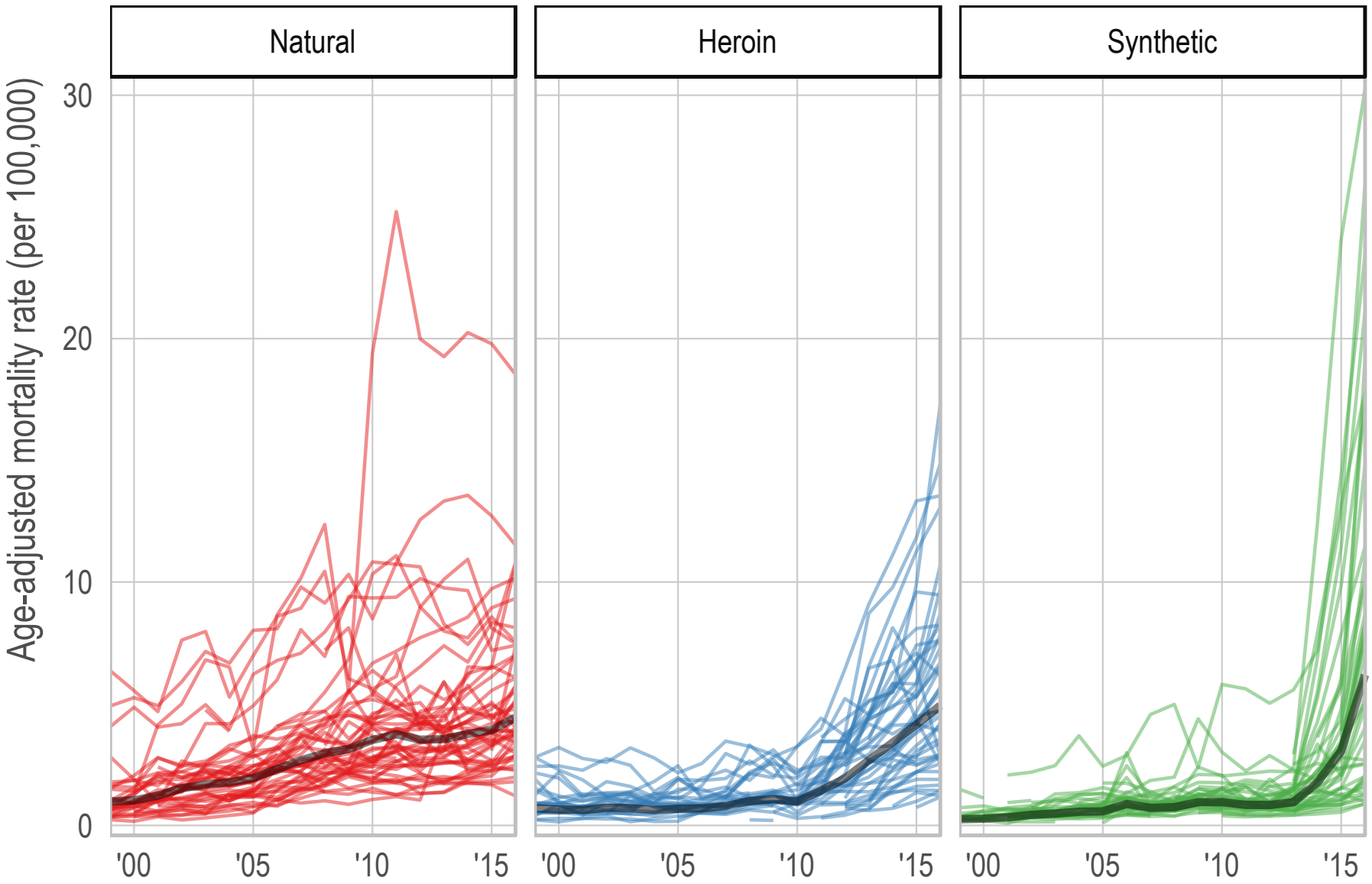
Variation by opioid type



Variation by race/ethnicity



Variation by state



Aims of the paper

1. Systematically describe the opioid epidemic across geography (state), race/ethnicity, and opioid type.
    - The epidemic over time (1999–2016)
    - The *current* epidemic in terms of level of mortality and current rate of increase
2. Identify "epidemic hotspots" — areas with high mortality and current rapid increases

Data / Methods

1. Multiple cause of death data from NCHS
2. Calculate age-standardized rates by state, race/ethnicity, and opioid type
   - Non-Hispanic Black and White populations
   - Natural (prescription); heroin; and synthetic (e.g. fentanyl) opioids
3. Joinpoint regression to identify significant changes

Results

Results explorer: `https://tiny.cc/epc2018`

Results Explorer | National Overview | State Results | Epidemic Hotspots

> *Geographic variation in opioid mortality by race/ethnicity in the United States, 1999-2016: Identifying epidemic hotspots*

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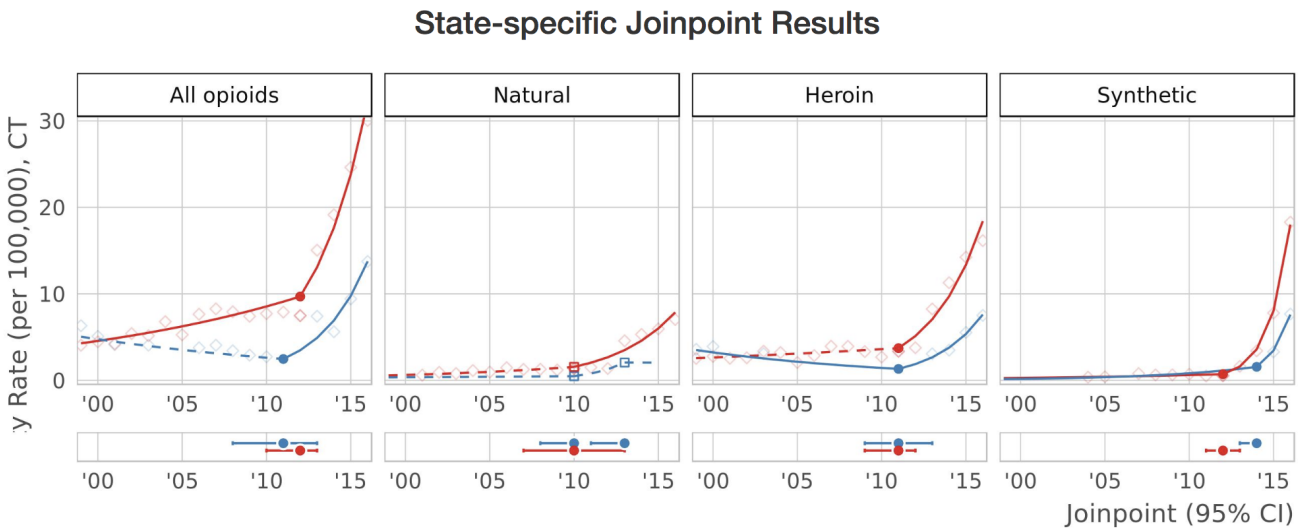
Explore state results

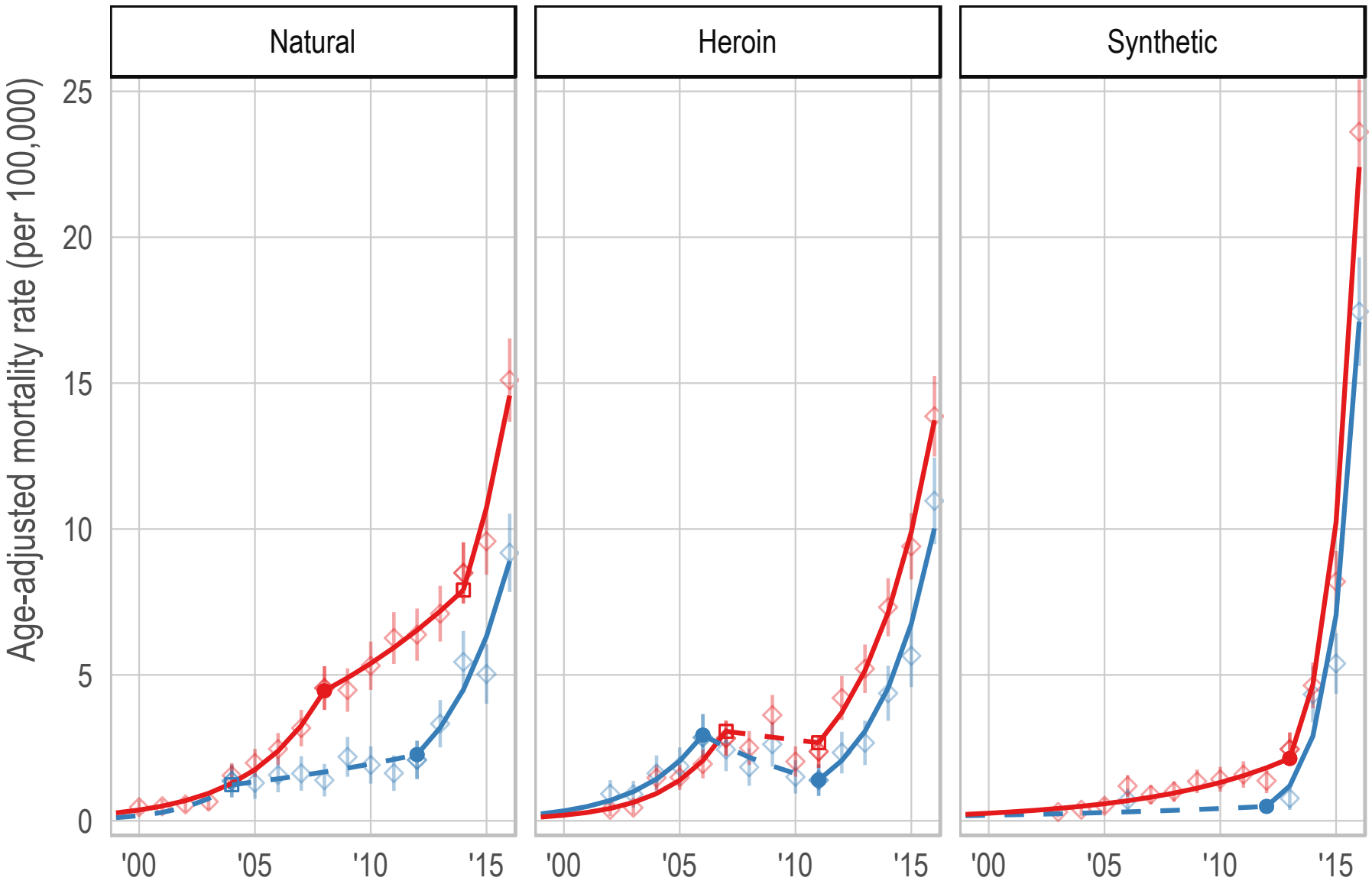
We performed joinpoint regressions by state, race/ethnicity, and opioid type. Below, each line is the result of a single joinpoint regression. Solid lines indicate a statistically significant slope (i.e., increase or decrease). Solid points on the line represent a statistically significant change in the slope before and after that point. Raw data (and 95% confidence intervals) are presented in the back. We defined statistical significance as P<0.01; however, you can adjust this value below. There is a clear geographical patterning for some opioids --- see the national results tab for more.

More information

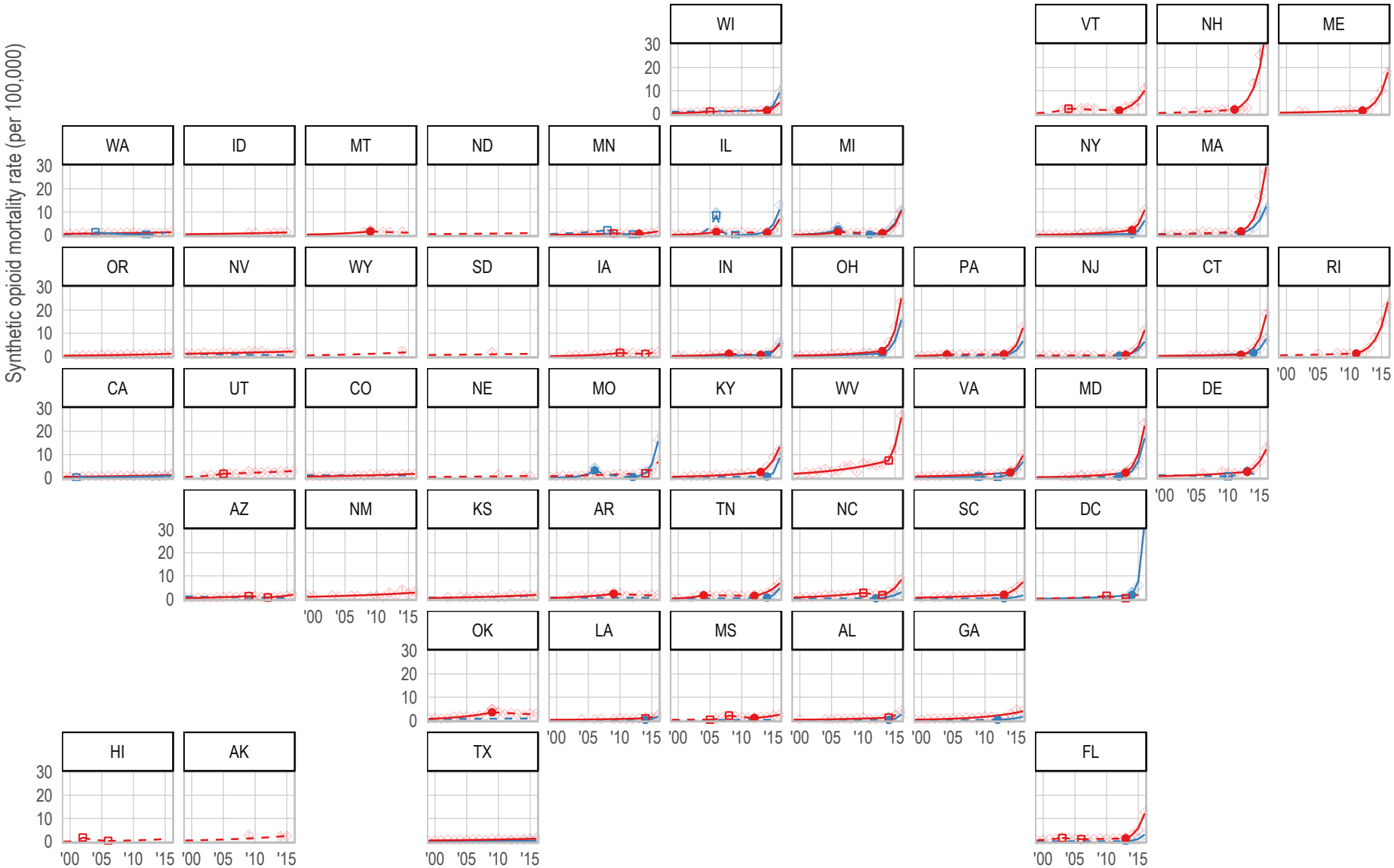
This is an interactive companion to our paper, which was presented at PAA 2018 and EPC 2018. To learn more about the paper and code (or report bugs), see our Github repository. Data from 1999 to 2015 come from the restricted-access multiple cause of death files provided by the National Center for Health Statistics. When possible, we supplement this data with 2016 data from CDC WONDER. A table of the average annual percent change (AAPC) is shown at the bottom. The AAPC can be interpreted as the estimated average change from the beginning of the period to the end of the period.



Example Results: Maryland

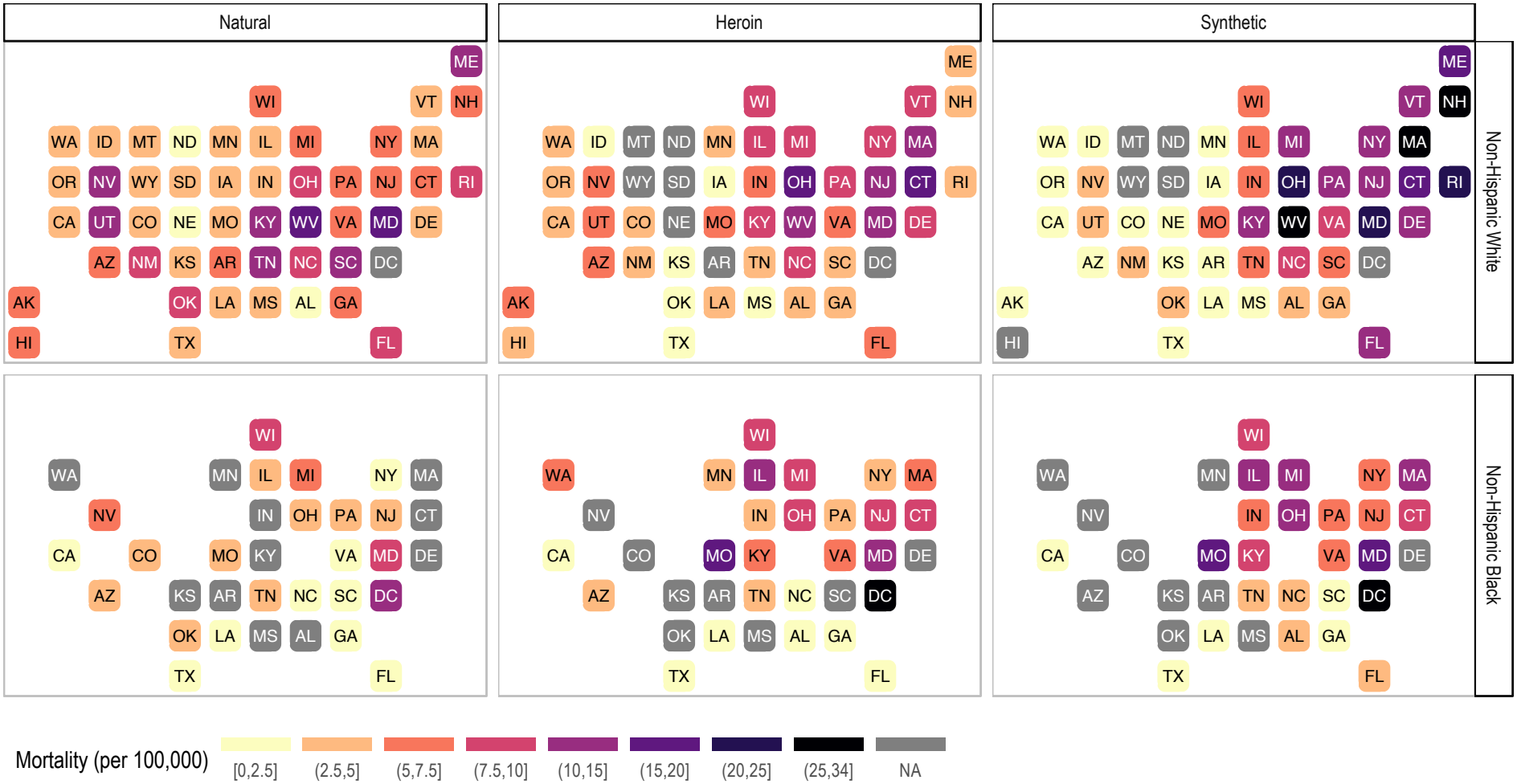


Example Results: Synthetic Opioids



Results: Current Epidemic

Current Level of Mortality



Current Rates of Increase

Epidemic Hotspots

Results

- No decreases in opioid mortality over whole time period
- Where there were increases, it is just as bad (or worse) for the black population
- Increases are driven by heroin and synthetic opioids in eastern states
  - Heroin deaths increased 30-34% per year for both populations
  - Synthetic opioids increased 70% per year for whites and 150% for blacks
- Synthetic opioids are doubling in 12 states for whites and 18 for blacks
- Strong geographical clustering of epidemic hotspots

Conclusions

- Not just one epidemic
- Huge variation by race and geography
- Interventions must be local and tailored to region, race/ethnicity, and opioid type
- Supply-side interventions need to be balanced with harm reduction interventions
- Surveillance of illicit markets needs to be dramatically improved

Thank you

Code and interactive results explorer:

`https://tiny.cc/epc2018`

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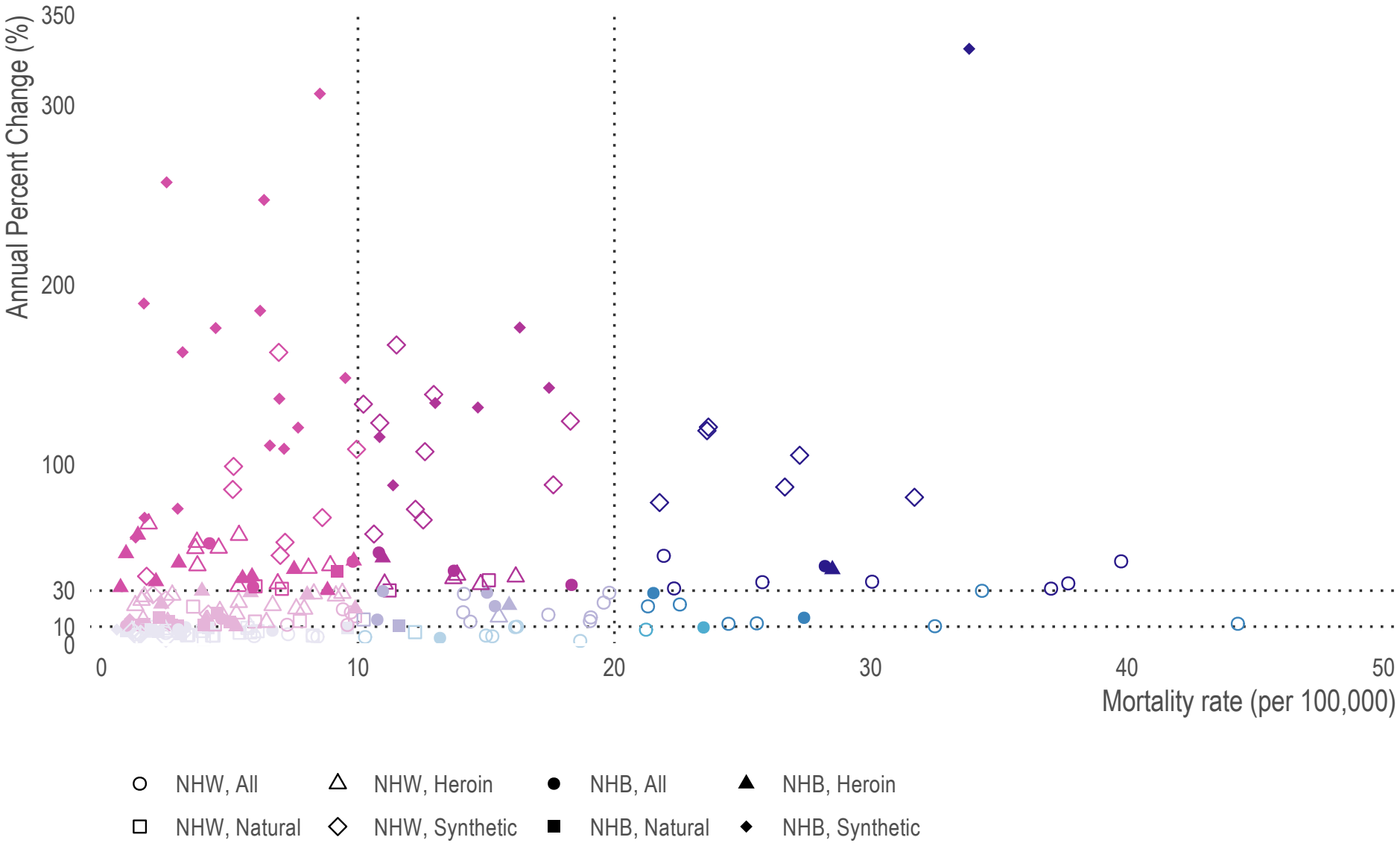
Epidemic Hotspots



Average Annual Percent Change