



# AMI morbidity and comprehensive smoke-free laws: A multi-state investigation

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# Clean Indoor Air Laws

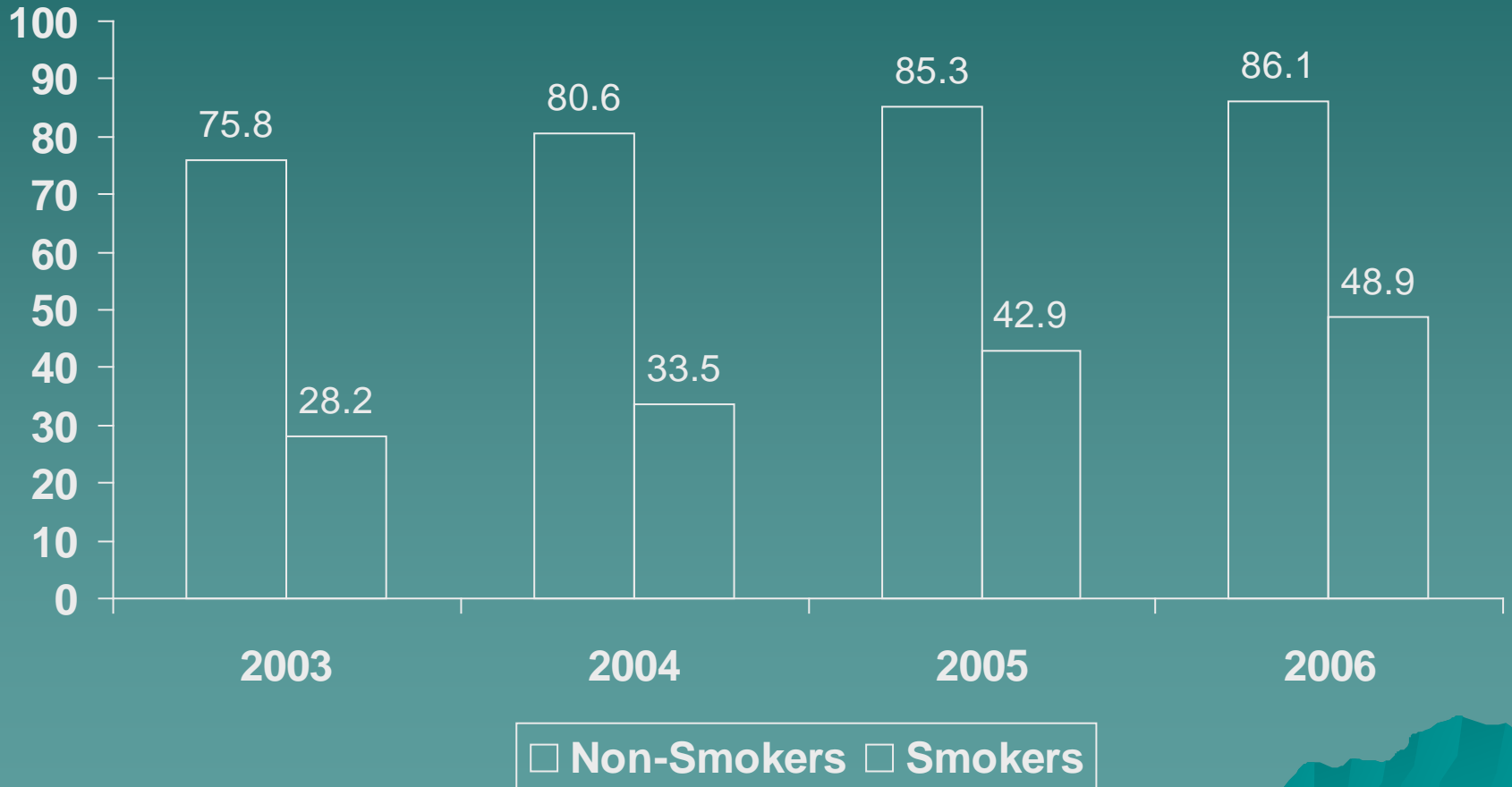
- ◆ New York State: Pop = 19M (10M 35+)
  - July 24, 2003
  - Incremental process beginning in 1989
    - ◆ Weak - Worksites with non-smoking areas, municipal buildings only
    - ◆ Weak - Restaurants with separate smoking/non-smoking areas
    - ◆ Moderate - All workplaces are smoke free indoors (exception for hospitality venues)
    - ◆ Comprehensive – All workplaces are smoke free including hospitality venues

# Evaluating Policy

- ◆ Support
  - ◆ Compliance
  - ◆ Short-term Impact
  - ◆ Health Outcomes
- 

- ◆ Economic Impact

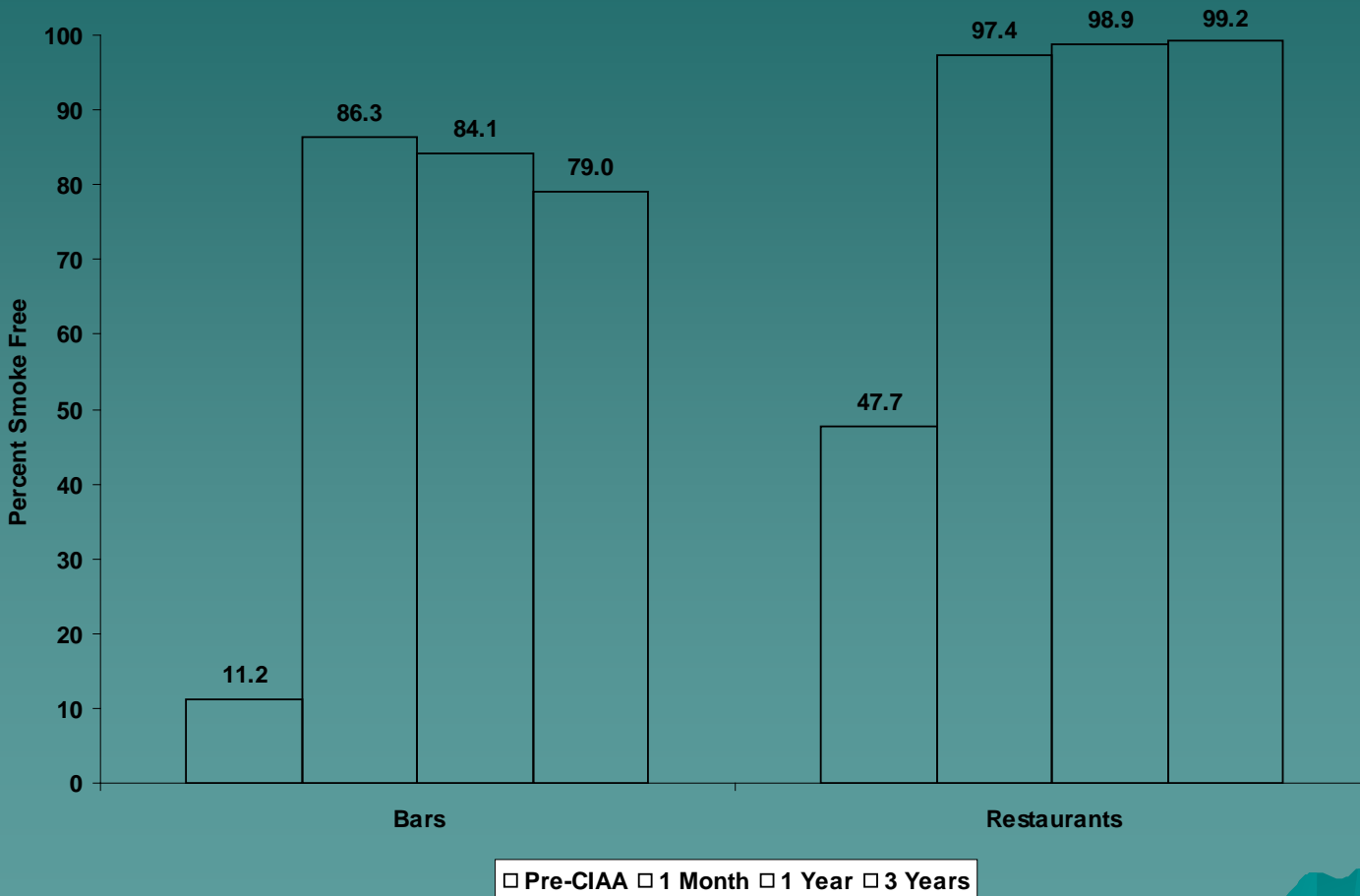
# Adults in Favor of New York's Clean Indoor Air Act (CIAA)



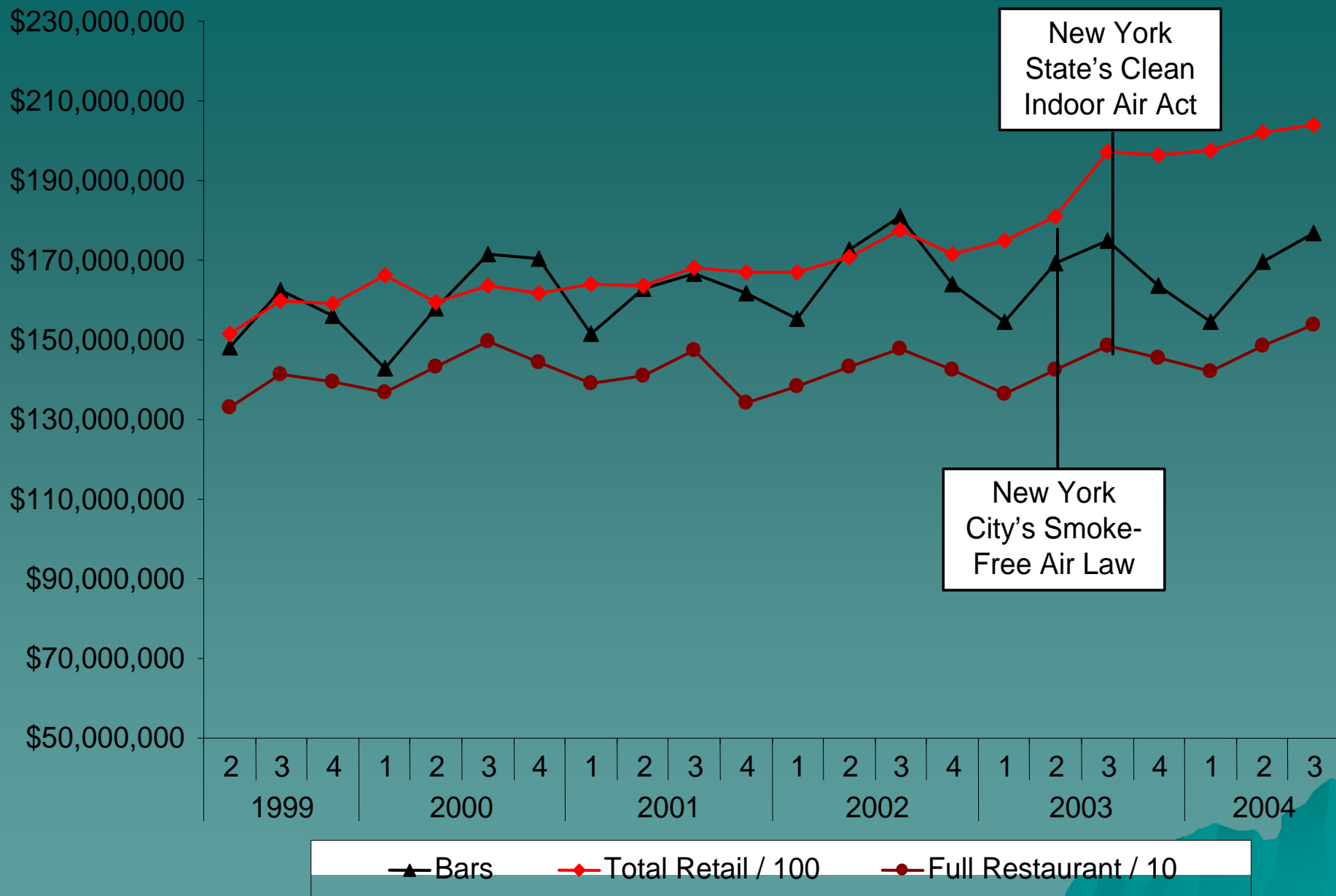
Source: NYS Adult Tobacco Survey, 2003-2006.

# Observational Compliance Data

## Pre-CIAA to Three Year Post

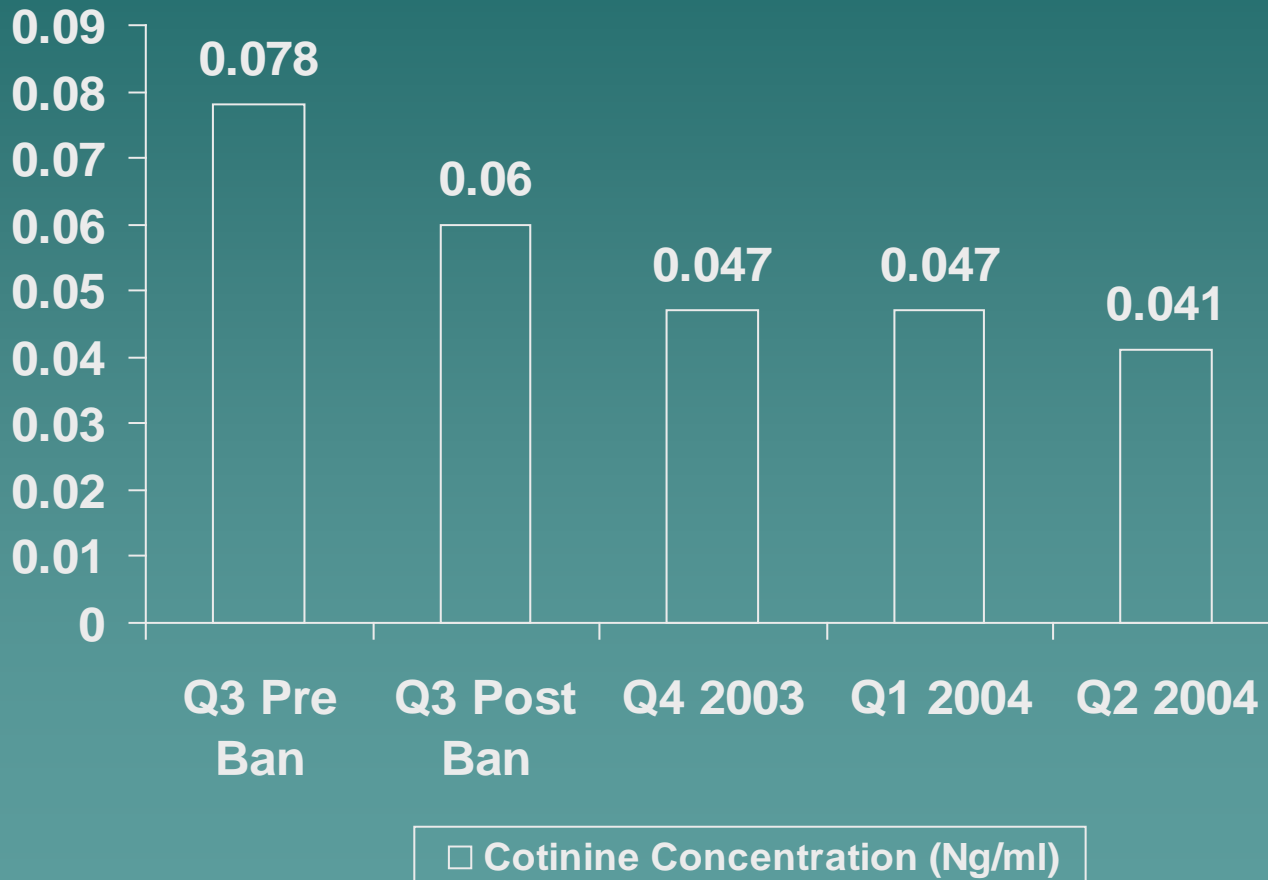


Source: [Addendum - Compliance with New York State's Clean Indoor Air Act: Three Year Follow-up Statewide Observational Study](#), NYS Department of Health, 2006.



Source: [The Health and Economic Impact of New York's Clean Indoor Air Act](#), RTI International, 2006.

# Cotinine Concentration Before and After New York's CIAA



Source: Bauer, U, Hyland A, Farrelly, M, Engelen, M, Weitzenkamp, D, Repace, J, Babb, S, Juster H. Reduced Secondhand Smoke Exposure After Implementation of a Comprehensive Statewide Smoking Ban – New York, June 26, 2003-June 30, 2004. MMWR, 2007; 56: 705-708.

# Method: Data Sources

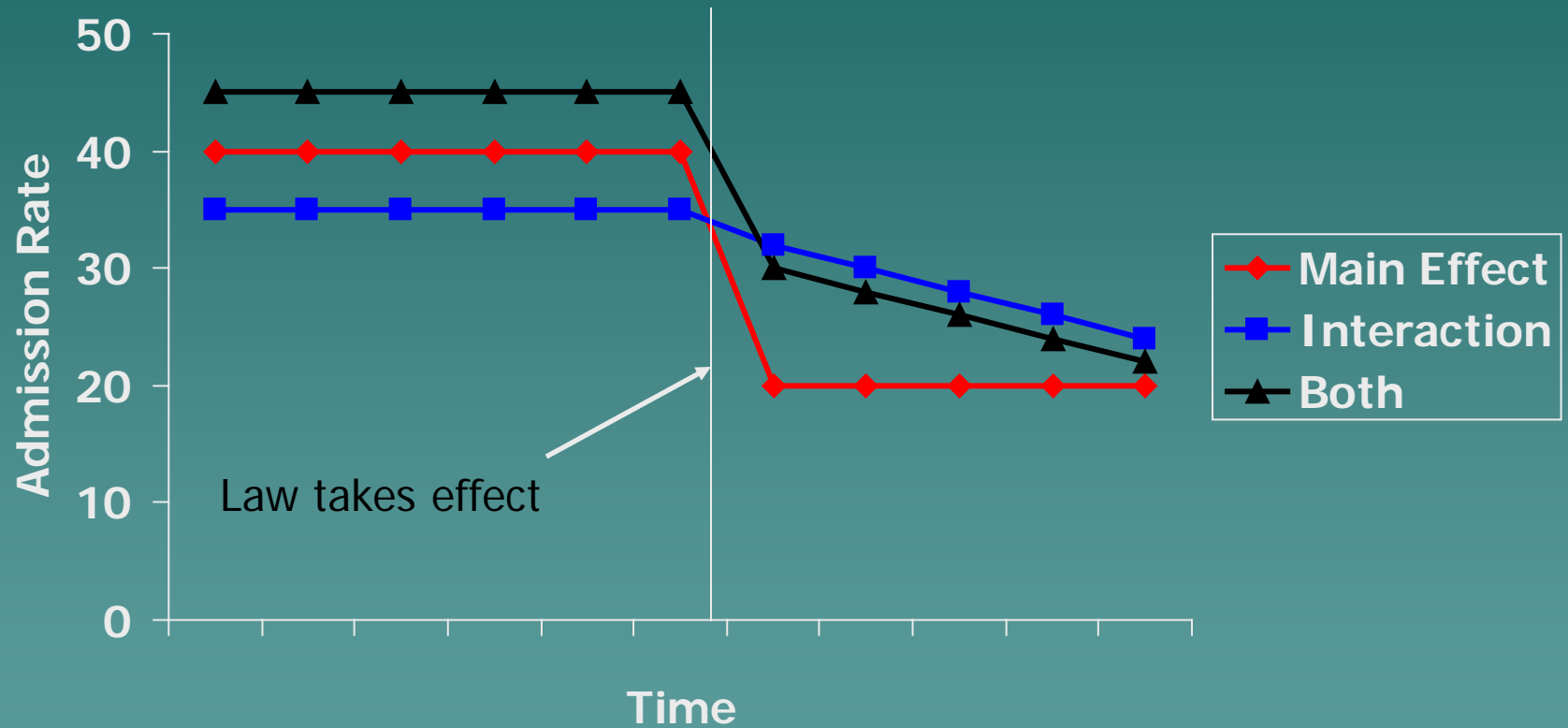
- ◆ Statewide Hospital Discharge Database (SPARCS)
- ◆ US Census Data
- ◆ Americans for Nonsmokers' Rights Foundation (ANRF) Local Tobacco Control Ordinance Database

# Interrupted Time Series Analysis

Dependent Variable

- ◆ Hospitalization Rates for AMI/100,000\*
  - County level; Monthly; NY, OR, PA

## Possible Time Series Outcomes

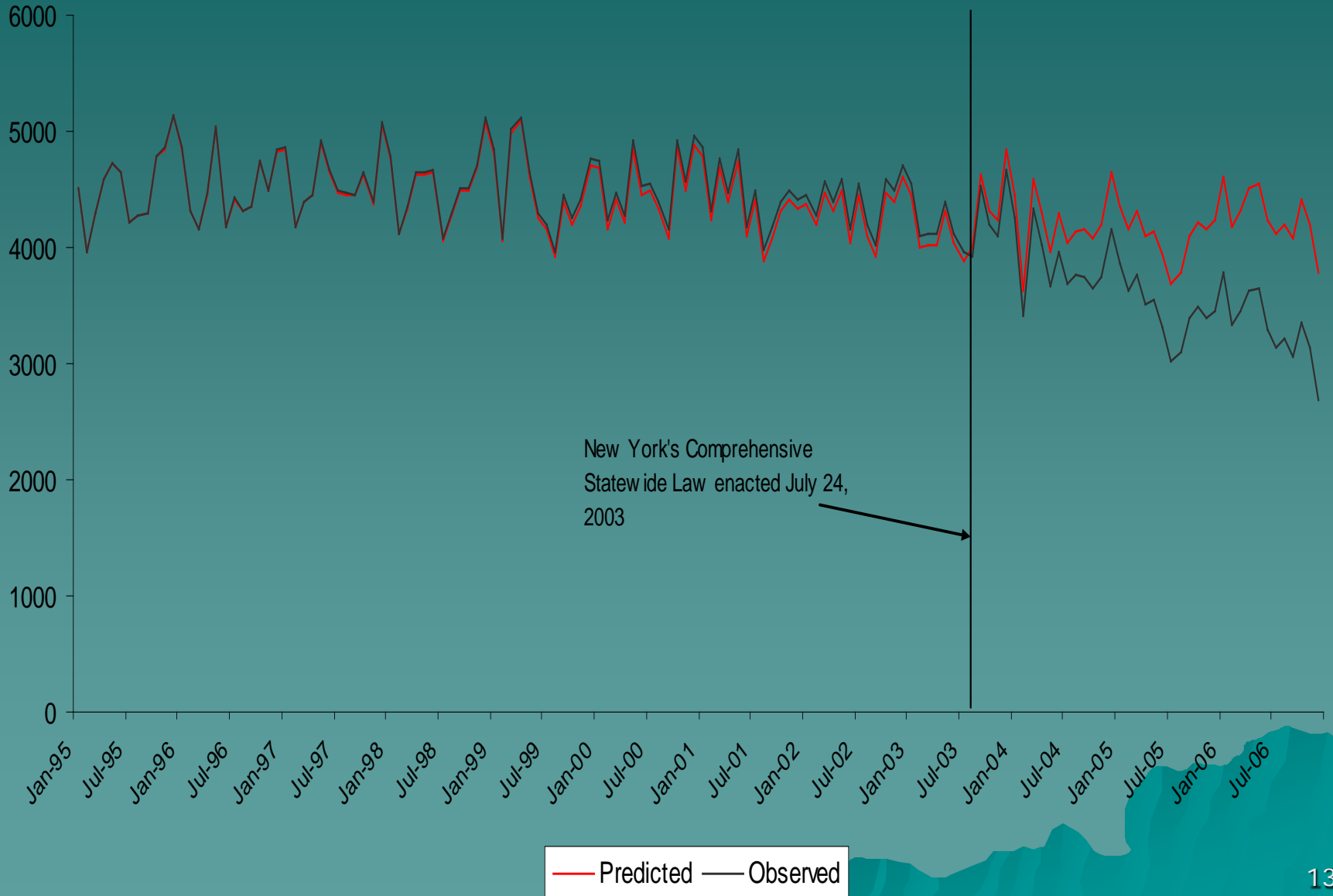


# Interrupted Time-Series Regression Analysis: New York 1995-2006

	<b>b</b> (95% CI)	<b>t (F)</b>	<b>p</b>
Overall F-test (138,8789)	$R^2 = 0.3531$	113.41	$p < .001$
<b>NY Comp. Law Main Effect</b>	<b>-1.48</b> (-2.81, -0.16)	<b>-2.20</b>	<b><math>p &lt; .05</math></b>
<b>NY Comp. Law X Time Interaction</b>	<b>-0.25</b> (-.29, -.21)	<b>-11.76</b>	<b><math>p &lt; .001</math></b>
NY County Moderate Law Main Effect	-0.88 (-2.0, .23)	-1.55	ns
NY County Mod. Law X Time Interaction	-0.12 (-.20, -.05)	-3.09	$p < .01$

N.B. Model also includes indicator variables for time of year (11 variables), county (61 variables), and county X time interaction (61 variables).

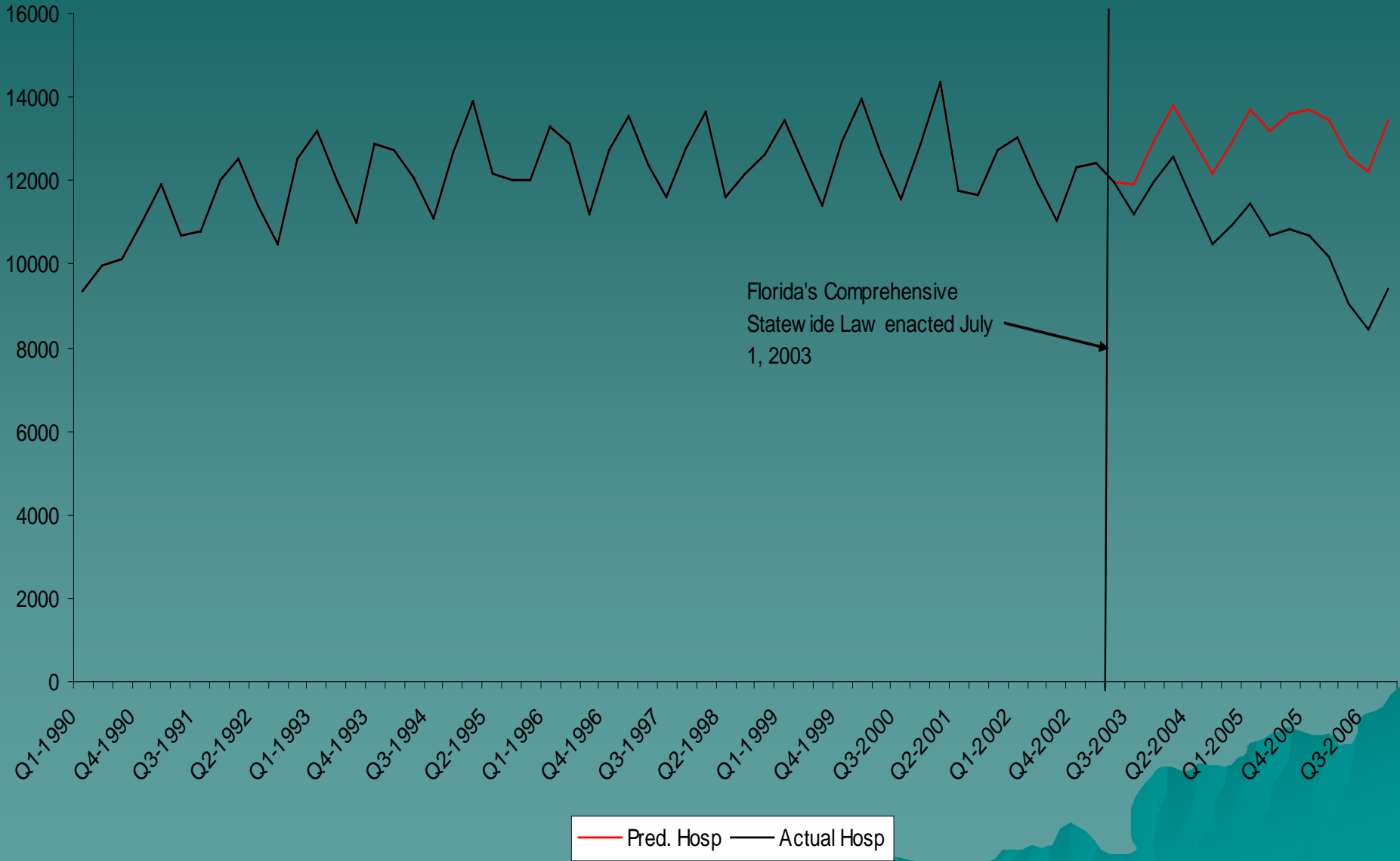
# Observed and predicted admissions for acute myocardial infarction as a function of a statewide comprehensive smoking ban: New York, 1995-2006



# Florida's CAAA

- ◆ Florida: Pop = 18M (10.2M 35+)
- ◆ July 1, 2003
- ◆ Banned smoking in all workplaces and restaurants
- ◆ Exemptions for free-standing bars

# Observed and predicted admissions for acute myocardial infarction as a function of a statewide comprehensive smoking ban: Florida, 1990-2006



# Oregon's CIAA

- ◆ Oregon: Pop = 4M (2M 35+)
- ◆ 2001, OR passed a law that restricted smoking in workplaces
- ◆ Excluded hospitality venues
- ◆ New comprehensive law for Jan. 1, 2010

# Interrupted Time-Series Regression Analysis: Oregon 1998-2006

	<b>b</b> (95% CI)	<b>t (F)</b>	<b>p</b>
<b>Overall F-test</b> (88,3799)	<b>R<sup>2</sup> =</b> <b>0.1364</b>	<b>23.90</b>	<b>p &lt; .001</b>
<b>NY/FL Comp. Law</b> <b>Main Effect</b>	<b>0.53</b> (-2.96, 4.01)	<b>0.30</b>	<b>ns</b>
<b>NY/FL Comp. Law</b> <b>X Time</b> <b>Interaction</b>	<b>0.21</b> (-.07, .49)	<b>1.48</b>	<b>ns</b>

N.B. Model also includes indicator variables for time of year (11 variables), county (61 variables), and county X time interaction (61 variables), county level laws, and time trends.

# Pennsylvania

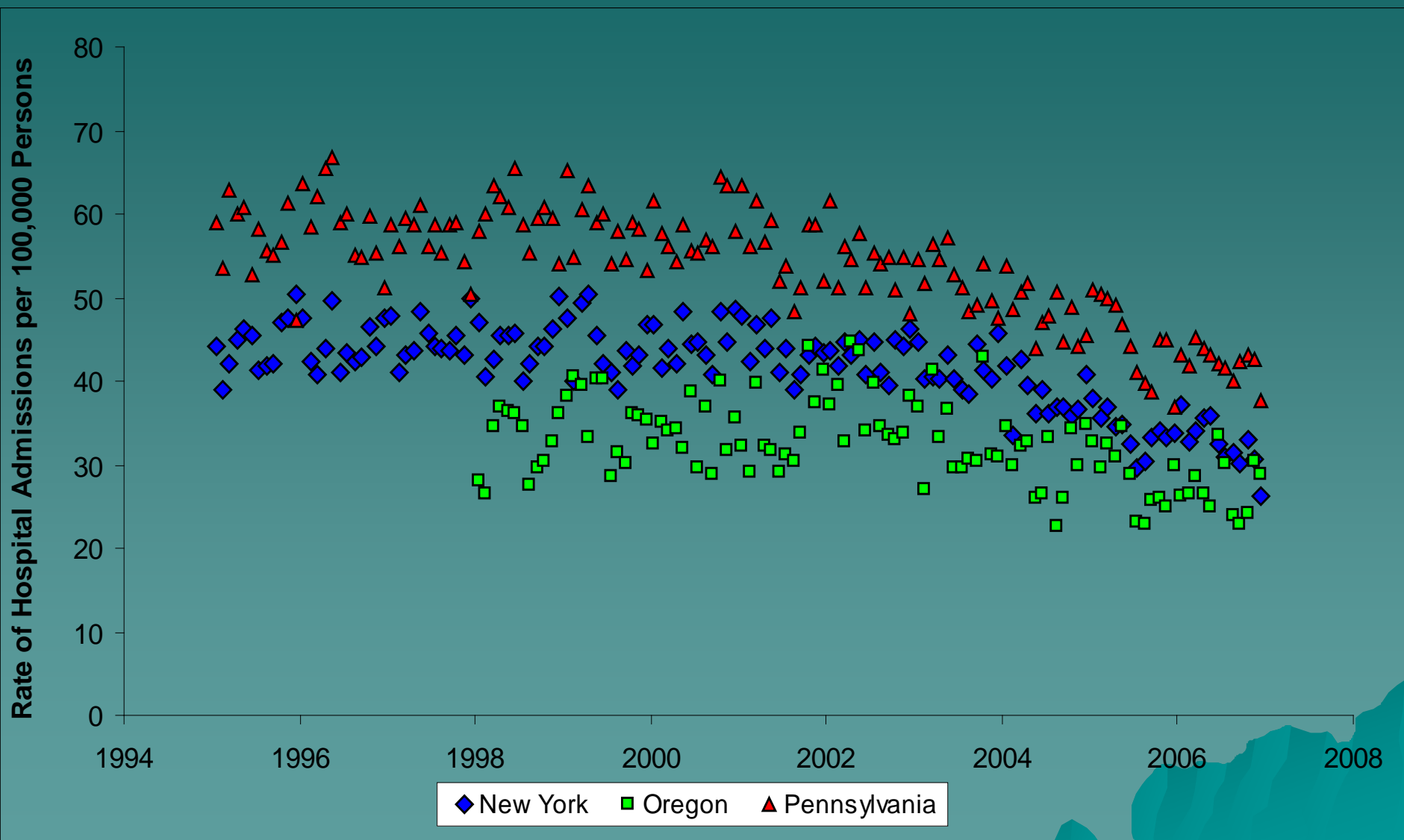
- ◆ Pennsylvania: Pop = 12M (7M 35+)
- ◆ Essentially very weak smoke free air laws in place during the study period.
- ◆ Preemption was in place – counties were not allowed to pass their own stronger laws
- ◆ Modest laws passed in 2007

# Interrupted Time-Series Regression Analysis: Pennsylvania 1995-2006

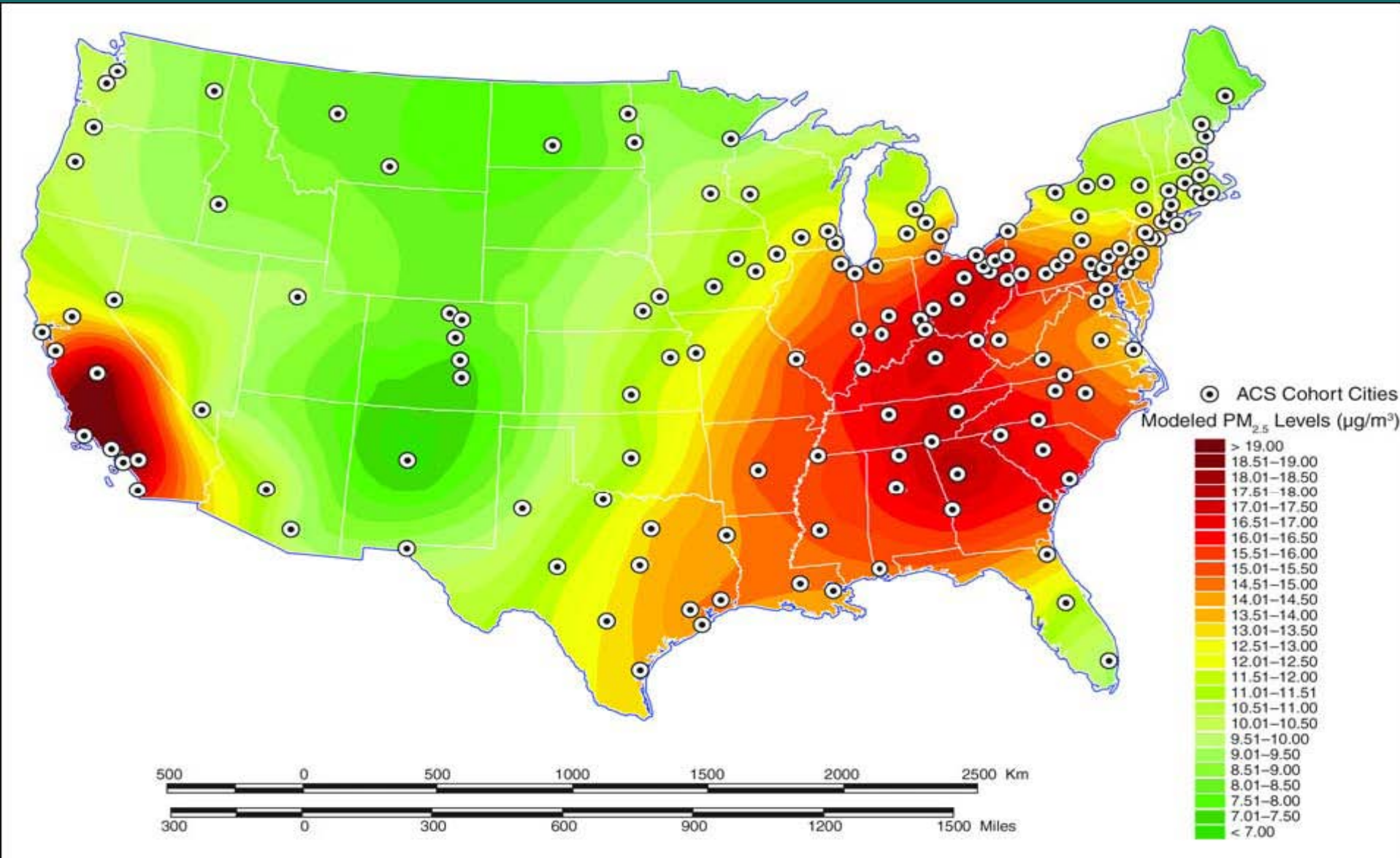
	b (95% CI)	t (F)	p
Overall F-test (86,3801)	R <sup>2</sup> = 0.4414	102.94	p < .001
<b>NY/FL Comp. Law Main Effect</b>	<b>-1.61</b> (-3.18, -0.41)	<b>-2.01</b>	<b>p = .04</b>
<b>NY/FL Comp. Law X Time Interaction</b>	<b>-0.01</b> (-0.10, 0.08)	<b>-0.20</b>	<b>ns</b>
Time <sup>2</sup> (month)	-0.01 (-.01, -.00)	-6.82	p < .01

N.B. Model also includes indicator variables for time of year (11 variables), county (66 variables), and county X time interaction (66 variables).

# Monthly rates of Hospital Admissions for AMI in New York, Oregon, and Pennsylvania.

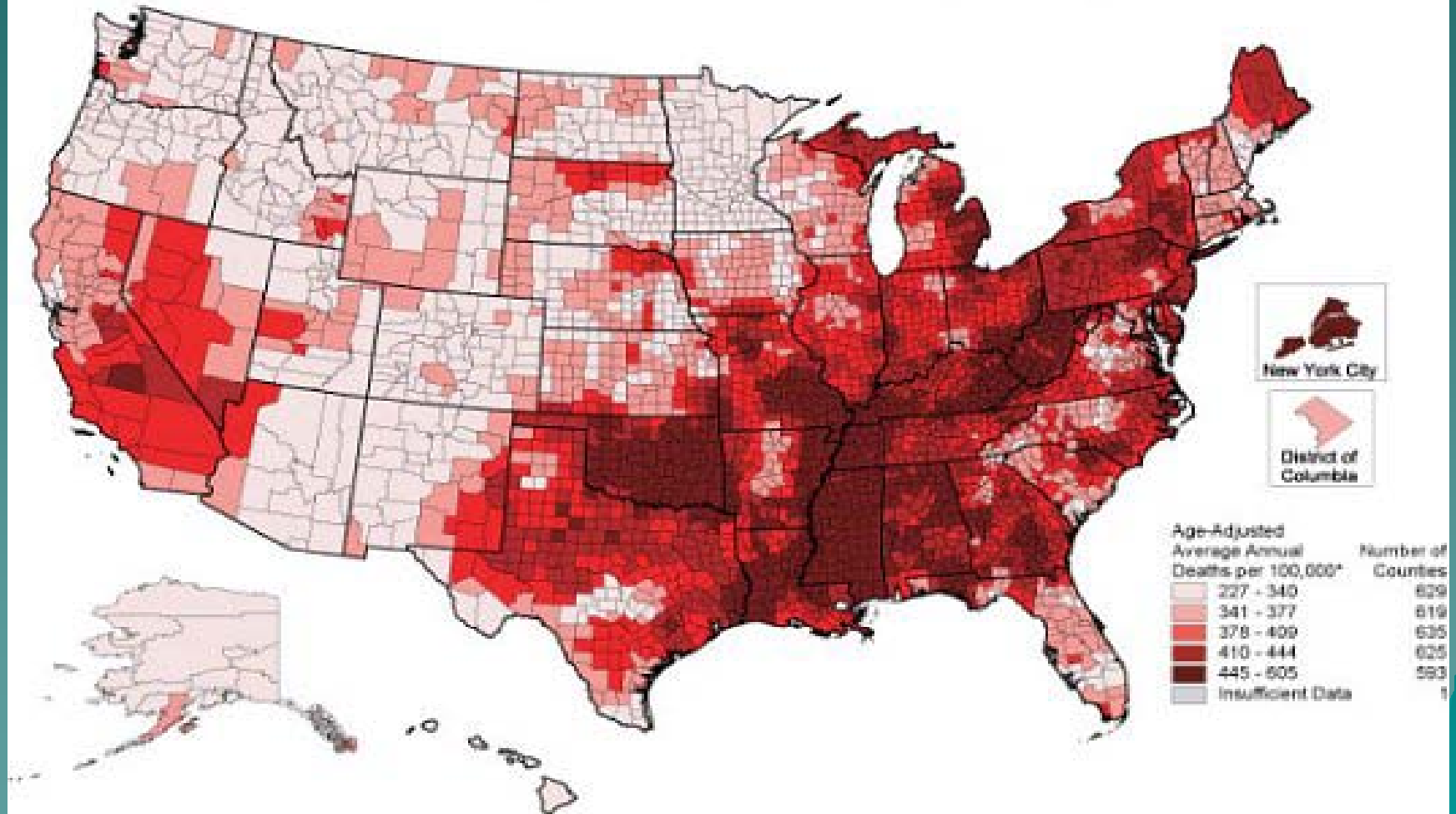


**Figure 22. Spatial distribution of PM<sub>2.5</sub> concentrations based on data from 1999–2000.** (Source: Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality, HEI.)



# Heart Disease Death Rates, United States 2000-2004

Heart Disease Death Rates, 2000-2004  
Adults Ages 35 Years and Older by County



# Summary

- ◆ Comprehensive smoking bans in NY and FL are associated with reductions in rates of hospitalization for AMI.
- ◆ The timing of those laws is not associated with any change in hospitalization rates in Oregon.
- ◆ Results for PA are less clear. Reductions in hospitalization appear to have begun long before the NY/FL laws.
- ◆ PA may differ on other important/unmeasured variables

# Limitations

- ◆ Population approach – no individual level data available
  - Method used trades size of population covered for individual level information
  - No information on smoking status, secondhand smoke exposure, health status, health care history, etc.
- ◆ Did not account for all relevant variables

# Next Steps

- ◆ Add one more comparable state for control comparison.
- ◆ Conduct similar analysis for hospitalization rates for stroke
- ◆ Conduct similar analyses using mortality rates for AMI and stroke.
- ◆ Other relevant variables – PM<sub>2.5</sub>

# Recommendations for other states

For states without a comprehensive law:

- ◆ Begin collecting support and exposure data now. Can be used to advocate for a law and serve as baseline data (National Adult Tobacco Survey)
- ◆ Are there local/county laws? Compare communities with and without laws for measures of exposure, support, business climate.
- ◆ Advocate using a health claim – see the SGR and IOM reports

For states with a comprehensive law:

- ◆ Support and exposure data can still be helpful – there will be resistance
- ◆ Measure compliance in different venues
- ◆ Does your state maintain a database of hospitalizations?

# Thank You

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