Update on the Effect of the California Tobacco Control Program

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Conclusions from Previous Work

- **With start of the California Tobacco Control Program, there was a <u>reduction in the initiation</u> of smoking among teens**
  - Pierce JP et al. Tobacco Control 2005; 14: 207-212
  - Messer KM et al. AJPH 2010; 100: 1298-1306

- **Compared to the Rest of the US, there was a <u>quickening of the decline</u> in both:**
  - per capita cigarette consumption
    - Pierce JP et al. Cancer Epidemiol. Biomarkers Prev. 19 (11) 2801-2810
  - the prevalence of heavier smoking
    - Pierce JP et al. JAMA 2011; 305 (11): 1106-1112

Conclusions from Previous Work (cont.)

- **Between 1960 to 2002, differences in per capita cigarette consumption between CA and the Rest of the US was explained by both the:**
  - difference in cigarette taxes
  - difference in tobacco control expenditures
    - Pierce JP et al. Cancer Epidemiol. Biomarkers Prev. 19 (11) 2801-2810
- **There was a suggestion of a slowing of this California effect after the year 2000:**
  - Pierce JP et al. JAMA 2011; 305 (11): 1106-1112
- **The difference in per capita consumption between CA and the Rest of the US was matched by difference in lung cancer 16-20 years later**
  - Pierce JP et al. Cancer Epidemiol. Biomarkers Prev. 19 (11) 2801-2810

Current Work funded by TRDRP

- **Identify whether the differences between California and the Rest of the US changed between early campaign period (1990-2000) and later campaign period (2000-2014) both for:**
  - implementation of tobacco control policies
  - on smoking behavior

- **Update the trends in lung cancer rates between California and the Rest of the US**

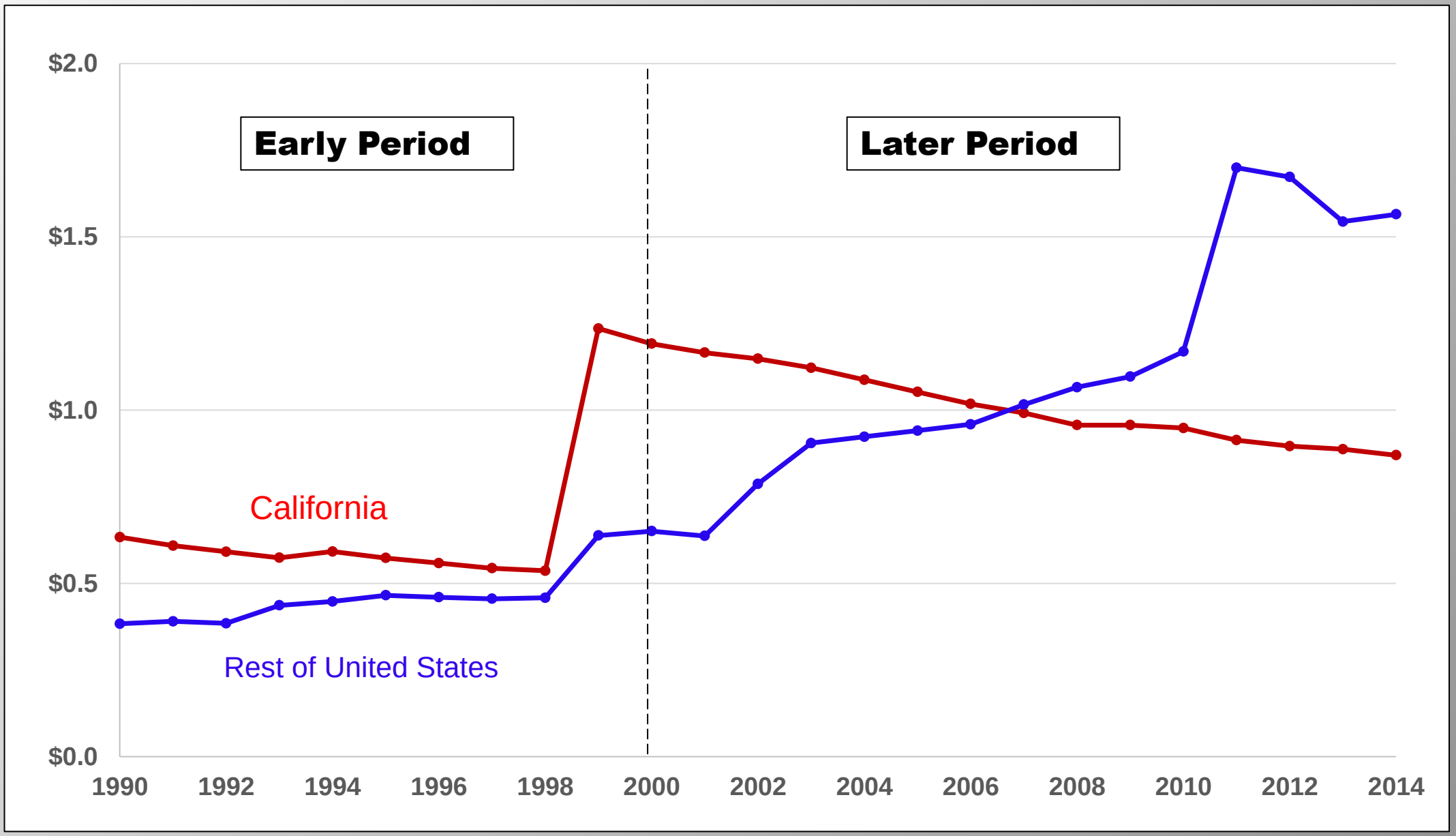
Policy Goals For Tobacco Control: MPOWER Approach

- **Introduced by WHO in 2008**
- **Six policies to reverse the global tobacco epidemic**
  - **M**onitor tobacco use & prevention policies
  - **P**rotect people from tobacco smoke
  - **O**ffer help to quit tobacco use
  - **W**arn about the dangers of tobacco
  - **E**nforce bans on tobacco advertising, promotion, & sponsorship
  - **R**aise taxes on tobacco

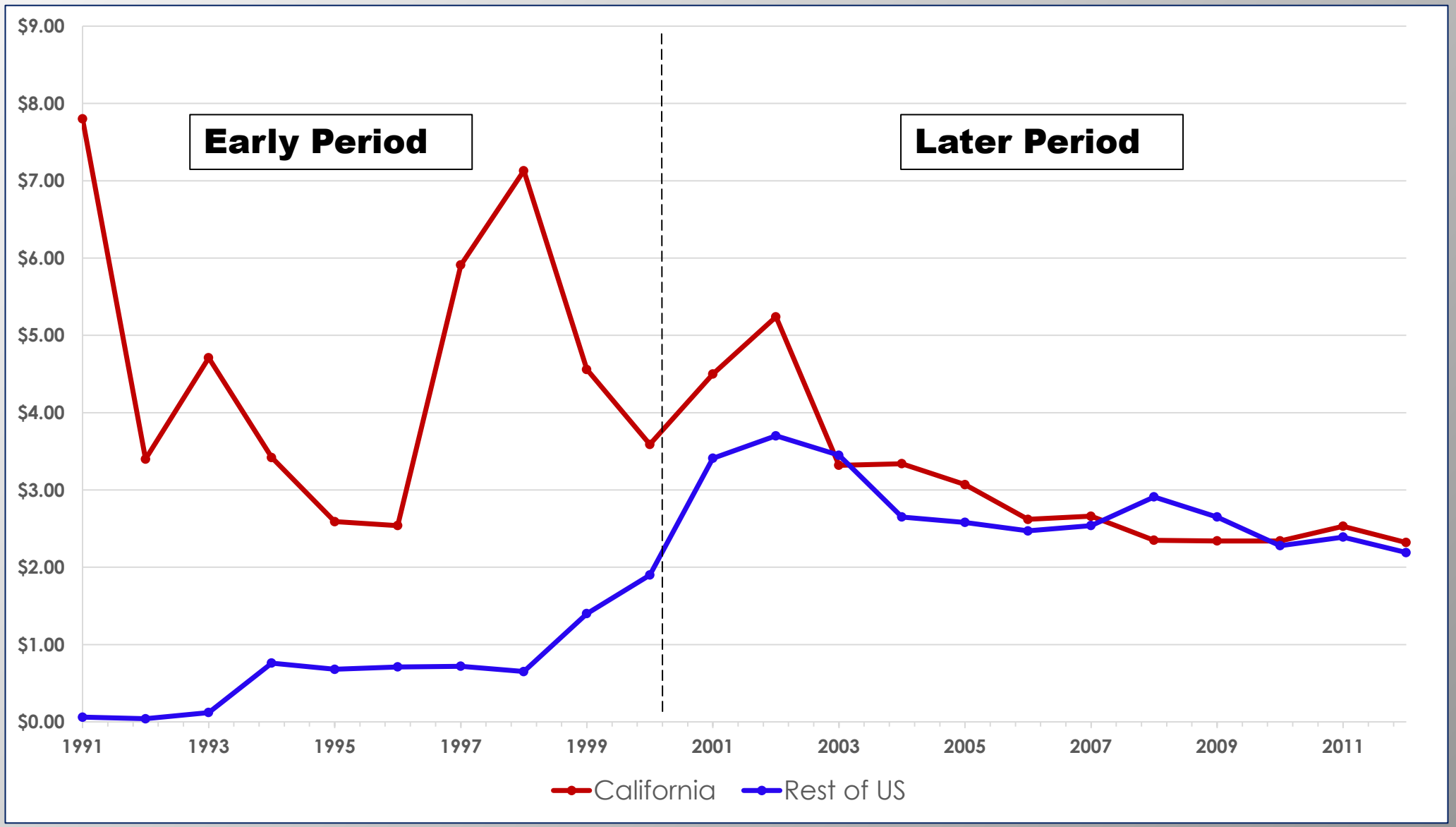
mpower

Conduct State Tobacco Control Programs

State Cigarette Tax Rates for California and the Rest of the US, 1990 to 2014 (Adjusted to the 2014 Dollar)

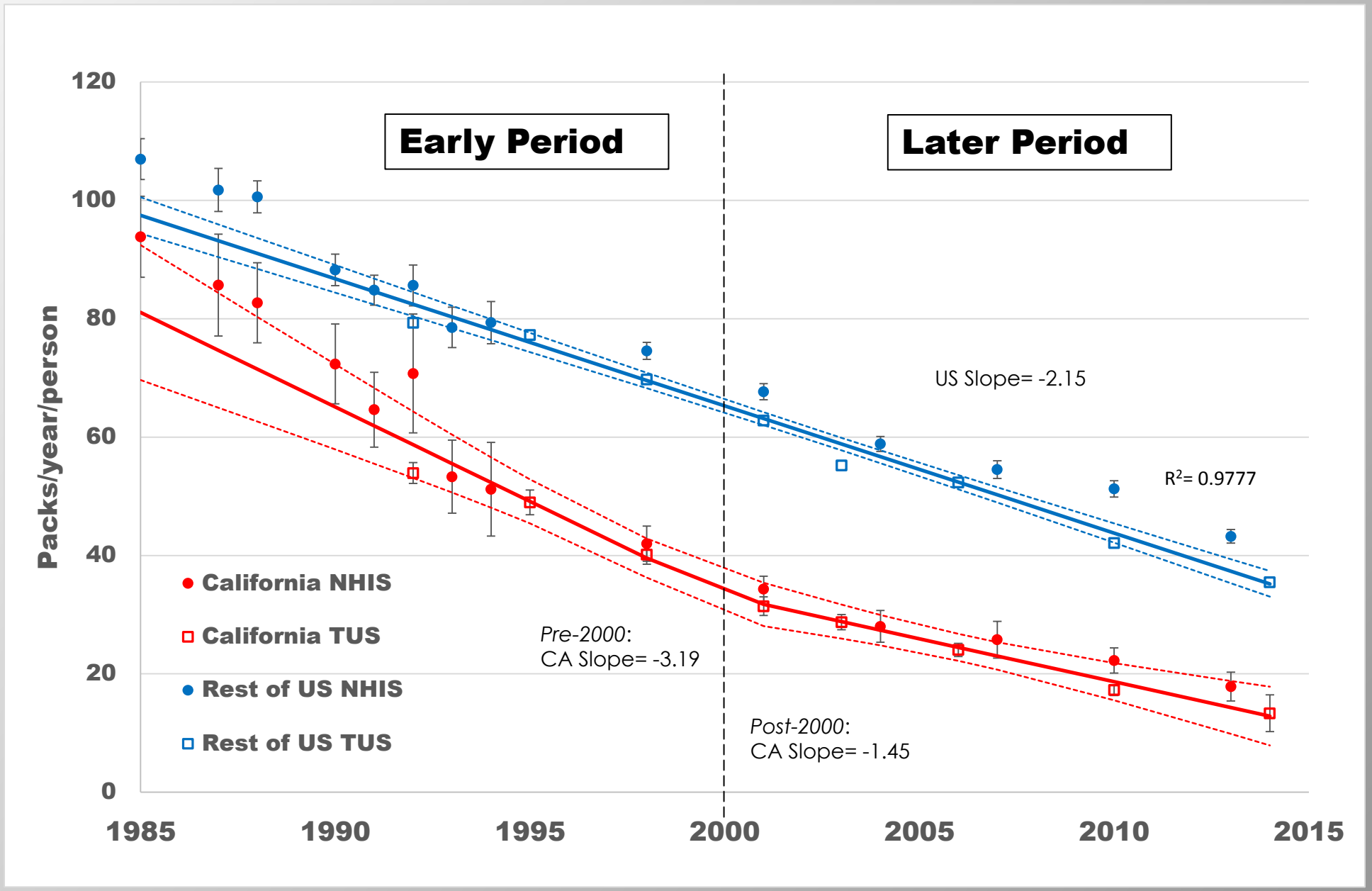


Tobacco Control Expenditure (per capita) for California and the Rest of the US, 1991 to 2012 (Adjusted to 2014 Dollar)

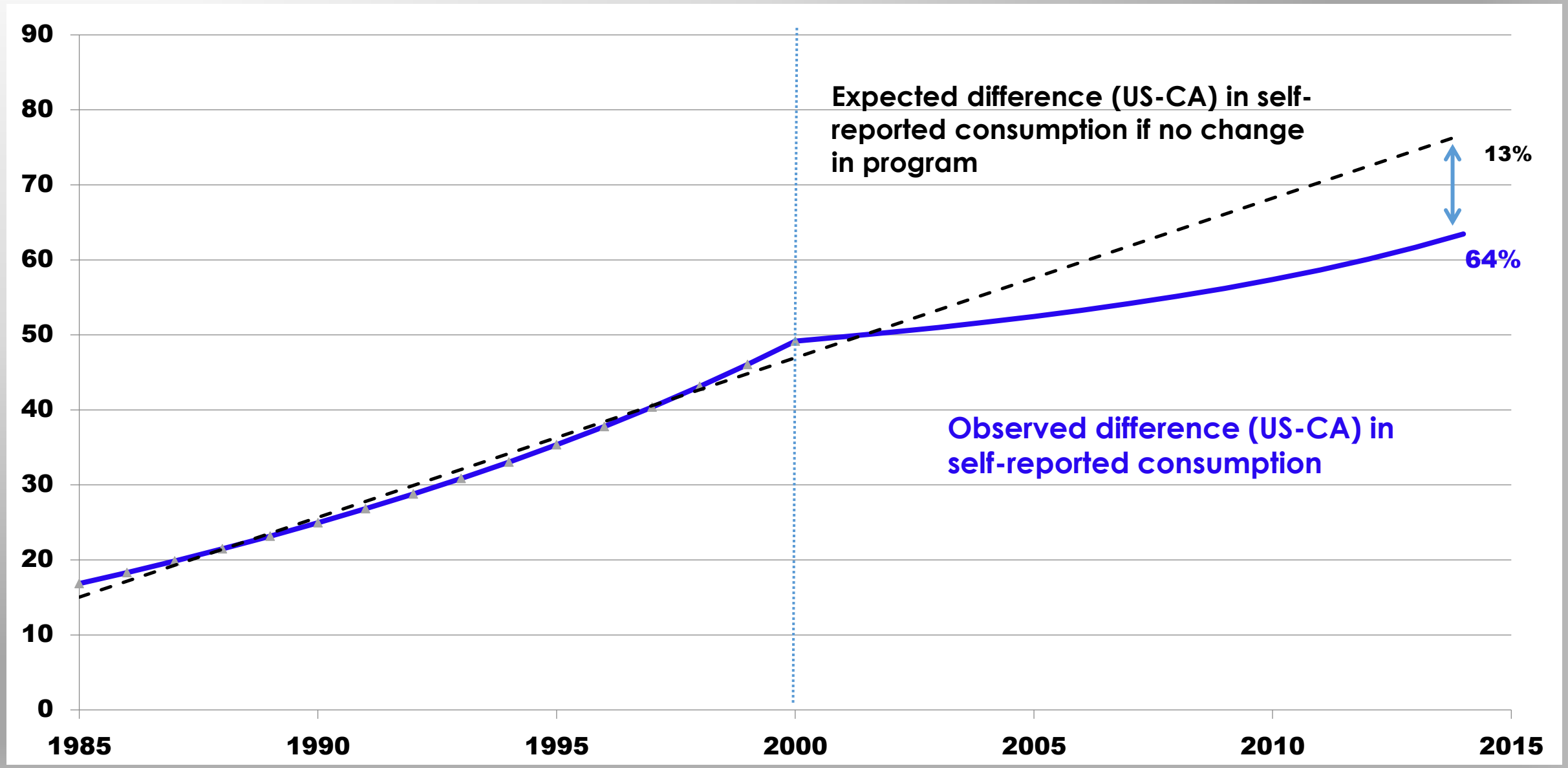


Source: Chaloupka Data

Trends in Self-Reported Per Capita Cigarette Consumption (Packs/Year/Adult)



The Difference in Per Capita Cigarette Consumption between CA than Rest of US, Changed after the year 2000



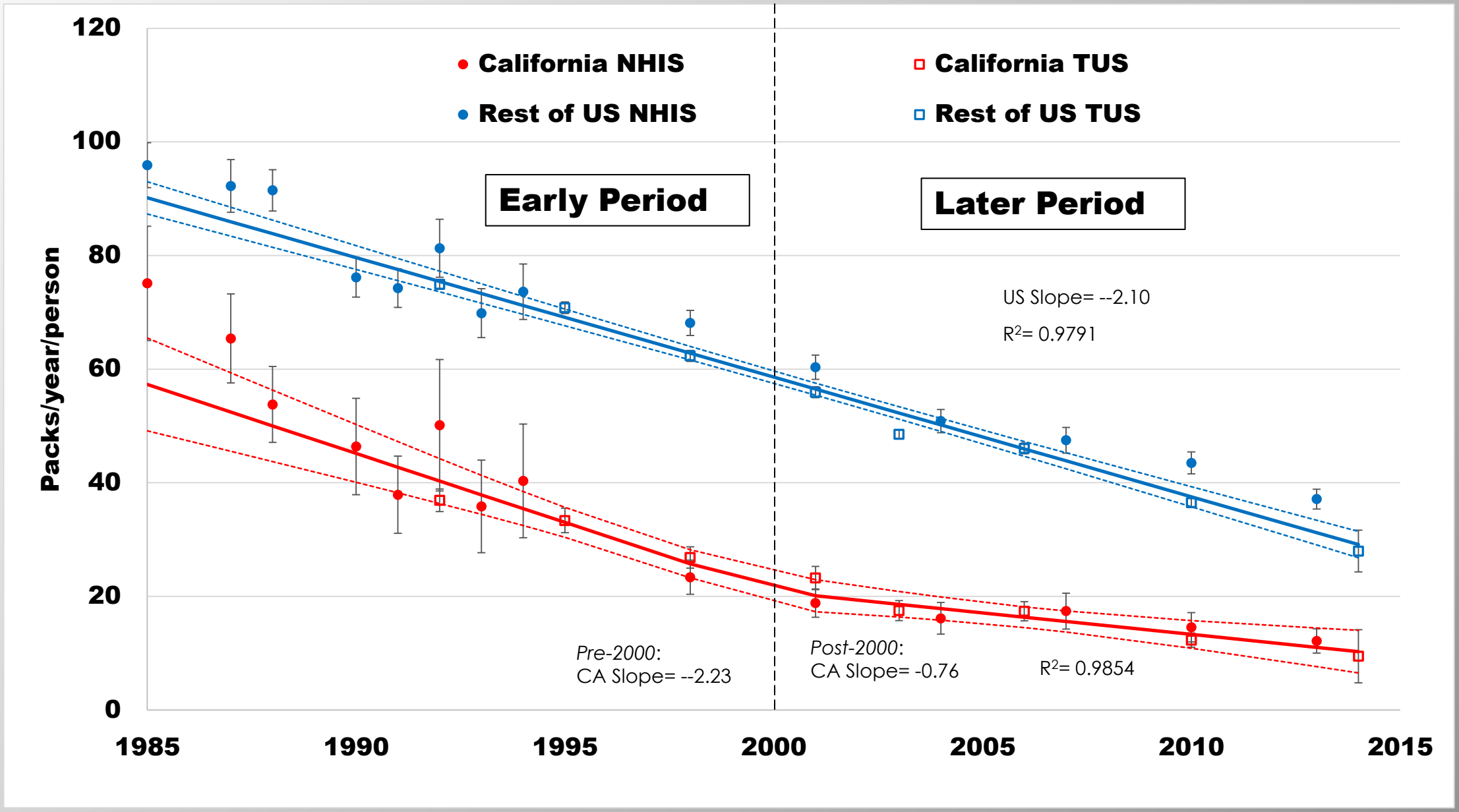
Predictors of Difference in Self-Reported Packs/Adult/Year between CA and Rest of US, 1985-2014

Model: % diff in consumption= % diff in taxes + % diff in TC expenditures + time

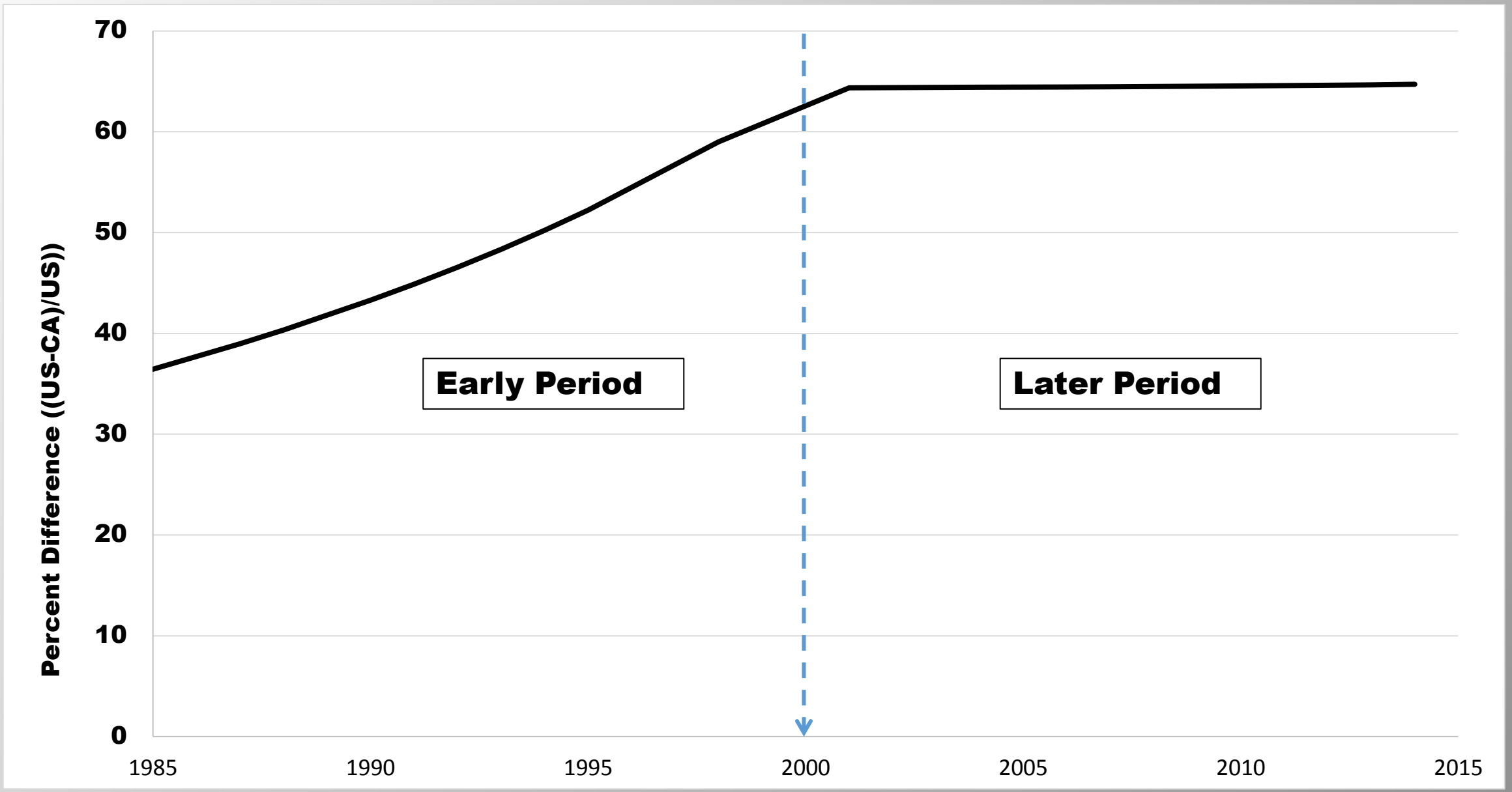
Model R^2 =0.9888

Label	Estimated slopes	Standard error	Pr > |t|	95% Confidence Limits	
Intercept	16.46	1.38	<.0001	13.56	19.37
% Difference in Taxes	-0.064	0.009	<.0001	-0.084	-0.044
% Difference in Tobacco Control Expenditures	0.0004	0.0001	0.0005	0.0002	0.0006
Time	1.67	0.065	<.0001	1.526	1.800

Trends in Per Capita Self-Reported Cigarette Consumption among Young Adults



Trend in the Percent Difference in Young Adult Per Capita Consumption (Rest of US – CA)



Summary

- After 2000, California lost the advantage that it had over the Rest of the US in:
  - having a higher excise tax on tobacco
  - spending more on Tobacco Control Programs
- These two interventions continued to be strong predictors of the number of cigarettes consumed in the state
- After 2000, there was a slowing in per capita cigarette consumption that was particularly marked among young adults

Cigarette Smoking and Lung Cancer

A simple model provides a reasonable approximation for lung cancer mortality

Lung Ca Mortality = *fn* (Years smoked^4 x cigs/day^2)

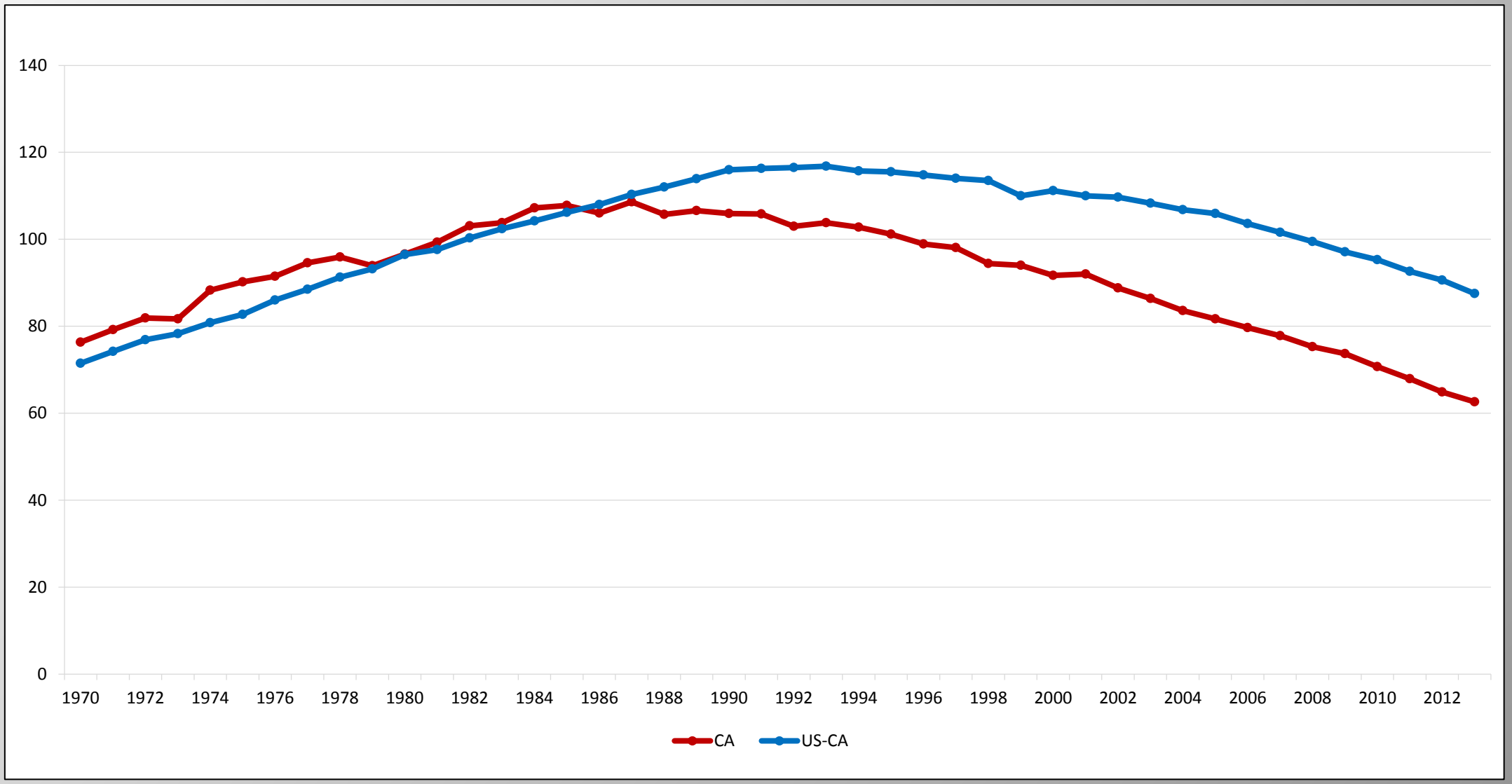
from Doll and Peto British Doctors Study, 1978

from Flanders…Thun M Cancer Prevention Study of ACS, 2003

Note: duration of smoking is highly correlated with age and cancer is well known to be exponentially related to age.

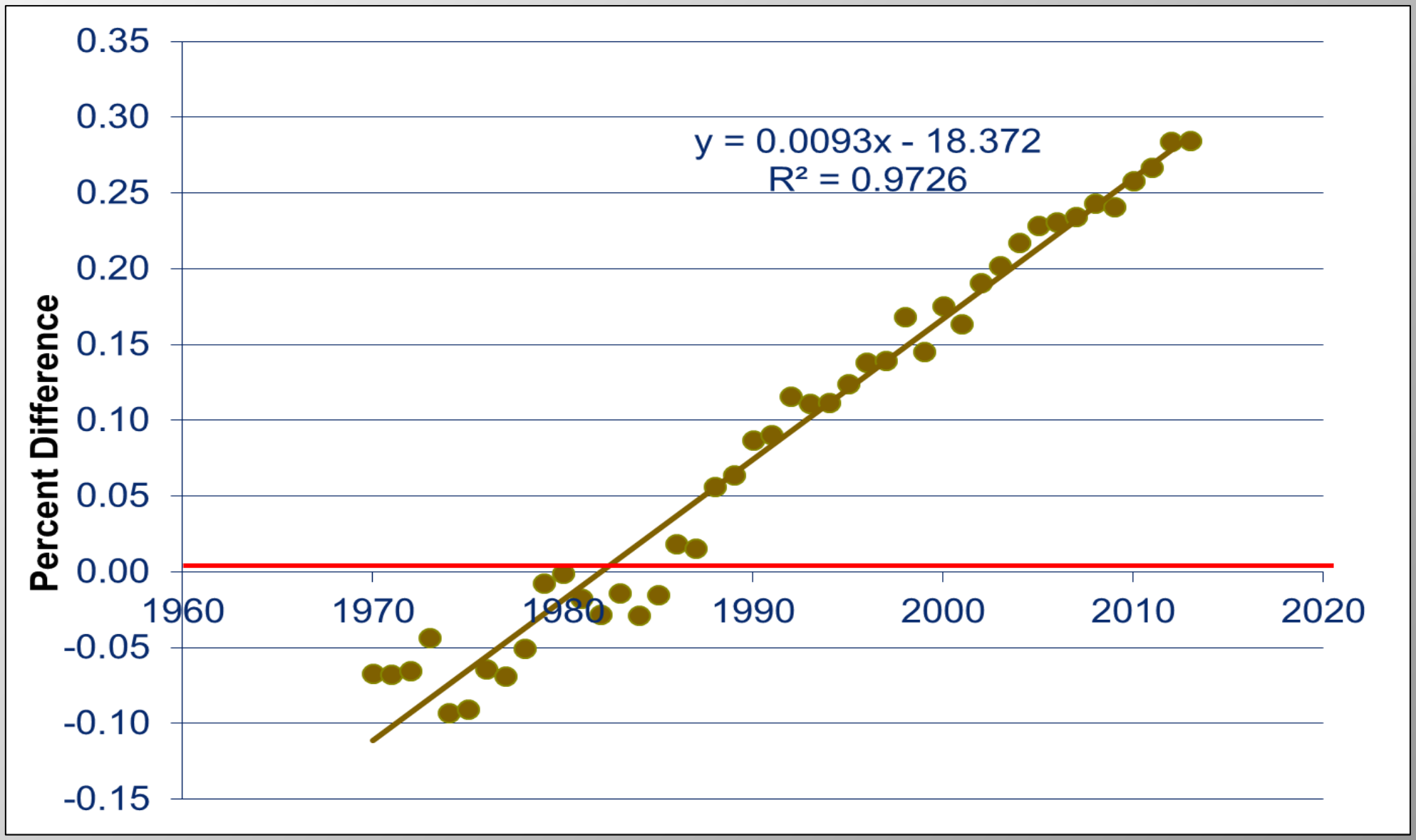
Trends in Lung Cancer Mortality: California vs Rest of US: 1970-2013

(Age-adjusted Rates per 100,000 Population of Age 35 Years and Older)



Source: CDPH/CA Cancer Registry; SEER program

Difference in Lung Cancer Mortality between California and the Rest of the United States



Summary of Lung Cancer Mortality

- California continues to separate from the Rest of the US in its declining lung cancer mortality – a trend that has continued since 1985-7

- Currently California rates are 28% lower than the rest of the US

- This increasing gap between California and the Rest of the US should continue -- the slower rate of change in per capita cigarette consumption was most apparent in young adults and it is expected to have a delayed effect on future lung cancer mortality rates.

Methods

- **Data Sources**
  - NHIS & TUS-CPS; State Tobacco Control Expenditure Database; CCR, SEER
- **Data Analyses**
  - TUS-CPS & NHIS
    - Standardized to the 2000 US Census by age, sex, and education
    - Means/Proportions weighted to calculate cell values
    - Variance calculated using methods appropriate for each survey
    - Cell values were multiplied by the appropriate 2000 US Census value and summed to produce a standardized population estimate
    - Variance estimates were multiplied by the square of the population proportion and added to create a standardized estimate.
- **Linear Models**
  - Spline Linear regressions were used
  - Point estimates were weighted using standardized variances
  - Initial models used one knot to test for a significant change in slope after 2000
  - If there was no significant change in slope then a simple linear model was used
  - Models parameters included time and a variable indicating CA or US estimates