



**THE ASSOCIATION BETWEEN TOBACCO
CONTROL VARIABLES AND STATE-SPECIFIC
CIGARETTE SMOKING PREVALENCE ESTIMATES
AMONG U.S. ADOLESCENTS – 1997 and 1999**

**Gary A. Giovino; Michael W. Smith; Cindy Tworek;
Sara Abrams; Andrew Hyland, K. Michael Cummings;
Department of Cancer Prevention, Epidemiology, and
Biostatistics; Roswell Park Cancer Institute**

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*A Policy Research Partnership
to Reduce Youth Substance Use*

Background

- The U.S. Surgeon General and others have documented that tobacco control policies can be used to promote reductions in tobacco use.
- Recent trends indicate a sharp increase in the number of states restricting minors' purchase, possession, and use (PPU) of tobacco.
- As part of our work for Project ImpacTeen, we have collected data on each state's PPU and clean indoor air (CIA) legislation, as well as data on cigarette prices.

Objectives

- To document trends in CIA laws and PPU laws
- To assess associations among price, CIA laws, and PPU laws
- To study associations between each of these tobacco control variables and adolescent smoking

Sources of Data

- **Youth Risk Behavior Surveillance System (YRBSS):**
 - State-specific data on public high school students (approximate ages 14-18 years old). State-specific sample sizes ranged from 1,248 – 8,636.
 - Two adolescent smoking measures were studied: Past Month Smoking and Frequent Smoking (smoked on ≥ 20 of the previous 30 days)
 - In 1997, weighted data were published for 24 participating states and the District of Columbia; and in 1999, for 22 states.
 - CDC weighted the state-specific estimates and the data are considered representative of all public high school students in each state.

Sources of Data

- **National Household Survey on Drug Abuse (NHSDA):**
 - State-specific data on major adolescent and adult substance abuse (ages 12-17, 18-25, and ≥ 26 years; ages 12-17 used for this report).
 - We used Past Month Smoking (smoked on ≥ 1 day in previous 30 days).
 - In 1999, representative samples were drawn in each state; sample sizes ranged from 1,256–1,280 in 42 states and D.C. and from 2,669–4,681 in 8 states. About one-third of each sample was aged 12-17 years.
- **Price Data: *The Tax Burden On Tobacco*** (State-specific price estimates as of November 1st of each year):
 - Average price is constructed by weighting present year and past year prices, and then adding the average to the average of federal and state excise taxes for the current year.

Sources of Data

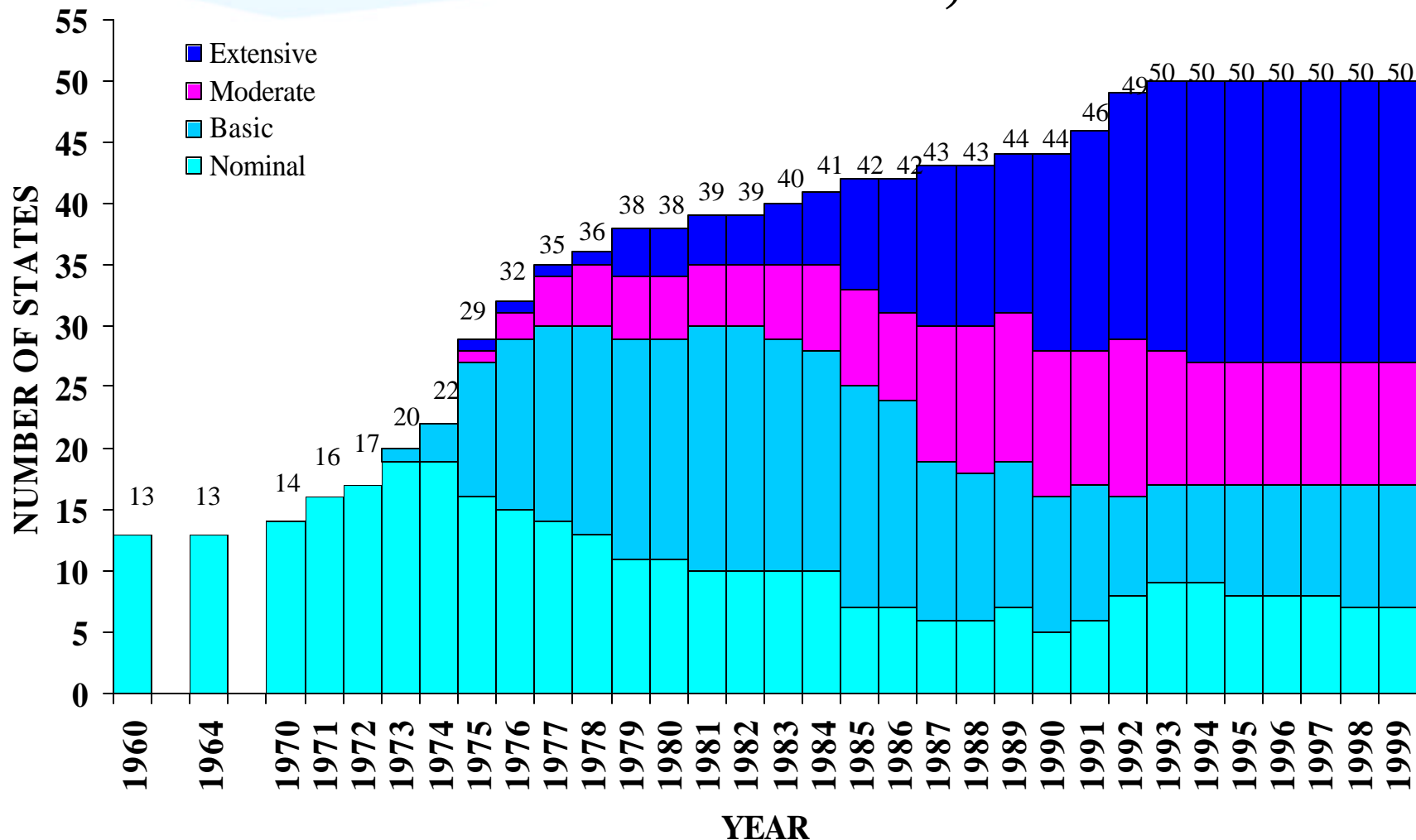
- **Legislative data: ALA's State Legislated Actions On Tobacco Issues (SLATI) and CDC's State Tobacco Activities Tracking and Evaluation (STATE) systems were used for:**
 - PPU Legislation: The presence of a law prohibiting minors' purchase, possession, or use of cigarettes was determined for in each state for 1997 and 1999. A PPU Index was calculated as the sum of the number of laws in each state in a given year (range = 0-3). A Historical PPU Index was determined by summing the number of PPU laws in place in a given state during the previous 8 years (theoretical range = 0-24).
 - CIA Legislation: Each state was given a rating based on the strength of protection (i.e., none, restricted, restricted with separate ventilation, prohibited) provided in various locations (i.e., private worksites, government worksites, restaurants, retail/grocery stores, malls, sports arenas, child care centers, hospitals, public transit, and hotels/motels) for 1997 and 1999 with points subtracted for preemption clauses.
 - Roswell Park Cancer Institute (RPCI) researchers resolved discrepancies that arose, often by calling state government offices.

Statistical Analyses

•Statistical Analyses

- Simple and multiple linear regression analyses were conducted using SPSS software.
- Regressions of price; CIA legislation rating; and PPU legislation ratings on adolescent smoking were done with YRBS data and with NHSDA data.
- t-tests were used to compare mean prevalences in states with and without PPU laws
- For YRBS-based calculations, analyses were conducted overall and by gender for past month smoking and frequent smoking.
- Crude and adjusted *beta* coefficients were calculated, along with standard errors and statistical probabilities.

Restrictiveness Of State Laws Regulating Smoking In Public Places – U.S., 1960-1999



Sources: 1989 Report of the Surgeon General and SLATI

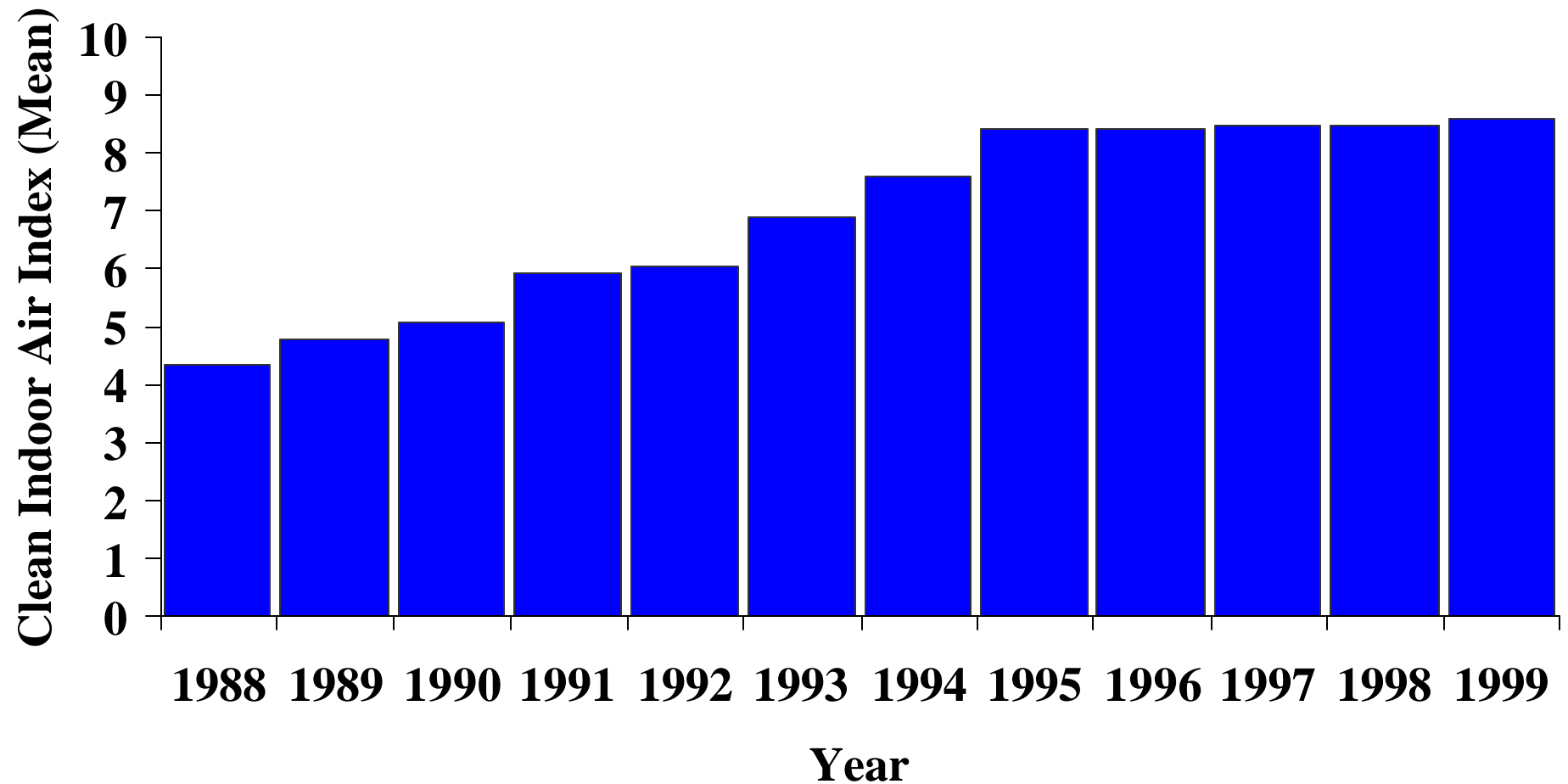
Notes: Includes the District of Columbia; Alabama is the only state with no restrictions on smoking in public places

• **Index of restrictiveness:**

- None - no statewide restrictions
- Nominal - State regulates smoking in one to three public places, excluding restaurants and private worksites
- Basic - State regulates smoking in four or more public places, excluding restaurants and private worksites
- Moderate - State regulates smoking in restaurants but not private worksites
- Extensive - State regulates smoking in private worksites.

Source: 1989 Surgeon General's Report

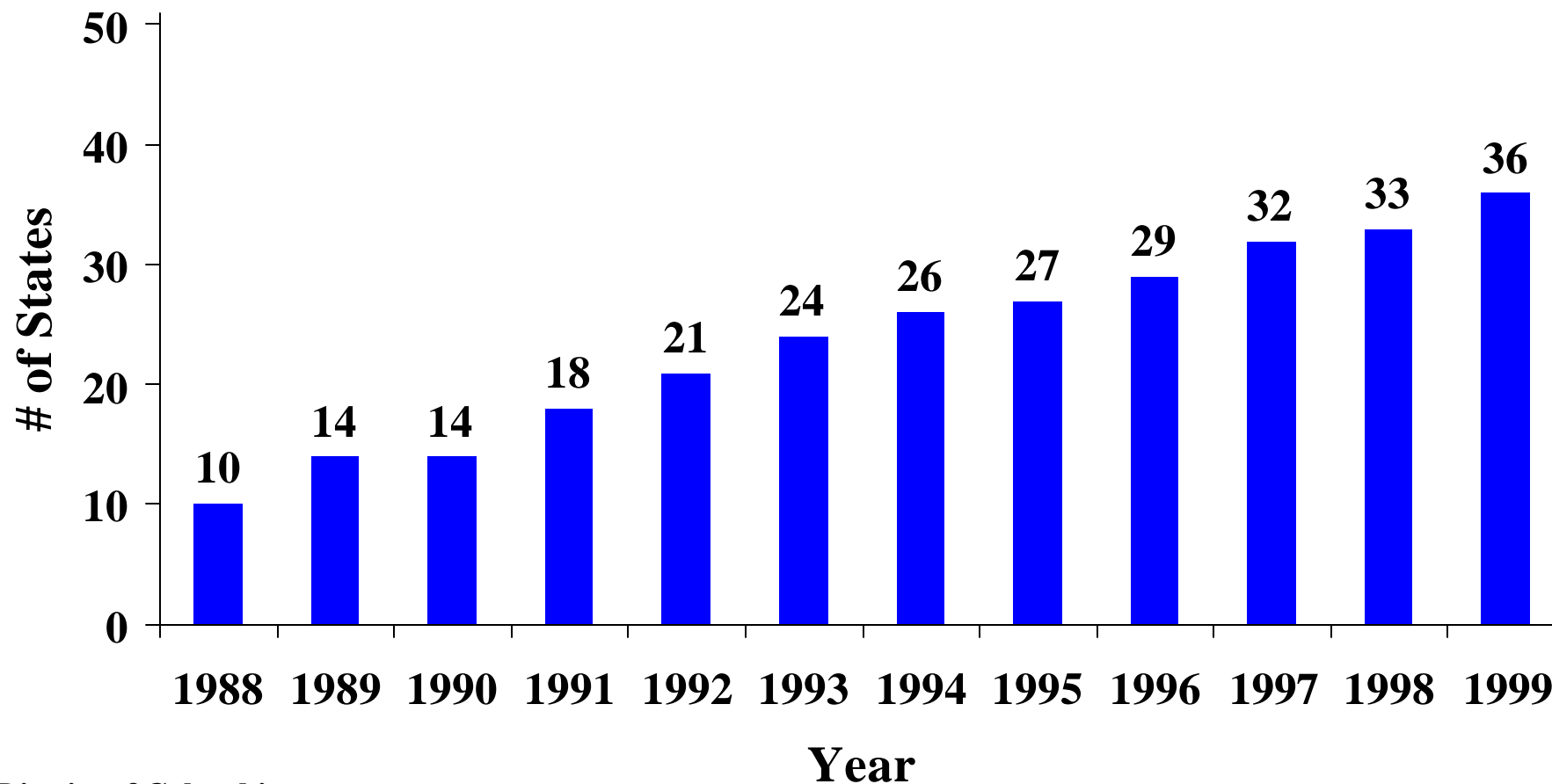
Mean Clean Indoor Air Law Rating Per State* - - United States, 1988-1999



*Includes the District of Columbia; Theoretical Range = -5-42

Sources: ALA's SLATI, CDC's STATE system, and Roswell Park Cancer Institute

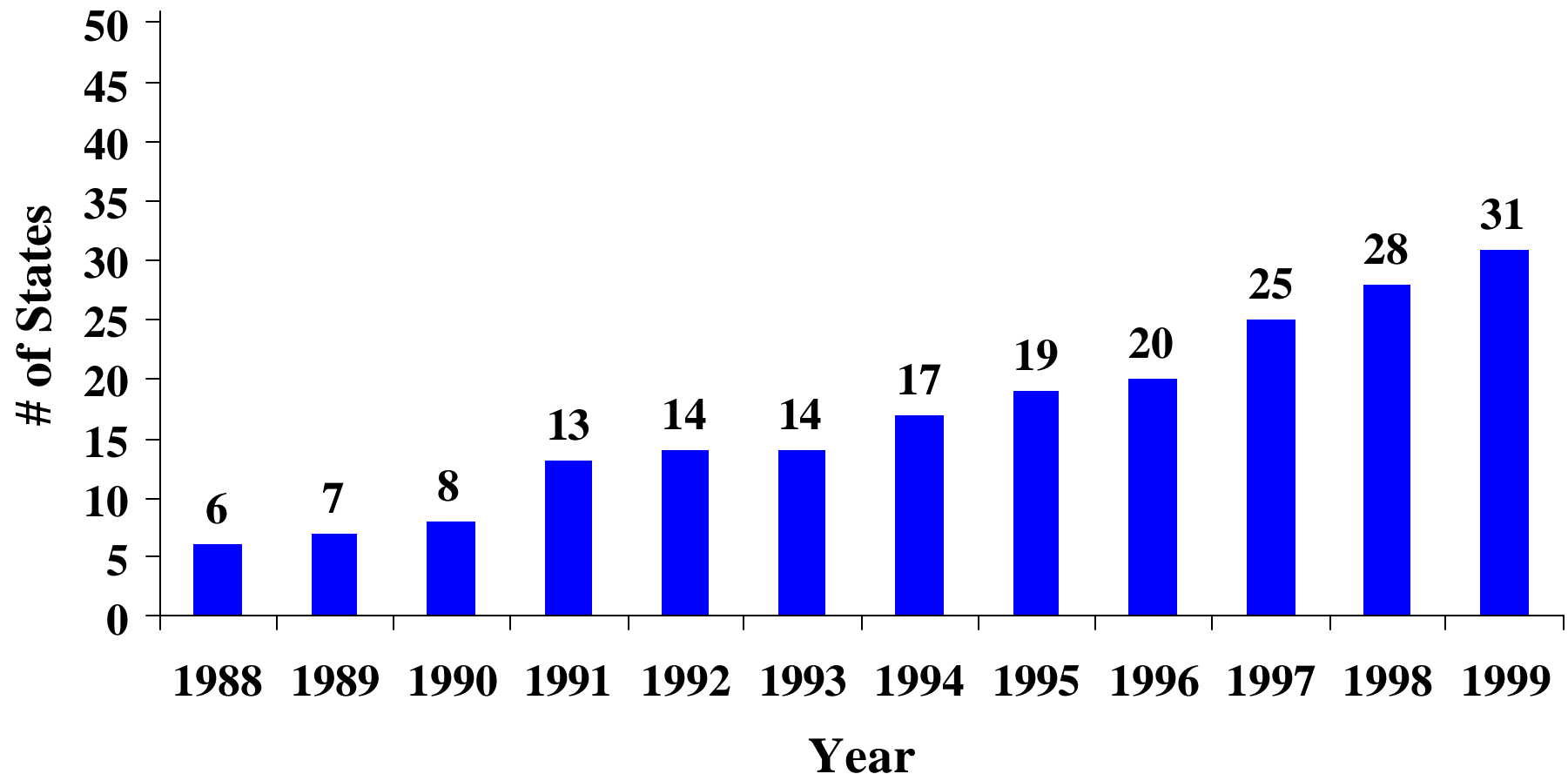
Number of U.S. States including D.C.*, with Legislation Restricting the Purchase of Cigarettes to Persons aged ≥ 18 years, 1988-1999



*District of Columbia

Sources: ALA's SLATI, CDC's STATE system, and Roswell Park Cancer Institute.

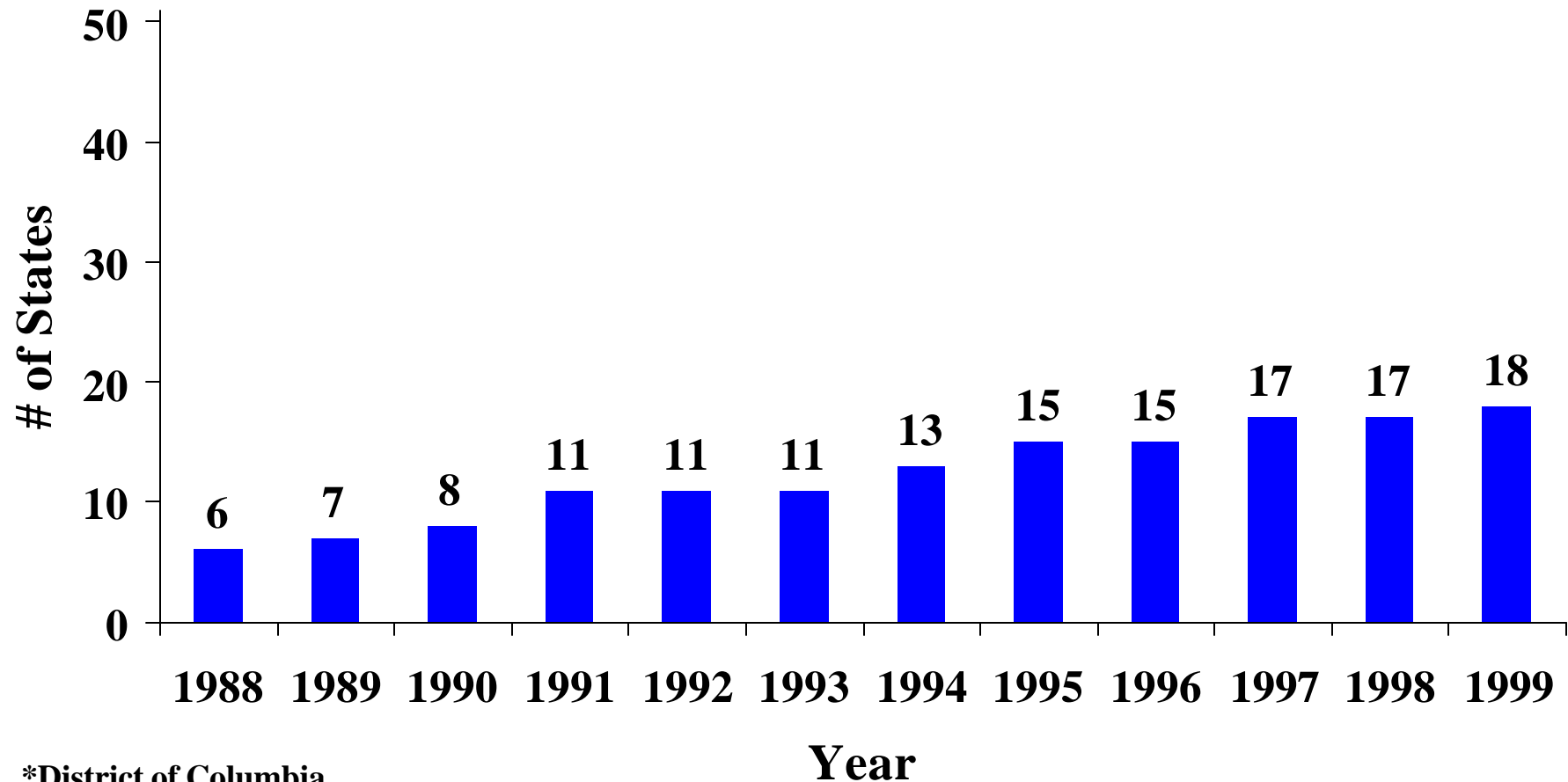
Number of U.S. States including D.C.*, with Legislation Restricting Possession of Cigarettes to Persons aged ≥ 18 years, 1988-1999



*District of Columbia

Sources: ALA's SLATI, CDC's STATE system, and Roswell Park Cancer Institute.

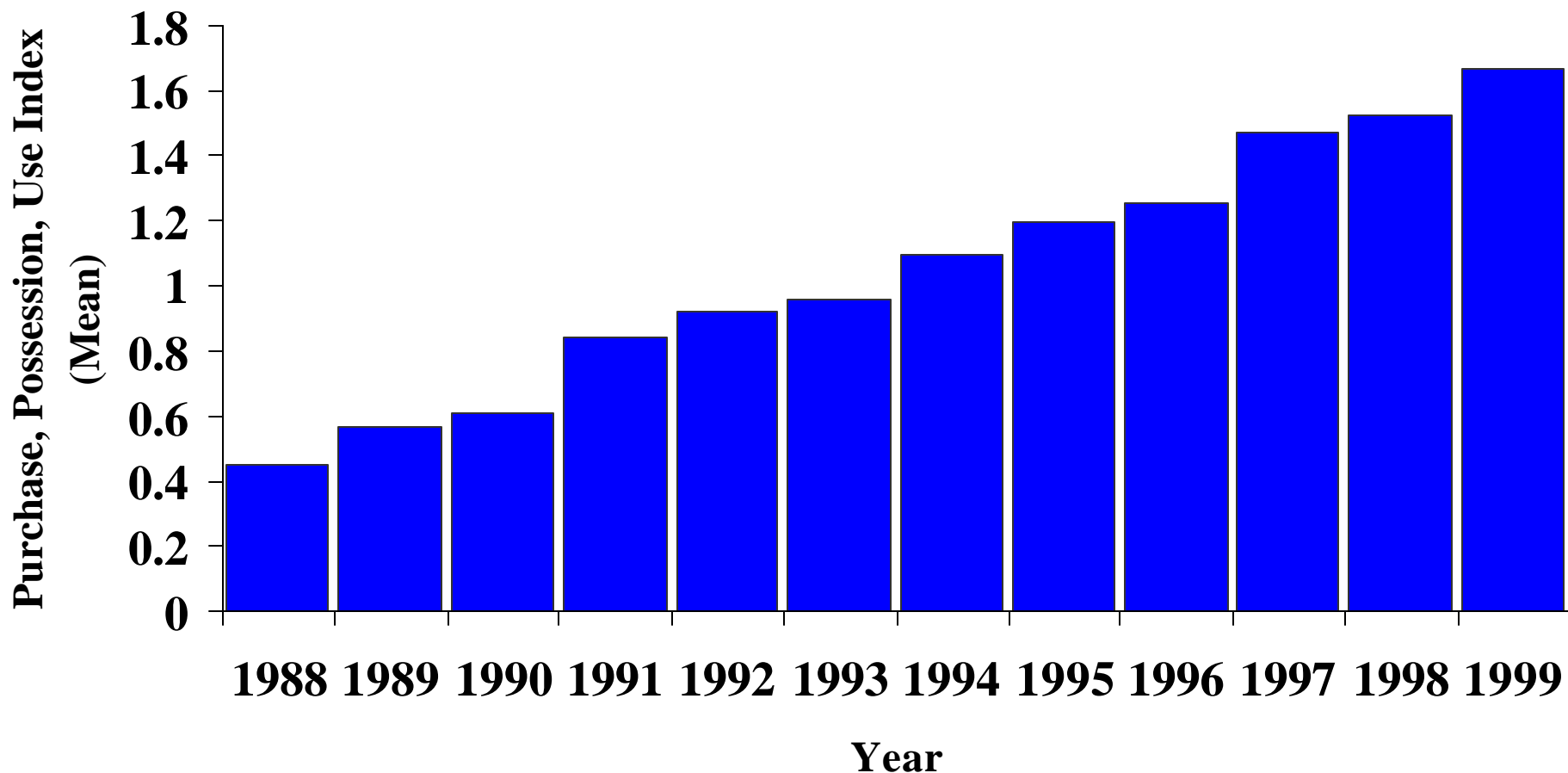
Number of U.S. States including D.C.*, with Legislation Restricting the Use of Cigarettes to Persons aged ≥ 18 years, 1988-1999



*District of Columbia

Sources: ALA's SLATI, CDC's STATE system, and Roswell Park Cancer Institute.

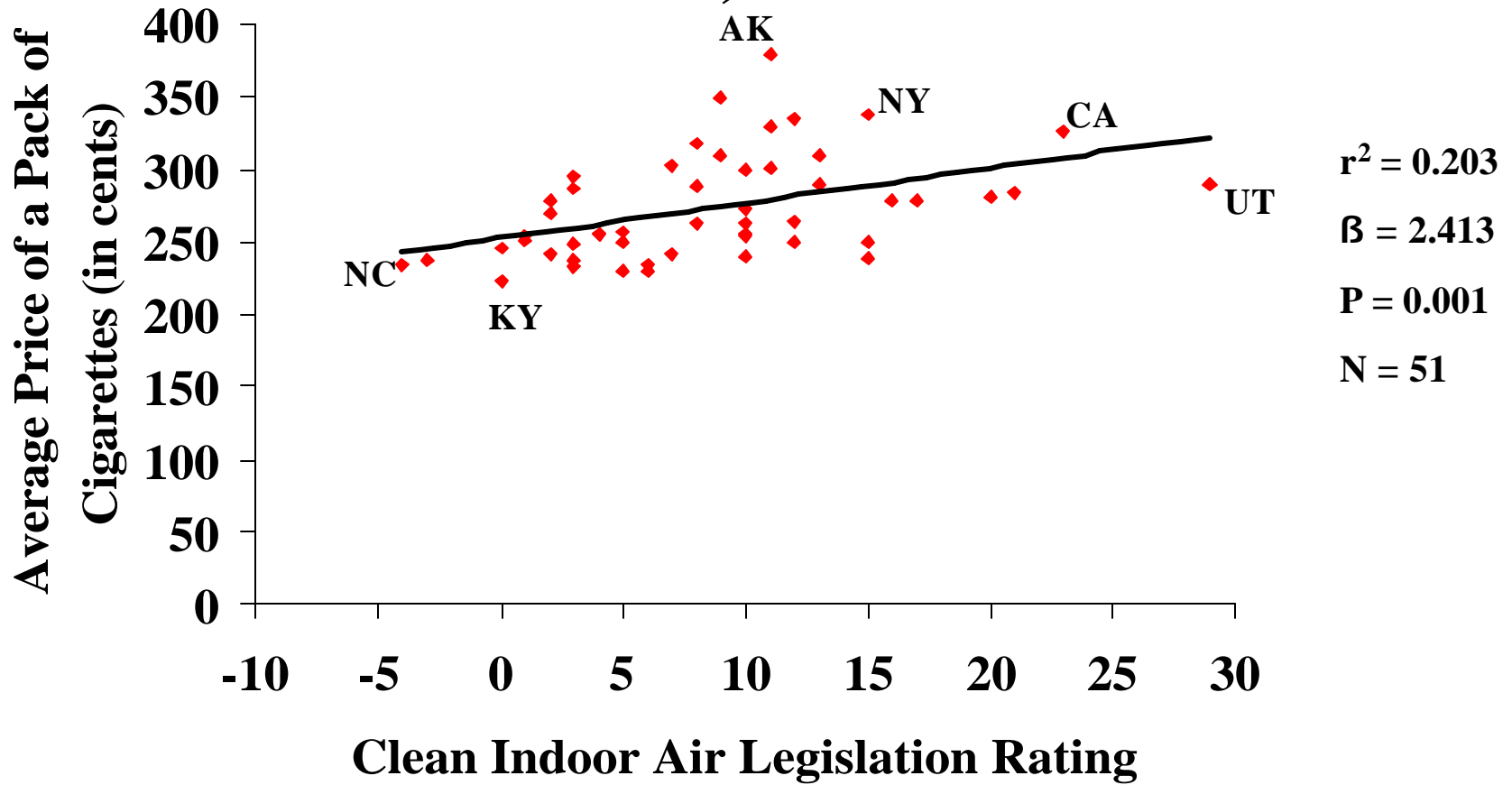
Mean Number of Purchase, Possession, and Use Laws per State* -- United States, 1988-1999



*Includes the District of Columbia; Note: Theoretical Range = 0-3

Sources: ALA's SLATI, CDC's STATE system, and Roswell Park Cancer Institute.

Clean Indoor Air Legislation Rating by the Average Price of a Pack of Cigarettes – United States, 1999



Sources: ALA's SLATI, CDC's STATE system, 1999 *Tax Burden On Tobacco* and the Roswell Park Cancer Institute

Table 1. Analysis of Variance of Purchase, Possession, and Use Legislation Rating by Clean Indoor Air Legislation Rating and the Average Price of a Pack of Cigarettes –United States, 1997 and 1999

| PPU Index | | df | F | Significance |
|------------------|----------------------|-----------|--------------|---------------------|
| 1997 | | | | |
| | CIA Index | 50 | 0.992 | 0.324 |
| | Average Price | 50 | 0.370 | 0.546 |
| 1999 | | | | |
| | CIA Index | 50 | 0.048 | 0.827 |
| | Average Price | 50 | 1.047 | 0.311 |

Source: 1997 and 1999 *Tax Burden On Tobacco*; ALA's SLATI, CDC's STATE system, and RPCI

Table 2. Relationship between Adolescent State-Specific Smoking Prevalence* and the Average Price of a Pack of Cigarettes –1997, 1999

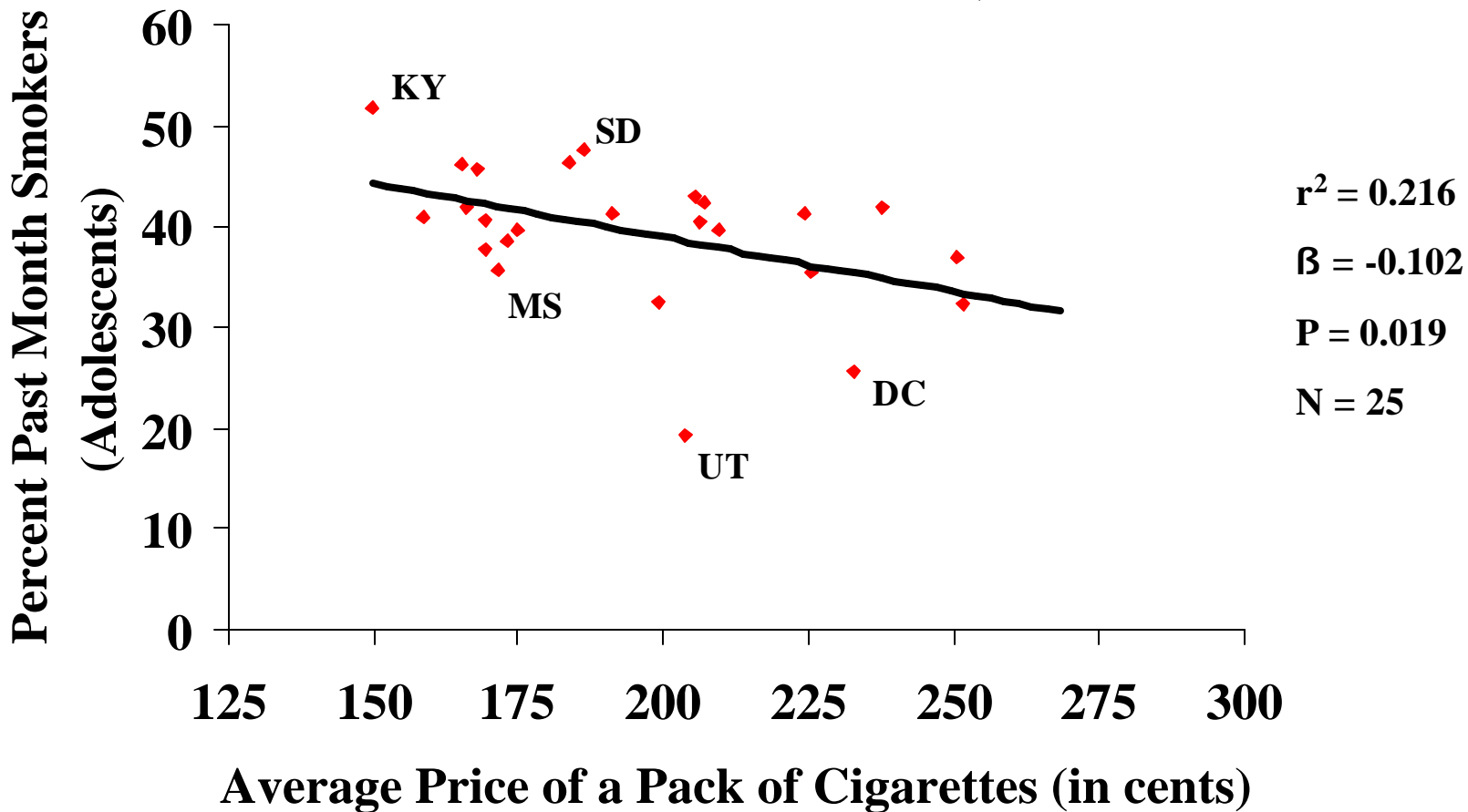
| Characteristic | N§ | Crude | | | Adjusted† | | |
|-------------------|----|--------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| 1997 YRBSS | | | | | | | |
| Overall | 25 | -0.102 | 0.041 | 0.019 | -0.065 | 0.041 | 0.132 |
| Male | 25 | -0.134 | 0.039 | 0.002 | -0.095 | 0.039 | 0.023 |
| Female | 25 | -0.071 | 0.046 | 0.137 | -0.034 | 0.048 | 0.489 |
| 1999 YRBSS | | | | | | | |
| Overall | 22 | -0.057 | 0.031 | 0.081 | -0.016 | 0.028 | 0.559 |
| Male | 22 | -0.079 | 0.03 | 0.017 | -0.038 | 0.026 | 0.155 |
| Female | 22 | -0.039 | 0.034 | 0.267 | 0.002 | 0.032 | 0.95 |
| 1999 NHSDA | | | | | | | |
| 12-17 year old | 51 | -0.045 | 0.011 | <0.001 | -0.033 | 0.012 | 0.009 |

*Smoked on ≥ 1 day during the previous 30 days

§N = number of states; †Adjusted for the PPU legislation rating and the CIA legislation rating.

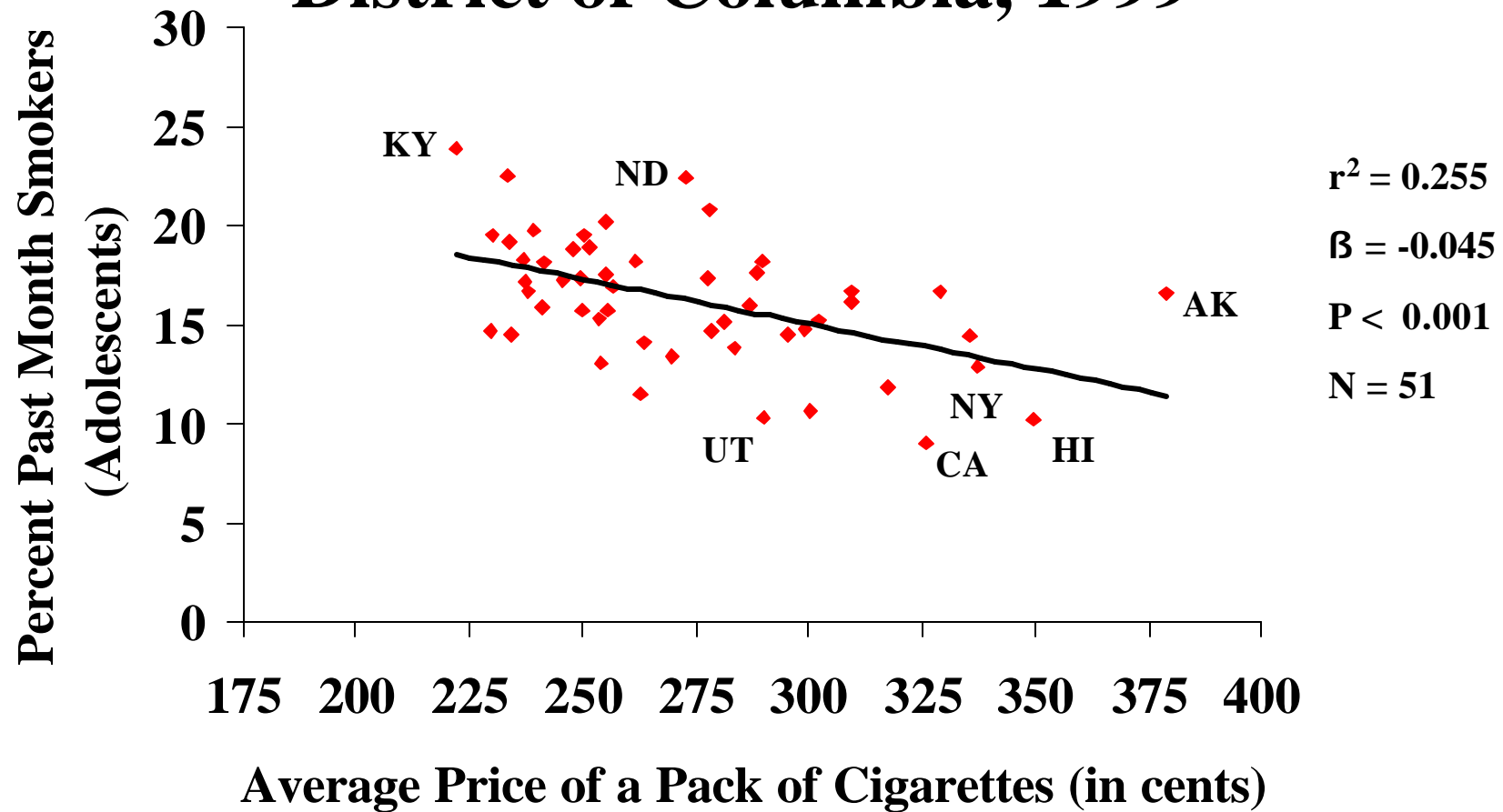
Sources: 1997, 1999 YRBSS; 1999 NHSDA; 1997, 1999 *Tax Burden On Tobacco*

Cigarette Smoking Among Youth by the Average Price of a Pack of Cigarettes in 24 States and the District of Columbia, 1997



Sources: 1997 YRBSS (14-18 year old public school students); 1997 *Tax Burden On Tobacco*
Note: Past Month Smoking = smoking on ≥ 1 day during the previous 30 days

Cigarette Smoking Among Youth by the Average Price of a Pack of Cigarettes in 50 States and the District of Columbia, 1999



Sources: 1999 NHSDA (12-17 year olds); 1999 *Tax Burden On Tobacco*

Note: Past Month Smoking = smoking on ≥ 1 day during the previous 30 days

Table 3. Relationship between Adolescent State-Specific Smoking Prevalence* and the Clean Indoor Air Legislation Rating –1997, 1999

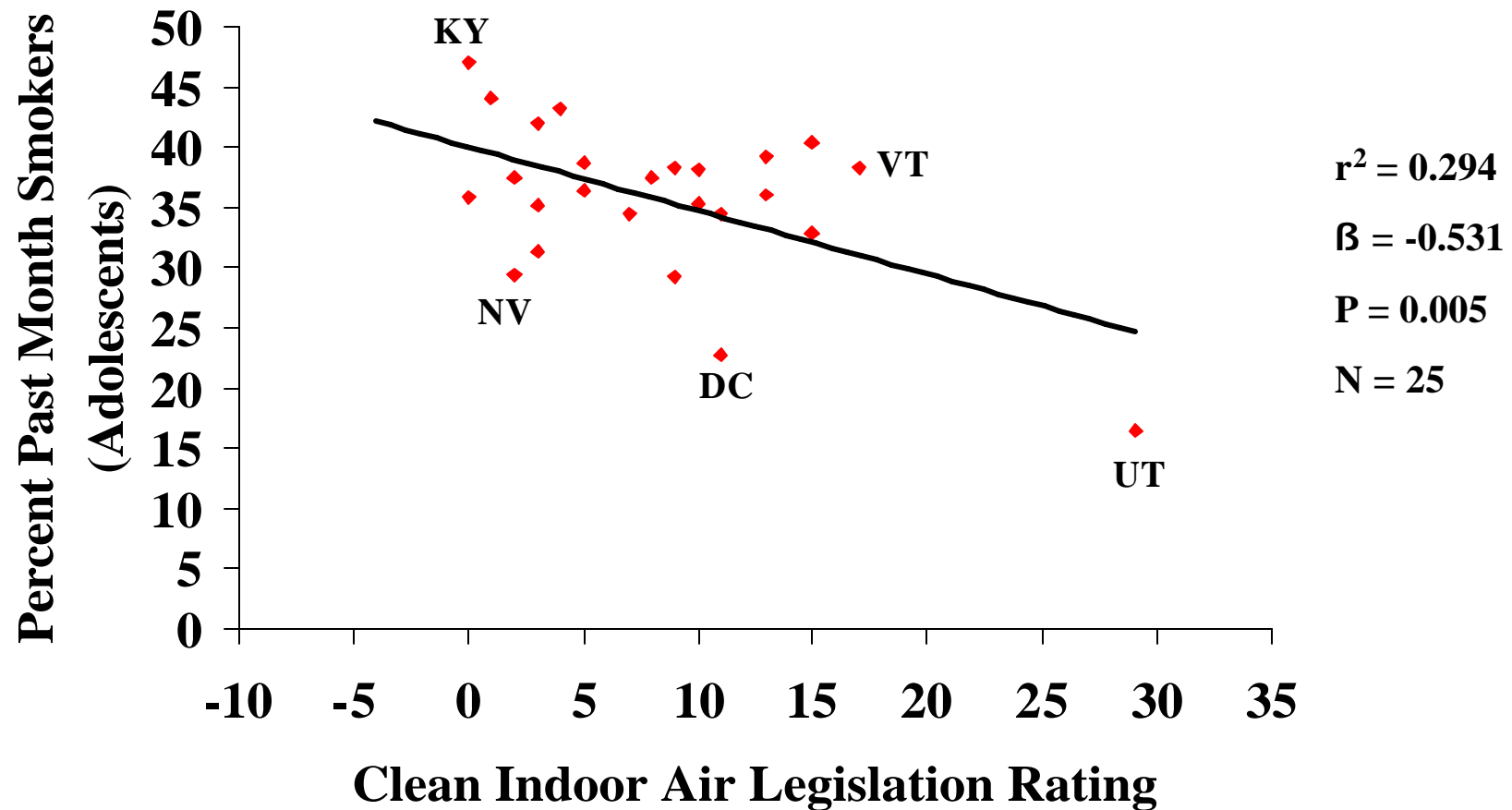
| Characteristic | N§ | Crude | | | Adjusted† | | |
|-------------------|----|--------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| 1997 YRBS | | | | | | | |
| Overall | 25 | -0.531 | 0.172 | 0.005 | -0.424 | 0.184 | 0.032 |
| Male | 25 | -0.601 | 0.171 | 0.002 | -0.435 | 0.173 | 0.020 |
| Female | 25 | -0.470 | 0.190 | 0.021 | -0.424 | 0.213 | 0.060 |
| 1999 YRBS | | | | | | | |
| Overall | 22 | -0.632 | 0.144 | <0.001 | -0.589 | 0.165 | 0.002 |
| Male | 22 | -0.691 | 0.141 | <0.001 | -0.599 | 0.154 | 0.001 |
| Female | 22 | -0.574 | 0.166 | 0.002 | -0.573 | 0.189 | 0.007 |
| 1999 NHSDA | | | | | | | |
| 12-17 year old | 51 | -0.219 | 0.061 | 0.001 | -0.141 | 0.066 | 0.037 |

*Smoked on ≥ 1 day during the previous 30 days; §N = number of states

†Adjusted for the state-specific PPU Index, and the average price of a pack of cigarettes.

Sources: 1997, 1999 YRBSS; 1999 NHSDA; 1997, 1999 *Tax Burden On Tobacco*; ALA's SLATI; CDC's STATE system and the Roswell Park Cancer Institute

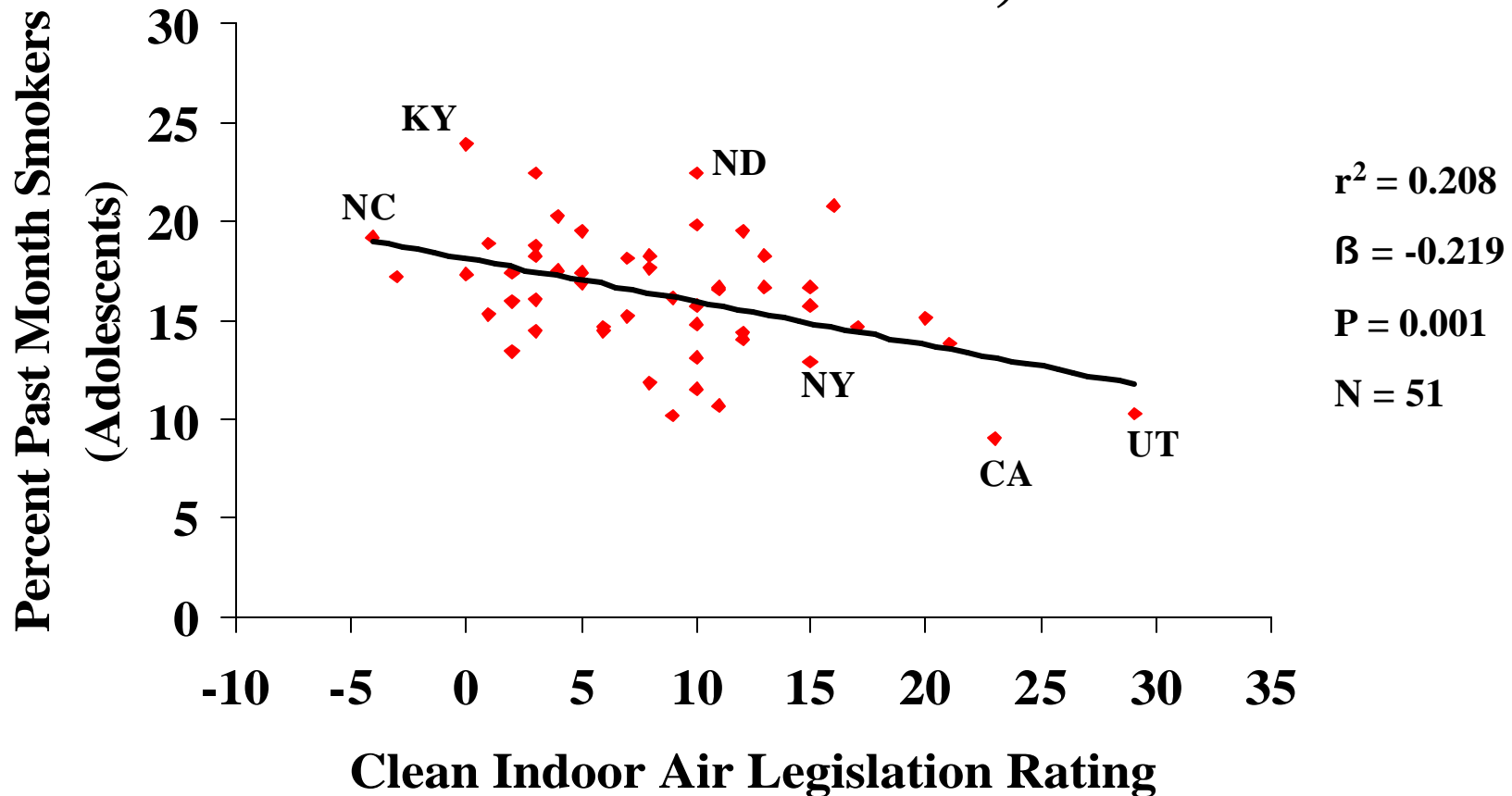
Cigarette Smoking Among Youth by the Clean Indoor Air Legislation Rating in 24 States and the District of Columbia, 1997



Sources: 1997 YRBSS (14-18 year old public school students); ALA's SLATI; CDC's STATE system, and the Roswell Park Cancer Institute

Note: Past Month Smoking = smoking on ≥ 1 day in the previous 30 days

Cigarette Smoking Among Youth by the Clean Indoor Air Legislation Rating in 50 States and the District of Columbia, 1999



Sources: 1999 NHSDA (12-17 year olds); ALA's SLATI, CDC's STATE system, and the Roswell Park Cancer Institute. Note: Past Month Smoking = smoked on ≥ 1 day in the previous 30 days

Table 4. Relationship between Adolescent State-Specific Smoking Prevalence* and the Purchase, Possession, and Use Legislation Rating –1997, 1999

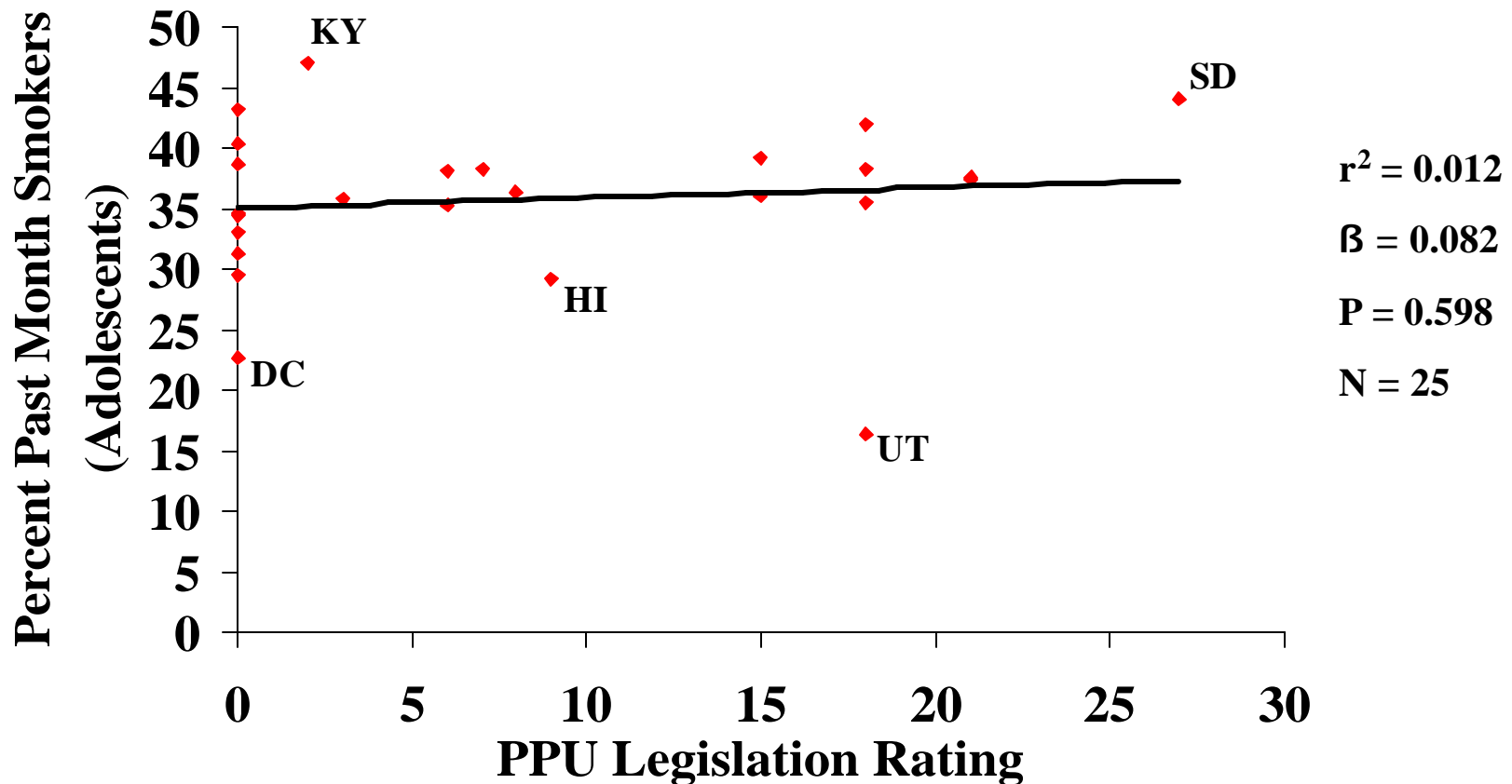
| Characteristic | N§ | Crude | | | Adjusted† | | |
|-------------------|----|--------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| 1997 YRBS | | | | | | | |
| Overall | 25 | 0.082 | 0.154 | 0.598 | 0.128 | 0.127 | 0.325 |
| Male | 25 | 0.051 | 0.160 | 0.752 | 0.106 | 0.119 | 0.384 |
| Female | 25 | 0.108 | 0.160 | 0.508 | 0.145 | 0.147 | 0.333 |
| 1999 YRBS | | | | | | | |
| Overall | 22 | -0.057 | 0.031 | 0.081 | -0.016 | 0.028 | 0.559 |
| Male | 22 | -0.079 | 0.030 | 0.017 | -0.038 | 0.026 | 0.155 |
| Female | 22 | -0.039 | 0.034 | 0.267 | 0.002 | 0.032 | 0.950 |
| 1999 NHSDA | | | | | | | |
| 12-17 year old | 51 | 0.008 | 0.059 | 0.898 | 0.013 | 0.051 | 0.797 |

*Smoked on ≥ 1 day during the previous 30 days; §N = number of states

†Adjusted for the average price of a pack of cigarettes, and the state-specific CIA legislation rating.

Sources: 1997, 1999 YRBSS; 1999 NHSDA; 1997, 1999 *Tax Burden On Tobacco*; ALA's SLATI, CDC's STATE system and the Roswell Park Cancer Institute

Cigarette Smoking Among Youth by the Historical PPU Legislation Rating in 24 States and the District of Columbia, 1997



Sources: 1997 YRBSS (14-18 year old public school students); ALA's SLATI, CDC's STATE system, and the Roswell Park Cancer Institute

Note: Past Month Smoking = smoking on ≥ 1 day during the previous 30 days

Historical PPU Legislation Rating = Sum of PPU laws for previous 8 years (0 = no law; 1 = law present)

Table 5. Comparison of Adolescent Smoking Prevalences in States With and Without Purchase, Possession, or Use Laws – United States, 1997

| Characteristics | Mean in States with No Law | N | Mean in States with Law | N | t | P-value |
|---------------------------------------|----------------------------|----|-------------------------|----|-------|---------|
| 1997 YRBS – Past Month* | | | | | | |
| Purchase | 35.5 | 13 | 36.0 | 12 | 0.194 | 0.848 |
| Possession | 35.1 | 15 | 36.7 | 10 | 0.600 | 0.554 |
| Use | 34.2 | 17 | 39.0 | 8 | 1.781 | 0.088 |
| Any PPU Law | 34.3 | 10 | 36.7 | 15 | 0.890 | 0.383 |
| 1997 YRBS – Frequent Smoking** | | | | | | |
| Purchase | 18.0 | 13 | 19.2 | 12 | 0.645 | 0.525 |
| Possession | 17.8 | 15 | 19.6 | 10 | 0.927 | 0.363 |
| Use | 17.4 | 17 | 20.9 | 8 | 1.869 | 0.074 |
| Any PPU Law | 17.0 | 10 | 19.5 | 15 | 1.371 | 0.184 |

*Smoked on ≥ 1 day during the previous 30 days; **Smoked on ≥ 20 days during the previous 30 days

Sources: 1997 YRBSS (14-18 year old high school students); ALA's SLATI, CDC's STATE system, and the Roswell Park Cancer Institute

Table 6. Comparison of Adolescent Smoking Prevalences in States With and Without Purchase, Possession, Use Laws – United States, 1999

| Characteristics | Mean in States with No Law | N | Mean in States with Law | N | t | P-value |
|---------------------------------|----------------------------|----|-------------------------|----|--------|---------|
| 1999 NHSDA – Past Month* | | | | | | |
| Purchase | 16.8 | 18 | 16.0 | 33 | -0.851 | 0.399 |
| Possession | 16.5 | 23 | 16.1 | 28 | -0.431 | 0.668 |
| Use | 15.9 | 34 | 17.1 | 17 | 1.299 | 0.200 |
| Any PPU Law | 16.0 | 9 | 16.3 | 42 | 0.268 | 0.790 |

*Smoked on \geq 1 day in the previous 30 days

Source: 1999 NHSDA (12-17 years old); ALA's SLATI, CDC's STATE system, and RPCI

Summary and Discussion

TRENDS IN LAWS

- CIA laws increased in scope until the early 1990s
- PPU laws have steadily increased from 1988-1999

ASSOCIATION OF TOBACCO CONTROL VARIABLES WITH EACH OTHER

- CIA laws and Price are associated with each other
- PPU laws are not associated with CIA laws or with Price

Summary and Discussion (2)

ASSOCIATION OF TOBACCO CONTROL VARIABLES WITH ADOLESCENT SMOKING

- Price is generally inversely associated in the univariate analyses with adolescent smoking. The effect is lessened in the multivariate models. However, the small sample size of the YRBS analyses is likely a factor, as price remains significant in the NHSDA multivariate analysis and more rigorous econometric studies consistently show a strong Price effect.

Summary and Discussion (3)

- CIA legislation is consistently associated with lower adolescent smoking rates. CIA legislation may reflect a strong anti-smoking climate in a community. In addition, strong CIA laws will make smoking appear less normative and make smoking more difficult.
- PPU laws were not related to adolescent smoking prevalences. We have not measured enforcement; nor have we developed a measure of local ordinances (future work). In addition, it is possible that states enact these laws in response to higher smoking rates, although analyses involving the Historical PPU Index seem to contradict this hypothesis). Other analyses, including study of tobacco documents, are needed to sort out these factors.