

CIGARETTE SMOKING AMONG ADOLESCENTS AND ADULTS IN U.S. STATES AND THE DISTRICT OF COLUMBIA IN 1997 AND 1999 - WHAT EXPLAINS THE RELATIONSHIP?

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Background

- Interest in preventing adolescent tobacco use uptake increased substantially in the 1990s.
- As part of our work for Project ImpacTeen we observed that state-specific adolescent smoking and adult smoking prevalences varied directly.
- Other factors may affect adolescent and adult smoking prevalences (e.g., price of cigarettes and clean indoor air legislation).

Objectives

- To assess crude relationships between state-specific estimates of adolescent and adult cigarette smoking using data from three major surveillance systems (YRBS, BRFSS, and NHSDA).
- To determine if crude relationships persist after adjusting for potential covariates (e.g. price and strength of clean indoor air legislation).
- To test the hypothesis that the relationship between adolescent and adult smoking would be attenuated, but not eliminated, after controlling for price and strength of clean indoor air legislation.

Sources of Data

- Youth Risk Behavior Surveillance System – State-specific data on public high school students (approximate ages 14-18 years).
 - Two adolescent smoking measures were studied: Past Month Smoking and Frequent Smoking.
 - 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.
- Behavioral Risk Factor Surveillance System – State specific data on major adult risk behaviors (ages ≥ 18 years).
 - One adult smoking measure was studied: Current Smoking (smoked ≥ 100 lifetime cigarettes and currently smoke every day or on some days)
 - In 1997 and 1999, all 50 states and the District of Columbia participated.

Sources of Data

- **National Household Survey on Drug Abuse – State-specific data on major adolescent and adult substance abuse (ages 12-17, 18-25, and ≥ 26 years).**
 - One smoking measure was studied: Past Month Smoking (smoked on ≥ 1 day in the previous 30 days).
 - Representative samples were drawn from all 50 states and the District of Columbia.
- ***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 and Statistical Analyses

- **“State Legislated Actions On Tobacco Issues”/CDC’s STATE System – for state-specific clean indoor air legislation.**
 - Each state was given a rating based on the strength of protection provided in various locations (e.g., private workplaces, restaurants) with points subtracted for preemption clauses.
- **Statistical Analyses**
 - Simple and multiple linear regression analyses were conducted using SPSS software.
 - Regression of adult smoking on adolescent smoking was done for BRFSS and YRBS data, as well as for NHSDA data.
 - Analyses were conducted overall, by gender, and by race/ethnicity for YRBS-based analyses.
 - Crude and adjusted *beta* coefficients were calculated, along with standard errors and statistical probabilities.

Results

- **In general, adjusted relationships for 1997 data between adolescent Past Month Smoking and adult smoking prevalences were attenuated (compared to crude), but remained significant overall and among males, females, whites, 18-24 year old adults, and 25-44 year old adults. (Tables 1, 1a)**
- **Similar patterns were observed between adolescent Frequent Smoking and adult smoking (Tables 1 and 1a).**
- **Adjusted relationships for 1999 NHSDA data between adolescent Past Month Smoking and adult Past Month Smoking were attenuated but remained significant among both 18-25 year old and ≥ 26 year old adults. (Table 2)**
- **Adjusted relationships for 1999 YRBS/BRFSS analyses were significant only among females for adolescent Past Month and Frequent Smoking. (Tables 3 and 3a)**

Table 1. Relationship between State-Specific Smoking Prevalence Estimates for Adolescents* and Adults** – 1997

| Characteristic | N§ | Crude | | | Adjusted† | | |
|----------------------|----|--------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| Overall | 25 | 1.370 | 0.242 | <0.001 | 1.171 | 0.337 | 0.002 |
| Male | 25 | 1.331 | 0.221 | <0.001 | 0.957 | 0.267 | 0.002 |
| Female | 25 | 1.067 | 0.260 | <0.001 | 0.937 | 0.331 | 0.01 |
| African American | 11 | -0.177 | 0.223 | 0.448 | -0.110 | 0.415 | 0.799 |
| Hispanic | 7 | 0.735 | 0.454 | 0.167 | 0.107 | 0.446 | 0.826 |
| White | 23 | 1.306 | 0.261 | <0.001 | 1.030 | 0.357 | 0.009 |
| Age of Adults | | | | | | | |
| 18-24 | 25 | 0.732 | 0.164 | <0.001 | 0.616 | 0.137 | <0.001 |
| 25-44 | 25 | 1.077 | 0.181 | <0.001 | 0.906 | 0.232 | 0.001 |
| 45-64 | 25 | 0.825 | 0.224 | 0.001 | 0.538 | 0.302 | 0.090 |

*Smoked on greater than or equal to 1 day during the previous 30 days; from YRBSS

** Smoked on every day or some days; from BRFSS

§N = number of states

†Adjusted for the average price of a pack of cigarettes (1997), and the state specific indoor air legislation rating.



Table 1a. Relationship between State-Specific Smoking Prevalence Estimates for Adolescents* and Adults** - 1997

| Characteristic | N§ | Crude | | | Adjusted† | | |
|----------------------|----|-------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| Overall | 25 | 0.940 | 0.177 | <0.001 | 0.943 | 0.250 | 0.001 |
| Male | 25 | 0.816 | 0.163 | <0.001 | 0.691 | 0.214 | 0.004 |
| Female | 25 | 0.809 | 0.186 | <0.001 | 0.788 | 0.240 | 0.004 |
| African American | 11 | 0.045 | 0.094 | 0.646 | 0.077 | 0.189 | 0.698 |
| Hispanic | 7 | 0.254 | 0.395 | 0.540 | -0.321 | 0.320 | 0.389 |
| White | 23 | 0.890 | 0.177 | <0.001 | 0.751 | 0.245 | 0.006 |
| Age of Adults | | | | | | | |
| 18-24 | 25 | 0.570 | 0.103 | <0.001 | 0.511 | 0.096 | <0.001 |
| 25-44 | 25 | 0.735 | 0.133 | <0.001 | 0.703 | 0.176 | 0.001 |
| 45-64 | 25 | 0.535 | 0.165 | 0.004 | 0.406 | 0.232 | 0.095 |

*Smoked on greater than or equal to 20 days during the previous 30 days; from YRBSS

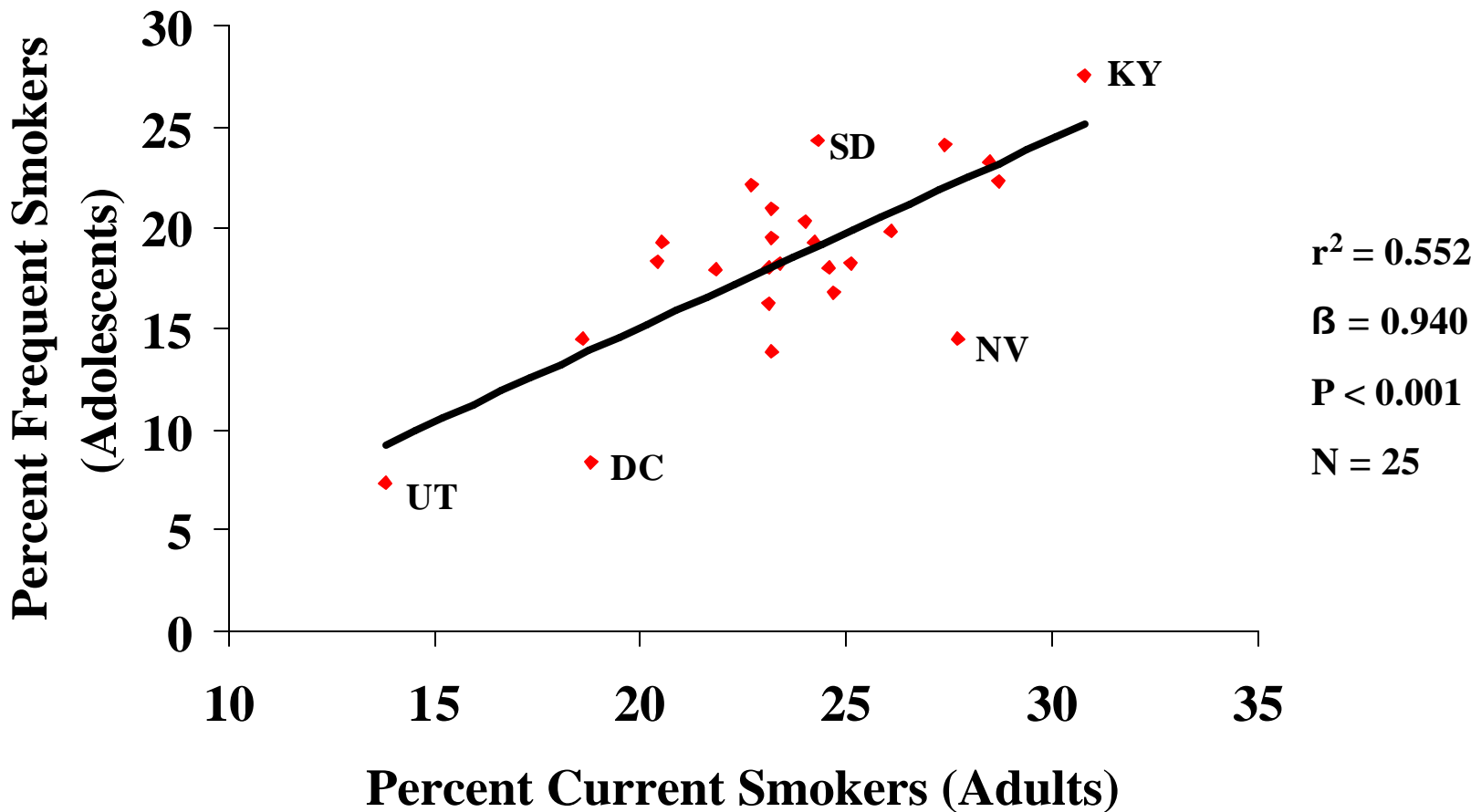
** Smoked on every day or some days; from BRFSS

§N = number of states

†Adjusted for the average price of a pack of cigarettes (1997), and the state specific indoor air legislation rating.



Cigarette Smoking Among Youth and Adults in 24 States and the District of Columbia, 1997



Sources: 1997 Youth Risk Behavior Survey (14-18 year old public school students)
 1997 Behavioral Risk Factor Survey (adults 18+ years old)

Note: Frequent Smoking among youth = smoking on ≥ 20 days during the previous 30 days
 Adult current smoking = smoking every day or on some days



Table 2. Relationship between State-Specific Smoking Prevalence Estimates for Adolescents* and Adults* - 1999

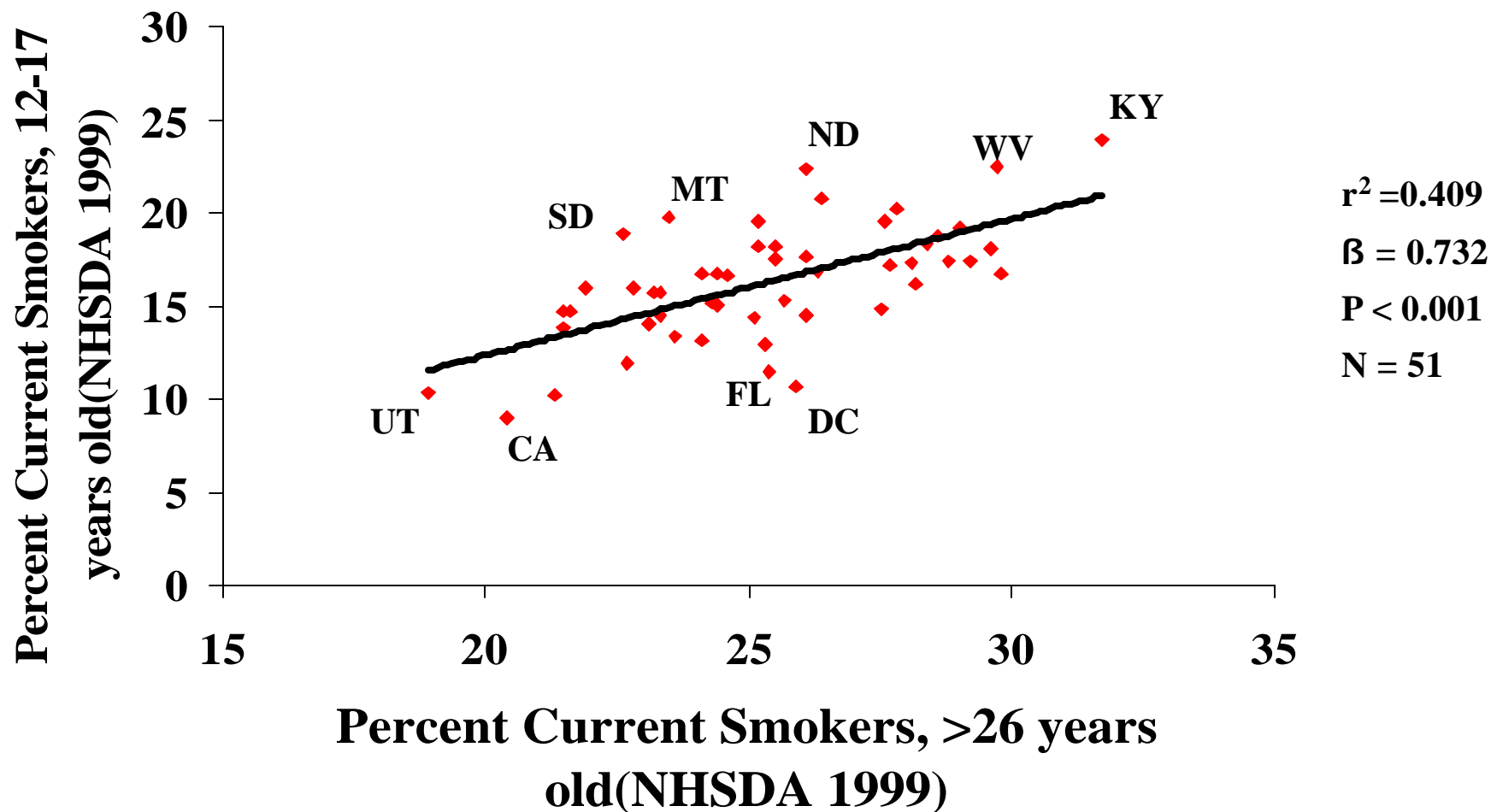
| Characteristic | N§ | Crude | | | Adjusted† | | |
|---------------------|----|-------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| Age of Adult | | | | | | | |
| 18-25 | 51 | 0.460 | 0.073 | <0.001 | 0.377 | 0.068 | <0.001 |
| ≥26 | 51 | 0.732 | 0.126 | <0.001 | 0.557 | 0.142 | <0.001 |

*Smoked on greater than or equal to 1 day during the previous 30 days; from NHSDA

§N = number of states

†Adjusted for the average price of a pack of cigarettes (1999), and the state specific indoor air legislation rating.

Smoking Prevalence Among Youths Aged 12-17 Years Old and Adults Aged ≥ 26 Years Old in All 50 States and the District of Columbia, 1999 NHSDA



Note: Current smokers were persons who smoked at least 1 day during the previous 30 days

Source: 1999 National Household Survey on Drug Abuse

Table 3. Relationship between State-Specific Smoking Prevalence Estimates for Adolescents* and Adults** – 1999

| Characteristic | N§ | Crude | | | Adjusted† | | |
|------------------|----|-------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| Overall | 22 | 1.031 | 0.308 | 0.003 | 0.531 | 0.317 | 0.112 |
| Male | 22 | 0.856 | 0.297 | 0.009 | 0.238 | 0.284 | 0.414 |
| Female | 22 | 1.018 | 0.295 | 0.003 | 0.722 | 0.313 | 0.033 |
| Race | | | | | | | |
| African American | 10 | 0.655 | 0.551 | 0.269 | 1.007 | 0.752 | 0.229 |
| Hispanic | 7 | 0.246 | 0.800 | 0.770 | -0.610 | 0.715 | 0.456 |
| White | 20 | 1.216 | 0.413 | 0.009 | 0.624 | 0.397 | 0.126 |

*Smoked on greater than or equal to 1 day during the previous 30 days; from YRBSS

** Smoked on every day or some days; from BRFSS

§N = number of states

†Adjusted for the average price of a pack of cigarettes (1999), and the state specific indoor air legislation rating.



Table 3a. Relationship between State-Specific Smoking Prevalence Estimates for Adolescents* and Adults** - 1999

| Characteristic | N§ | Crude | | | Adjusted† | | |
|------------------|----|--------|-------|---------|-----------|-------|---------|
| | | Beta | SE | P-value | Beta | SE | P-value |
| Overall | 21 | 0.654 | 0.195 | 0.003 | 0.403 | 0.214 | 0.077 |
| Male | 21 | 0.515 | 0.177 | 0.009 | 0.217 | 0.184 | 0.253 |
| Female | 21 | 0.691 | 0.197 | 0.002 | 0.564 | 0.213 | 0.017 |
| Race | | | | | | | |
| African American | 12 | <0.001 | 0.093 | 0.995 | 0.170 | 0.112 | 0.168 |
| Hispanic | 8 | 0.142 | 0.216 | 0.535 | -0.141 | 0.252 | 0.606 |
| White | 22 | 0.106 | 0.063 | 0.107 | 0.053 | 0.072 | 0.472 |

*Smoked on greater than or equal to 20 days during the previous 30 days; from YRBSS

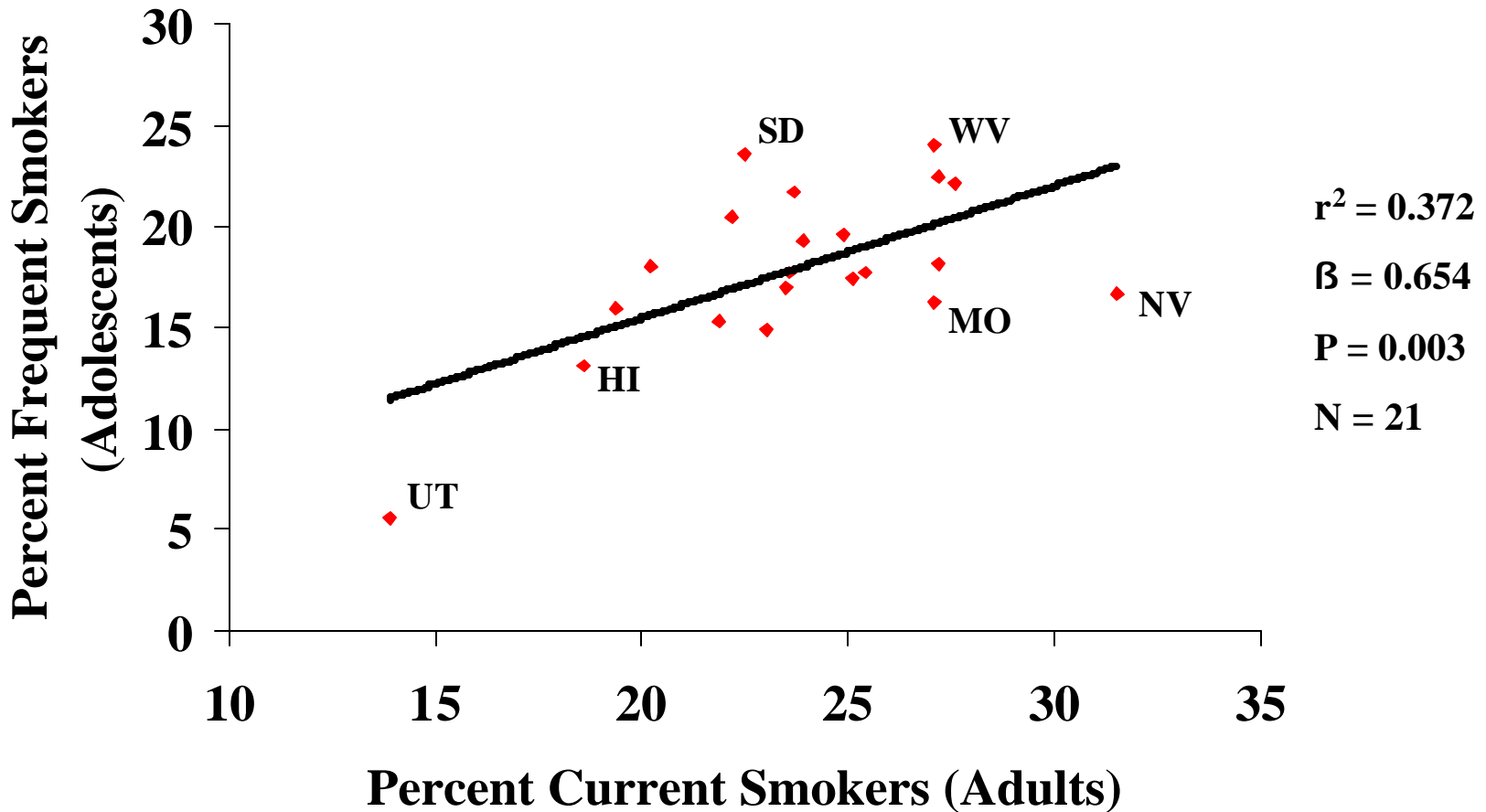
** Smoked on every day or some days; from BRFSS

§N = number of states

†Adjusted for the average price of a pack of cigarettes (1999), and the state specific indoor air legislation rating.



Cigarette Smoking Among Youth and Adults in 21 states, 1999



Sources: 1999 Youth Risk Behavior Survey (14-18 year old public school students)
 1999 Behavioral Risk Factor Survey (adults 18+ years old)

Note: Frequent Smoking among youth = smoking on ≥ 20 days during the previous 30 days
 Adult current smoking = smoking every day or on some days



Discussion

- The relationships generally persisted after control for the two most important policy variables, consistent with the notion that adult smoking directly influences adolescent smoking.
- These data tend to support the notion that efforts to both prevent initiation and promote quitting would be an optimal tobacco control strategy*.
- Results for African-Americans and Hispanics are likely influenced by the small number of states for which data were drawn, and the declines in prevalence among African-American adolescents in the past 20 years.



*A third necessary strategy is to protect non-smokers from environmental tobacco smoke.

Limitations

- Ecologic Fallacy: Data were drawn and analyzed from state-specific population data. Therefore results can not be interpreted on an individual basis.
- Other variables (e.g., relationship quality between adolescents and parents, income disparity) may account for the relationship between adolescent and adult smoking prevalence that could not be ruled out by this analysis.