THE IMPACT OF TOBACCO-FREE SCHOOL LAWS ON STUDENT AND FACULTY SMOKING BEHAVIOR

Rachana Bhatt

University System of Georgia Board of Regents

Peter Hinrichs

Federal Reserve Bank Of Cleveland

Tobacco Online Policy Seminar

June 3, 2022

Disclosure

- No items to disclose, per https://www.tobaccopolicy.org/code.html

Background

- Numerous adverse health and economic consequences of tobacco use
  - Heart disease, cancer, impaired brain development (DHS, 2014)
  - Medical cost of treatment, loss of life and economic productivity
  - Leading cause of preventable disease, disability and death (CDC, 2022)

- Tobacco use starts early and persists into adulthood (CTFK,2019)
  - Every day, ~1,600 people under 18 try their first cigarette
  - 90% of adult smokers began while in their teens
  - Two-thirds of adult smokers became daily smokers before they reached 19

Interventions in Schools

- Anti-tobacco programming and curriculum
  - Educate about health and economic consequences
  - Programming for prevention and cessation
  - Health or physical education course

- Federal Pro-Children Act of 1994 banned indoor smoking by anyone inside of school buildings in all states
  - Still allows those who have reached minimum age to smoke in parking lots and outdoor areas
  - Before, during, after school hours, and at school events

24/7 Smoking Bans

- Tobacco-Free School Laws
  - Bans use of tobacco products by students, staff, and visitors anywhere on school premises at any time for any reason
- Mandated in 30 states as well as District of Columbia

Tobacco products are prohibited on school grounds, inside school buildings, in school parking lots or playing fields, in school buses or vehicles or at off-campus school sponsored events. For purposes of this subsection, "school" means any public, charter or private school where children attend classes in kindergarten programs or grades one through twelve. A person who violates this section is guilty of a petty offense. (Arizona, 1999)

Adoption of 24/7 Bans

Figure 2: Year of Initial State 24/7 Tobacco-Free Law

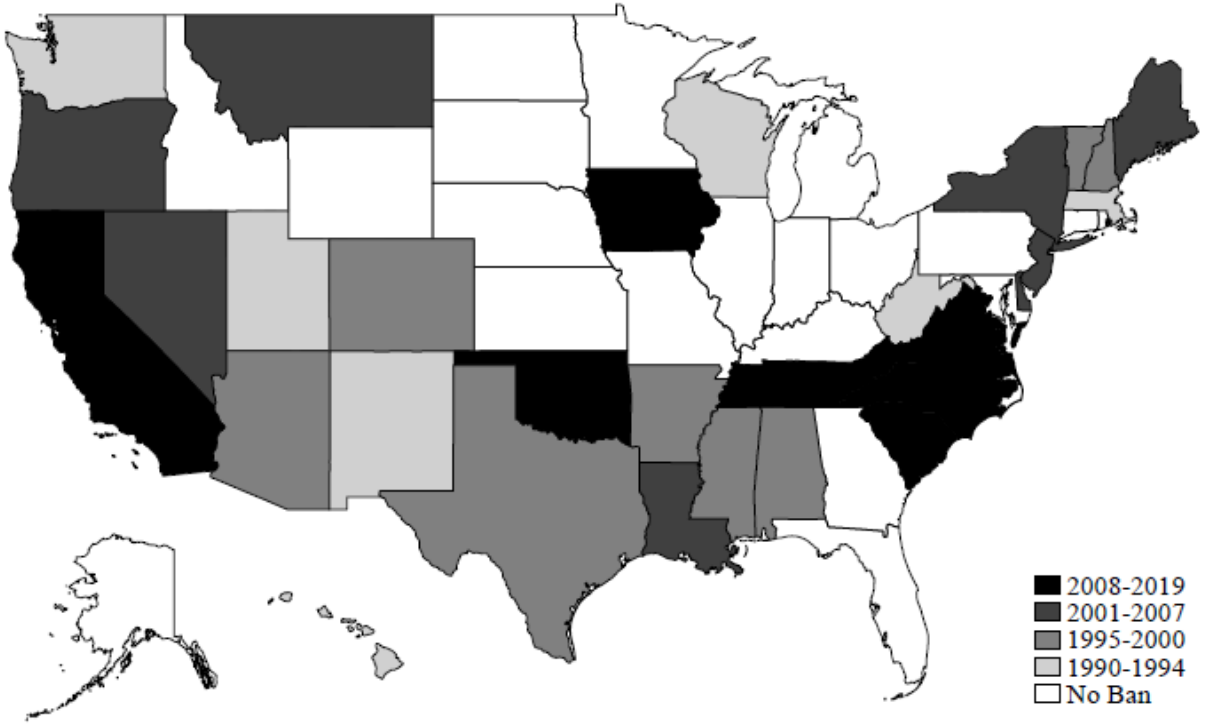
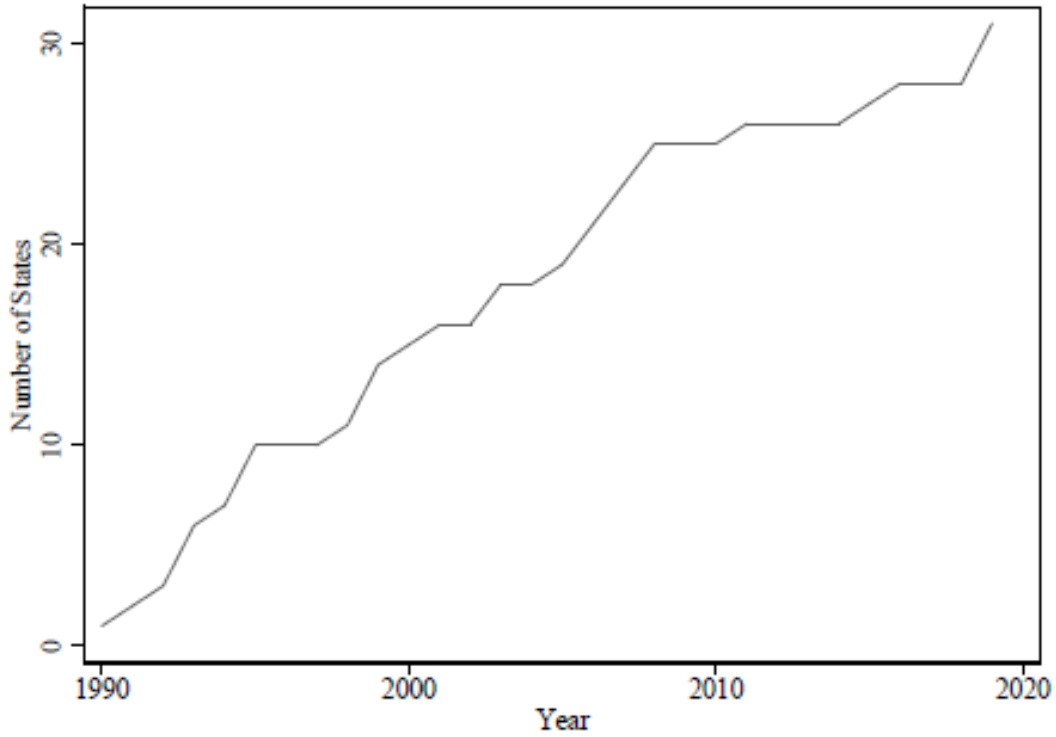


Figure 3: Adoption of 24/7 Tobacco-Free Laws by State



Mechanisms

- Why it may work
  - Restrict tobacco use and exposure to second-hand smoke
  - Limit opportunity to see *others* use tobacco
  - Teach by example, reinforce curriculum
  - Peer and role model effects

- Why it may not work
  - Lack of compliance and enforcement
  - Displace tobacco use to other places/times of the day

Prior Research on Smoking Bans

- Workplace, hospitality, public spaces
  - Reduces tobacco use in restricted locations (Evans, Farrelly, and Montgomery 1999, Carton et al. 2016)
  - Mixed effect on second-hand exposure (Adda and Cornaglia 2010, Kuehnle and Wonder 2017, Carpenter 2009)
- School settings
  - State indoor clean air laws have little impact on staff smoking behavior (Bitler, Carpenter, and Zavodny 2010)
  - Bans in Germany reduced propensity for smoking and number of cigarettes smoked (Pfeifer, Reutter, and Strohmaier 2020)

Research Questions

- What impact do 24/7 bans have on smoking behavior?
  - Students and school staff
  - Intensive and extensive margin
  - Smoking at school
- Do the bans have different effects one, three, five years out?
- Is the impact similar for teaching and non-teaching staff?

Data: State-Level Covariates

- 24/7 Bans
  - Lexis Nexis searches of state legislative documents and direct contact with public health administrators
  - Supplement with other sources such as ALA's State Legislated Actions on Tobacco Issues and CDC STATE System
  - Handful of additional states have bans which are less than 24/7 (exceptions on hours)

Data: State-Level Covariates

- Bans, taxes, and economic indicators
  - Cigarette taxes
  - Dates of statewide smoking bans in restaurants, bars, and non-hospitality workplaces (American Nonsmokers' Right Foundation, 2021)
  - Median household income, and unemployment rate

Data: Youth Risk Behavioral Surveillance System

- Cross-sectional
  - Every odd year, 1995-2019
  - Grades 9-12
  - Public and private schools
- Restricted use with state id
- Administered ~ spring
  - treated if ban exists in state on the first day of the year
- Ever smoked a cigarette
- Number of days in the past month that smoked a cigarette
- Number of days in past month that smoked a cigarette on school property (until 2013)

Data: Tobacco Use Supplement of CPS

- Cross-sectional survey
  - Every few years, 1995-2019
  - State id
- Samples
  - 15-18 year olds enrolled in high school
  - 22-65 year olds that work in elementary and secondary school industry
- Instructional staff vs. non
- Ever smoked >=100 cigarettes

  if yes, then
  - Currently daily smoker

    if yes, then
    - Number of days in past month that smoked a cigarette

Table 1: Descriptive Statistics for YRBSS

Variable	Mean (SD)
Individual-Level Smoking Outcomes	
Has Ever Smoked	0.51
Smoked in Past 30 Days	0.21
Smoked 3+ Days of Past 30 Days	0.16
Smoked at School in Past 30 Days	0.09
Smoked 3+ Days at School in Past 30 Days	0.06
State-Level School Smoking Ban	
School Smoking Ban	0.35
Individual-Level Covariates	
Age 14	0.11
Age 15	0.25
Age 16	0.26
Age 17	0.24
Age 18+	0.14
Female	0.49
Male	0.51
White	0.59
Black	0.14
Hispanic	0.17
Asian	0.04
Native American	0.01
Other Race/Multiracial	0.05
Race Missing	0.01
State-Level Covariates	
Non-Hospitality Smoking Ban	0.30
Restaurant Smoking Ban	0.40
Bar Smoking Ban	0.33
Cigarette Tax (2019 $/Pack)	1.19
	(0.92)
State Median HH Income (2019 $1000s)	61.05
	(8.68)
Unemployment Rate	5.82
	(2.03)
N	186,771

Table 2: Descriptive Statistics for CPS

Variable	Youth Mean (SD)	Education Industry Mean (SD)	Teachers Mean (SD)	Non-Teach. in Ed. Ind. Mean (SD)
Individual-Level Smoking Outcomes				
Smoked 100 Cigarettes in Lifetime	0.07	0.24	0.20	0.29
Smoked in Past 30 Days	0.05	0.08	0.05	0.11
Smoked 3+ Days of Past 30 Days	0.05	0.08	0.05	0.11
Smokes at Least Pack/Day	0.01	0.02	0.01	0.03
State-Level School Smoking Bans				
School Smoking Ban	0.27	0.36	0.36	0.36
N	64,529	70,781	33,727	37,054

Methods

- Difference-in-Difference Model

$$Y_{ist} = \alpha_0 Ban_{st} + \alpha_1 X_{ist} + \alpha_2 Z_{st} + \delta_t + \theta s + \gamma_{st} + \varepsilon_{ist}$$

  - Individual *i*, state *s*, survey year *t*
  - Individual and state level covariates
  - Year and state fixed effects
  - State specific linear time trends
  - Cluster s.e. at state level

Identifying Assumption

- Treated and control observations follow a common trend in absence of ban, conditional on covariates and time trends.

- Regressing ban on covariates produces coefficients that are close to zero and rarely significant

- Pre-Existing Trends/Dynamic Effects
  - Replace ban with set of dummies for years before and after ban

Results: YRBSS

Table 4: Effects of School Smoking Bans on Youth Smoking in YRBSS Data

Variable	Has Ever Smoked	Smoked 1+ Days of Past 30 Days	Smoked 3+ Days of Past 30 Days	Smoked at School in Past 30 Days	Smoked 3+ Days at School in Past 30 Days
School Smoking Ban	−0.0050	−0.0016	0.0056	−0.0113*	−0.0022
	(0.0087)	(0.0108)	(0.0077)	(0.0056)	(0.0055)
N	172,376	177,813	177,813	139,200	139,200

Results: CPS Youth

Table 6: CPS Results for High School Students Aged 15-18

Variable	Smoked 100 Cigarettes in Lifetime	Smoked 1+ Days of Past 30 Days	Smoked 3+ Days of Past 30 Days	Smokes at Least Pack/Day
School Smoking Ban	−0.0151***	−0.0159***	−0.0159***	−0.0017
	(0.0042)	(0.0040)	(0.0040)	(0.0012)
N	64,242	63,686	63,686	62,619

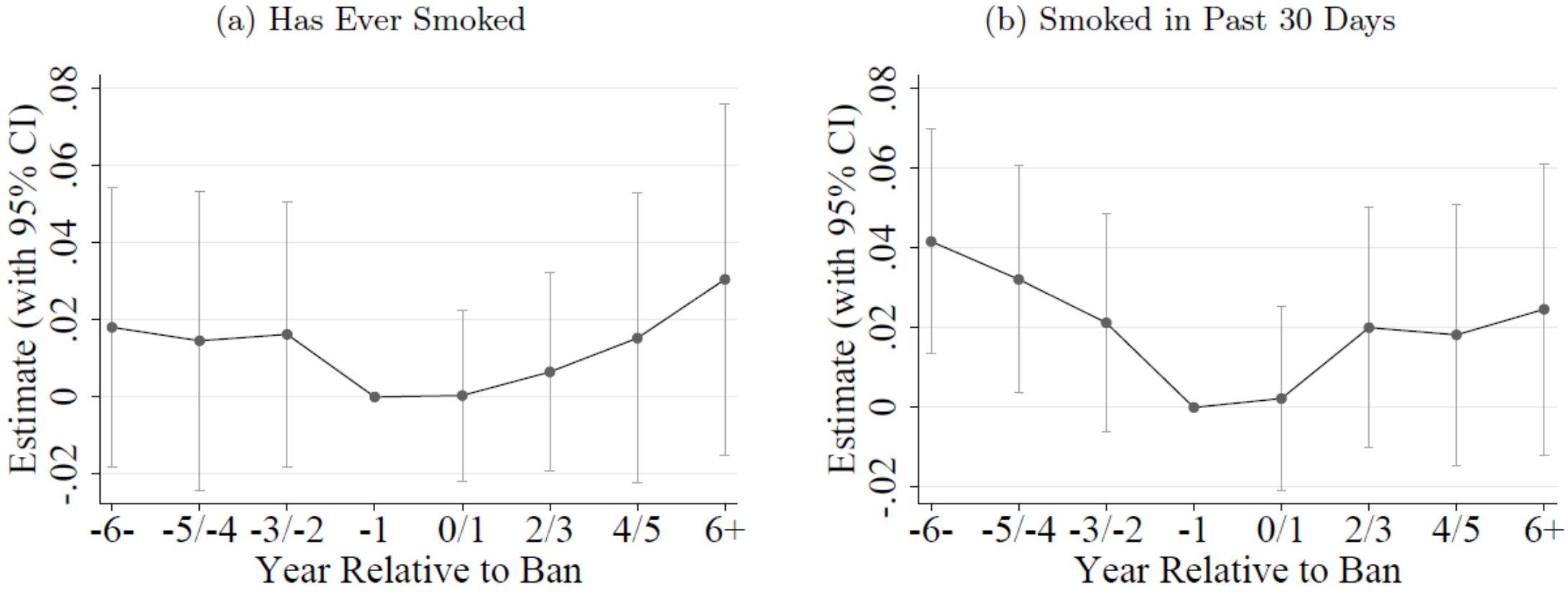
Results: CPS Adults

Table 8: CPS Results for Teachers vs. Non-Teachers in Education Industry

Sample	Smoked 100 Cigarettes in Lifetime	Smoked 1+ Days of Past 30 Days	Smoked 3+ Days of Past 30 Days	Smokes at Least Pack/Day
Teachers Aged 22-65				
Coefficient	0.0083	−0.0048	−0.0050	−0.0056*
(Standard Error)	(0.0174)	(0.0088)	(0.0085)	(0.0033)
Mean of Left-Hand Side Variable	0.2075	0.0571	0.0554	0.0127
Sample Size	33,663	33,501	33,501	33,267
Non-Teachers in Education Industry Aged 22-65				
Coefficient	0.0088	0.0068	0.0079	−0.0128
(Standard Error)	(0.0151)	(0.0129)	(0.0132)	(0.0093)
Mean of Left-Hand Side Variable	0.3043	0.1150	0.1131	0.0343
Sample Size	36,967	36,726	36,726	36,101

Results: YRBSS Dynamics

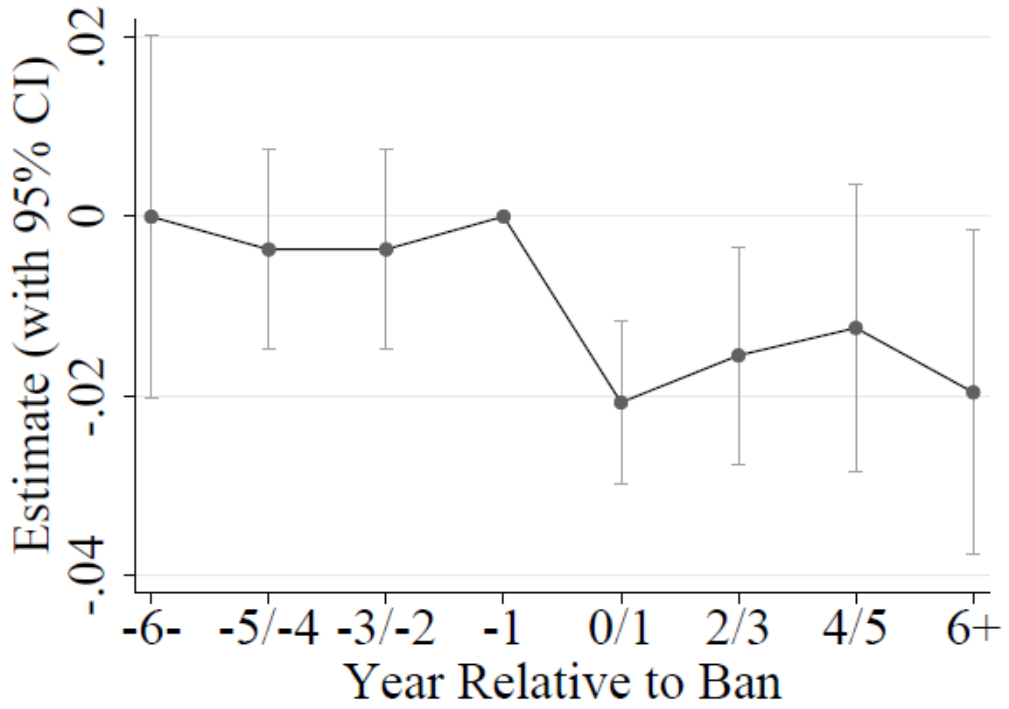
Figure 6: Dynamic Effects in YRBSS for Youth



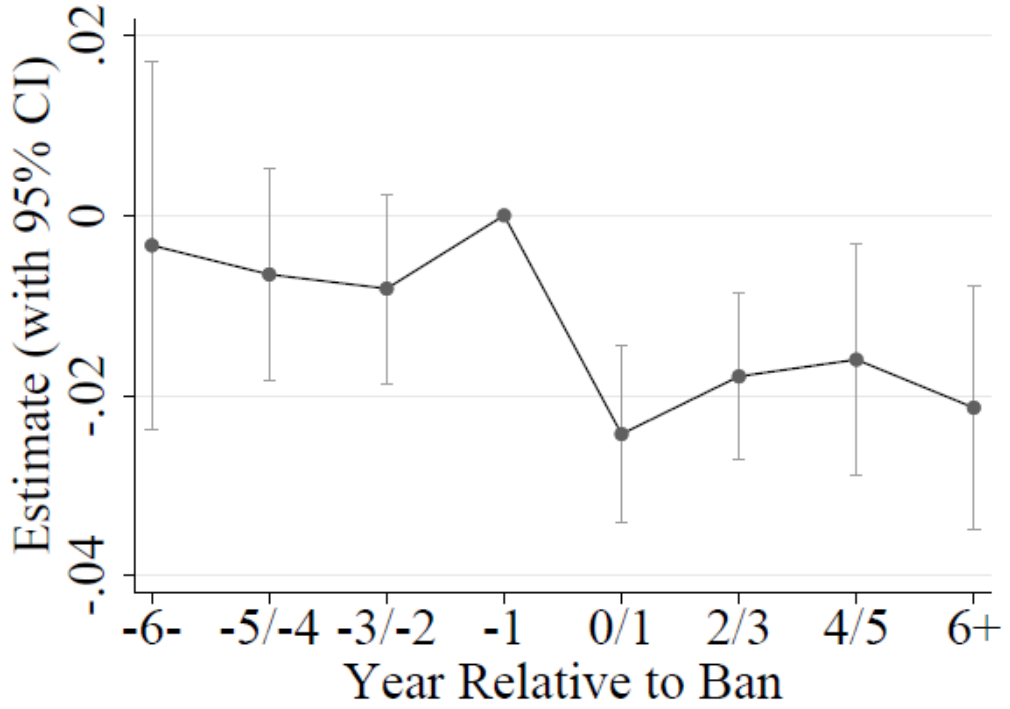
Results: CPS Youth Dynamics

Figure 8: Dynamic Effects in CPS for Youth

(a) Smoked 100 Cigarettes in Lifetime



(b) Smoked in Past 30 Days



Alternative Definitions of Treatment

- Only bans without exceptions for demonstrations or prescription use
- Only bans with state level enactment
- Only bans enacted by legislature

- Treated if ban enacted in state between January-June
- Treated if ban allows for hours exception

Discussion

- Results indicate
  - Little or no impact on youth smoking
  - Results are only significant in CPS data
  - No effect on school staff

- Evidence from other survey data suggests
  - Non-compliance by students
  - Lack of enforcement/implementation by schools
  - Local education agencies may have own bans

Discussion

- 10% of high school teens report that their peers always comply with school smoking restrictions (TAPS, 1989)
- 37% of students report knowing someone who used tobacco on school property in the past month (NYTS, 2013)

Table 10: Responses from Secondary Schools in SHPPS on Violations from Students

	Overall	Ban States	Non-Ban States
1994	68.6%	.	.
2000	57.6%	54.9%	58.3%
2006	45.6%	45.0%	45.9%
2014	88.0%	87.7%	88.2%

Discussion

Table 11: Responses from Secondary Schools in SHPPS on Not Being Allowed to Smoke on School Grounds

		Overall	Ban States	Non-Ban States
During School Hours				
Students	1994	98.9%	.	.
Staff	1994	71.4%	.	.
During Non-School Hours				
Students	1994	96.5%	.	.
Staff	1994	61.9%	.	.
During Any School Activity				
Students	2000	96.5%	95.7%	96.8%
	2006	97.4%	96.5%	97.9%
	2014	95.5%	95.5%	95.5%
Staff	2000	77.0%	85.0%	74.8%
	2006	87.4%	95.7%	83.3%
	2014	96.1%	96.8%	95.5%
Visitors	2000	69.3%	82.3%	65.8%
	2006	79.7%	90.7%	74.2%
	2014	92.9%	94.3%	91.9%

Questions/Comments?

- Rachana.Bhatt@usg.edu
- www.linkedin.com/in/rachana-bhatt-40b54a236