

Understanding the Impact of Tobacco Control Media Campaigns: Refining Old Models, Developing New Ones, and Applying Lessons to Other Health Promotion Media Campaigns



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Overview

- A little bit of background: media campaigns and smoking
- Present analyses of the relationship between adult smoking and exposure to anti-smoking TV ads
 - Data, Methods, and Results
- Discuss some related analyses & next steps
 - Anti-Drug
 - Obesity
 - Pharmaceutical
 - New Media

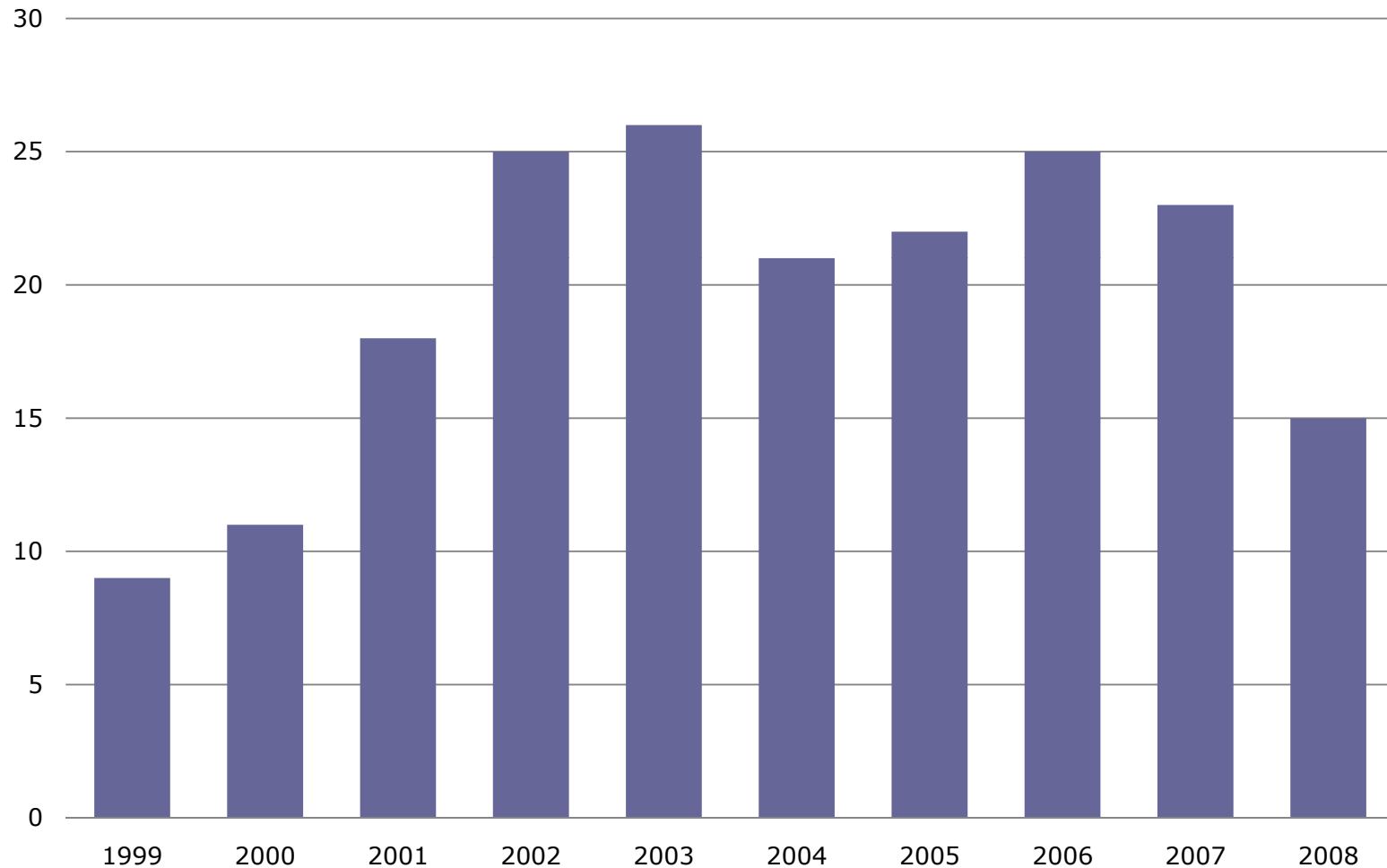


Background:

TV Advertising and Smoking

- Tobacco remains the largest killer in US and world.
- Following the Master Settlement Agreement between the tobacco industry and 46 states (in 1998), there was a huge increase in the number and type of smoking-related television advertisements
- Increases in number and types of smoking related ads has resulted in variation in exposures over time and between communities: a natural experiment
- Most previous studies involved research demonstration projects, effects of tobacco control advertising at the state level (eg. CA, MA, FL) or national level (Fairness Doctrine; American Legacy Foundation)

Counter-Marketing Campaigns in the US: 37 State Campaigns + Legacy (national)



Defined as at least ½ exposure pure month.
37 states and the District of Columbia over a ten year period (1999-2008)

Other Smoking-Related Ads

□ Pharmaceutical Cessation Aids

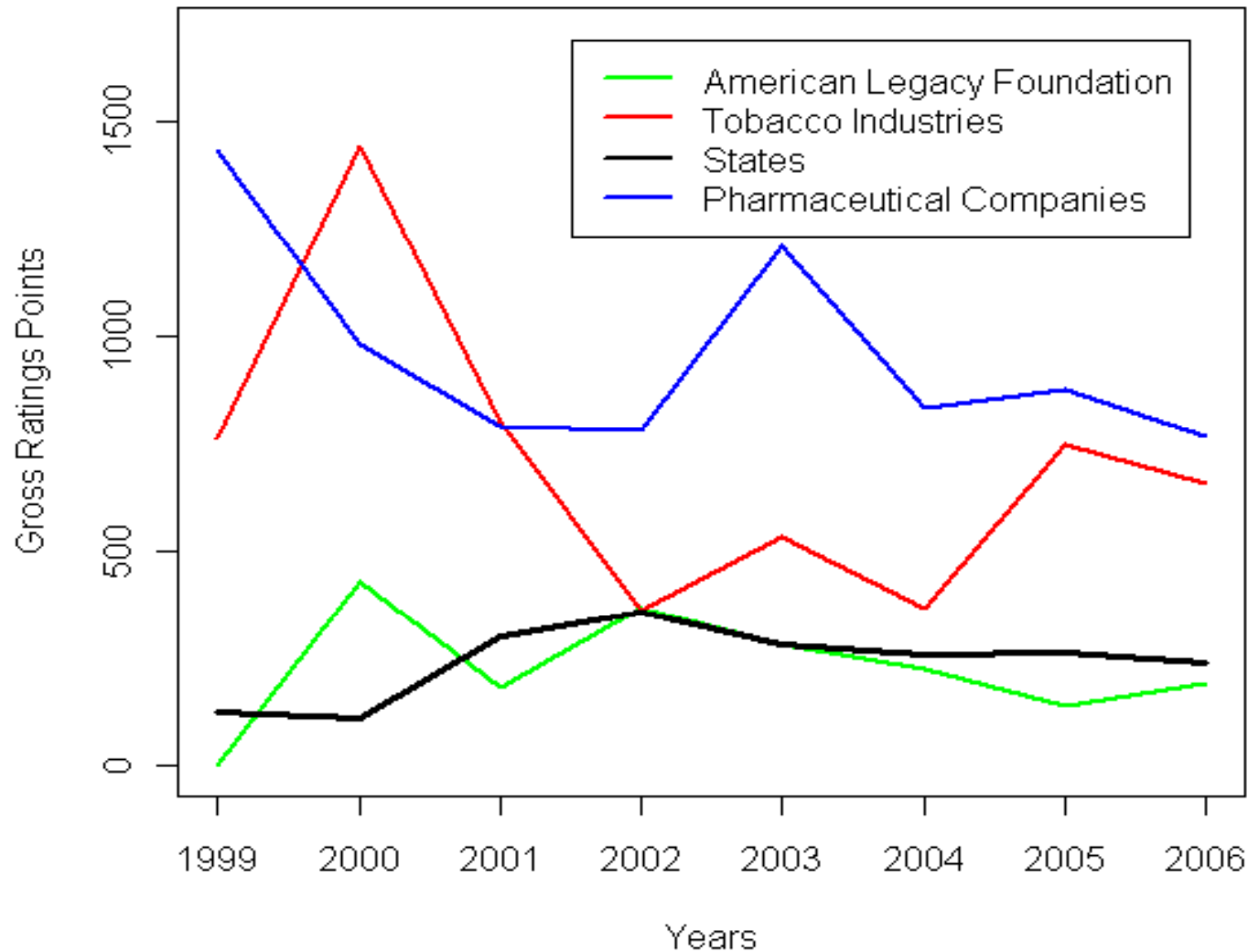
(NRT, Zyban)

- Early 1992-present
- 1996 NRT goes over-the-counter (OTC)

□ Philip Morris's Television Campaigns

- Dec 1998 Think. Don't Smoke. (Youth)*
- Jul 1999 Talk. They'll Listen. (Parent)*
- Jul 2000 Things are Changing (corporate image)
- Jul 2003 www.philipmorrisusa.com (corporate image)

US Annual Average Smoking-Related Television Advertising Exposure Levels, by Sponsor



Previous research on youth showed:

- ❑ **Tobacco and pharmaceutical companies are the largest smoking-related advertisers, even in states with large media campaigns (Wakefield, Szczypka, Emery et al., 2006. *Addiction*).**
- ❑ **Anti-smoking ads are associated with smoking-related attitudes, beliefs, and behavior (Emery, et al., 2005, *JPAM*).**
- ❑ **Tobacco Industry youth-targeted ads have little affect on youth; the parent targeted ads may be associated with harmful boomerang relationships among older youth (Wakefield, Terry-McElrath, Emery, et al., *AJPH*, 2006).**
- ❑ **Recent state budget crises that have resulted in severe cuts or elimination of tobacco control media campaigns may result in longer-term costs**
- ❑ **There is very little evidence about advertising and adult smoking**

Tobacco Advertising Research Hypotheses

- **Exposure to anti-smoking (state and Legacy sponsored) ads is associated with:**
 - Increased anti-smoking attitudes and beliefs
 - Reduced smoking

- **Exposure to Pharmaceutical or Tobacco Industry ads on TV is associated with:**
 - smoking-related attitudes, beliefs and behaviors (direction unclear)

- **Exposure to one type of ad will interact with exposure to another type**
 - Industry ads will counteract the effects of public health ads
 - Legacy and state ads will reinforce each other

Study Design

Exposure Measures: Nielsen Data

- **Type:** Single occurrence (every commercial)
- **Length:** 1999 – 2009
- **Breadth:** 75 Designated Media Areas (DMAs)

- **Size of Data Set:** Approximately 3+ million individual ad occurrences

- **Variables for each ad occurrence:**
 - Date and Time
 - Market and Station (Network, Local Affiliate, Cable)
 - Sponsor, Creative Title, Program Title
 - Gross Rating Points (GRPs) for Total Television Households
 - Targeted Rating Points (TRPs) Total Teens 12 –17

Interpretation of Ratings

- Customary unit for quantifying exposure to ads
- If one percent of the audience sees an ad one time, the ad earns one GRP or TRP
- Aggregated monthly, by media market, to estimate the average number of times/month an ad is exposed to an audience in that market
 - 100 GRPs = 1 potential exposure (on average)
 - 250 GRPs = 2.5 potential exposures (on average)
- Exposures are averages across the population, depending on viewing habits

Study design: outcome measures

- Current Population Surveys-Tobacco Use Supplements
 - approximately 56,000 households per wave.
 - Used waves from 1998-1999, 2000, 2001-2002, and 2003, and 2006-2007 waves (and 2009 as soon as it's available).
- Measures
 - Current smoking (any in past 30 days)
 - Someday smoking
 - Everyday smoking
 - Amount smoked
 - Planning Quit Attempt in next 30 days

Basic Model

Smoking Behavior_i = f[GRP_{m(j,(i))}, personal characteristics_i, state tobacco policies_{s(i)},]

- Personal Characteristics (controls): age, race, gender, (time), education, marital status, employment status (full-time indoor, part-time indoor, not in labor force, part/full-time home, unemployed), geographic region
- State Tobacco Policies : Smokefree Air Index, real average price of cigarettes, 'baseline' state-level smoking prevalence

Models of Smoking Behavior

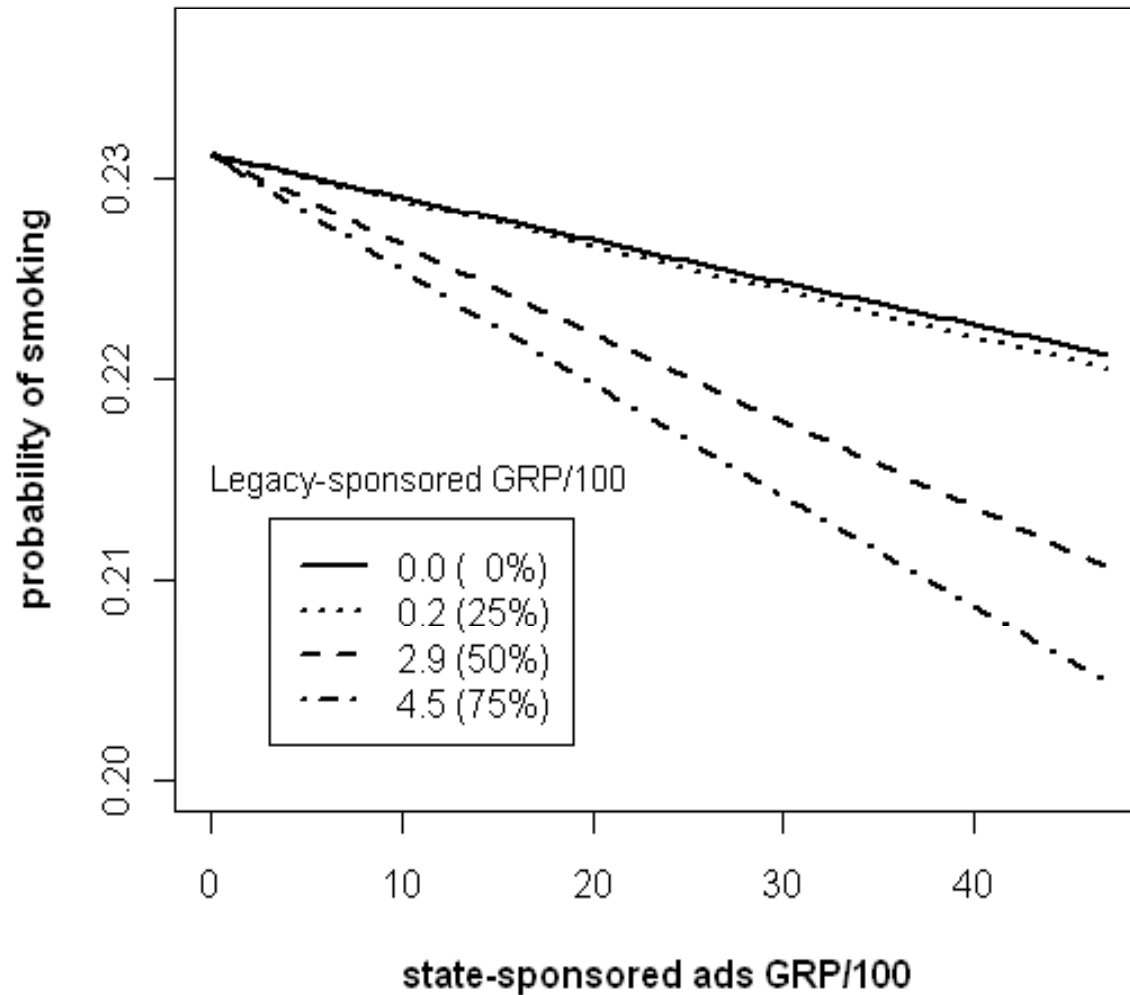
	Current v. Non-Current ¹ N=433232 (p-value)	Intention to Quit ¹ N=65747 (p-value)	Number of Cigs/Day ² N=298365 (p-value)
State ³	0.97 (0.0002)	1.05 (0.0061)	NS
Legacy ³	0.96 (0.0032)	1.11 (0.0025)	NS
Pharm ³	0.97 (<-0.0001)	NS	NS
Tob-Industry ³	1.04 (<0.0001)	1.09 (0.0133)	NS
Cigarette Price (\$1 increment)	0.95 (0.0015)	1.12 (0.0099)	-0.06 (<0.001)
SFA score	0.998 (0.0015)	NS	NS

¹Odds Ratio from logistic regression models

²Regression Coefficient from negative binomial regression model

³ Exposure measured by 10 recency-weighted exposures for four months prior to survey date

Significant Interaction between Legacy and State Ads



Summary of Fixed-Effects Models

- **More of the good stuff is generally good**
 - State, Legacy, and Pharmaceutical ads are associated with lower odds of smoking
 - Tobacco Industry ads are associated with higher odds of smoking
 - State, Legacy, and Tobacco Industry ads are associated with higher odds of having intentions to quit
 - There appears to be no relationship between ads and the amount smoked by current smokers
 - Legacy and State ads reinforce each other

Related and On-going Analyses

- Random Effects Models allow us to account for multi-level data.
 - Individual level data combined with media-market level data
 - Correlations between individuals within a media market

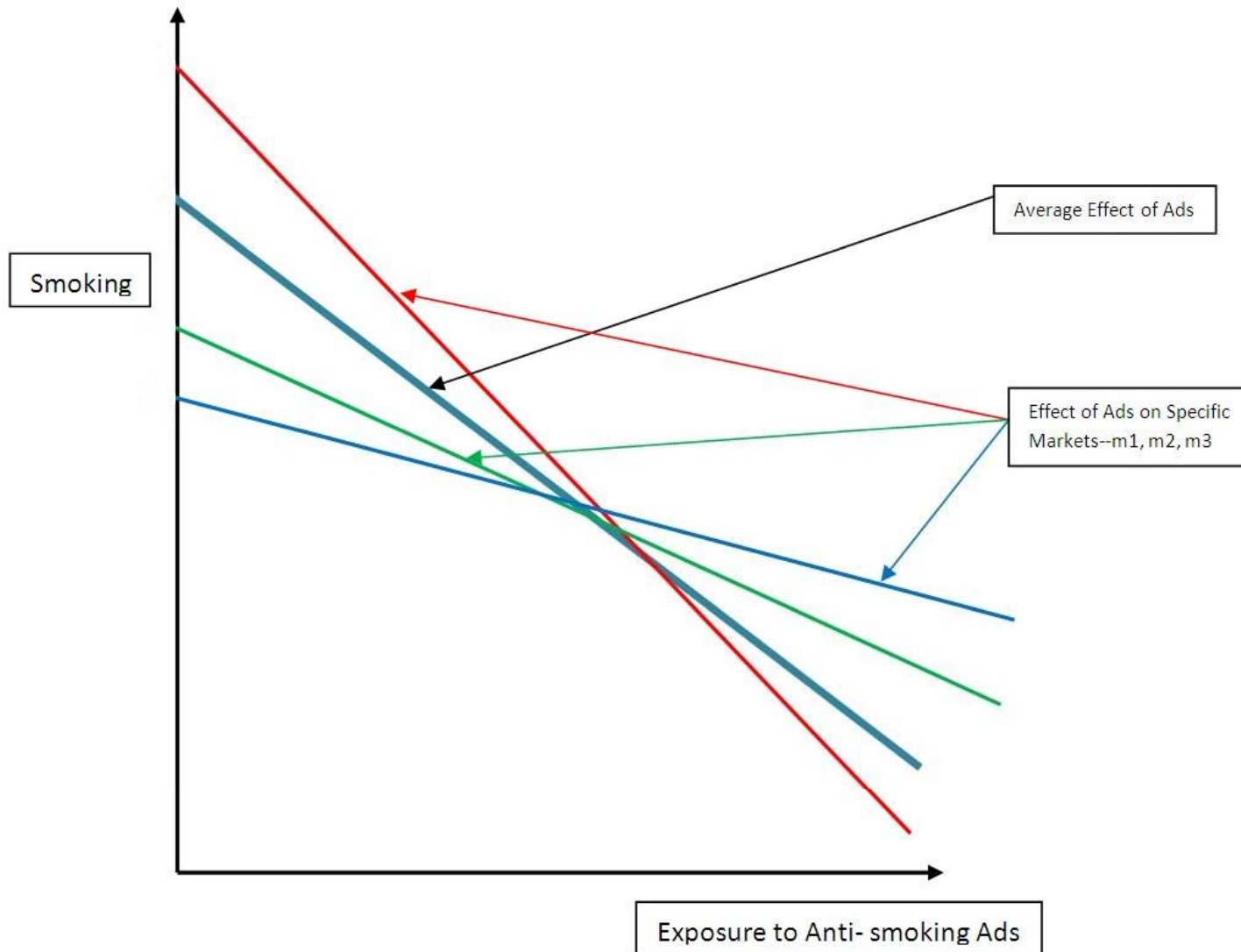
$$\text{Smoking} = \beta_{0(m)} + \beta_{1(m)}\text{GRP} + \beta_2\text{Personal} + \beta_3\text{Tobacco Control} + u$$



Early findings of Random Effects Models

- There is significant variance across media markets in the relationship between exposure to ads and adult smoking:
 - Intercept: Initial smoking prevalence varies
 - Slope: The effect of the ads varies

Illustration of Variance in Ad Effects





What explains the differences we see?

- State policy environment
 - Cigarette prices
 - Smokefree Air laws
 - Size and length of media campaigns

- Population characteristics
 - Proportion of full-time indoor workers
 - Proportion of population under 25 years old
 - Proportion non-white
 - Average education level

- **What do you think???**

Maybe it's something about the ads...

- What are salient characteristics of ads?
 - What do you think???

- Is it possible to reliably code for ad characteristics?
 - Do you think it is??

- Partnered with Joseph Cappella, from the Annenberg School of Communications at the University of Pennsylvania to develop and validate codes

Answering the Questions Incrementally: Describing Ad Characteristics

- No small endeavor: Nielsen data include over 2000 individual state-sponsored ads—so we prioritized those with greatest exposure levels
- Need to match actual ads in CDC archives to Nielsen data, and then rank by GRPs
- When the ads are ranked, the top 75%, or so, of the total ratings points represented a manageable number of ads (approximately 150) .



Ad Characteristics

General Information

- Length of ad
- Target Audience
 - youth v. general
 - pregnant smokers
 - race/ethnicity
- Quitline direction (phone and/or website)
- Sound Quality
- Picture Quality

Ad Characteristics

Message Themes

- Health
 - Disease and Death
 - Cosmetic damage
- Quitting
 - Positive frame of quitting
 - Strategy of Quitting
- Negative Tobacco Industry
 - Tobacco Industry Marketing tactics
 - Selling Disease and Death
- Endangers others-secondhand smoke
- Social Stigma of Smoking
 - Endangers others-burden
 - Smokers' negative life circumstances
 - Refusal skills model

Ad Characteristics

Message Sensation Value

- Animation
- Cuts
- Edits
- Faces
- Special visual effects
 - E.g. computer manipulation of images; blood
- Slow Motion/Fast Motion
- Unusual colors
- Intense moments
- Sound Saturation
- Music
- Sound Effects
- Slow Voice
- Fast Voice



Ad Characteristics

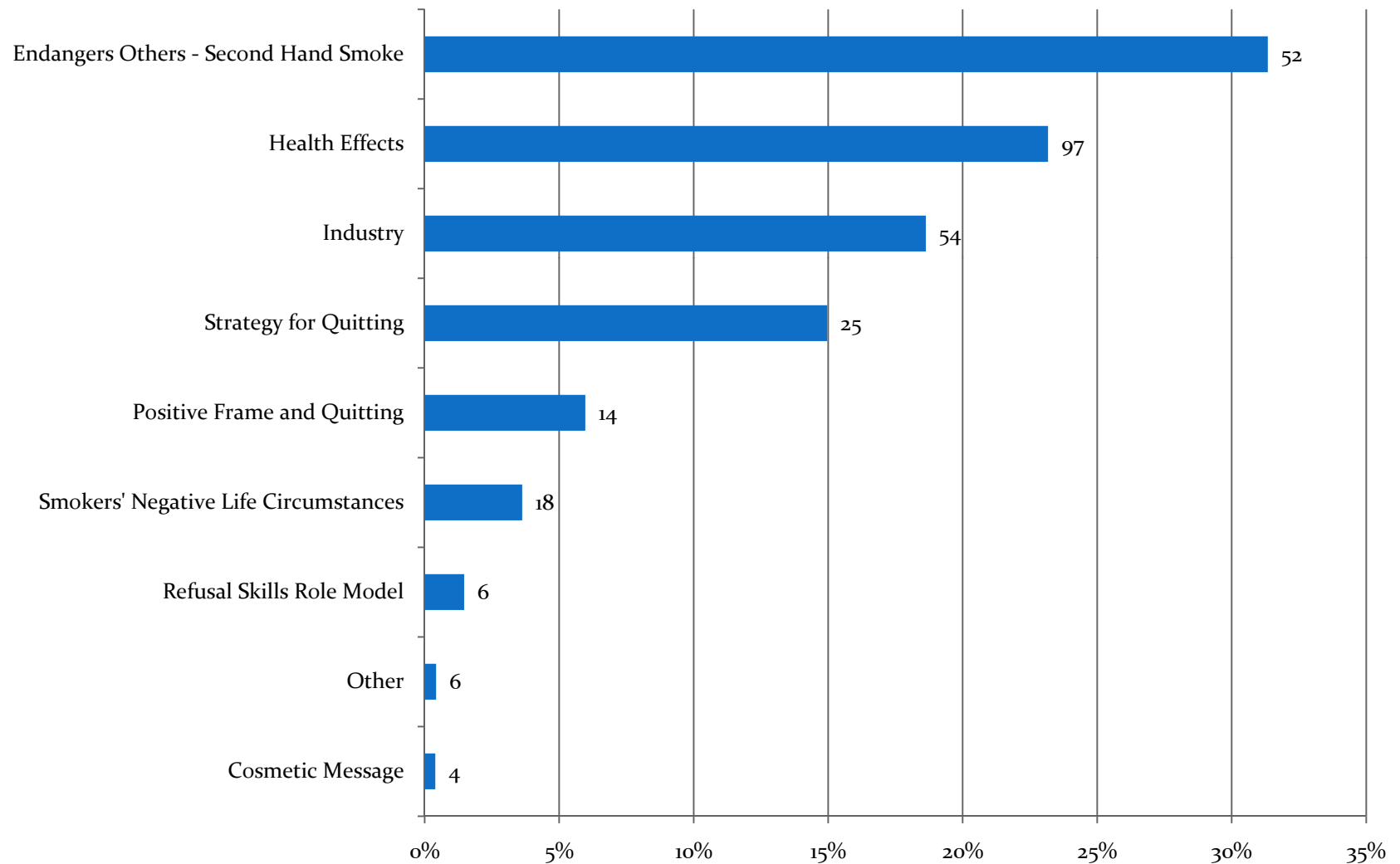
Message Sensation Value-Content

- Acted-out v. Talking Head
- Narrative
- Unexpected format
- Surprising/twist ending

Death Appeals

Smoking Cues

Ad Messages: Percent of GRPs, and number of markets





Reduced and Combined messages for analytic purposes

- Endangers Others-Secondhand Smoke
- Health Effects = Disease and Death with Endangers Others-Burden
- Industry Marketing = Marketing Tactics with Selling Disease and Death
- Strategy for Quitting

Early results: suggestive, but don't take it to the bank yet...

□ Tobacco Control Policy

- Higher cigarette prices and stronger SFA laws associated with lower variance in slope of GRPs
- No significant interaction between cigarette prices or SFA laws and slope of GRP

□ Population Characteristics

- Higher proportion of full-time workers associated with lower variance in slope of GRPs
- Higher proportion of youth (<25) associated with steeper slope of GRPs
- Higher proportion of non-white associated with steeper slope of GRPs



More early results

- Higher proportion of Health Effects and Second Hand Smoke ads are associated with lower variance in slope of GRPs
- Higher proportion of SHS ads associated with steeper slope of GRPs
- Higher proportion of narrative format ads associated with flatter slope of GRPs

Take away ideas, so far...

- There are lots of campaigns that emphasize secondhand smoke
- Health effects messages are next most common, followed by industry marketing, and strategy for quitting
- Second Hand Smoke may be an impactful message
- Dominance of a single message in a campaign may blunt the effect of total amount of ads

Limitations and next steps

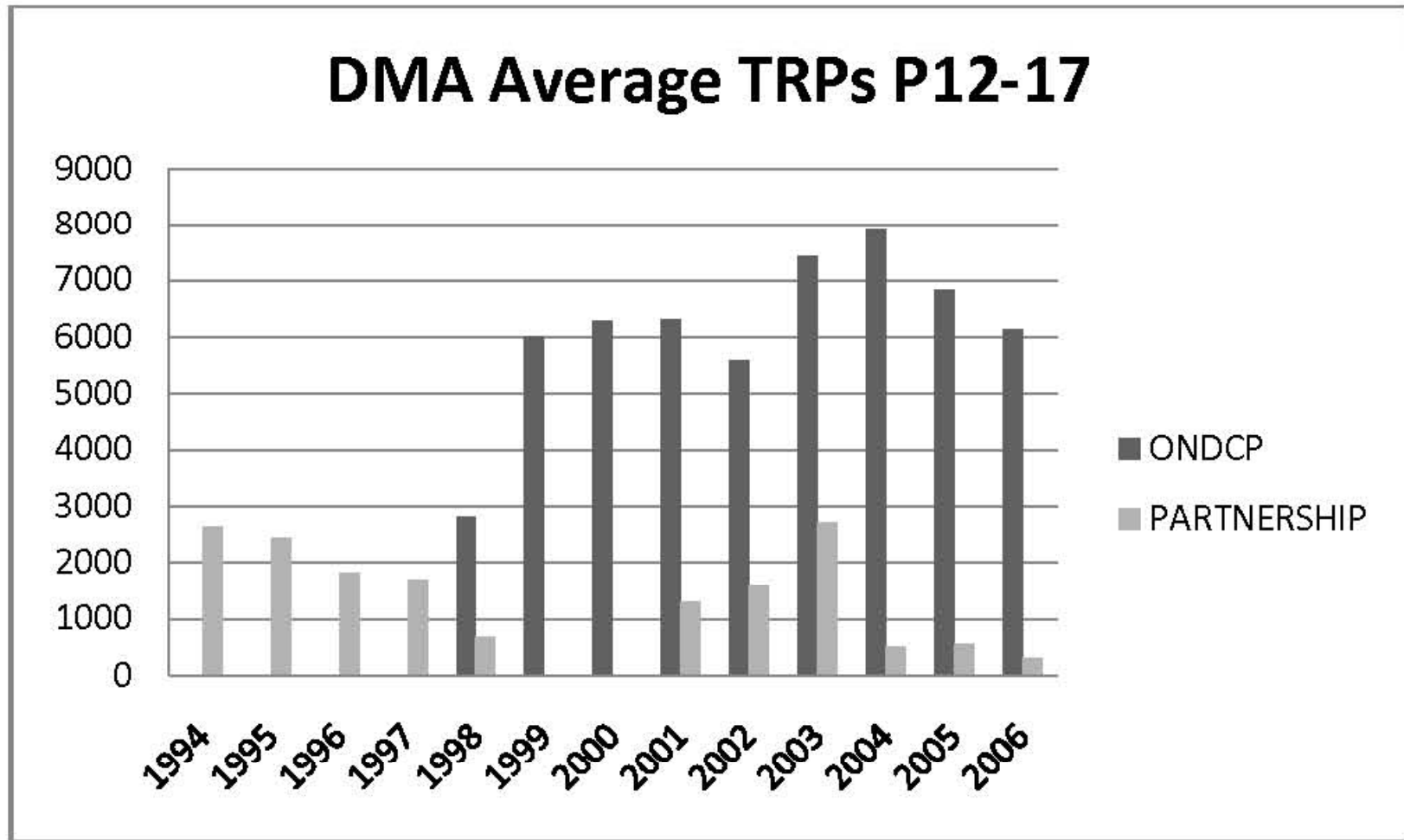
- We still haven't really figured out WHY the effect of ads varies across markets
 - What do you think???
- Only most highly exposed ads were coded for message and other characteristics
- Many other ad characteristics to consider
 - Message sensation value
 - What would you recommend considering next?



A similar problem: Anti-Illicit Drug Advertising

- Partnership for a Drug-Free America launched first national anti-drug ad campaign in 1986
- Office of National Drug Control Policy launched massive media campaign in 1998, with nearly **\$1 Billion** authorized over five years
 - Early evaluations of ONDCP campaign suggested no effect, or worse—detrimental effect
 - After 2002, Marijuana Initiative began
 - 2004-5 Peer intervention ads introduced
 - 2006 Another re-focus—“Above the Influence”

Exposure levels for PDFA and ONCDP Ads



Relationship between exposure and drug-use-related outcomes

- Higher exposure to total anti-drug ads was associated with higher recall
 - For middle school students, significant relationship only for Partnership ads
- Partnership Ads
 - Higher disapproval of MJ for HS youth
 - Higher perceived risk of MJ for HS youth
 - Lower perceived availability of MJ for HS youth
 - Lower MJ and IOTM use for HS youth
- ONDCP Ads
 - Lower perceived risk (especially during 2003-2006)
 - Lower disapproval



Does Content Matter?

- MJ-focused ads more effective among Middle School students but potentially harmful among High School students
- More research necessary to understand effect of content and amount of exposure

Framing the Problem:

Is Obesity like Smoking? YES

- Public Health 'epidemic':
 - obesity associated with premature death, type 2 diabetes, heart disease, stroke, hypertension, gallbladder disease, osteoarthritis, sleep apnea, asthma, breathing problems, cancer, high blood cholesterol, complications of pregnancy, menstrual irregularities, hirsutism, stress, incontinence, and depression

- Obesity rates doubled in the U.S. (1978 – 2002)
 - Among adults in 1999-2002
 - 65% (!) were overweight (BMI > 25)
 - 30% were obese (BMI>30)
 - 5% were morbidly obese (BMI > 40)
 - Among children (6-19 years old)
 - 31% at risk for overweight or overweight (BMI≥85th percentile)
 - 16% overweight (BMI≥95th percentile)
 - Problem varies by race/ethnicity

Framing the Problem, continued:

Is Obesity like Smoking? YES

- Federal and state governments in the US have recently launched anti-obesity advertising campaigns.
 - In 2000, anti-obesity ads aired in one media market (San Diego)
 - In 2001, anti-obesity ads aired in the five California media markets
 - In 2002, the CDC's VERB campaign was launched across 75+ media markets nationally, and 3 additional state-level campaigns aired across 3 new markets
 - In 2003, the VERB campaign continued to run and 5 more states launched campaigns—bringing the total of state campaigns to nine.

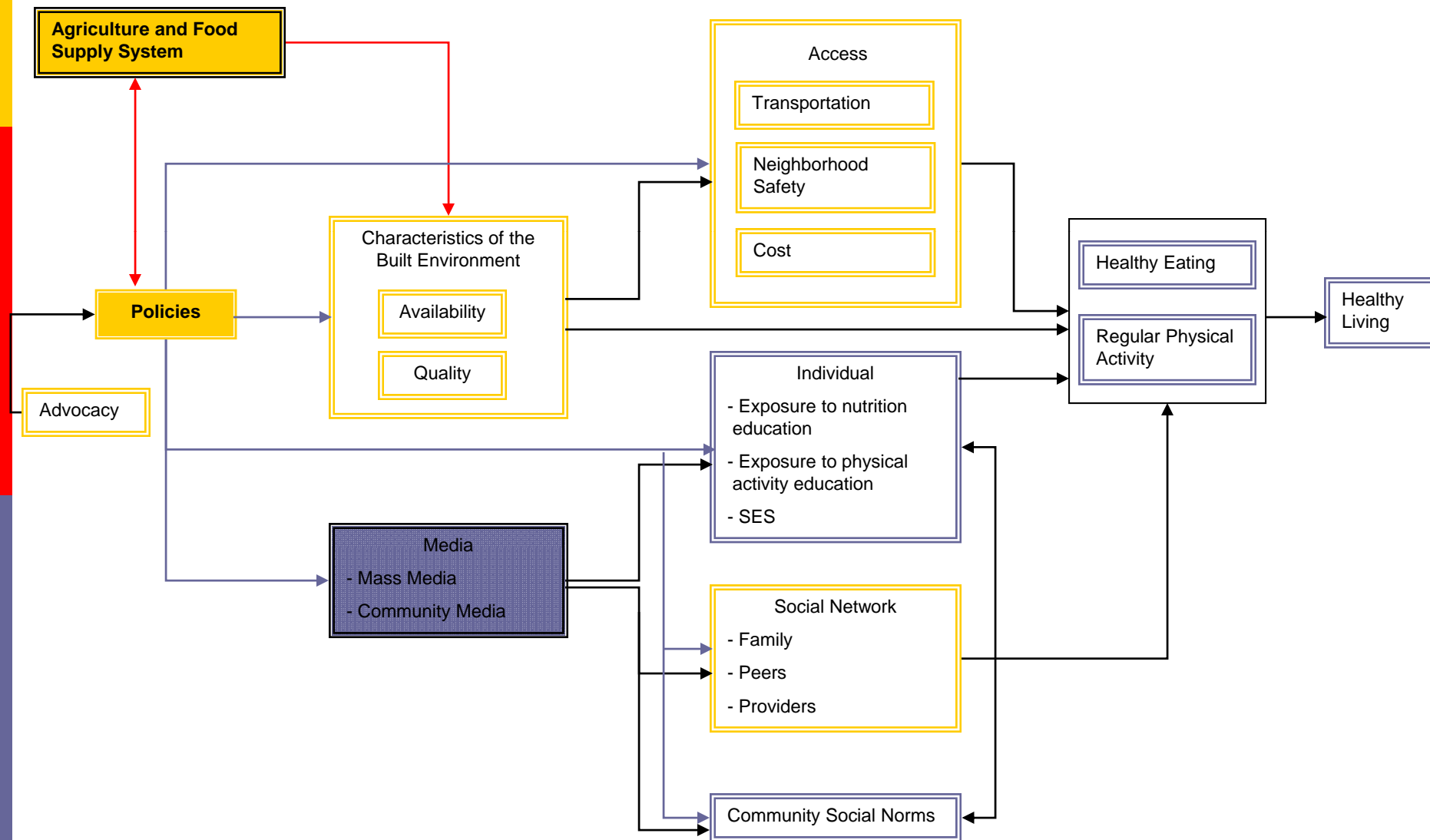
Framing the Problem, continued:

Is Obesity like Smoking? NO

- Obesity is not a single behavior:
 - Eating
 - Physical activity
 - Genetics
 - Culture
 - Work/Transportation
 - Built Environment: access to and cost of food, transportation, opportunities for physical activity

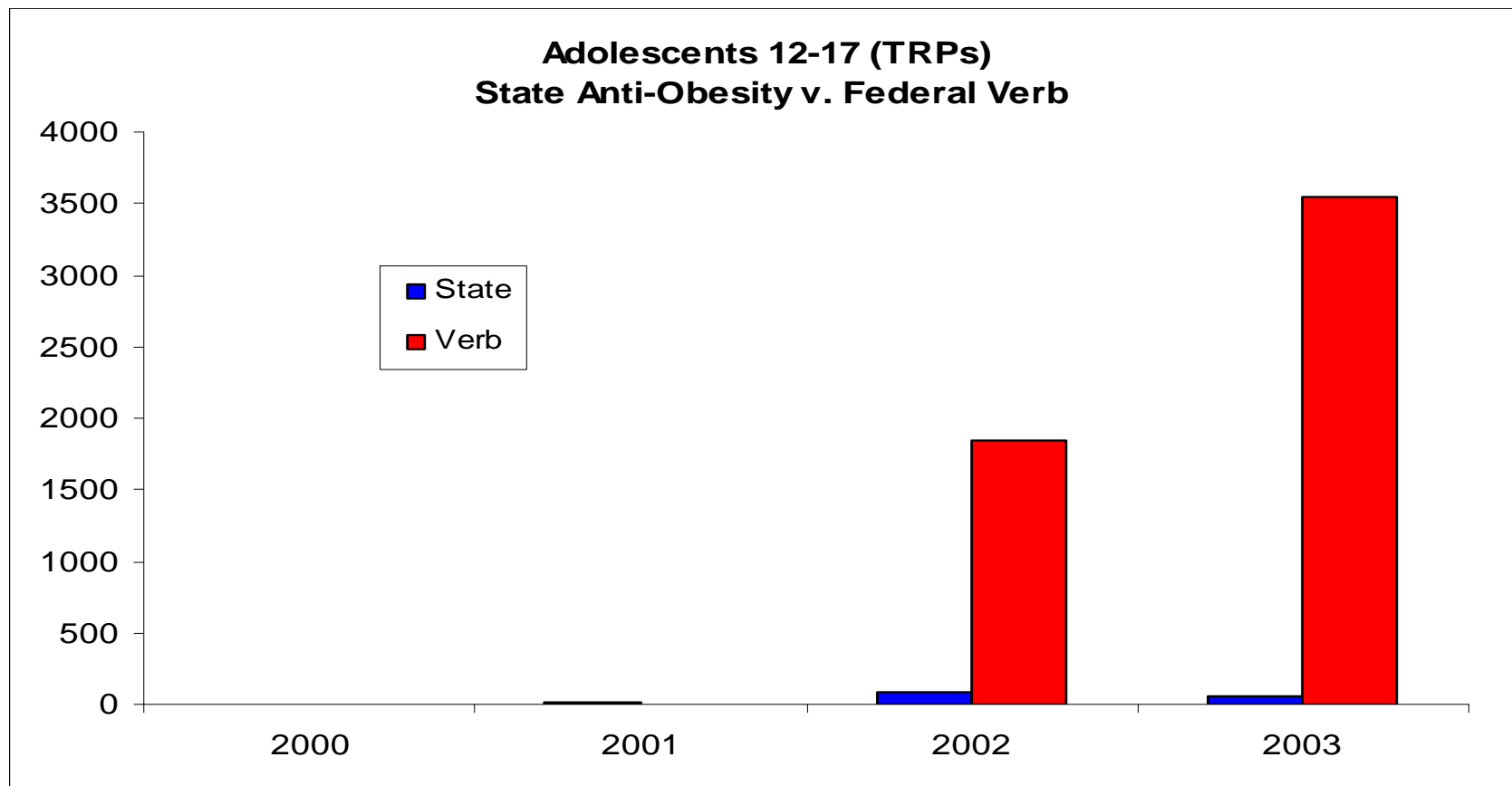
- Even media environment is more complex:
 - Ads for food: fast food, groceries, restaurants...
 - Ads about other obesity-related behaviors (gym membership, active cruises?...)

Environmental Influences on Physical Activity and Healthy Eating



Moving Forward Anyway: Media Data

- GRPs and TRPs for state and federally sponsored anti-obesity advertising for 75 media markets for 1999-2003



Moving Forward Anyway: A different take on the Media Data

National Average Public Health TRPs (12-17) by TYPE

year	Active	Healthy Eating	Both
2000	0	3	1
2001	0	15	0
2002	1860	29	31
2003	3559	24	34

Looked for other messages: don't eat junk; don't be a slug.

Basic Model

- **Obesity-related Behavior_i = f[personal characteristics_i, built environment_{l(i)}, TRP_{m(i)}]**

- **E.g., DV= vegetable eating; exercise; BMI ...**
 - Personal Characteristics: grade, year, gender, race/ethnicity, earned income, average parental education, job, sports, vegetable eating(?), exercise(?)

 - Built Environment: non-paid exercise opportunities, paid exercise opportunities, fast-food outlet density, grocery prices...

Future Directions

- Simple description of media environment: what's out there now:
 - Public health ads
 - Food (cereal, snacks, candy, chips, cookies, grocery promotions...)
 - Soda/Pop, sugary beverages
 - Fast food
 - Restaurants
 - Sports club promotions

- Play with basic models

- Further characterize public health ads: message content, targeting, length...

Another Related Area—Pharmaceutical Advertising

- Fourth most common TV ads
- Do they educate consumer or drive demand and health care costs?
- Evidence so far is MIXED
- Nielsen data allow us to look across drug categories
- Also important to look at content

How relevant is TV advertising in a Rapidly Changing Media Environment?

- TV remains dominant medium—Americans watch an average of 4 hours of TV/day!
- Internet use nearly universal—60% of homes have broadband!
- The way we watch TV has changed!
 - In 2006 25% of TV time shared with Internet use
 - DVRs and other sources of video content increasingly common
- Need to account for exposure, seeking and exchange of health-related information—and interaction of each!