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## *Secondhand Smoke and Legislating Clean Indoor Air*

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## *Section A*

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SHS and the Health Effects of Passive Smoking

# *Definition of SHS and Passive Smoking*

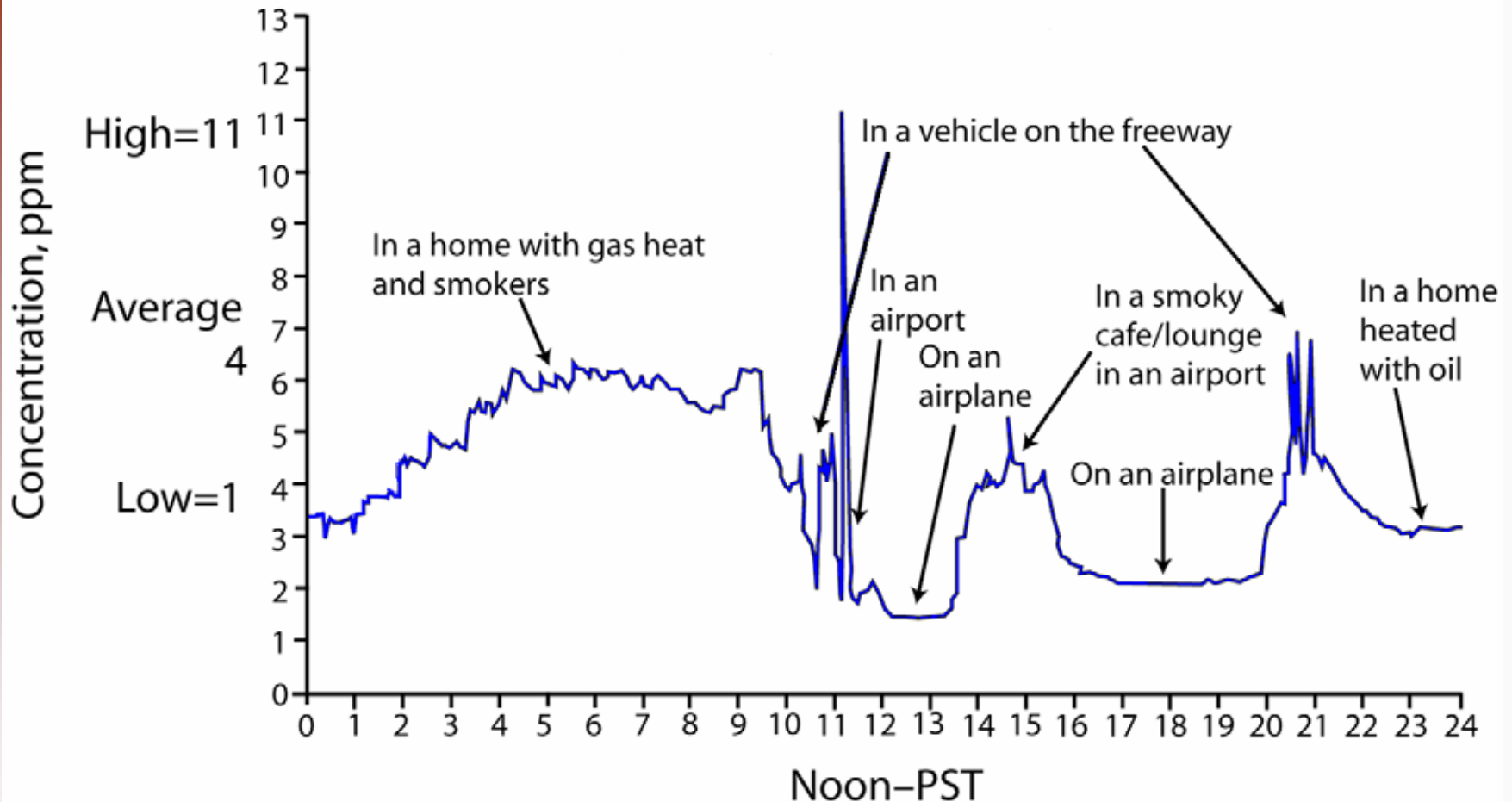
- SHS
  - Mixture of sidestream smoke released by the smoldering cigarette and the mainstream smoke that is exhaled by the smoker
  
- Passive Smoking
  - Inhalation of tobacco smoke by nonsmokers. Also referred to as involuntary smoking

- Some Terminology
  - Active smoking
  - Passive smoking
  - Involuntary smoking
  
- SHS or ETS
  - SHS preferred
  - ETS originated with industry

- Irritants and Toxicants
  - Ammonia, formaldehyde, carbon monoxide, nicotine, toluene, nitrogen dioxide, hydrogen cyanide, acrolein, acetaldehyde
  
- Carcinogens
  - Benzo[a]pyrene, 2-naphthylamine, 4-aminobiphenyl, benzene, vinyl chloride, arsenic, chromium, polonium-210

- Homes, workplaces, transportation, public places
- Exposure varies with time-activity pattern
- Exposure in multiple locations adds up to total personal exposure

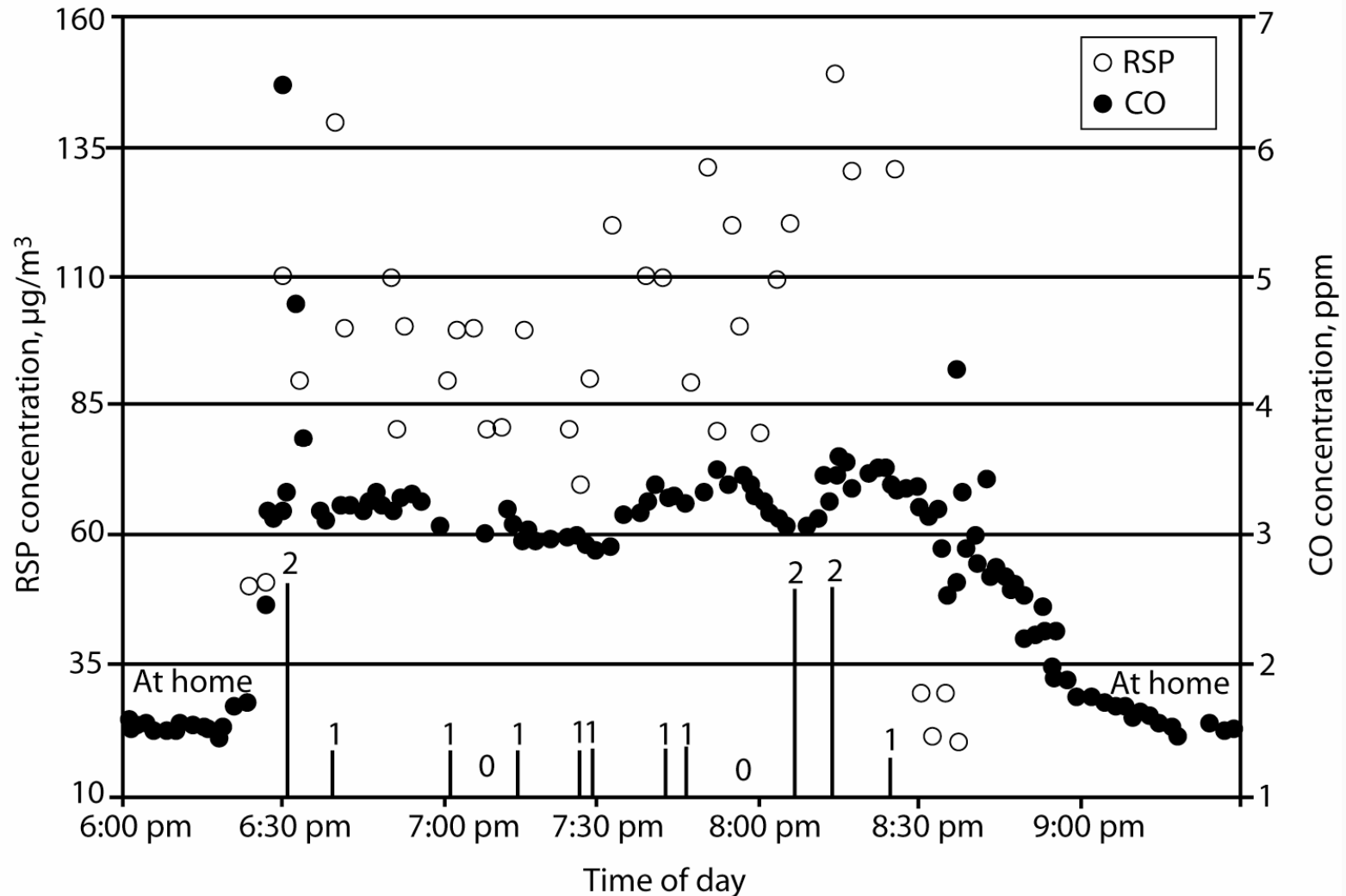
# Personal Exposure to CO across a Day



Source: Klepeis, N.E. 1999. An Introduction to the Indirect Exposure Assessment Approach: Modeling Human Exposure Using Microenvironmental Measurements and the Recent National Human Activity Pattern Survey. Environmental Health Perspectives Supplements 107 (S2).

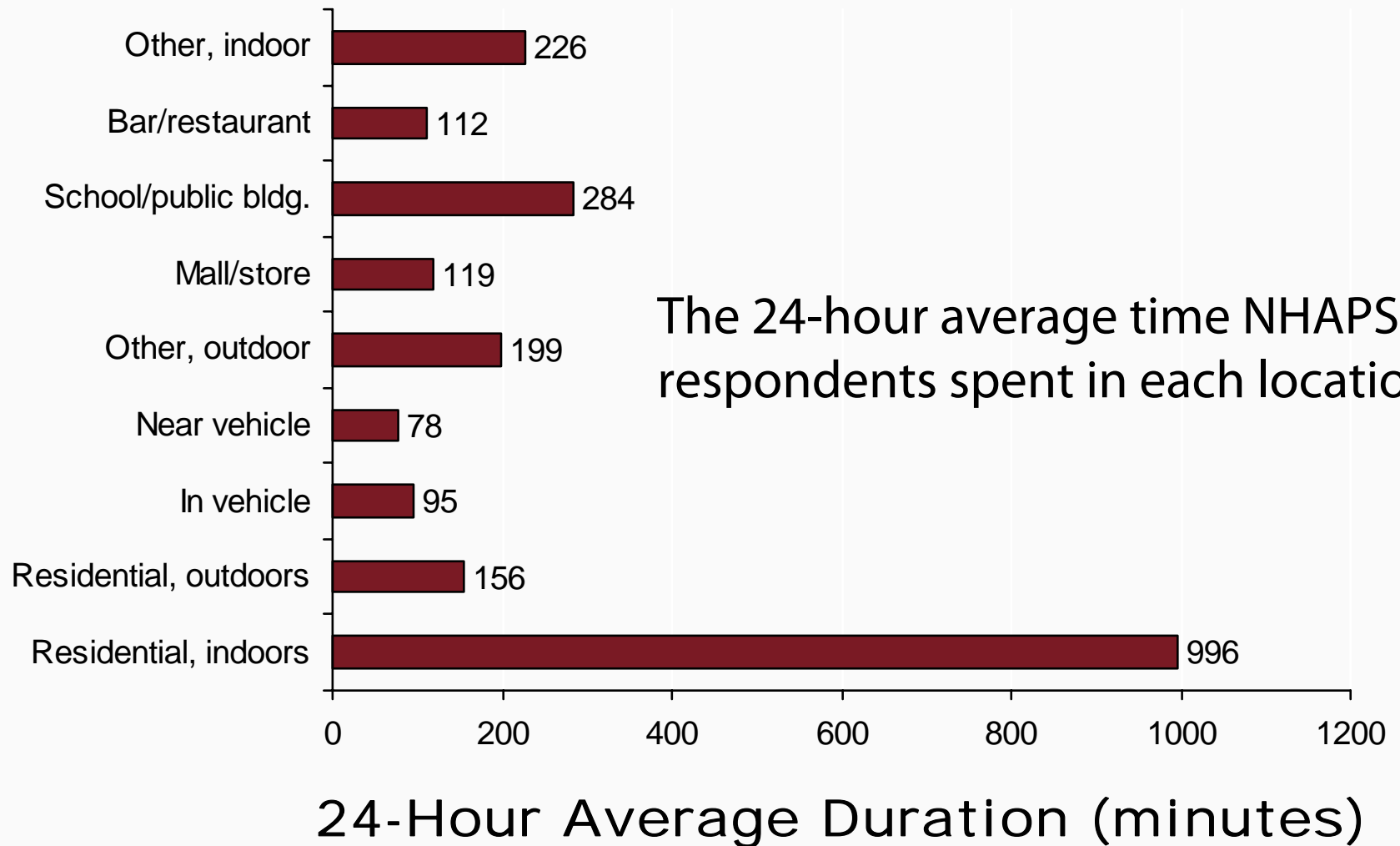


# CO and RSP Measured in a Smoky Bar/Restaurant



Source: Klepeis, N.E. 1999. An Introduction to the Indirect Exposure Assessment Approach: Modeling Human Exposure Using Microenvironmental Measurements and the Recent National Human Activity Pattern Survey. Environmental Health Perspectives Supplements 107 (S2).

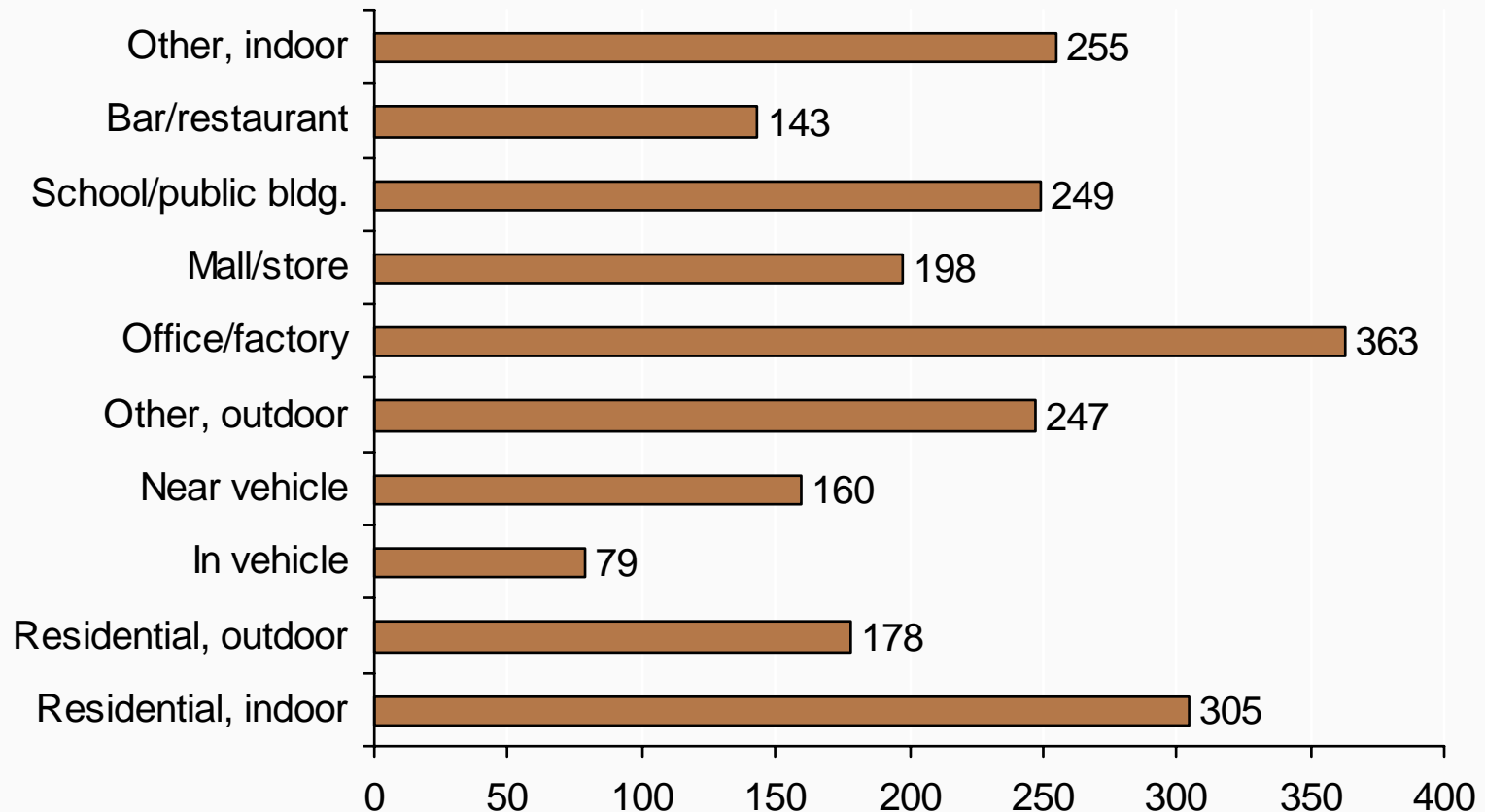
# Time Spent in Location



Data source: Klepeis, N.E. 1999. An Introduction to the Indirect Exposure Assessment Approach: Modeling Human Exposure Using Microenvironmental Measurements and the Recent National Human Activity Pattern Survey. Environmental Health Perspectives Supplements 107 (S2).

# Exposure to SHS in Each Location

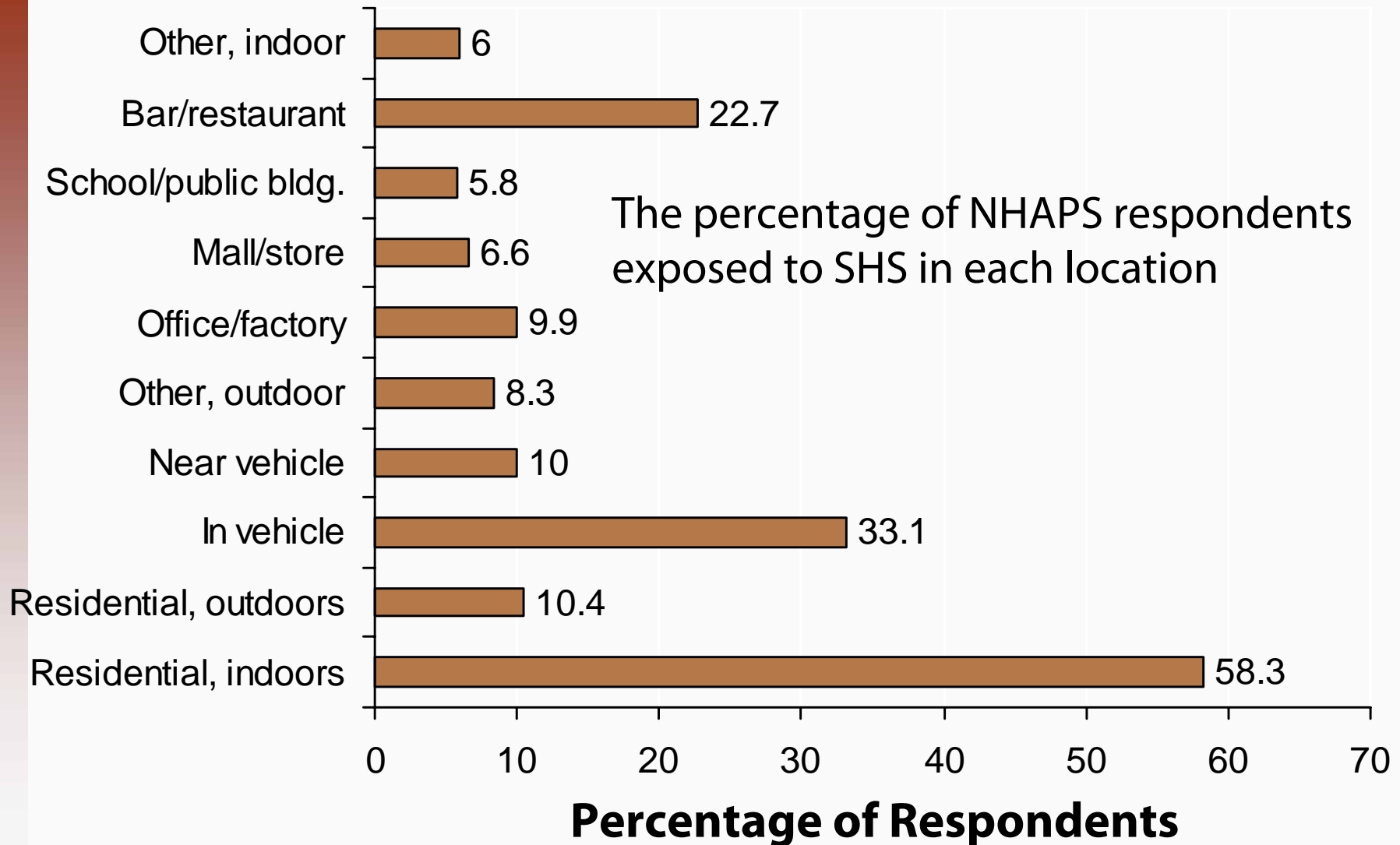
The 24-hour average time NHAPS respondents spent exposed to SHS in each location



24-Hour Average Duration (minutes)

Data source: Klepeis, N.E. 1999. An Introduction to the Indirect Exposure Assessment Approach: Modeling Human Exposure Using Microenvironmental Measurements and the Recent National Human Activity Pattern Survey. Environmental Health Perspectives Supplements 107 (S2).

# Exposure to SHS in Each Location



Data source: Klepeis, N.E. 1999. An Introduction to the Indirect Exposure Assessment Approach: Modeling Human Exposure Using Microenvironmental Measurements and the Recent National Human Activity Pattern Survey. Environmental Health Perspectives Supplements 107 (S2).



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## *Section B*

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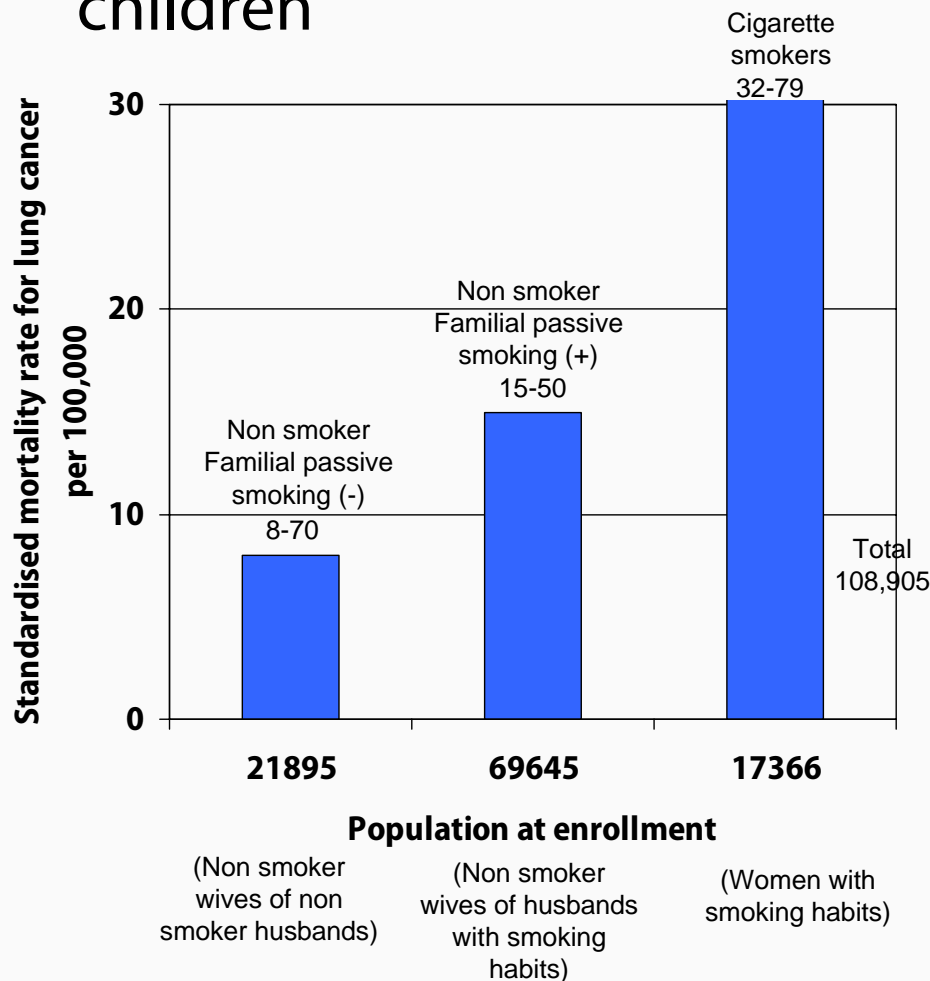
### Health Effects of Passive Smoking

# *Health Effects of Passive Smoking*

- SHS is tobacco smoke—tobacco smoke kills
  - Similar irritants, toxicants, and carcinogens found in SS and MS
  - No evidence of a threshold dose for health effects of active smoking, e.g., lung cancer
  - Biomarkers of tobacco smoke, such as cotinine, show that SHS is taken up by nonsmokers
  - Epidemiologic studies provide evidence that SHS causes diseases in children and adults

# Scientific Evidence That SHS Kills

- Initial epidemiological investigations reported in the late 1960s focused on parental smoking and illness in children



Data source: Hirayama T. 1981. Non-smoking wives of heavy smokers have a higher risk of lung cancer: a study from Japan. *BMJ* 282:183-5

- First major studies on lung cancer reported in 1981 from Japan and Greece

Hirayama T. 1990 Life-Style and Mortality: a Large-Scale Census-Based Cohort Study in Japan (Vol)6 (*Contributions to Epidemiology and Biostatistics*) Basel: Karger.

Trichopoulos D, Kalandidi A, Sparros L, MacMahon B. Lung cancer and passive smoking. *Int J Cancer*. 1981 Jan 15;27(1):1-4.



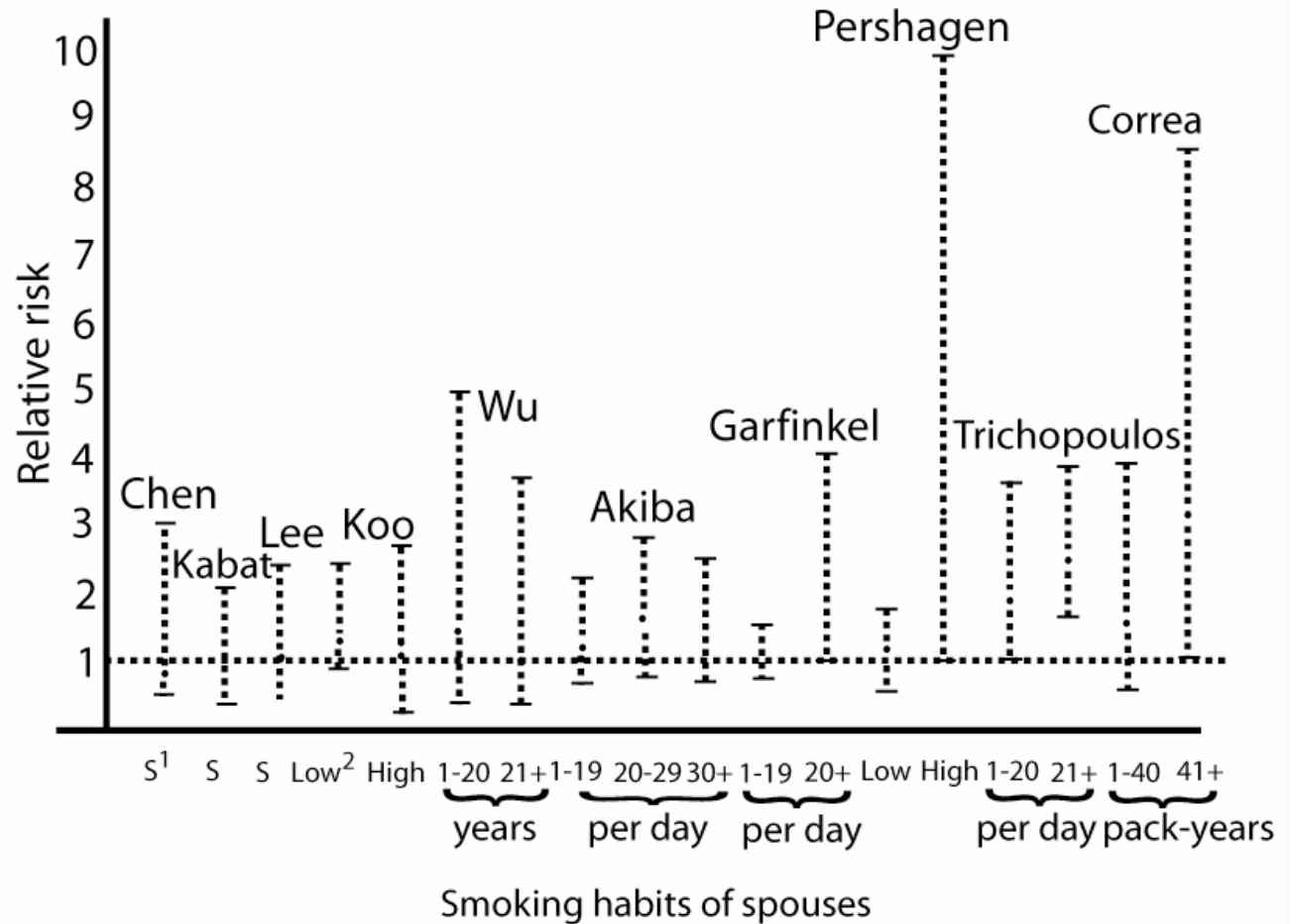
- Misclassification
  - Active smoking
  - Passive smoking
- Confounding
- Statistical error
- Plausibility

- *“Error Invalidates Japanese Smoking Study, Experts Say”*
- *“Independent statisticians have confirmed a fundamental arithmetical error which invalidates the claim in a widely publicized Japanese study that environmental cigarette smoke is associated with lung cancer in non-smokers.”*
- *“One of the authorities who found the error is Professor Nathan Mantel of the George Washington University Biostatistics Center. He is co-author of the statistical test which was used in the Japanese study, and in which the arithmetical error occurred.”*

# 1986 Surgeon General's Report



Former U.S. Surgeon General  
C. Everett Koop, M.D.



Source: 1986 Surgeon General's Report  
[http://www.cdc.gov/tobacco/sgr/sgr\\_1986/](http://www.cdc.gov/tobacco/sgr/sgr_1986/)  
 accessed 1/3/06

Photo source: <http://profiles.nlm.nih.gov/QQ/B/B/D/M/>  
 accessed 1/3/06


- *Evaluation of the Carcinogenic Risk of Chemicals to Humans: Tobacco Smoking*
- *The Health Consequences of Involuntary Smoking*
- *Environmental Tobacco Smoke*

- International Agency for Research on Cancer, Tobacco smoking, in IARC monographs on the evaluation of the carcinogenic risk of chemicals to humans. 1986, IARC: Lyon. p. 127-35.
- US Department of Health and Human Services (1986). *The Health Consequences of Involuntary Smoking: A Report of the Surgeon General*. Washington, DC, US Department of Health and Human Services.
- National Research Council. Board on Environmental Studies and Toxicology. Committee on Passive Smoking (1986). *Environmental Tobacco Smoke. Measuring Exposures and Assessing Health Effects*. Washington, DC, National Academy Press.

Health effects of passive smoking: Assessment of lung cancer in adults and respiratory disorders in children. U.S. EPA.  
May 1990


- Based on meta-analysis of 31 studies
- Extensively criticized by the tobacco industry
- Federal court decision around methods
- Policy implications key

WORLD HEALTH ORGANIZATION  
INTERNATIONAL AGENCY FOR RESEARCH ON CANCER



## IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

### VOLUME 83 Tobacco Smoke and Involuntary Smoking



LYON, FRANCE  
2004

*“Involuntary smoking (exposure to second-hand or 'environmental' tobacco smoke) is carcinogenic to humans.”*

“The massive effort launched across the tobacco industry against one scientific study is remarkable.”

- Ong, E. K. and Glantz, S. A. 2000. Tobacco industry efforts subverting International Agency for Research on Cancer's second-hand smoke study. *The Lancet* 355 (9211): 1253–1259.

- Maintained controversy about SHS control
- Health effects
- Extent of exposure
- Control strategies
- Costs of control measures



*“Parties recognize that scientific evidence has unequivocally established that exposure to tobacco smoke causes death, disease, and disability.”*

- Sudden infant death syndrome (SIDS)<sup>1</sup>
- Acute respiratory illnesses<sup>2</sup>
- Chronic respiratory symptoms<sup>3</sup>
- Reduced lung function growth<sup>4</sup>
- Asthma and exacerbation of asthma symptoms<sup>5</sup>
- Acute and chronic middle ear disease<sup>6</sup>

*Source: 1. CALEPA/C; UK/A; WHO/C*

*2. SG '84/A; SG'86/A; EPA/C; CALEPA/C; UK/C; WHO/C for increased prevalence or respiratory illnesses and SG '84/A; SG'86/A; EPA/A; CALEPA/C; WHO/C for increased frequency of bronchitis and pneumonia*

*3. SG'86/A; WHO/C*

*4. SG '84/A; SG'86/A; EPA/A; CALEPA/A; WHO/C*

*5. EPA/C; CALEPA/C; WHO/C for exacerbation and EPA/A; CALEPA/C for new cases*

*6. SG '86/A; EPA/C; CALEPA/C; UK/A; WHO/C*

- Established
  - Lung cancer<sup>1</sup>
  - Cardiovascular disease<sup>2</sup>
- Possible
  - Reduced lung function
  - Other cancers
  - Exacerbation of asthma<sup>3</sup>
  - Respiratory symptoms<sup>4</sup>

Source: 1. SG '86/C; EPA/C; CALEPA/C; UK/C; IARC/C

2. CALEPA/C; UK/C; WHO/A

3. CALEPA/C

4. SG '84/A

- There is **no safe level** of SHS!

Warning: You don't have to smoke to die from it. Second-hand smoke kills.



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## *Section C*

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# Controlling Passive Smoking

- Control source
  - Reduce smoking
- Change the source
- Separate smokers and nonsmokers
- Increase ventilation
- Use air cleaning

- Concentration of SHS depends on—
  - Strength of source
    - ▶ Number of smokers and smoking pattern
    - ▶ Emissions from cigarettes
  - Ventilation
    - ▶ Rate of exchange of outdoor with indoor air
  - Air cleaning

- What works?
  - Elimination of the source
- What does not work?
  - Separation of smokers and nonsmokers in the same space
  - Ventilation
  - Air cleaning



“... our ultimate objective is to maintain the ability for our consumers to enjoy our products in public venues, such as restaurants, hotels, bowling centers, and shopping malls.”

- Philip Morris and the Hospitality Industry

## **“FOR IMMEDIATE RELEASE JT to Accelerate Expansion of “Reduced Odor Cigarette Segment”**

Tokyo, October 6, 2003 --- Japan Tobacco Inc. (JT) (TSE:2914) announced today an initiative aimed at the “reduced odor cigarette segment” through the launch of “Mild Seven Prime Super Lights Box” (Mild Seven Prime/JPY 300 per pack) and a sales area expansion of “Lucia Citrus Fresh Menthol” (Lucia/JPY 300 per pack), starting November 4, 2003.

In its latest medium-term management plan, JT PLAN-V, JT stated that the company is creating a new category of cigarettes with reduced tobacco odors. The creation of this new segment is part of JT's commitment **to allow smokers and non-smokers to more easily coexist.**

Lucia is the first product in this category, launched in the Tokyo metropolitan area, in February of this year. Following its successful market entry in Tokyo, the brand's sales area was expanded into the neighboring four prefectures in August. Since its launch, Lucia has maintained market share at levels almost twice as large as other newly marketed brands, and from November 4 onwards it will be available nationwide.”

- JT delight world

# ASHRAE Standard

## Ventilation for acceptable indoor air quality

(American Society of Heating  
Refrigerating and Air  
Conditioning Engineers, Inc.)

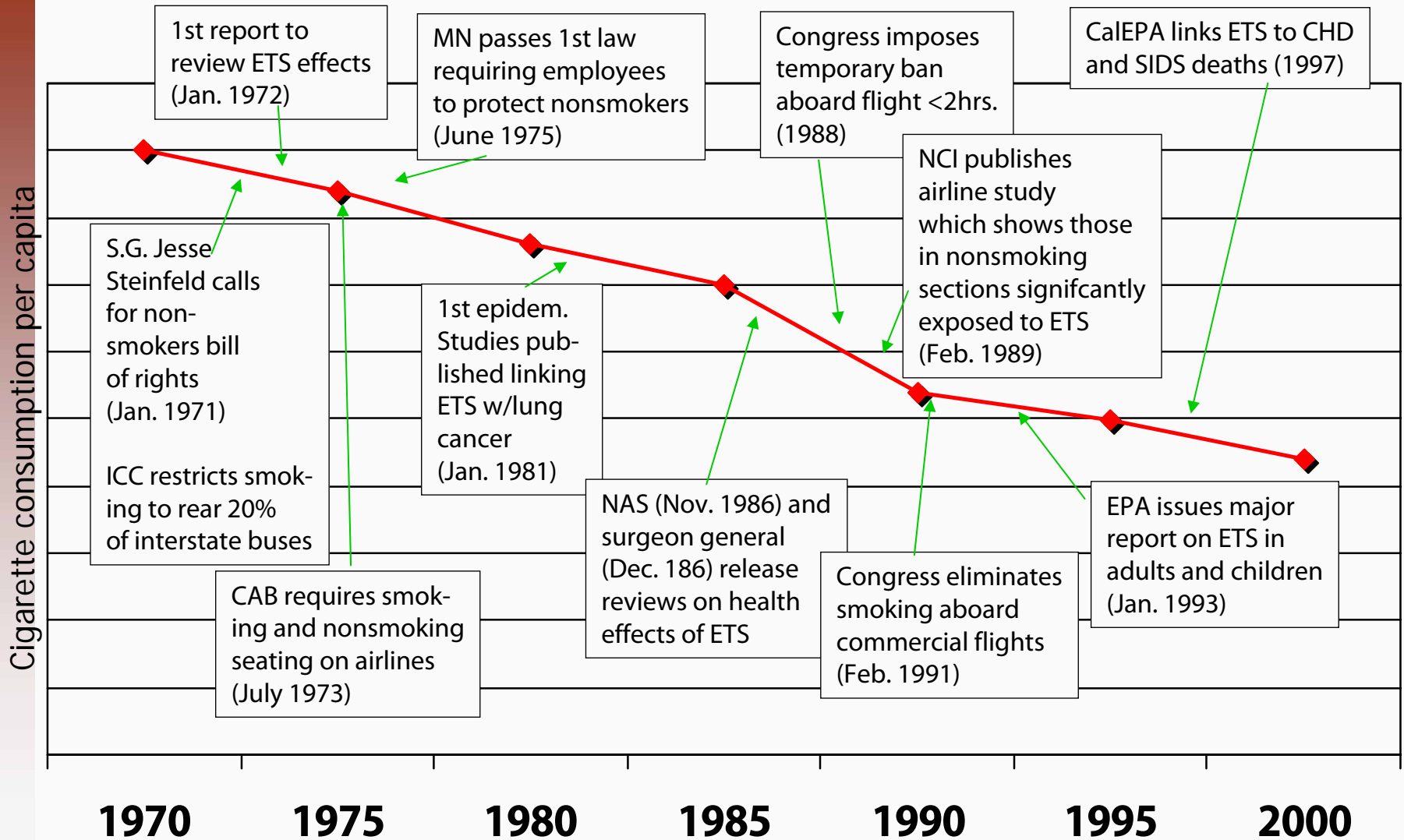
*“This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of standard.”*

# Establishing Smoke-free Public Places

- **Public places** comprise a broad spectrum of enclosed areas to which the public is invited or in which the public is permitted, including but not limited to—
  - *Banks*
  - *Educational facilities*
  - *Health care facilities*
  - *Public transportation*
  - *Reception areas*
  - *Restaurants*
  - *Retail food/markets*
  - *Shops/shopping malls*
  - *Sport arenas*
  - *Theaters*
  - *Waiting rooms*

- Short-term
  - Reduction in respiratory effects
  - Evidence of reduction in heart attacks
  - Economic savings
  
- Long-term
  - Reduction in prevalence
  - Increase in cessation
  - Reduction in lung cancer
  - Changing societal norms

# History of Effort to Protect Nonsmokers in U.S. From SHS



Data source: Tobacco Outlook Report, Economic Research Service, U.S. Dept. of Agriculture.

# *Airline Action to Restrict Smoking*

**1973**

U.S. Federal Aviation Commission outlaws smoking in airplane lavatories

**1972**

Introduction of separate smoking and nonsmoking sections

**1987**

Association of Flight Attendants endorses complete ban on smoking on commercial flights

# *Airline Action to Restrict Smoking*

**1987**

Air Canada  
introduces first non-  
smoking flights

**1988**

Ban on smoking  
aboard U.S.  
domestic flights  
less than two  
hours

**1992**

ICAO resolves to  
eliminate smoking  
on international  
commercial flights  
by 1996



# Airline Action to Restrict Smoking

## 1994

Some airlines have  
smoke-free  
international flights

Singapore Airlines  
American Airlines  
Cathay Pacific  
British Airways  
Virgin Atlantic  
Delta  
United

## 1998

Some airlines  
have bans on  
smoking on **ALL**  
flights

Finnair  
Aer Lingus  
British Airways  
Lufthansa  
SAS

## 2000

U.S. bans smoking  
on all domestic and  
international  
flights

“Many of the largest airports [in the U.S.] already restrict smoking to designated smoking lounges, but air inside these airports is still unhealthy, according to a recent study by the U.S. Centers for Disease Control and Prevention.

The CDC says these smoking lounges - even if they have separate ventilation systems - don't contain all smoke.

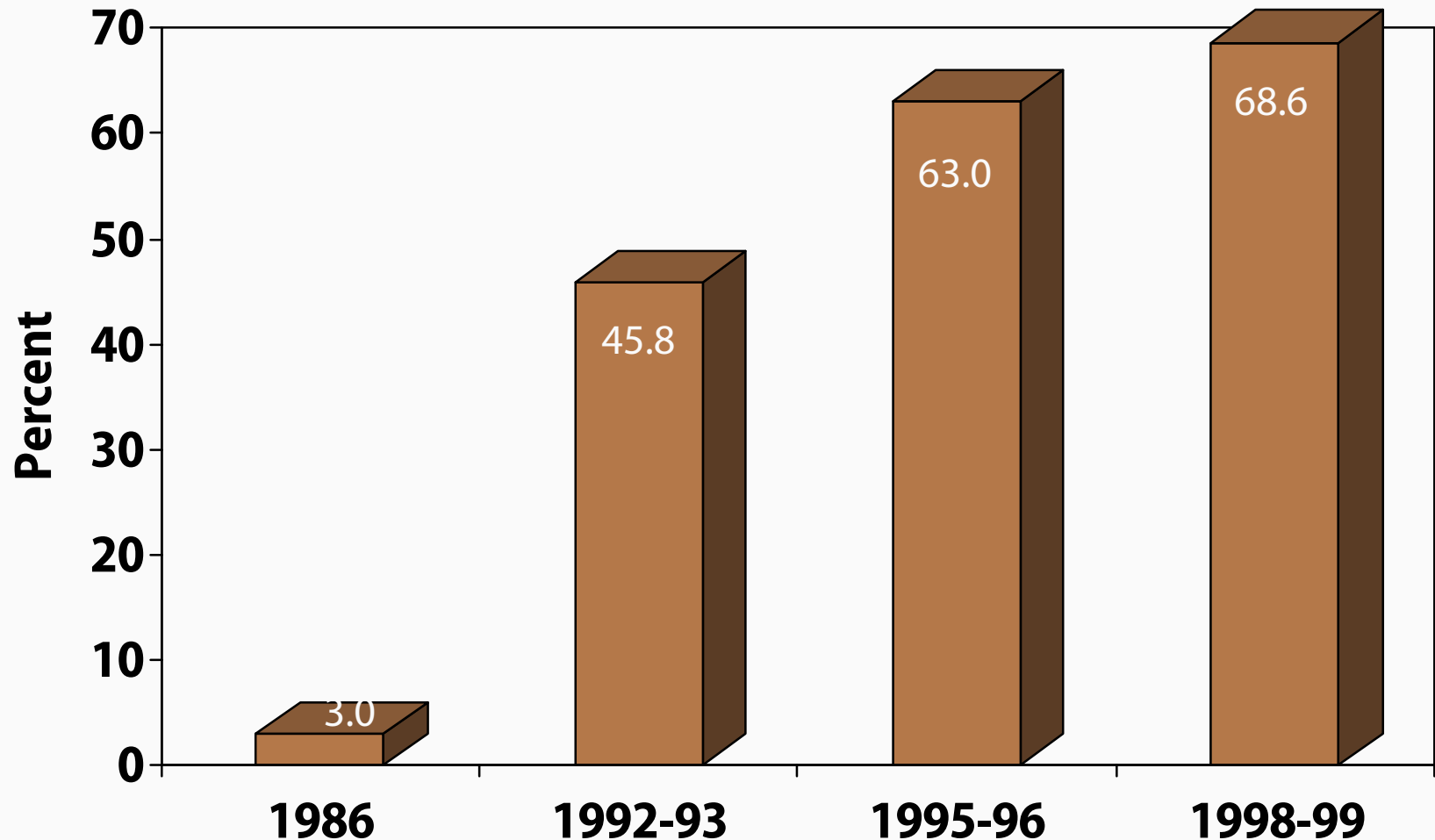
Many airports also lack regulations that keep smokers away from building entryways, creating an unhealthy zone that everyone coming and going must enter.”

- Workers exposed to SHS on the job are **34% more likely to get lung cancer**
  - Fontham et al. (1991)
- International Labor Organization reported that cancer is the **number one killer in the workplace** and SHS is estimated to cause 2.8% of all worksite cancers
  - ILO. (2002)
- Workplace smoking increases an employer's potential legal liability
- Nonsmoking employees have received settlements in cases based on their exposure to SHS
  - Sweda. (1997)

- Effectively reduce SHS exposure
  - Percentage of workers reporting NO exposure to SHS rose from 19% to 54% one year after national smoke-free workplace legislation in Finland.
- Major impact on cessation and prevalence
  - Smoke-free workplaces are associated with a 29% reduction in cigarette consumption
    - ▶ Fichtenberg and Glantz. (2002)

- **Employee benefits**
  - Safer and healthier working environment
  - May benefit from cessation opportunities and support
  
- **Employer benefits**
  - Increased worker productivity
  - Reduced health care costs
  - Reduced maintenance costs
  - Reduction in the risk of fire

# Change in Worker Protection from SHS

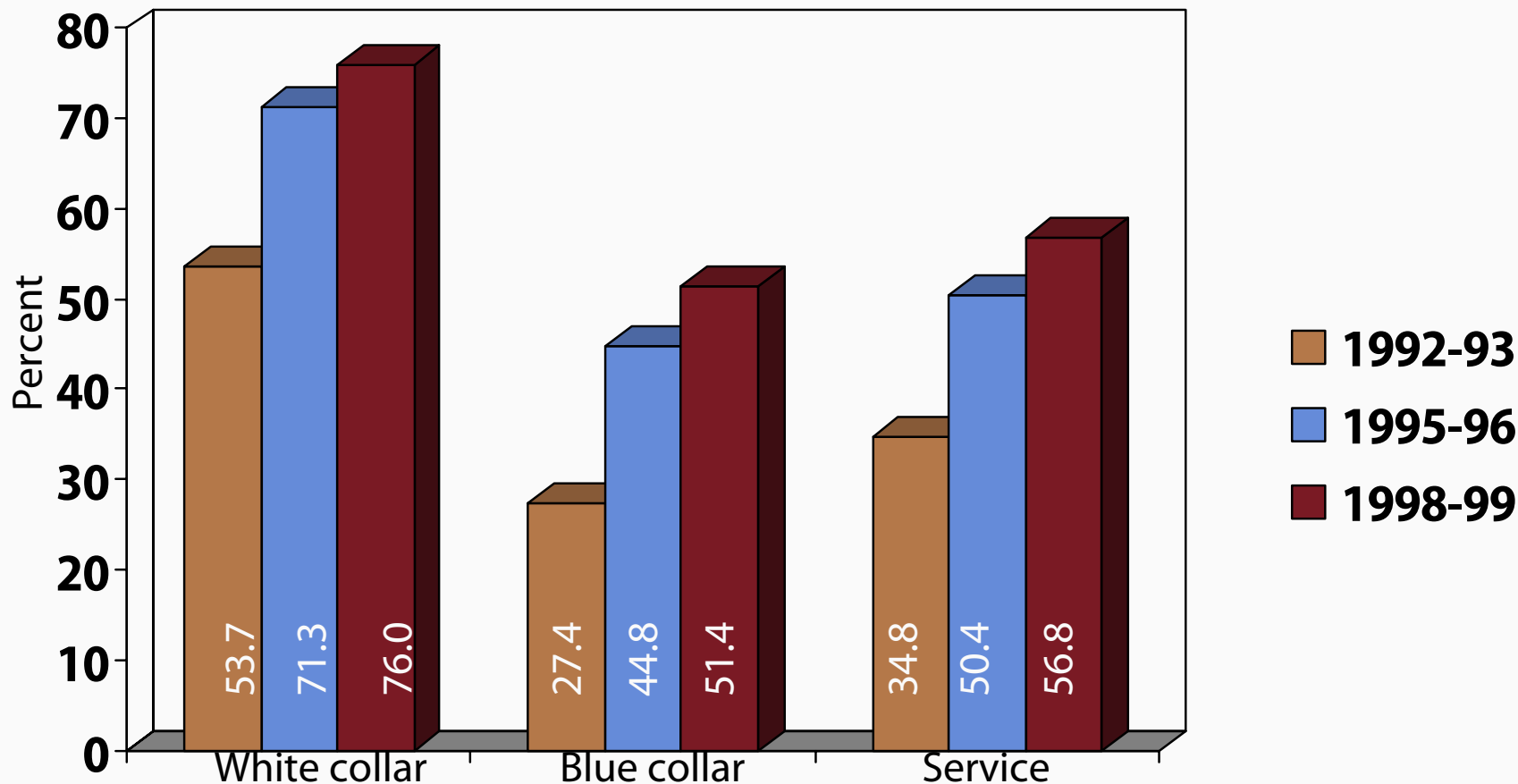


*Notes: All estimates based on 1998-99 CPS data should be considered preliminary; 1986 data based on 18 years and older; all others—15 and older*

*Data source: 1986 Adults Use of Tobacco Survey; all others—Current Population Study.*

# Change in Smoke-free Workplace Policy Coverage

Change in Smoke-free Workplace Policy Coverage among Indoor American Workers by Type of Worker



Notes: Self-respondents ages 15 years and older

Data source: Shopland, D.R., C.M. Anderson, D.M. Burns, K.K. Gerlach. 2004. Disparities in smoke-free workplace policies among food service workers. JOEM 46 (4): 347-356.

- If all workplaces would become smoke-free, per capita consumption would drop by
  - 4.5 percent (U.S.)
  - 7.6 percent (U.K.)
- Achieving this type of reduction would require an increase from \$0.76 to \$3.05 and £3.44 to £6.59 per pack of cigarettes
  - Similar to tax increase to \$1.11 and £4.26



*“Smokers facing workplace restrictions have an 84 percent higher quit rate than average”*

*“Ten percent industry decline if smoking was banned in all workplaces”*

*“Anticipate a 74 percent increase in quitting rate if smoking was banned in all workplaces”*

-Philip Morris

Impact of workplace restrictions on consumption and incidence

*“Total prohibition in workplaces strongly affects industry volume.”*

*“Milder workplace restrictions, such as smoking only in designated areas, have much less impact on quitting rates and very little effect on consumption.”*

-Philip Morris

Impact of workplace restrictions on consumption and incidence

- Industry recognized by the early 1970s that clean indoor air restrictions would severely undermine their business
  - *“Smokers facing workplace restrictions have an 84 percent higher quit rate than average”*
- None of the major companies fully accepts the scientific evidence on SHS
- Directly involved in activities aimed to undermine science
  - *Quote from WHO report on IARC*
- Directly counters attempts to legislate clean indoor air

# *Economic Impact of Smoke-free Ordinances*

- What the tobacco industry is saying privately—
  - *“The immediate implication for our business is clear: if our consumers have fewer opportunities to enjoy our products, they will use them less frequently and the result will be an adverse effect on our bottom line.”<sup>1</sup>*
  - *“Smoking bans are the biggest challenge we have ever faced. Quit rate goes from 5% to 21% when smokers work in nonsmoking environments.”<sup>2</sup>*

*Source: 1. Philip Morris internal document, Bates No. 2041183751/3790.*

*2. Philip Morris internal document, Bates No. 2054893642/3656.*

# *Economic Impact of Smoke-free Ordinances*

- What the Tobacco Industry is Saying Privately—
  - *“Those who say they work under [smoking] restrictions smoked about one-and-one quarter fewer cigarettes each day than those who don’t. That may sound light but remember we are talking about light restrictions, too. Those 220 people in our survey who work under smoking restrictions represent some 15 million Americans. That one-and-one quarter per day cigarette reduction, then, means nearly 7 billion fewer cigarettes smoked each year because of workplace smoking restrictions. . . .”*

# *Economic Impact of Smoke-free Ordinances*

- What the tobacco industry is saying privately—
  - *“... At a dollar a pack, even the lightest workplace smoking restrictions is costing this industry 233 million dollars a year in revenue. How much more will it cost us with far more restrictive laws such as those in Suffolk County and Fort Collins now being enacted?”*

## *Priority Interventions—Restaurants and Bars*

- Highest levels of exposure
  - 160 to 200 percent higher than in smoking offices
- Nonsmoking areas are NOT effective in controlling exposure
- Smoke-free ordinances DO NOT result in lost business or negative impacts on local economies

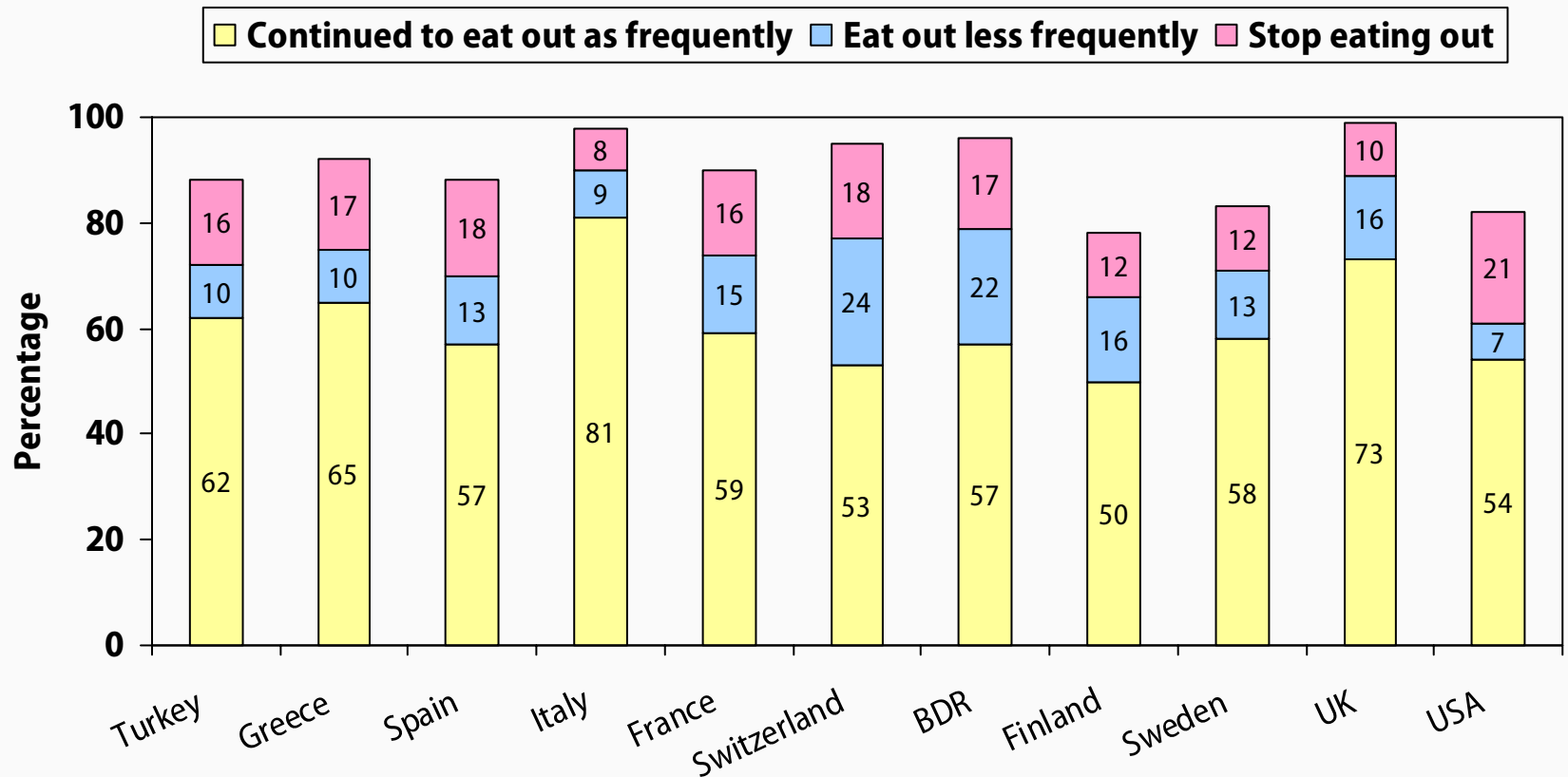
# Priority Interventions—Restaurants and Bars

- What restaurateurs are saying—
  - *“We have had great business. Sales have gone up because of it. When the single-room restaurant allowed patrons to smoke, it went everywhere. There have been no complaints since the change.”<sup>1</sup>*
  - *“I haven’t had anybody complain about it since the ban. Even smokers say they don’t want to deal with secondhand smoke when they’re eating.”<sup>2</sup>*



# Reactions of Smokers to Smoking Bans in Restaurants

## Reactions of European and American smokers to smoke-free ordinances in restaurants

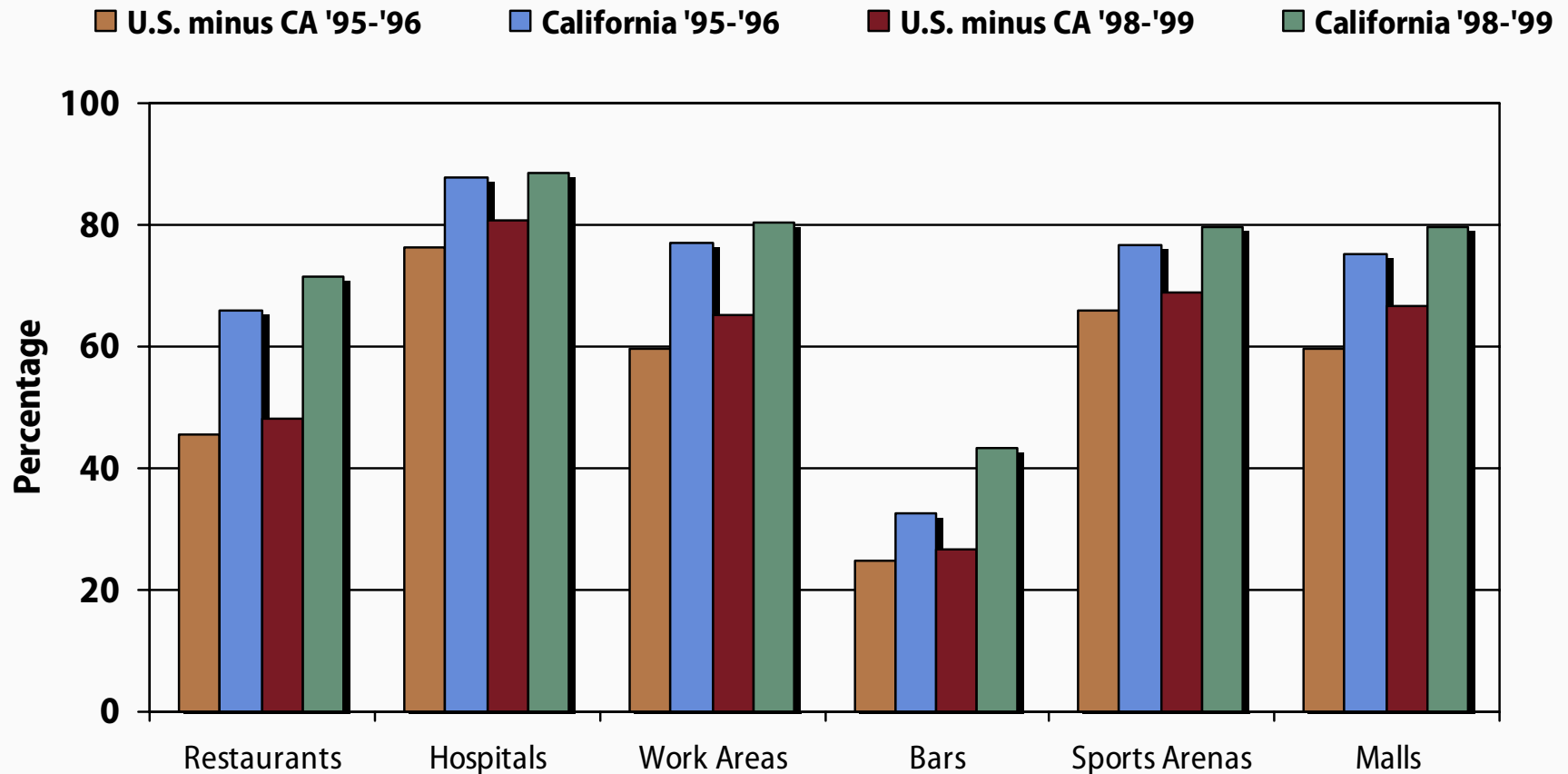


A survey done by Philip Morris Incorporated in 1989 demonstrated that European smokers were more accepting of smoke-free regulations than were Americans.

Data source: Minnesota Tobacco Litigation Depository (Bates No. 2500147496).

# Smokers' Beliefs About Where Smoking Should Be Banned

Percentage of adult respondents reporting that smoking should not be allowed at all in each venue



Data source: Gilpin E.A., Lee L., Pierce J.P. 2004. Changes in population attitudes about where smoking should not be allowed: California versus the rest of the USA. *Tob Control*: 13(1):38-44.

# Studies Show That Going Smoke-free Won't Hurt Business

- A large body of research—studies of more than 180 localities—shows that the passage of smoke-free ordinances **has no effect on aggregate restaurant revenues.**<sup>1</sup>
- *“Taxes generated by the sale of food and beverages in the city are up 4.4 percent for the first nine months of this year compared to the same period last year. Food and beverage sales are up 5.8 percent over 2000, according to the city’s treasury division. Adjusted for inflation, the increases are about 2.8 percent and 1.6 percent, respectively.”*<sup>2</sup>

## *Studies Show That Going Smoke-free Won't Hurt Business*

- A 1999 study of the effects of smoke-free ordinances in Wisconsin's Dane County found **"no support for the dire predictions of those who opposed the smoke-free ordinances."** The researchers controlled for economic factors that might influence the strong showing of the county's restaurants. Some measures, they concluded, suggest that the legislation helped the county's restaurant business.

## *Studies Show That Going Smoke-free Won't Hurt Business*

- A Massachusetts study found that **46% of nonsmoking adults avoid smoky places**, primarily because they dislike the smell of smoke, have concerns about their health, and suffer physical symptoms (like eye and throat irritation). The researchers concluded that advertising a smoke-free environment is likely to attract patrons, especially health-conscious, well-educated nonsmokers.

## **New York City after the ban. A success.**

*“Almost two years into cigarette ban, New York City bars thrive and many smokers shrug”*

- The New York Times

*“New York smoking ban proves a success, even among previously fiery opponents.*

*Predicted economic hit never came, officials say.”*

- The New York Times

# *Industry Reaction to Restaurant Smoking Restrictions*

- Front Groups
  - Third-party allies in the hospitality industry
  - Act on tobacco industry's behalf in opposing smoking control laws
  - Claim not to be allied with the industry but receive funding directly from the industry
  - Examples:
    - ▶ Hospitality Coalition on Indoor Air Quality
    - ▶ California Business and Restaurant Alliance
    - ▶ National Smokers Alliance
    - ▶ Beverly Hills Restaurant Association

“What if they passed a law that took away 30% of your business?”

- The Tobacco Institute

- The Tobacco Institute ran an ad in the hospitality trade press suggesting that business tanked after Beverly Hills went smoke-free in 1987



# Priority Interventions—Hospitals

- Smoking is inconsistent with the health goals of medical institutions
- Protect patients and health staff
- Promotes lower prevalence and higher quit rates among employees, including doctors and nurses
- Improves ability to help patients quit smoking and provides strong role models



Image source: Institute for Global Tobacco Control

- Governments lack authority to restrict smoking in homes—but other public interventions and health practitioners can—
  - Educate smokers about the risks that their smoking poses to their families
  - Encourage smokers to go outside to smoke
  - Stress protection of the vulnerable—children, pregnant women, the elderly, and the ill

- Political will
- Industry opposition
- Public acceptance and enforcement

# *Elements of Successful Clean Indoor Air Campaigns*

- Focus on priority areas
- Gather community support
- Know industry tactics and front groups

- Reveal industry activities
- Publicly engage the industry
- Work at the local level
  - *“It’s barely controlled chaos [at the local level]. We can’t be everywhere at once.”*

- SHS is tobacco smoke—tobacco smoke kills!
- Prohibition of smoking, rigorously enforced, can eliminate exposure
- Exposure at home remains a challenge