Epidemiology of Hardcore Smoking: The Need to Advance the Field

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Transdisciplinary Classification of Hardcore Smokers: How Shall We Define "Hardcore"? Symposium

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Definitions of Epidemiology and Public Health Surveillance

Epidemiology: The study of the distribution and determinants of health-related states or events in specialized populations and the application of this study to the control of health problems.

Public Health Surveillance: The ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and improve health.

Sources: Last JM, *A Dictionary of Epidemiology* 1995; *MWWR* 2001;50(No. RR-13),page 2.

Purposes of a Tobacco-Related Surveillance System

To provide timely information from populations on:

- prevalence of use of various products (tobacco and pharmaceutical)

- factors that influence their use

- incidence, prevalence, and mortality from tobacco-attributable diseases

- impact of tobacco control programs and policies on relevant outcomes

Uses of Tobacco Surveillance Data

- Learn about nature of the problem
- Justify policies, programs, and legislation
- Monitor and evaluate these
- Set realistic objectives
- Identify high risk groups
- Justify research initiatives
- Conduct research

Trends in cigarette smoking* among adults aged ≥18 years, by sex - United States, 1955-2003
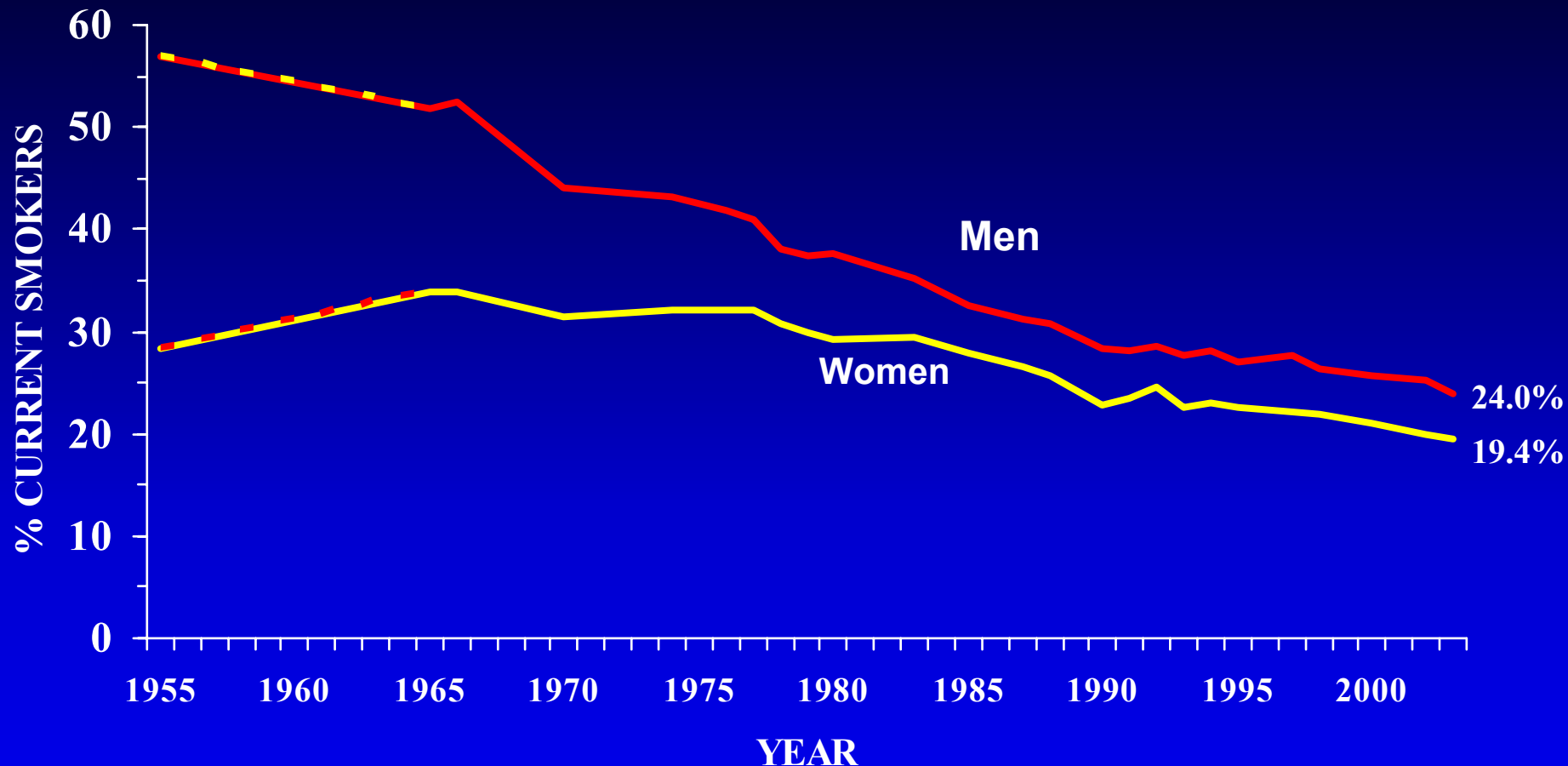
*Before 1992, current smokers were defined as persons who reported having smoked ≥100 cigarettes and who currently smoked. Since 1992, current smokers were defined as persons who reported having smoked ≥100 cigarettes during their lifetime and who reported now smoking every day day or some days. 2003 estimate is for January-June.

Source: 1955 Current Population Survey; 1965-2003 National Health Interview Surveys

Background

- Key Question: As tobacco control progresses, are we left with proportionately more smokers who either can't or won't quit? Previous work:

- Fagerström and colleagues' international comparisons of dependence (*Tobacco Control* 1996).

- Irvin and Brandon (*N&TR* 2000, 2003)
    - increasing recalcitrance in CT samples
    - concern about representativeness.

Background (2)

- Warner and Burns (2003) define the "Hard-Core Smoker" as a daily, long-term smoker who is unable or unwilling to quit and who is likely to remain so even when possessing extensive knowledge about the hazards of smoking and confronting substantial social disapproval of smoking.

- E.g., older physicians who smoke.

Russell's Motivation/Dependence Model of Quitting
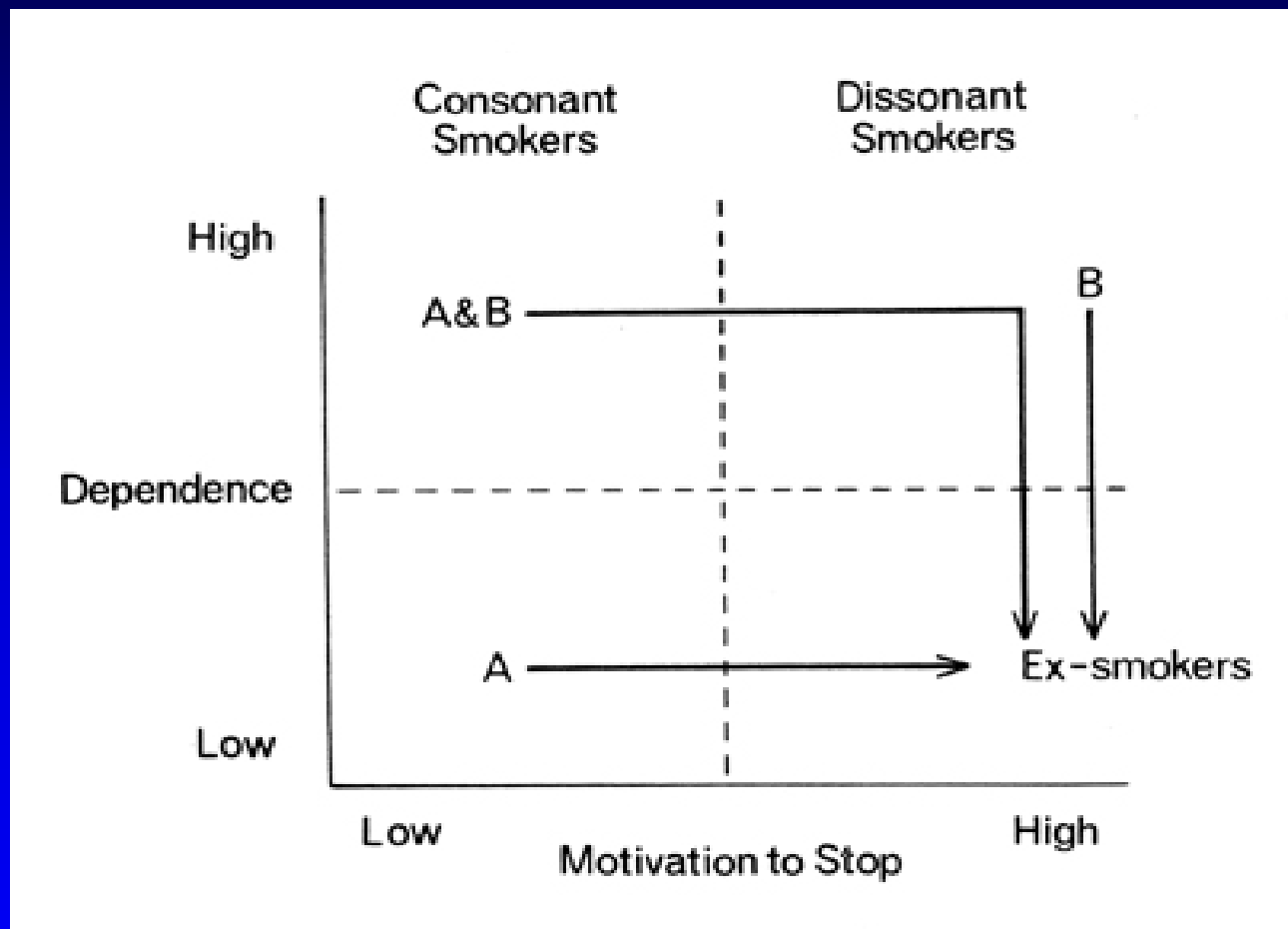
Background (3)

- One empirical measure, developed by Emery and colleagues (*AJPH* 2000):
  - current daily smoking of $\geq$ 15 CPD among persons aged $\geq$ 25 years who had not attempted to quit during the preceding year and who never expected to quit.
  - 5.2% of California smokers
  - Retired, white males, low to moderate SES, who live alone

Background (4)

- Jarvis et al (*BMJ* 2003):
  - Less than a day w/o cigarettes in past 5 yrs; no quit attempt in past year; no desire or intention to quit.
  - 16% of UK smokers were hardcore
  - Hardcore smoking was associated with nicotine dependence, socioeconomic deprivation, and age (older).
  - HC smokers in denial about personal health consequences

Background (6)

- Hughes and Brandon (*N&TR* 2003) stress importance of distinguishing two types of hardening:
  - Decreases in intention to quit and
  - Decreases in ability to achieve abstinence.
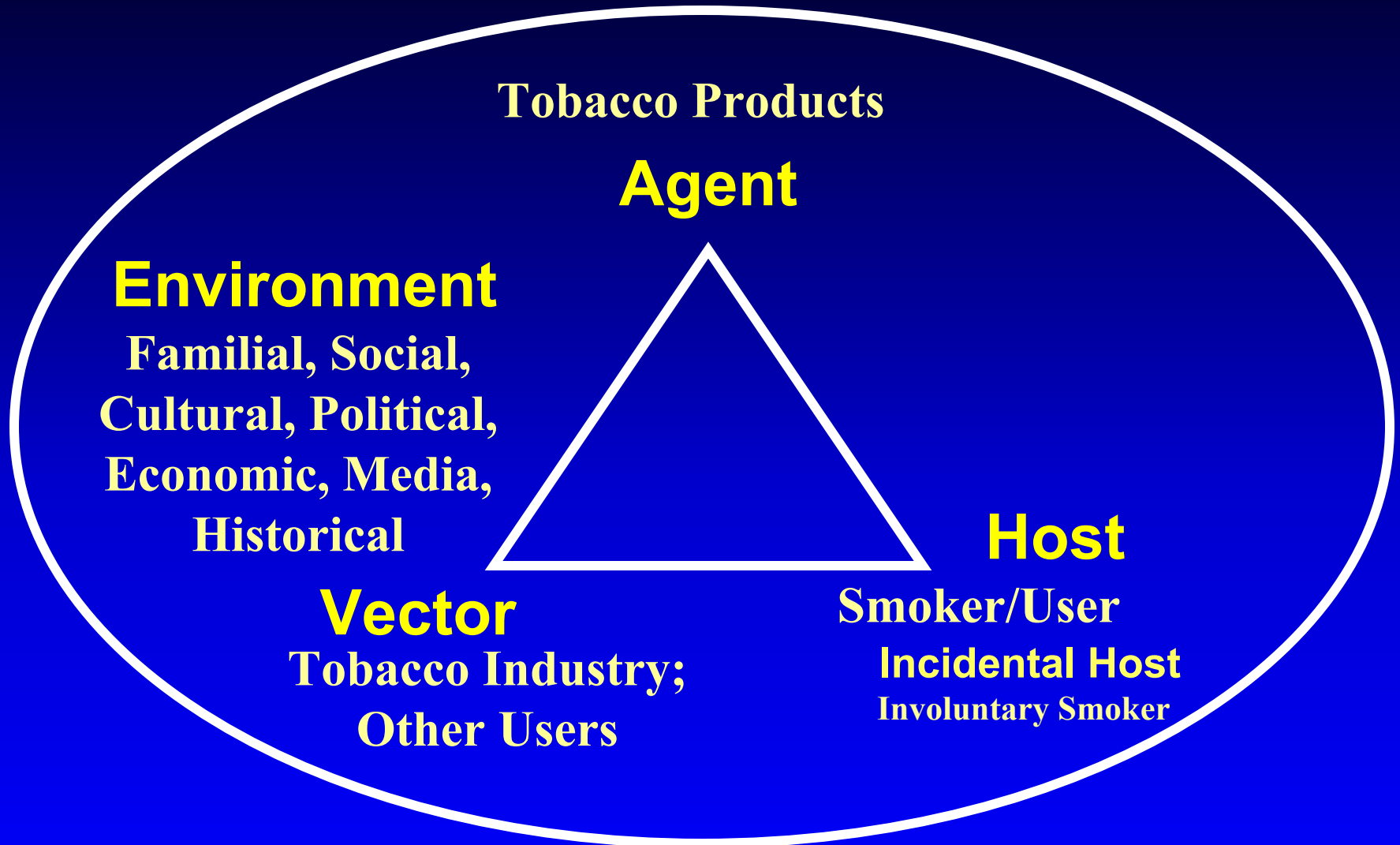- Whether the smoking population is hardening is a testable hypothesis.

Background (5)

- "Hardening" assesses whether the population of smokers is less likely to quit, either because of less motivation or greater dependence.

- Accurate diagnosis of U.S. smoking population could influence allocation of resources.
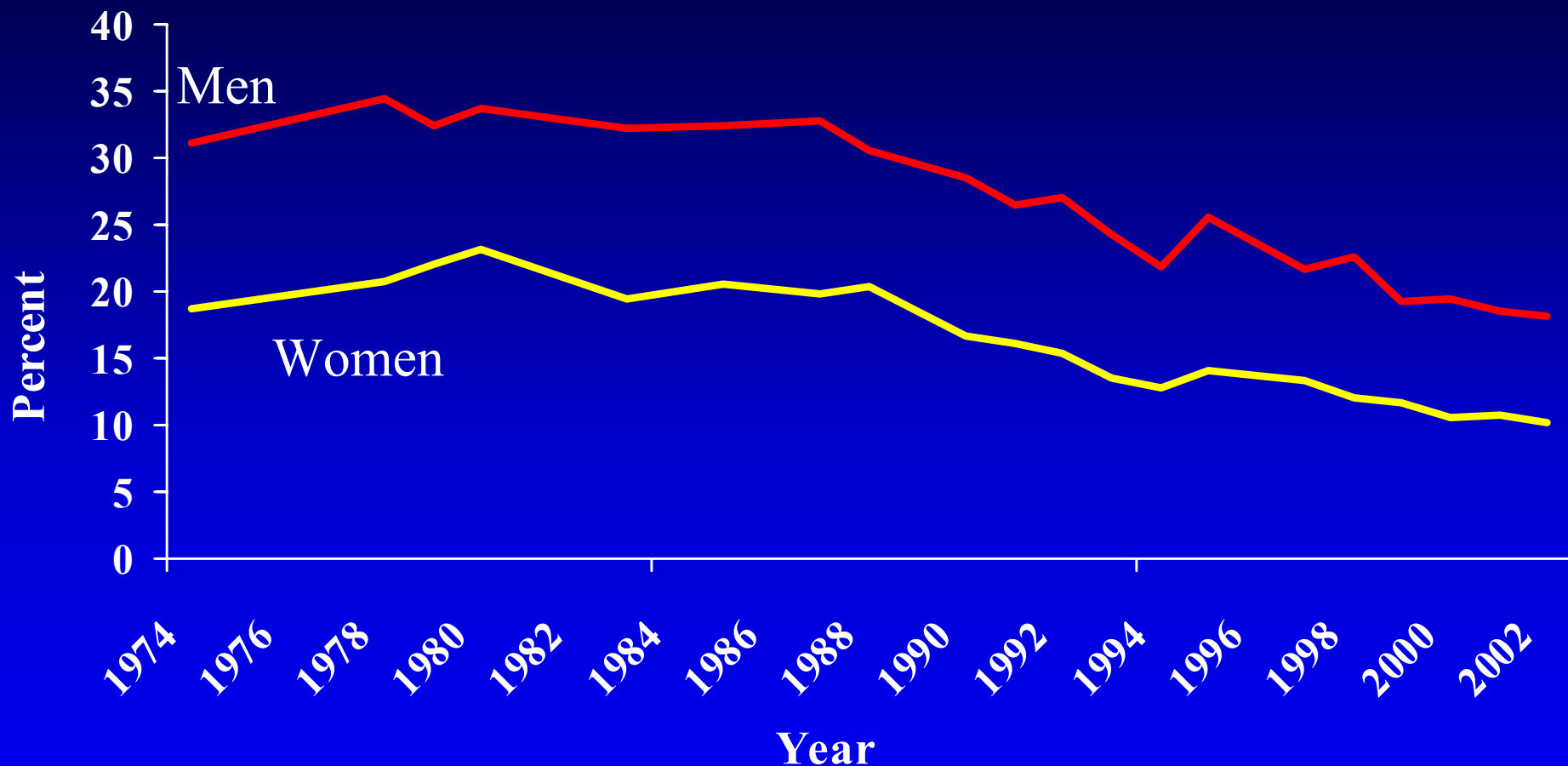
Outline of Today's Presentation

- Epidemiologic Model
- Previous Work
  - National trends
  - State-specific patterns
- Advancing the Field
  - Incorporating measures of dependence
  - Incorporating cotinine
  - Incorporating cohort data
    - COMMIT
    - Hard Core Smoker & Harm Reduction Survey

Epidemiologic Model of Tobacco Control

Tobacco Products

Agent

Environment
Familial, Social,
Cultural, Political,
Economic, Media,
Historical

Host
Smoker/User
Incidental Host
Involuntary Smoker

Vector
Tobacco Industry;
Other Users

Adapted from: Orleans & Slade, 1993

Heavy Cigarette Smoking* Among Adults Aged 18+ by Gender – United States, 1974 -2002

Men

Women

Percent

Year

40
35
30
25
20
15
10
5
0

1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002

Source: various National Health Interview Surveys, 1974-2002
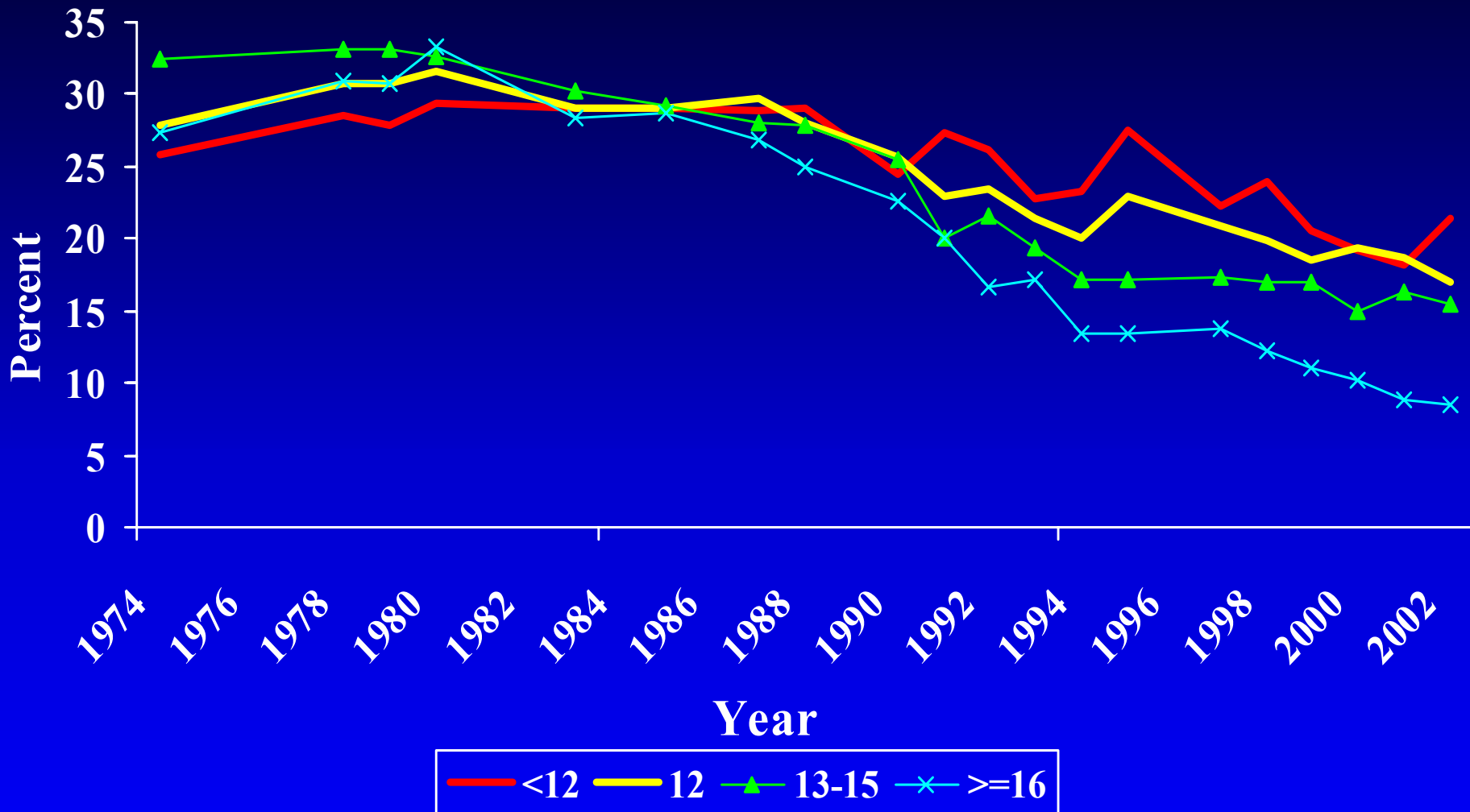*Smoking 25+ cigarettes per day

Trends in cigarette smoking* among adults aged >25 years, by education- United States, 1965-2002
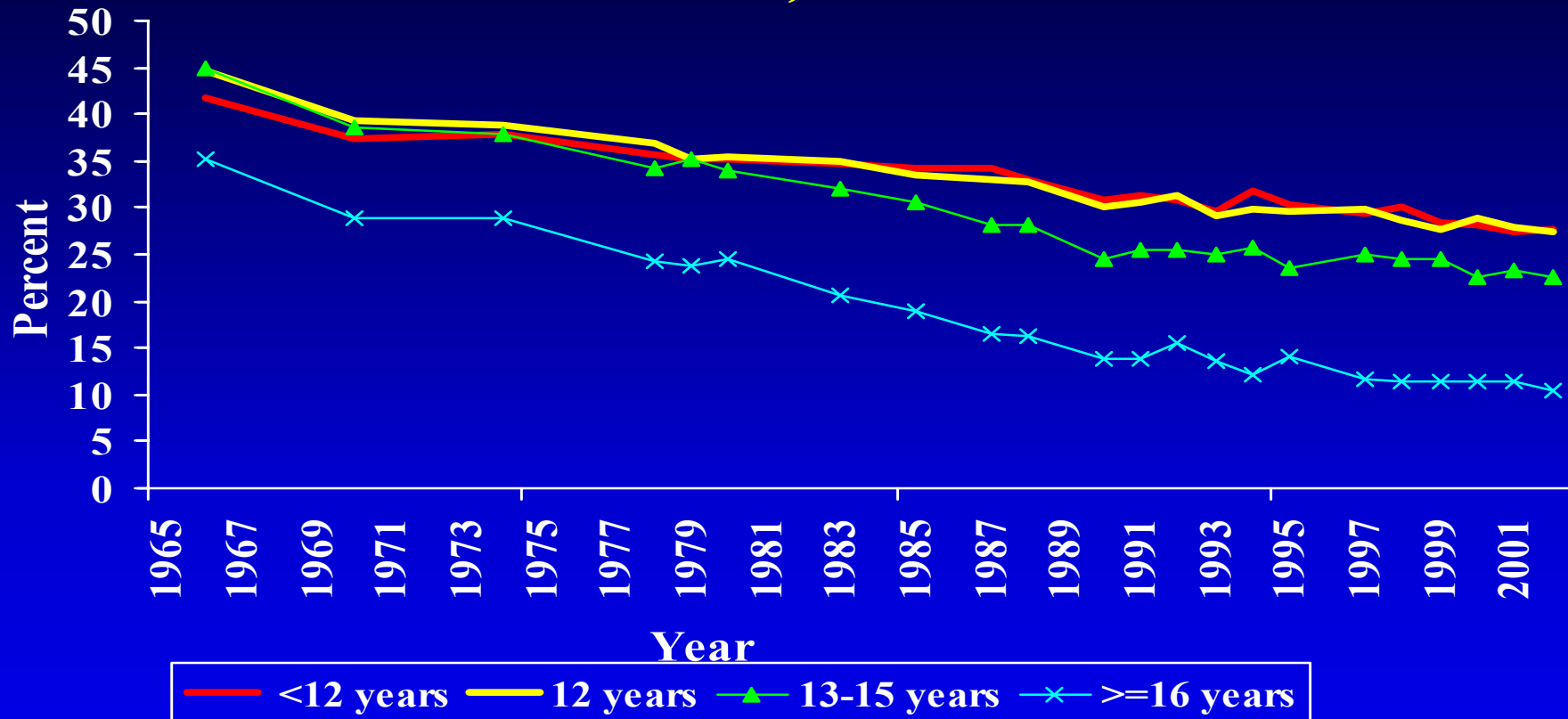
*Before 1992, current smokers were defined as persons who reported having smoked >100 cigarettes and who currently smoked. Since 1992, current smokers were defined as persons who reported having smoked >100 cigarettes during their lifetime and who reported now smoking every day day or some days.

Source: various National Health Interview Surveys from 1965 - 2002, National Center for Health Statistics
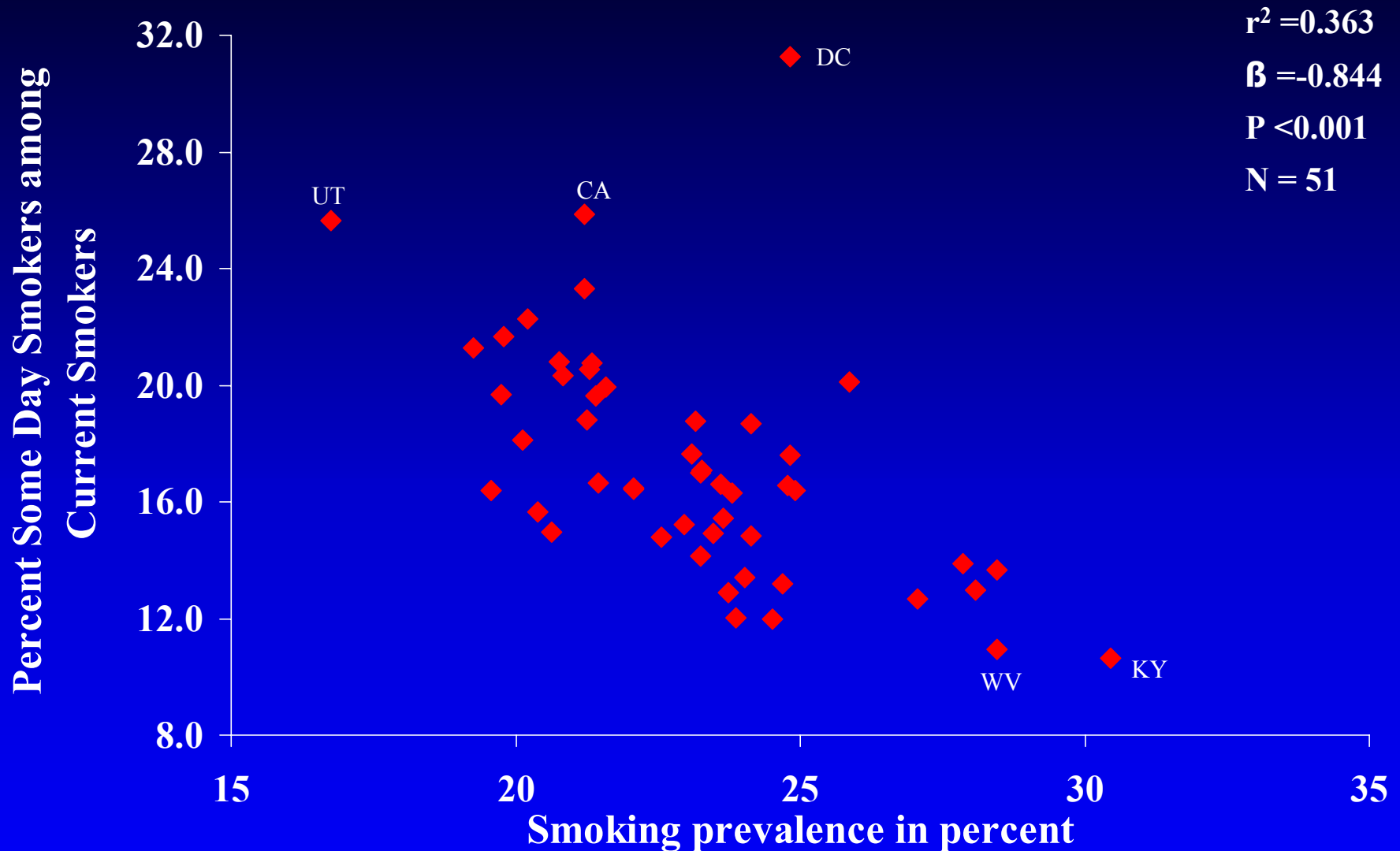
Heavy Cigarette Smoking* Among Adults Aged 25+ by Education – United States, 1974 -2002

Source: various National Health Interview Surveys, 1974 - 2002
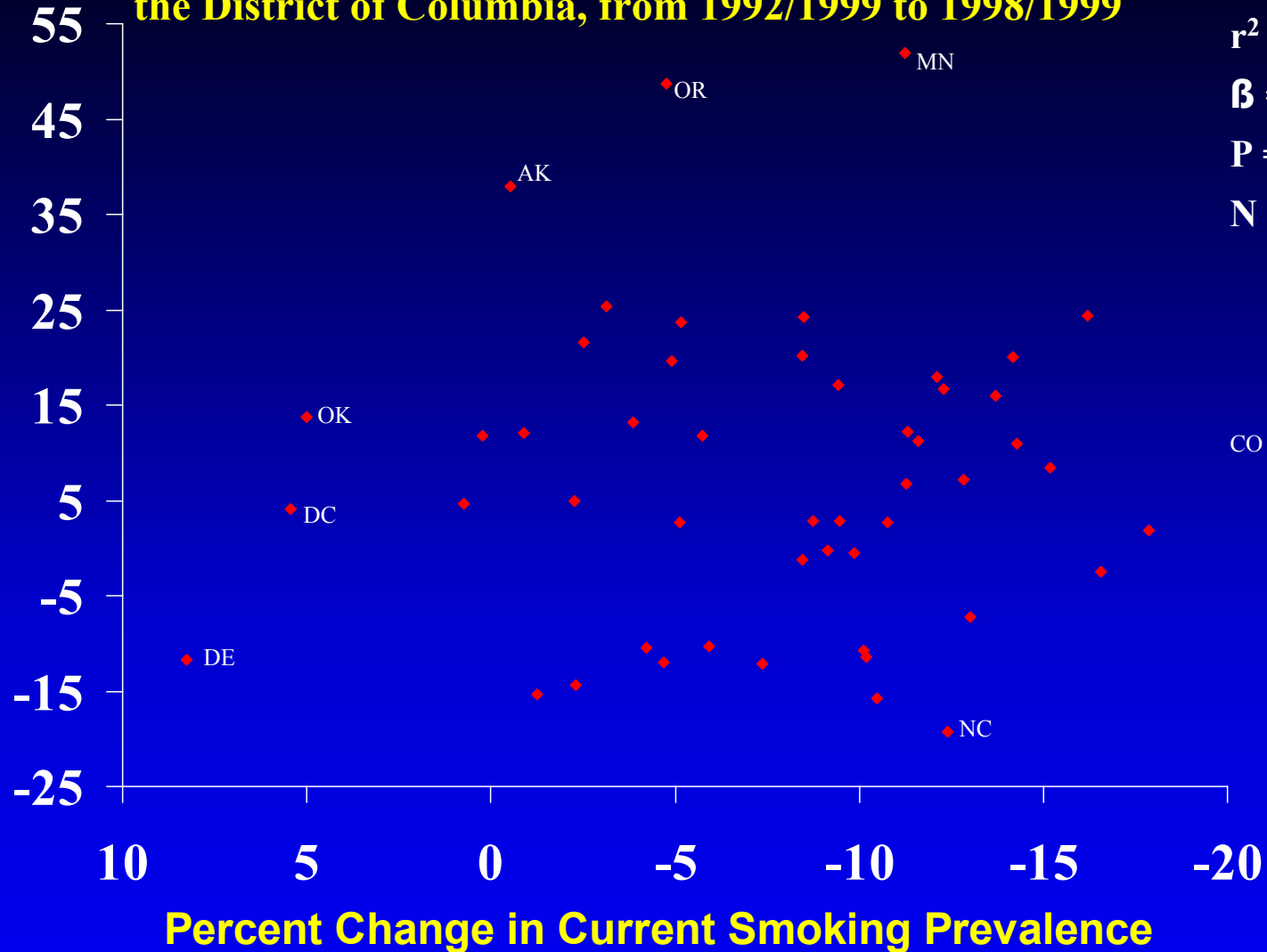*Smoking 25+ cigarettes per day

Some Day Smoking among Current Smokers by Current Smoking Prevalence in 50 States and D.C., 1998-1999

$r^2 = 0.363$

$\beta = -0.844$

$P < 0.001$

$N = 51$

Percent Some Day Smokers among Current Smokers

Smoking prevalence in percent

Source: Current Population Survey, 1998-1999; ages 25+, age-adjusted estimates

State-Specific Estimates of Change (%) in Current Smoking Prevalence and Change (%) in Some Day Smoking Prevalence among Current Smokers in All 50 States and the District of Columbia, from 1992/1999 to 1998/1999
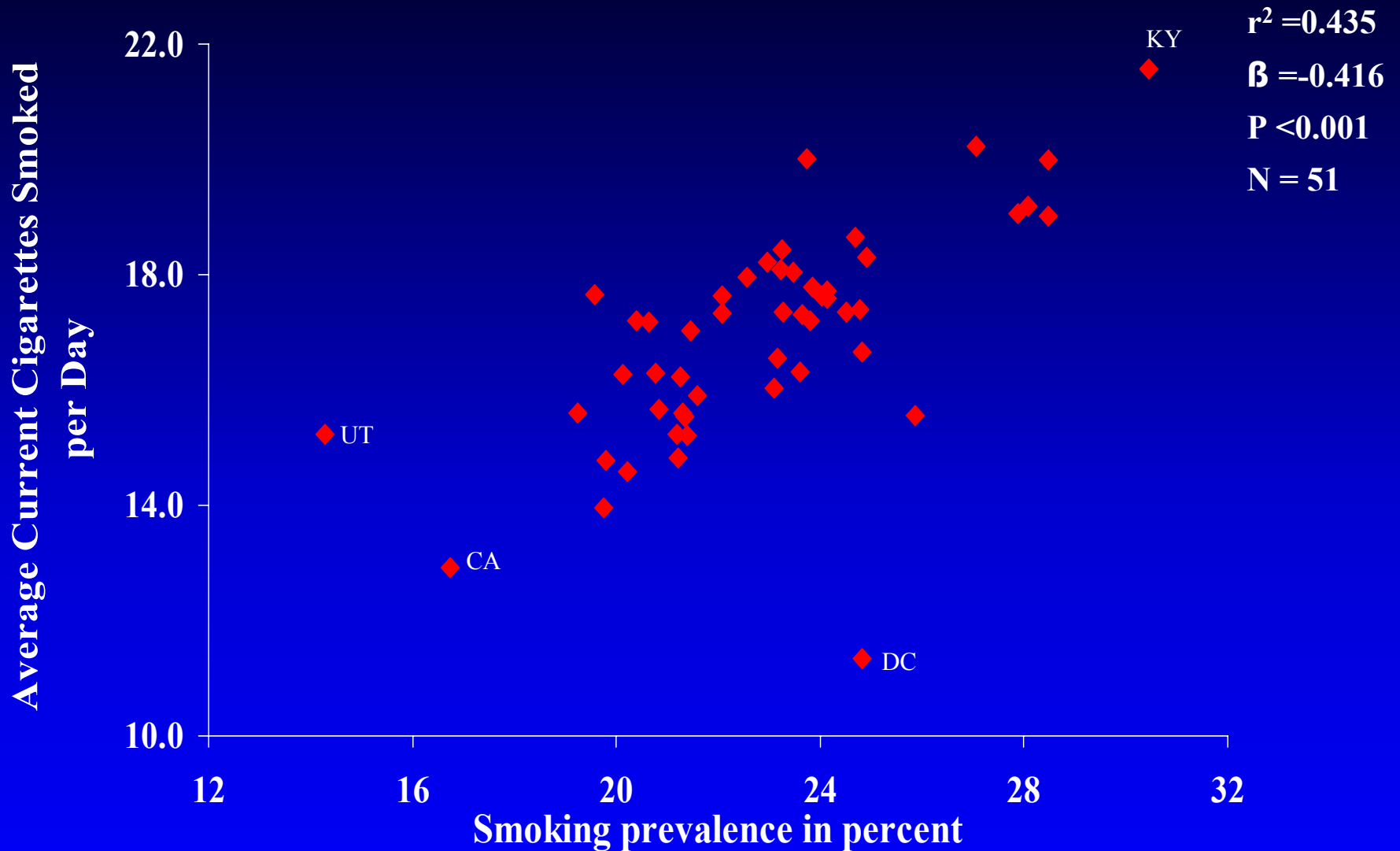
Percent Change in Prevalence of Some Day Smoking among Current Smokers

Percent Change in Current Smoking Prevalence

$r^2 = 0.001$

$\beta = -0.08$

$P = 0.828$

$N = 51$

MN
OR
AK
OK
DC
DE
CO
NC

Source: 1992/1993 and 1998/1999 National Cancer Institute, Tobacco Use Supplement to the Current Population Survey
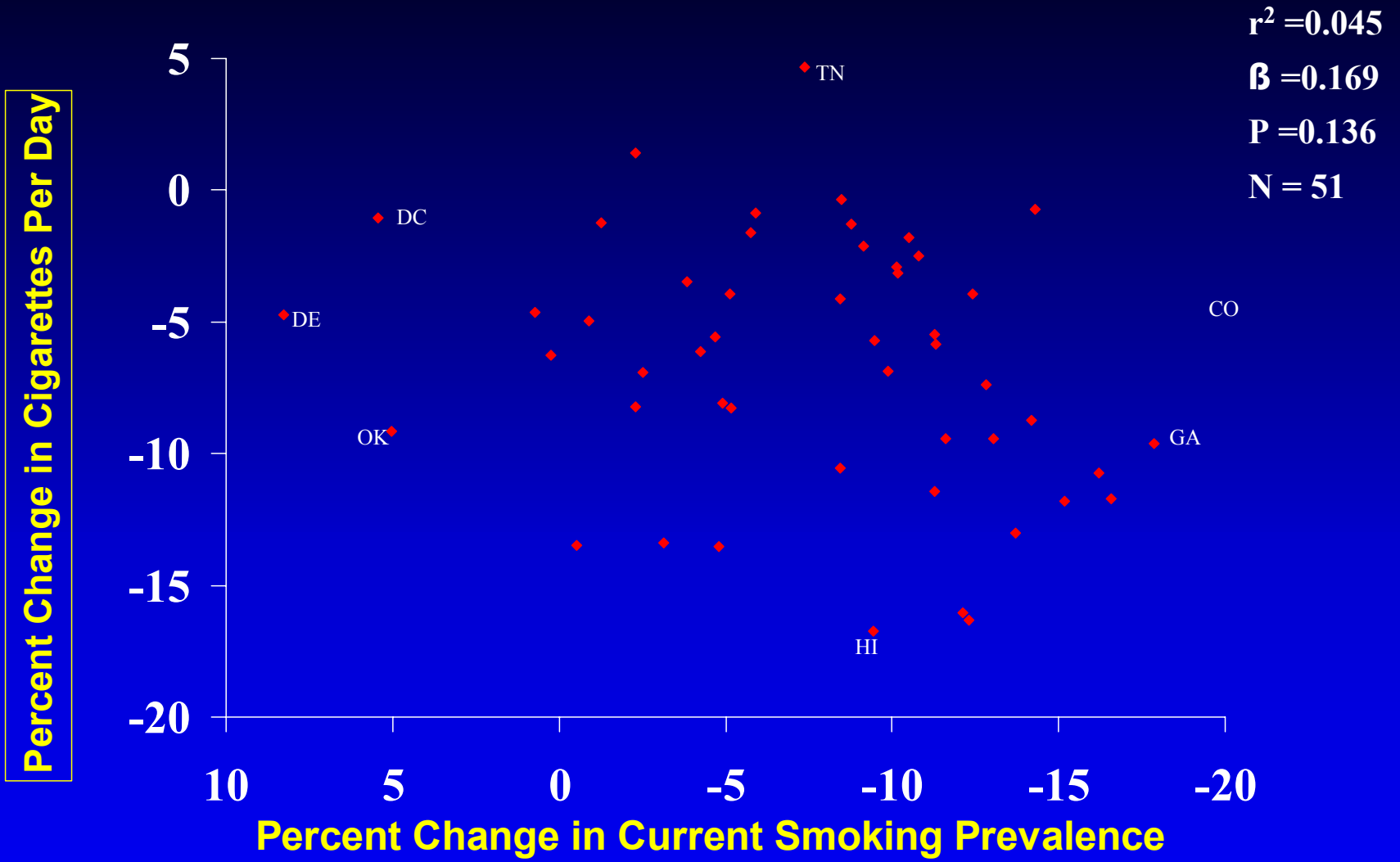
Note: among persons aged 25+ years; estimates are age-adjusted

Cigarettes Smoked per Day by Current Smoking Prevalence in 50 States and D.C. -- 1998-1999

r² =0.435
ß =-0.416
P <0.001
N = 51

KY
UT
CA
DC

Average Current Cigarettes Smoked per Day

22.0
18.0
14.0
10.0

12   16   20   24   28   32

Smoking prevalence in percent

Source: Current Population Survey, 1998-1999; ages 25+, age-adjusted estimates

State-Specific Estimates of Change (%) in Current Smoking Prevalence and Change (%) in Cigarettes Smoked Per Day* in All 50 States and the District of Columbia, from 1992/1999 to 1998/1999
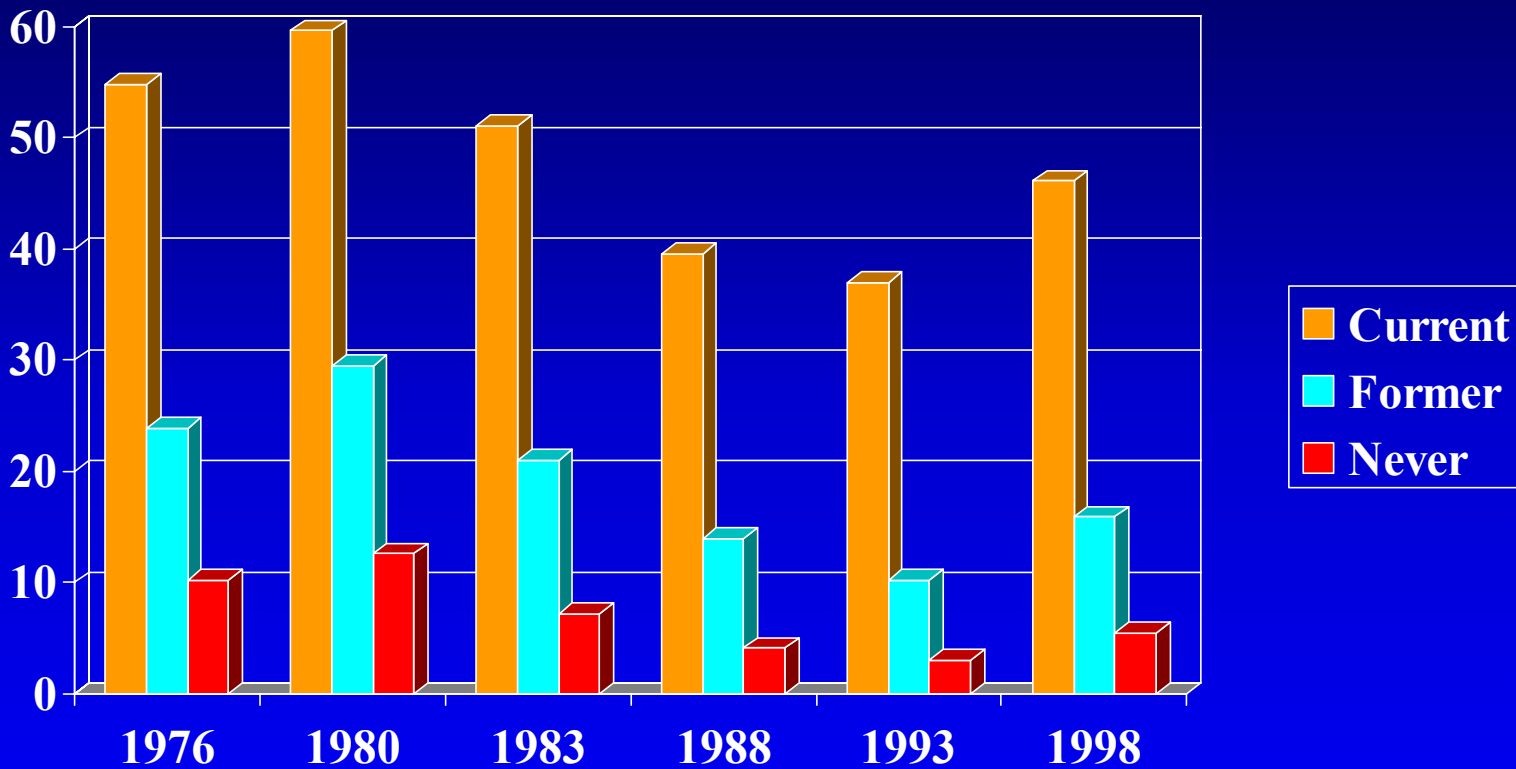
Source: 1992/1993 and 1998/1999 National Cancer Institute, Tobacco Use Supplement to the Current Population Survey

* Among Current Smokers

Note: among persons aged 25+ years; estimates are age-adjusted

Trends in Prevalence of Past Marijuana Use Among U.S. High School Seniors, by Cigarette Smoking Status – 1976-1998


Source: Institute for Social Research, University of Michigan, Monitoring the Future Surveys

Trends in Prevalence of Binge Drinking Among U.S. Adults aged ≥ 25 years, by Cigarette Smoking Status – 1979-1998
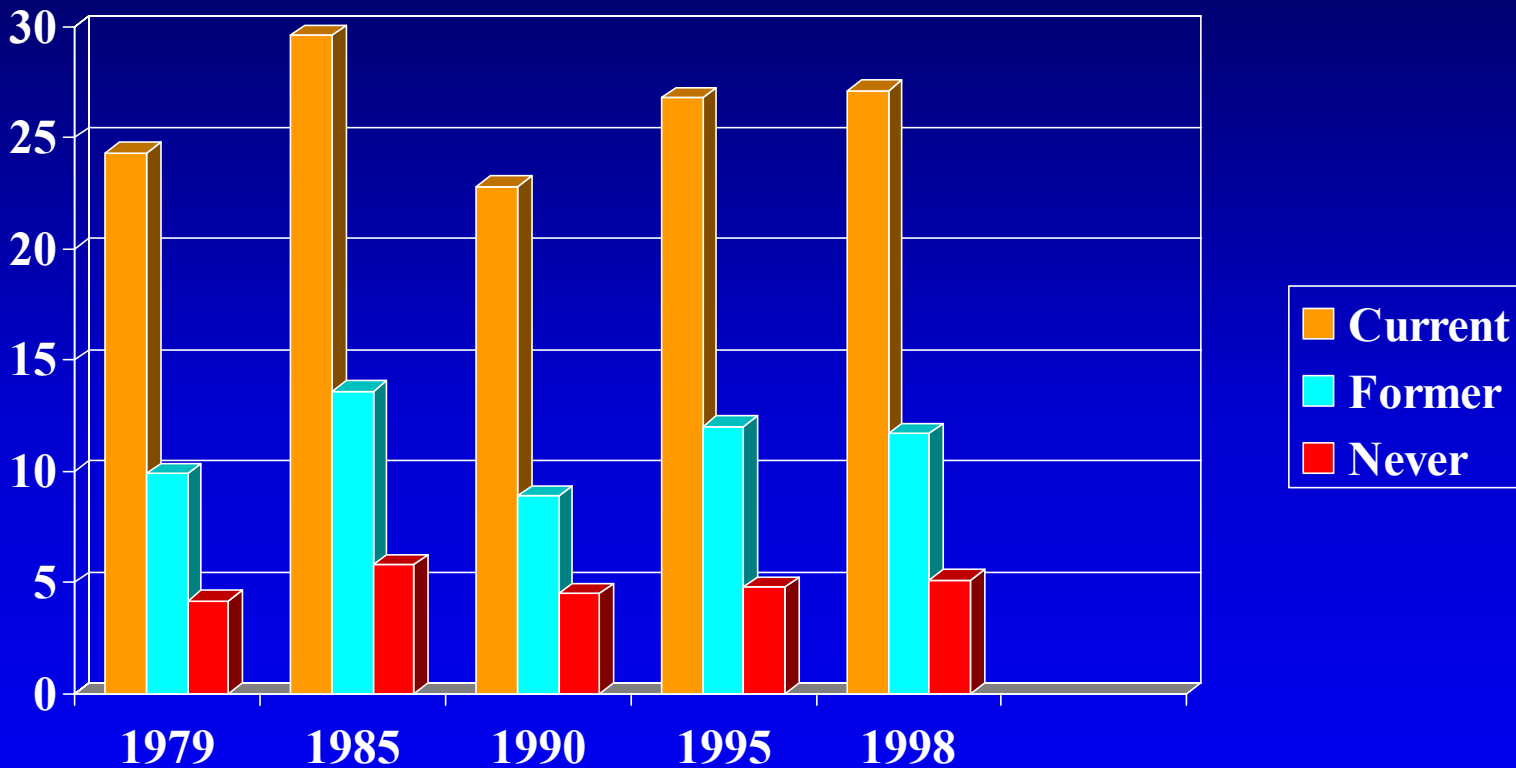
Source: SAMHSA – National Household Survey on Drug Abuse

Trends in Prevalence of Marijuana Use Among U.S. Adults aged ≥ 25 years, by Cigarette Smoking Status – 1979-1998

Legend:
- Current (orange)
- Former (cyan)
- Never (red)
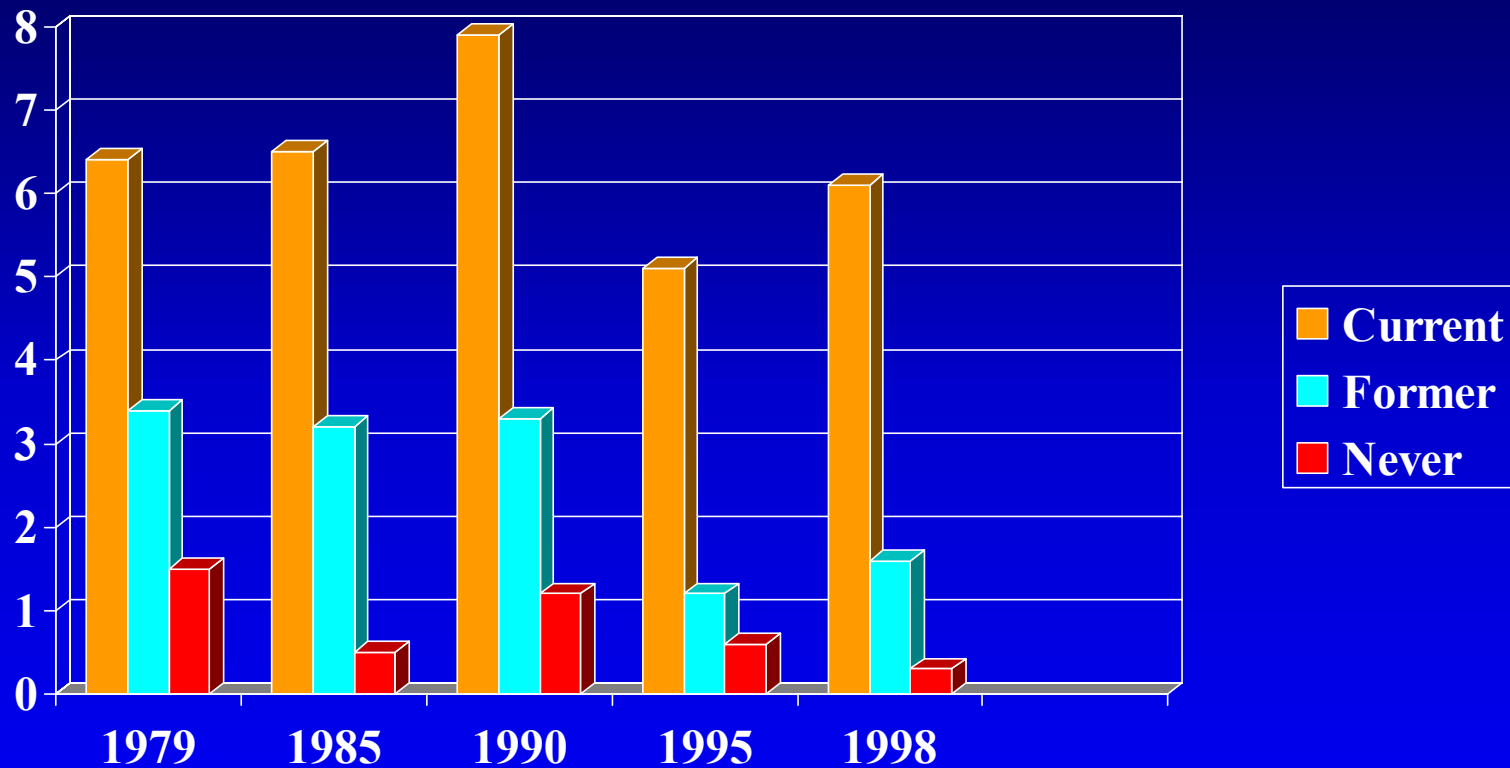
Source: SAMHSA – National Household Survey on Drug Abuse

Advancing the Field

Optimal Methodologies

- Population-based serial cross sectional surveys AND rolling cohorts – national / state
- Measuring
  - Tobacco use behaviors
  - Dependence
  - Motivation and intentions
  - Co-Morbidities
  - Efficacy, stress, support, coping skills
  - Appropriate body fluids for biomarker and genetic testing

Current Surveys

- National Health Interview Survey
- Current Population Survey Tobacco Use Supplements
- National Survey on Drug Use and Health
- National Health and Nutrition Examination Survey

Current Measures

- Smoking behaviors
- Indicators of dependence
- Alcohol and illicit substance use
- Co-morbidities
- Motivation and intentions to quit
- Selected demographics

Incorporating Measures of Dependence

- 2002 National Survey on Drug Use and Health (NSDUH) – assesses use of tobacco, alcohol, and illicit drugs; serious mental illness, depressive symptoms; 2002 data considered baseline

- Nicotine Dependence Syndrome Scale (Shiffman)

- Analyses (to be completed in Spring):

    - Assess NDSS score (continuous) as a function of change in smoking prevalence in respondent's state (controlling for demographics and with and without CPD)

Incorporating Cotinine

- National Health and Nutrition Examination Survey (NHANES III [1988-1991] and NHANES 1999-2000)

- Stratify appropriately

- Assess:

  - cotinine per smoker

  - CPD

  - cotinine per cigarette

Plasma cotinine by deprivation in adult smokers: HSFE 1993, 1994, 1996
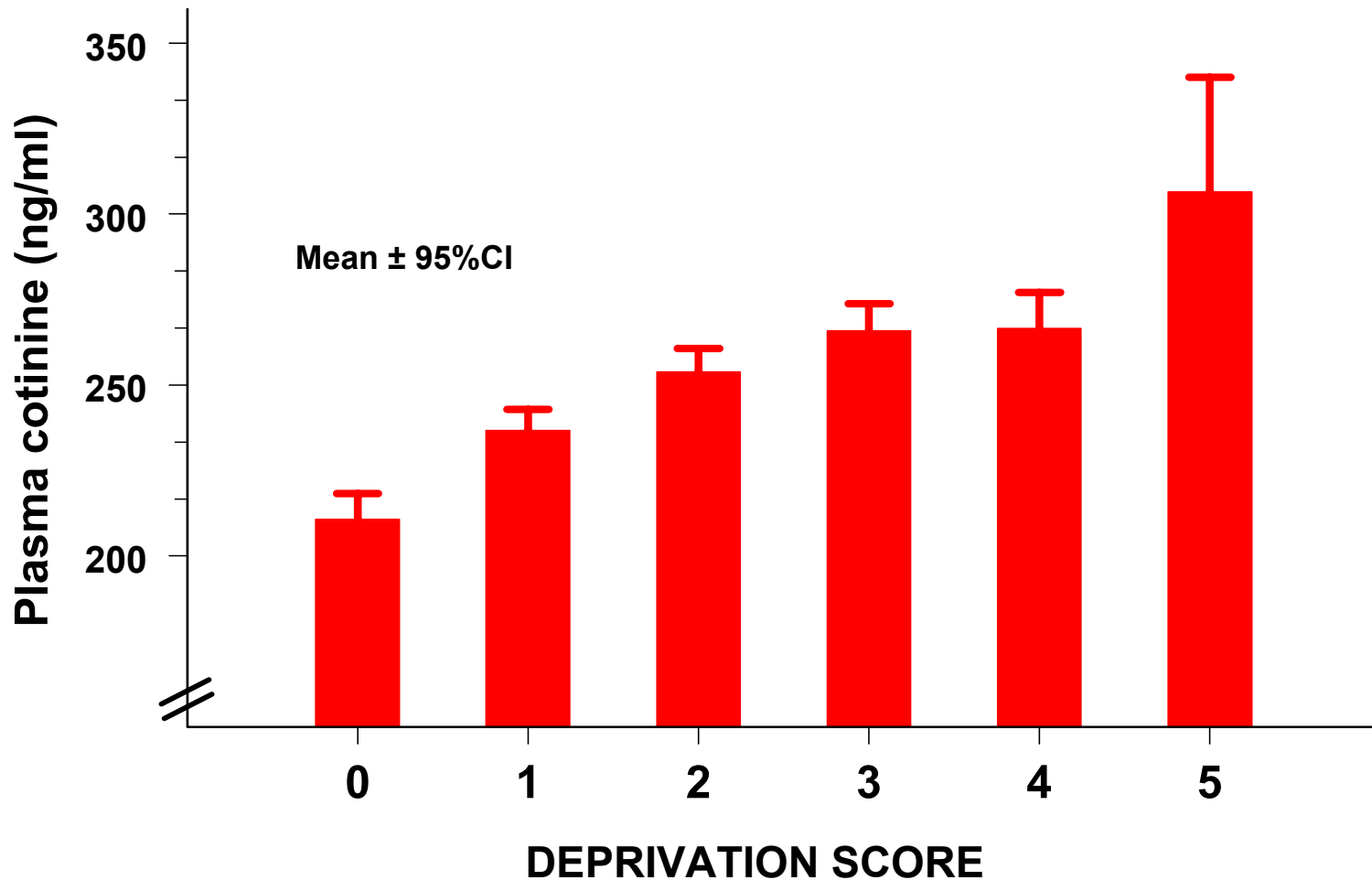
Incorporating Cohort Data

COMMIT

- 2001 follow-up of original 1988 COMMIT cohort (ages 25-64)
- 3,448 persons who were smoking at both waves
- Results:
  - Average cigarettes per day decreased (by 5)
  - Time to first cigarette increased
  - Desire to quit increased slightly
- Loss to follow-up: Those not followed more likely to smoke early and not want to quit . No difference in CPD.

Hard Core Smoker & Harm Reduction Survey

- National telephone survey of current smokers and former smokers off < 5 years; ages 25 years and older
- Fielded on February 12, 2004
- One year follow-up assessment
- Measures:
  - Smoking behaviors
  - Dependence
  - Readiness to quit
  - Motivation and intentions
  - Perceptions of cigarettes
  - Perceptions of treatments
  - Functional utility
  - Support and advice
  - Motivation enhancers
  - Quitting experiences, methods
  - PREPs – awareness, use, perceptions of; interest in

  - Media exposure
  - Home/work smoking bans
  - Health beliefs
  - Alcohol and illicit drug use
  - Mental health indicators
  - Perceived stress
  - Physical health
  - Fruit and vegetable consumption
  - Demographics

Summary

- Optimal definition involves motivation and dependence
- Analyses based on CPD do not indicate hardening, but CPD is not enough.
- Concurrent binge drinking and MJ use do not suggest hardening
- Clinical trial data consistent with hardening, but how representative are the samples used and does representativeness change over time?
- COMMIT cohort data do not support hardening.
- Measures of dependence needed – which scale?
- Is cotinine necessary?

Discussion

- Recommend: NHIS split-sample technique to compare current quitting patterns to those from decades ago.

- Recommend enhanced population-based surveillance (rolling cohorts):

  - Product surveillance

  - Host factors – use patterns, dependence, quitting experiences & methods, motivation, intentions, dependence, perceptions, functional utility, co-morbidities, genetics, biomarkers.

  - Environment: marketing (tobacco and pharmaceuticals), government messages, programs, policies.

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