

Smokeless Tobacco as a Harm Reduction Strategy: Evidence and Concerns

Scott L. Tomar, DMD, DrPH

University of Florida College of Dentistry

stomar@dental.ufl.edu

Background

- Much recent discussion about moist snuff
- Claims that using moist snuff...
 - ...carries few health risks
 - ...will reduce risk of harm among smokers
 - ...can prevent smoking initiation
 - ...was responsible for Sweden being first country to achieve WHO goal

Objectives

- Review the health effects associated with use of moist snuff
- Examine evidence for effect of snuff in reducing smoking in 3 nations
- Discuss unintended consequences of health community promoting snuff for “harm reduction”

ST-Associated Health Effects

- Oral and pharyngeal cancer
- Pancreatic cancer
- Adverse reproductive health outcomes
- Smokeless tobacco keratosis / leukoplakia
- Gingival recession
- Dental caries
- Cardiovascular diseases
- Type 2 diabetes and insulin resistance
- Nicotine addiction

ST and Oral Cancer: IARC Reviews

1984: International Agency for Research on Cancer (IARC) evaluation

- “There is *sufficient evidence* that oral use of snuffs of the types commonly used in North America and western Europe is carcinogenic to humans.”

ST and Oral Cancer: 2004 IARC Evaluation

- “Overall, there is *sufficient evidence* that smokeless tobacco causes oral cancer and pancreatic cancer in humans, and *sufficient evidence* of carcinogenicity from animal studies.”
- Smokeless tobacco is “carcinogenic to humans.”
- Exposure to NNN and NNK is “carcinogenic to humans,” on the basis of *sufficient evidence* from animals and strong mechanistic evidence in exposed humans.
- NNN and NNK are the most abundant strong carcinogens in smokeless tobacco

ST and Cancer: Other Reviews

- “Most recent studies from the US and Scandinavia are not statistically significant, but moderate positive associations cannot be ruled out due to lack of power.”

Critchley and Unal 2003 [Thorax 2003;58(5):435-43]

ST and Myocardial Infarction (MI)

- 4 large US and Swedish cohort studies consistently found increased risk for MI death*
- Large international case-control study found elevated risk for MI among subjects with no history of using other tobacco products (OR=2.23, 95% CI=1.41–3.52), only slightly lower than for smoking (OR=2.95, 95% CI=2.77–3.14).**
- 3 smaller case-control studies found no assoc.***

*Bolinder et al. *Am J Public Health* 1994;84:399-404; Henley et al. *Cancer Causes Control* 2005;16(4):347-58; Hergens et al. *J Int Med* [in press]

**Teo et al. *Lancet* 2006; 368(9536):647-58.

*** Huhtasaari et al. *BMJ* 1992;305:1252-6; Huhtasaari et al. *J Am Coll Cardiol* 1999;34:1784-90; Hergens et al. *Epidemiology* 2005;16(1):12-6.

ST and Reproductive Health

- In recent prospective cohort studies, ST use associated with increase risk for
 - Low birth weight^{1,2}
 - Preterm delivery^{1,2}
 - Pre-eclampsia²
 - Stillbirth³

1. Gupta and Sreevidya. *BMJ* 2004; 328(7455):1538

2. England et al. *Am J Obstet Gynecol* 2003;189(4)939-43.

3. Gupta and Subramoney. *Epidemiology* 2006;17(1):47-51.

Snuff and Diabetes

- Swedish cross-sectional study, men age 35-56 (n=3,128)*
- Increased risk for type 2 diabetes associated with using 3+ cans snuff
 - OR = 2.7 (95% CI: 1.3-5.5)
- Comparable risk associated with smoking 25+ cigarettes / day
 - OR = 2.6 (95% CI: 1.1-5.9)

Snuff and Metabolic Syndrome

- Cluster of cardiovascular risk factors: obesity, impaired glucose regulation, dyslipidemia, hypertension
- Swedish longitudinal cohort study, 10-year follow-up (n=16,500)*
- Heavy snuff use (>4 cans/week) independently associated with development of:
 - Metabolic Syndrome, OR=1.6 (1.26-2.15)
 - Elevated triglycerides, OR=1.6 (1.30-1.95)
 - Obesity, 1.7 (1.36-2.18)

*Norberg et al. *Scand J Public Health* 2006;34:576-83.

ST and Addiction: Reviews

- “There is no doubt that regular use of ST leads to a physical dependence on nicotine.”¹
- “...smokeless tobacco qualifies as a drug of abuse and has a high potential to produce dependence or addiction.”²
- “The use of smokeless tobacco products can lead to nicotine dependence or addiction.”³

1. Hatsukami DK, Severson HH. *Nicotine Tob Res* 1999;1(1):21-44.

2. Henningfield JE, Fant RV, Tomar SL. *Adv Dent Res* 1997;11(3):330-5.

3. USDHHS. *The health consequences of using smokeless tobacco: a report of the Advisory Group to the Surgeon General*. 1986. NIH Pub 86-2874

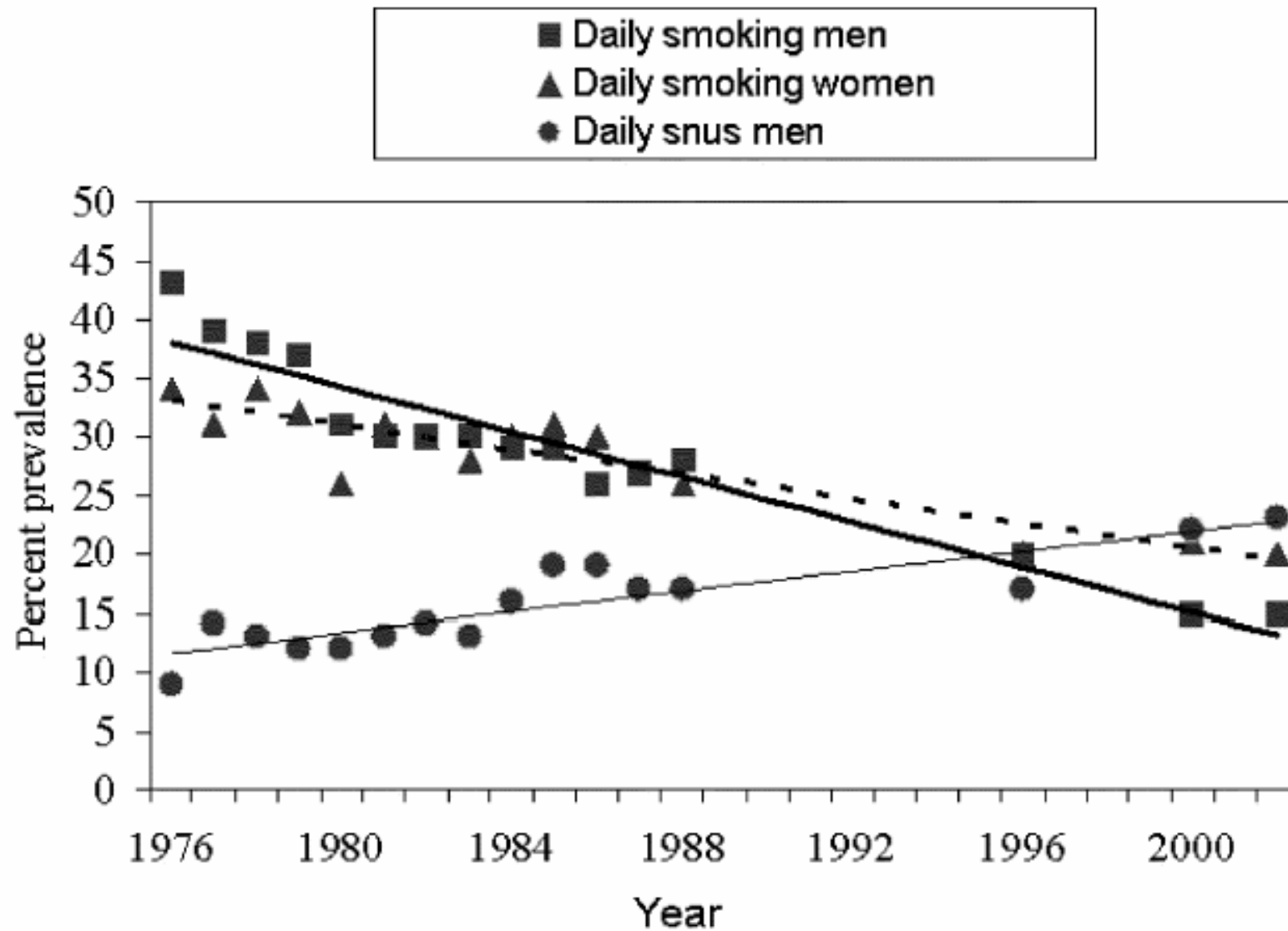
Possible mechanisms for snuff in reducing population harm from smoking:

- Exclusive snuff use conveys lower risk for morbidity and mortality
- Perhaps snuff could reduce population harm from smoking by:
 - Preventing smoking initiation
 - Fostering smoking cessation
 - Reducing cigarette consumption among continuing smokers

Sweden: The Role Model?



The “Swedish Experience”

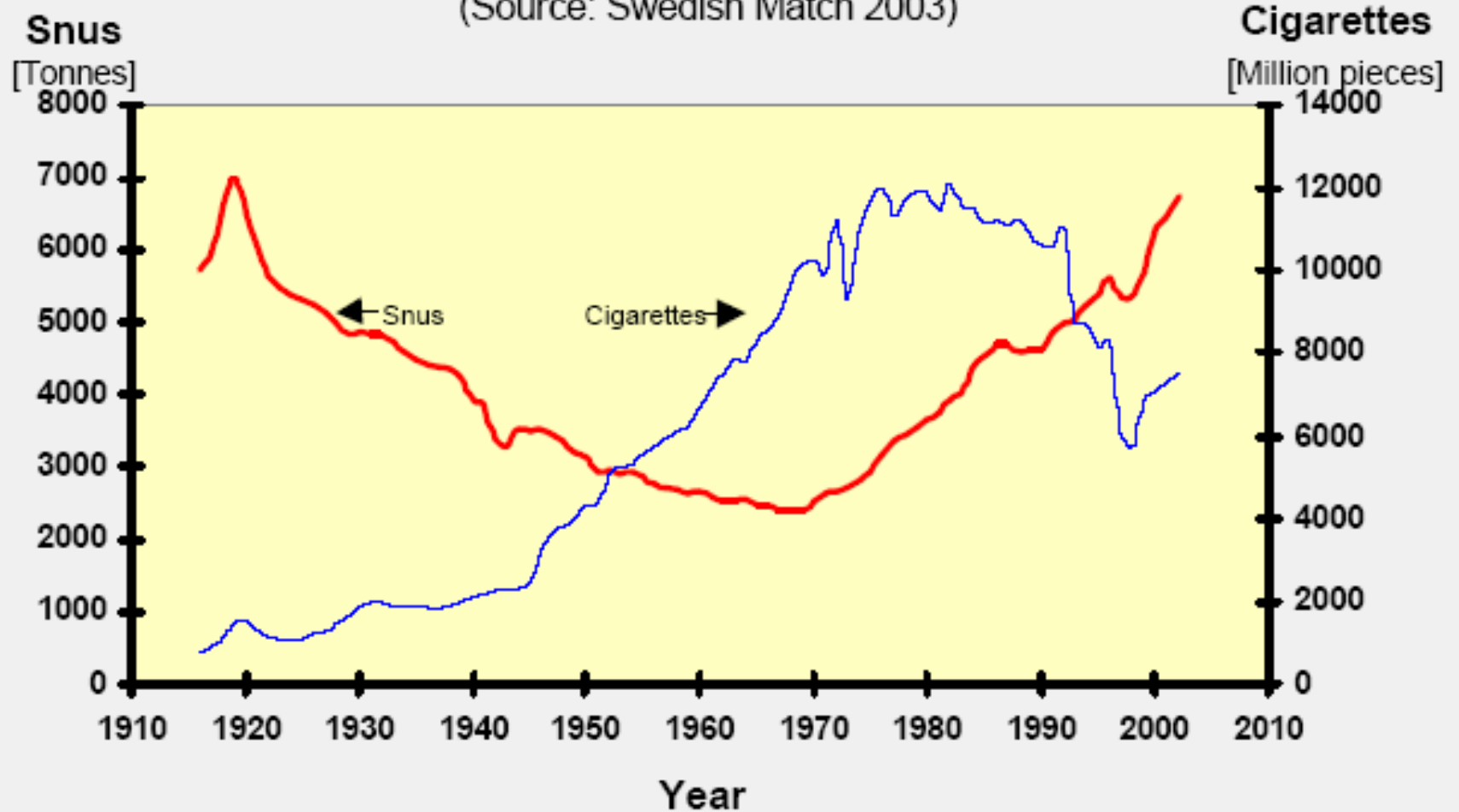


Consumption in Sweden

www.swedishmatch.com

Sales of Snus and Cigarettes in Sweden 1916 - 2002

(Source: Swedish Match 2003)



Claim:

“Sweden has achieved the lowest smoking prevalence rate in all of Europe.”

Savitz DA, et al. Public Health Implications of Smokeless Tobacco Use as a Harm Reduction Strategy. *Am J Public Health* 2006;96(11):1934-9

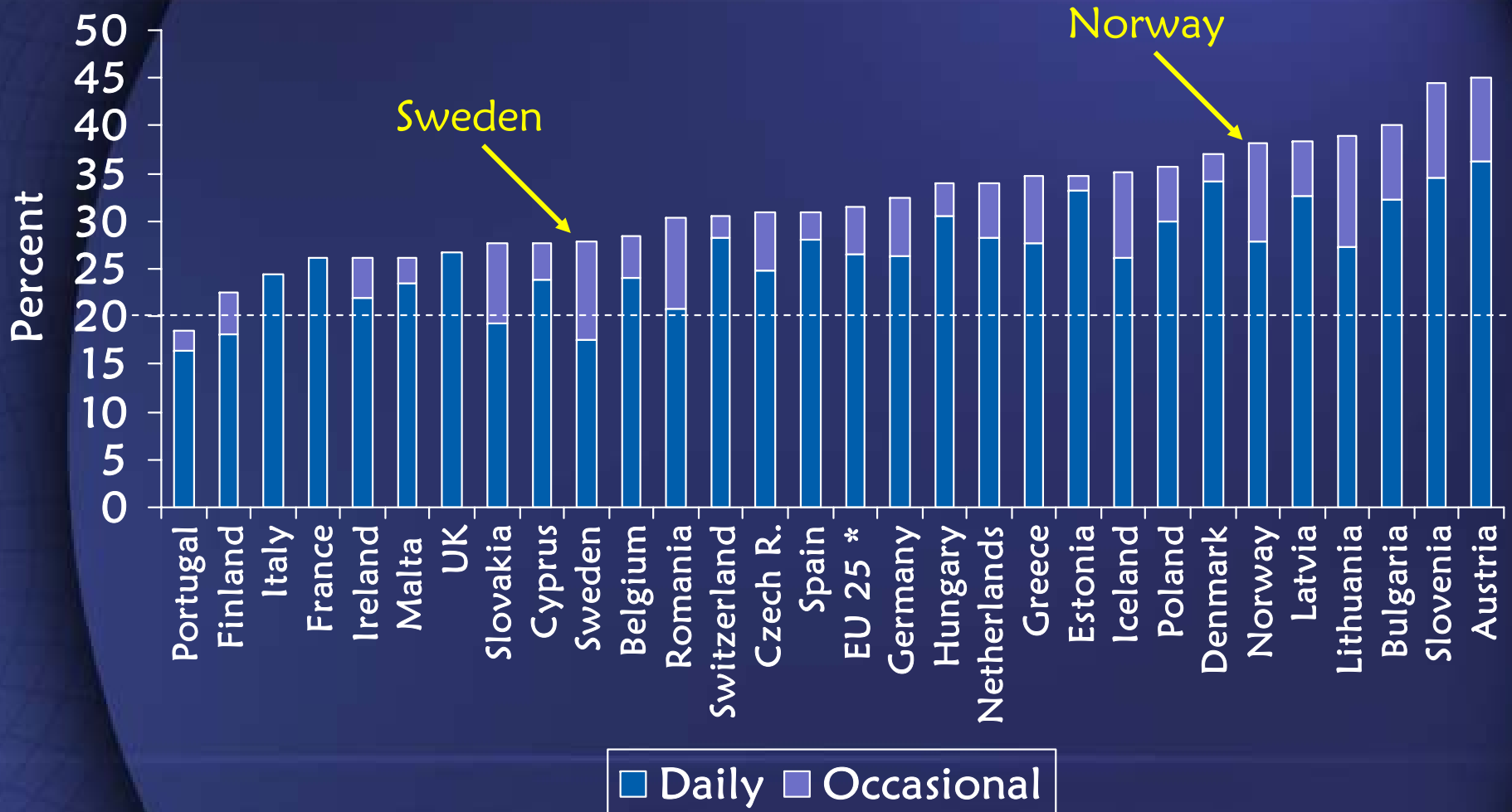
Claim:

“Sweden was the first and only country in the western world to reach the World Health Organization’s (WHO) goal of reducing the percentage of smokers in the adult population (men and women) to below 20% by 2000.”

The Reality

- WHO did not limit smoking definition to “daily” smoking
- WHO did not limit target to men
- Sweden did not achieve the goal
- Many other European countries have achieved lower prevalence of smoking
- Most of US and Canada have lower prevalence of smoking

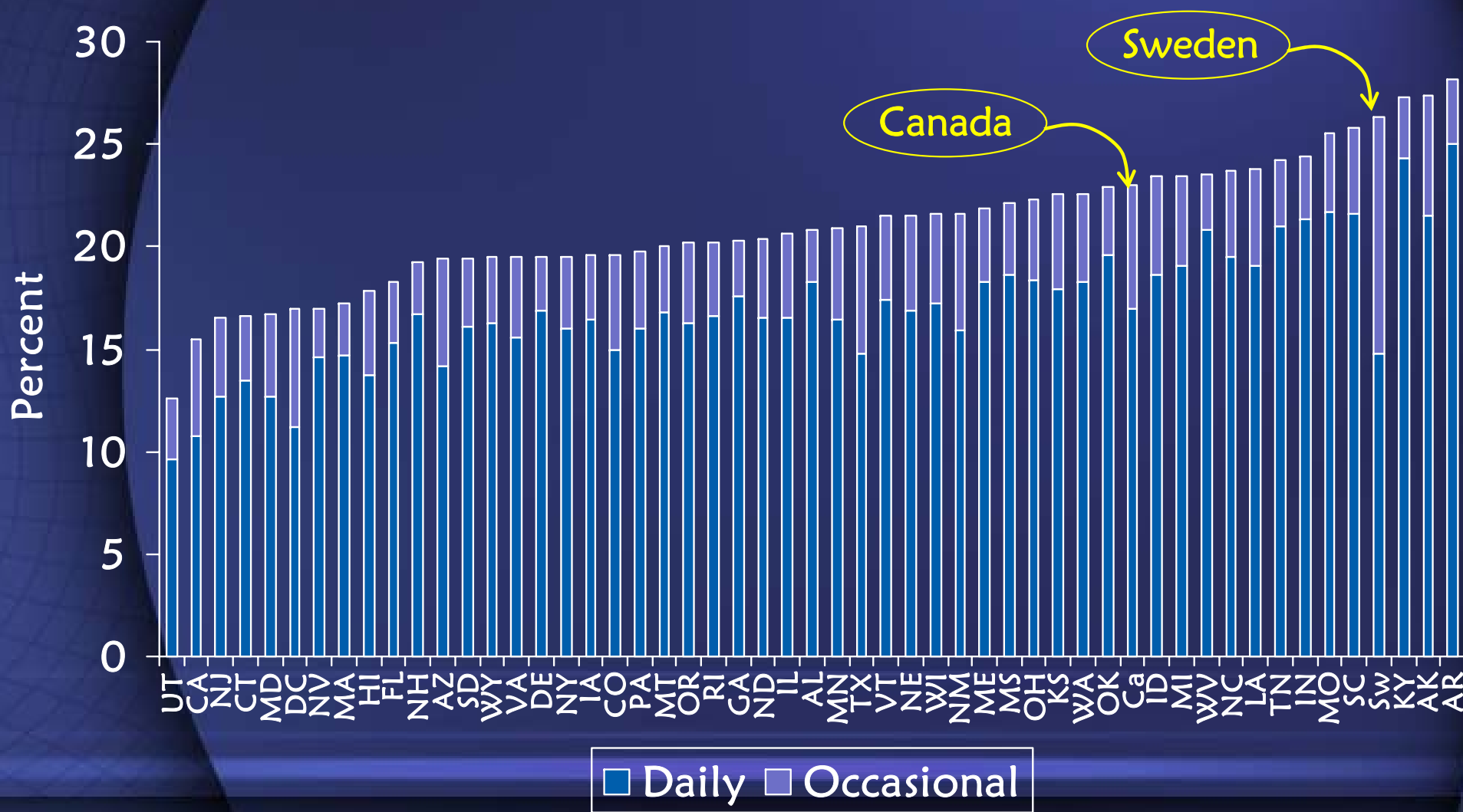
Current Smoking, All Ages European Union Countries, 2004



Sources: European Commission, Health & Consumer Protection Directorate-General, Directorate C - Public Health and Risk Assessment, C2 - Health information. 2007.
http://ec.europa.eu/health/ph_information/dissemination/echi/echi_32_en.pdf

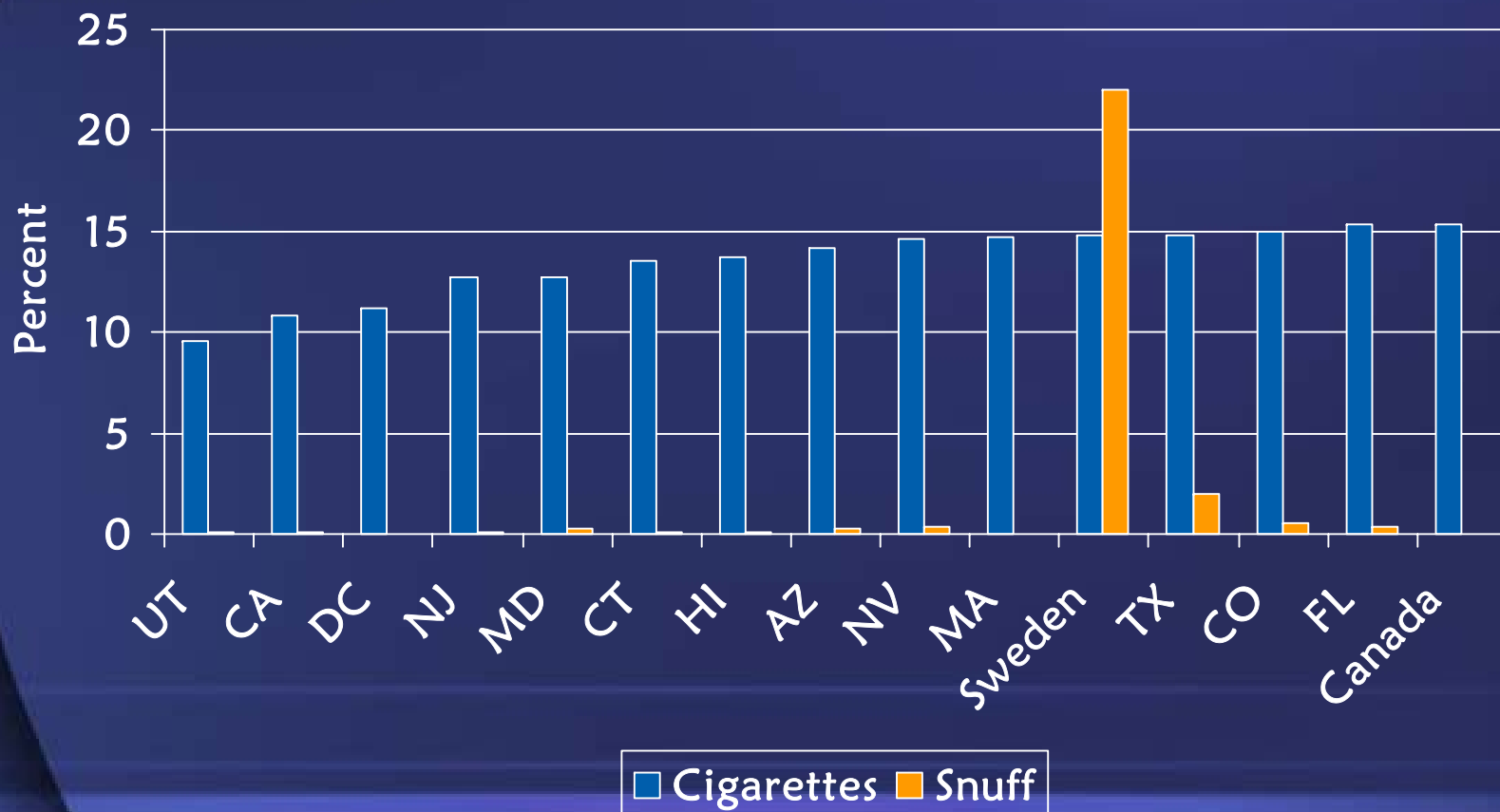
Current Smoking, Males Age 16+

Canada, 50 U.S. States & DC, Sweden



Sources: 2003 CPS Tobacco Use Supplement; Statistics Sweden 2004 ULF; Canadian Tobacco Use Monitoring Survey (CTUMS) 2004

Daily Smoking or Snuff Use Males Age 15+ U.S. States, Canada and Sweden



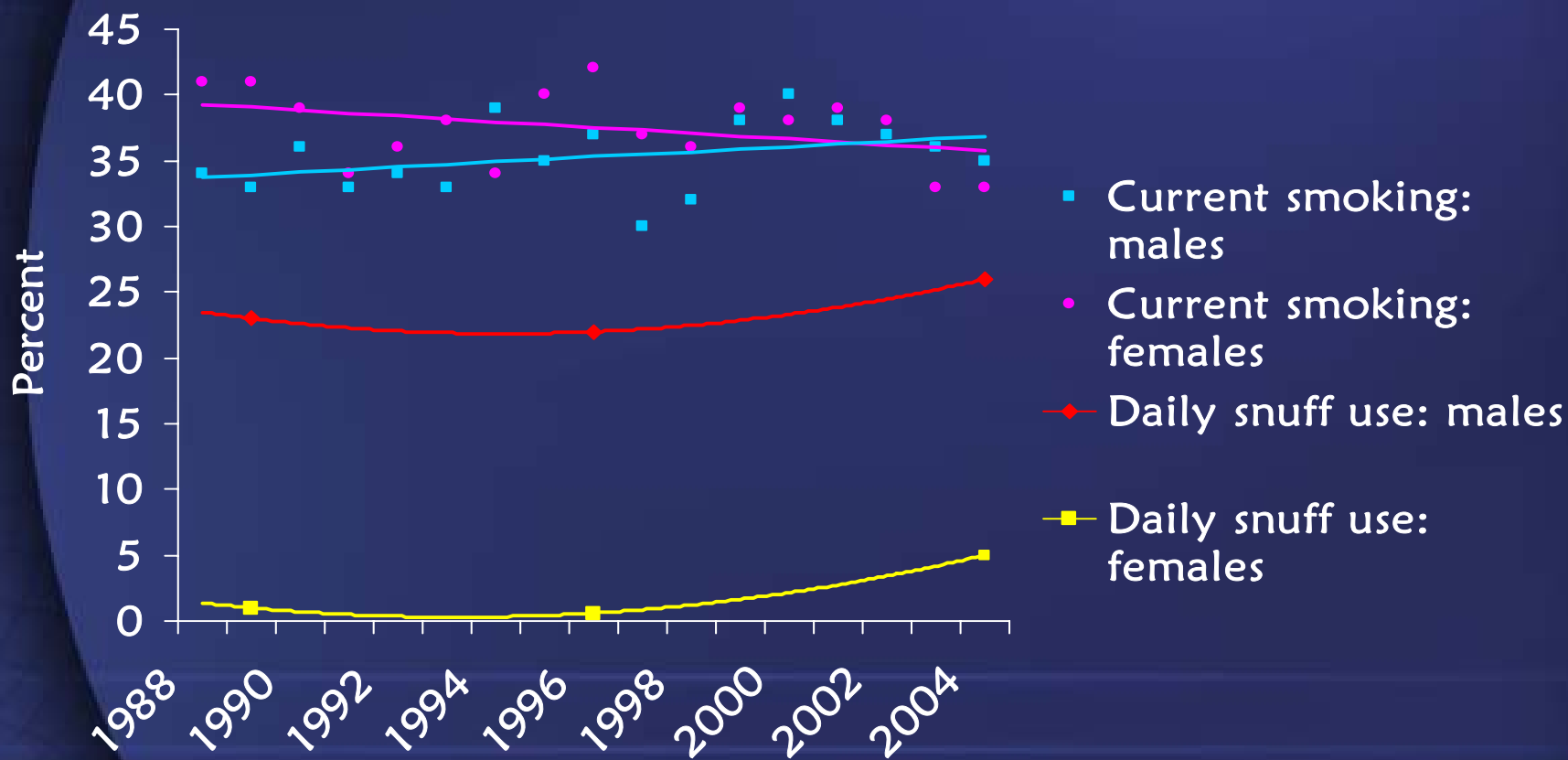
Sources: 2003 CPS Tobacco Use Supplement; Statistics Sweden 2004 ULF; Swedish snuff: 2004 Health on Equal Terms, National Institute of Public Health; 2006 Canadian Tobacco Use Monitoring Survey

Claim:

- “Use of snus in Sweden is associated with a reduced risk of becoming a daily smoker and an increased likelihood of stopping smoking.”

Ramstrom LM, Foulds J. Role of snus in initiation and cessation of tobacco smoking in Sweden. *Tob Control* 2006;15(3):210-4.

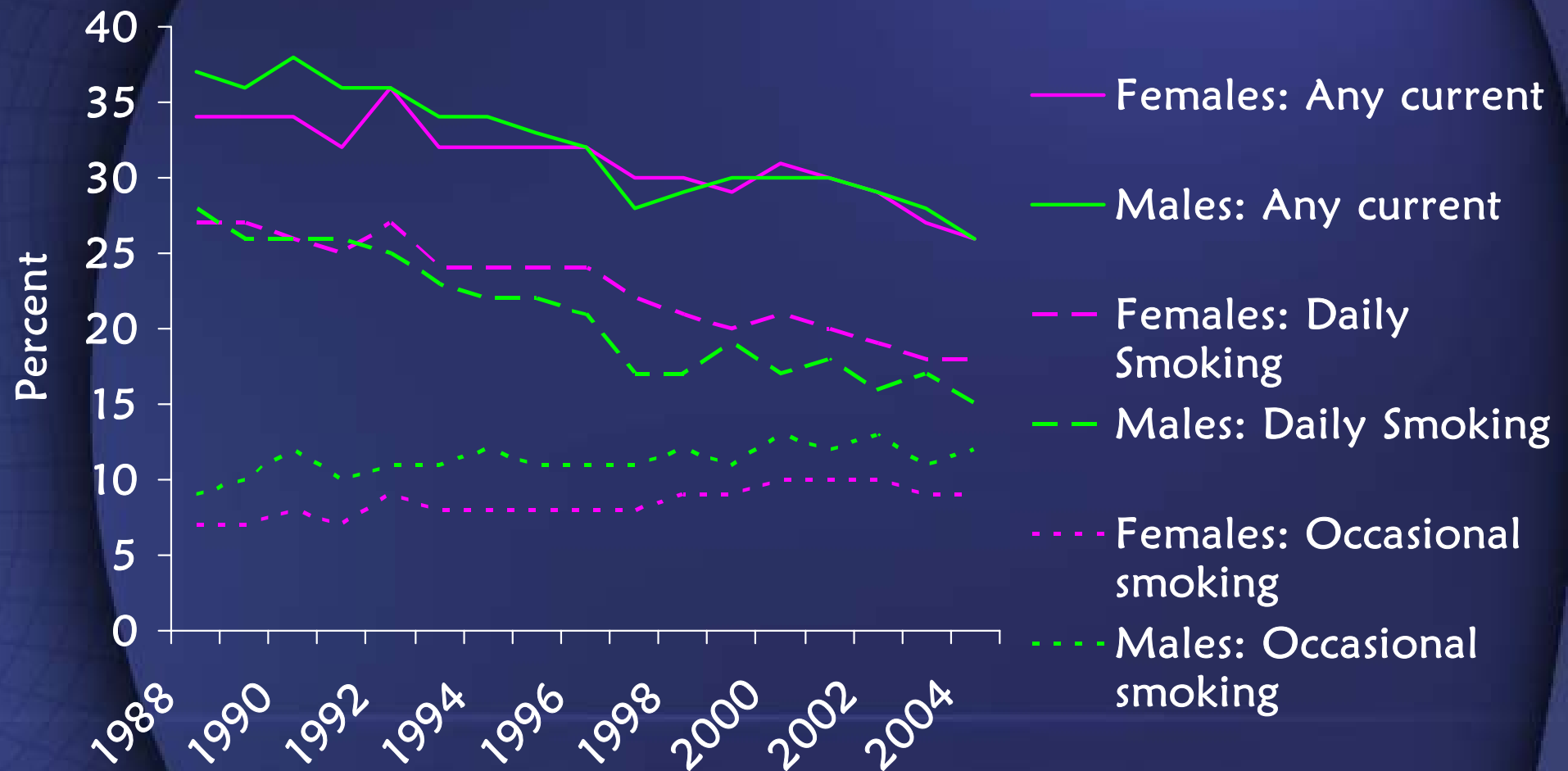
Proportion of persons age 16-24 who used snuff daily or currently smoked*, by sex Sweden, 1988-2004



* Smoked daily or occasionally

Statistics Sweden (SCB). ULF surveys.

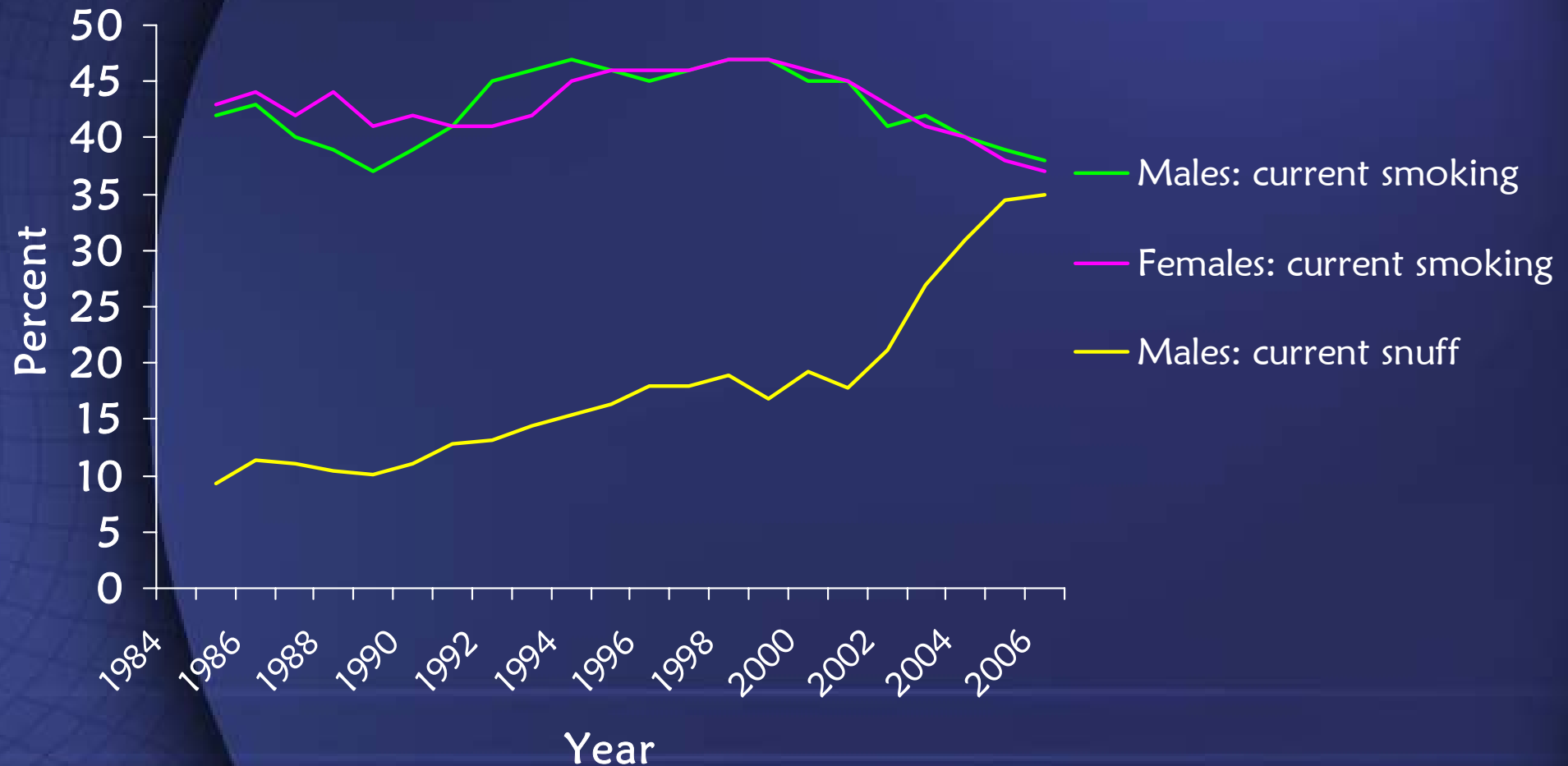
Prevalence of Daily or Occasional Smoking Age 16-84 years Sweden 1988-2004



Data from Statistics Sweden ULF surveys

Norwegian Experience?

Current* Smoking or Snuff Use Norway, 1985-2006 Age 16-24



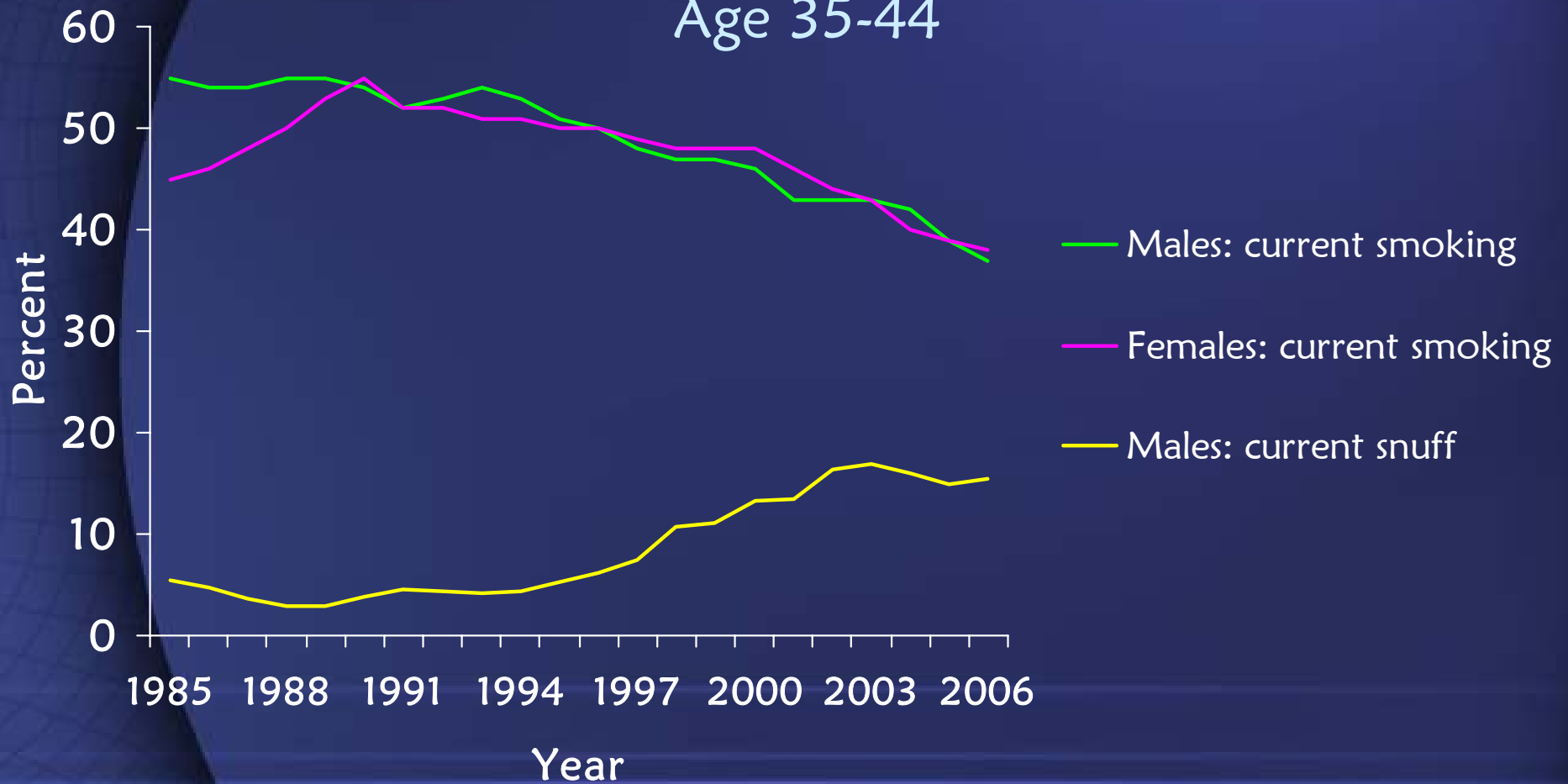
*Daily or occasional

Statistics Norway.

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=royk

Smoking and Snuff Use Norway, 1985-2006

Age 35-44

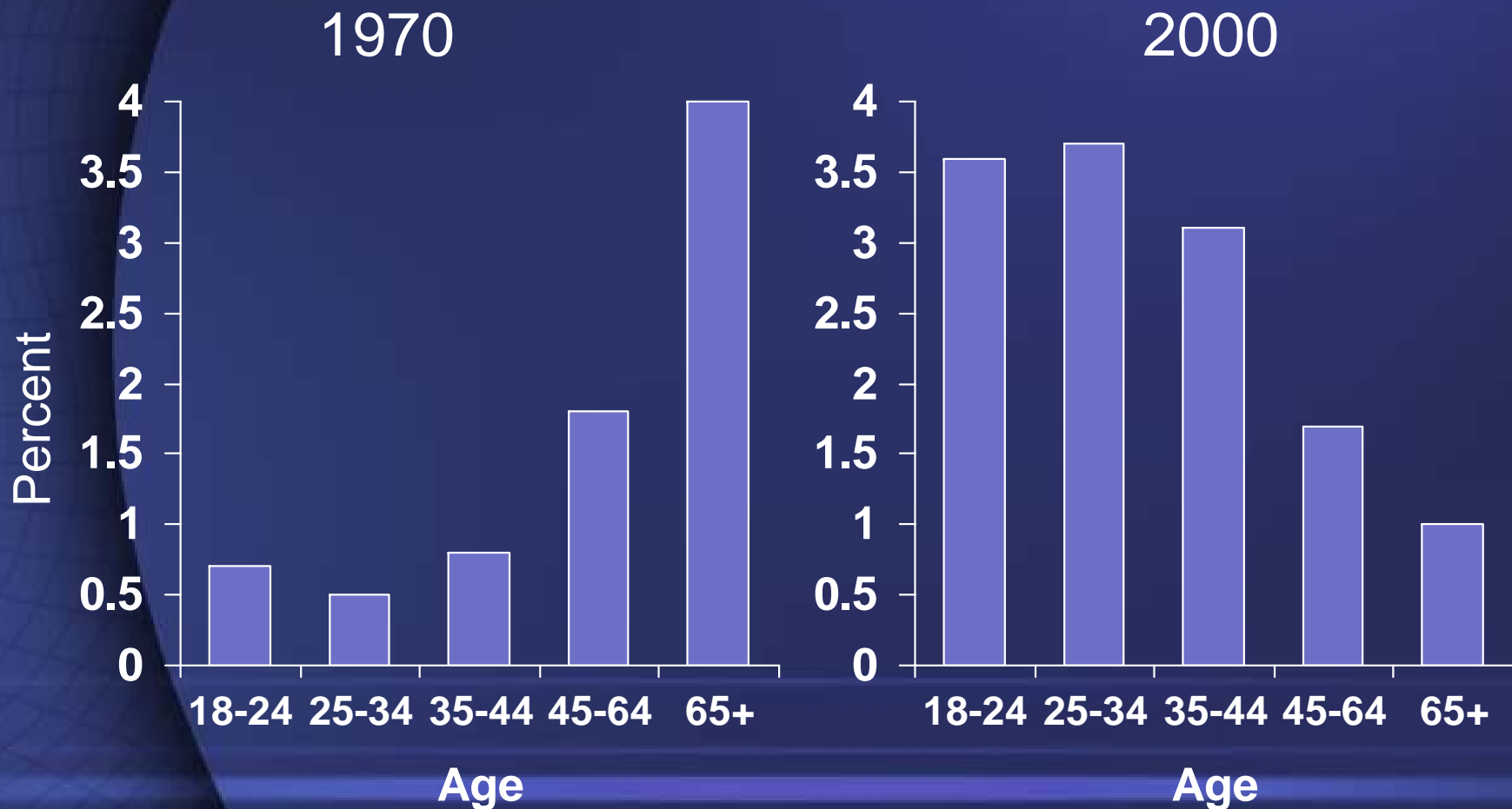


Source: Statistics Norway

U.S. Experience?

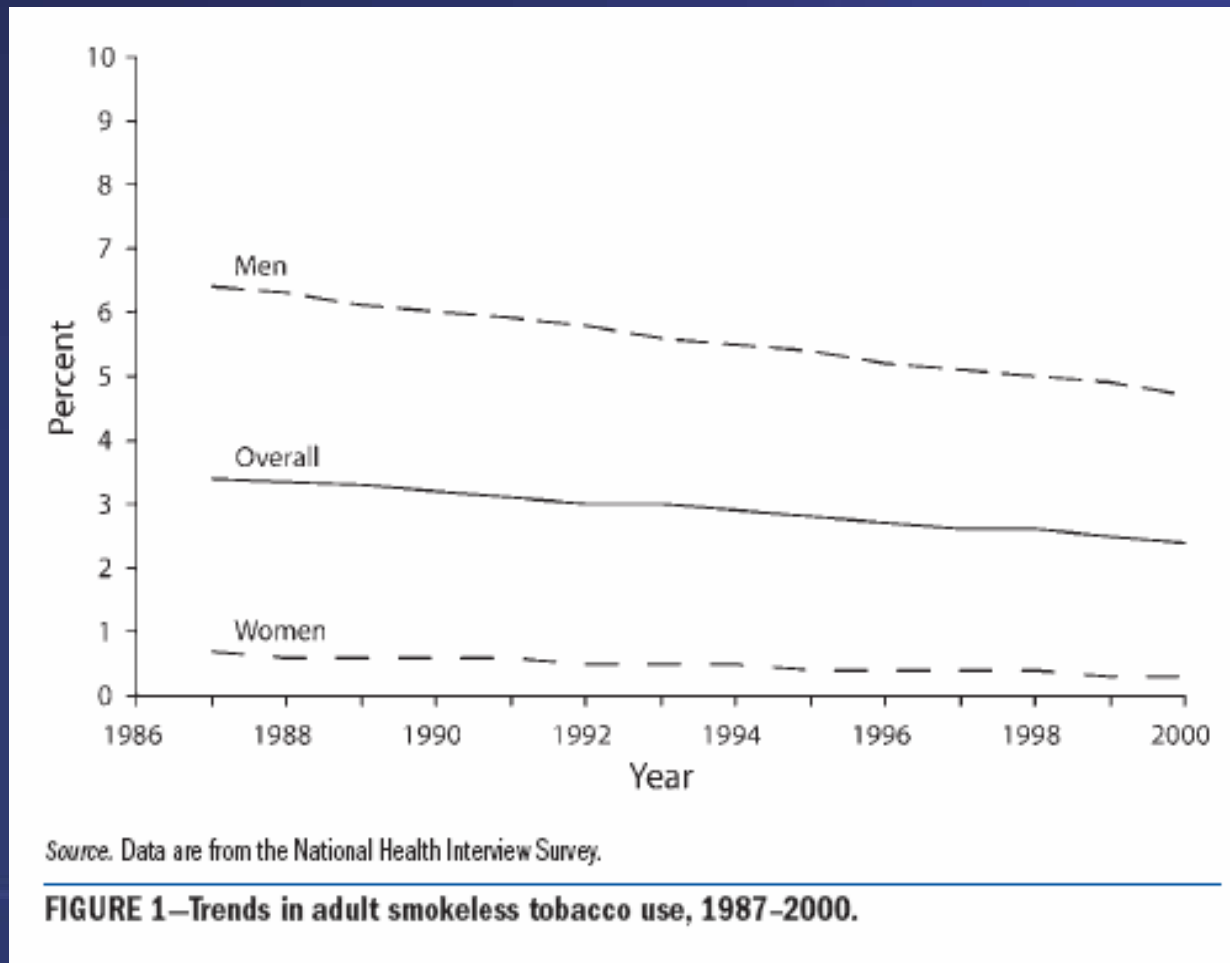
Prevalence of Snuff Use Among Men, by Age

United States, 1970 and 2000

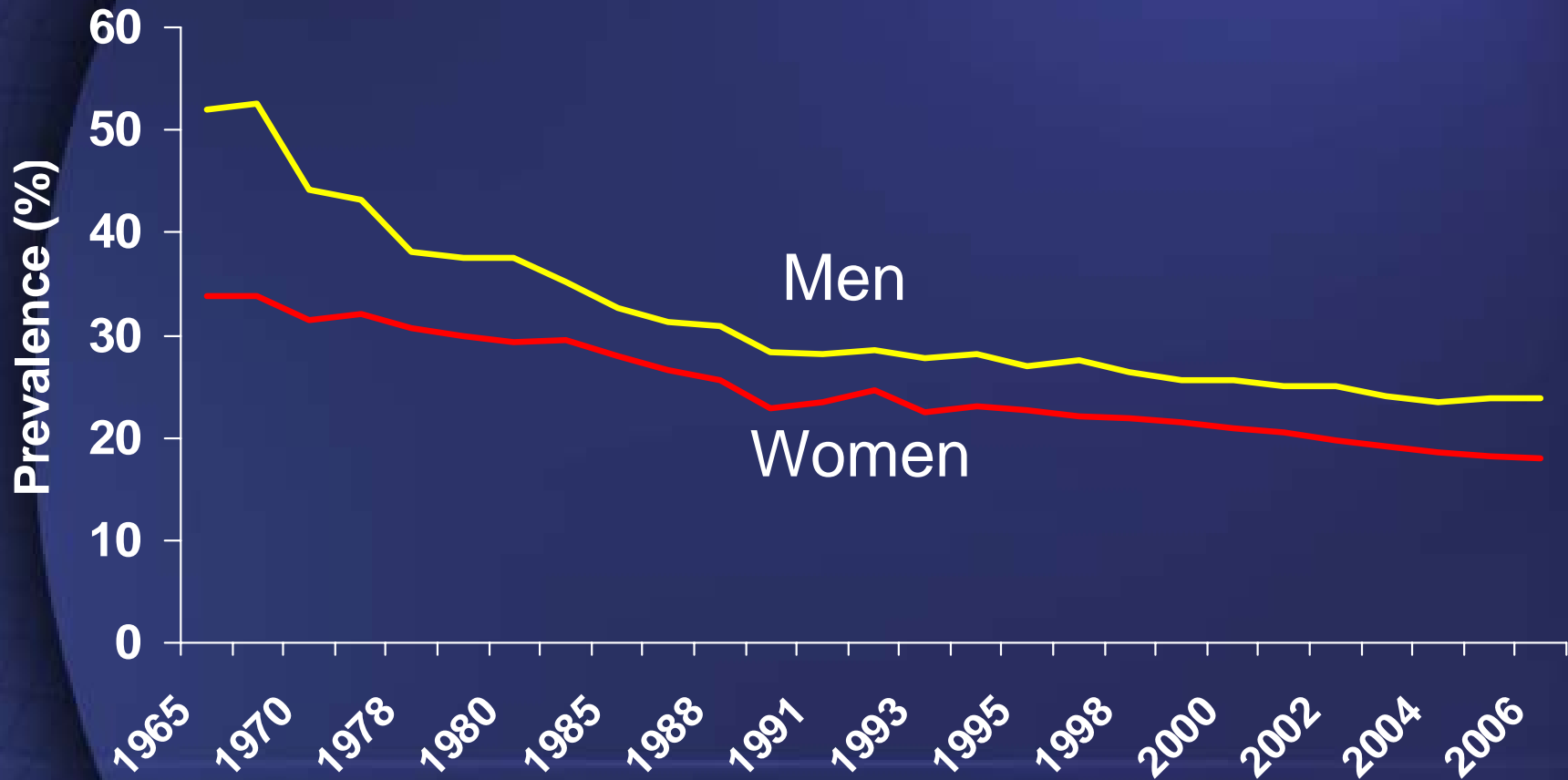


Tomar. Smokeless Tobacco Products in the United States and Sweden. In: NCI Monograph 19 [in press]

Trends in Adult ST Use, 1987-2000



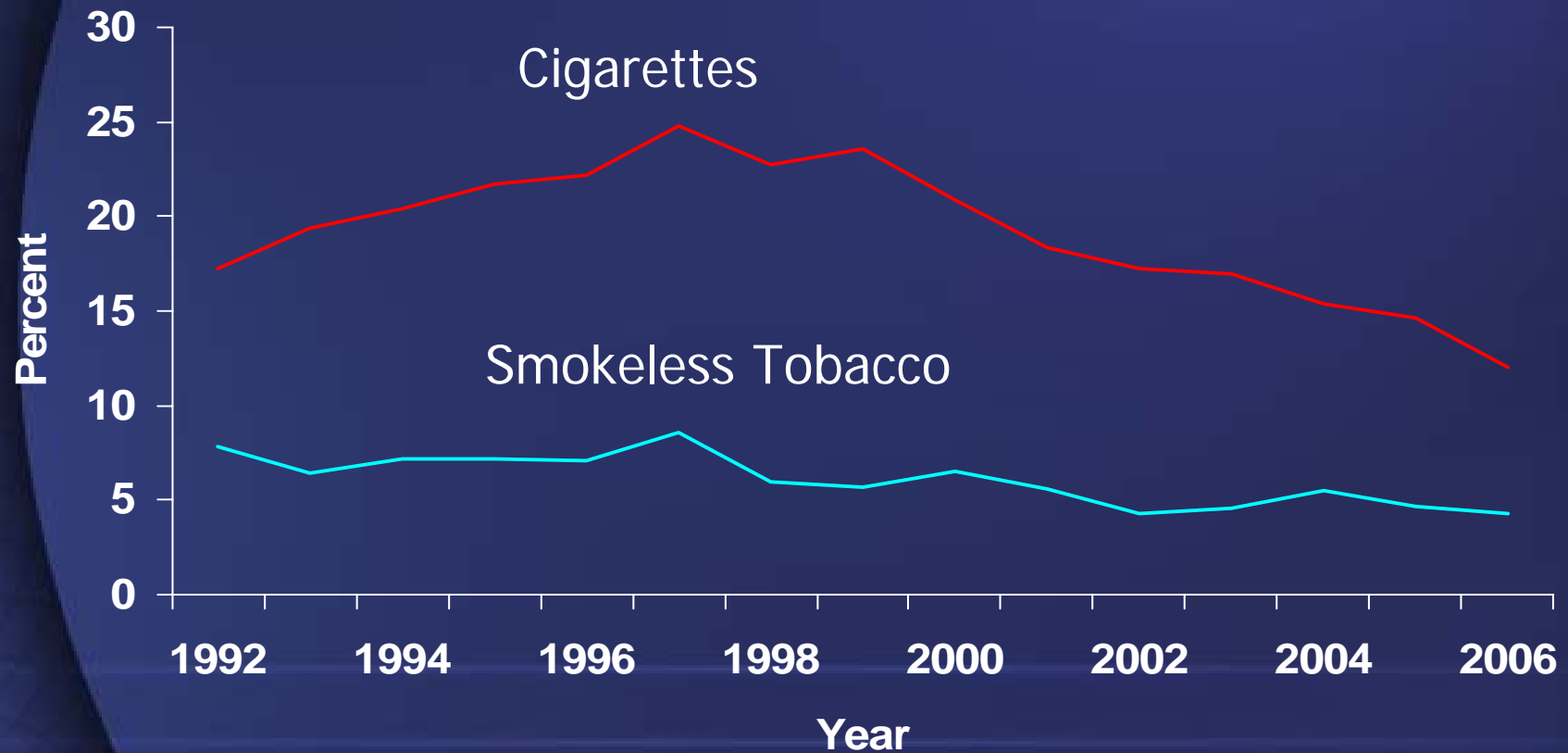
Trends in Adult Cigarette Smoking United States, 1965-2006



Source: NHIS 1965-2006

Daily Use of Cigarettes or ST among Male High School Seniors

US Monitoring the Future Project, 1992-2006



Johnston, O'Malley, Bachman, & Schulenberg (2007)

Potential Unintended Consequences of Promoting Snuff as “Safer”

- Primary adopters of snuff have been adolescent & young adult males
- Young smokers are those least likely to perceive risk from smoking, so why would they switch?
- Mixed messages from public health community leads to confusion: “don’t use any tobacco, but this type is safer”
- History of public misinterpretation of “lower risk”; e.g. light cigarettes
- Dual use of cigarettes and snuff is common and may reduce smoking cessation

Some Ethical Considerations

- Responsible clinicians and public health leaders rely on evidence-based practice; no reliable evidence for snuff as effective treatment for smoking
- Responsible professionals do not recommend more dangerous products when safer ones exist
- Other examples of recommending an established human carcinogen as treatment?

Conclusions

- Initiation of snuff use mostly in young males
- Association of snuff and smoking decline inconsistent
- Snuff use conveys lower risk for death and disease than smoking, but is still a harmful product
- Many potential negative consequences, with little evidence of benefit
- Major ethical concerns for clinicians and public health professionals
- Currently no framework to evaluate and regulate products