

# 21<sup>st</sup> Century Global Hazards of Smoking

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**St. Michael's**

Inspired Care.  
Inspiring Science.

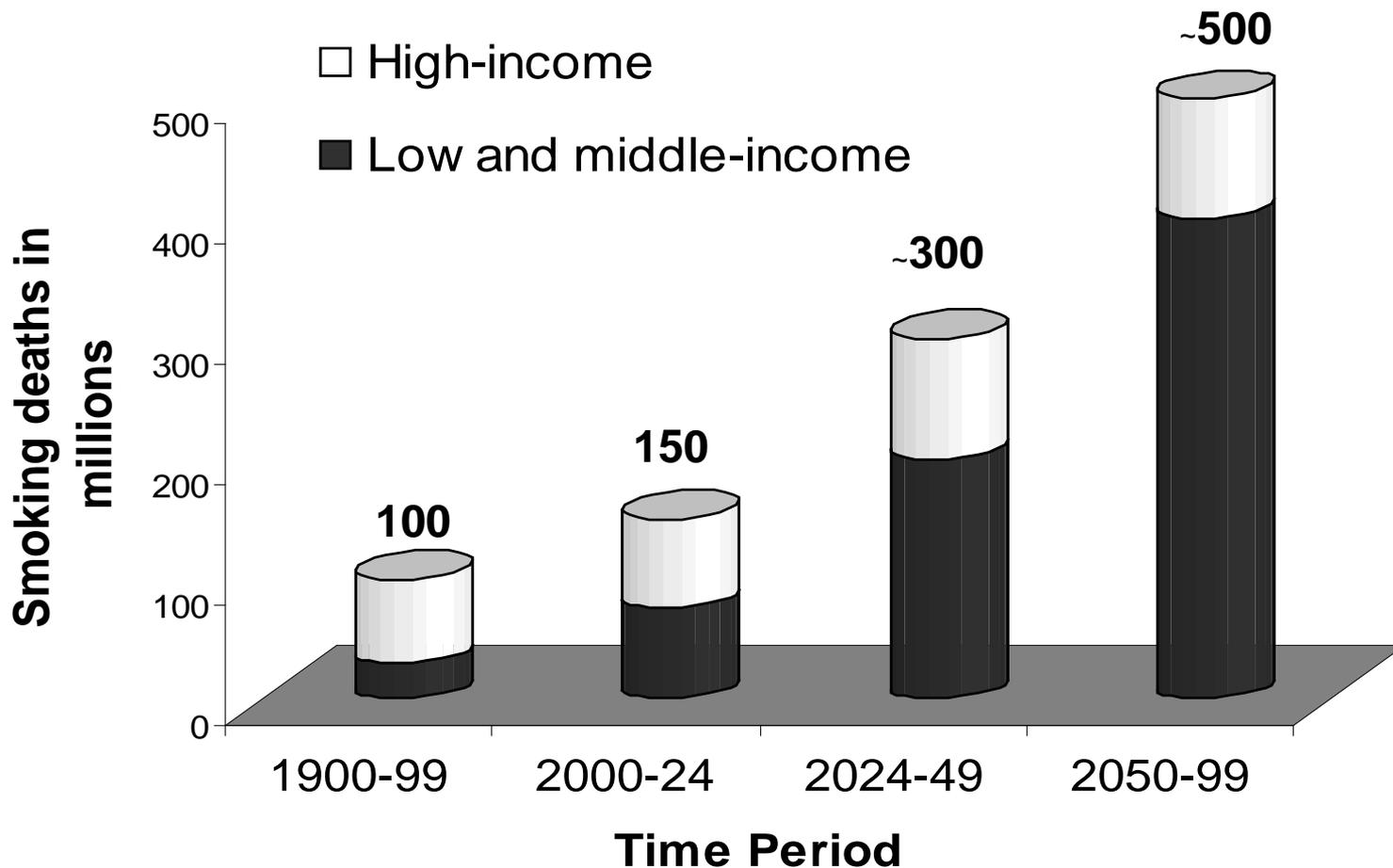


UNIVERSITY OF TORONTO  
DALLA LANA SCHOOL OF PUBLIC HEALTH

# Conclusions

- **On current patterns: 1 Billion smoking deaths this century, or about 250 million deaths among those <35 years in just 16 countries**
- **Prolonged smokers lose about one decade of life**
- **Cessation by age 40 (and preferably earlier) avoids 90% of the excess risk of continued smoking**
- **Tripling of excise tax worldwide is the best strategy to reduce smoking deaths**
- **Monitoring is needed: smoking on death certificates**

# A billion tobacco deaths in the 21<sup>st</sup> century on current smoking patterns



Source: Peto et al 2001; Jha, 2009

# Worldwide no of substance users

B=billions, M=millions

<u>Substance</u>	<u>Users</u>	<u>Annual deaths</u>
Smoking	1.3 B *	~ 5 M
Drinking	2.0 B	~ 2 M
Illicit drugs	0.2 B	~ 0.2 M

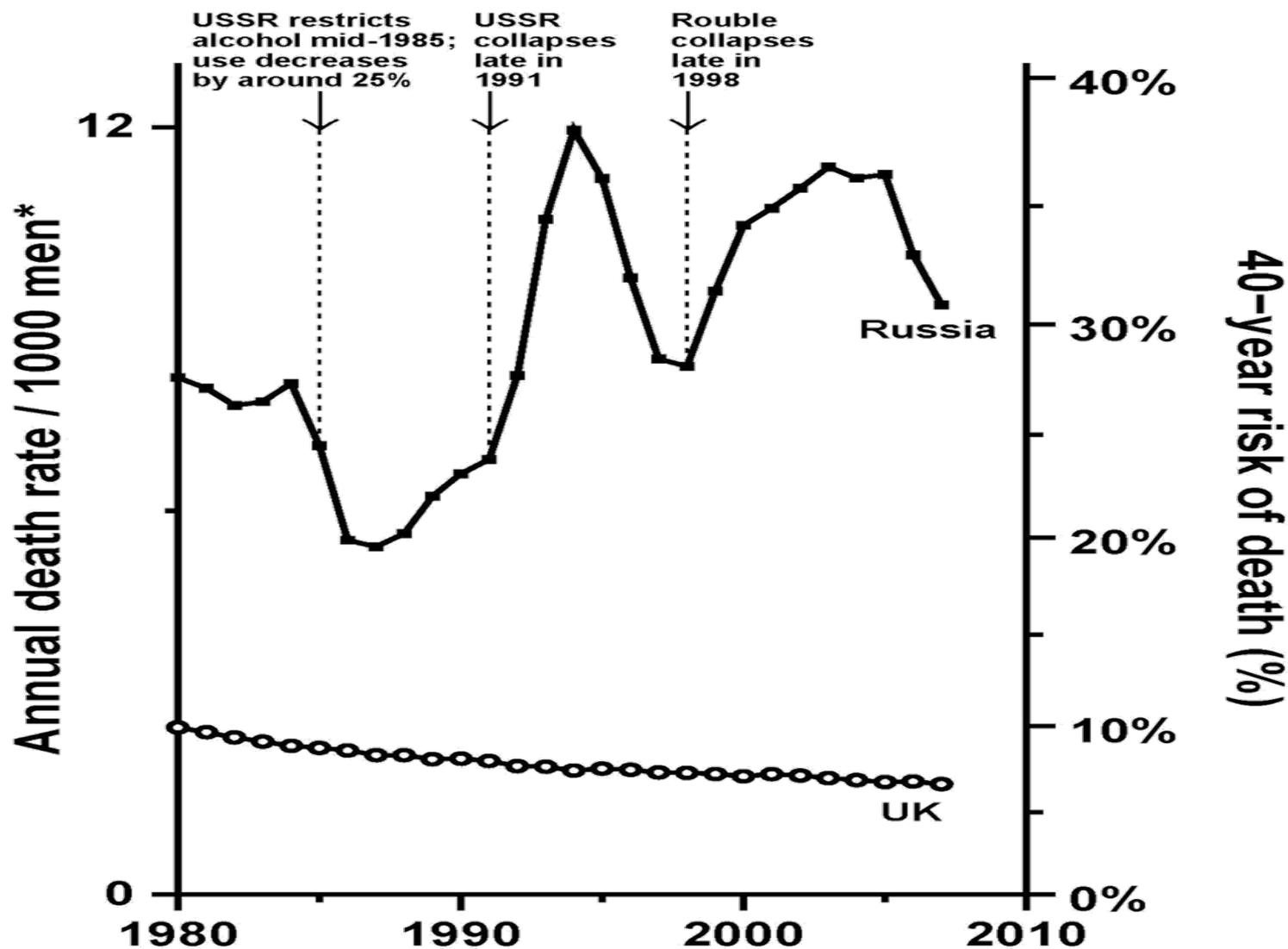
**Global sales ~6,000 B sticks (vs 5,000 B in 1990)**

**1 ton of tobacco=1 M sticks=1 death**

# Smoking versus other risks (alcohol, fast driving)

- Risk of addiction is greater for smoking
- No “learning” from youthful excesses
- Risk of death from smoking is much higher: of 1000 males smokers aged 20
  - 250 die from smoking in middle-age
  - 20 die from road accidents or violence (30 from all alcohol-related conditions)

# All-cause mortality, males aged 15–54, in Russia and UK 1980–2007



\* Mean of rates in component 5-year age groups (15–19 to 50–54 years)

Source: WHO mortality & UN population estimates

Source: Lancet  
27 June 2009



# Russian male death rate ratios

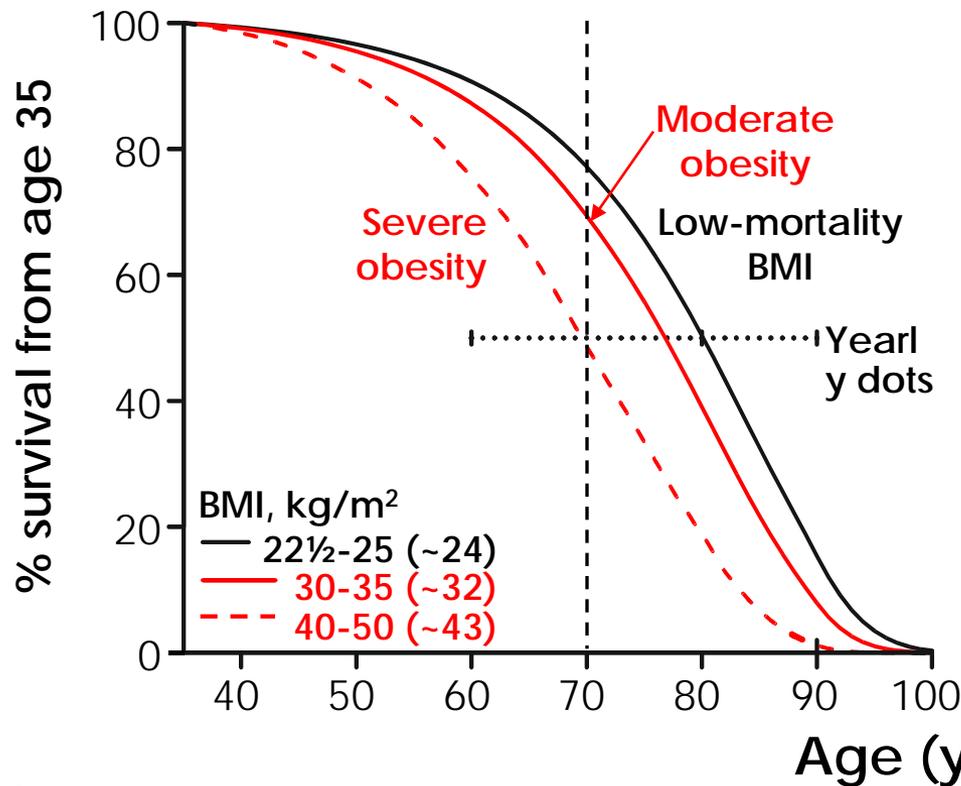
~1 bottle of vodka/day  
vs <0.5 bottles/week:

2 x any medical cause  
4 x road traffic accident  
6 x any other accident  
8 x suicide  
10 x murder

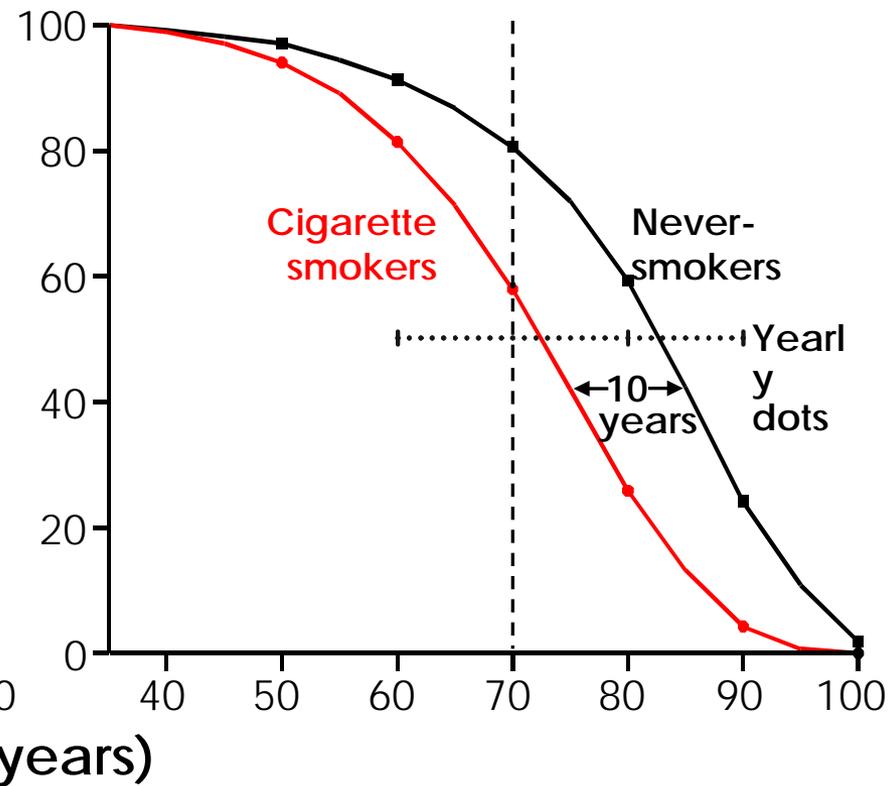
# Life expectancy

**Lose 3 years with moderate obesity/10 years with smoking**  
2 kg/m<sup>2</sup> extra BMI (if overweight) or 10% smoking prevalence shortens life by ~1 yr

Prospective Studies Collaboration (males)

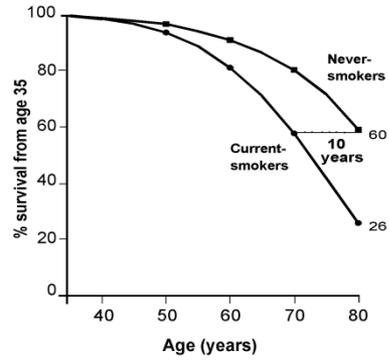


Male British Doctors' Study

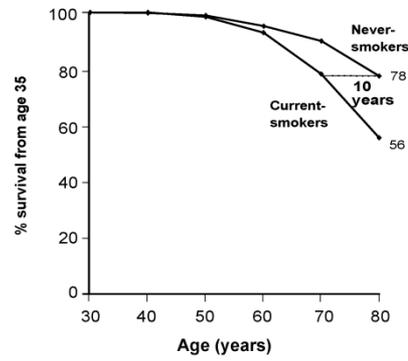


Source: Peto, Whitlock, Jha, NEJM, 2010

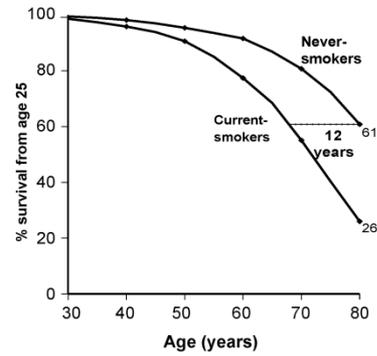
### UK Men



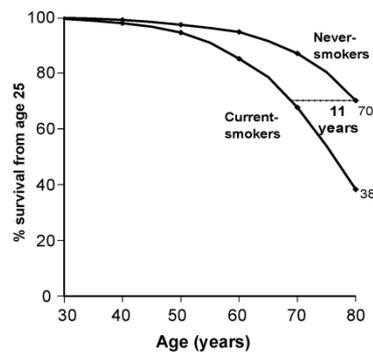
### UK Women



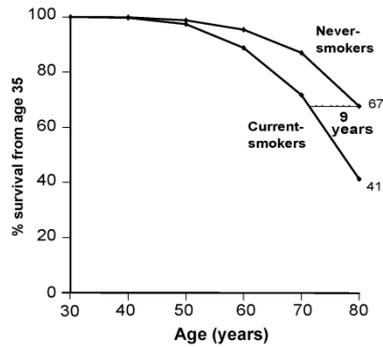
### US Men



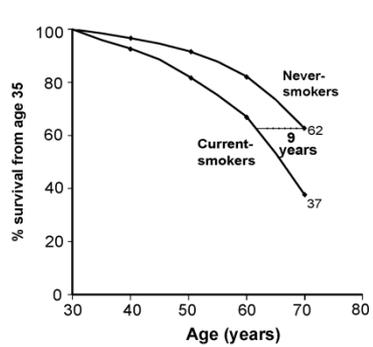
### US Women

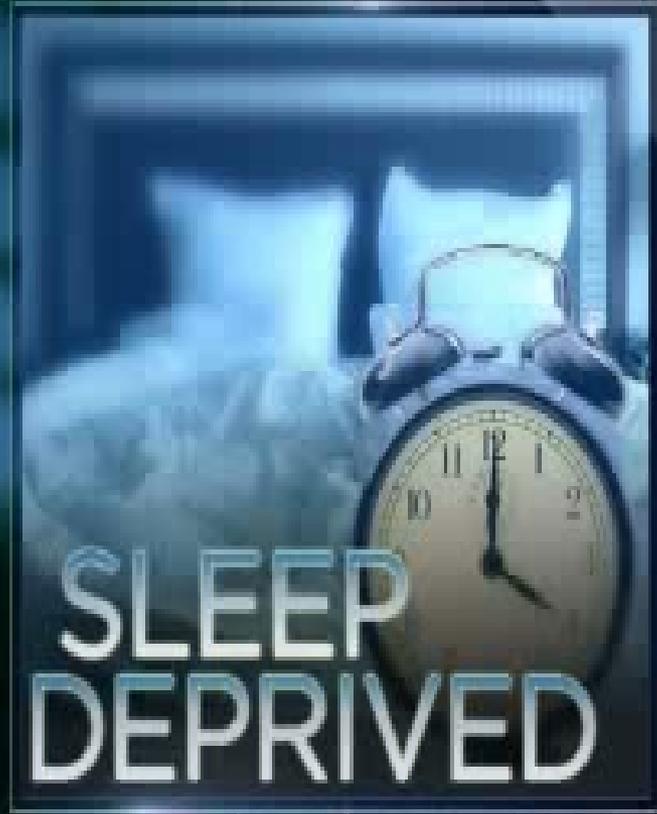


### Japanese Men



### Indian Men





# Survey US women and men & link them to the National Death Index *"Facebook of death"*

deathbook®

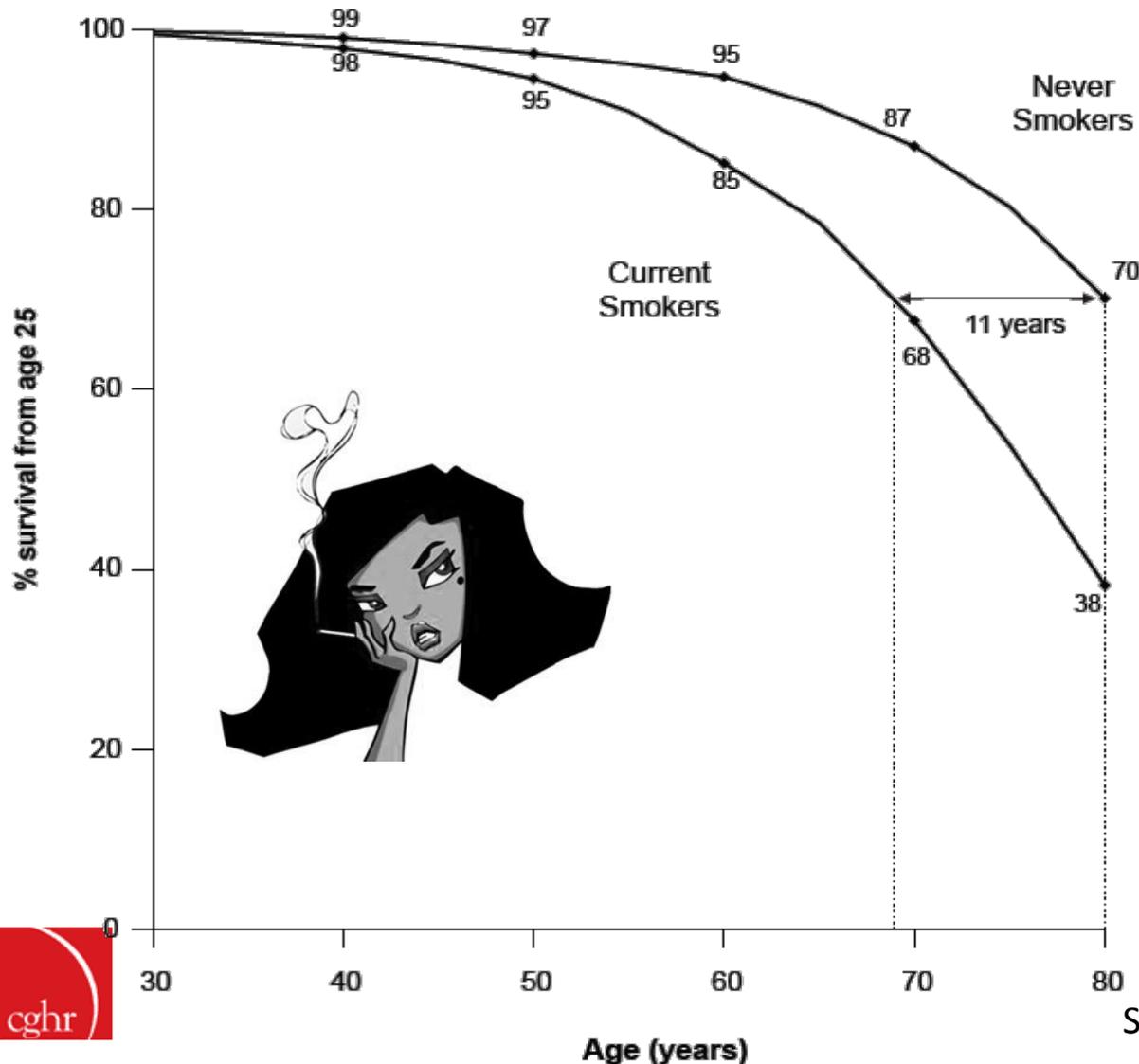
**(Hazard ratios\* current vs. never smokers,  
ages 25-79, by gender)**

**WOMEN WHO SMOKE: 3.0 times more likely  
to die**

**MEN WHO SMOKE : 2.8 times more likely  
to die**

# FEMALES: Survival probabilities

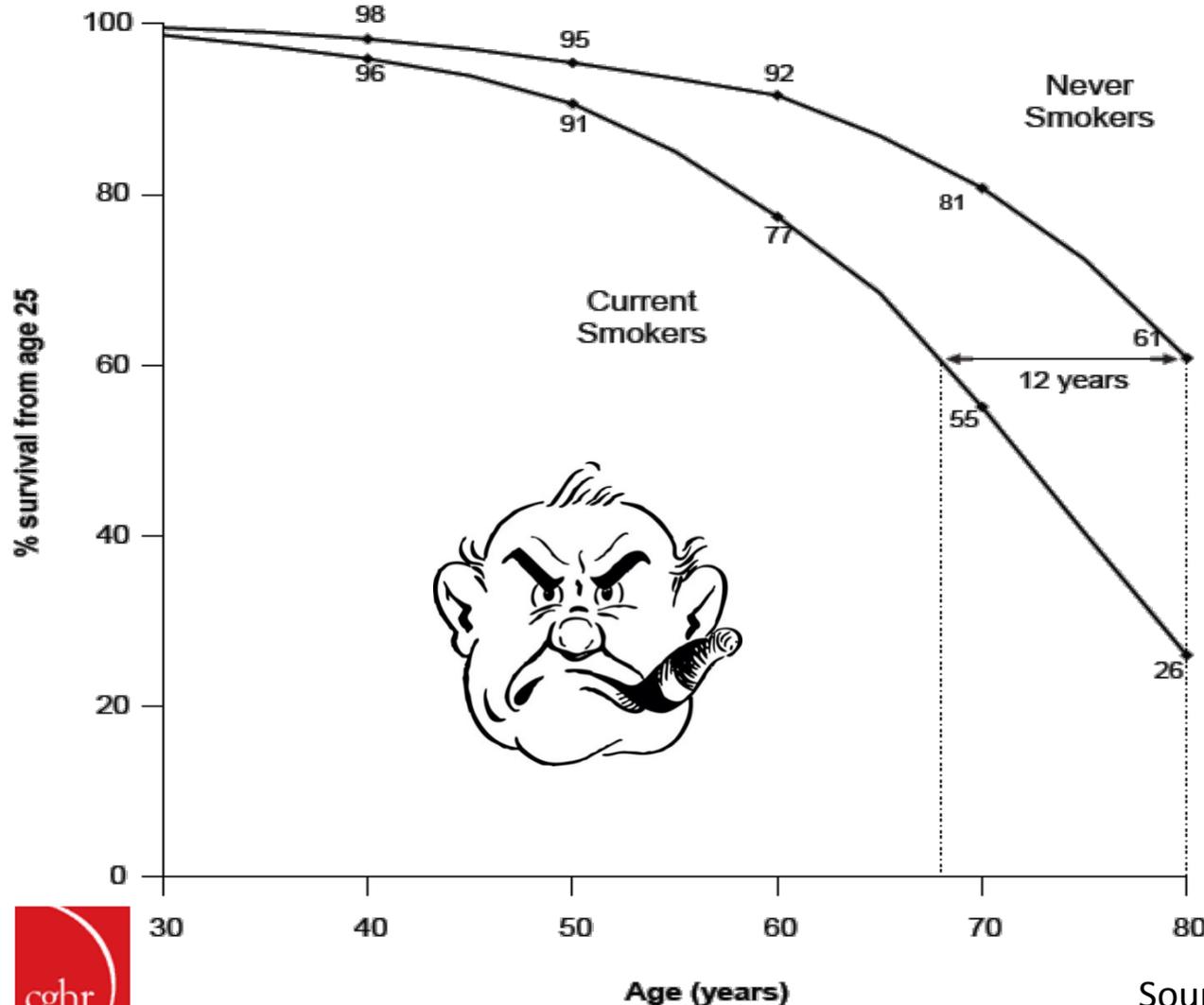
between ages 25 and 80 years among current and never-smokers in the US



HR adjusted for age, education, alcohol, adiposity (BMI), scaled to 2004 national rates, but comparable results if only actual cohort used

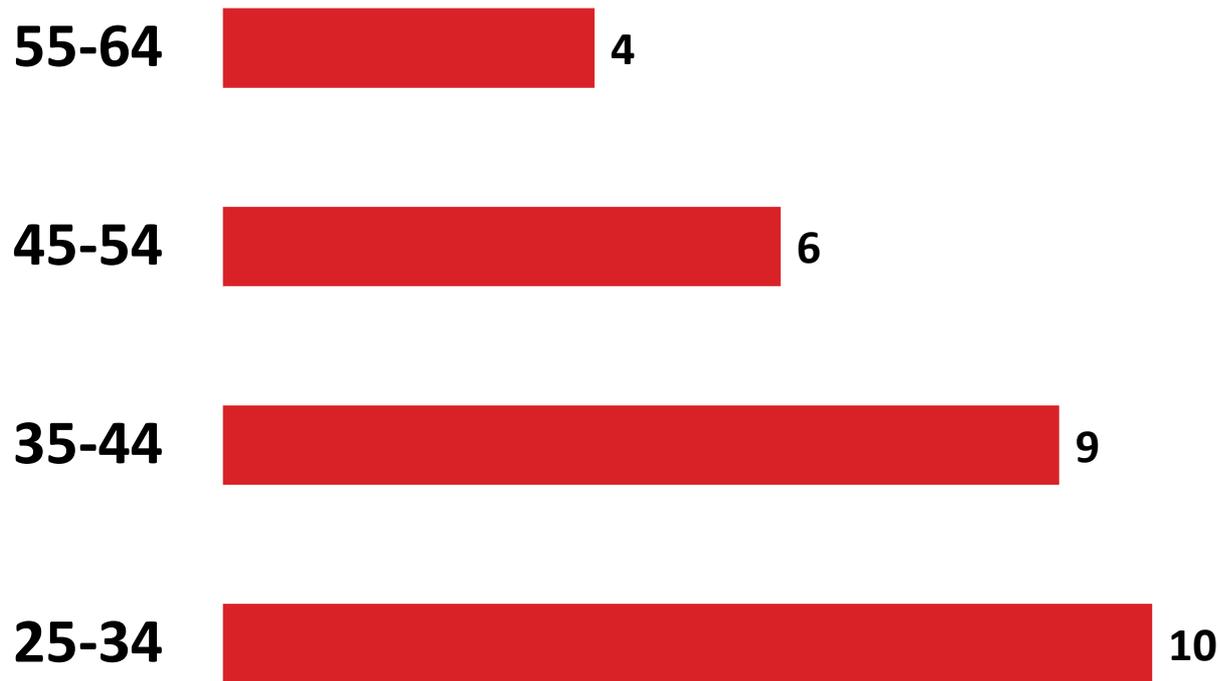
# MALES: Survival probabilities

between ages 25 and 80 years  
among current and never-smokers in the US



HR adjusted for age, education, alcohol, adiposity (BMI), scaled to 2004 national rates, but comparable results if only actual cohort used

# Years gained by quitting smoking by age



**GATS1 (orange) in 14 countries, B,R,I,C, + 10 other LMICs**  
**GATS+US+UK: 16 countries, 4B population, 2.3B age <35**

**Of 2.3B age<35, 0.5B either smoke, or will smoke by age 30  
(at current 25-34 prevalences): 450M male, 50M female.**



# Chinese cigarette increase 40 years after US increase

**Delayed hazard: observed (1950, 1990) and predicted (2030) proportions of all deaths at ages 35-69 due to tobacco**

US (all adults)		China (men)	
1950	12%	1990	12%
1990	33%	2030	33%

**INDIA:  
1 million tobacco  
deaths per year during  
the 2010s**

Jha et al, NEJM 2008



# INDIA: Years of life lost among 30 year old smokers\* (MDS results)



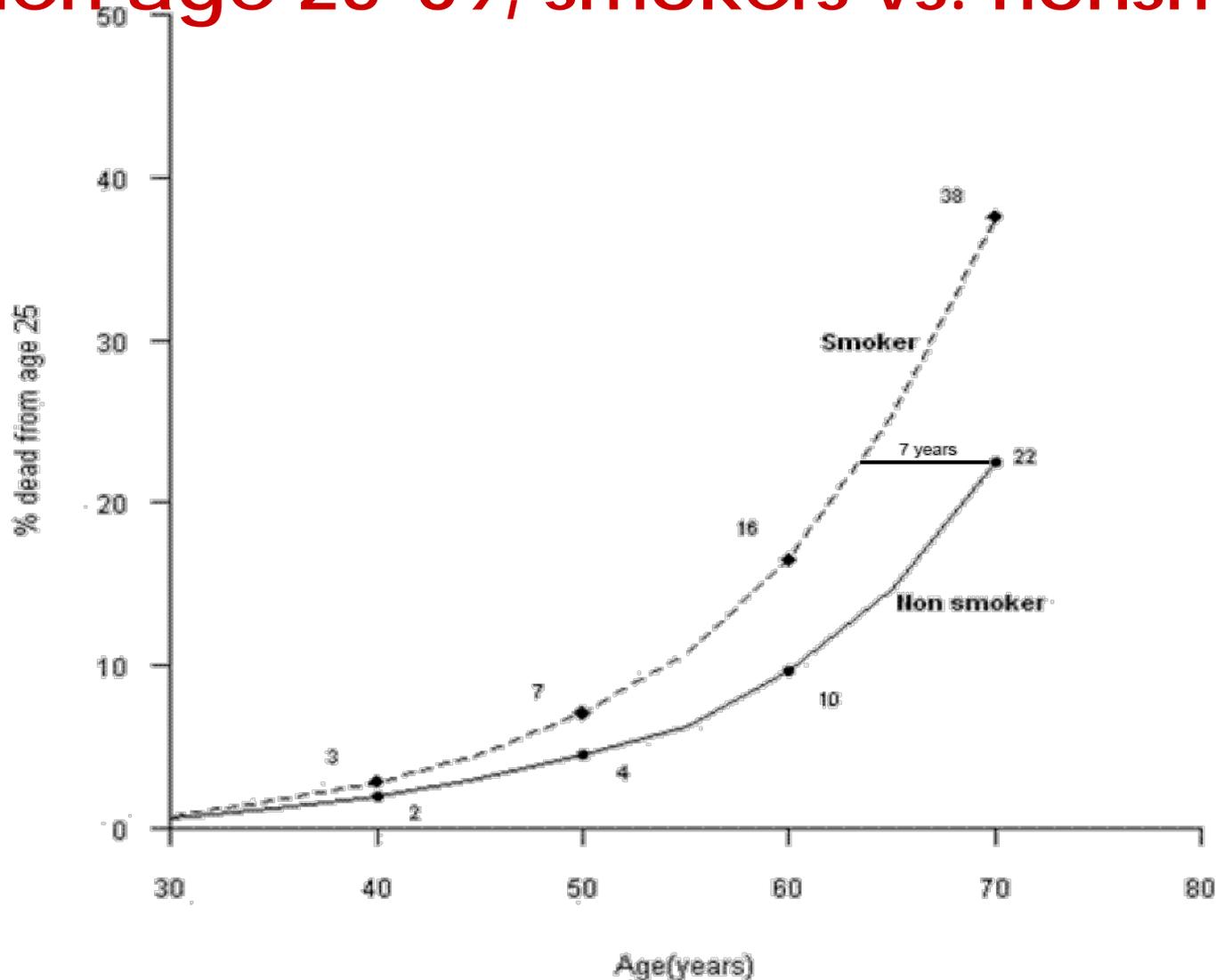
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<b>Men who smoke bidis</b>	<b>6</b> years
<b>Women who smoke bidis</b>	<b>8</b> years
<b>Men who smoke cigarettes</b>	<b>10</b> years

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\* At current risks of death versus non-smokers, adjusted for age, alcohol use and education  
(note that currently, few females smoke cigarettes)

# Cumulative risk of death, Bangladeshi men age 25-69, smokers vs. nonsmokers



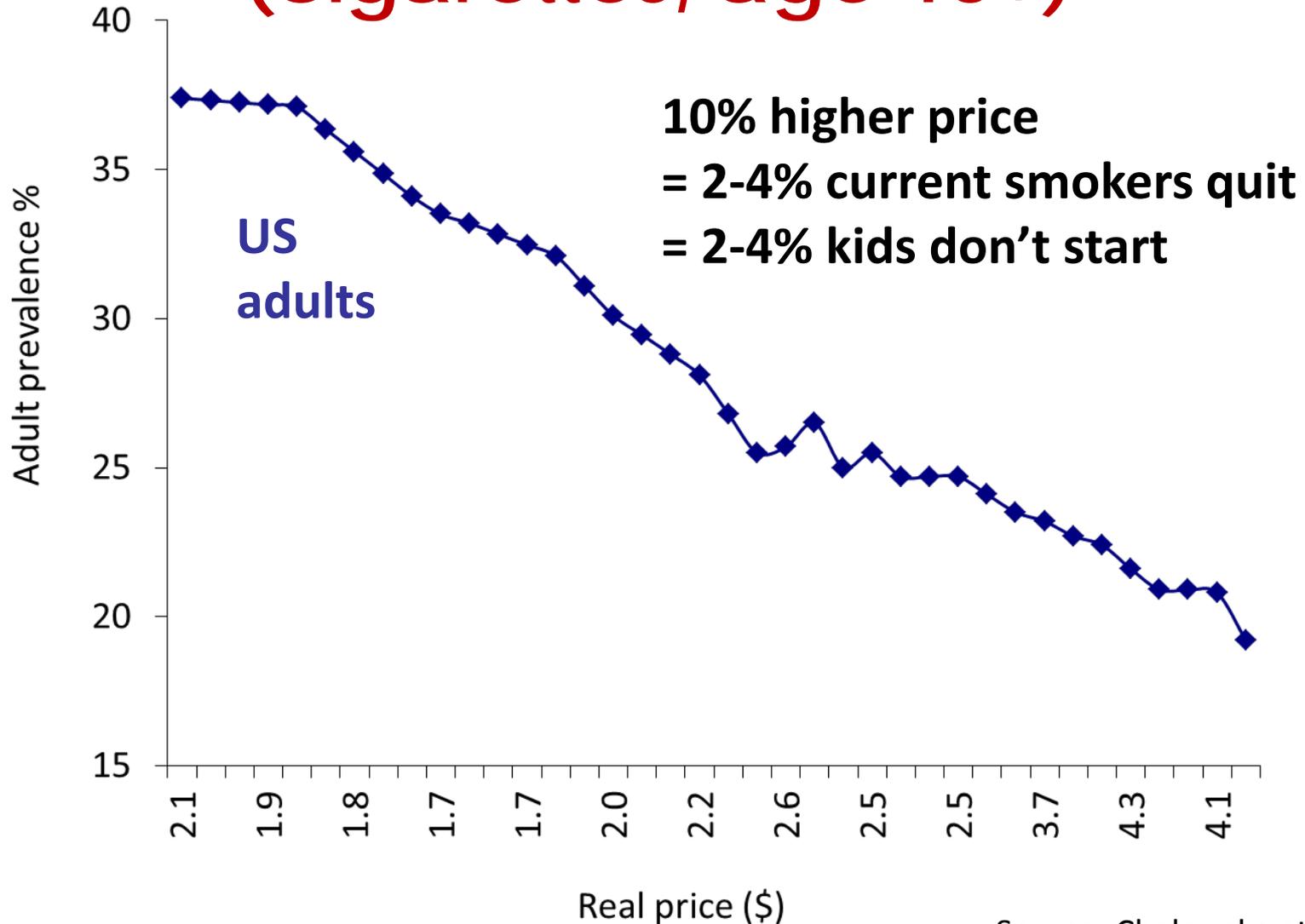
\*adjusted for age, alcohol use and education

Source: Alam et al, 2012

# Which interventions help current smokers to quit?

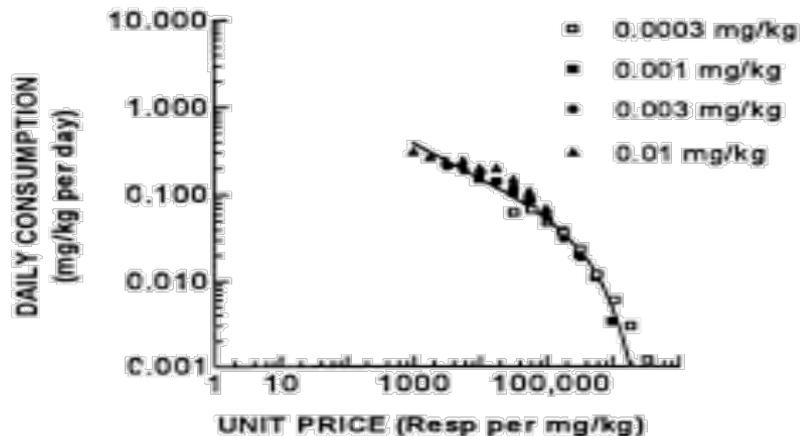
- Higher cigarette/bidi taxes: 50% higher price means 20% of CURRENT SMOKERS WILL QUIT
  - *Greater effects on the poor and in youth*
- Non-price measures: big, local packet warnings labels with tax stamp (to counter smuggling), absolute ad and promo ban, complete ban on public smoking, monitor and report smoking mortality, counter smuggling
- Increased access to nicotine replacement and other cessation therapies

# Price elasticity in humans (cigarettes, age 15+)

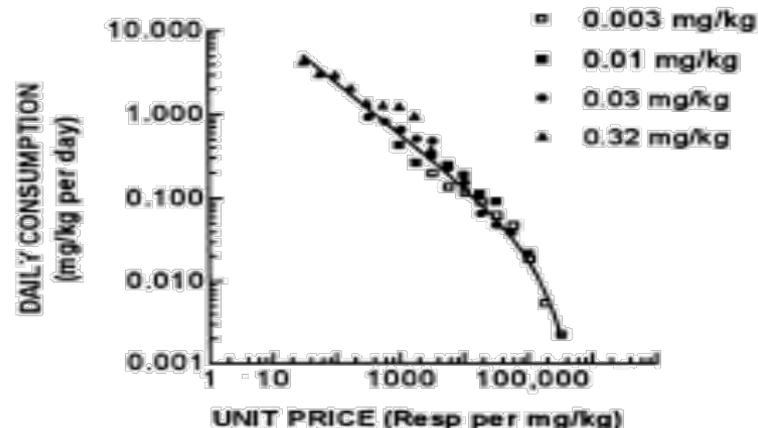


# Price elasticity in monkeys (various addictive goods)

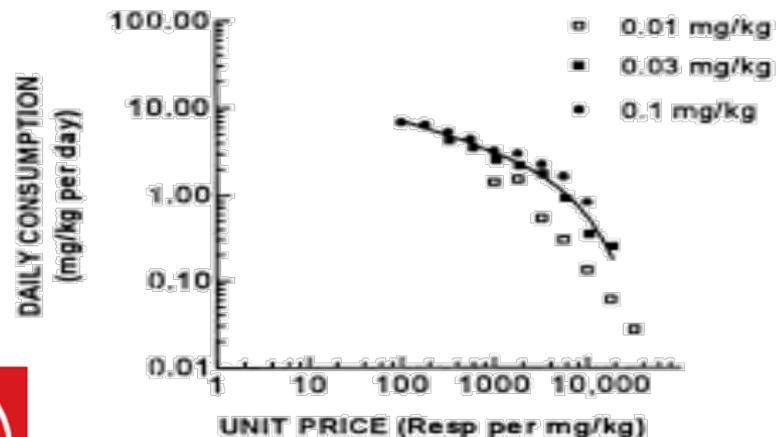
ALFENTANIL



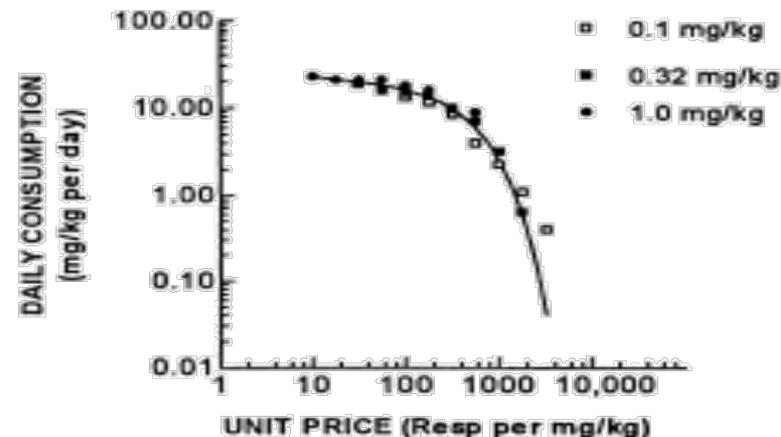
NALBUPHINE



COCAINE

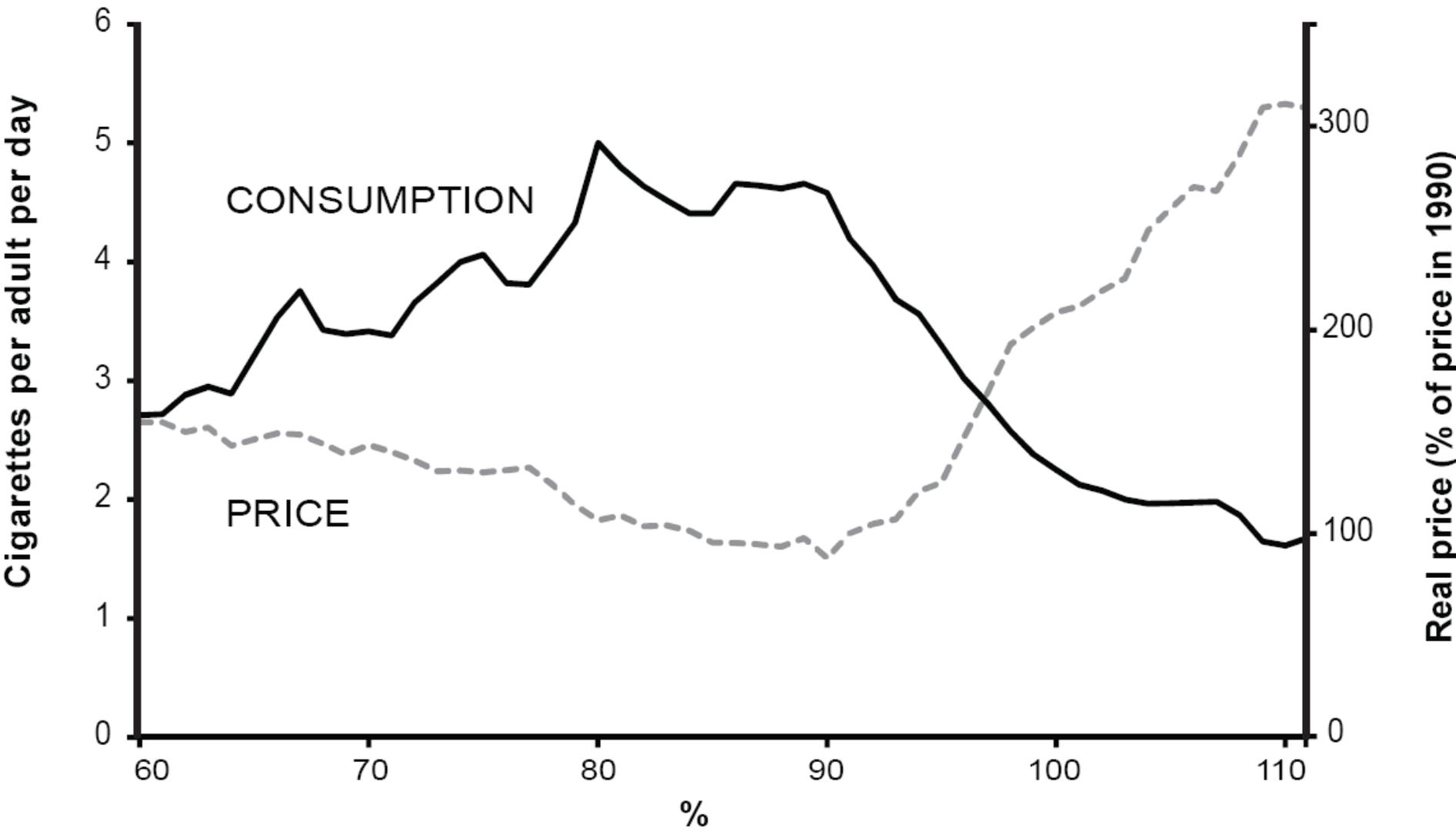


METHOHEXITAL

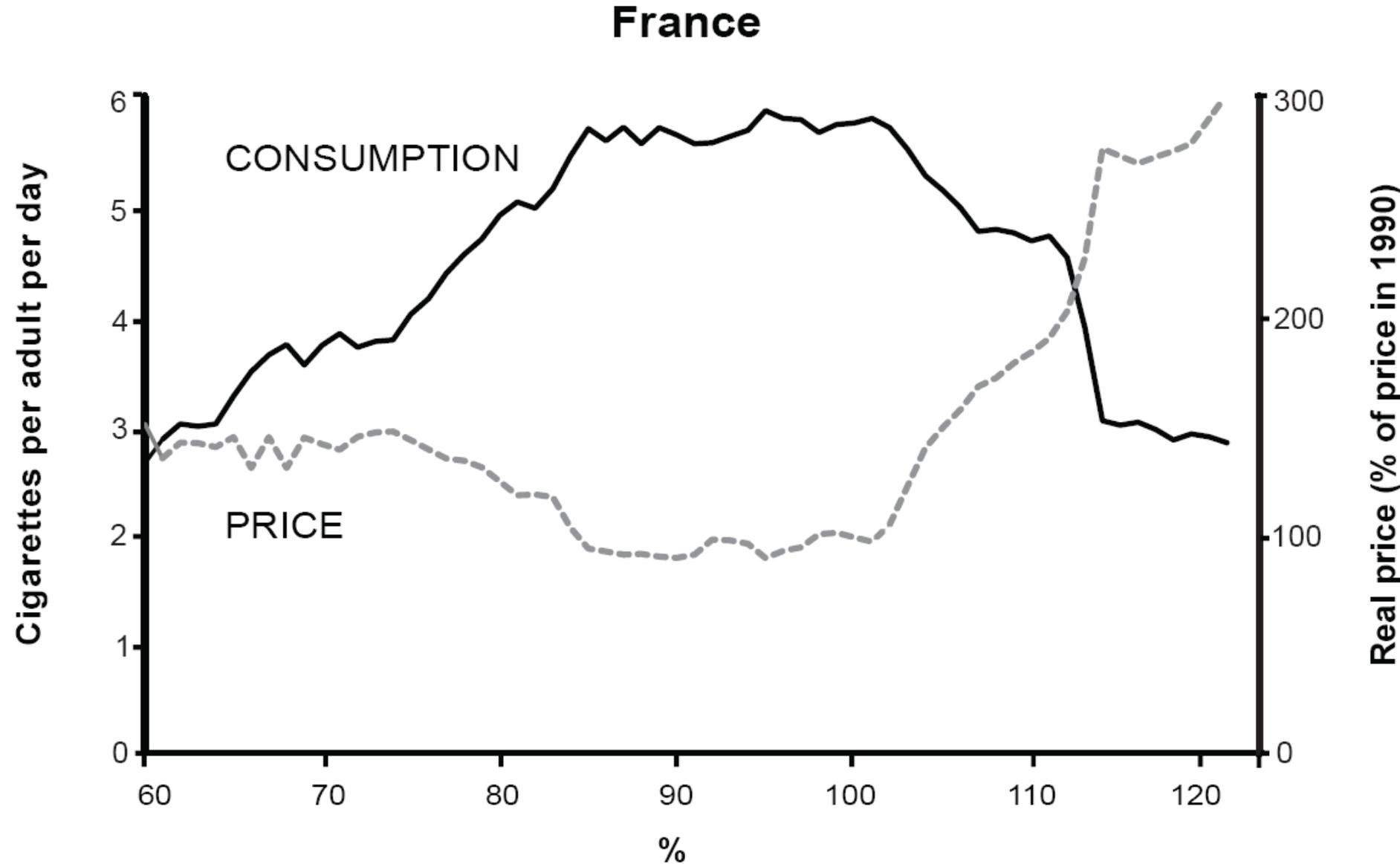


# Cigarette prices tripled, consumption halved, tax revenue doubled: SOUTH AFRICA

## South Africa



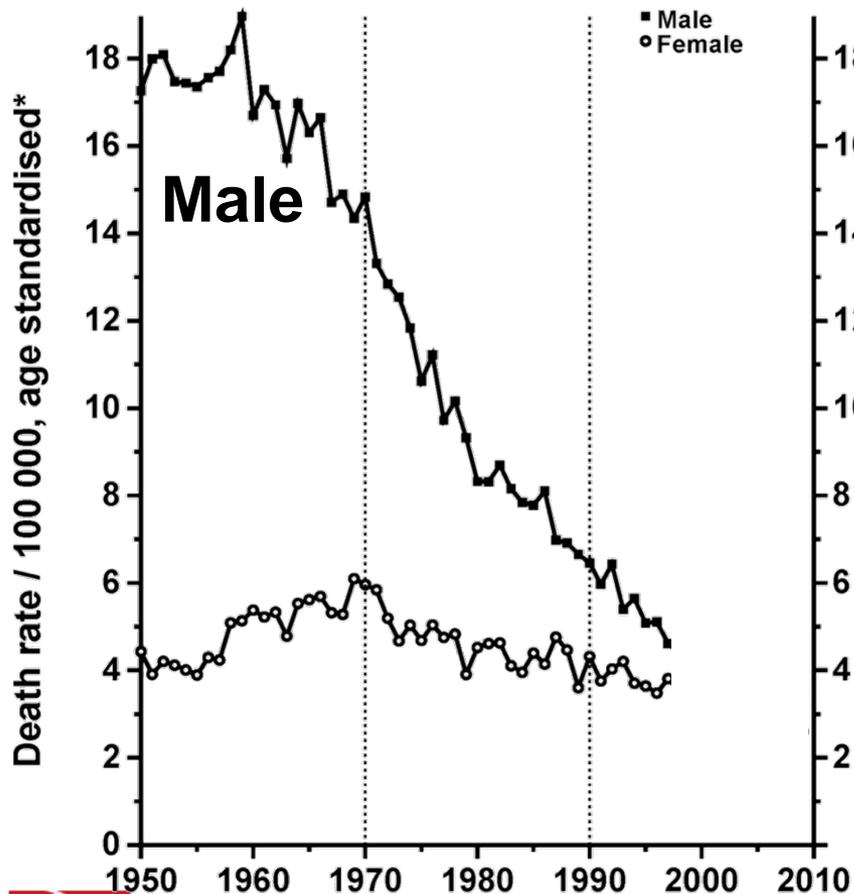
# Cigarette prices tripled, consumption halved, tax revenue doubled: FRANCE



# UK & France, lung cancer mortality trends (35-44) to 1997, but not beyond

## UNITED KINGDOM

Lung cancer mortality at ages 35-44

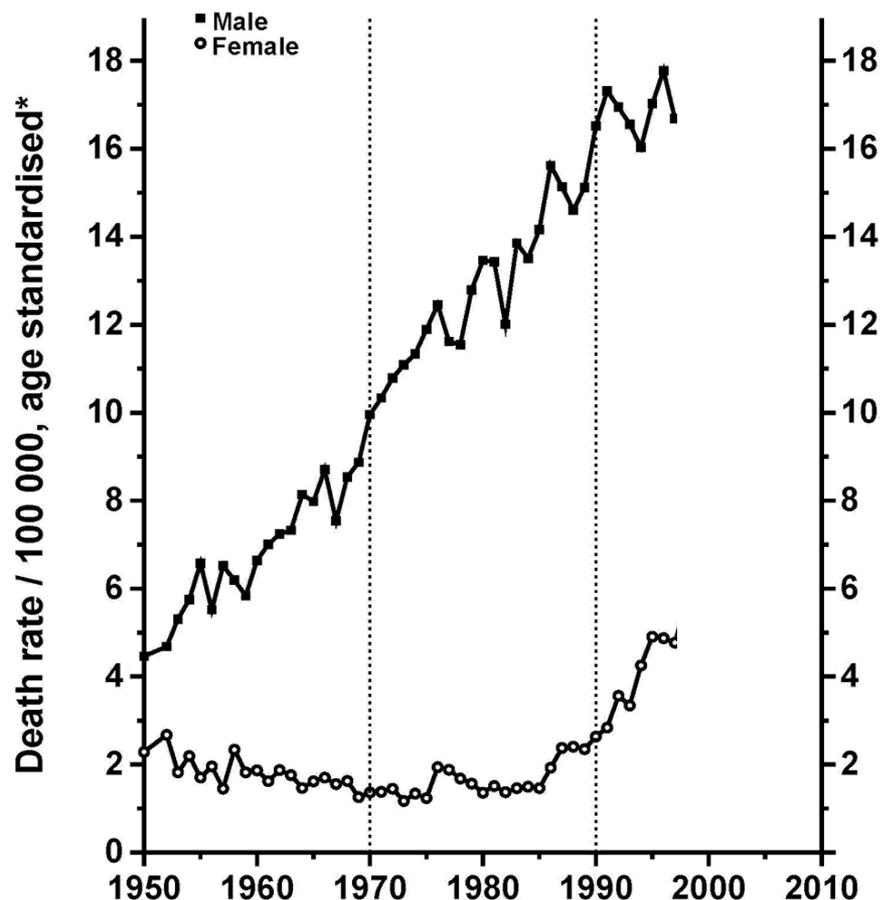


\*Mean of annual rates in the two component 5-year age groups

Source: WHO mortality & UN population estimates

## FRANCE

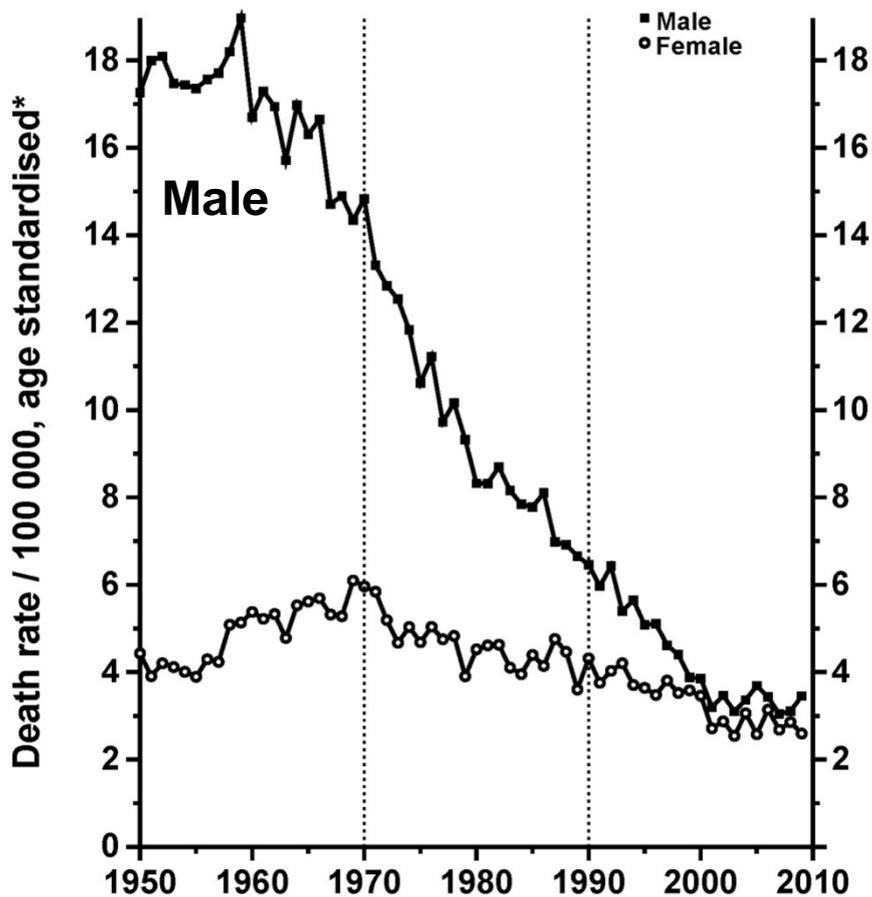
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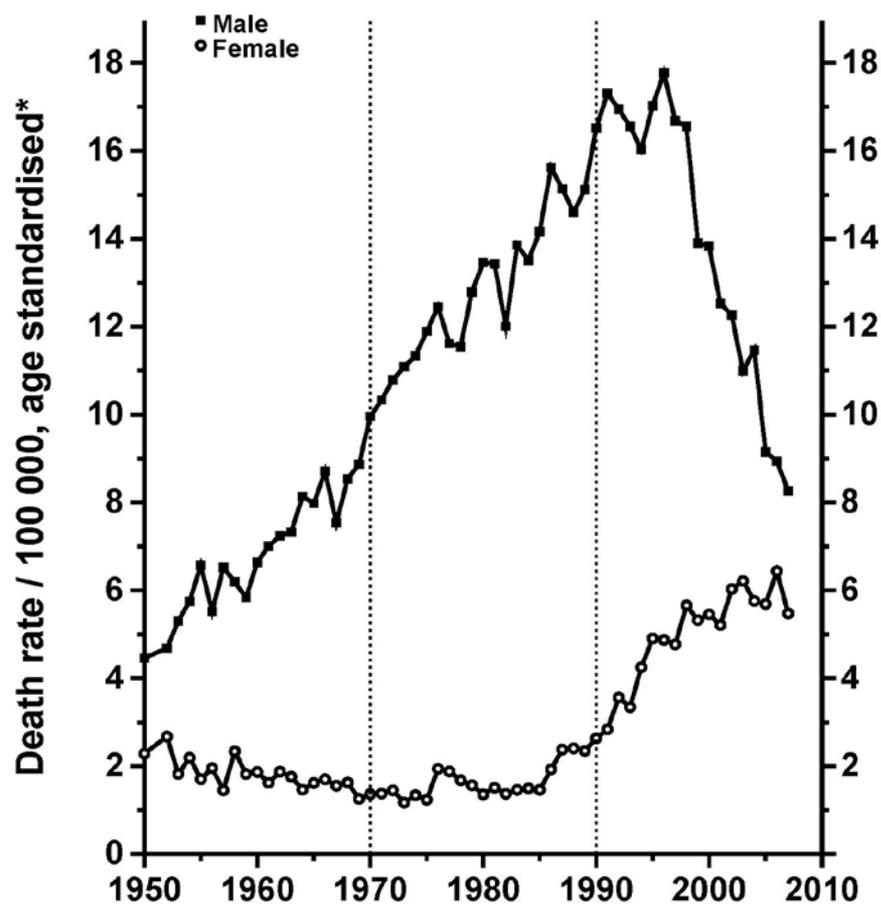
**UNITED KINGDOM 1950–2009: Males & Females  
Lung cancer mortality at ages 35–44**



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Source: WHO mortality & UN population estimates

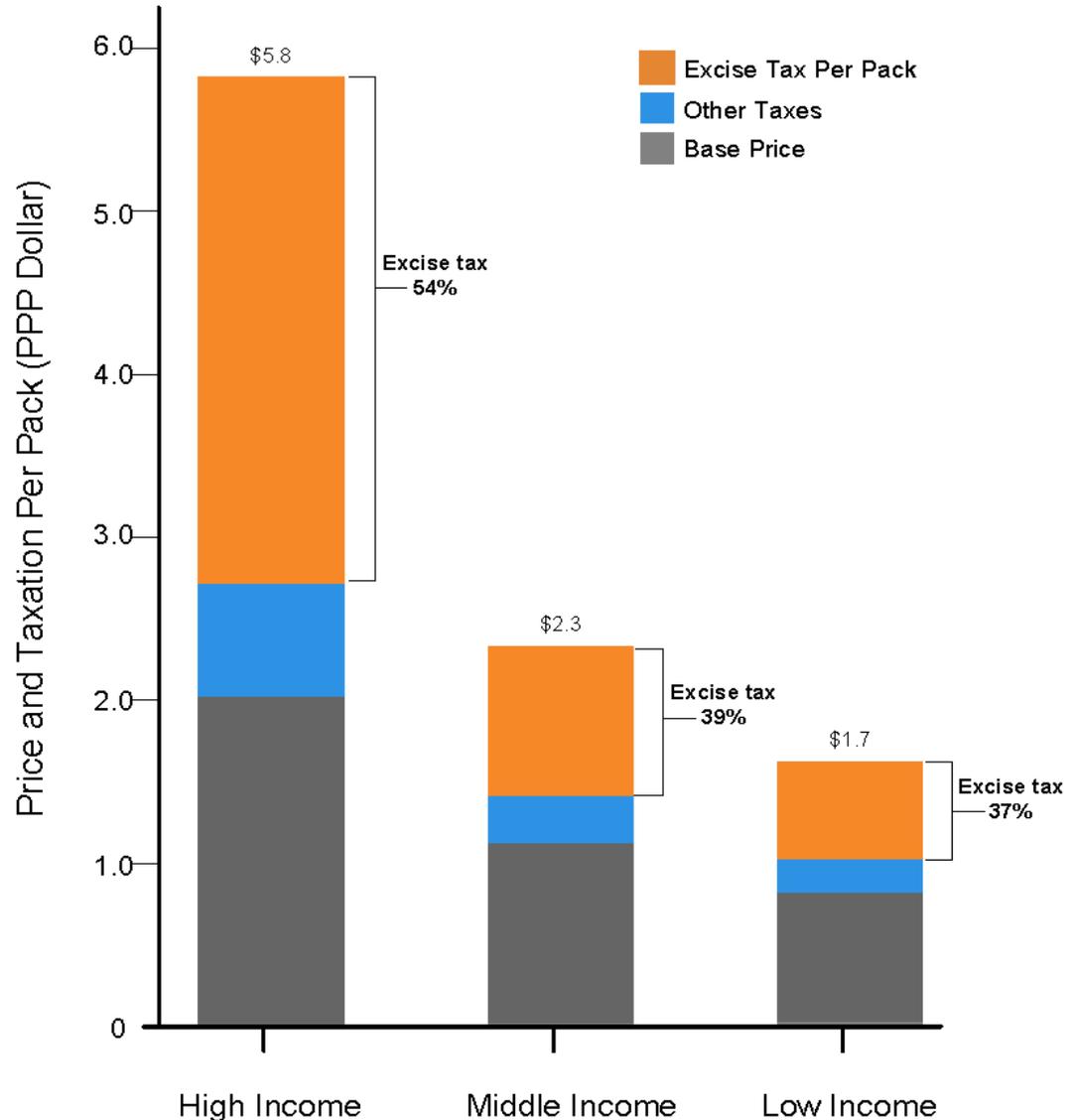
**FRANCE 1950–2007: Males & Females  
Lung cancer mortality at ages 35–44**



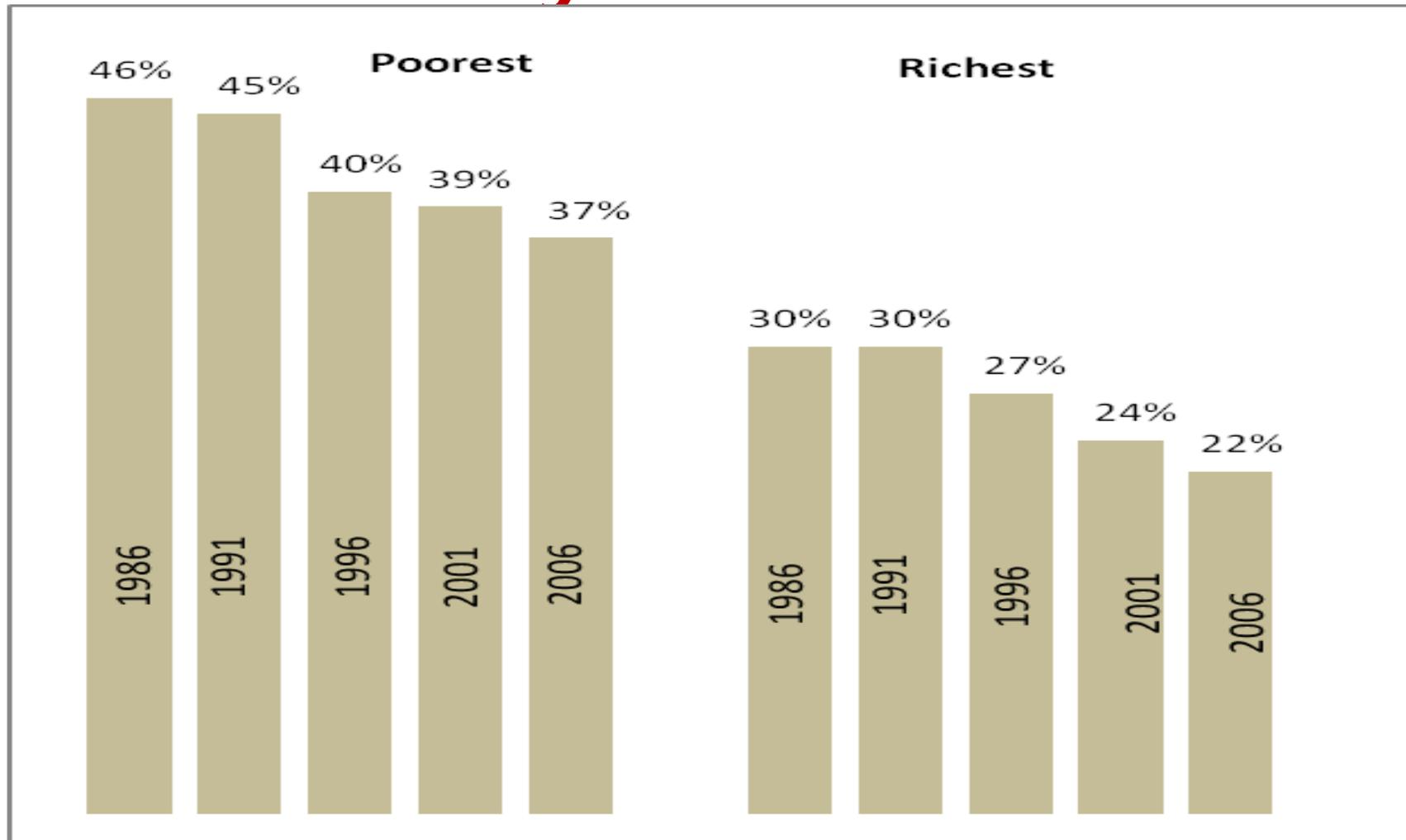
\*Mean of annual rates in the two component 5-year age groups

Source: WHO mortality & UN population estimates

# Excise taxes underused in LMICs



# Tobacco deaths in Canadian men by income



# Plain packaging (Australia) and pictorial warning labels (Canada)



**WARNING**  
**TOBACCO USE**  
**CAN MAKE YOU**  
**IMPOTENT**

Cigarettes may cause sexual impotence due to decreased blood flow to the penis. This can prevent you from having an erection.

Health Canada

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