

# Socioeconomic status and the 25x25 risk factors as determinants of premature mortality: a multicohort study of 1.7 million men and women

(Lancet. 2017 Mar 25;389(10075):1229-1237)

---

**Silvia STRINGHINI**

***Senior lecturer, Epidemiologist***

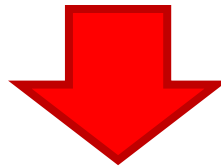
**IUMSP** University Institute for Social and Preventive Medicine, Lausanne  
University Hospital, Lausanne, Switzerland

# Background

- In 2011, WHO put in place the 25x25 initiative, a plan to cut mortality due to non-communicable diseases by 25% by 2025 with actions on 7 major risk factors (**25x25 risk factors**):
  - ✓ harmful use of alcohol
  - ✓ insufficient physical activity
  - ✓ current tobacco use
  - ✓ raised blood pressure
  - ✓ intake of salt
  - ✓ diabetes
  - ✓ obesity
- Global Burden of Disease (GBD) Collaboration: annual risk assessment of the burden of disease and injury attributable to 67 risk factors in 21 world-regions

# Background

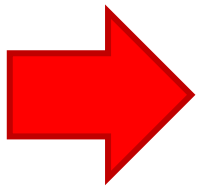
- Socioeconomic circumstances influence all these factors but are never included as targets in global health strategies
- However, they are modifiable by policies at the local, national, and international level as are risk factors targeted by existing global health strategies



- **Objective:** To compare the contribution of socioeconomic status to mortality and years-of-life-lost with that of the 25x25 conventional risk factors.

# Data

- 48 independent prospective cohort studies (including Gazel) from Europe, the USA, and Australia with information on:
  - ✓ socioeconomic status (occupational position)
  - ✓ 25x25 risk factors (high alcohol intake, physical inactivity, current smoking, hypertension, diabetes and obesity)
  - ✓ Mortality



1 751 479 participants (54% women)

# Data

- Socioeconomic status (last known occupational position in 3 categories)
- Smoking (current/ never/former)
- Alcohol consumption: abstainers (0 units per week) /moderate (1–21 units per week for men, 1–14 per week for women) /or heavy (>21 units per week for men, >14 per week for women) drinkers.
- Physical inactivity: differently for each cohort
- Body-mass index (BMI): normal ( $18.5 < \text{BMI} < 25 \text{ kg/m}^2$ ), overweight ( $25 \leq \text{BMI} < 30 \text{ kg/m}^2$ ), or obese ( $\text{BMI} \geq 30 \text{ kg/m}^2$ ).
- Hypertension:  $\text{SBP} \geq 140 \text{ mm Hg}$  or  $\text{DBP} \geq 90 \text{ mm Hg}$  or current intake of anti-hypertensive medication or self-reported hypertension
- Diabetes fasting glucose  $\geq 7 \text{ mmol/L}$  or 2 h post-load glucose  $\geq 11.1 \text{ mmol/L}$  or glycated haemoglobin  $\text{A1c} \geq 6.5\%$  or self-reported diabetes
- Data for salt intake only available from a few cohort studies so it was omitted from our analysis

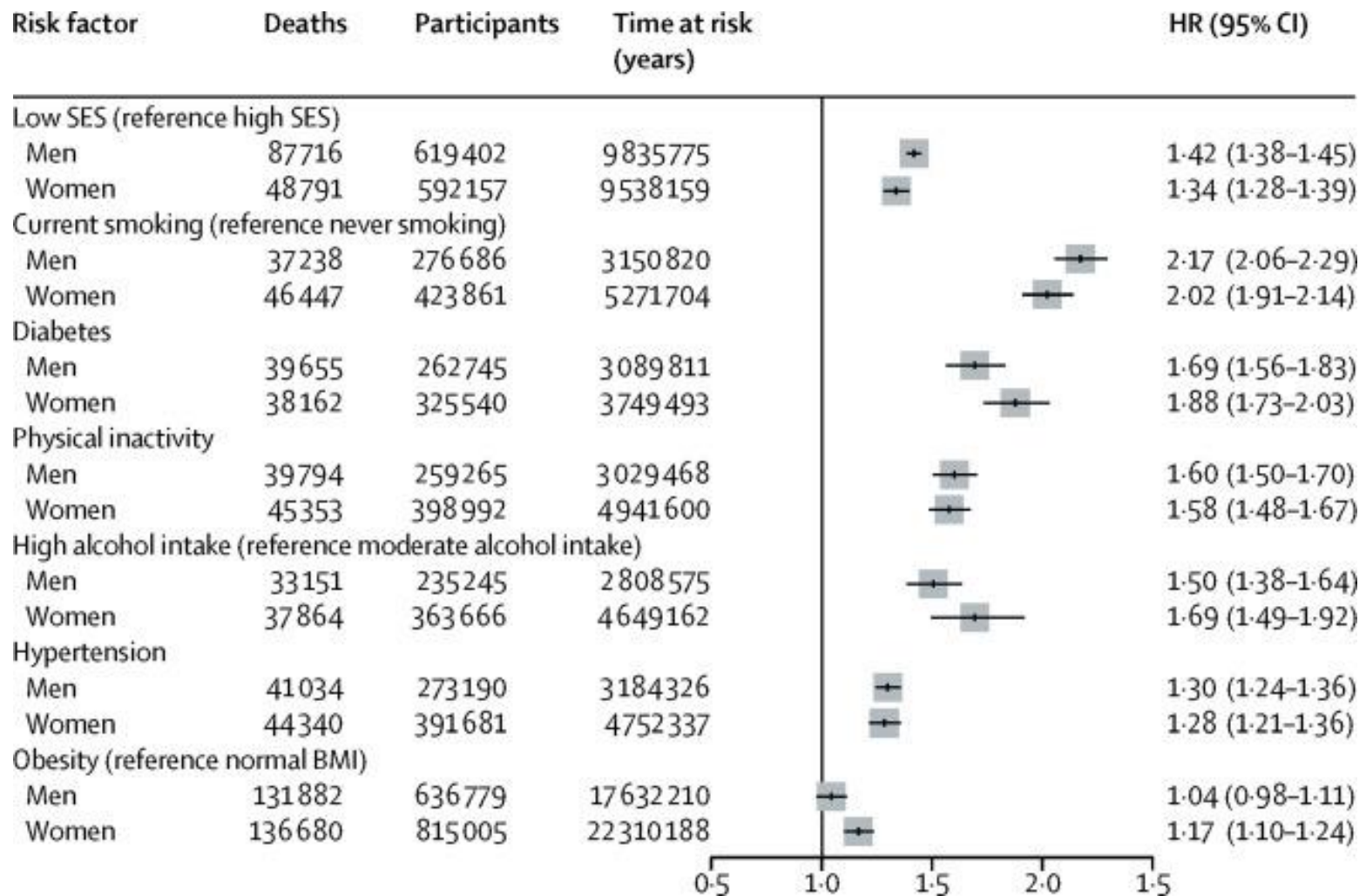
# Statistical analysis

- Analyses first performed separately in each study; estimates subsequently combined in a meta-analytical framework
- HR and 95% CIs generated using flexible parametric survival models on the cumulative hazards scale
- Separate models fitted for men and women and included marital status and race or ethnicity (minimally adjusted models)
- Models then mutually adjusted for all risk factors simultaneously (mutually adjusted)
- Population attributable fraction (PAF) calculated based on the HR and the proportion of participants exposed
- Years of life lost calculated as difference of the areas under the survival curves (from age 40 years to 85 years) comparing population exposed to a given risk factor with the reference population with no exposure

# Results

- Over 26.6 million person-years at risk (mean follow-up 13.3 years), 310,277 participants died
- In men, 43 765 (15.2% of total) with low occupational position died and 17 160 (11.5%) with high occupational position died
- In women, 11 835 (9.4% of total) with low occupational position died and 8292 (6.8%) with high occupational position died
- Participants with low occupational position had higher mortality risk than did those with high occupational position, HR 1.42, 95% CI 1.38–1.45 for men HR 1.34, 1.28–1.39 for women

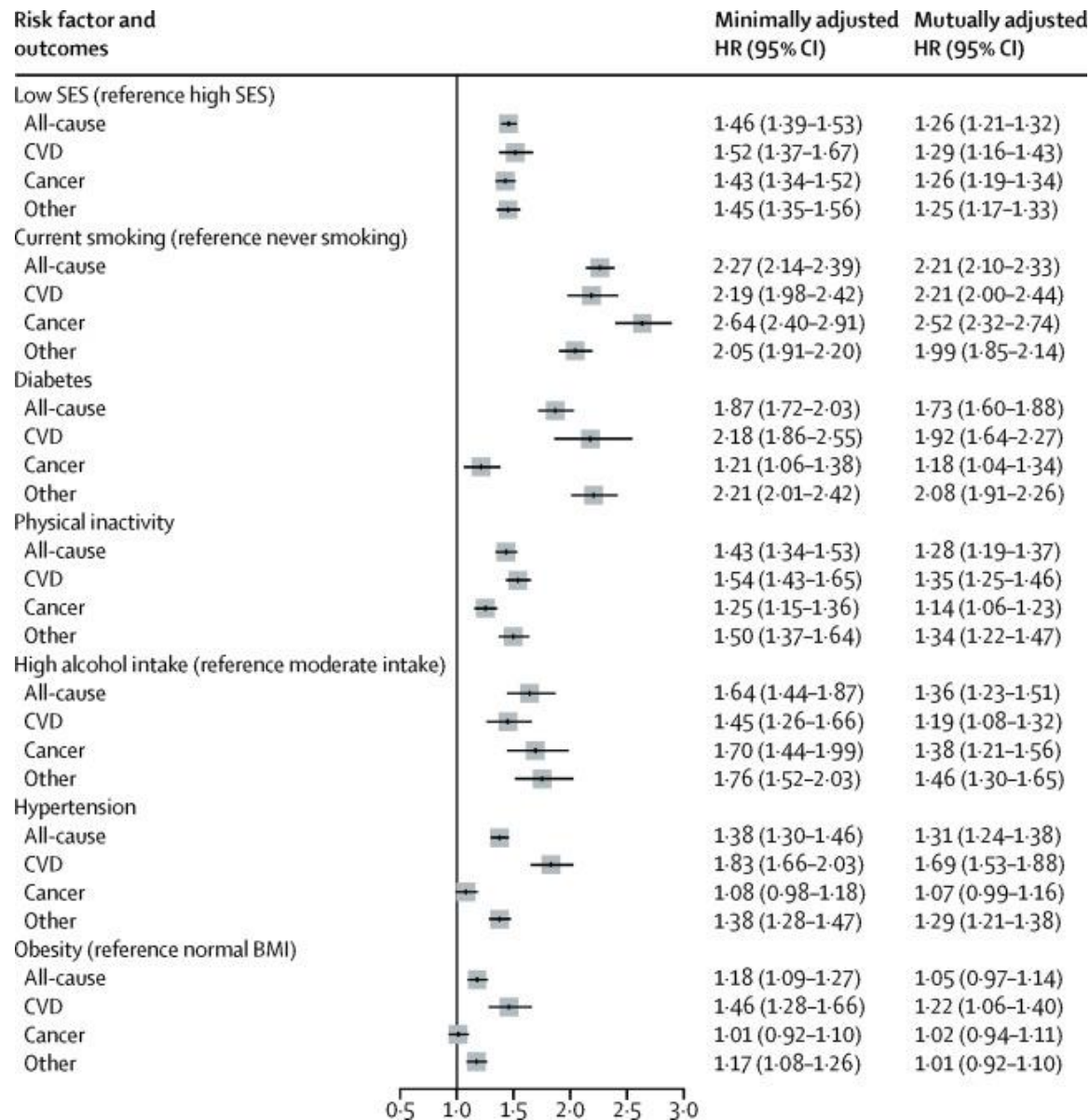
# Results – HR SES and 25x25 risk factors



Association of low SES with mortality comparable to that of the other major risk factors



# Results – HRs, mutually adjusted models



Association between low socioeconomic status and mortality consistent across causes of death and remained significant in mutually adjusted models

# Et Gazel ?

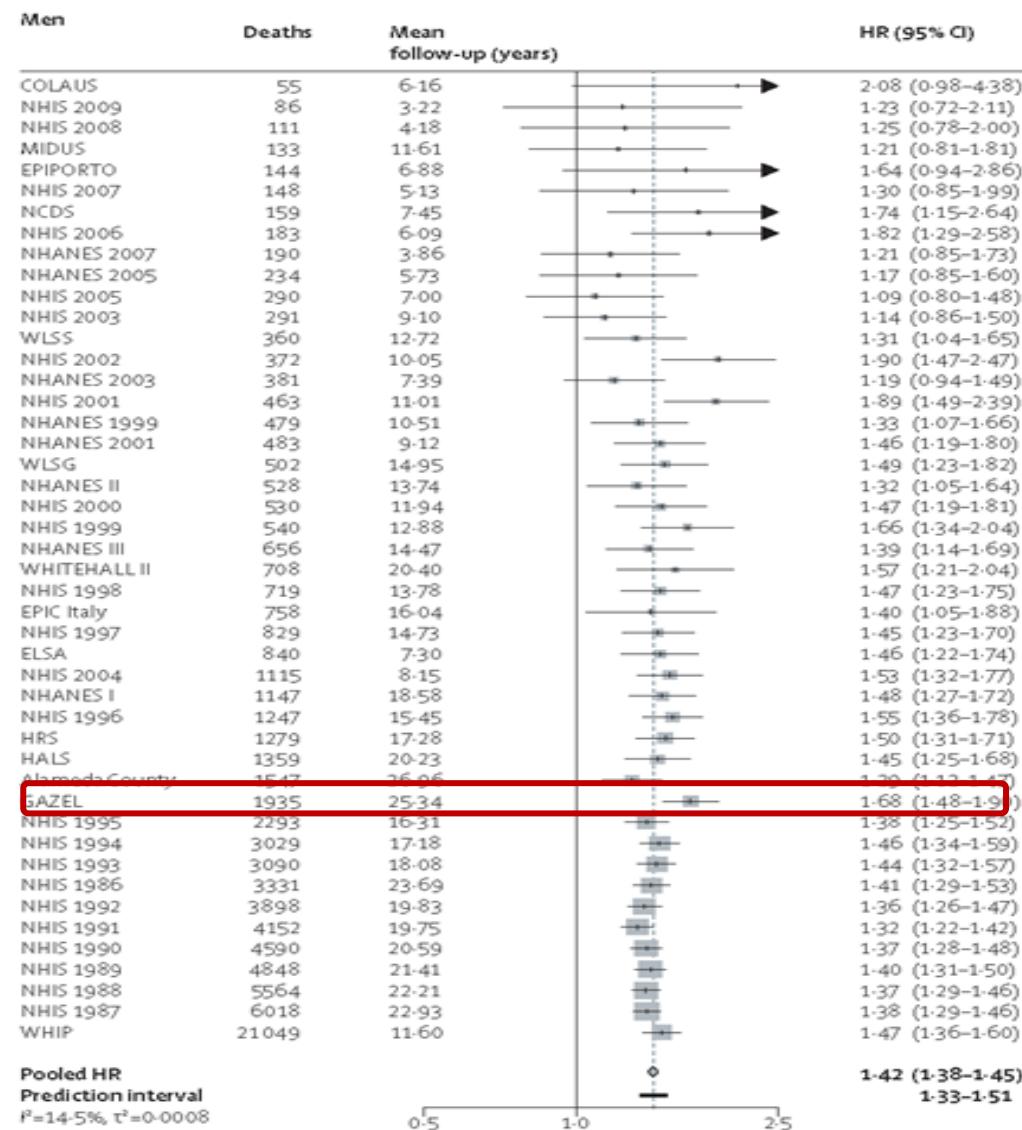
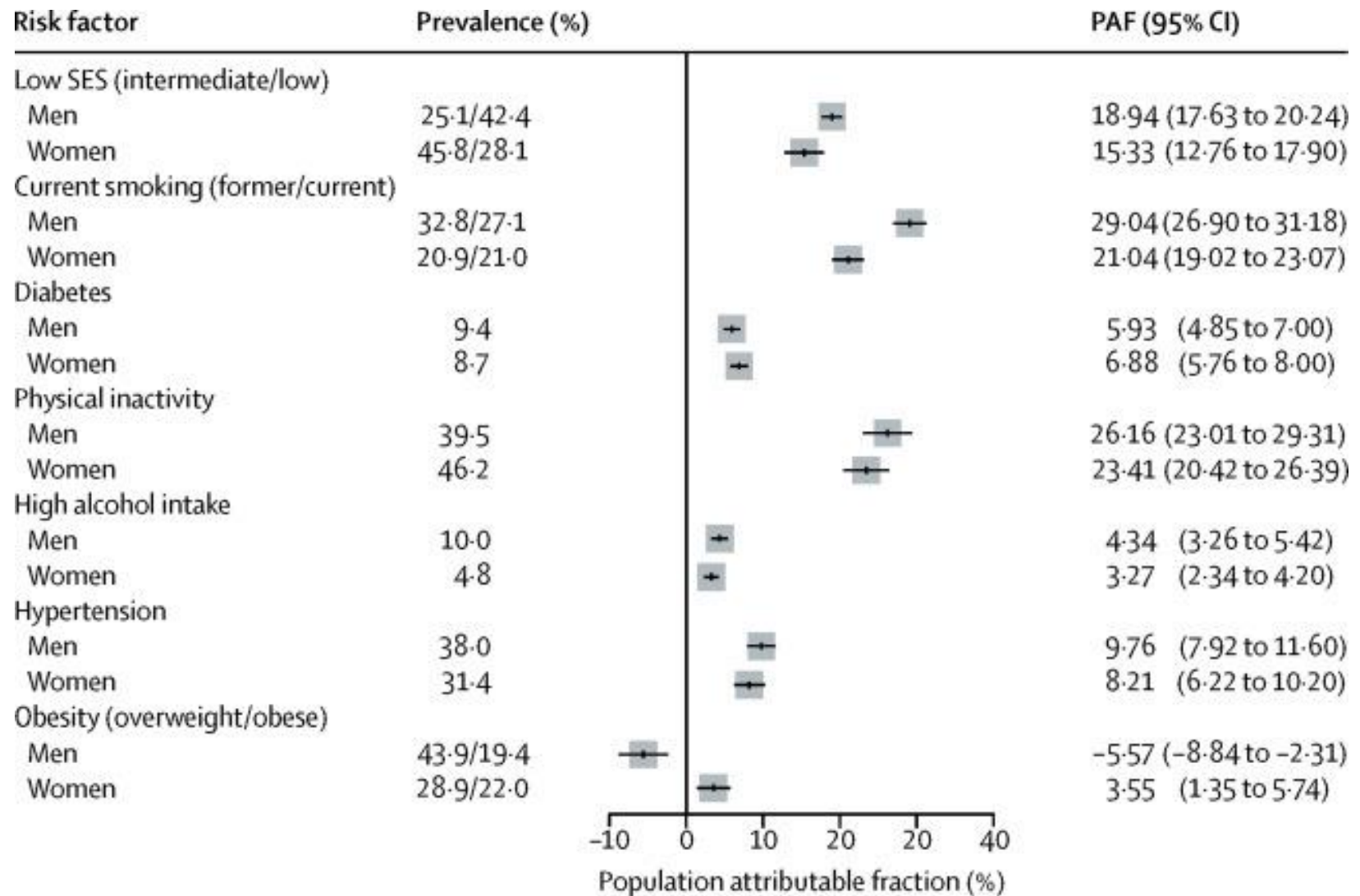


Figure 1: Mortality for low versus high occupational position in men in 46 cohort studies

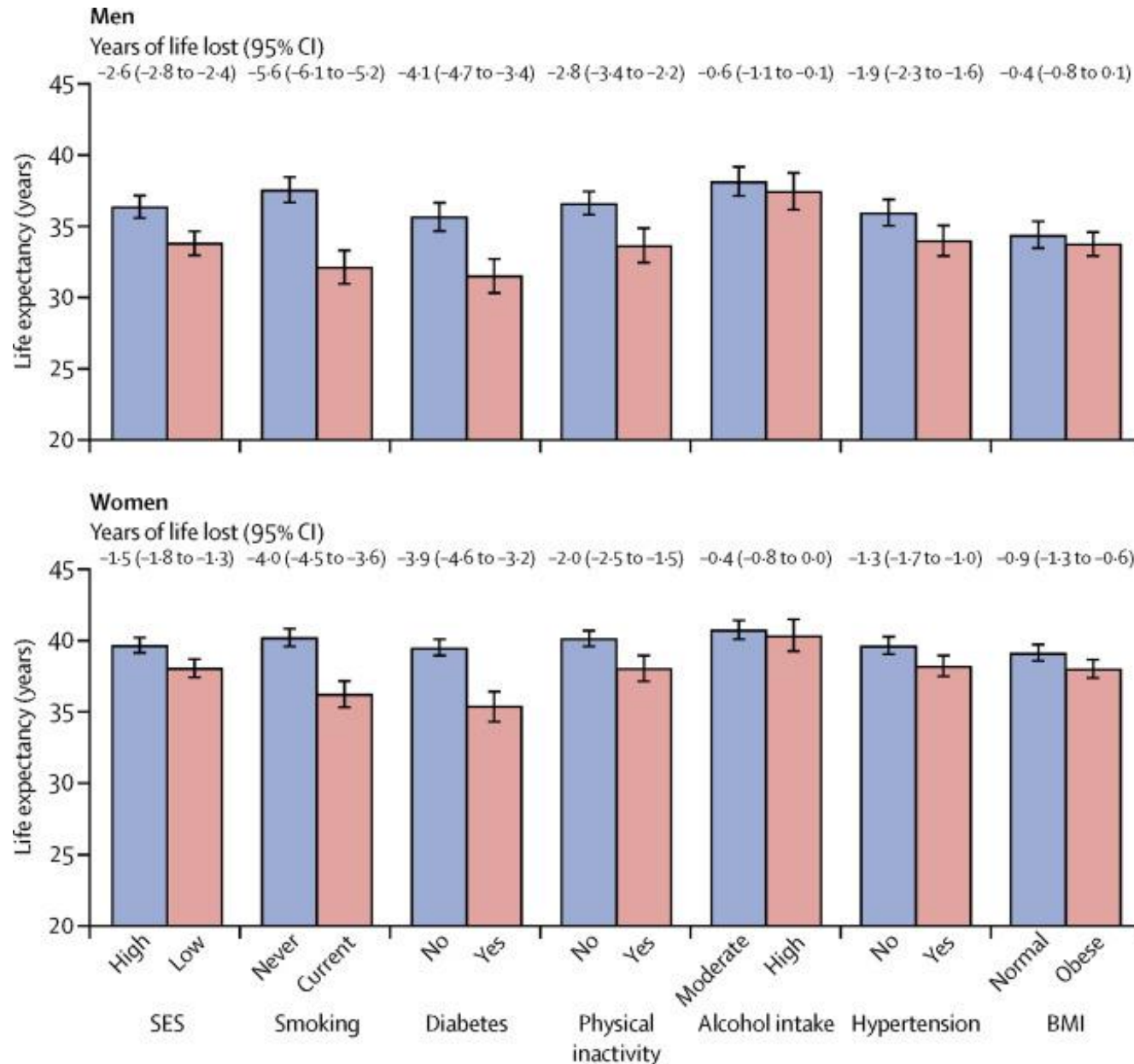
HRs are adjusted for age, marital status, and race or ethnicity. Pooled HR is represented with a grey diamond

# Results- Population Attributable Fraction



PAF of low SES comparable to that of the other major risk factors

# Results: Years of Life Lost



Partial life expectancy at 40 years reduced by more than 2 years because of low SES.

All other 25x 25 factors were associated with decreased life expectancy, apart from BMI

# Interpretation

- **Comparable** health impact of low socioeconomic status to that of major risk factors → socioeconomic circumstances, in addition to the 25x25 factors, should be treated as a target for local and global health strategies, health risk surveillance, interventions and policy
- Limitations:
  - ✓ *Use of single indicator of SES*
  - ✓ *Difficult to disentangle interconnected pathways*
  - ✓ *PAF assume causal relationships*
  - ✓ *Broad categorizations of risk factors and SES*
  - ✓ *Heterogeneity across cohorts*

# Conclusions

- Existing global strategies and actions defined in the 25 × 25 health plan and the Global Burden of Diseases surveillance programme potentially exclude a major determinant of health from the agenda
- Similar to the risk factors targeted by existing global health strategies, socioeconomic circumstances are modifiable by policies at the local, national, and international levels:
  - ✓ promotion of early childhood development
  - ✓ poverty reduction
  - ✓ improvements to access to high-quality education
  - ✓ enacting of compulsory schooling laws
  - ✓ creation of safe home, school, and work environments(some examples)

# Thank you for your attention