



**The impact of selected risk factors on
expected lifetime without longstanding,
limiting illness and quality-adjusted life-years**

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Purpose

To quantify the impact of selected risk factors on health by estimating

- **Expected lifetime with and without longstanding, limiting illness and**
- **Quality-adjusted life-years (QALY)**

classified by risk factor levels

Risk factors

Smoking

- Never smoker
- Ex-smoker
- Moderate smoker 1-14 gram of tobacco per day
- Heavy smoker ≥ 15 gram of tobacco per day

Alcohol consumption

- Moderate consumption 1-14 units of alcohol per week for women
 1-21 units of alcohol per week for men
- High consumption more than 14 units of alcohol per week for women
 more than 21 units of alcohol per week for men

Physical inactivity (during leisure time)

- Active At least light physical activity 4 hours per week
- Inactive Sedentary (except for disabled individuals)

Overweight

- Normal weight $18.5 \leq \text{BMI} < 25.0$
 - Overweight $25.0 \leq \text{BMI} < 30.0$
 - Obese $30.0 \leq \text{BMI}$
- BMI: Body Mass Index
Underweight (BMI < 18.5) excluded

Data sources

- **Death rates** by sex and age from **the Cause of Death Register**
- As to smoking: **Lung cancer death rates** and **relative risks** from **the second prospective Cancer Prevention Study (CPS-II)** of the **American Cancer Society**
- **Relative risks** for death estimated from **the Danish National Cohort Study (DANCOS)**: the Danish Health Interview Surveys in 1987, 1991, 1994 and 2000 linked to the Danish Civil Registration System and other national registers
- **Prevalence of long-standing, limiting illness** and **EQ-5D scores** by sex, age and risk factor level established from the **Danish Health Interview Survey 2000**

Long-standing illness

Interview question:

“Do you suffer from any long-standing illness, long-standing after-effect of injury, any disability, or other long-standing condition?”

If “yes” a question were asked to clarify whether the disease implied restrictions to daily life or at work

EQ-5D

Mobility

- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

Self-care

- I have no problems with self-care
- I have some problems washing and dressing myself
- I am unable to wash or dressing myself

Usual activities (e.g. work, study, housework, family or leisure activities)

- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities

Pain/Discomfort

- I have no pain or discomfort
- I have moderate pain or discomfort
- I have extreme pain or discomfort

Anxiety/Depression

- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed

Danish EQ-5D weights

Official Danish EQ-5D weights established from a study in 2000 at University of Southern Denmark

Weights for all health states defined by the EQ-5D classification system – a total of 243 ($=3^5$) states

Methods

Construction of life tables

by sex and risk factor level

Survey data

Prevalence of long-standing, limiting illness and EQ-5D scores
by sex and risk factor level

Sullivan's method

- Expected lifetime without longstanding, limiting illness and
- Quality-adjusted life expectancy (QALY)

Methods

Construction of life tables

by sex and risk factor level

P_0 sex and age specific prevalence of unexposed

P_i prevalence for risk factor exposure level i

RR_i relative risk ($RR_0 = 1$)

Then sex and age specific death rate, is given by $D = \sum P_i \cdot RR_i \cdot D_0$ and

D_0 death rate of unexposed can be calculated

Sex and age specific death rates for unexposed, D_0 , are multiplied with the relative risk, RR_i to estimate sex and age specific death rates for risk factor level i

Finally, risk factor level specific life tables are constructed

For smoking an indirect method (Peto and colleagues) was used.

Methods

Survey data

- **Prevalence of long-standing, limiting illness**

and

- **mean EQ-5D scores**

by sex and risk factor level

Methods

Sullivan's method

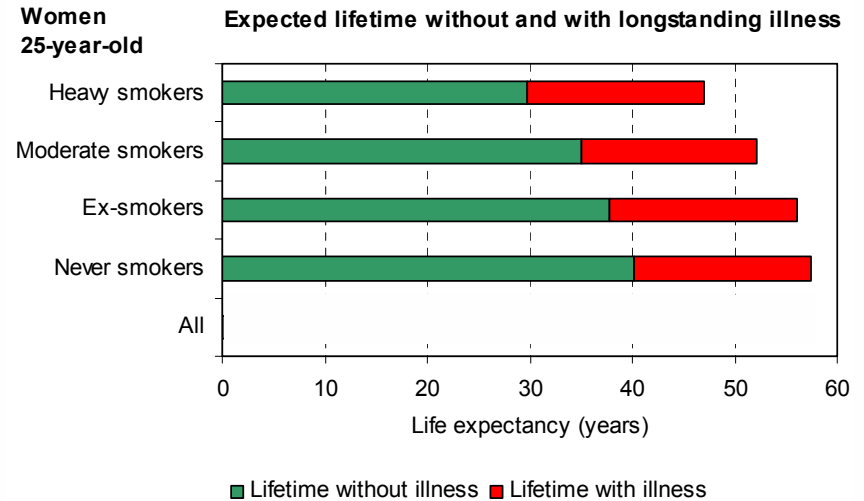
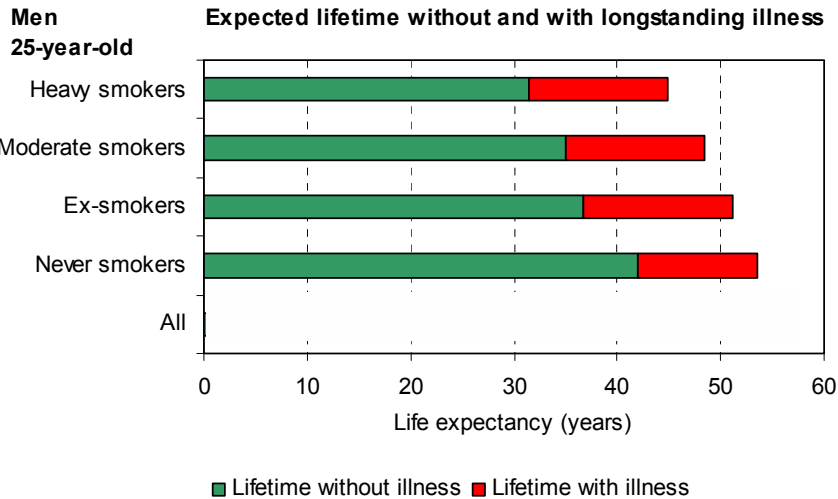
to estimate

- **Expected lifetime without longstanding, limiting illness**
- and
- **Quality-adjusted life-years (QALY)**

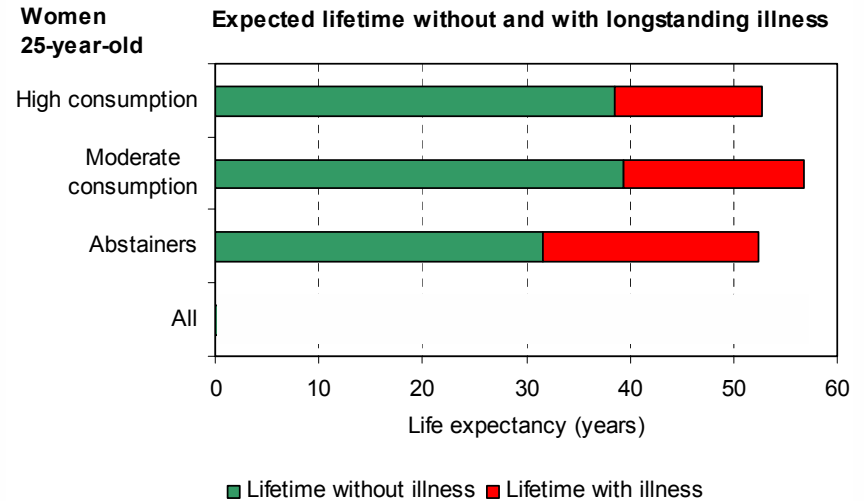
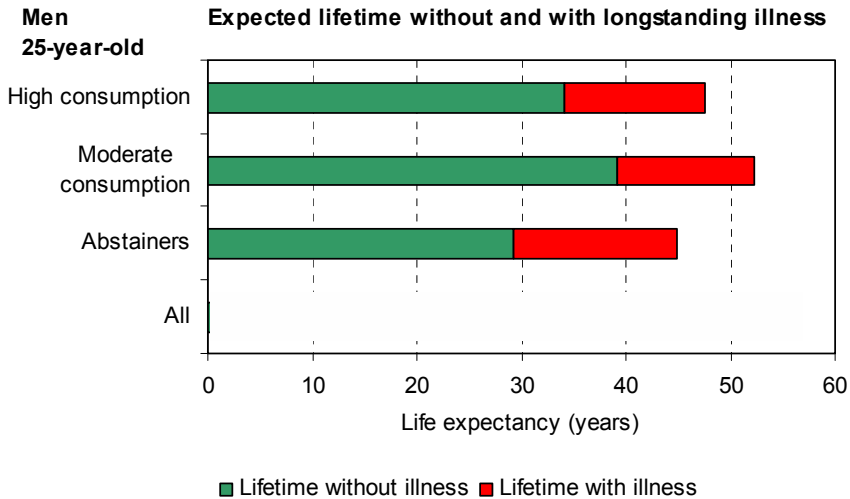
Results

Risk factors and expected lifetime without longstanding, limiting illness

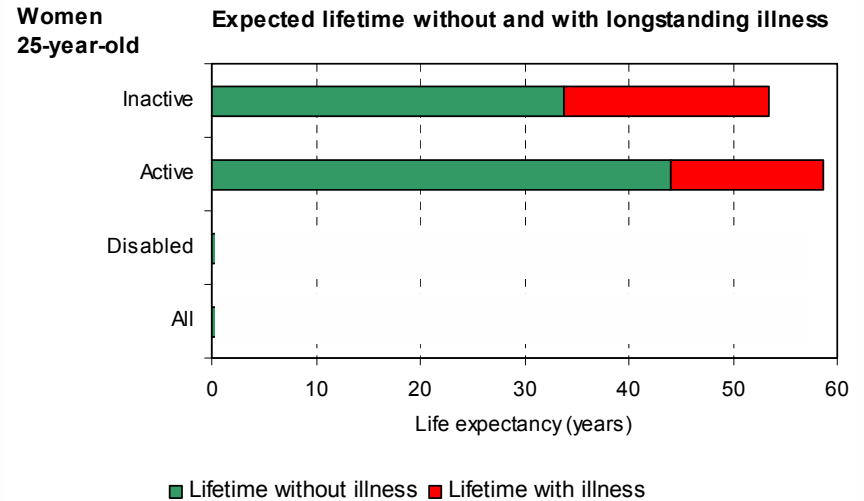
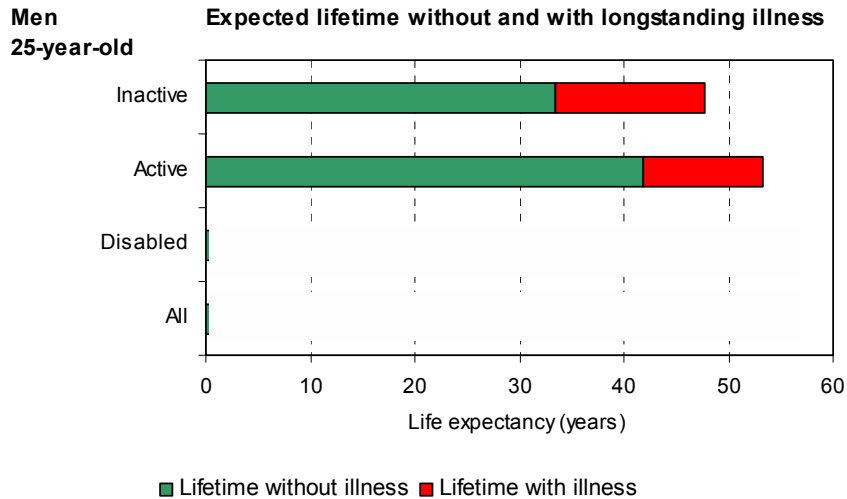
Smoking and expected lifetime without and with longstanding, limiting illness



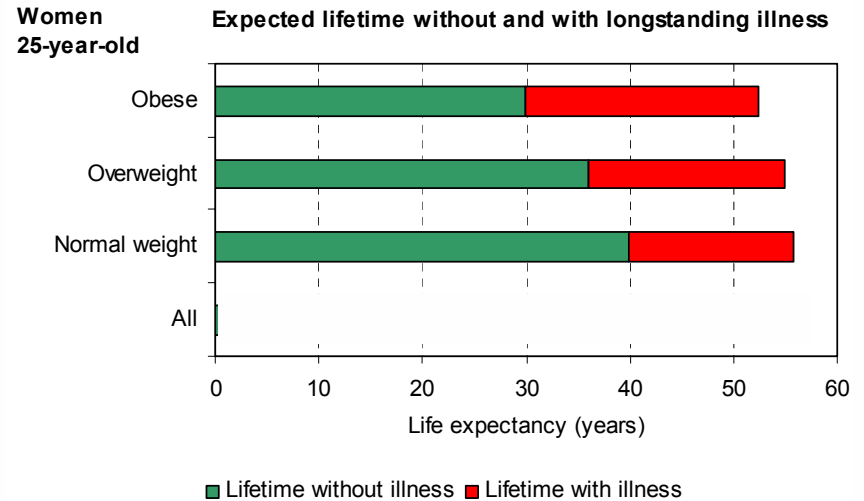
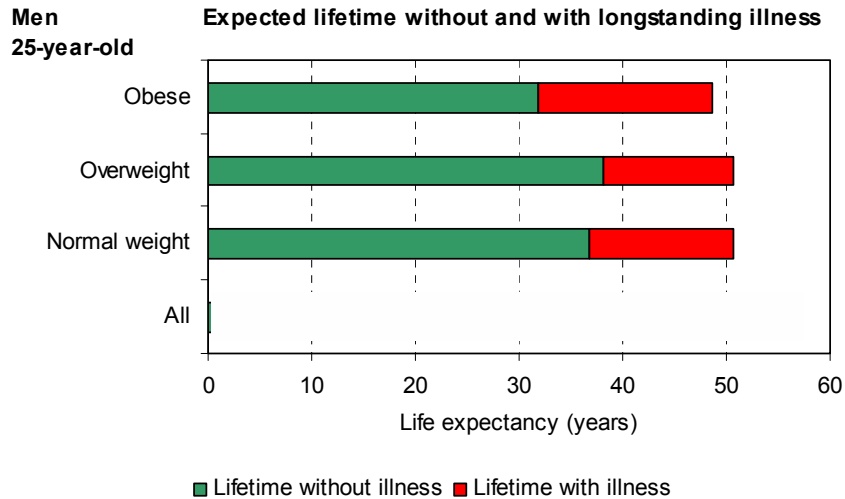
Alcohol and expected lifetime without and with longstanding, limiting illness



Physical activity and expected lifetime without and with longstanding, limiting illness



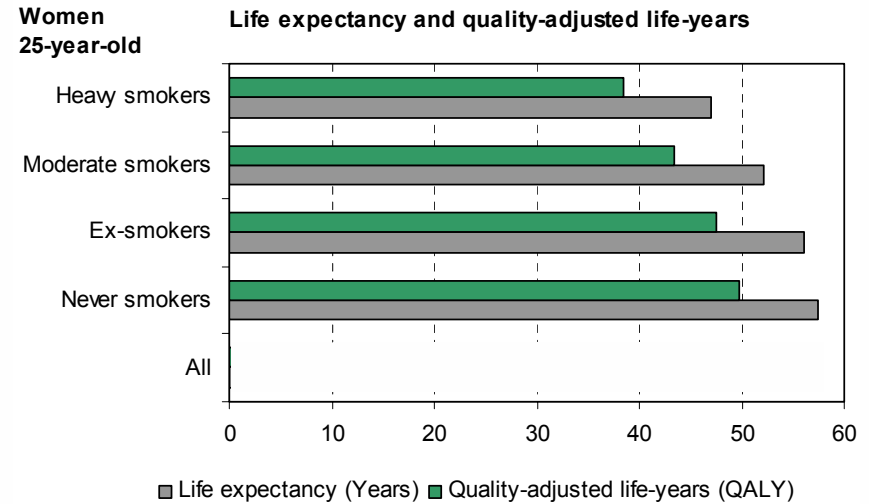
Overweight and expected lifetime without and with longstanding, limiting illness



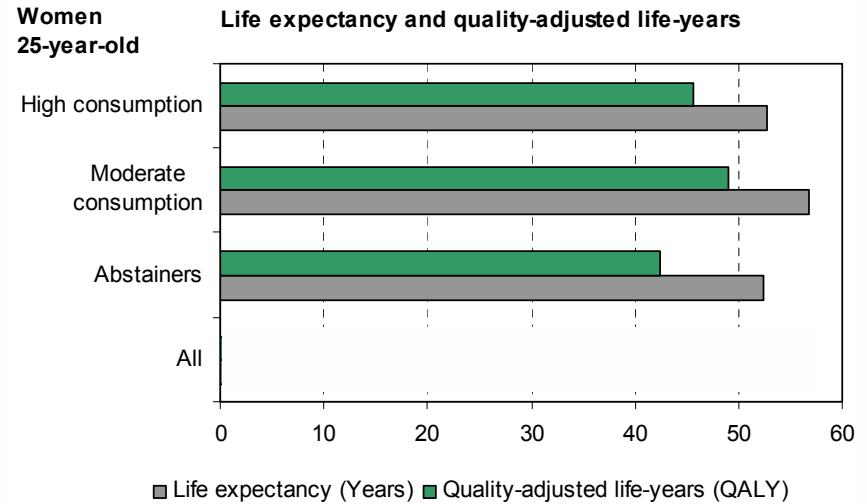
Results

Risk factors and quality-adjusted life-years

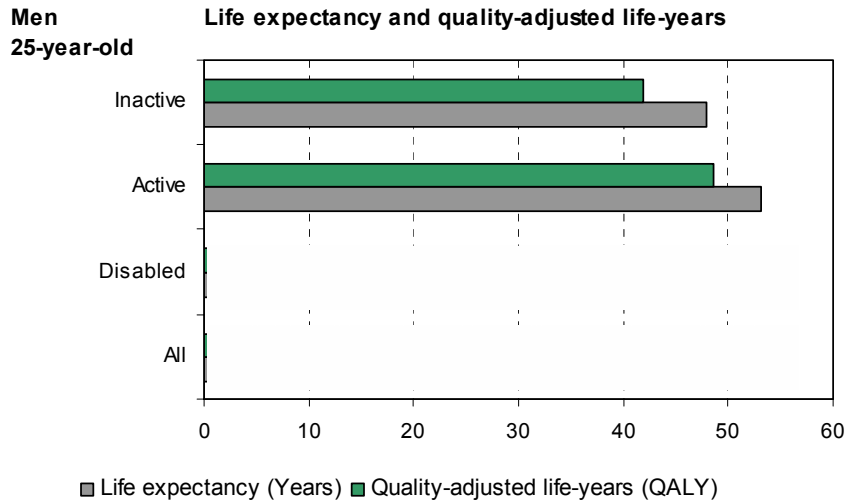
Smoking and quality-adjusted life-years



Alcohol and quality-adjusted life-years



Physical activity and quality-adjusted life-years

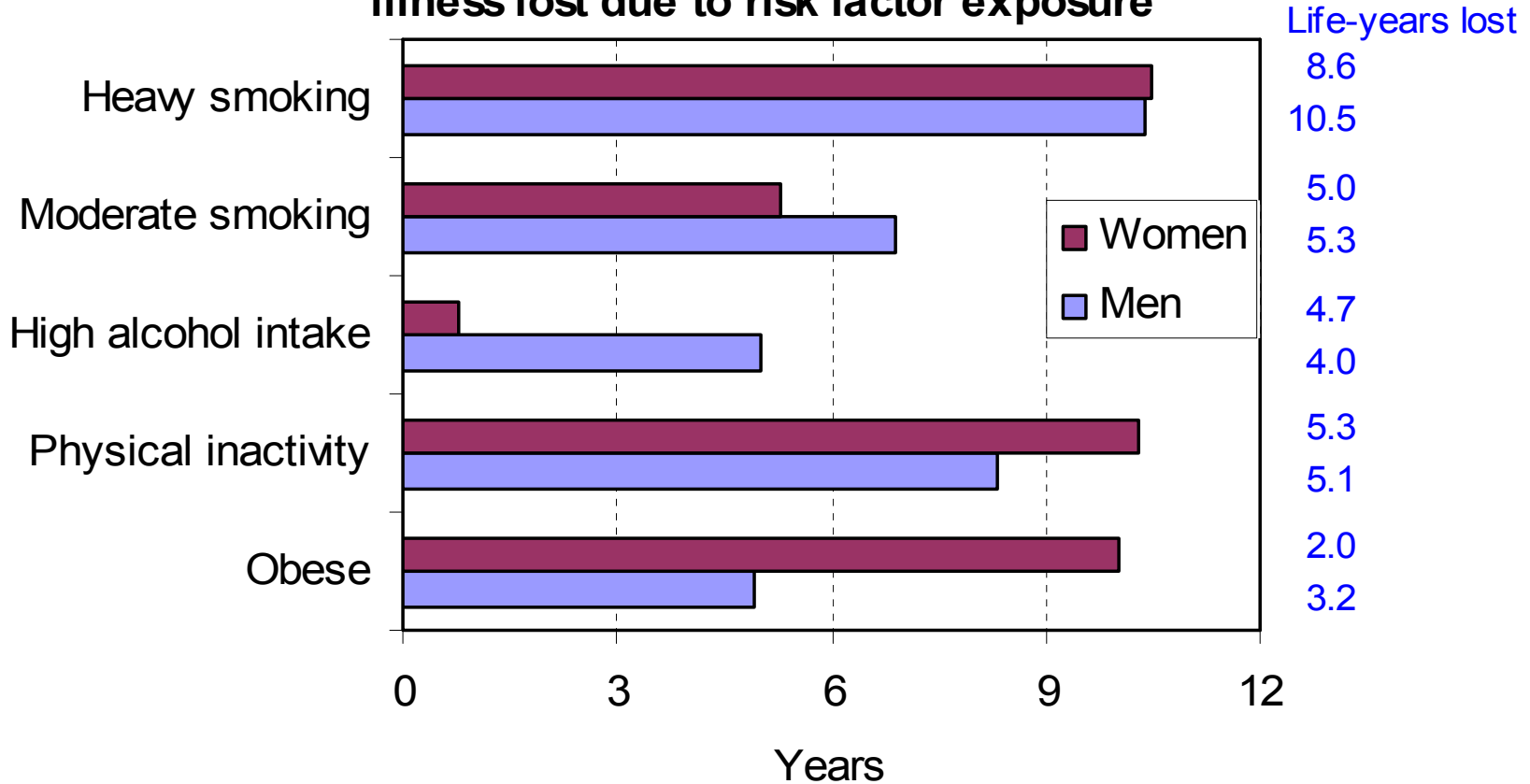


Overweight and quality-adjusted life-years

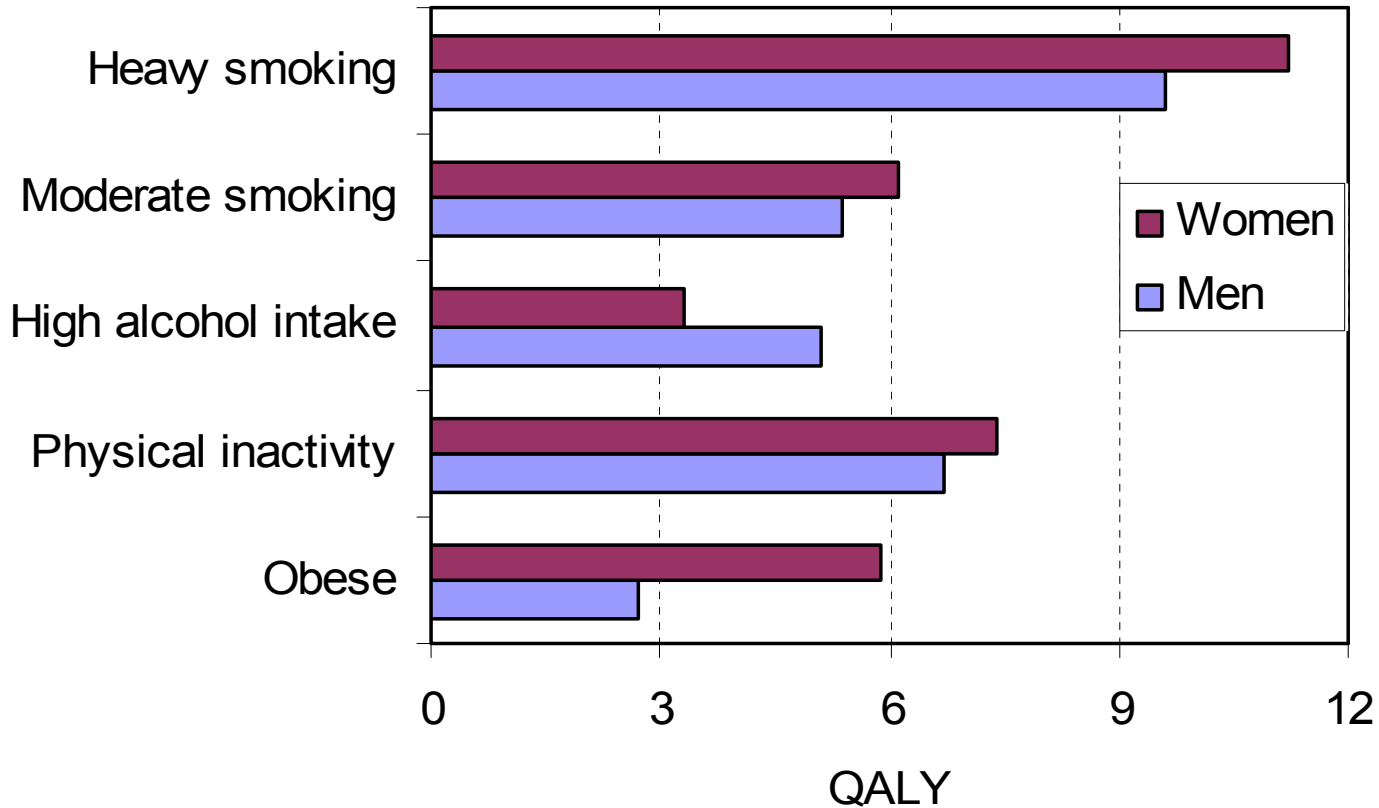


Comparisons across risk factors

Expected lifetime without longstanding, limiting illness lost due to risk factor exposure



Quality-adjusted life-years lost due to risk factor exposure



Summary – Health expectancy

Risk factor	Life expectancy lost		Healthy life lost	
	Years		Years	
	Men	Women	Men	Women
Smoking				
Heavy smokers	8.7	10.4	10.4	10.5
Moderate smokers	5.0	5.3	6.9	5.3
Ex-smokers	2.4	1.5	5.2	2.5
Alcohol				
High consumption	4.7	4.0	5.0	0.8
Physical inactivity				
Inactive	5.3	5.1	8.3	10.3
Body weight				
Overweight	0.0	0.7	-1.4	3.9
Obese	2.0	3.2	4.9	10.0

Summary – Health expectancy

Risk factor	Life expectancy lost		Healthy life lost		Risk factor Prevalence	
	Years		Years		%	
	Men	Women	Men	Women	Men	Women
Smoking						
Heavy smokers	8.7	10.4	10.4	10.5	23.2	16.5
Moderate smokers	5.0	5.3	6.9	5.3	16.2	18.1
Ex-smokers	2.4	1.5	5.2	2.5	25.2	22.0
Alcohol						
High consumption	4.7	4.0	5.0	0.8	14.8	8.7
Physical inactivity						
Inactive	5.3	5.1	8.3	10.3	16.0	16.9
Body weight						
Overweight	0.0	0.7	-1.4	3.9	39.9	24.8
Obese	2.0	3.2	4.9	10.0	9.8	9.1

Summary – Quality-adjusted life-years

Risk factor	Life expectancy lost		Quality-adjusted life-years lost	
	Years		QALY	
	Men	Women	Men	Women
Smoking				
Heavy smokers	8.6	10.5	9.6	11.2
Moderate smokers	5.0	5.3	5.4	6.1
Ex-smokers	2.4	1.5	2.6	2.1
Alcohol				
High consumption	4.7	4.0	5.1	3.3
Physical inactivity				
Inactive	5.3	5.1	6.7	7.4
Body weight				
Overweight	0.0	0.7	-0.5	2.4
Obese	2.0	3.2	2.7	5.9

Summary – Quality-adjusted life-years

Risk factor	Life expectancy lost		Quality-adjusted life-years lost		Risk factor Prevalence	
	Years		QALY		%	
	Men	Women	Men	Women	Men	Women
Smoking						
Heavy smokers	8.6	10.5	9.6	11.2	23.2	16.5
Moderate smokers	5.0	5.3	5.4	6.1	16.2	18.1
Ex-smokers	2.4	1.5	2.6	2.1	25.2	22.0
Alcohol						
High consumption	4.7	4.0	5.1	3.3	14.8	8.7
Physical inactivity						
Inactive	5.3	5.1	6.7	7.4	16.0	16.9
Body weight						
Overweight	0.0	0.7	-0.5	2.4	39.9	24.8
Obese	2.0	3.2	2.7	5.9	9.8	9.1



Thank you!

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