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The potential impact of smoking interventions on HLY in France

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Background and aim

- Tobacco is leading cause of mortality and there is increasing evidence that smoking is also associated with disability

- Increasing disability-free life expectancy (DFLE) is among the main priorities of national and European public health policy
  - The European Union is targeting a two-year increase in Healthy Life Years (HLY) by 2020

- The aim of this presentation is to assess the loss in HLY at age 15 in France due to smoking, and the gains that could be achieved under different smoking control scenarios

Data: primary data source

Health Barometer (Baromètre Santé, BS)

- Two stage random sample non-institutionalized population

- Telephone interview (CATI)

- BS 2005: 12-75 years, N = 30514 (57.9%)

- BS 2010: 15-85 years, N = 27653 (61%)

- BS 2010: % starting and % quitting by age and gender

- BS 2010: % disabled GALI indicator (= health measure HLY)

- BS 2010: OR smoking -> disability

- BS 2005 & BS 2010: % re-starters by age and gender

Other data sources

- Eurohex:
- Mortality and population counts, 2010, by age and gender

- DYNAMO-HIA database
- RR smoking to mortality (former smokers by time since quitting)

Methods: generation input data

- Reconstruction of smoking start, quit and restart probabilities

- Start: BS 2010: age starting to smoke regularly (or: age first cigarette)

- Quit: BS 2010: age when persons quitted smoking

- Restart: life table calculation based on % current and former smokers in BS 2005 and BS 2010, yearly mortality and quit probabilities by age

- OR linking smoking to GALI prevalence

- Corrected for marital status, education, BMI, alcohol consumption and age

- By gender and former smokers by time since quitting

DYNAMO-HIA tool

Reference scenario

Description of business as usual situation:
demographic, epidemiological and risk factor exposure

Intervention scenario

Changed risk factor exposure:
changed prevalence and/or changed risk factor transition rates

DYNAMO-HIA

Estimation of change in large set of health outcomes:
comparison reference and intervention scenario

DYNAMO-HIA: behind the scenes

- Standard causal pathway in epidemiology

| *Risk factor* | → | *Diseases* | → | *Mortality*
Disability
SMPH |

- Markov modeling framework
  - Explicit risk factor states
  - Disease states: incidence, prevalence, mortality
  - Competing risks are taken into account

- Technical realization
  - Discrete time frame using a multi state model (disease process)
  - Dynamic micro simulation (risk factor)

DYNAMO-HIA: behind the scenes

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Methods: effect smoking on HLY

- DYNAMO-HIA tool (http://www.dynamo-hia.eu/)

- Release 2: DFLE as outcome

- Reference (=BAU) vs. scenarios with changed smoking transitions (start, quit, restart)

- Direct modelling effect smoking on mortality (using RR) and disability (using OR)

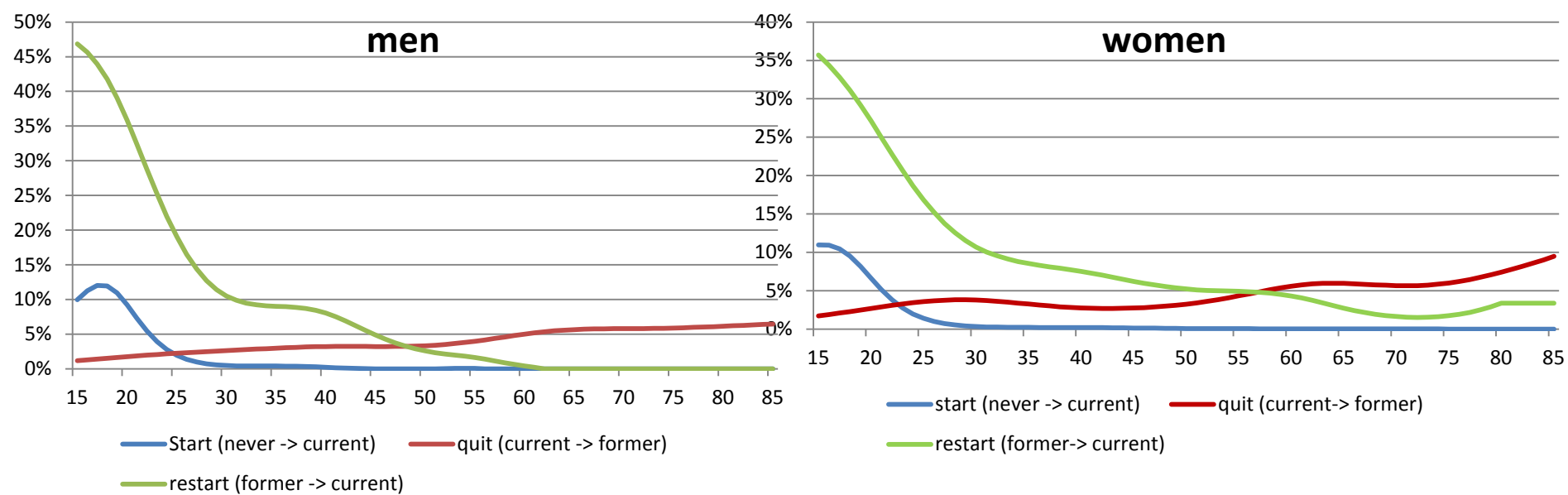- DFLE with Sullivan method (cohort and period by future year)

Percentage current, former and never smokers

Men

Women
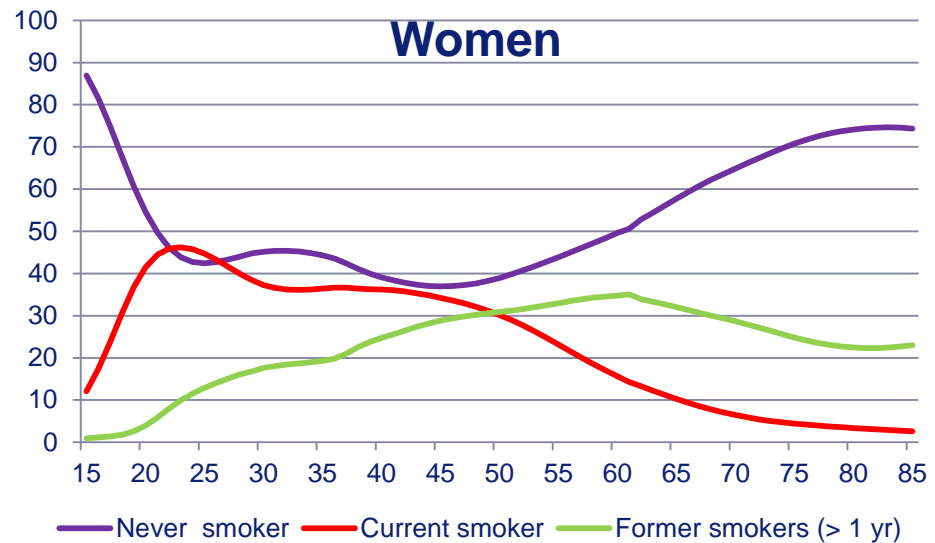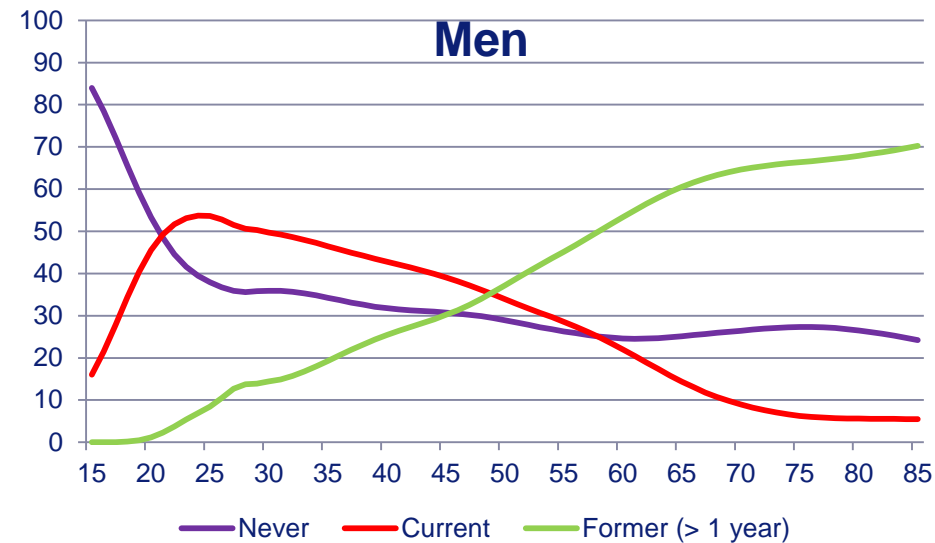
Own calculations : Based on *Baromètre Santé* 2010

Current smoker is including those stopped less than 1 year

Smoking: start, quit and restart percentages

Own calculations : Based on *Baromètre Santé* 2005 and 2010

OR and RR

	OR smoking -> disability	OR former smokers 20 year quitting (all ages)
Men	1.58	1.23
Women	1.43	1.34

Own calculations : Based on Barometer Santé 2010

|	RR smoking -> all cause mortality	RR former smokers 20 year quitting (age 50)	RR former smokers 20 year quitting (age 80)
Men	2.07	1.02	1.33
Women	1.77	1.01	1.23

DYNAMO-HIA database

Scenarios

| Scenario	Relevance
1. Smoking-free population	Loss due to smoking
2. No smoking initiation before age 18	Max. gain by increasing minimum smoking initiation age to 18 years
3. Zero (re)start probabilities	Max. gain by smoking initiation interventions
4a. 30% increase in quit probabilities 4b. 100% increase in quit probabilities	Effect of GP/nurse advice on smoking cessation Effect of group therapy smoking cessation (adults), TABADO intervention (adolescents)
5. All current smokers quit	Max. gain by smoking cessation interventions
6 All smokers quit, no smoking initiation	Max. effect future interventioins

Scenarios (remaining life course)

Men, cohort age 15

Legend: HLY, ULY, LE

Scenarios (in 10 years)

men age 15 2020

Legend: HLY (blue), ULY (red), LE (green)

Categories:
1. Smoking-free population
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4b 100% increase in quit probabilities
5. All current smokers quit
6 All smokers quit, no smoking initiation
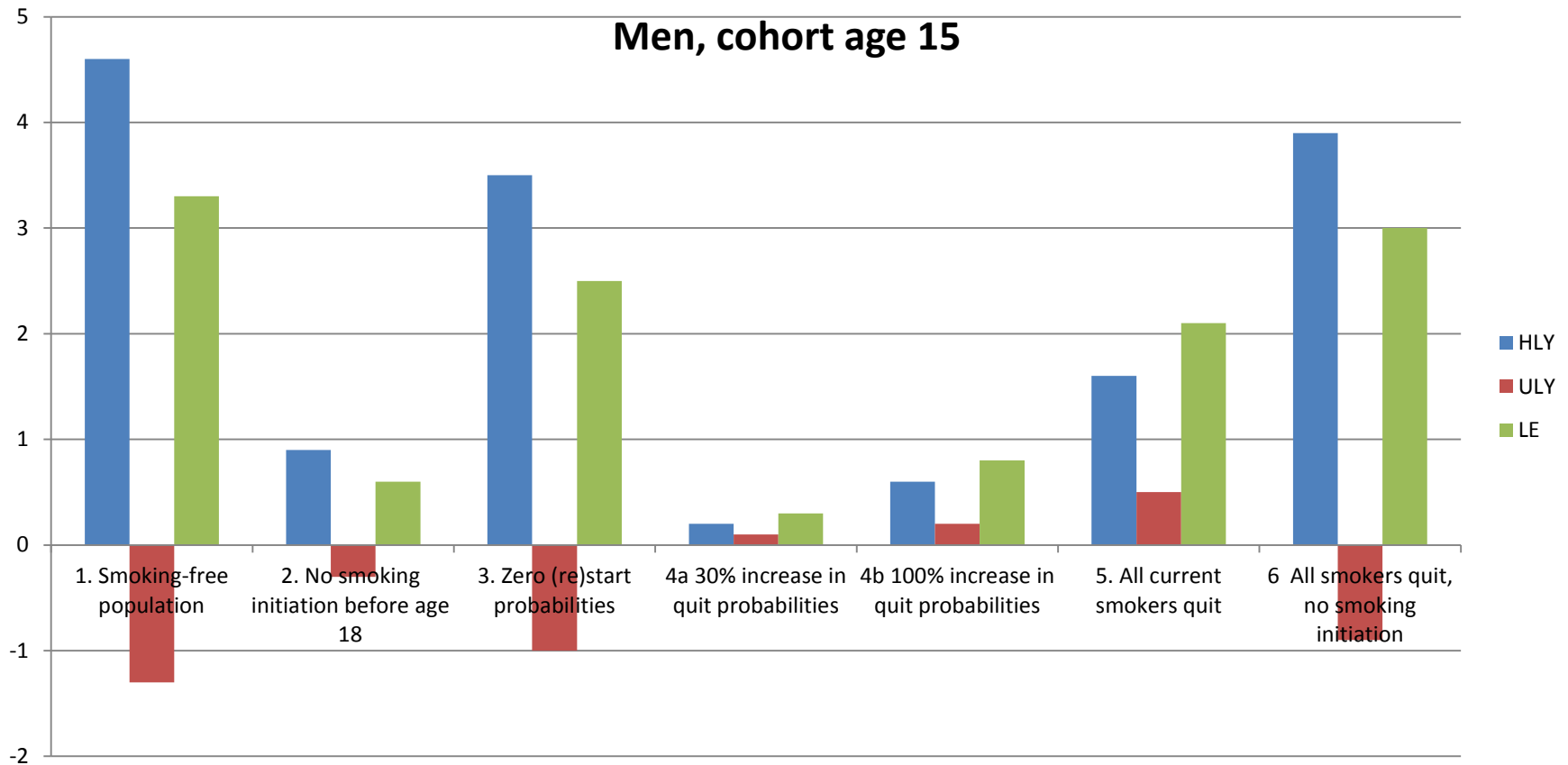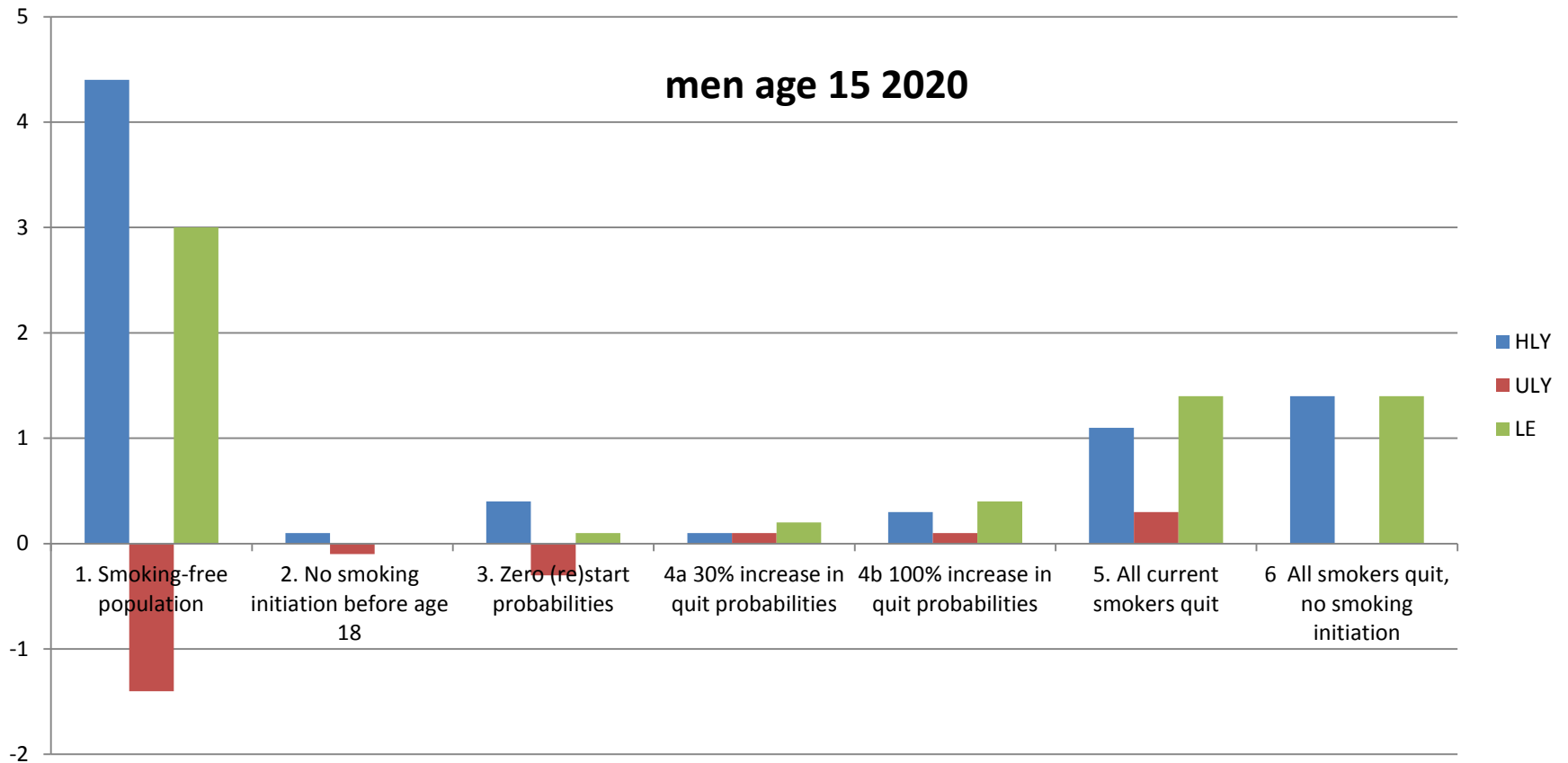
Scenarios (in 40 years)

men age 15 2050
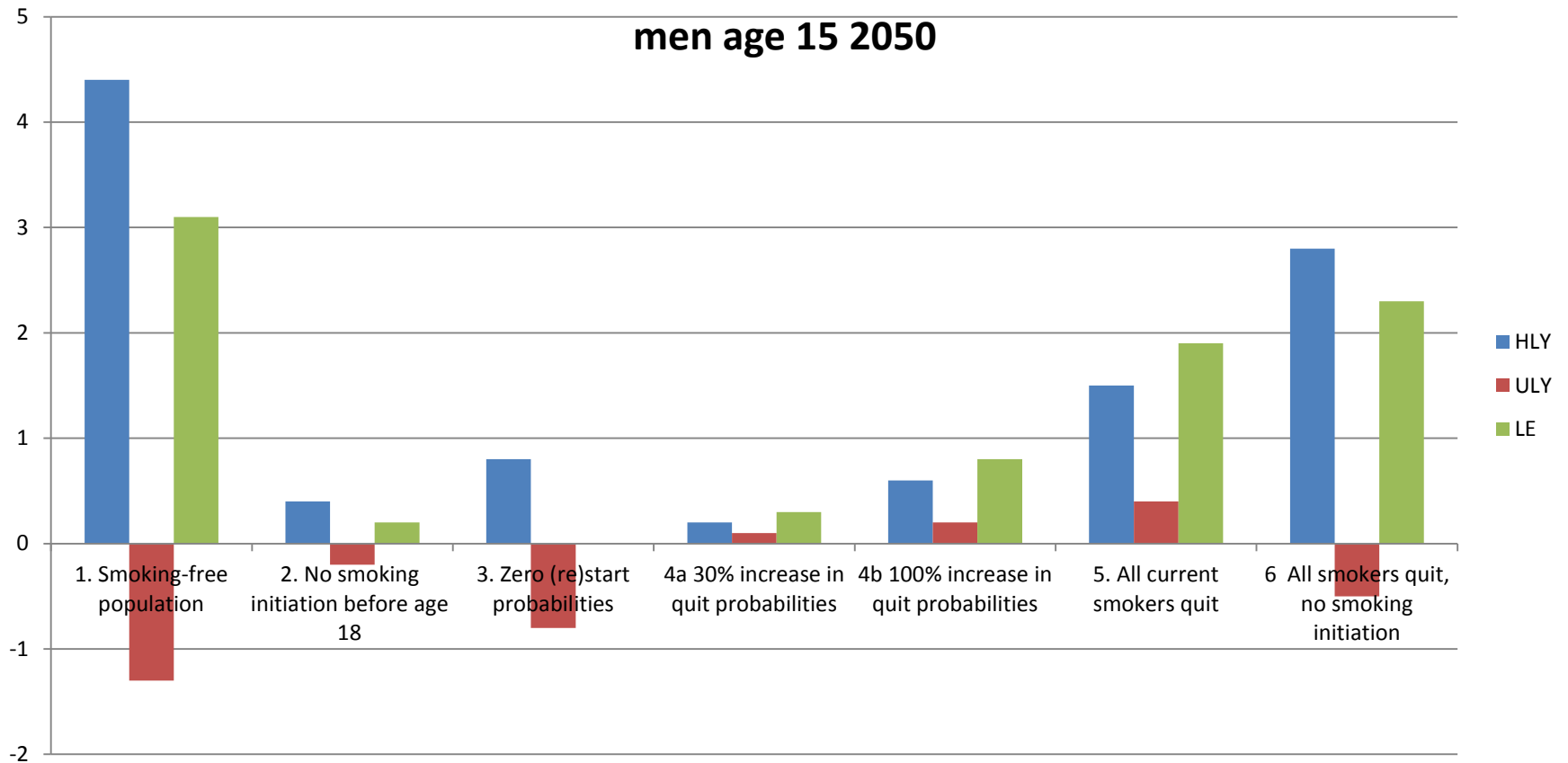
Conclusions

- Smoking yields large losses in terms of HLY and total LE

    - 15-year old men loose almost 4.5 HLY; women almost 3.5 HLY

- Most gains can be achieved by not starting

    - remaining life time: almost 3.5 HLY can be gained in 15 year old men, 2.5 years in 25 year old women

    - but takes a long time

- Substantial, but smaller gains by quitting (men 1.5, women 0.8 years)

        - More ULY ?

- Realistic interventions targeting smoking cessation and smoking initiation have small effects on HLY and take time to show effects

Discussion

- Limited data for start, quit and restart %

- Restart % reconstructed
  - Young ages high restart, but small group of former smokers

- **OR disability past smokers**
  - Could be reverse causation
  - Causality to be confirmed in other studies
  - Suggestion that quitting interventions rise ULY, but this depends on OR
  - **-> more research needed**

Acknowledgements

Cohort life expectancy with and without disability
at age 15

Cross-sectional life expectancy with and without disability (Sullivan Method)

2030, at age 15

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years

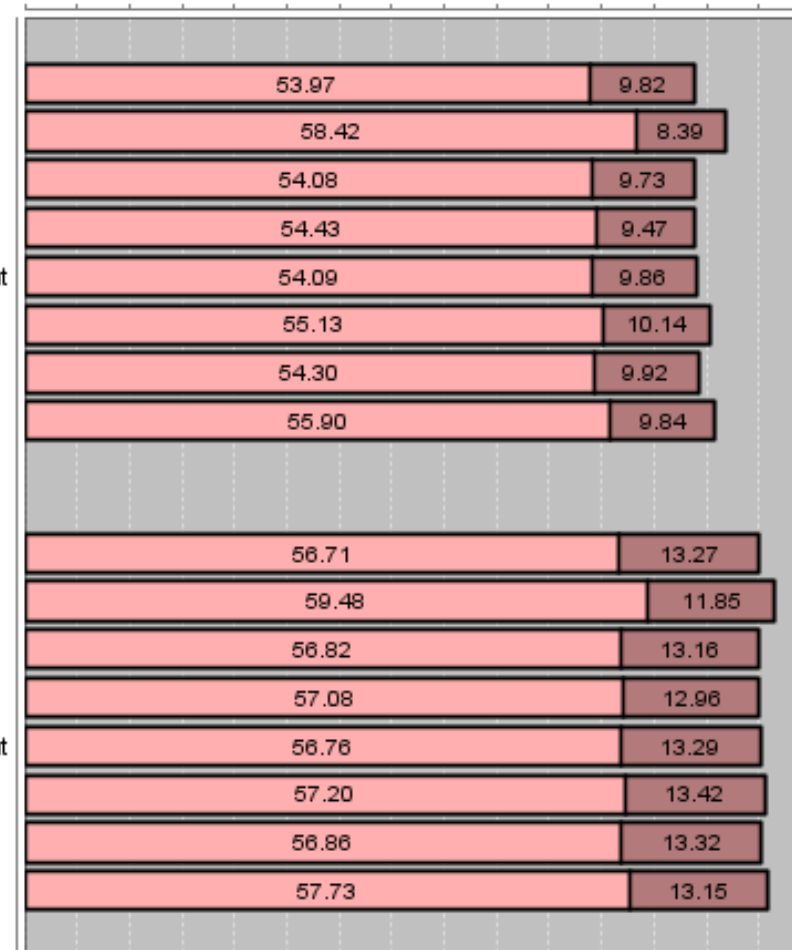|	without disability	with disability
men		
Reference Scenario	53.97	9.82
Nobody ever smoked	58.42	8.39
No start below age 18	54.08	9.73
No one starts	54.43	9.47
Increase quit chances with 30 procent	54.09	9.86
Everyone stops	55.13	10.14
Doubling quit chances	54.30	9.92
No one starts every one quits	55.90	9.84
women		
Reference Scenario	56.71	13.27
Nobody ever smoked	59.48	11.85
No start below age 18	56.82	13.16
No one starts	57.08	12.96
Increase quit chances with 30 procent	56.76	13.29
Everyone stops	57.20	13.42
Doubling quit chances	56.86	13.32
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Cross-sectional life expectancy with and without disability (Sullivan Method)
2050, at age 15
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Cross-sectional life expectancy with and without disability (Sullivan Method)
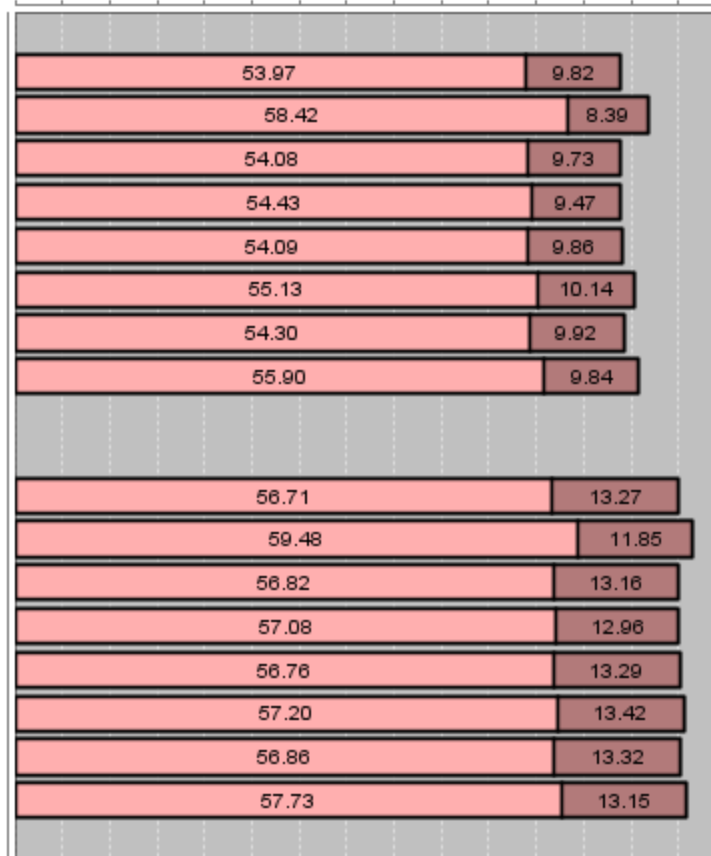### 2030, at age 15
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