

# **Inequality of Opportunity in Health: Data and empirical issues**

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# Introduction

- Empirical analysis of inequality in opportunities in health requires to measure:
  - health
  - determinants of health that are beyond the sphere of individual responsibility (circumstances) and thus, which could be recognised as sources of inequalities of opportunities in health
  - determinants of health that are under the control of individuals (efforts), and thus which could be recognised as sources of legitimate inequalities in health
- What is used in the literature on IOP in health and health care ?
- What should be used ?

**How to measure health?**

# What is health?

## WHO (World Health Organization) (1946)

*« Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. »*

- A very comprehensive definition which underlines the multidimensional aspect of health
- This definition assumes a saturation point exists
- Should the definition be age related? For example, is it reasonable to expect a 80 year old person to run a mile in the same time as a 20 year old person?
- Who is able to judge the health status of one individual ? A medical doctor or the individual himself?
- It is impossible to find a unique measure of the « true » or « objective» health status

# How to measure health for IOP analysis?

- Relevant indicators for identifying differences in the severity in physical and mental health problems that may affect
  - the survival probability
  - the ability to work or to perform activities of daily living
  - health-related quality of life or well-being
- Sensitive but not too discriminant (depending of age groups studied)
- Relevant indicators for interpersonal comparisons
  - quite “objective”
  - at least not subject to systematic biases related to circumstances or efforts
- Relevant indicators for identifying needs of care in the case of IOP in healthcare

# How to measure health? Mortality

- The most objective indicator of health status is mortality
- Measure of the “quantity of life” and not of the “quality of life”
- One can argue that it is a good measure of the worst health status (since most individuals, even in very poor health, do not choose to commit suicide)
- Mortality is accurately registered in administrative data
- However, administrative data provide very few additional information on:
  - Circumstances: place of birth and place of death, nationality at birth and at death; sometimes education, parental occupation and occupation when mortality data are linked to census data
  - Efforts: no information on lifestyles excepted on health care use in claims data from health insurance funds and national health services
- Data from interview surveys (with information on circumstances and efforts) could be merged with mortality data
- However, death is (hopefully) a very scarce event, especially before age 70

# How to measure health status (among alive people)?

- Health interview surveys report many indicators of health status, which can be gathered according to the three models proposed by Blaxter (1985):
  - According to the medical or biological model, health can be evaluated by reported diseases
  - According to the functional and social model, health is evaluated by reported functional limitations or reported inability to perform normal tasks
  - According to the subjective model, health status may be evaluated by self-assessed health, or by list of symptoms

# The medical model

According to the medical or biological model, health can be evaluated by diagnosed or reported diseases and information coming from clinical, physiological or psychiatric examination

- More accurate information when morbidity is reported by doctors than by individuals
- More accurate information when respondents are asked to report diagnosed morbidity rather than morbidity (without any mention of diagnosis). Responses are also different when people are asked to report treated diseases or diseases from which they suffer
- The number of diseases reported is also sensitive to the number of diseases suggested within a list
- The use of reported morbidity is debatable for measuring health inequalities since reporting (diagnosed) diseases implies to have access to care and to have a quite high level of health literacy
- Biomarkers collected during interviews have the advantage to be objective but are not always very good predictors of subsequent health problems



# Wave 6 SHARE survey

## PH006\_DocCond

Please look at card 8.

*[ Has a doctor ever told you that you had/ Do you currently have] any of the conditions on this card? [ With this we mean that a doctor has told you that you have this condition, and that you are either currently being treated for or bothered by this condition.] Please tell me the number or numbers of the conditions.*

IWER:

{CodeAll}

### DOCTOR TOLD YOU HAD CONDITIONS

1. A heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure
2. High blood pressure or hypertension
3. High blood cholesterol
4. A stroke or cerebral vascular disease
5. Diabetes or high blood sugar
6. Chronic lung disease such as chronic bronchitis or emphysema
10. Cancer or malignant tumour, including leukaemia or lymphoma, but excluding minor skin cancers
11. Stomach or duodenal ulcer, peptic ulcer
12. Parkinson disease
13. Cataracts
14. Hip fracture
15. Other fractures
16. Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment
18. Other affective or emotional disorders, including anxiety, nervous or psychiatric problems
19. Rheumatoid Arthritis
20. Osteoarthritis, or other rheumatism
21. Chronic kidney disease
96. None
97. Other conditions, not yet mentioned

# The functional and social model

According to the functional and social model, health is evaluated by functional limitations or inability to carry out normal tasks.

**Activities restrictions measure the ability to carry out “ normal “ tasks and justify help from profesional (or family), specific mechanical devices, or facility placement**

- The term **“Activities of daily living” or ADLs** (Katz, 1963) refers to the **basic tasks** of everyday life, such as eating, bathing, dressing, toileting, and transferring from chair to bed
- The term **“Instrumental Activities of Daily Living” or IADLs** (Lawton, 1969) refers to the **activities often performed by a person who is living independently** in a community setting during the course of a normal day, such as managing money, shopping, telephone use, travel in community, housekeeping, preparing meals, and taking medications correctly

**Functional Limitations (physical, sensory, cognitive) measure difficulties to perform some specific sensory and physical activities** such as seeing ordinary newspaper print (with glasses or contacts if normally used), hearing normal conversation (using aid if normally used), having speech understood, Lifting or carrying 10 lbs., walking a quarter of a mile without resting climbing a flight of stairs without resting

# Wave 6 SHARE survey

## PH048\_HeADLa

*Please look at card 12.*

*Please tell me whether you have any difficulty doing each of the everyday activities on this card. Exclude any difficulties that you expect to last less than three months.*

*IWER:*

*Probe: any others?*

*{CodeAll}*

### HEALTH AND ACTIVITIES

1. Walking 100 metres
2. Sitting for about two hours
3. Getting up from a chair after sitting for long periods
4. Climbing several flights of stairs without resting
5. Climbing one flight of stairs without resting
6. Stooping, kneeling, or crouching
7. Reaching or extending your arms above shoulder level
8. Pulling or pushing large objects like a living room chair
9. Lifting or carrying weights over 10 pounds/5 kilos, like a heavy bag of groceries
10. Picking up a small coin from a table
96. None of these

### Functional limitations

Probe: any others?

{CodeAll}

### **MORE HEALTH AND ACTIVITIES**

1. Dressing, including putting on shoes and socks
2. Walking across a room
3. Bathing or showering
4. Eating, such as cutting up your food
5. Getting in or out of bed
6. Using the toilet, including getting up or down

### **Activities of daily living**

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### **Instrumental activities of daily living**

7. Using a map to figure out how to get around in a strange place
8. Preparing a hot meal
9. Shopping for groceries
10. Making telephone calls
11. Taking medications
12. Doing work around the house or garden
13. Managing money, such as paying bills and keeping track of expenses
14. Leaving the house independently and accessing transportation services
15. Doing personal laundry
16. None of these

# Mini European Health Module

Accordingly with Blaxter's framework, all European survey have to collect at least the following set of questions:

- **Self-Assessed Health (or self-reported health)**

“How is your health in general?”      Very good; Good; Fair; Bad; Very bad

“Would you say your health is...”      Excellent; Very good; Good; Fair; Poor

- **Long standing illness or health problems (chronic diseases)**

“Do you have any longstanding illness or longstanding health problem?”

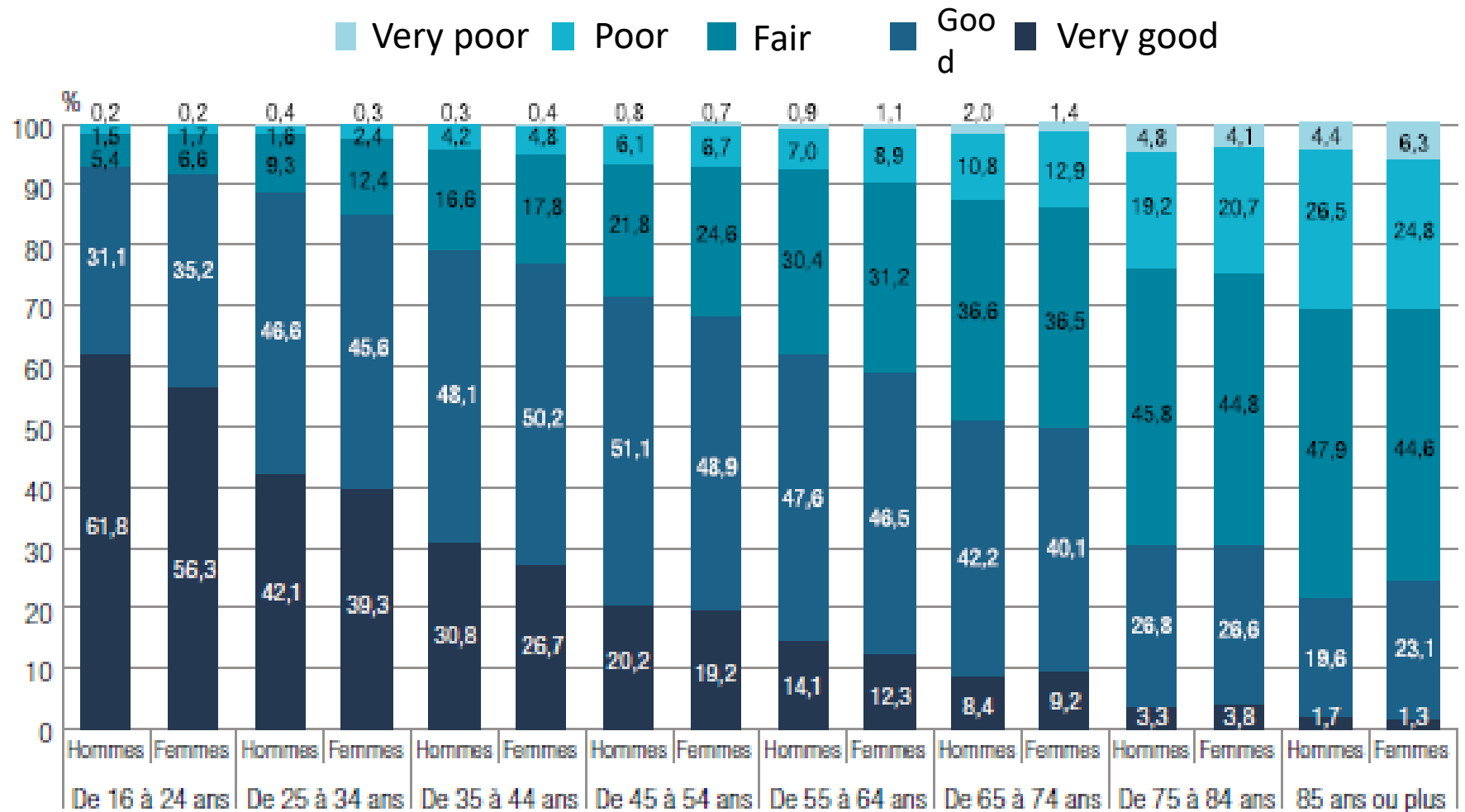
Yes/No

- **Functional health**

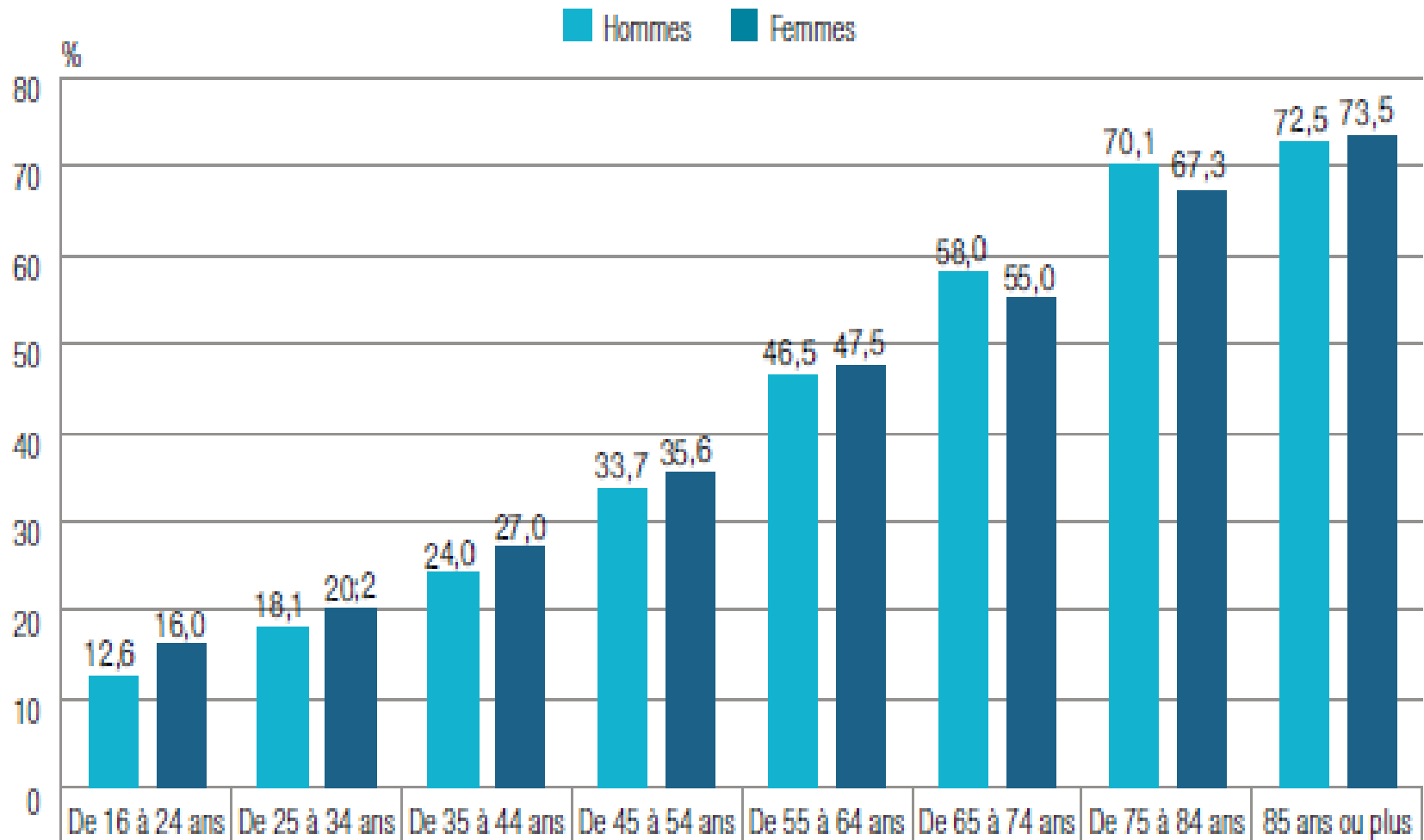
“For at least the past six months, to what extent have you been limited because of a health problem in activities people usually do?”

Severely limited; Limited but not severely; Not limited at all

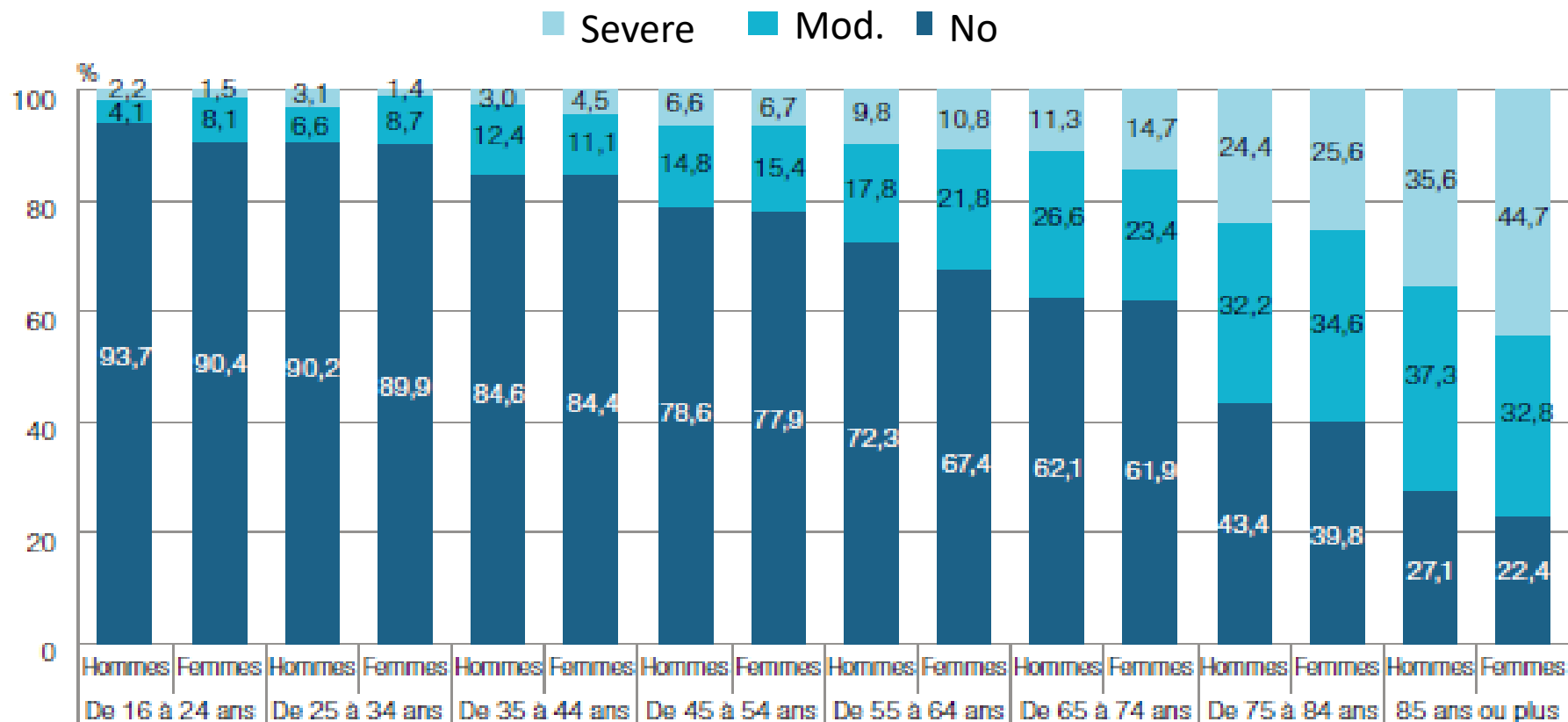
# Self-assessed health by age in France in 2012 (SILC)



# Long standing illness by age in France in 2012 (SILC)



# Activities limitations by age in France in 2012 (SILC)



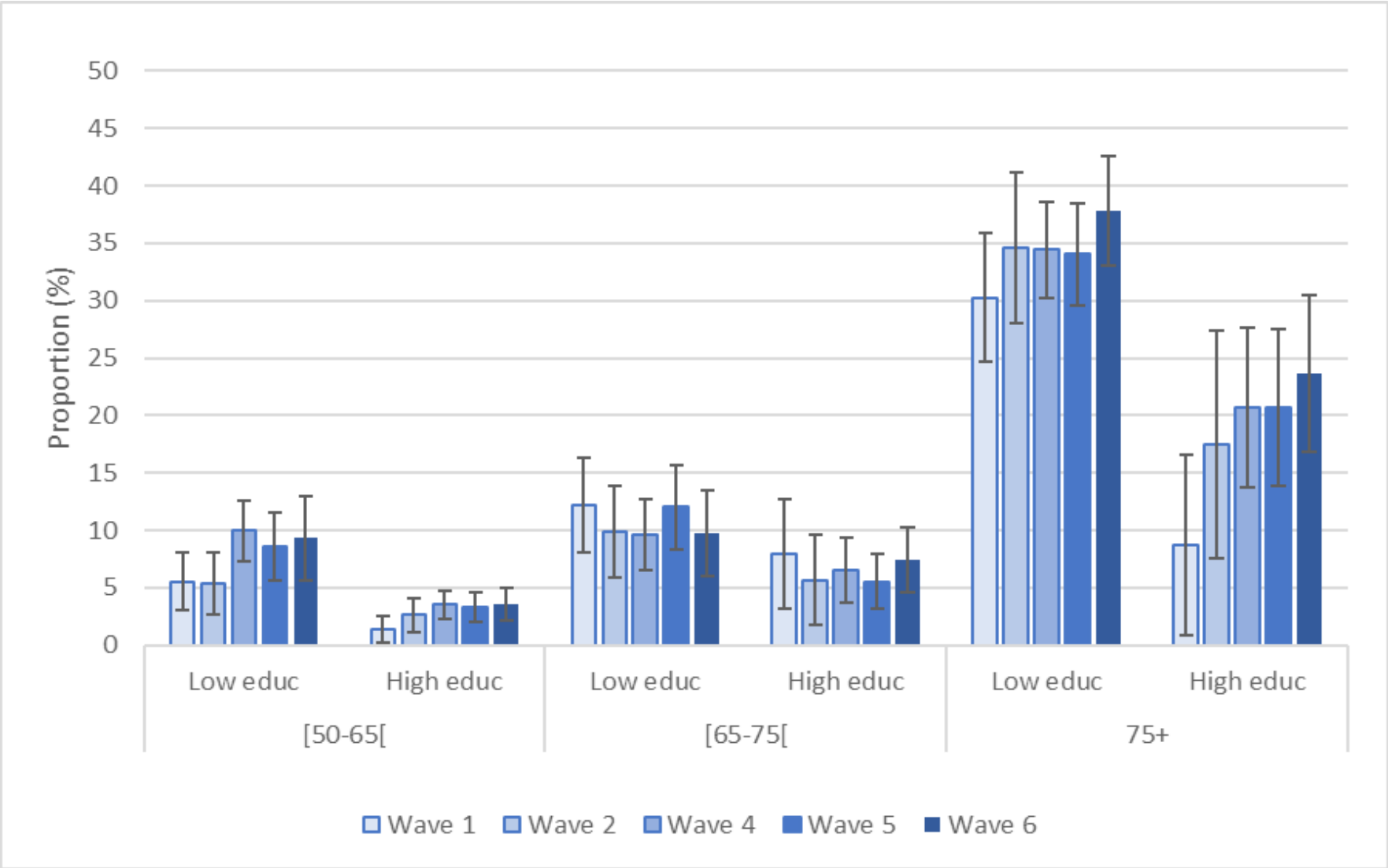


# Frailty: score of vulnerability and predictor of adverse health events

Frailty is defined as increased vulnerability to stressors resulting from a decrease in the physiological reserves of multiple systems. Frailty has been operationalized by the presence of a critical number of impairments in physical strength, physical activity, nutrition, mobility and energy (Fried et al., 2001):

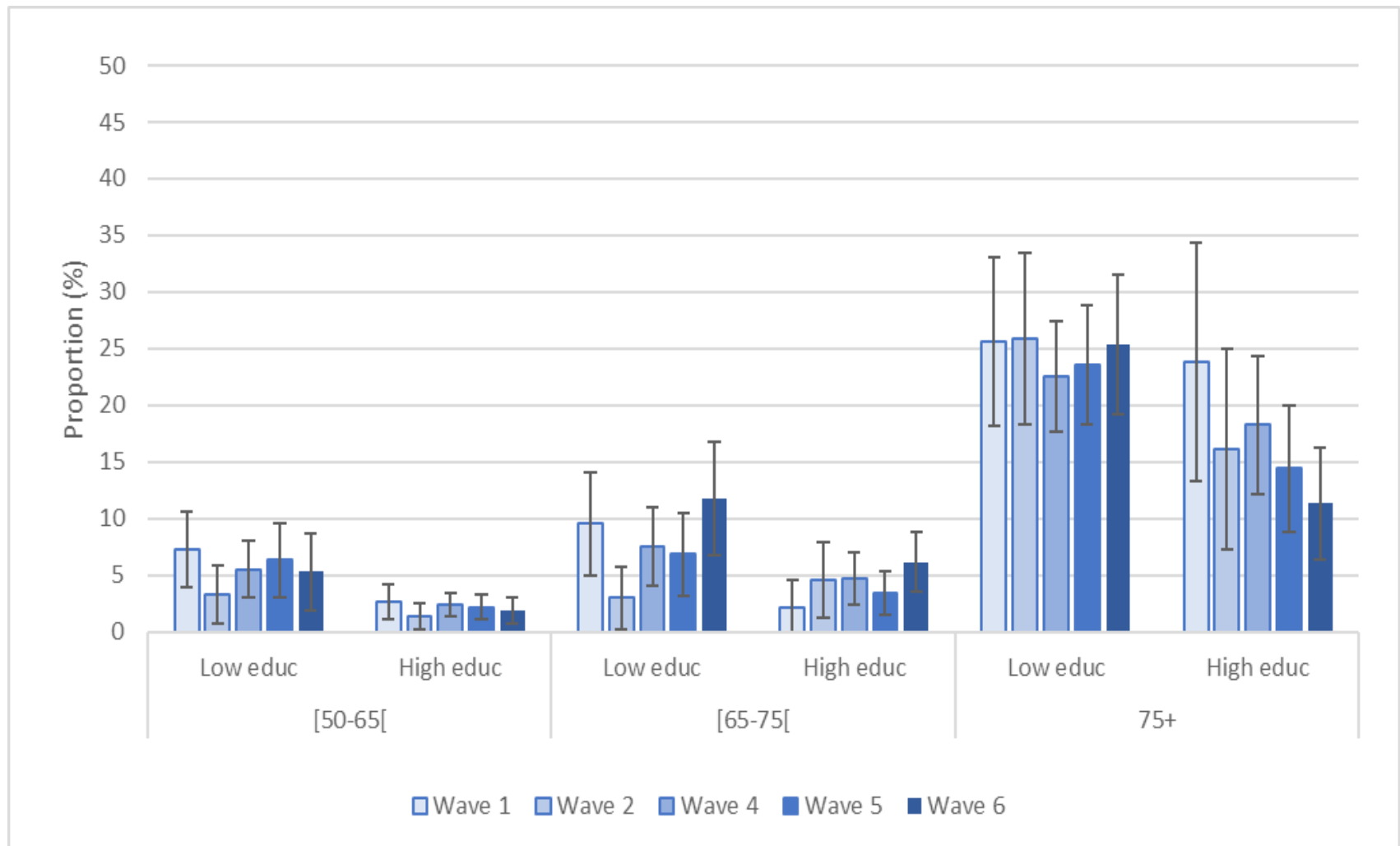
- **Exhaustion:** “In the last month, have you had too little energy to do the things you wanted to do?” Yes / No
- **Shrinking:** “What has your appetite been like?” or, in the case of a non-specific or uncodeable response to this question, by responding “Less” to the question: “So, have you been eating more or less than usual?” Yes / No
- **Weakness,** assessed by **handgrip strength** (Kg) using a dynamometer
- **Slowness:** “Because of a health problem, do you have difficulty [expected to last more than 3 months] walking 100 metres?” or “... climbing one flight of stairs without resting?” Yes / No.
- **Low activity:** “How often do you engage in activities that require a low or moderate level of energy such as gardening, cleaning the car, or doing a walk?”  
Once a week / Less

# Frailty score by education in Europe (women)



Arnault et al. (2019), "Persistence in inequalities of frailty at older age: A comparison of nine EU countries", waves 6 and 7 SHARE First Result Book

# Frailty score by education in Europe (men)



Arnault et al. (2019), "Persistence in inequalities of frailty at older age: A comparison of nine EU countries", waves 6 and 7 SHARE First Result Book

# EQ-5D: score of health-related quality of life

By placing a tick in one box in each group, please indicate which statements best describe your health today.

**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 selfcare

I have some problems washing or dressing myself

I am unable to wash or dress 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

Levels of perceived problems are coded as follows:

Level 1  
is coded  
as a '1'

Level 2  
is coded  
as a '2'

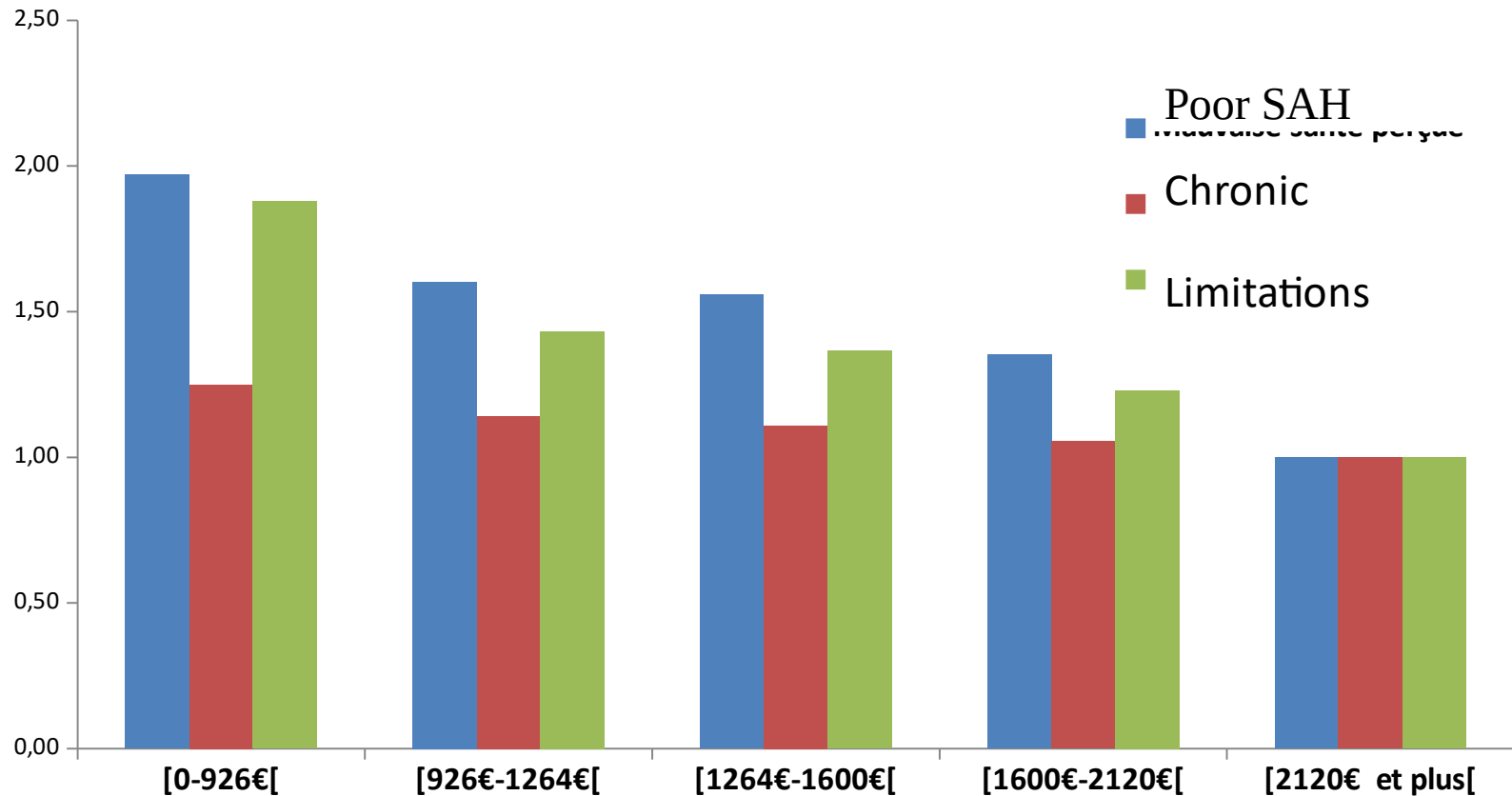
Level 3  
is coded  
as a '3'

*NB: There should be only one response for each dimension.*

**Carefull considerations  
with health measures**

# Health status according to income in France in 2012 (EHIS)

Relative risk adjusted by age and sex



# Measuring health for measuring inequalities health

- As these indicators do not refer to the same dimension of health, they necessarily lead to a different measurement of inequalities of opportunity in health if the association between circumstances and efforts and health does change according to the considered dimension of health

Some socioeconomic groups may have specific risks for functional limitations but not higher risks of chronic diseases

- One can also consider that each indicator is prone to a socioeconomic reporting heterogeneity: differences in reporting according to socioeconomic status may exist at a “given objective health status”
- More generally, those indicators may be affected by various reporting bias

# Bias affecting health measures

- Comprehension of the survey questions
  - Measurement error
- Differences in ability to recall past events
  - Recall bias, even a more important issue in retrospective survey
- Subjective judgments : No reason to expect judgments entirely comparable across respondents (different conceptions of health or expectations)
  - Reporting heterogeneity bias
- Responses not be independent from circumstances or social classes: reporting poorer health when more educated or from a higher social background due to higher health expectations and better access to health care
  - Social reporting heterogeneity bias
- Justify/rationalise a behaviour:
  - Working age man out of work may mention health limitations
    - State dependent bias / Justification bias
- Potential financial incentives to identify oneself in poor health:
  - Early retired who benefit from disability benefit
    - Justification bias



# Measuring health for measuring inequalities health

Very large literature on reporting bias affecting self-assessed health

(e.g. Delpierre et al., 2009, 2012a, 2012b; Elstad, 1996; Etile & Milcent, 2006; Mackenbach et al., 1996; Malmusi et al., 2012; Schneider et al., 2012; Tubeuf & Perronnin, 2008; Van Doorslaer & Gerdtham, 2003; Jurges, 2007; Shmueli, 2002; Shmueli, 2003; Tubeuf, 2009)

Few studies on bias affecting other health indicators

In Jusot et al. (2017):

Among the 3 health indicators of the MEHM and the SF36 mental score, chronic disease reporting suffers from many biases and is particularly under-reported by less educated, low social status and low income.

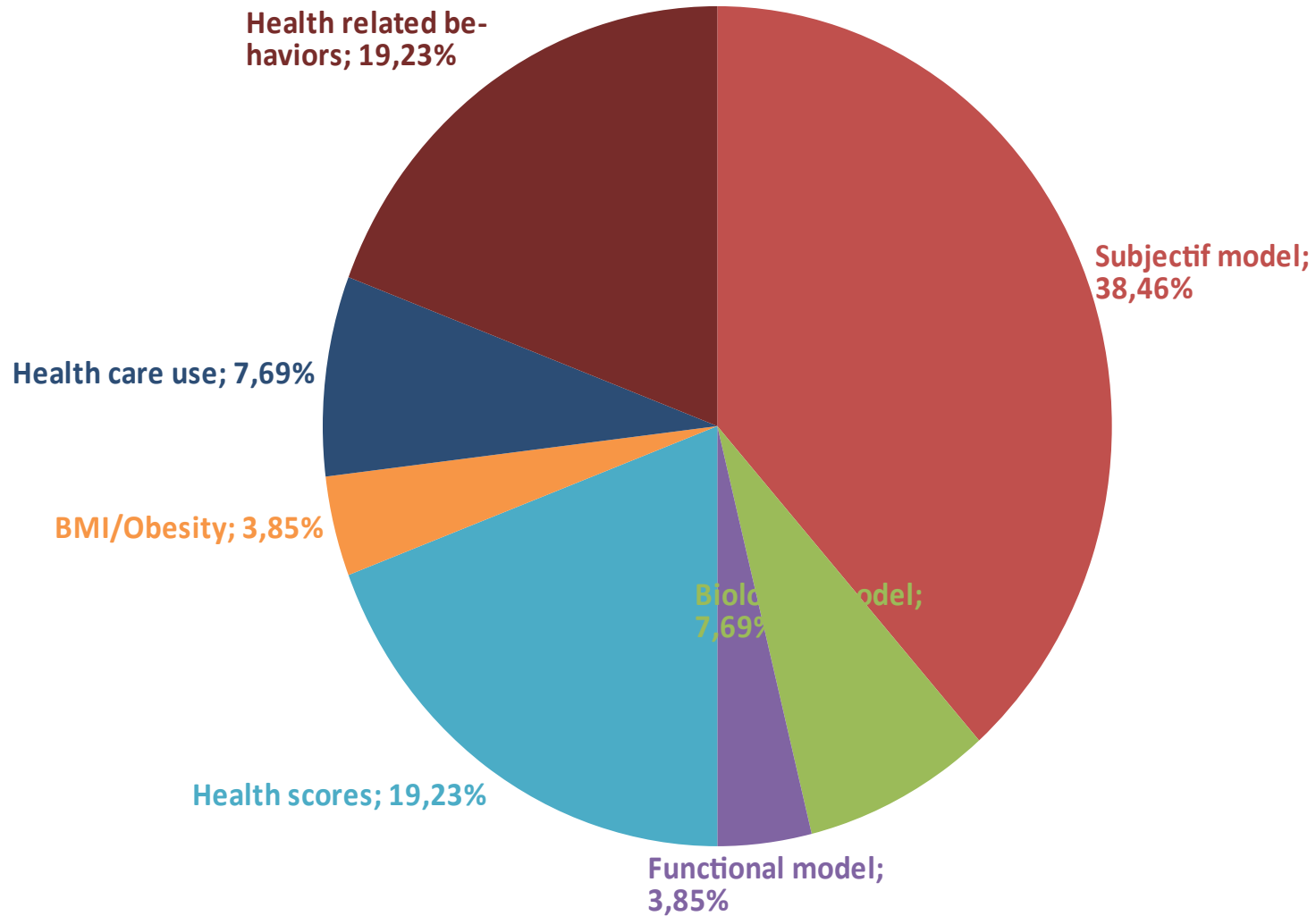
Self-assessed health, activity limitations and mental health seem to be less biased indicators

**How is health measured in IOP analyses?**

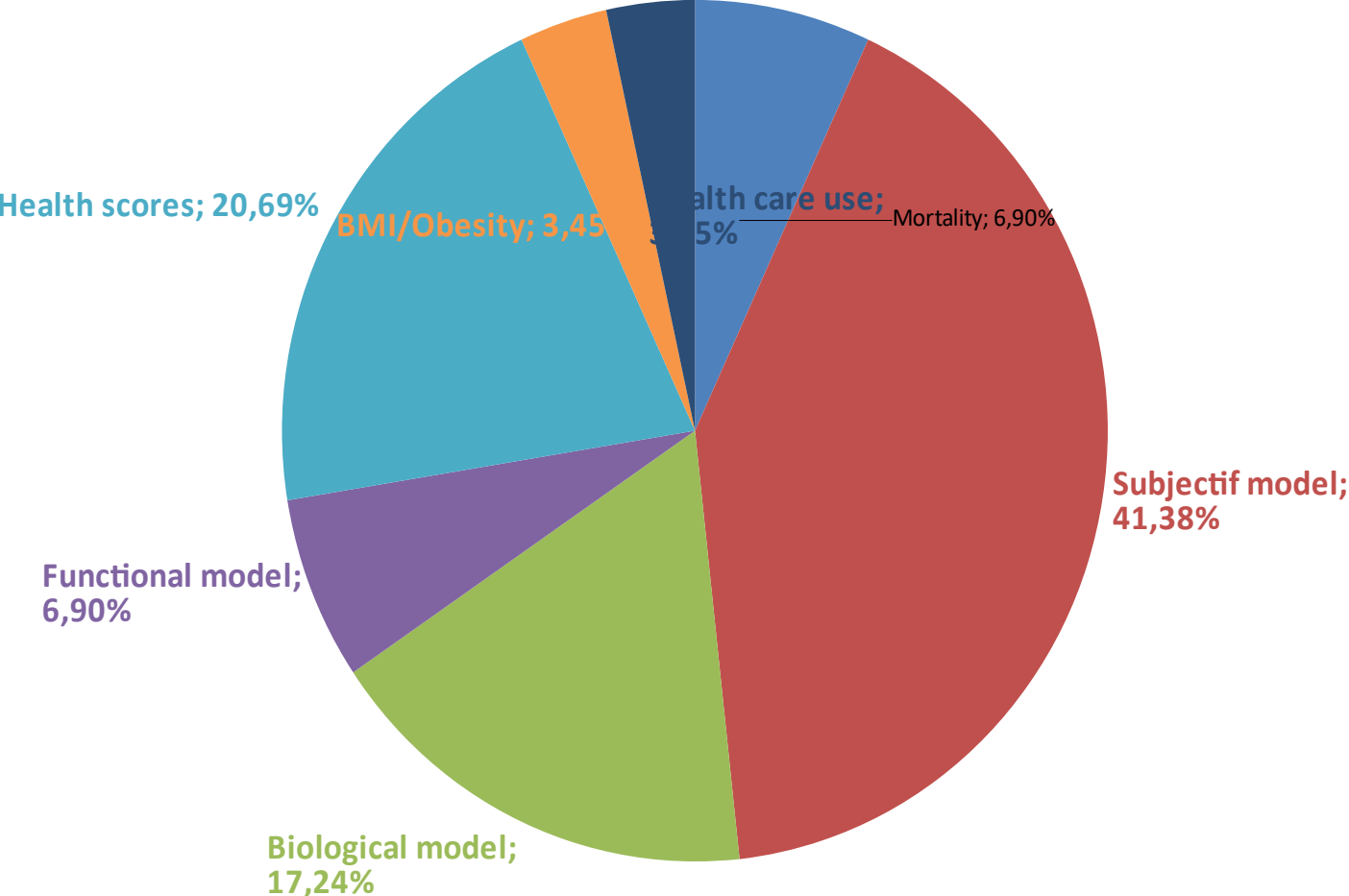
# How is health measured in IOP analyses ?

- If we restrict our analysis to studies conducted among adult population
  - 10 of the 15 publications using the ex-ante perspective provide at least one analysis with SAH
  - 12 of the 18 publications using the ex-post perspective provide at least one analysis with SAH
- But others health indicators are also used, referring to the different models proposed by Blaxter

# Health outcomes in th 26 ex-ante IOP analyses (15 publications)



# Health outcomes in th 29 ex-post IOP analyses (18 publications)



# How is health measured in IOP analyses ?

- Interestingly, some studies refer to health score in order to take into account the multidimensional dimension of health: EQ-5D; HUI; Physical and Mental SF36 scores; score built from a regression of SAH on other available health indicators including biomarkers, chronic diseases, functional limitations
- Surprisingly, some studies analyse healthcare and other health related behaviors as health outcomes and not as potential effort variables

**How to measure circumstances?**

# How to measure circumstances ?

First candidates are characteristics defined before the age of consent (childhood) as they could be considered as strictly exogeneous:

- Sex at birth, year of birth, ethnicity
  - Available in administrative data or easy to collected in retrospective survey (no recall bias) (numerous issues of collection for ethnicity)
  - But in analysis in IOP in health, age and sex are often considered as biological determinants rather than as circumstances that should be compensated
  - In analysis in IOP in health care, age and sex are considered are sources of need of care, and thus as legitimate source of differences in healthcare use (more care for those who need more treatment)
- Place of birth and nationality at birth
  - available in administrative data or easy to collect in retrospective survey
  - Not necessary the most relevant since the past characteristics of the place of birth in terms of socioeconomic level, healthcare supply or other public resources are easy to find



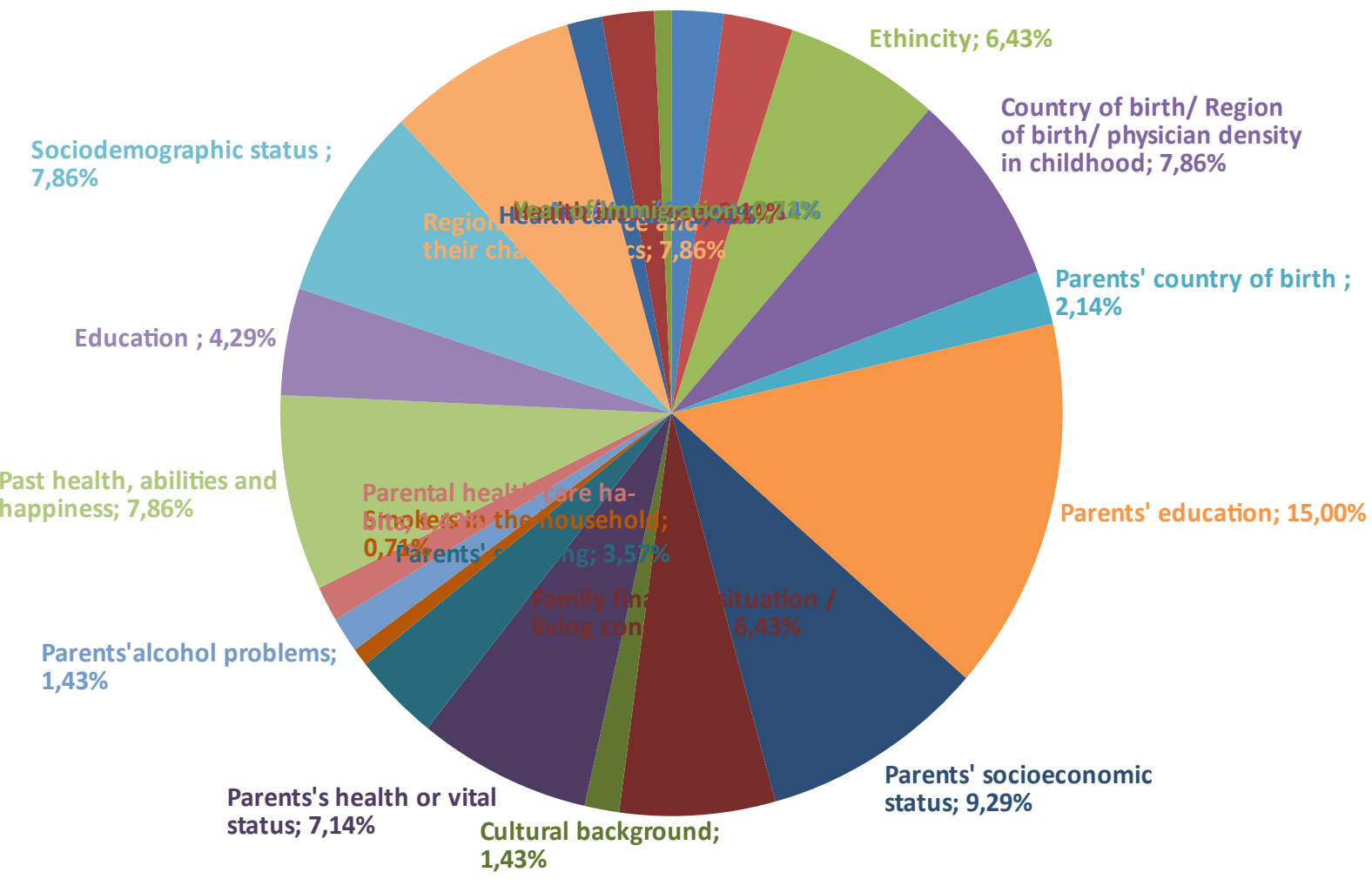
# How to measure circumstances?

- Family background:
  - Biological versus non biological parents/step parent (not easy to collect)
  - Having a “father” and or a “mother” in the household at birth or during childhood
  - Parental education
  - Parental occupation at a certain age (birth/11 years old)
  - Living standard, living conditions during childhood, hardship
  - Parental health:
    - Survival status, age at death and causes of death
    - Diseases and general health status reported by the descendent
  - Religion in the family
  - Language spoken at home

# How to measure circumstances?

- Current characteristics: more debatable as they are partly under control
  - Education
  - Occupation
  - Income, living standard or living conditions
  - Wealth
  - Household composition, marital status

**How are circumstances measured  
in IOP analyses (among adults) ?**



# How are circumstances measured in IOP analyses (among adults) ?

- Most of studies used place of birth and parental socioeconomic status:
  - Parental education is the most used, event if it is not the most easy to collect, proxy such as the number of books at home, should be more relevant
  - Parental occupation is also subjected to measurement error (when occupation is collected at death and reported by survivors, it is always higher than the occupation reported by ego during his life)
  - Economic hardships and perceived financial situation seem to be easy to collect and relevant for explaining health and lifestyles
- Others circumstances are used and parental SES only represent 30% of circumstances used
  - Parental health, often measured by vital status since perceived health status of the parents by the respondent is very subjective and subject of bias
  - Parents health behaviors
  - Numerous study use current socioeconomic status as well

**How to measure efforts?**

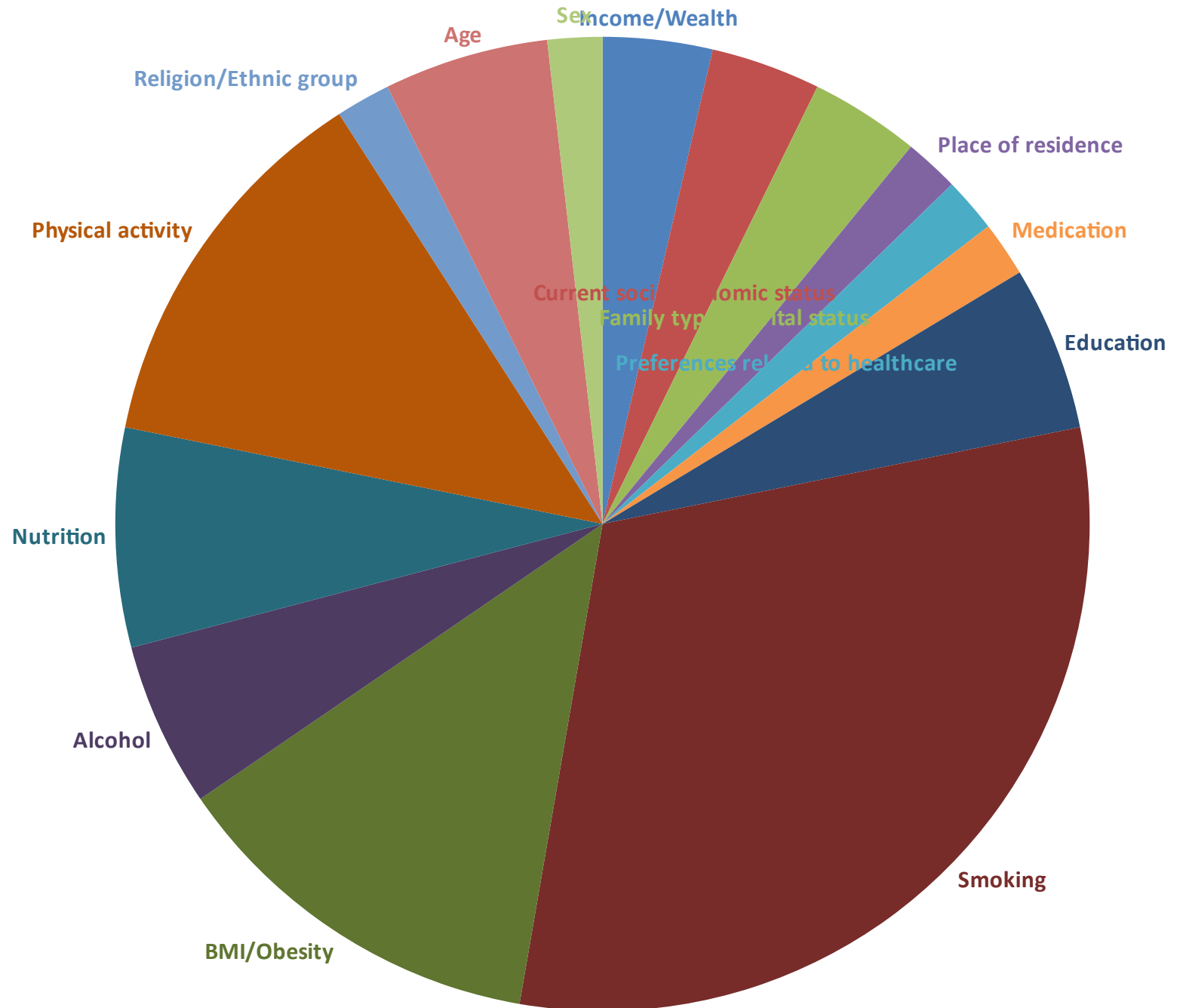
# How to measure efforts ?

- First candidates are behaviors that could be at least partly freely chosen by individuals and that may affect health status:
  - Smoking: Current, past, age at initiation, number of year, quantity....
  - Diet: vegetable, fried food meat,....
  - Sugar
  - Obesity (viewed as an indicator of unbalanced diet)
  - Exercice, physical activity
  - Risky sexual behaviors and other risky behaviors
- Education, occupation, income, marital status
- Healthcare utilization
  - Non use / frequency of visits / expenses
  - Forgone care
  - Preferences for treatment

# How are efforts measured in IOP analyses ?

- If we restrict our analysis to ex-post studies, 17 of the 18 publications use smoking as effort
- Others variables are also used:





# How are efforts measured in IOP analyses ?

- 17 of the 18 ex-post publications use smoking as effort
- Others variables most often used are:
  - Diet and obesity (even if it is an outcome and not only a behavior)
  - Physical activity
  - Socioeconomic status
- Very few studies use healthcare as effort variables
  - Healthcare use is mainly explained by need of care
  - But it reveals preferences as well
  - But it is not so clear is the principal of reward has to apply

# Opinions about responsibility-sensitive health care financing

Conditions	Asthma	Asthma	Anemia
Circumstance	Severity of asthma	Expose at work	Severity of anemia
Effort	Treatment observance	Smoking	Diet
Equal public contribution	20%	17%	18%
Equal out-of pocket	17%	10%	32%
Equal contribution for equal circumstances	31%	31%	22%
Equal contribution for equal effort	17%	32%	11%
Mix financing	13%	7%	13%
Mix financing	2%	2%	5%

Le Clainche C., Wittwer J. (2015), « Responsibility-sensitive fairness in health financing: Judgments in four European countries », Health economics, 24:4.

# Opinions about responsibility-sensitive health care delivery

« People should have access to publicly funded healthcare even if they behave in ways that damage their health »

Strongly agree  
/Agree

26%

Disagree/  
Strongly  
disagree

47%

Without  
opinion

23%

Can't choose

4%

# Opinions about fairness in healthcare financing

How willing would you be to pay higher taxes to improve the level of healthcare for all people in your country?

Very  
willing/willing

20,5%

Fairly  
unwilling/  
Very unwilling

55,5%

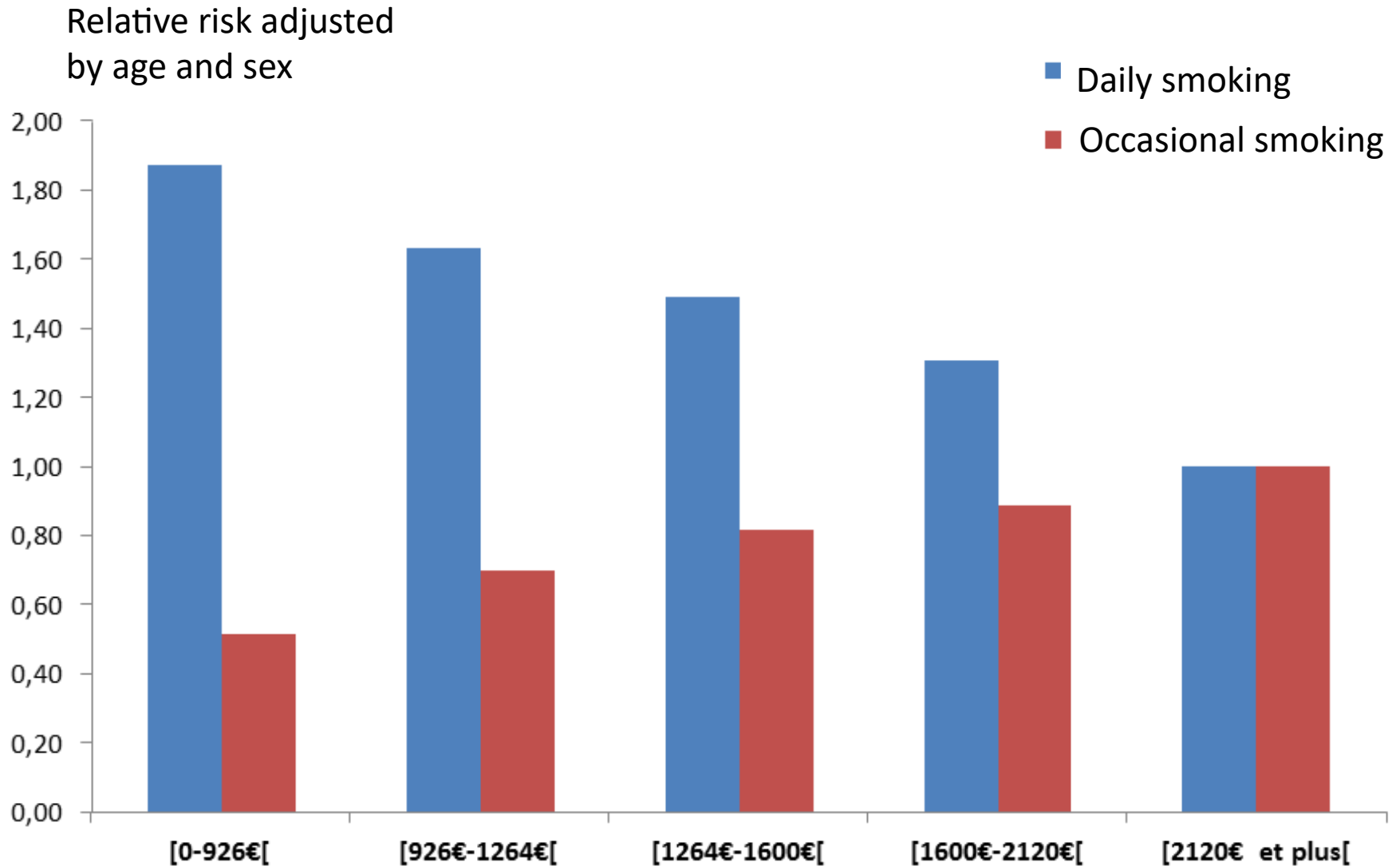
Neither willing  
nor unwilling

20%

Can't  
choose

4%

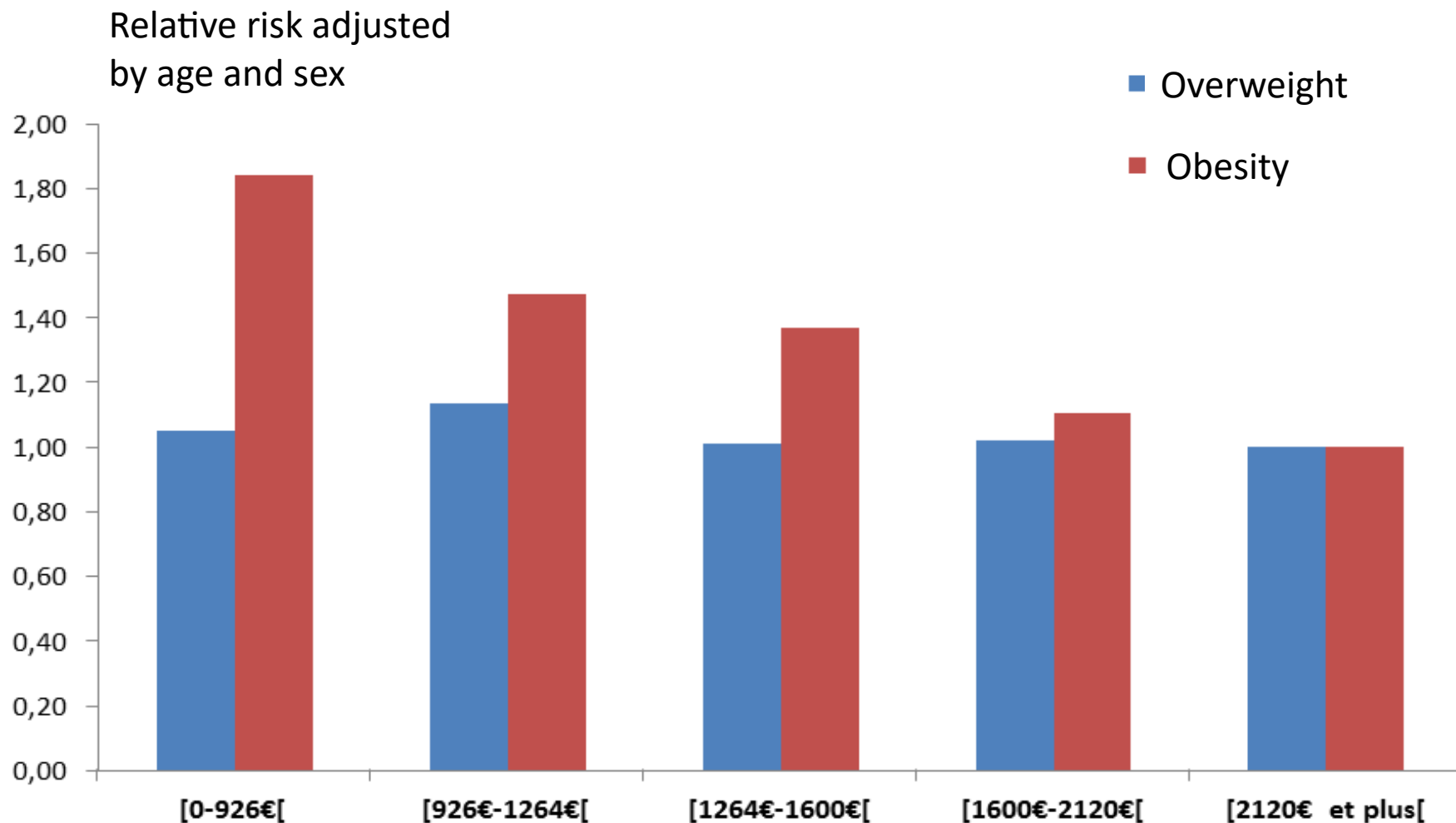
# Relative risk of smoking by income in 2012 in France



Source : Calculations based on Célant N., Guillaume S., Rochereau T. (2014), «Enquête sur la santé et la protection sociale 2012 », Les rapports de l'Irdes,, n°556.

CU income Quintile

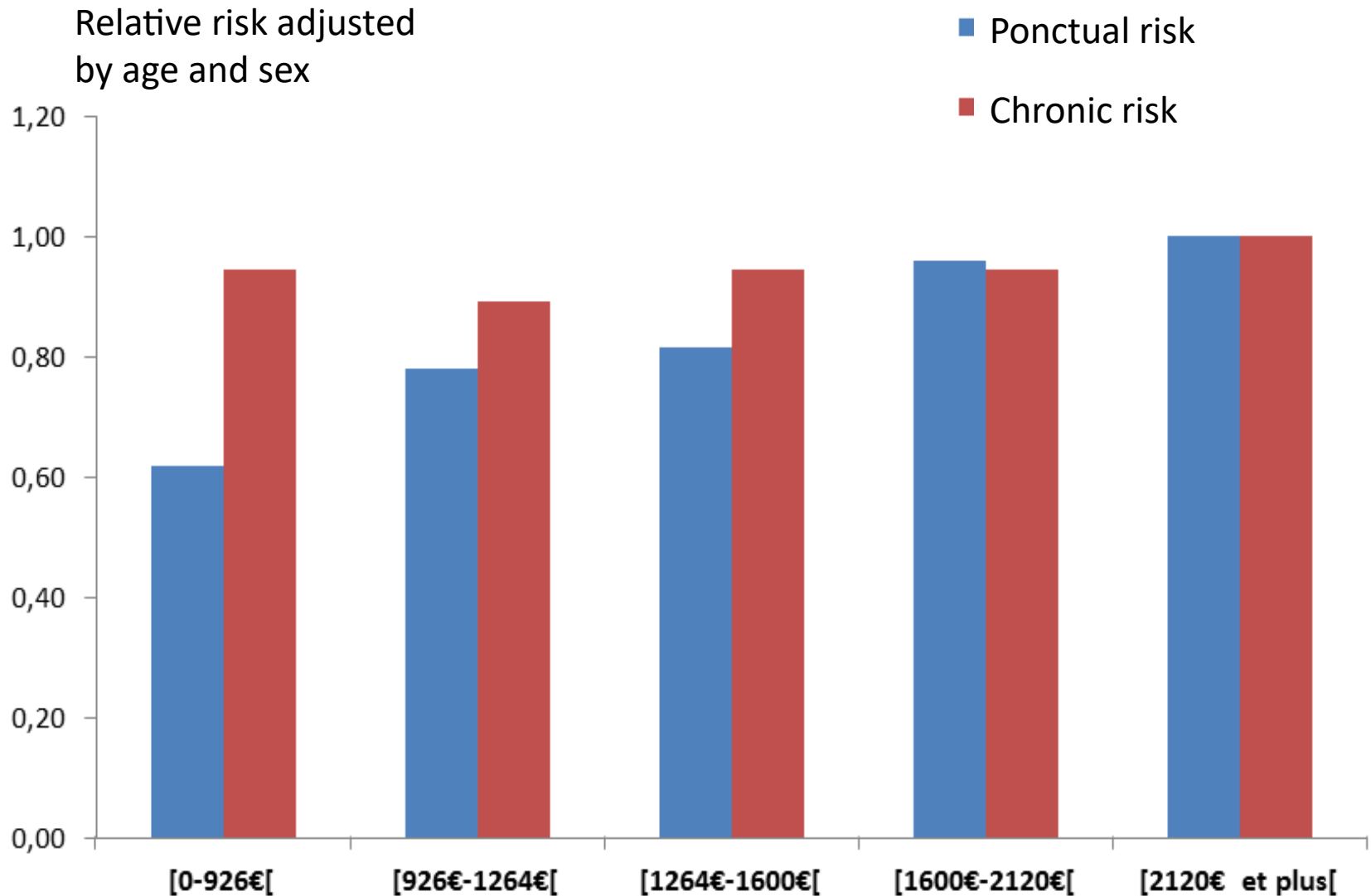
# Relative risk of overweight by income in 2012 in France



Source : Calculations based on Célant N., Guillaume S., Rochereau T. (2014), «Enquête sur la santé et la protection sociale 2012 », Les rapports de l'Irdes,, n°556.

CU income Quintile

# Relative risk of problematic alcohol drinking by income



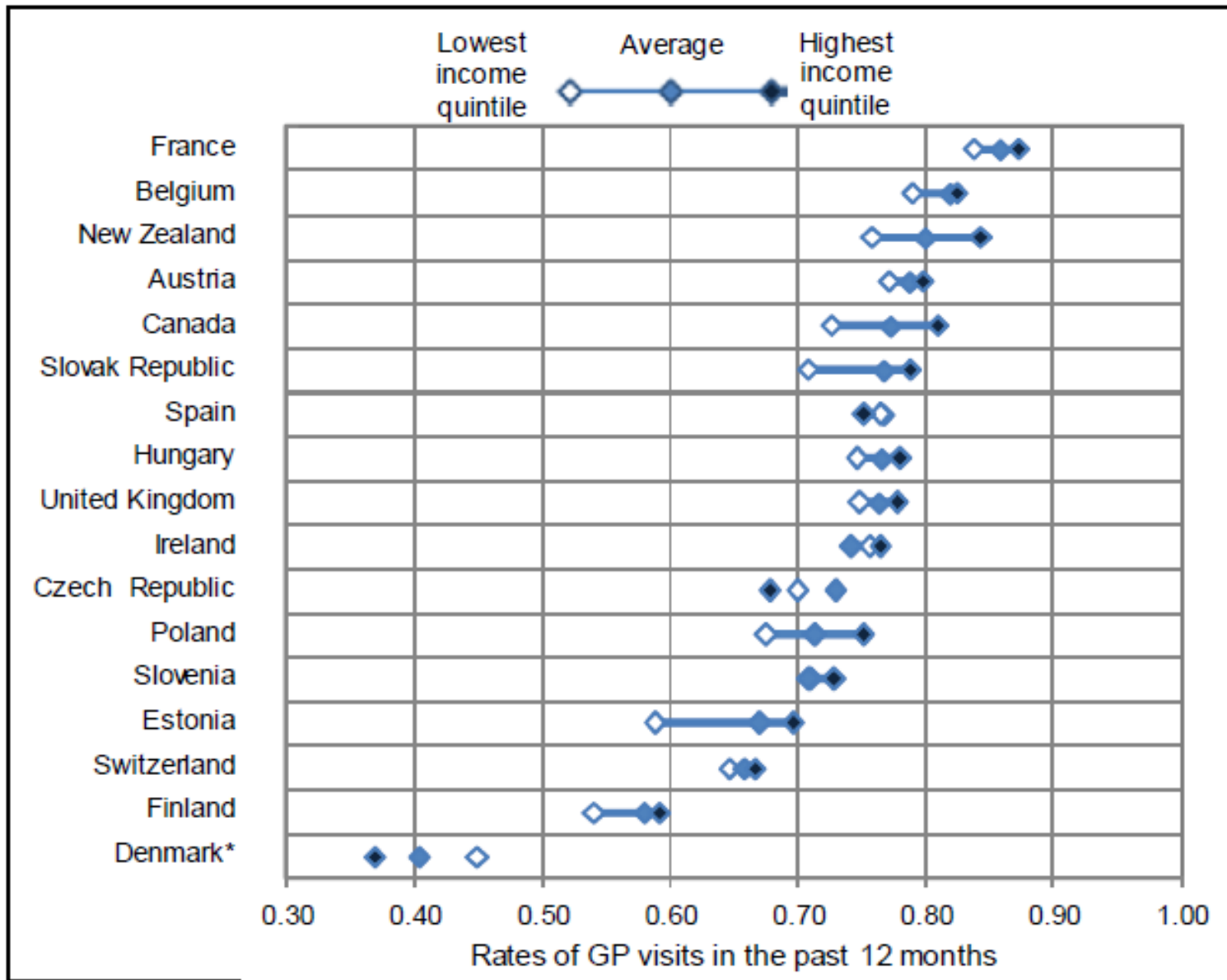
Source : Calculations based on Célant N., Guillaume S., Rochereau T. (2014), «Enquête sur la santé et la protection sociale 2012 », Les rapports de l'Irdes,, n°556.

CU income Quintile



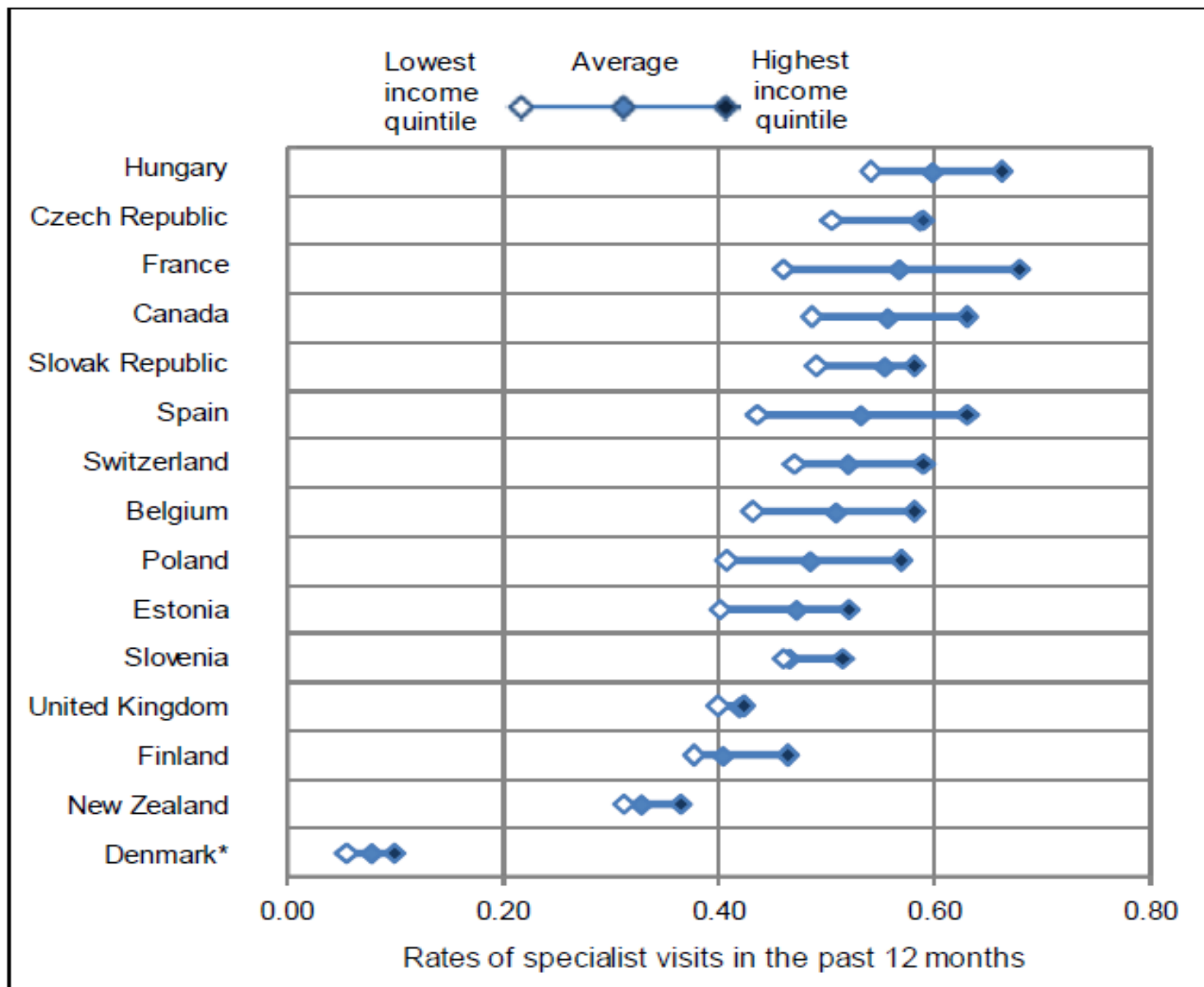
# How to measure healthcare?

- Use of GP care during the last 12 months (0/1)
- Number of visits to general practitioners during the last 12 months
- Use of specialist care during the last 12 months (0/1)
- Number of visits to specialists during the last 12 months
- Hospitalization during the last 12 months, sometimes with a distinction between planned and in emergency
- Self-reported use of health services (basic health care, nutrition, immunisation, mammography)
- Forgone care: very subjective but good measure of unmet needs (dissatisfaction with regards to the health system). As assessed by the respondent, this measure is adjusted by his preference for health



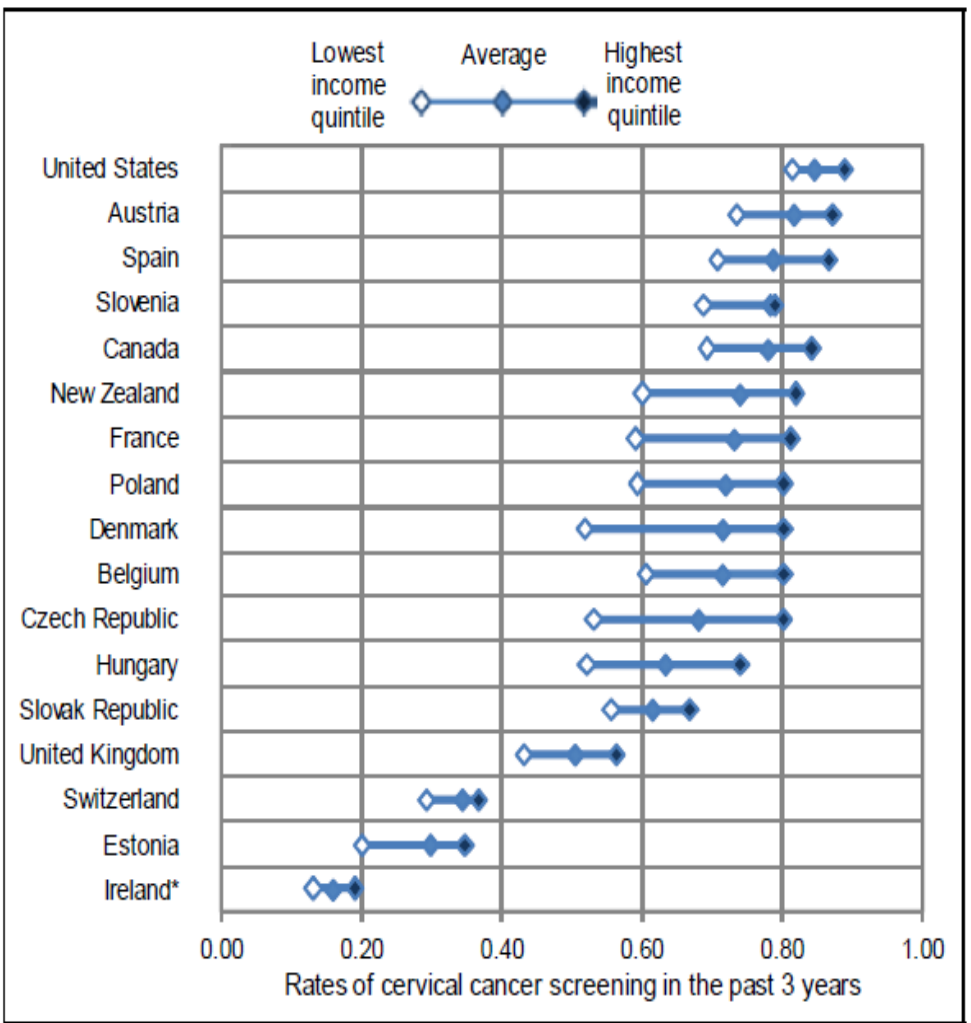
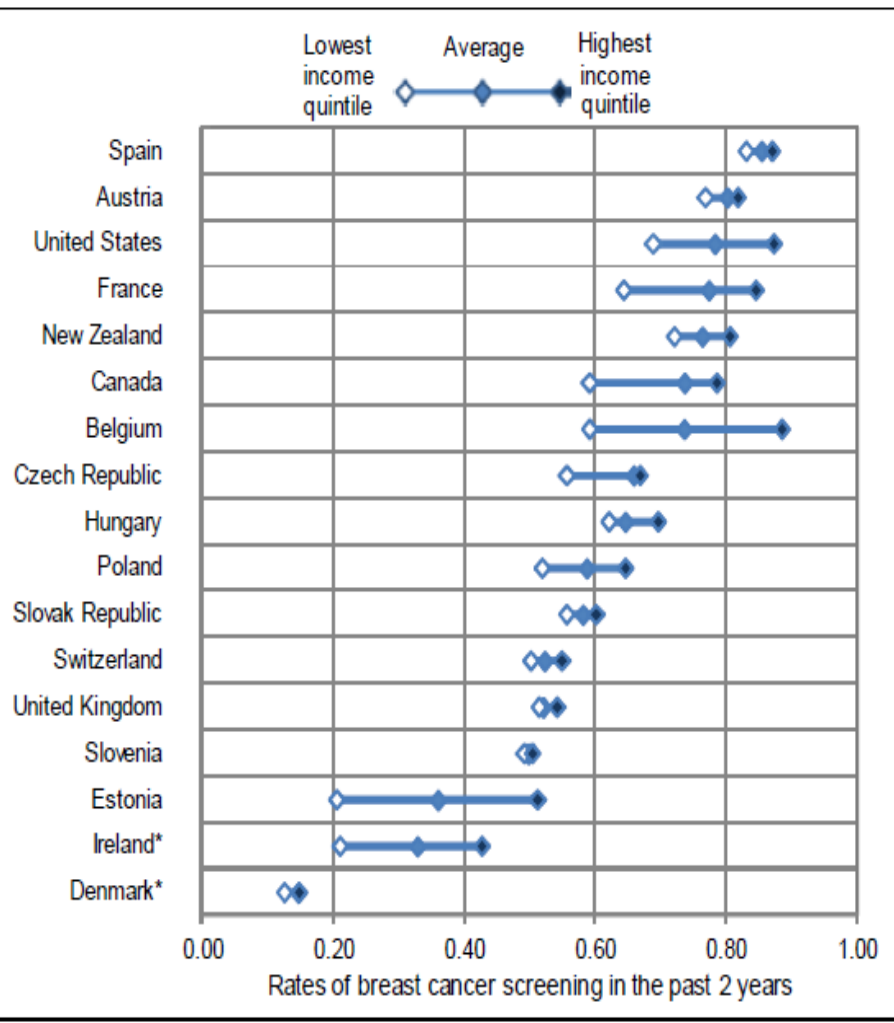
Results after adjustment for age, sex, and health status

Devaux M. (2013), "Income-related inequalities and inequities in health care services utilisation in 18 selected OECD countries", European Journal of Health Economics, DOI 10.1007/s10198-013-0546-4.



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**Which data for studying  
IOP in health ?**

# Which data for studying IOP in health ?


- Prospective data
  - administrative data
  - birth cohort (NCDS for example)
- Retrospective survey
  - currently validated health indicators
  - recall bias
- Good health measures, and repeated in order to take into account state dependence
- Circumstances: parents' education and occupation but not only.... financial situation, parents health and health related behaviors
- Efforts: smoking but not only.....exercise, diet, preferences towards health and health care

# Why not using the Survey on Health Aging and Retirement in Europe?



- **International**
  - Data about individuals aged 50 and over
  - 79 500 interviews realised in 27 countries in wave 7 (25 EU countries + Suisse + Israël) (3500 interviews per countries)
  - Sister surveys : HRS (USA); ELSA (England); CHARLS (China); JSTAR (Japan) ;KloSA (Corea); ELSI (Brazil); LASI (India)
- **Longitudinal**
  - Panel (every 2 years)
  - Retrospective questionnaire on life history in wave 3 (SHARE LIFE) and 7 (SHARE LIFE +)
- **Accessible: Wave 7 accessible in Spring 2019**
  - [Information: info@share-project.org](mailto:info@share-project.org)
  - [Data access: www.share-project.org/data-access](http://www.share-project.org/data-access)

**Table 2: Health indicators available from Europe-wide surveys**

	Health indicator	ECHP	EU-SILC	SHARE	
	Most subjective	Self-assessed health (very good,...very bad)	X	X	X
	Chronic illness/condition	X	X	X	
	Limited activities	X	X	X	
	Symptoms			X	
	Depression scale			X	
	Activities of Daily Living			X	
	Diagnosed conditions			X	
	Body Mass Index (reported)	X <sup>a</sup>		X	
	Physical measurements (grip strength, walking speed)			X	
	Most objective	Mortality	X		X

Note: a 1998–2001 only and not for France, Germany, Luxembourg, The Netherlands and the UK.

Owen O’Donnell (2009), Measuring health inequalities in Europe - Methodological issues in the analysis of survey data *Eurohealth Vol 15 No 3*



# Why not using the Survey on Health Aging and Retirement in Europe?

- **Additional health outcomes**
  - Tests cognitive limitations
  - Blood analysis in wave 6
  - Dental health
- **Efforts and healthcare**
  - Health-related behaviors
  - Health care use; unmet needs
  - Long term care
- **Circumstances**
  - Country of birth and nationality
  - Parents' SES and health, childhood conditions
- **Current socioeconomic status**
  - Income; Education; Occupation
  - Wealth
  - Social participation, social network



**Thanks**

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