Surveillance of inequalities
Inequalities in surveillance

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Italian CCM

BRFS, Roma

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Inequalities in surveillance

A challenge for BRFS

Coverage?

Only social?

Inequalities in surveillance

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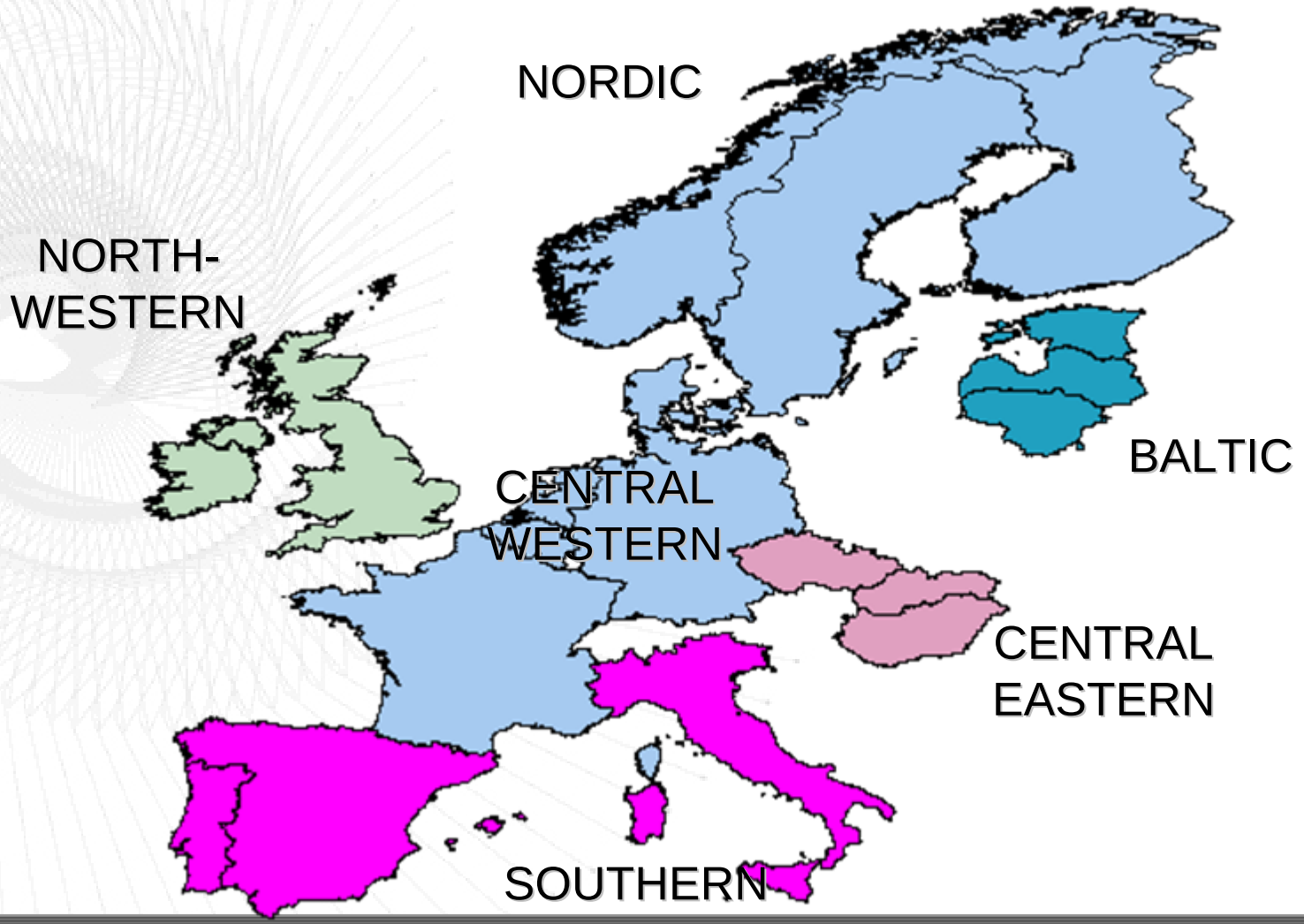
Coverage?

- ***Gaps in data collection***
- ***Larger social inequalities in Eastern Europe***

Only social?

Countries included in the new European comparative studies (Eurothine) coordinated by Erasmus Un., Rotterdam



Mackenbach et al, 2007

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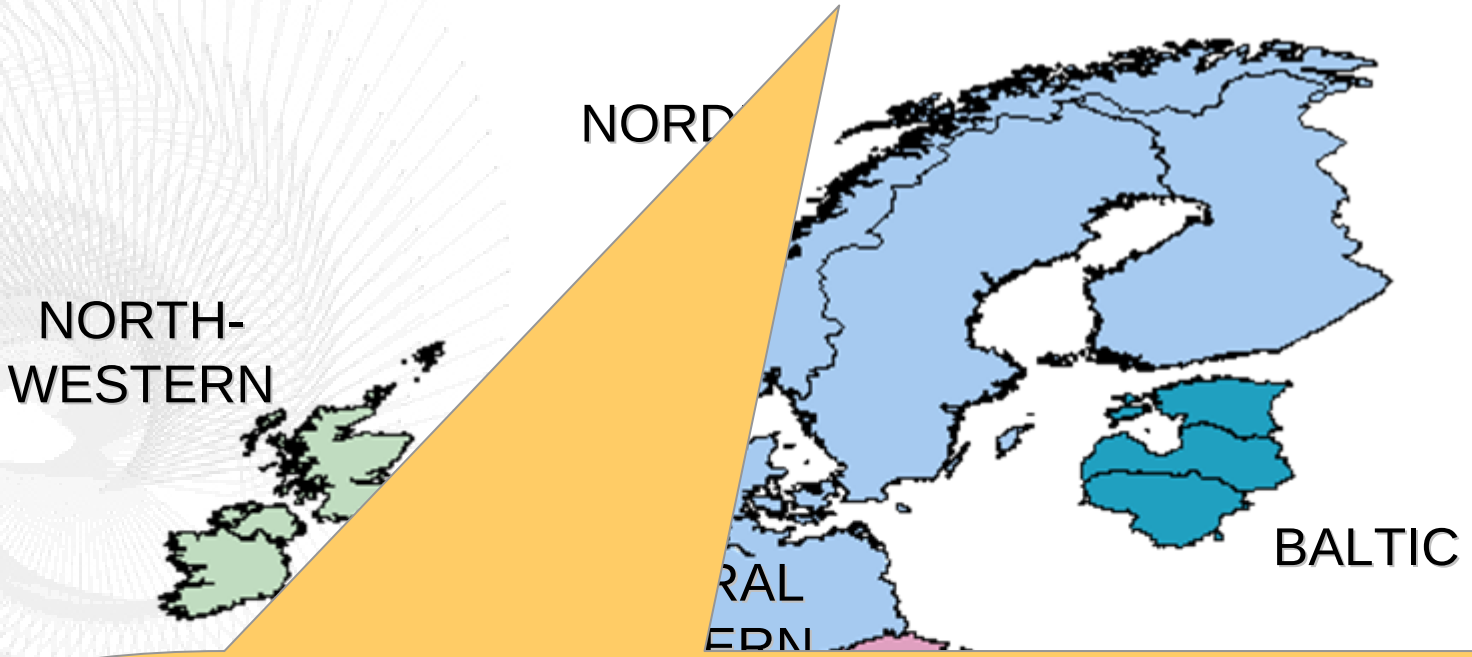


Main gaps in data collection:

Lack of basic description data on mortality/SAH in some

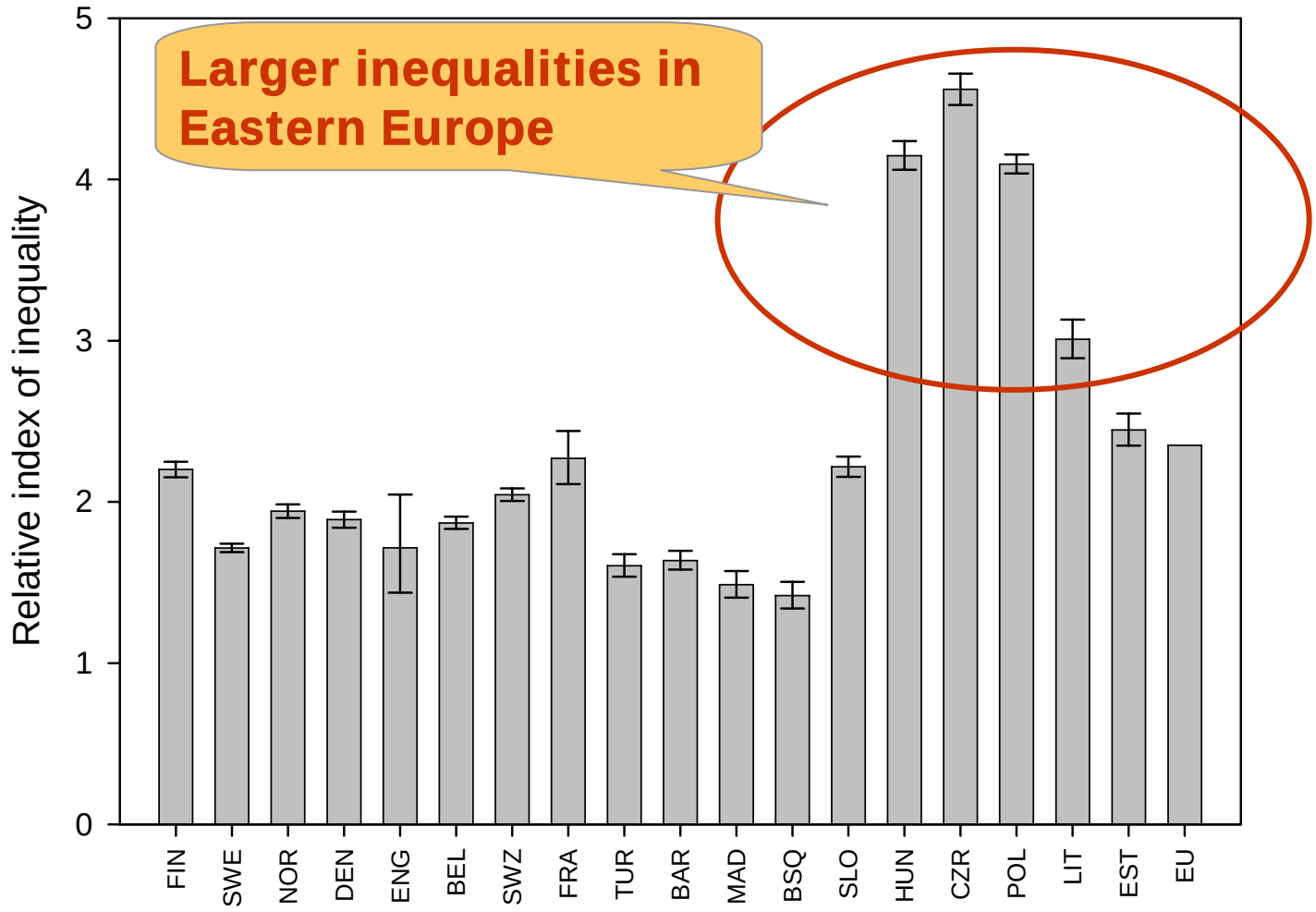
Severe deficiencies (sample size, frequency of collection…)

Lack of data on other health outcomes (cancer, injures…)

Lack of data on determinants

Comparability far from optimal

Relative inequalities in total mortality by level of education among men in 18 populations



Mackenbach et al, 2007

Inequalities in surveillance

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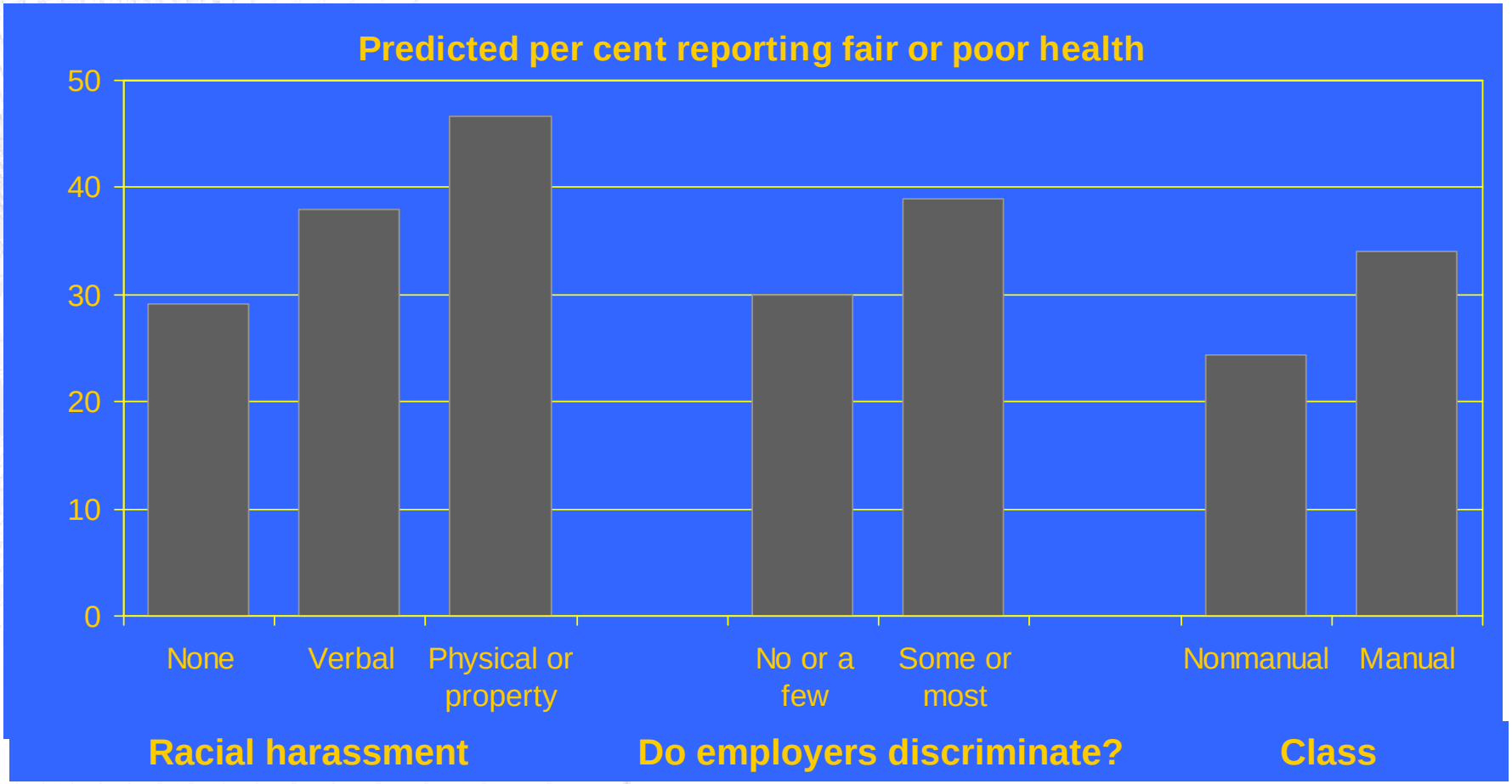
Coverage?

- *Gaps in data collection*
- *Larger social inequalities in Eastern Europe*

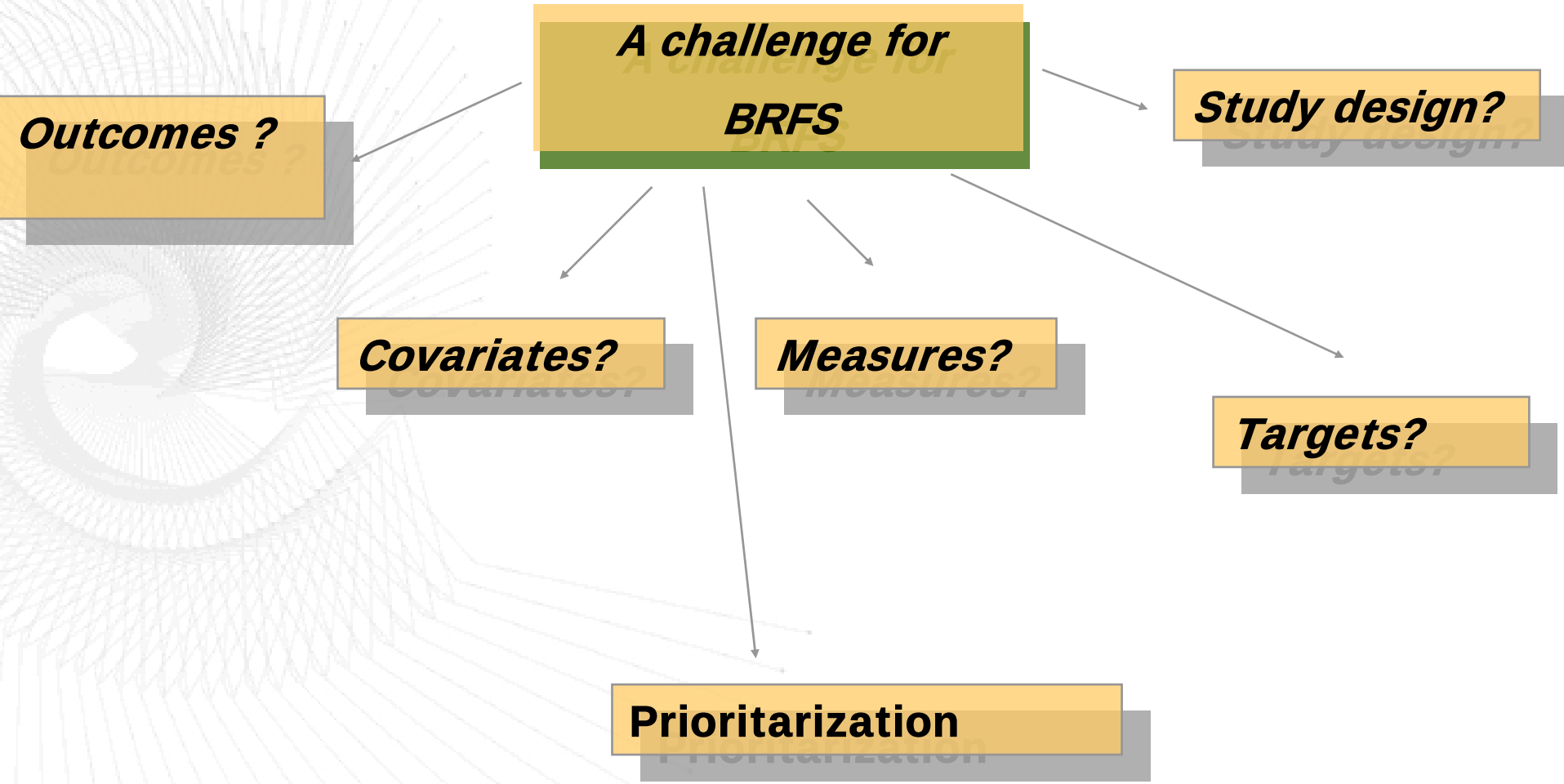
Only social?

- *missing ethnic minorities*



(Karlsen and Nazroo 2002)

Surveillance of inequalities



Surveillance of inequalities

A challenge for BRFS

Outcomes

Health (functioning)?

Determinants:

- Proximal?

- Distal ?

Covariates?

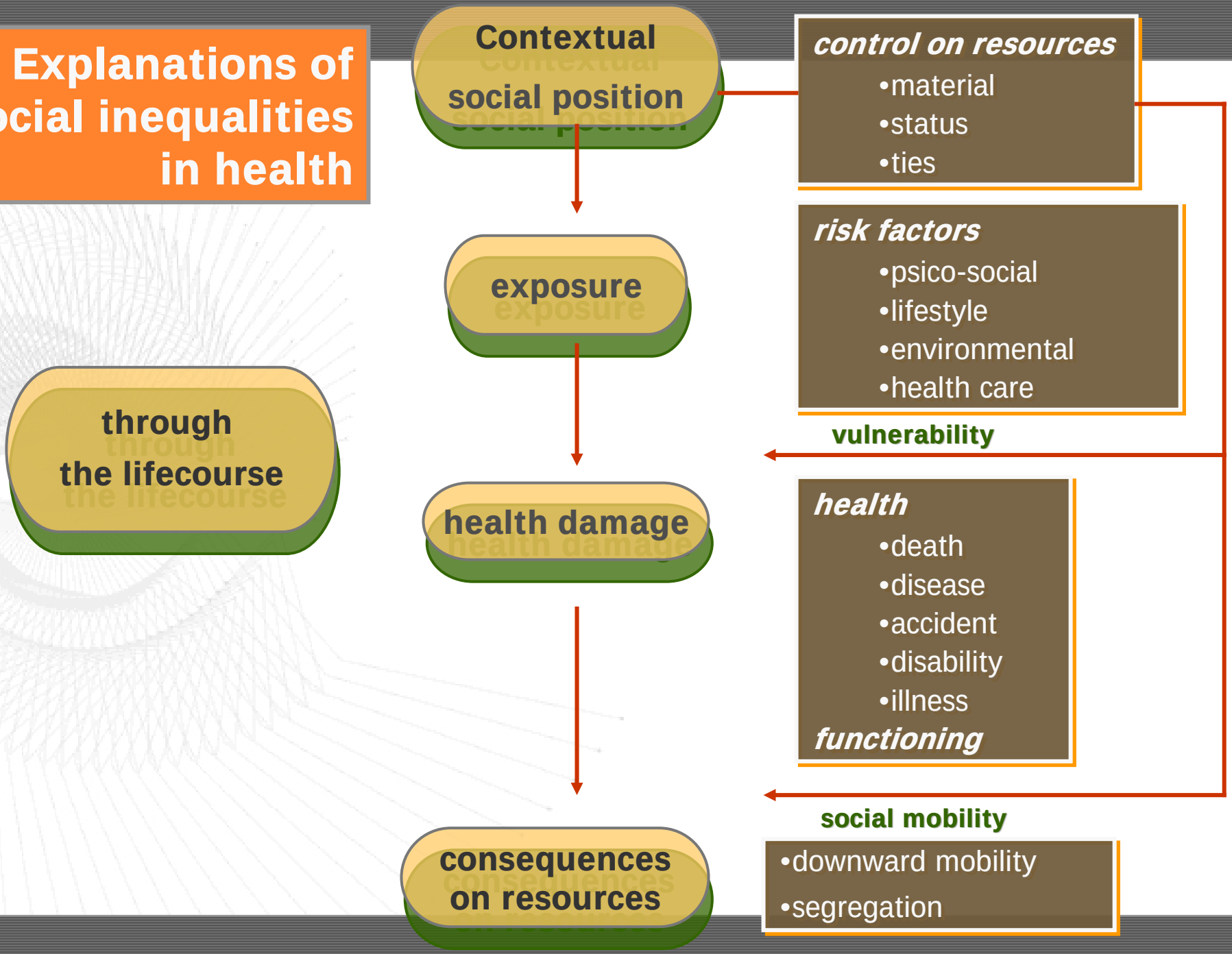
Measures?

Study design?

Targets?

Prioritarization

Explanations of social inequalities in health



Surveillance of inequalities

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Health (functioning)?

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Covariates

Changing predictive value with age, gender, outcome…

Record linkage

Study design?

Measures?

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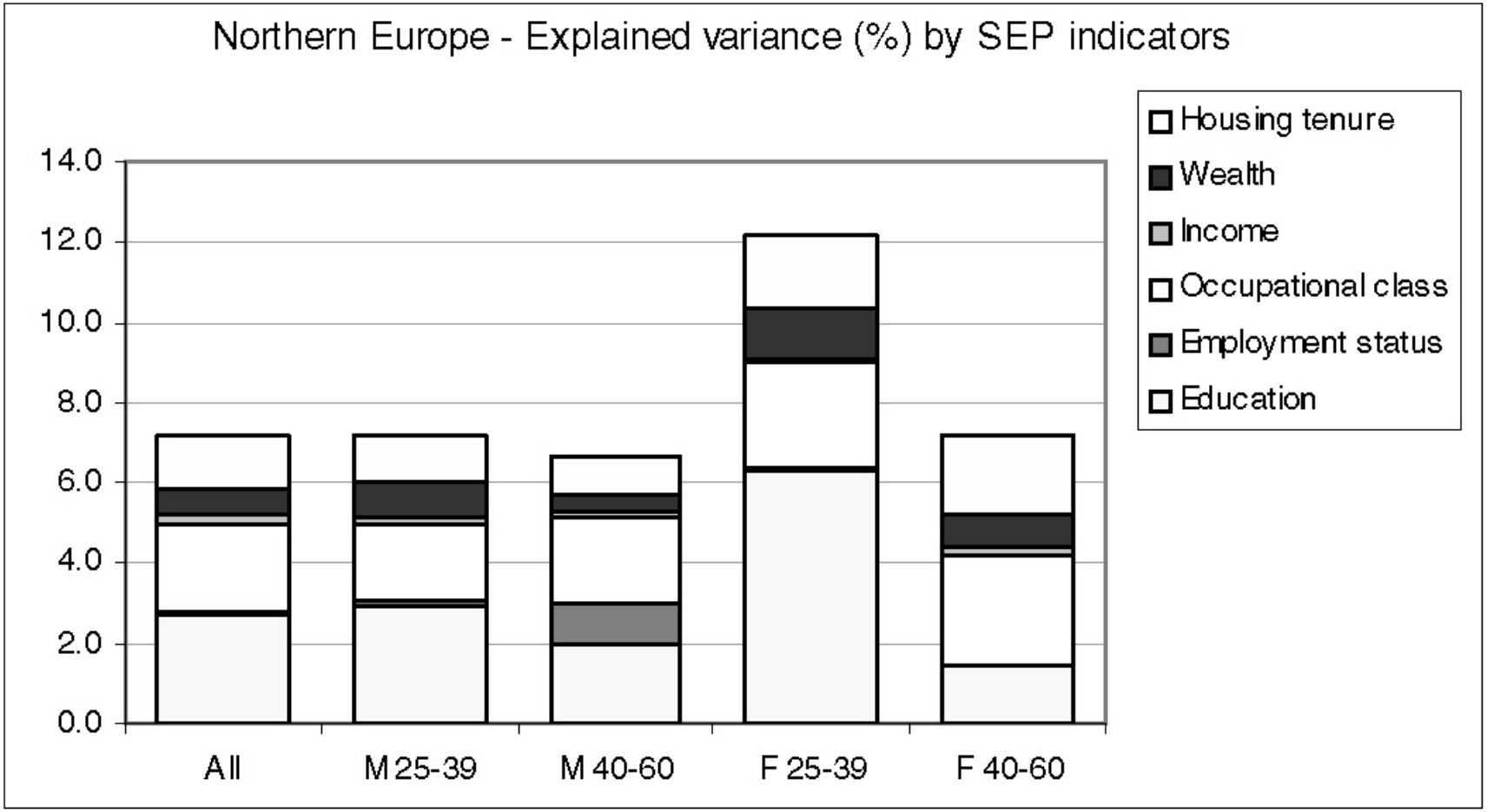
Prioritarization?

Figure 1a. Explained variance in smoking by different SEP indicators – Northern Europe



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Record linkage

Measures of inequalities

- *Relative?Absolute?*
- *Reference category?*
- *Background rate?…*

Study design?

Targets?

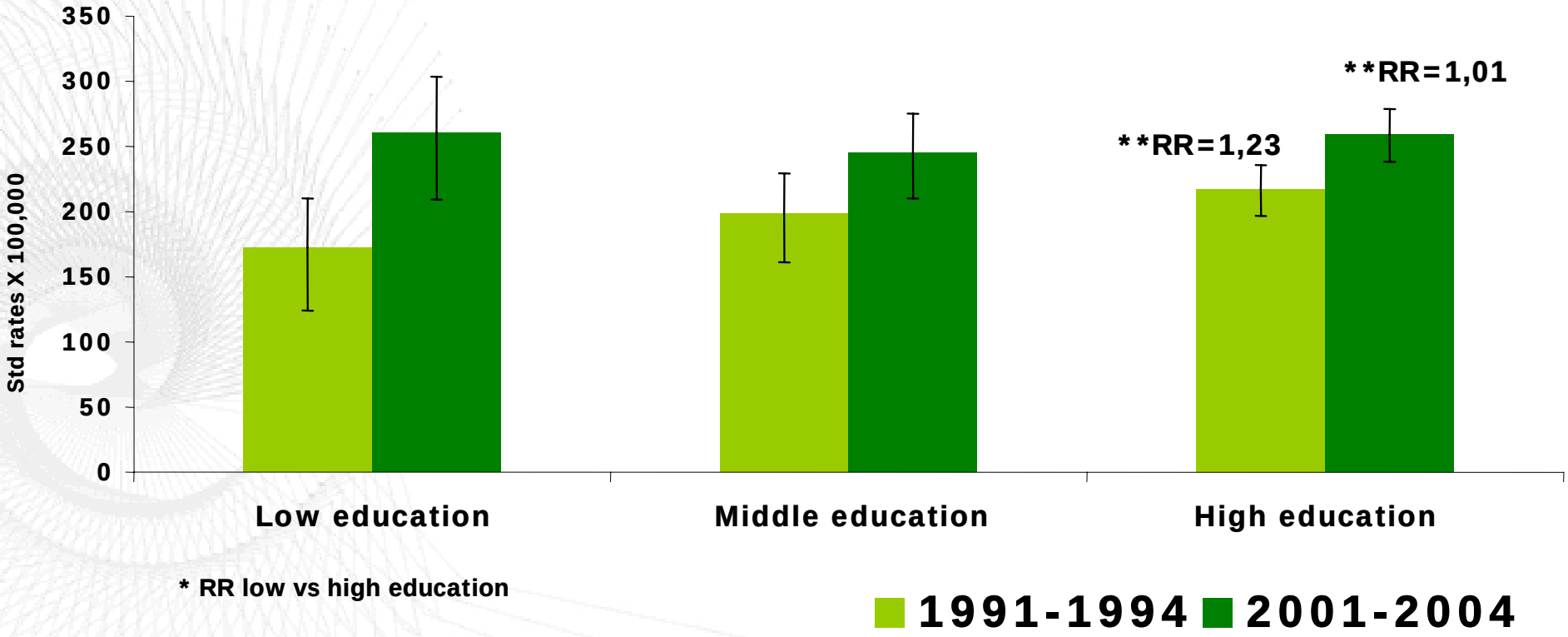
Prioritarization

% of Italian 50-69 asymptomatic women having had mammography in their life

	mammography		
	women 50-69 yrs		
	1999-2000	2004-2005	% of increase
education			
upper secondary and tertiary	70,0	79,3	13,3
lower secondary	66,7	73,6	10,3
primary	51,8	65,5	26,4
Italia	**58,1**	**71,0**	**22,2**

Istat, 2006

Respiratory mortality among 65+ females in Turin



* RR low vs high education

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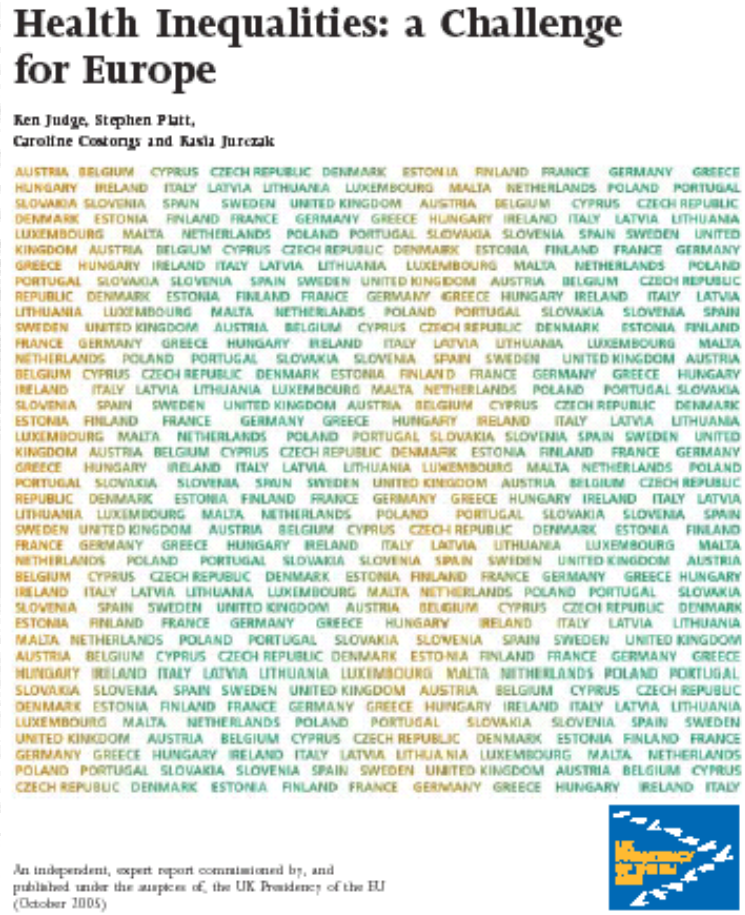
Prioritarization

Study design?

Targets?

- *reducing the gap*
- *improving the worst*
- *softening the gradient*



"**A number of countries** – including the Netherlands, Sweden and the UK – have made strenuous efforts to use the **existing evidence base** to guide their attempts to reduce health inequalities. This is far from straightforward because the research evidence is not conclusive and much has to be inferred.

…

Many EU countries seek to **improve the health of the most** socio-economically **disadvantaged** groups in society, most commonly through a social inclusion focus. Others are attempting to **narrow the health gap between the most and least** socio-economically advantaged.

…

However, no EU member state has yet made a concerted effort to implement the most radical approach to health inequalities, namely a **reduction in the health gradient,** whereby health is related to the position of social groups (and individuals within these groups) at every level within society."

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Prioritarization

Study design?

More than one design for different objectives?

See Sweeden

Targets?

- *reducing the gap*
- *improving the worst*
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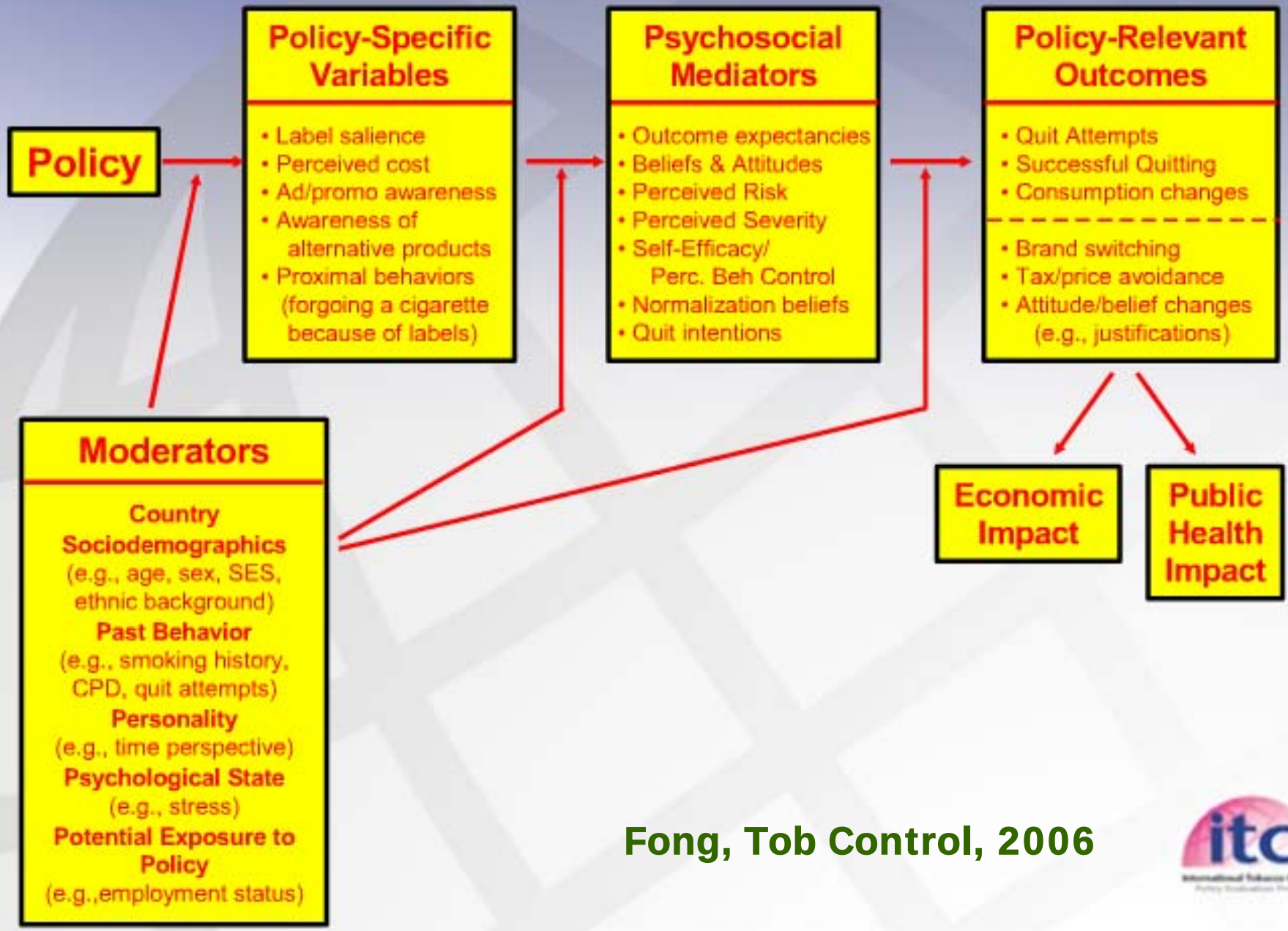
Italy vs. Scotland (UK) Evaluation

Strategy for smoking Bans

ITALY (10/01/2005)	SCOTLAND (26/03/2006)
yes, unpublished	**Evaluation Plan** (Haw, J Public Health, 2006)
NO	**Before & After Cross-sectional surveys on SHS exp in children** (Akhtar, BMJ 2007;)
NO	**Before & After Cross-sectional surveys on SHS exp in adults** (Haw, BMJ, 2007)
IMA hospital admissions Piedmont (Barone-Adesi, Eur Heart J 2006)	**IMA Hospital Admissions** (Proceedings Edinburgh Conference, September 10-11, 2007)

ITALY (10/01/2005)	SCOTLAND (26/03/2006)
PM2.5 & nicotine SHS markers in hospitality industry	**PM2.5 SHS markers in hospitality & Change in respiratory health of bar workers**
NO (Gorini, JOEM, 2005, Edinburgh Conf & Basel Conf 2007 Tominz, Epidemiol Prev, 2006; Ruprecht, Epidemiol Prev, 2006, Gasparrini, Epidemiol Prev 2006; Valente, Tob Control, 2007)	(Menzies, JAMA, 2006, Semple, Tob Control, 2007, Semple, Ann Occup Hyg, 2007)
Qualitative Bar Study (Proceedings Rome Conference, 31 may 2005)	**Qualitatite Bar Study** (Hilton, BMC Public Health, 2007)
NO	**Qualitative Community Study** (Proceedings Edinburgh Conference, September 10-11, 2007)
NO	**Qualitative Home Exp Study** (Phillips, BMJ, 2007)
NO	**ITC Project: comparison Scotland England** (Proceedings Edinburgh Conference, September 10-11, 2007)

Conceptual Model of the ITC Project



Fong, Tob Control, 2006

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- Background rate?…

Study design?

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Targets?

- reducing the gap

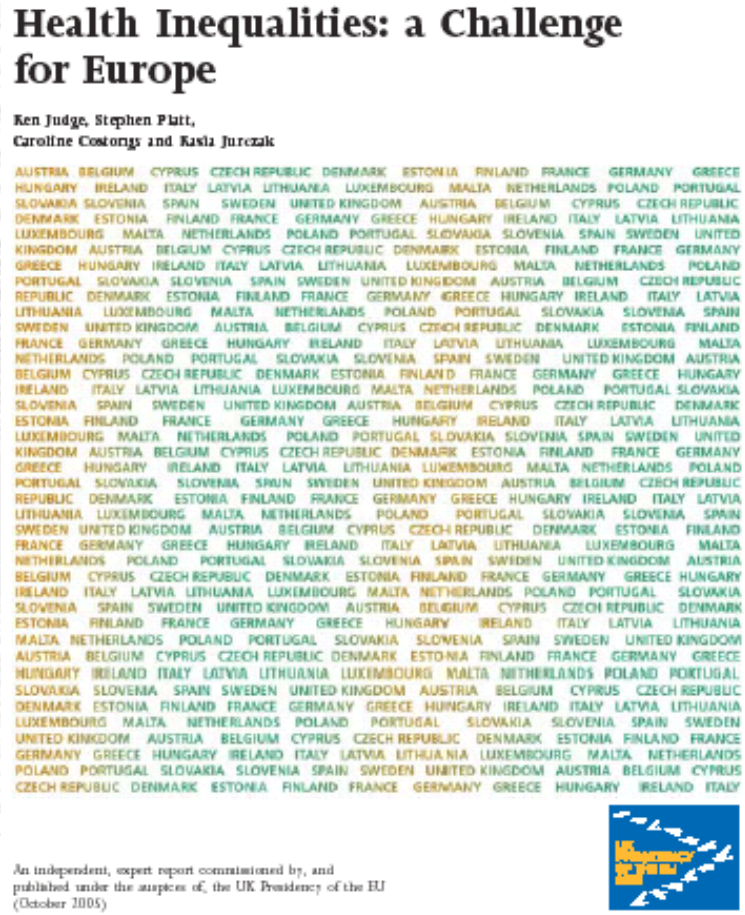
- improving the worst

- softening the gradient

Prioritarization?

- size of inequalities as a measure of amenability to intervention

Challenges



Limited evidence of effectiveness

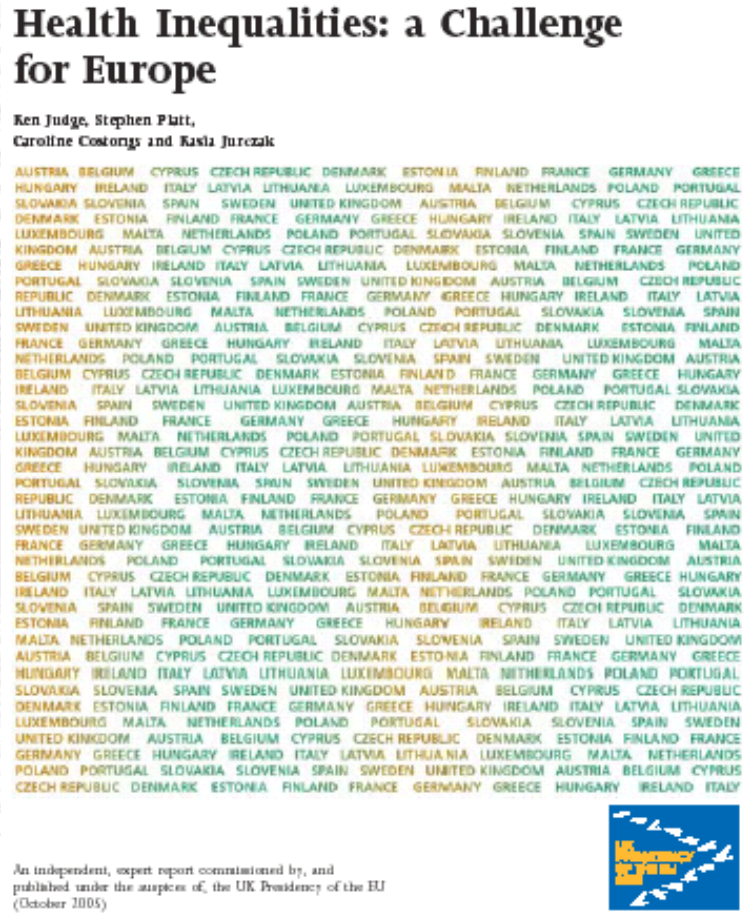
- take advantage of natural experiments

- comparative analysis

- monitoring

Equity health impact assessment of policies

Challenges



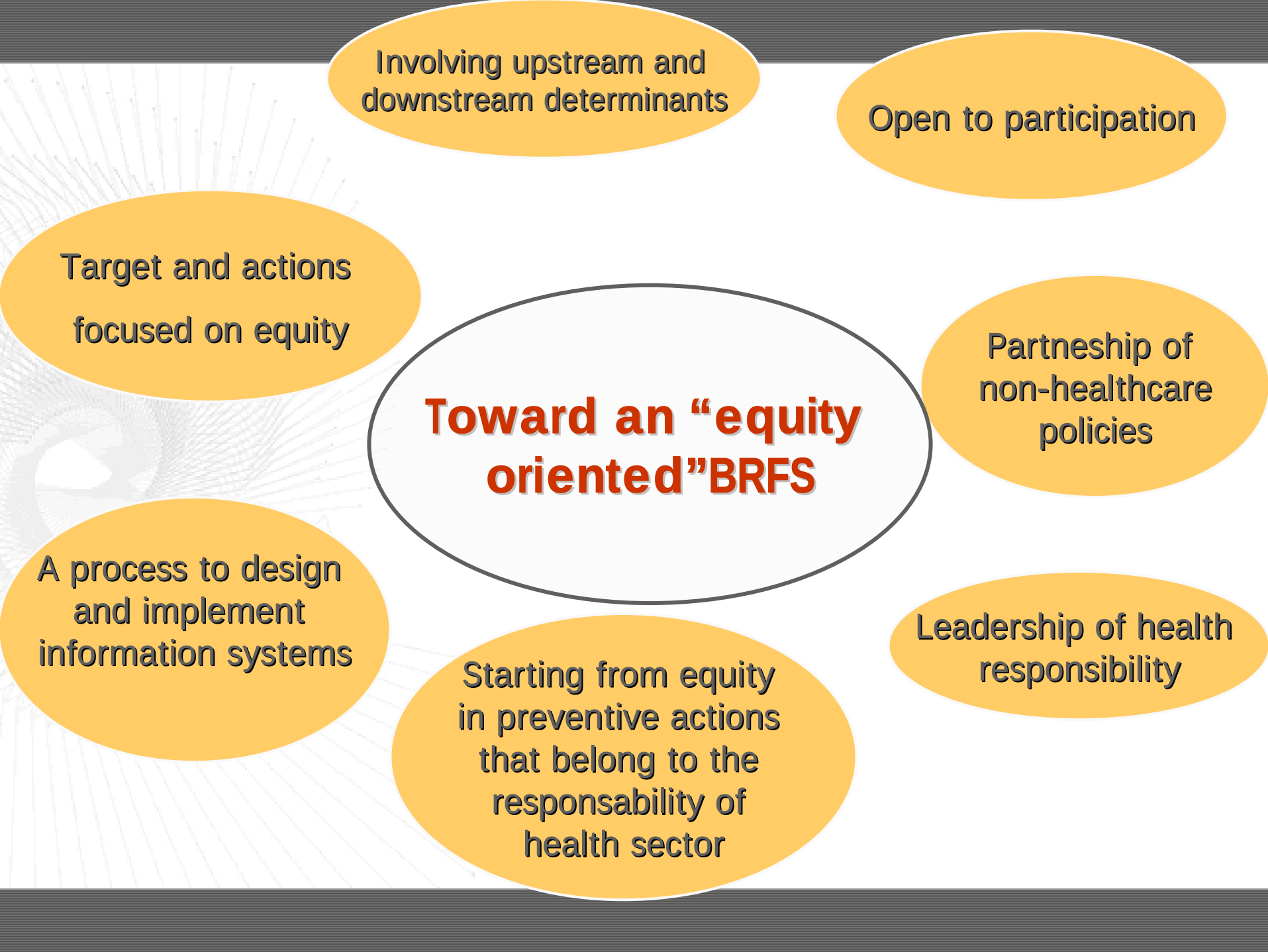
Focus on social gradient instead of most vulnerable (population wide and broader action)

Value of targets

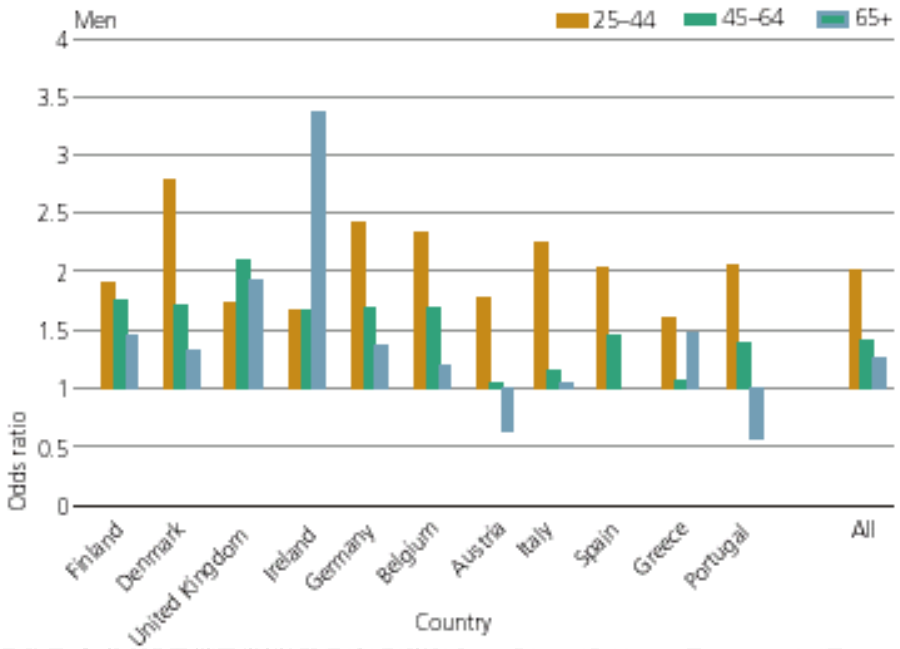
-sufficient rationale?

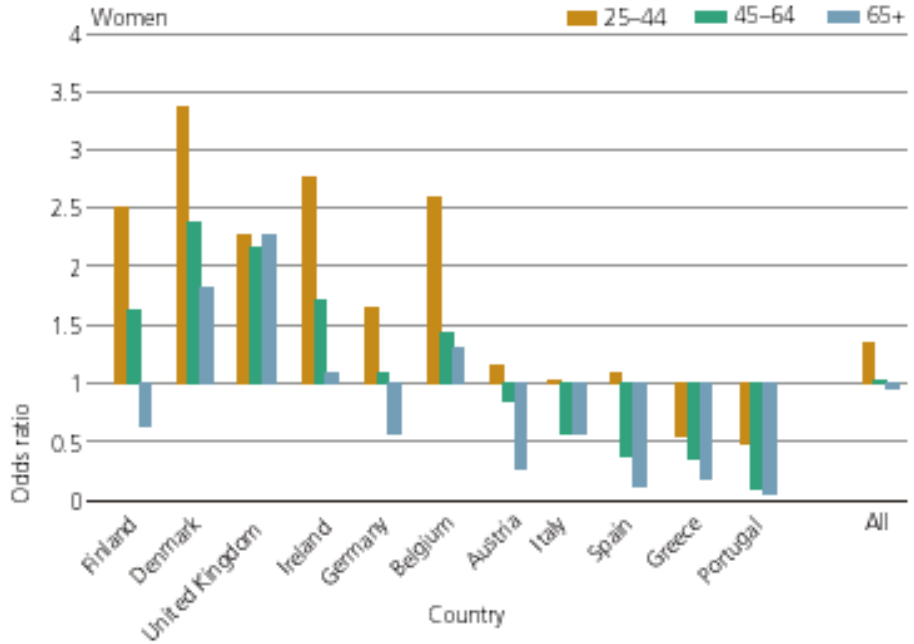
- type of target?

- help or hinder implementation?


Involving upstream and downstream determinants
Open to participation
Target and actions focused on equity
Toward an "equity oriented"BRFS
Partneship of non-healthcare policies
A process to design and implement information systems
Starting from equity in preventive actions that belong to the responsability of health sector
Leadership of health responsibility

Inequalities in current daily smoking by level of education in 11 European countries, 1998





Source: Huisman M, Kunst AE, Mackenbach JP. Educational inequalities in smoking among men and women aged 16 years and older in 11 European countries. Tob Control 2005; 14: 106–113.

Mackenbach JP. Health inequalities: Europe in profile. London, UK Presidency of the EU, 2005

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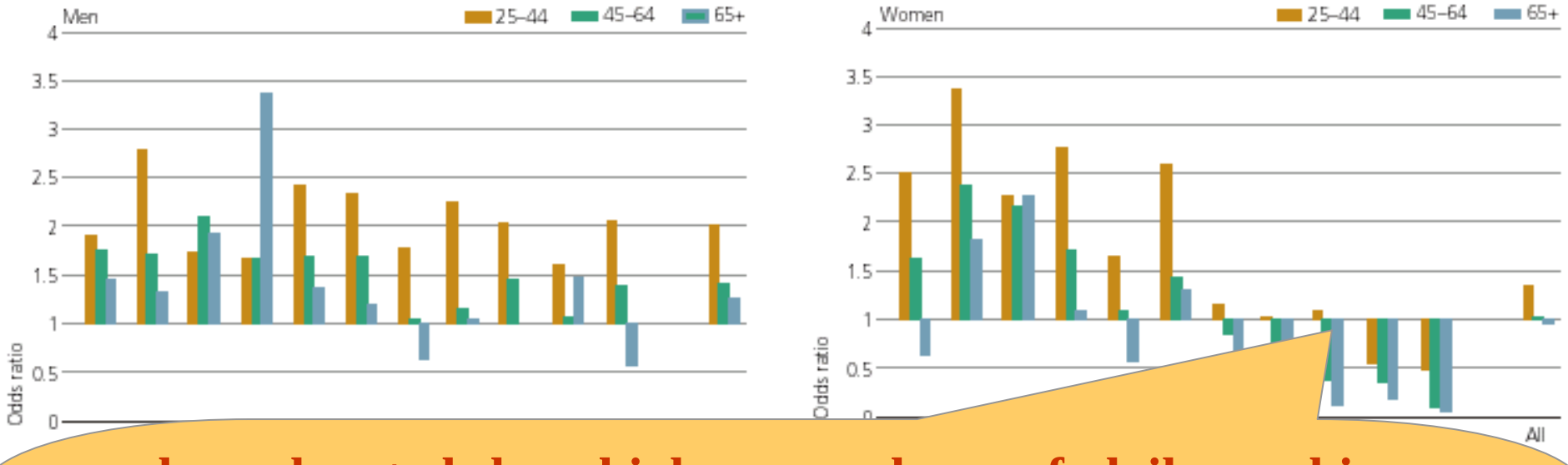
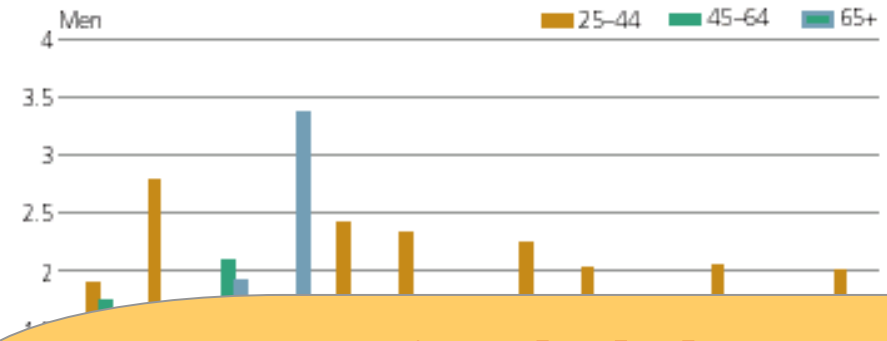
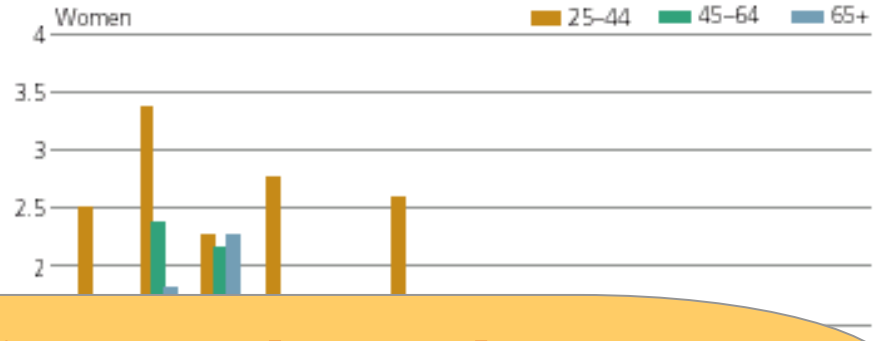


less educated show higher prevalence of daily smoking in most European countries, in all ages, and in both genders, but among females in the Southern countries, where the smoking epidemic is still in earlier stages

2005.

Inequalities in current daily smoking by level of education in 11 European countries, 1998





excessive alcohol consumption may play a role too

while the role of diet is not yet clear

obesity may become much more important in the future

Huisman M, Kunst AE, Mackenbach JP. Educational inequalities in smoking among men and women aged 16 years and older in 11 European countries. Tob Control 2005.

Inequalities in different health care indicators by educational level in Turin

	Mortality in colon cancer	Coronarografy in AMI	Revascularization in AMI	Inappropriate hospital admissions
HIGH	1	1	1	1
MEDIUM	**1.21** (1.05 - 1.40)	**0.93** (0.86 – 1.02)	**0.93** (0.85 – 1.02)	**1.12** (1.03-1.22)
LOW	**1.33** (1.16 - 1.51)	**0.83** (0.76 – 0.90)	**0.83** (0.76 – 0.91)	**1.19** (1.10-1.29)

less educated individuals may be more vulnerable to inappropriate hospitalization

Piedmont Region. Health Report 2006

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less educated patients with myocardial infarction may confront more limitations in accessing effective and appropriate care such as coronarography and re-vascularization

Piedmont Region. Health Report 2006

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less educated patients with colon cancer may experience more unfavourable outcomes

Piedmont Region. Health Report 2006

How much confident that the role of disadvantage that has been measured

- **individual (larger?)**
- **contextual (smaller?)**

Is not affected by substantial limitations (biases)?

- **Stability of the meaning of the indicator**
  - **Time**
  - **Space**
- **Aggregate**
  - **Size**
  - **Eterogeneity**
- **Adjustement**
- **Modelling**

Methodological issues

Age-adjusted relative risks of all cause mortality by deprivation index and geographical level. Turin, males, 18-64 years

geographical level (mean number population)	deprivation index: very rich	rich	medium	deprived	very deprived
district (95,000)	1	1.08	1.20	1.13	1.26
ward (40,000)	1	1.09	1.15	1.25	1.28
statistical area (10,000)	1	1.09	1.23	1.34	1.43
census tract (250)	1	1.16	1.18	1.32	1.71
individual	1	1.21	1.46	1.48	1.73

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The size of the aggregate is relevant (ecological bias) only when the variable is used as a proxy

Hospitalisation rate 2004 among municipalities of the Piedmont region

Hierarchical models

hospitalisation rate per 100000 inhab. (mean: … std. dev: 3512.5)

VARIABLES	MODEL A (direct needs+off… coeff (x10)	95%IC		MODEL B (direct need+offer+indirect needs) coeff (x10)	95%IC	
direct needs						
% pop 0-4	-0,042	-0,140		-0,043	-0,142	0,056
% pop 65-84	**0,081**	**0,054**		**0,090**	**0,057**	**0,122**
% pop 85 +	0.007	-0,061		0,028	-0,048	0,104
crude mortality rate				1.300E-04	-2,250E-05	2,800E-04
offer						
beds					-0,006	0,018
distance					**-0,037**	**-0,020**
indirect needs						
% immigrants					-0,019	0,095
% pop primary edu…					-0,016	0,020
% manual workers a…					**0,002**	**0,025**
household crow ding				,472	-3,425	0,481
per capita-non food consumption	-	-	-	-5,990E-05	-3,000E-04	1,800E-04
population density	-	-	-	-4,220E-05	-1,000E-04	4,547E-05
% unemployed	-	-	-	0,005	-0,028	0,037
% elderly alone	-	-	-	-0,028	-0,057	0,001

But the size of the Italian municipalities may vary from 40 to more than one million residents! What is the effect of such eterogeneity?

Coefficients of regression models for the use of hospital services (2003-04) in Turin for different levels of eterogeneity in size of the aggregates

	CENSUS TRACT	HYPOTHESIS A	HYPOTHESIS B	STATISTIC ZONE	HYPOTHESIS C	HYPOTHESIS D	NEIGH-BOURHOOD
% population aged 0-4 years	-0.008	**0.009**	-0.018	**0.0001**	**0.022**	-0.029	**-0.041**
% population aged 65-84 years	0.005						**.010**
% population aged 85 years or more	**-0.001**						**16**
% immigrated	**-0.001**	**-0.002**					**02**
% unemployed	0.004	**0.004**	0.011	0.014	**0.007**	0.017	**0.011**
% with low educational level	0.005	0.005	0.007	**0.001**	**0.004**	**0.001**	**0.003**

Eterogeneity in the size of aggregate may change substantially the effect (size and direction)

Methodological developments: modelling

Individual

multi-level Bayesian modelling

aggregate

contextual

the group mean of an individual-level variable is used as a contextual variable

Cronbach's formulation

individual variables are centred around their respective group means, values are so transformed into deviation from mean

Methodological developments: modelling

Biggeri et al, 2006

		RRind	RRaggr
1	**Individuale** $y_{isa} = \alpha + \beta\ x_{isa} + \sum \xi_a age_a$	1.097	
2	**Contestuale** $y_{isa} = \alpha + \beta^I x_{isa} + \beta^C \bar{x}_{sa} + \sum \xi_a age_a$	1.067	1.085
3	**Cronbach** $y_{isa} = \alpha + \beta^I (x_{isa} - \bar{x}_{sa}) + \beta^A (\bar{x}_{sa} - \bar{x}) + \sum \xi_a age_a$	1.063	1.107
4	**Aggregato per età e sezione** $\bar{y}_{sa} = \alpha + \beta\ \bar{x}_{sa} + \sum \xi_a age_a$		1.089
5	**Aggregato per sezione** $\bar{y}_s = \alpha + \beta\ \bar{x}_s + \xi \overline{age_s}$		1.101
6	**Aggregato per sezione, deprivazione aggiustata per età** $\bar{y}^{age}{}_s = \alpha + \beta\ \bar{x}^{age}{}_s$		1.126
7	**Aggregato per sezione** $\bar{y}^{age}{}_s = \alpha + \beta\ \bar{x}_s$		1.154
8	**Aggregato per sezione, età come covariata ecologica** $\bar{y}^{age}{}_s = \alpha + \beta\ \bar{x}_s + \xi \overline{age_s}$		1.151

Methodological developments: modelling

Biggeri et al, 2006

individual data models overestimate individual effect, when a contextual effect is supposed to exist

contextual models correctly estimate individual effect and underestimate contextual effect

aggregate models correctly estimate the effect corresponding to the level of aggregation, but individual effect is not highlighted

but in aggregate analyses with standardized rates, even deprivation should be standardized

multi-level Bayesian modelling with Cronbach's formulation as the best approach to correctly estimate all effects

Aggregate studies (Wilkinson 2005)

-where aggregate inequalities are a proxy: troubles from ecological bias, from modelling, from adjustment…

-where aggregate inequalities matter per se

-income … inequalities among large aggregates (countries, states, cities…in developed societies)

-average income…

-among large aggregates… (in developing societies),

-and among small aggregates (census tracts, zip codes… closer to the individual, in developed societies)

- at the US state level 1/3 compositional effect, 2/3 contextual effect (Wolfson 1999),

-but they do not explore the whole story…

Individual studies

-where the whole story is explored

-and the individual inequalities seem to show larger effects on health than the area ones, when considered together (more composition than context)

Deprivation, average income, gini… Indicator of what?

Deprivation of … resources… we need to give them a name (Macintyre 2002):
-Income
-Education
-Support
-Access to structural opportunities
-Others..

Describing “social position”
-influencing health per se
-mostly because of relative position (at least in rich contemporary societies) (individual variable)
-which is proportional to the level of inequality (contextual variable)