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SANTÉ

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Epidemiology of the metabolic syndrome in Luxembourg

findings from ORISCAV-LUX study

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Outline

1. Scope of the problem
2. Rationale/motivation
3. Research objectives
4. Research methods
5. Results
6. Conclusion
7. Publications

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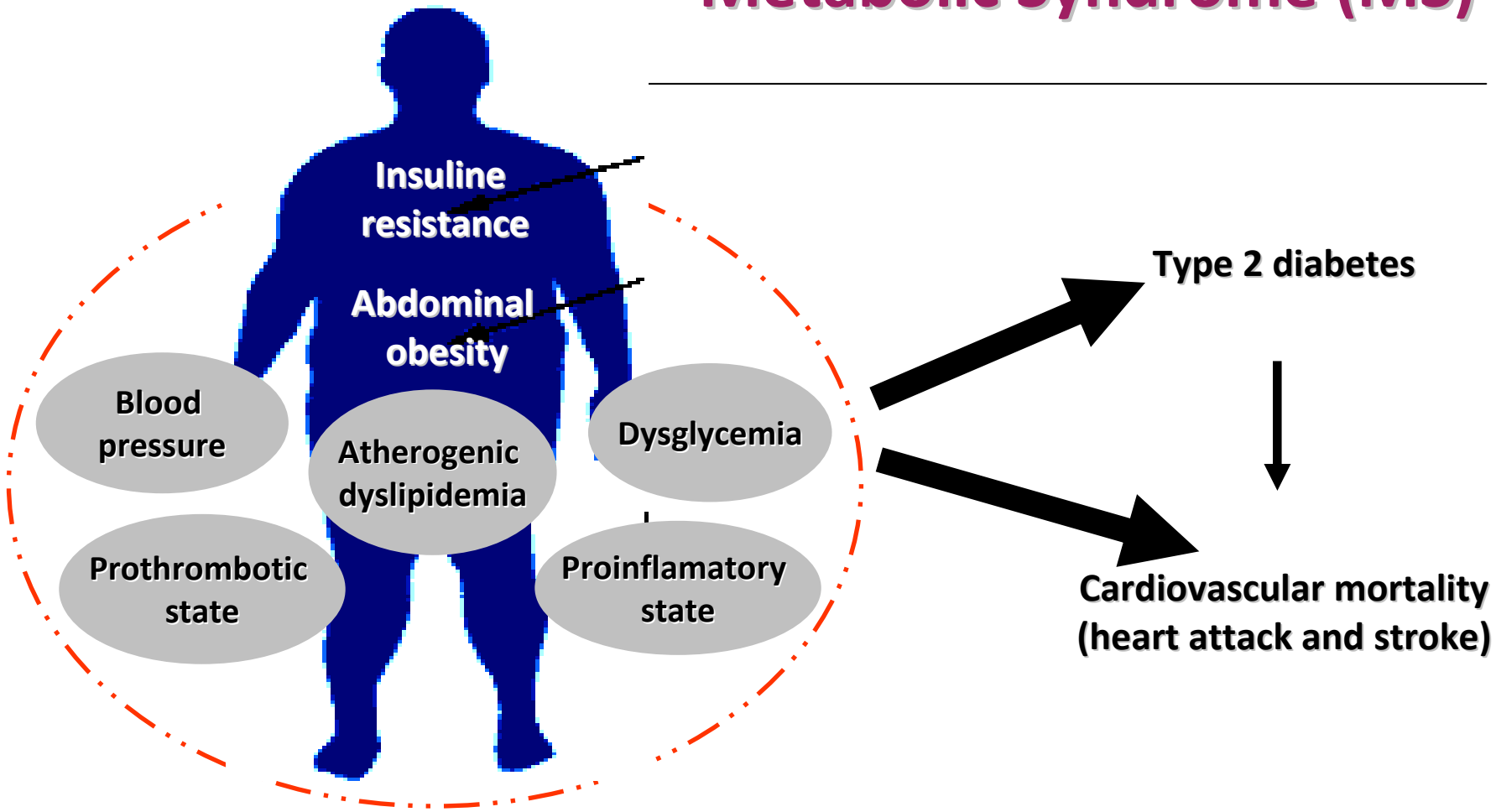
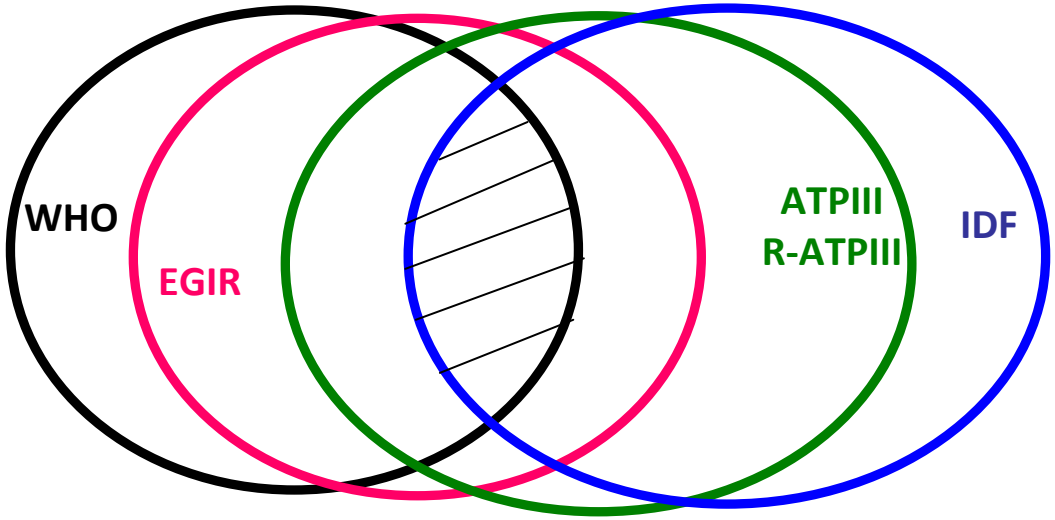
Metabolic Syndrome (MS)



MS is a multiplex cardio-metabolic disorder which clusters together in the same individual more often than might be expected by chance

Evolution of the MS criteria

Insulin resistance-based definitions → **Obesity-based definitions**



JIS 2009

3 or more of the following 5 criteria

1) ↑TG ≥ 150 mg/dl or treatment

2) ↓HDL-C < 40 mg/dl ♂
< 50 mg/dl ♀ or treatment

3) ↑ SBP ≥ 130 mmHg
DBP ≥ 85 mmHg or treatment

4) ↑FPG ≥ 100 mg/dl or treatment

5) **Waist Circumference (WC, cm) : population-specific cut-off points**

simpler and more operational →

Cardiovascular disease (CVD) risk prediction

Traditional risk assessment tools

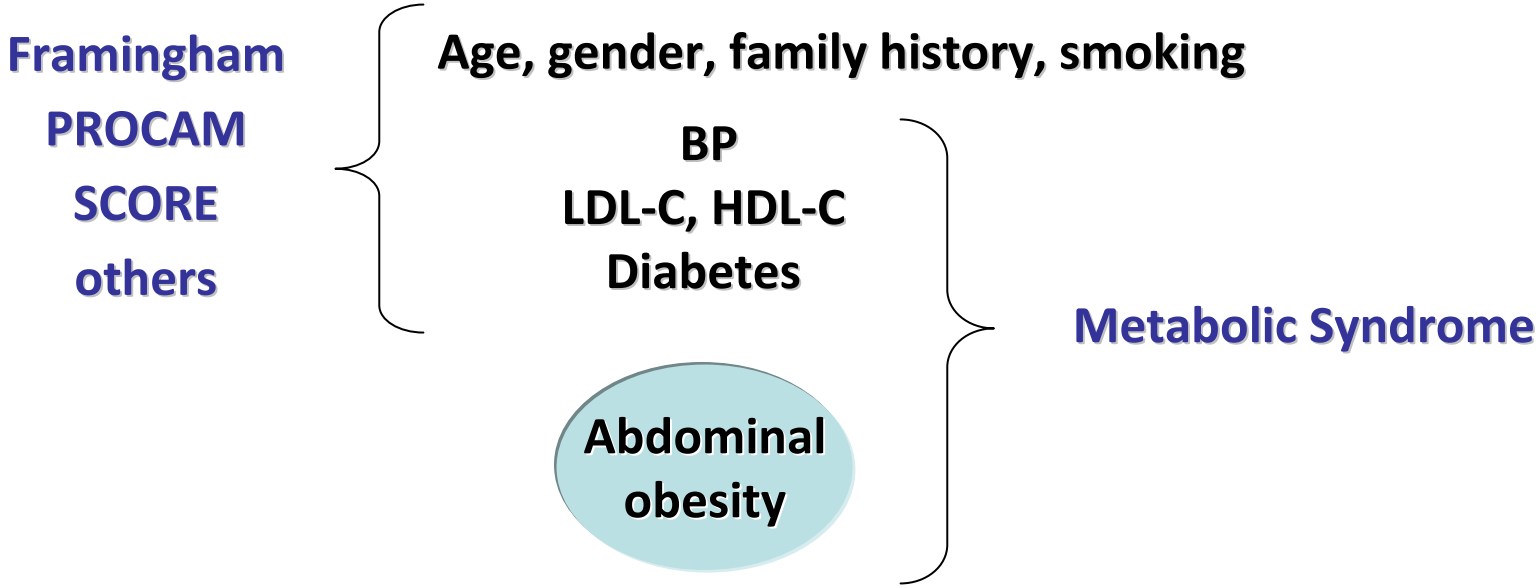
Framingham
PROCAM
SCORE
others

Age, gender, family history, smoking

BP
LDL-C, HDL-C
Diabetes

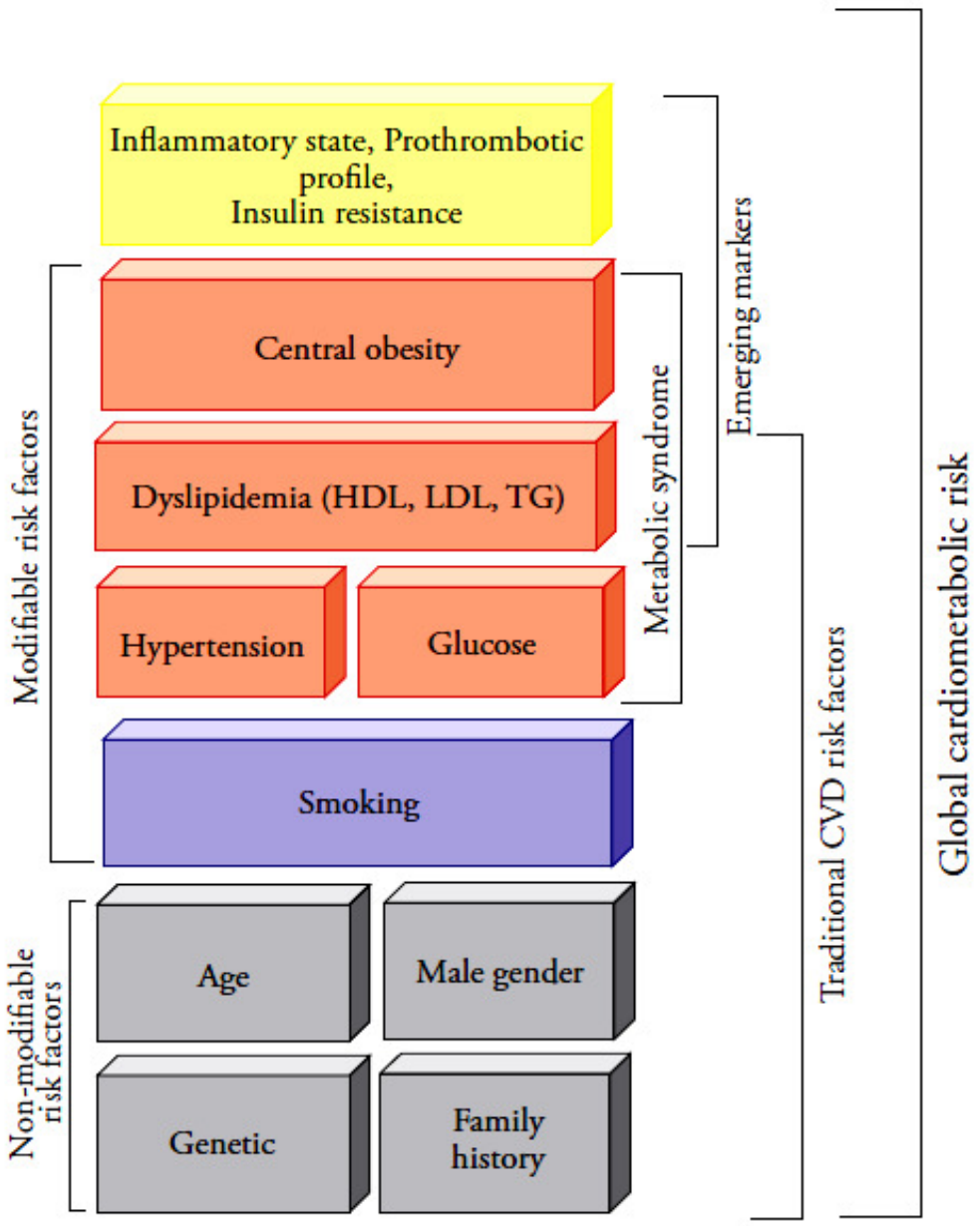
Cardiovascular disease (CVD) risk prediction

Traditional risk assessment tools



- Traditional tools do not capture additional risk (obesity)
- MS alone can not improve prediction of global CVD risk
- Neither MS nor risk tools can properly assess global CVD risk

Global Cardio-Metabolic Risk concept



The "building blocks" of global cardiometabolic risk, with adaptation from Després et al 2008

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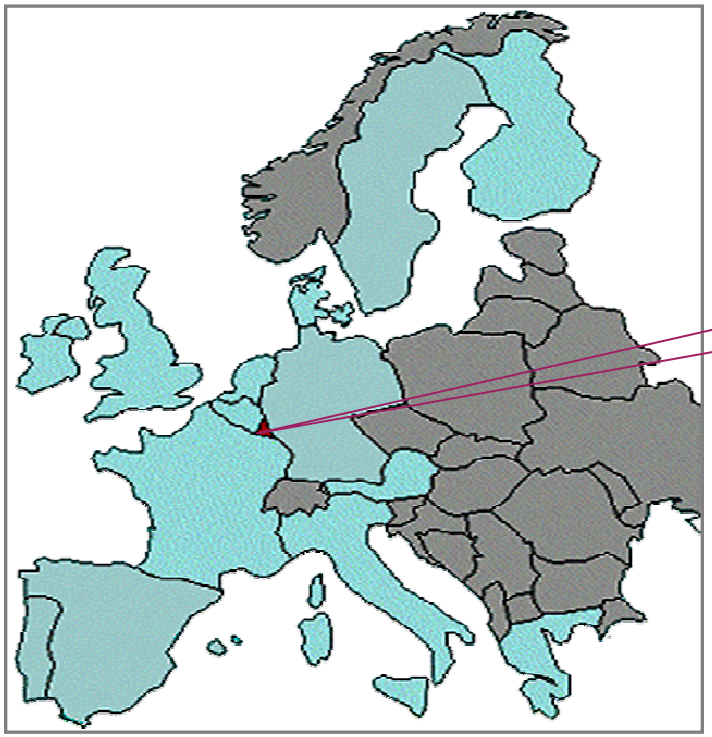
Geographical context



Grand-Duchy of Luxembourg

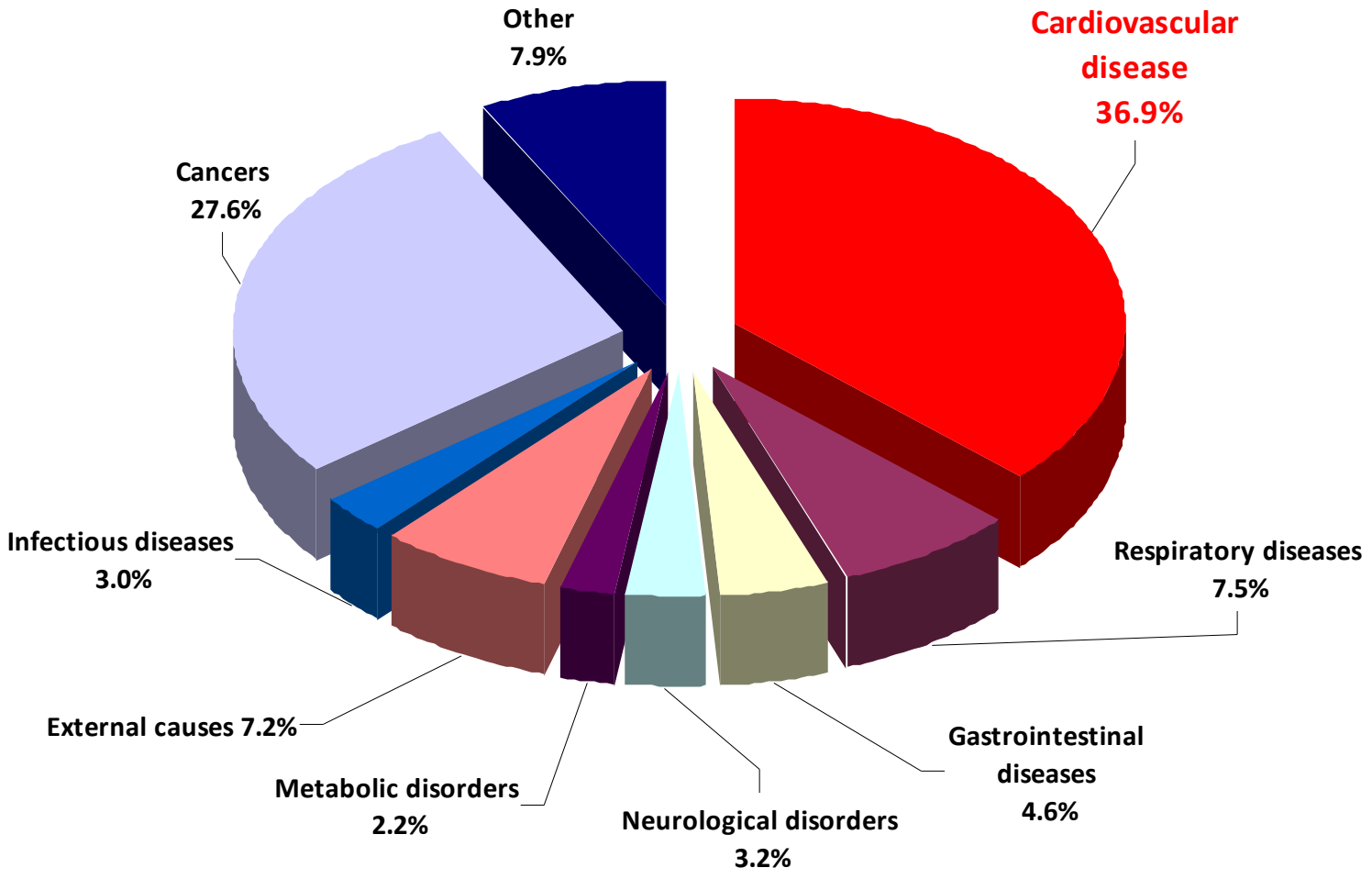
3 geographical districts

2586 km²

493,500 inhabitants

Luxembourgers **56.3%**
Foreigners **43.7%**

Causes of mortality in Luxembourg (2007)

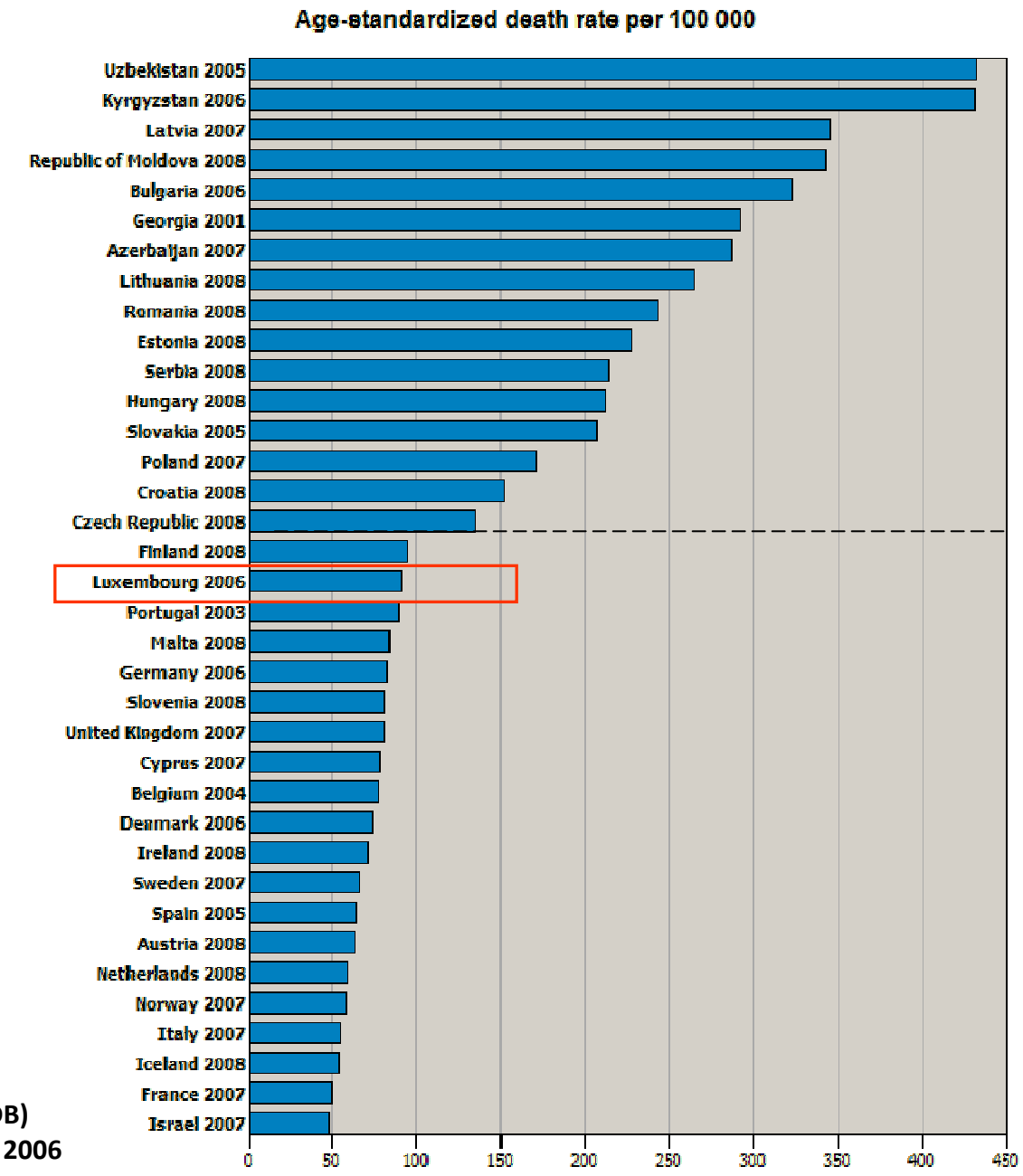


Directorate-General of Health, Luxembourg, 2007

Cardiovascular mortality in Europe

20-69 years

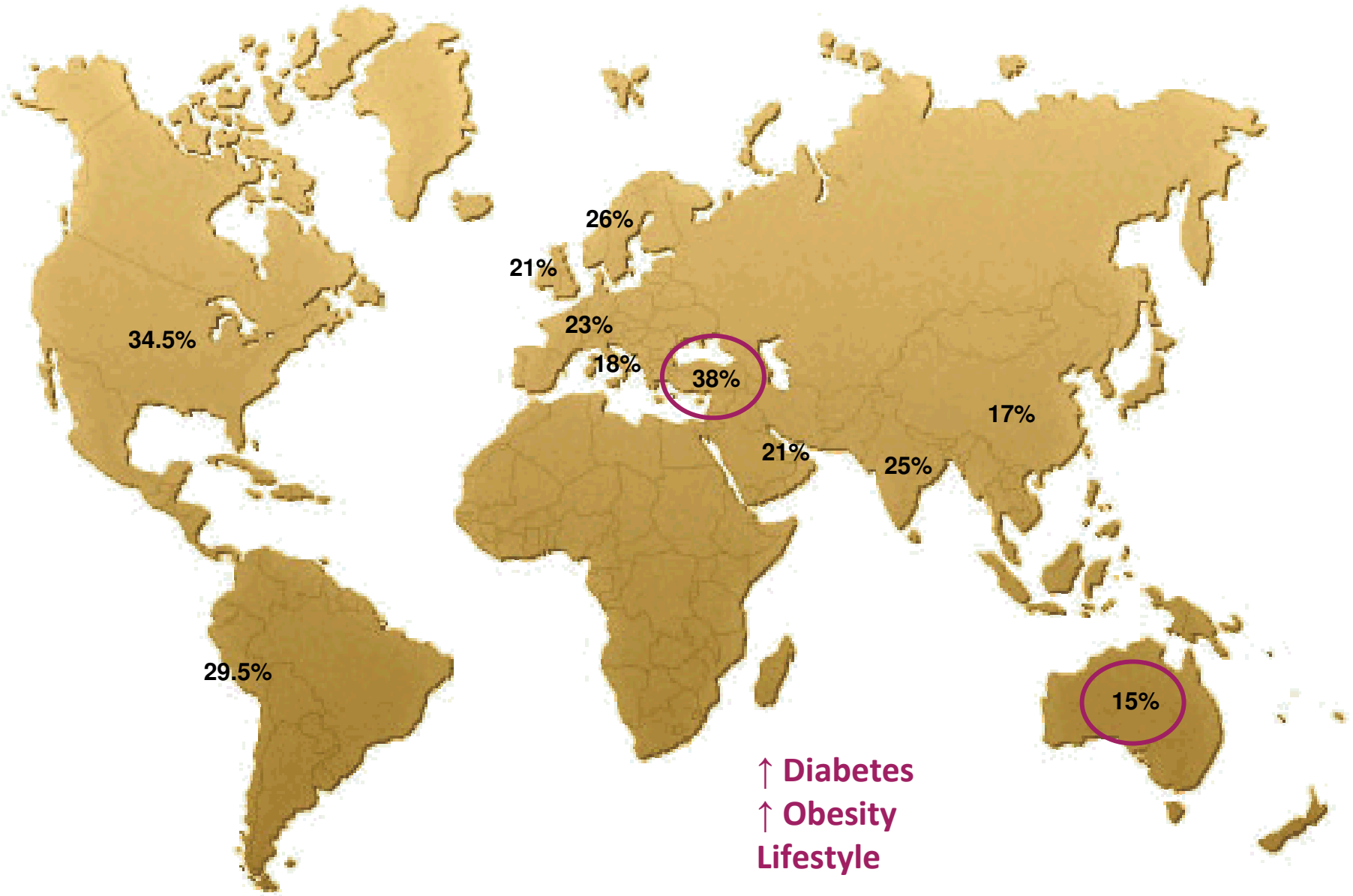
Highest mortality among the Western countries



European detailed mortality database (DMDB)
Copenhagen, WHO Regional Office for Europe, 2006

MS (ATPIII definition)

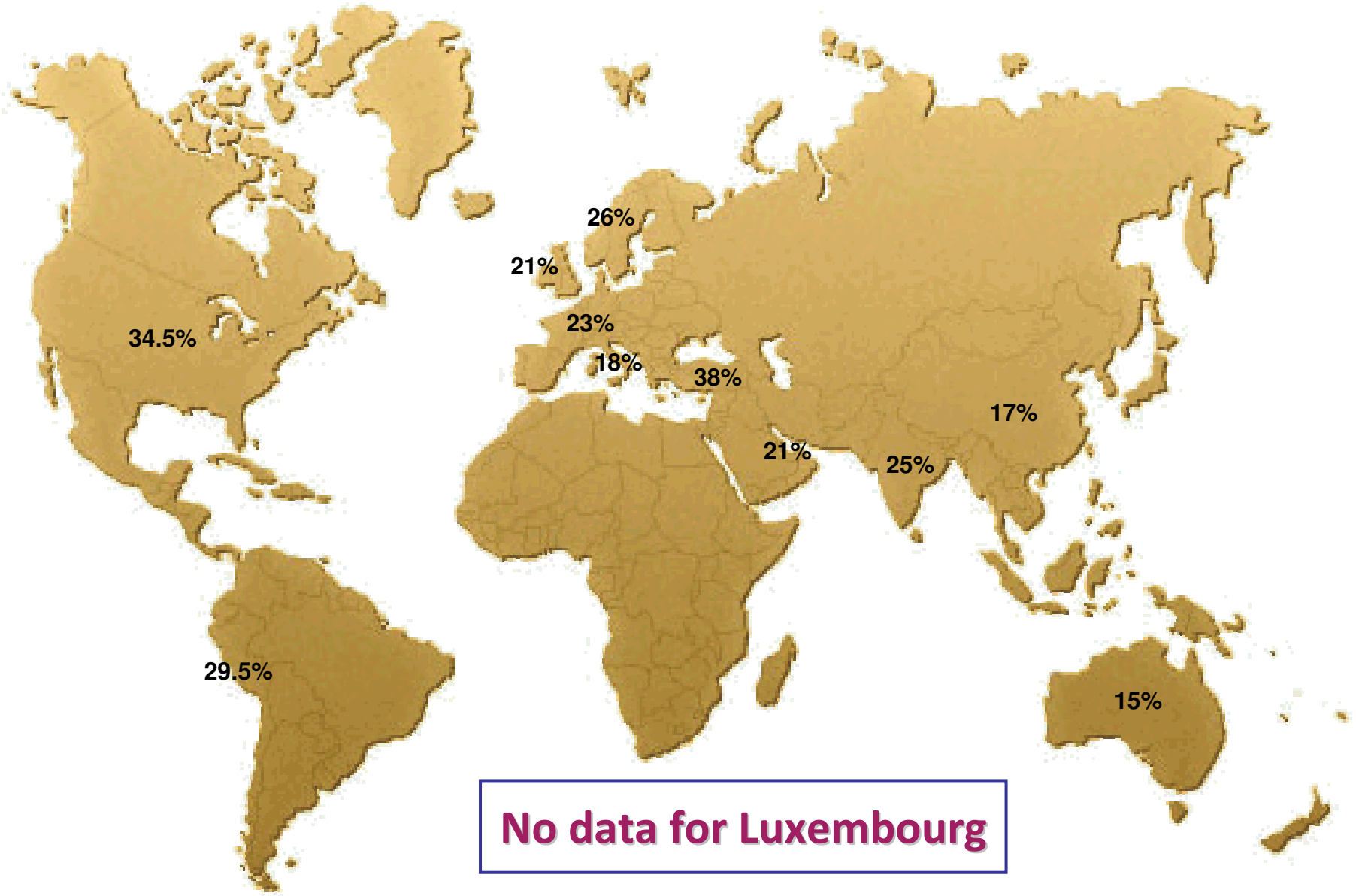
Worldwide public health challenge



↑ Diabetes
↑ Obesity
Lifestyle

MS (ATPIII definition)

Worldwide public health challenge



No data for Luxembourg

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Objectives

Inductive exploratory approach

- Investigate the epidemiological profile of MS in the general resident population of Luxembourg

- Identify the potential socio-economic and behavioral determinants of MS

"Group at risk"

« ***Evidence-based interventions*** »

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ORISCAV-LUX survey

Observation of Cardiovascular Risk Factors in Luxembourg

- 1st nationwide cross-sectional survey (November 2007-January 2009)
- Population of residents (18-69 years) of Luxembourg
- Stratified random sample of 1432 participants

Method of data collection

Mailing (invitation/information) with coupon-answer

Phone contact

Appointement

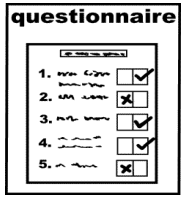
Investigation centre

1st step

IPAQ

FFQ

AUDIT



2nd step

Waist and hip circumferences

Weight

Height

Blood pressure

3rd step

Hair sample

Urine

Blood

Sampling procedure (1)

Stratified random sample

- **District** — Diekirch, Grevenmacher, Luxembourg
- **Gender**
- **Age category** — 18-69 y

National Health Insurance Registry

The distribution of selected subjects in each stratum is proportional to their distribution in the source population

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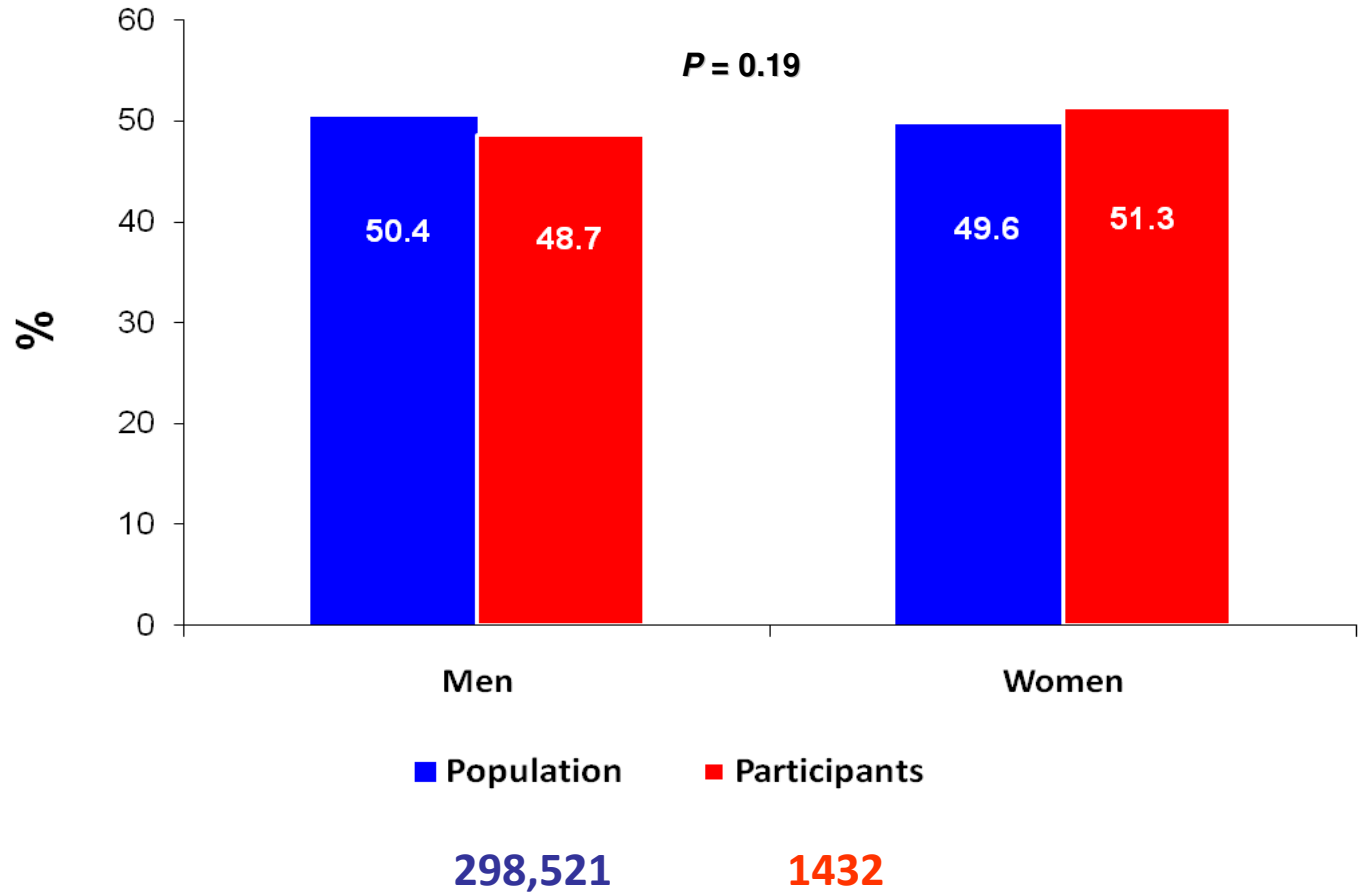
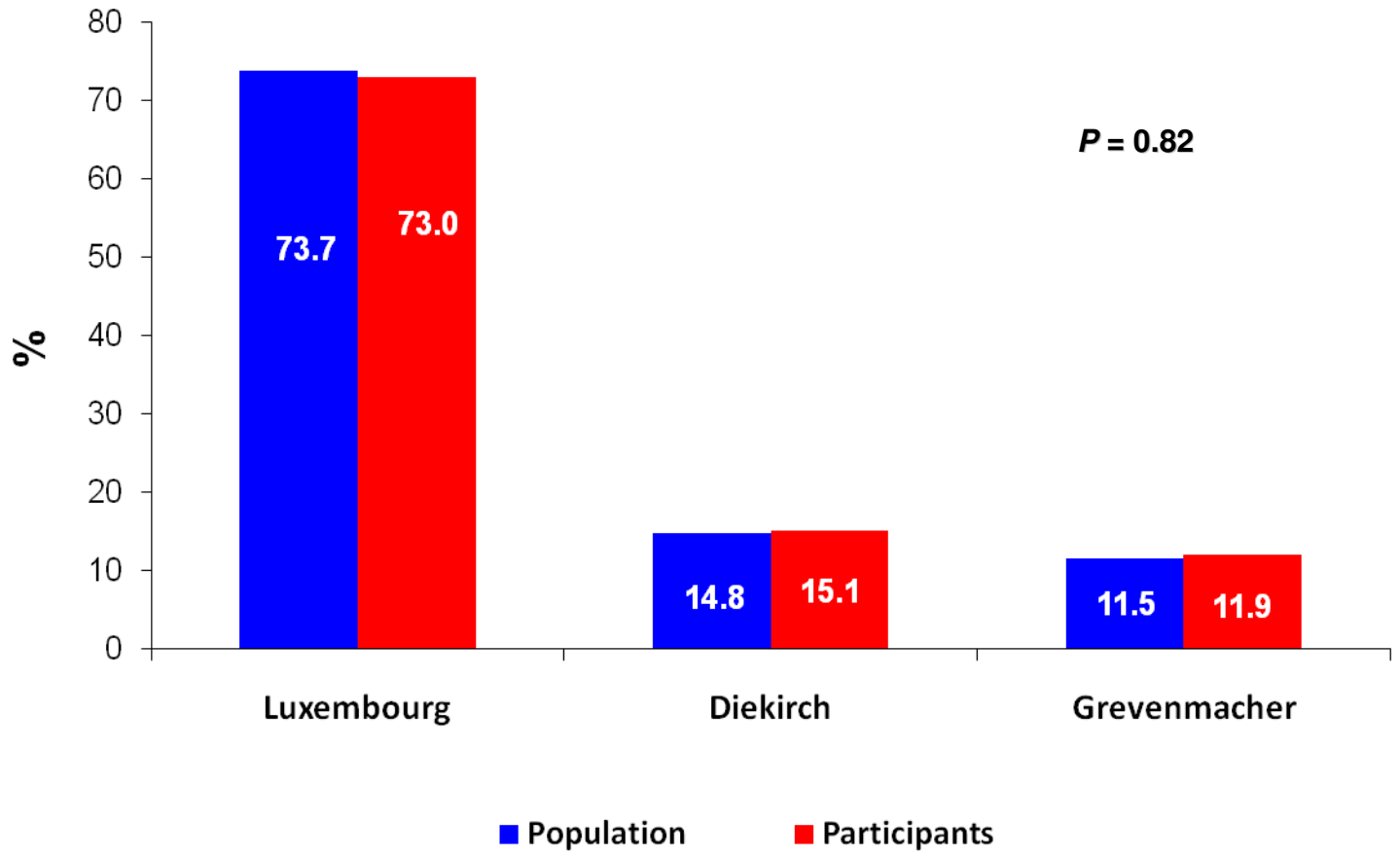
Sample representativeness (1)

Comparison of participants to source population according to gender



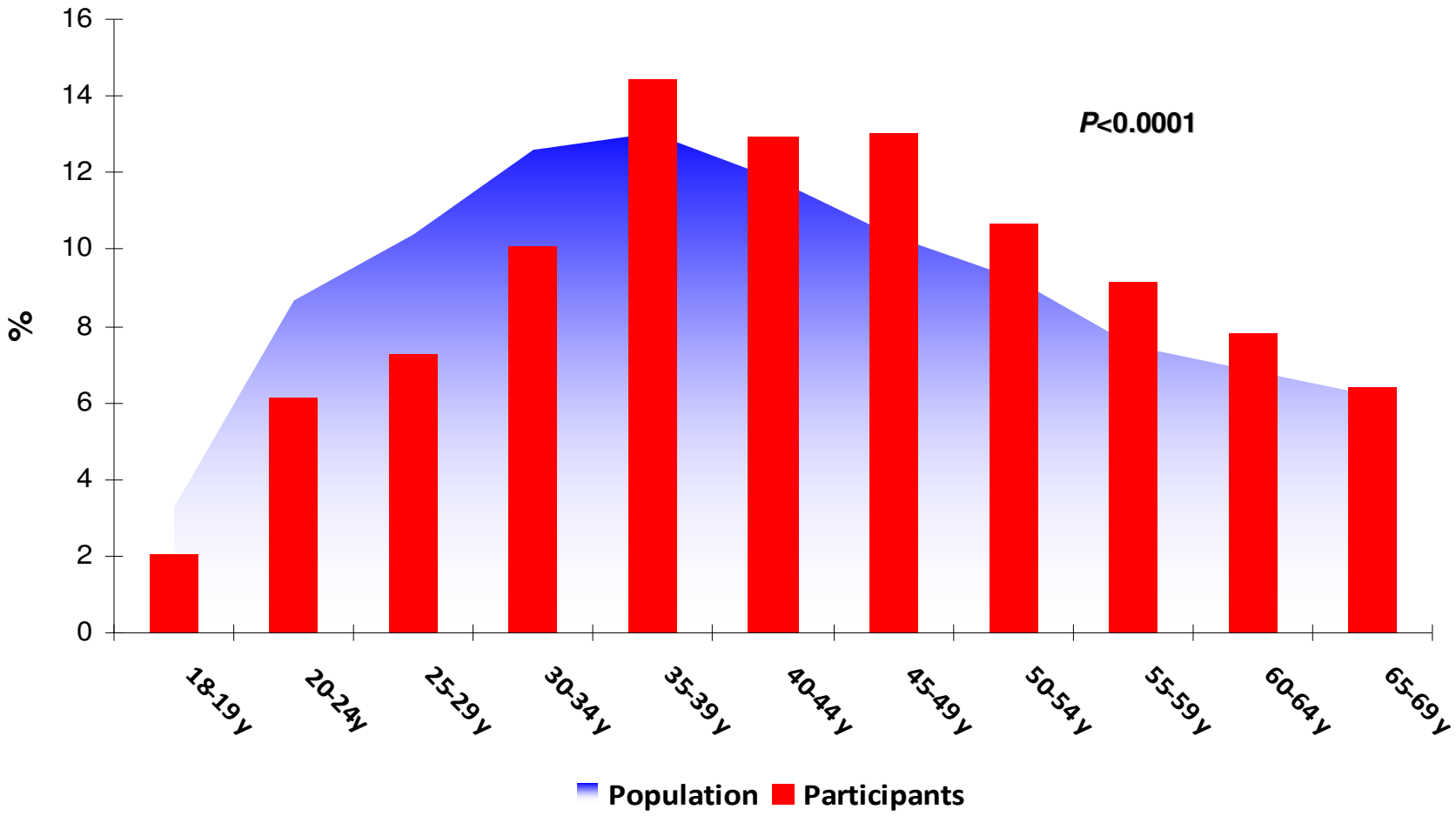
Sample representativeness (2)

Comparison of participants to source population according to district



Sample representativeness (3)

Comparison of participants to source population according to age groups



Sample representativeness (4)

To assess whether the health status affected the response rate

Comparison between participants and non-participants

- **Demographic indicators (profession, nationality)**
- **Morbidity indicators (prescribed medications, hospital admission and medical measures)**

National medical administrative database

Sample representativeness (4)

Conclusion*

Investigated clinical profile (hospital admission and cardiovascular health-related medical measures) was comparable in both groups (participants vs non-participants)

Response rate does not invalidate the results

Allows generalizing the findings for the population

*Alkerwi et al. BMC Medical Research Methodology 2010, 10:80

Epidemiological profile (1)

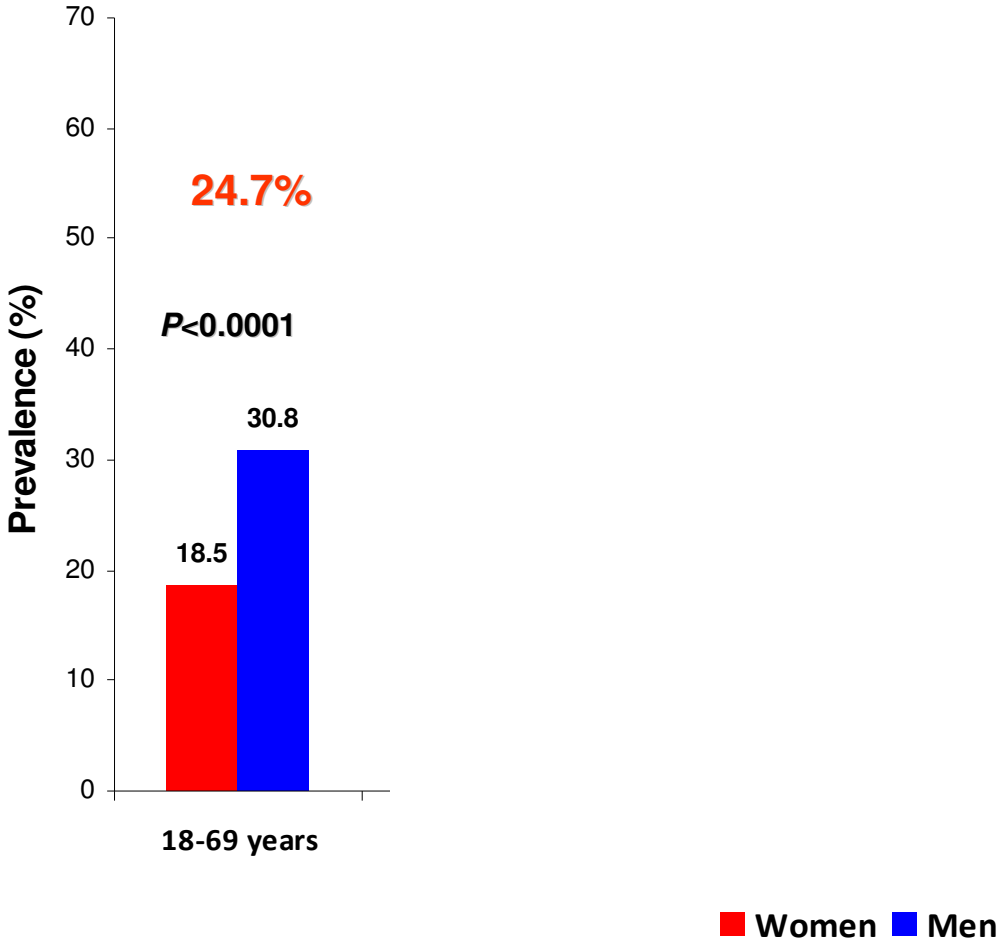
Metabolic syndrome
R-ATP III definition

3 or more of the following criteria

↑ WC	≥ 102 cm	≥ 88 cm
↓ HDL-C	< 40 mg/dl	<50 mg/dl
	or treatment	
↑ TG ≥ 150 mg/dl	or treatment	
↑ SBP ≥ 130 mmHg ↑ DBP ≥ 85 mmHg	or treatment	
↑ FPG ≥ 100mg/dl	or diagnosed diabetes	

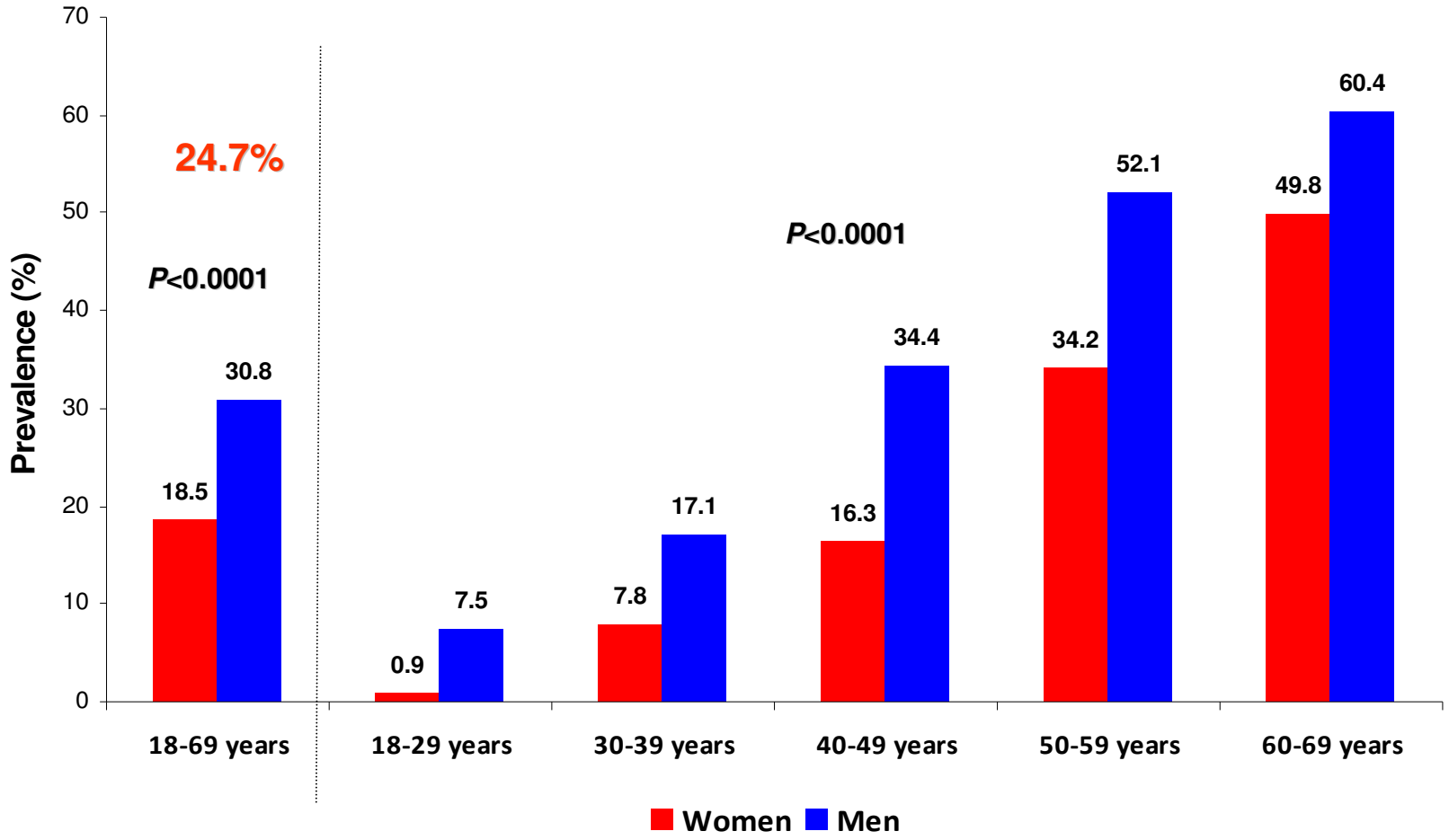
Epidemiological profile (2)

Prevalence of metabolic syndrome by gender

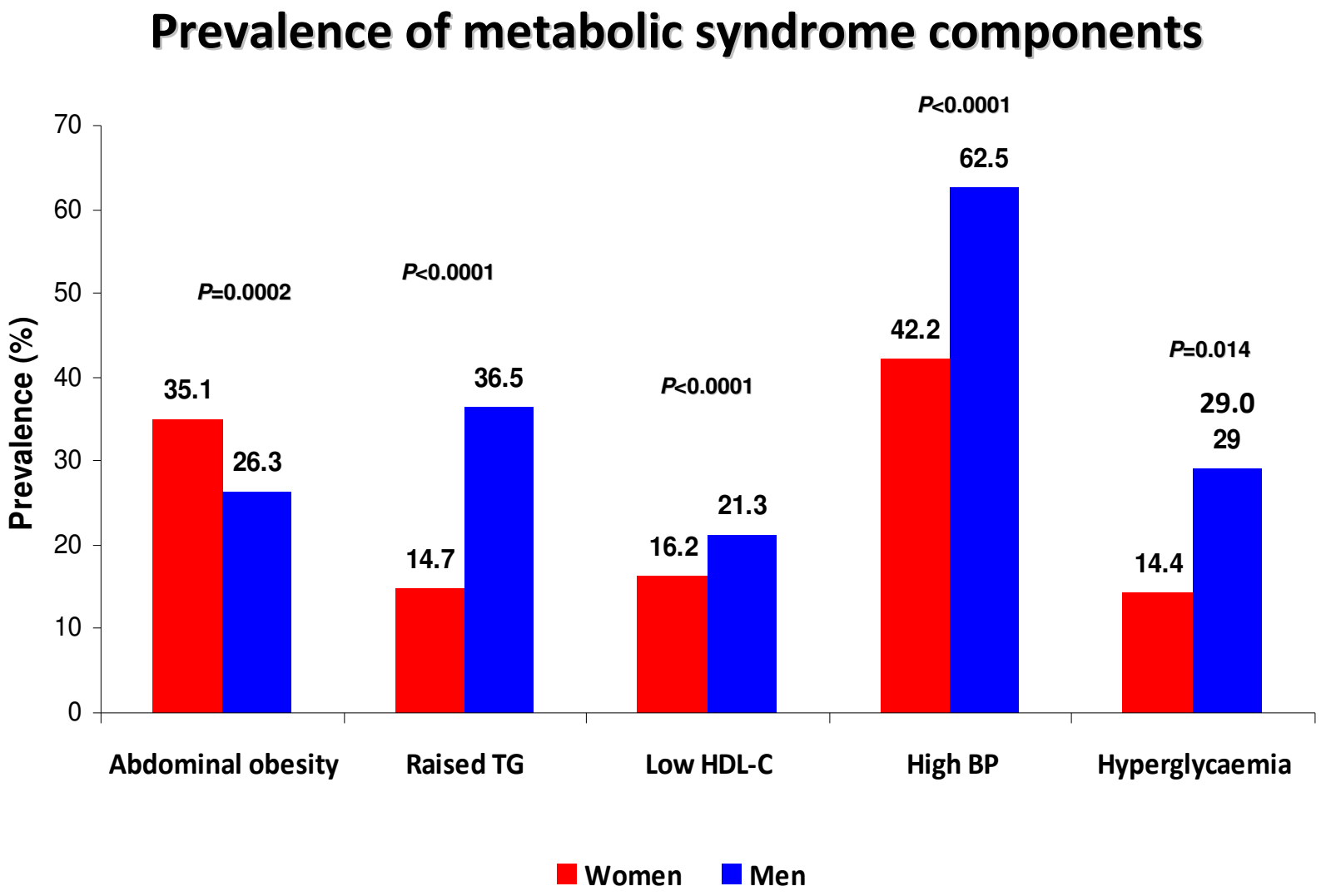


Epidemiological profile (3)

Prevalence of metabolic syndrome by gender and age



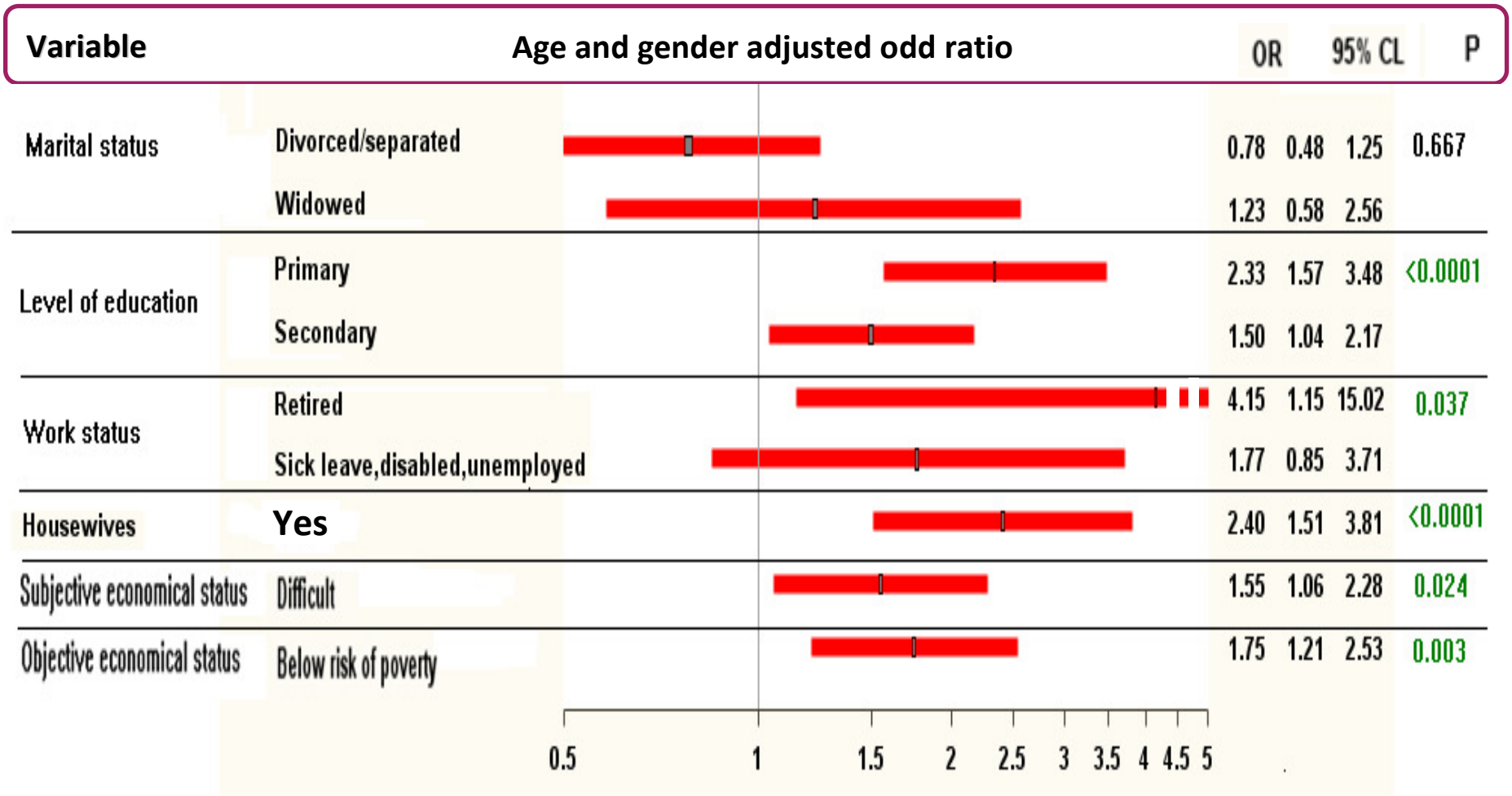
Epidemiological profile (4)



Epidemiological profile (5)

Metabolic syndrome – Logistic regression

Socio-economic factors

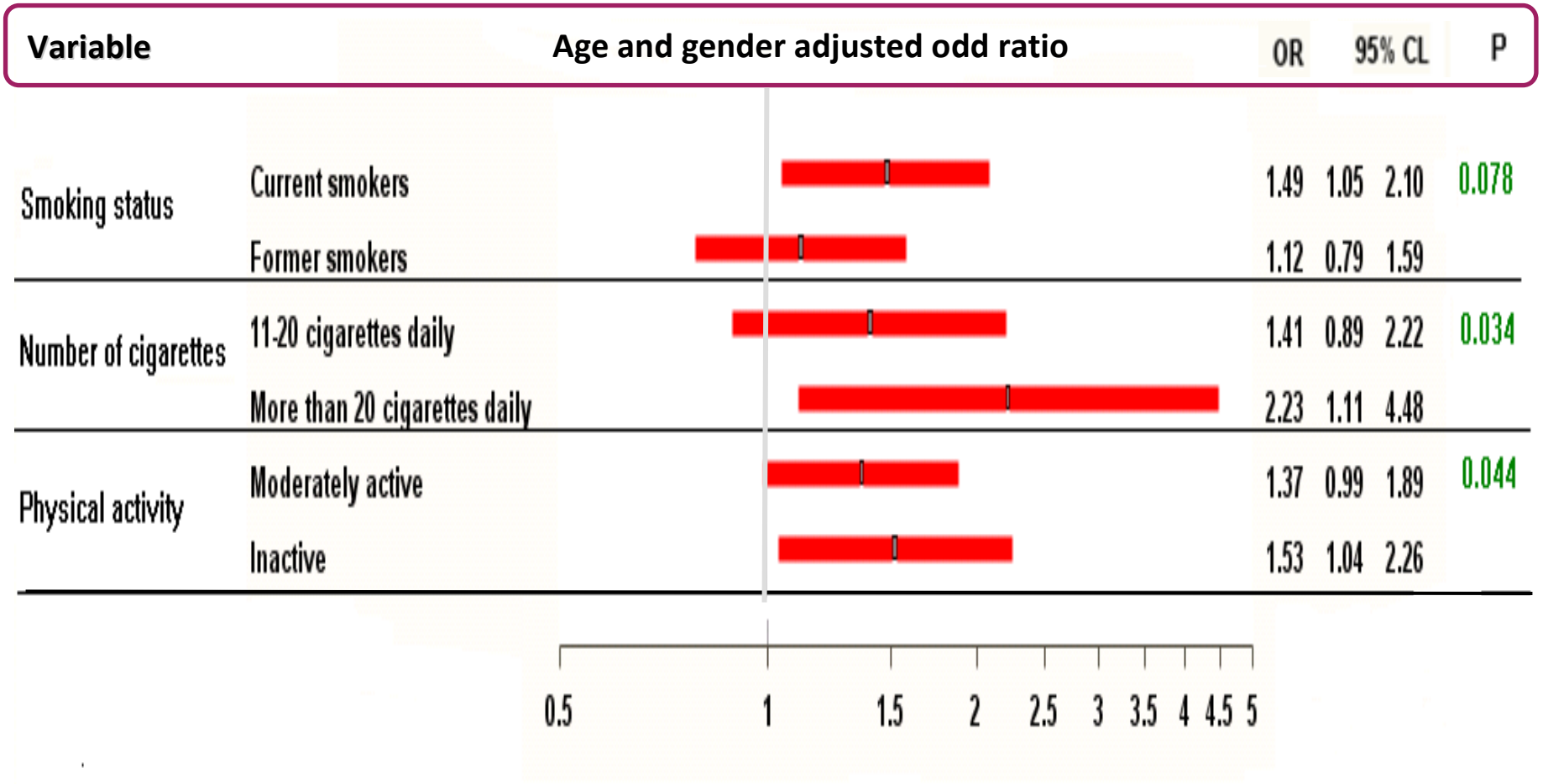


Reference category: married, university level of education, employed, working women, easy subjective economical status, above risk of poverty threshold

Epidemiological profile (6)

Metabolic syndrome – Logistic regression

Lifestyle factors

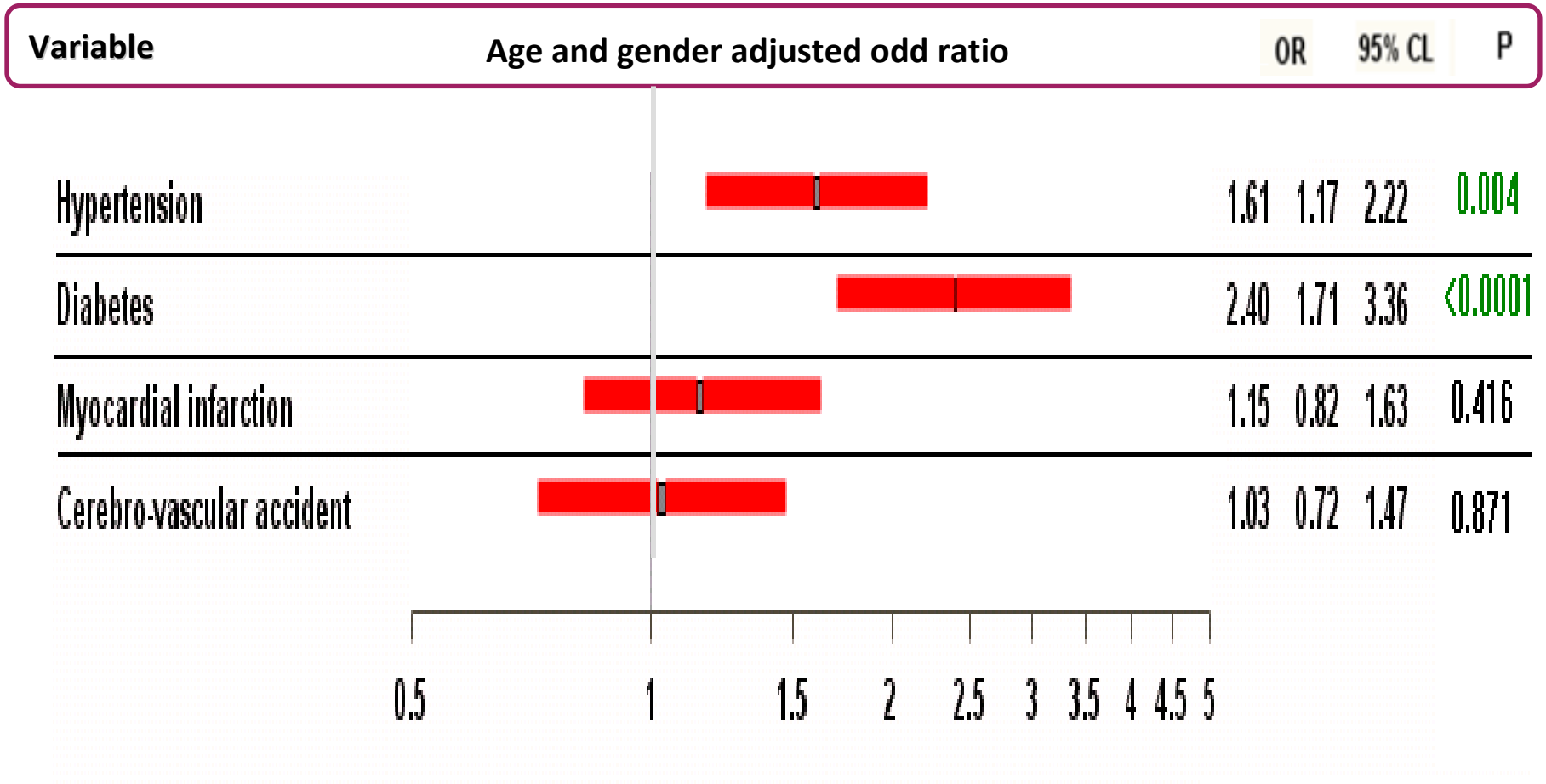


***Reference category*: non-smokers, less than 10 cigarettes/day, physically active**

Epidemiological profile (7)

Metabolic syndrome – Logistic regression

Family history

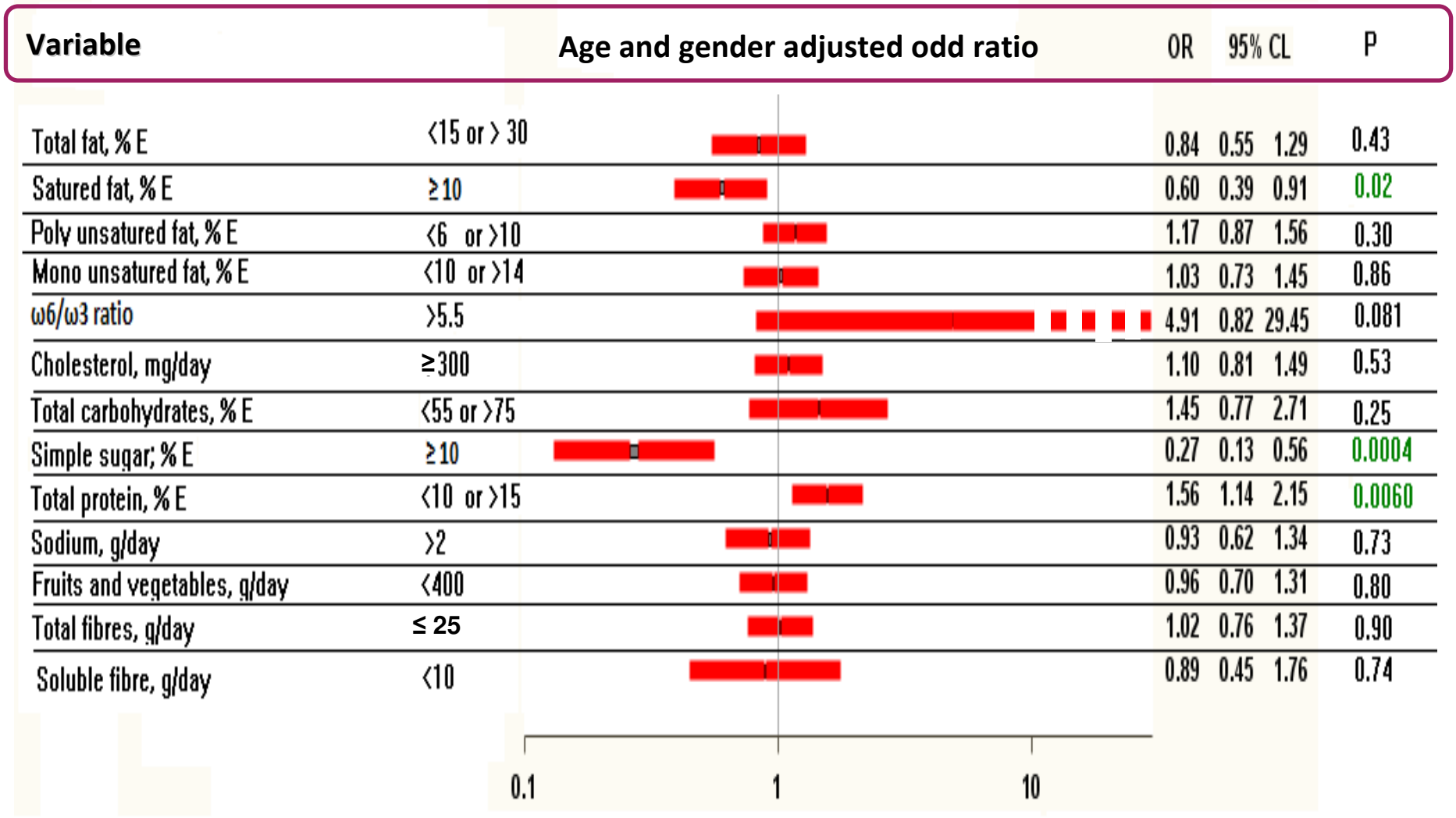


Reference category: no family history of (hypertension, diabetes, myocardial infarction, CVA

Epidemiological profile (8)

Metabolic syndrome – Logistic regression

Dietary factors

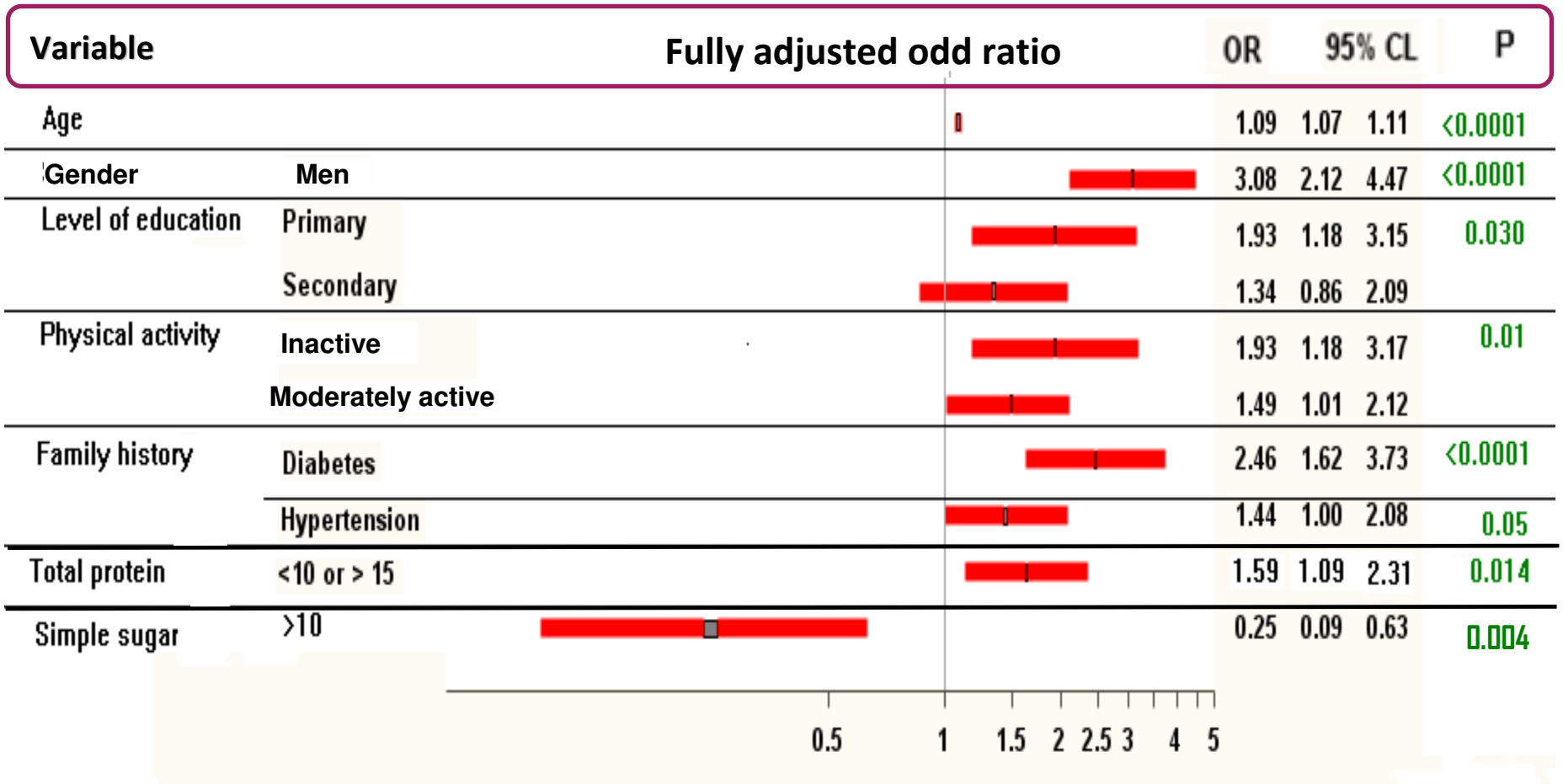


Reference categories **are those who respect the WHO recommendations, 2003**

Epidemiological profile (9)

Metabolic syndrome – Logistic regression

Final multivariate model



Conclusion

- The MS is an important health problem in Luxembourg (24.7%)
- MS increases remarkably with age in both genders
- Significant gender-specific differences
- Low education level, physical inactivity, inadequate protein diet and family history of diabetes and hypertension were the most important determinants of the MS
- Lifestyle-oriented intervention might be the promising approach for the primary prevention of MS

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Added-values of the study

- First reliable source of information for Luxembourg
- Provides scientific evidence for public health decision-makers
- Increases Luxembourg visibility at international level
- Model to reproduce the study in the neighboring regions
- Reinforcement of international collaboration
- Generates new hypotheses for future research

Peer-reviewed publications

1) **Alkerwi et al., Alcohol consumption and the prevalence of metabolic syndrome: A meta-analysis of observational studies, Atherosclerosis, 2009 vol. 204, no2, pp. 624-635.**

2) **Alkerwi et al., *First nationwide survey on cardiovascular risk factors in Grand-Duchy of Luxembourg (ORISCAV-LUX),* BMC Public Health 2010, 10:468.**

3) **Alkerwi et al., *Comparison of participants and non-participants to the ORISCAV-LUX population-based study on cardiovascular risk factors in Luxembourg,* Medical Research Methodology 2010, 10:80.**

4) **Alkerwi et al., *Nutrition, environment and cardiovascular health (NESCAV): protocol of an inter-regional cross-sectional study,* BMC Public Health 2010, 10:698.**

5) **Alkerwi et al., *Prevalence of the metabolic syndrome in Luxembourg according to the Joint Interim Statement definition estimated from the ORISCAV-LUX study*, BMC Public Health 2011, 11:4.**

6) **Alkerwi et al., *Dietary, behavioral and socio-economic determinants of the metabolic syndrome among adults in Luxembourg: finding from ORISCAV-LUX study*", Public Health Nutrition, doi:10.1017/S1368980011002278**

7) **Alkerwi et al., *Population compliance to dietary recommendations and its related factors: findings from ORISCAV-LUX study, submitted to British Journal of Nutrition, in July 2011.***

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METABOLIC SYNDROME • FOOD •

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Thanks for your attention