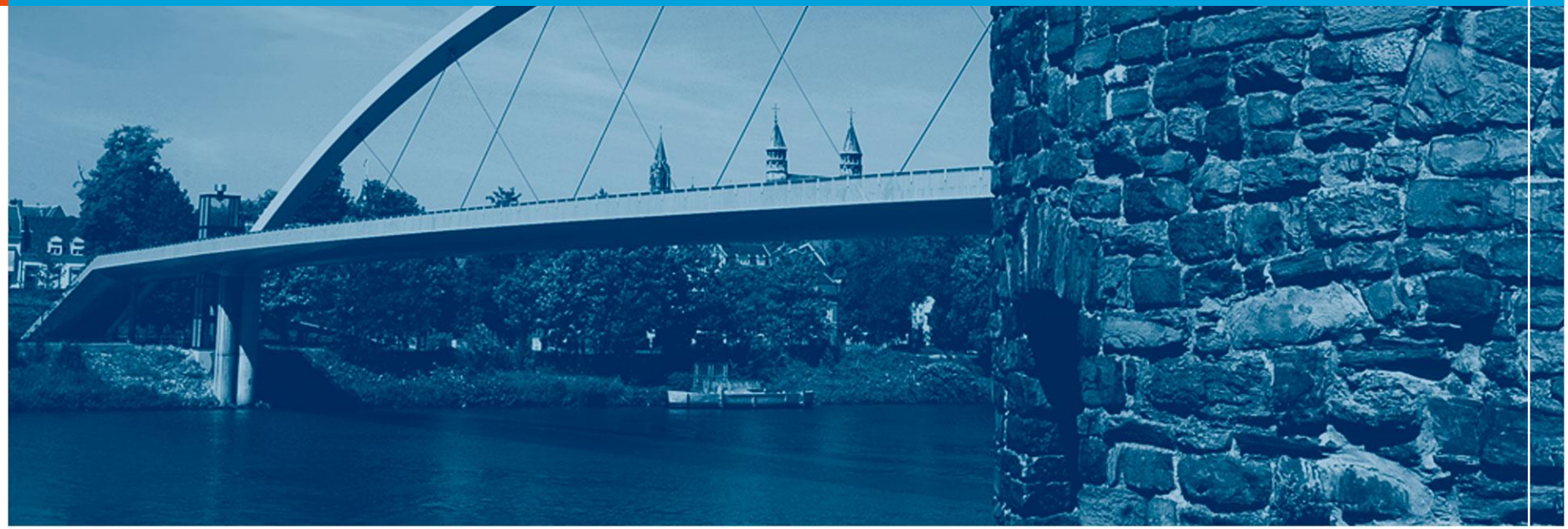
Maastricht University Leading in Learning!

CAPHRI School for Public Health and Primary Care

Seminar

"Life-course and environmental conditions as fundamental causes for Type 2 Diabetes (outcomes)"



Content

- Grant proposal Diabetes fonds

  "Work and residential conditions as fundamental causes for Type 2 Diabetes outcomes"

- Article
  - "Lifecourse socioeconomic conditions, health behavior risk factors and the risk of prediabetes: Findings from the Maastricht Study"

Grant proposal

- Background
- Objectives
- Scientific & Societal Relevance
- Study design
- Methods
- Global time plan

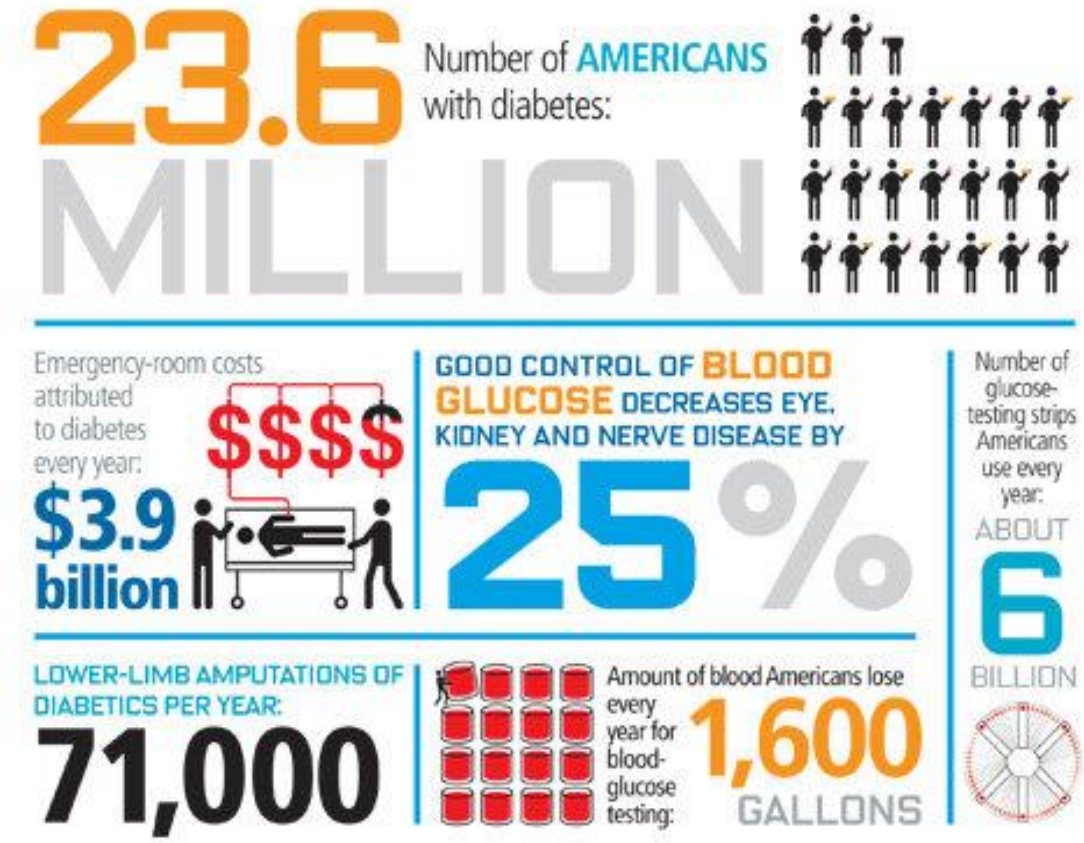
Background

- Type 2 Diabetes Mellitus (T2DM) is becoming a worldwide epidemic:
  - At the moment, 347 million people are diagnosed with diabetes worldwide
  - By the year of 2030, diabetes will be the 7th leading cause of death

  (WHO)

- Consequences of T2DM include:
  - Cardiovasculair diseases, of which 50% of diabetes patients will die
  - Retinopathy: result in blindness
  - Damage in blood vessels and nerve damage: result in limp-amputations
  - Kidney failure

- Effective prevention requires a full understanding of the aetiology of T2DM, risk factors and pathways


23.6 MILLION
Number of AMERICANS with diabetes:
Emergency-room costs attributed to diabetes every year:
$3.9 billion
$$$$
GOOD CONTROL OF BLOOD GLUCOSE DECREASES EYE, KIDNEY AND NERVE DISEASE BY
25%
Number of glucose-testing strips Americans use every year:
ABOUT
6
BILLION
LOWER-LIMB AMPUTATIONS OF DIABETICS PER YEAR:
71,000
Amount of blood Americans lose every year for blood-glucose testing:
1,600
GALLONS

Background

- Association between "classic" health behavior risk factors, socioeconomic conditions and T2DM risk is evident
- Low socioeconomic conditions also associated with poor health-related functioning in T2DM
- Health-related functioning:
  - Measure reflecting physical, social and mental health functioning
  - Includes participation in daily life, impairments, limitations and disabilities
  - Low socioeconomic conditions in T2DM patients associated with low quality of life, higher depression rates, higher complication rates

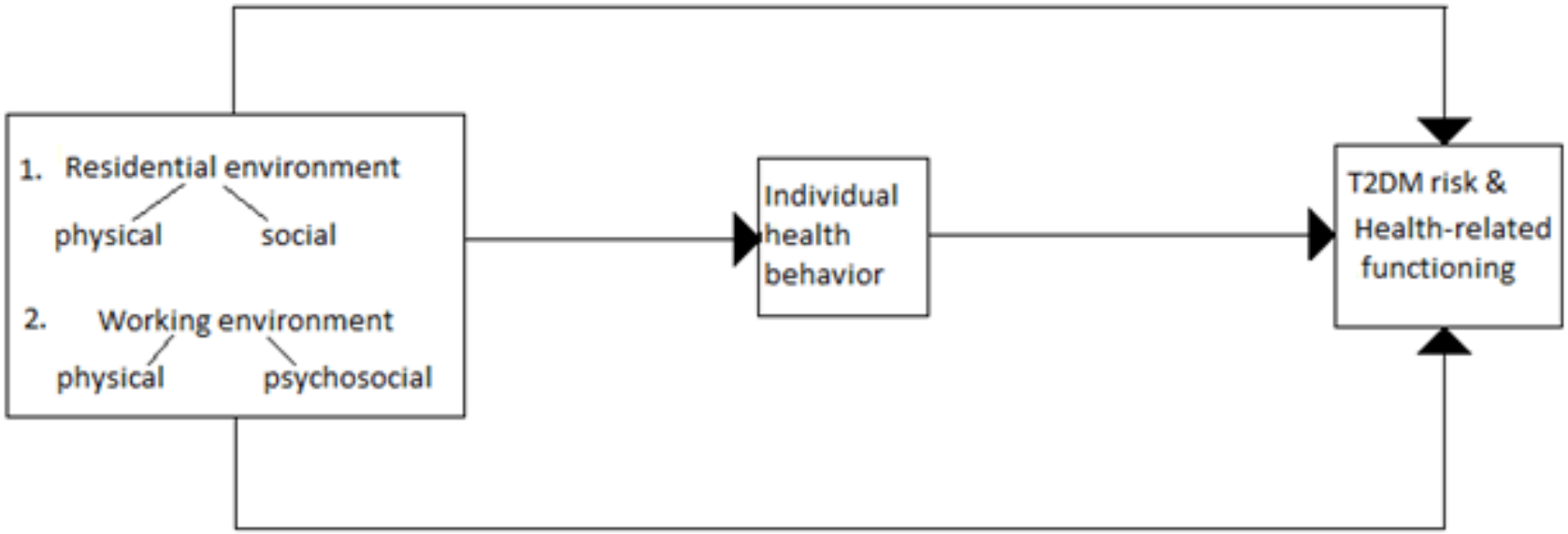
Background

- Socioeconomic status (SES) measure based on:
  - Income level
  - Educational level
  - Occupational level
- Often interpreted in terms of an (aspecific) environmental influence
- Specific environmental factors in their relationship with T2DM and health-related functioning are still unknown

Background

- Aim:
- Demonstrate the contribution of specific environmental factors and their pathways to T2DM risk and health-related functioning within T2DM patients:

Residential Environment	Working environment
• **Physical**: Housing & Neighborhood conditions (f.i. neigborhood safety, drafty house) • **Social**: Social interactions between neighbors as important aspect of social networks	• **Physical**: Physical workload • **Psychosocial**: Job stress



Possible pathways

1. Direct pathway via chronic stress. For instance, stress can cause chronic inflammation, which is likely to be involved in the pathophysiology of T2DM
2. Indirect pathway via health beviour risk factors, environment as context in which poor health behaviors are promoted and maintained

Objectives

- Estimate the association between residential conditions and T2DM risk and poor functioning within T2DM patients.
    - Physical vs Social

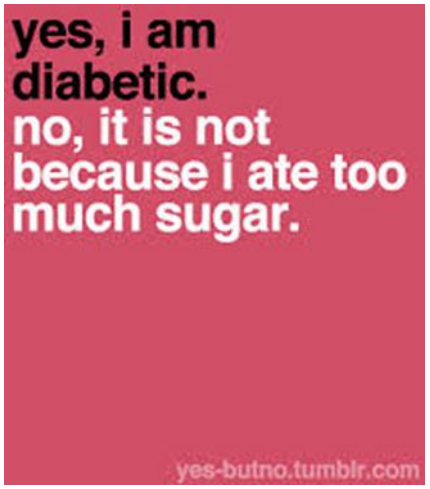
- Estimate the association between working conditions and T2DM risk and poor functioning within T2DM patients
    - Physical vs Psychosocial

Scientific relevance

- Further explanation of socioeconomic inequalities in health
- The first research in the Netherlands demonstrating the influence of the direct environment
- Generalization to other Western countries
- Emphasizes the potential of environmental interventions (in addition to lifestyle interventions)

Societal relevance

- "How does social class gets under the skin?"
- Switch focus from individual to environment
- Lower the current diabetes stigma associated with negative stereotype of obesity



Study design

- Data Maastricht Study
- Population-based prospective cohort study
- Data will include 4000 participants
  (Of whom 1000 diabetics)
- Three visits of 3-4hours examinations
- Questionnaires are filled in during the visits

Methods

- Measurements
- T2DM outcome status
    - Blood glucose tests and the use of diabetes medication
- Health-related functioning:
    - –SF36 & Diabetes-specific quality of life questionnaire
- Environmental conditions
    - Self-reported questionnaires about work, neighborhood and housing conditions
    - "Heeft u in het afgelopen jaar vaak te maken gehad met ernstig lawaai overlast van buren?"
- Statistical Analyses
    - based on binairy logistic regression and multiple linear regression analysis

Global Time Plan

Year 1	**Article 1:** The physical versus the social residential environment, health behavior risk factors and the risk of type 2 diabetes.
Year 2	**Article 2:** The physical versus the psychosocial working environment, health behavior risk factors and the risk of type 2 diabetes.
Year 3	**Article 3:** The physical versus the social residential environment, health behavior risk factors and health-related functioning in type 2 diabetes patients.
Year 4	**Article 4:** The physical versus the psychosocial working environment, health behavior risk factors and health-related functioning in type 2 diabetes patients. **Finalizing PhD Thesis**

Article

"Life-course Socioeconomic conditions, "classic" health behavior risk factors and the risk of prediabetes: Findings from the Maastricht Study"

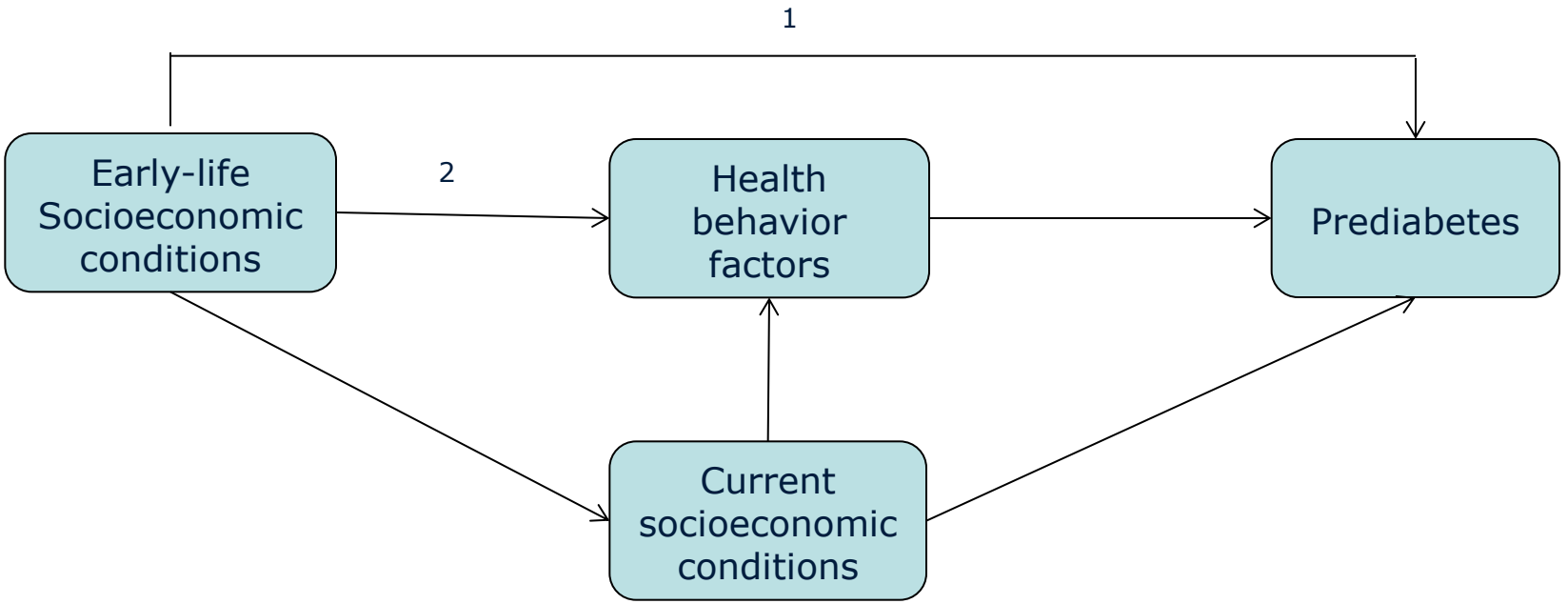
Content

- Background
  - Model
- Methods
  - Study population
  - Measures
  - Statistical analysis
- Results
- Conclusion/Discussion

Background

- Influence of adult socio-economic conditions in T2DM risk well-established
- Interest is growing in life-course perspective of socioeconomic conditions and different health outcomes
- Roots in early-life socioeconomic conditions is suggested in T2DM outcomes
- Mechanism through which early-life socioeconomic conditions can influence T2DM outcomes is not well-understood
- Prediabetes as T2DM outcome: provide information for early interventions (preventing T2DM development)

Model


1
Early-life Socioeconomic conditions
2
Health behavior factors
Prediabetes
Current socioeconomic conditions

Methods

- First data Maastricht Study
- N= 533, including 122 people with prediabetes

- Prediabetes:Impaired fasting glucose (IFG) & Impaired glucose tolerance (IGT)
  - As measured with Fasting Glucose tests and OGTT tests, fingerstick data and medication status

- Early-life socioeconomic conditions
  - Poverty in youth
  - Educational level Father and Mother

Methods

- Current socioeconomic conditions
  - Individual income respondent
  - Educational level respondent
- "classical" health behavior risk factors
  - BMI
  - Physical Activity
  - Smoking status
  - Alcohol use
- Statistical analyisis
  - Chi² tests/ t-tests
  - Binary logistic regression

Results

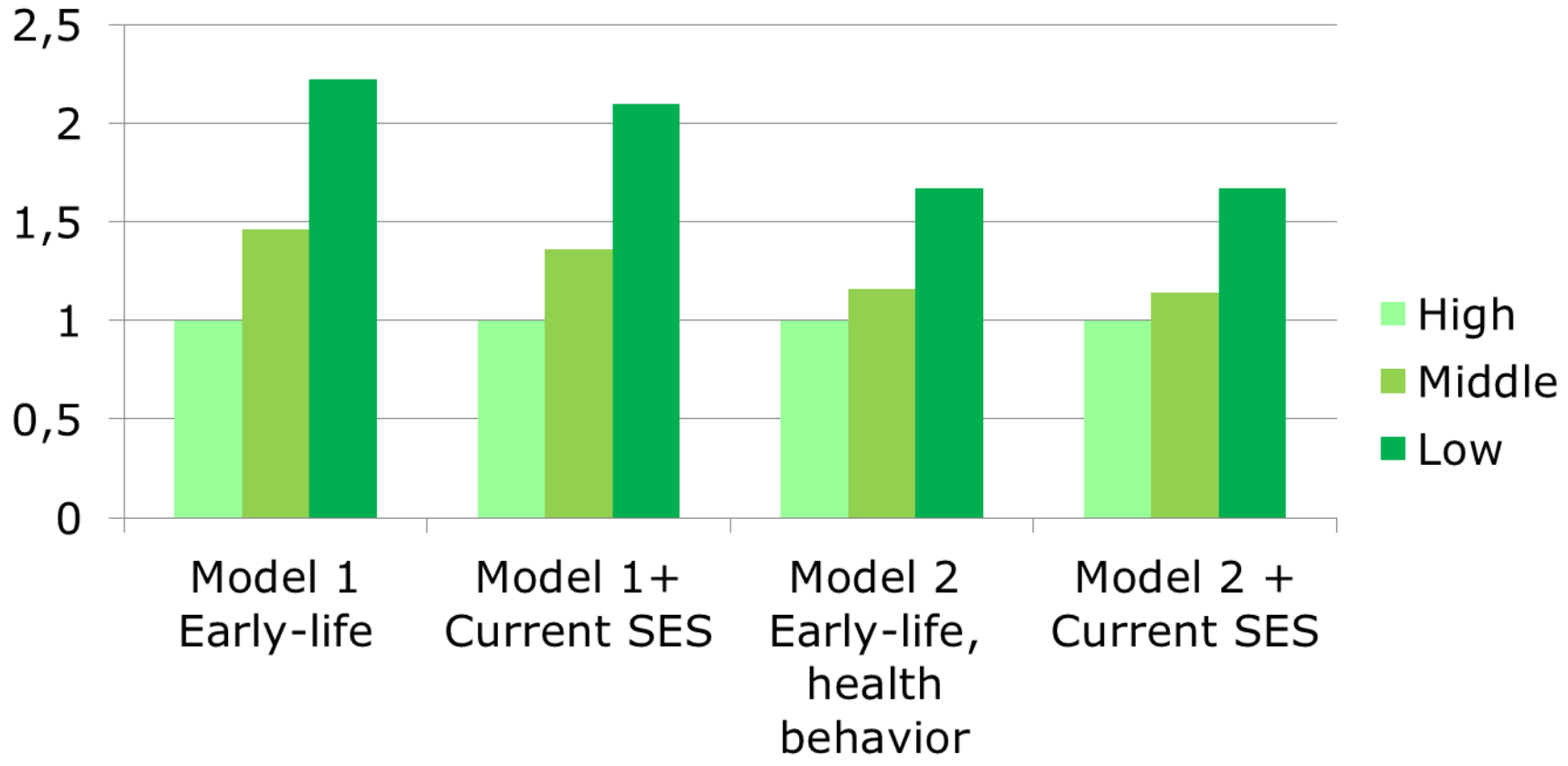
Descriptive characteristics

	No diabetes (N=411)	Prediabetes (N=122)
Age (Mean (SD))	57,09 (8,49)	61,66 (7,67)*
Gender (% Male)	46,2	60,7*
Early-life socioeconomic conditions (%low)	25,5	42,6*
Health Behavior Risk factors - BMI (% obese) - Physical activity (%low) - Alcohol use (% high) - Smoking status (% current)	 10,9 25,5 17,5 33,3	 22,1* 36,9* 14,8 33,6
Current socio-economic conditions (% low)	25,5	30,3

* $p<0.05$: chi^2 tests and independent t-test for prediabetes – no diabetes

Results

Odds Ratio's Early-life SES



Results

- Low early-life socioeconomic conditions indicate a higher risk of Pre-diabetes (OR =2,22), independent of current socioeconomic conditions

- Influence of early-life socioeconomic conditions partially explained by BMI (OR=1,69) (unhealthy nutrition?)

	Pre-diabetes
Early life SES OR (reference=high)	**Total N=533 PreT2DM = 122**
Model 1 (age, gender)	1,00 1,46 (0.85-2.49) 2,22 (1.32-3.71) ⇐
Model 2 (age, gender, BMI, PA, Alcohol, Smoking)	1,00 1,16 (0.66-2.04) 1,67 (0.96-2.91)
- Alcohol use	1,00 1,43 (0.83-2.46) 2,26 (1.34-3.81)
- Smoking status	1,00 1,45 (0.85-2.48) 2,21 (1.32-3.71)
- Physical Activity	1,00 1,43 (0.83-2.45) 2,16 (1.29-3.63)
- BMI	1,00 1,24 (0.72-2.16) 1.69 (0.99-2.90) ⇐
Model 1 + Current SES	1,00 1,36 (0.78-2.37) 2,10 (1.23-3.59)
Model 2 + Current SES	1,00 1,14 (0.64-2.04) 1,67 (0.94-2.95)

Conclusion/Discussion

- Low early-life socioeconomic conditions are associated with a higher risk of prediabetes
- Association is only partially mediated by BMI, but not by other health behavior factors
- Probably other mechanisms involved
  - Psychosocial mechanisms
  - Parenting styles
  - Stress, depression and trauma's
  - Environmental influences
  - Pathophysiological mechanisms involved: inflammation

Questions?