Timing and Duration of Neighbourhood Disadvantage: A Life Course Perspective on Health Behaviours

Justė Lekštytė (UAB/CED)

Johan Junkka (Umeå University)

Introduction

Health behaviours strongly shape long-term health outcomes

- Not just individual choice → influenced by **social** & **physical environments**

Growing up in disadvantaged areas linked to:

- poorer health
- weaker educational & behavioural outcomes

Effects depend on:

- timing (childhood as a sensitive period)
- duration (longer exposure → stronger impact)

Introduction

- Limitations in research:
  - cross-sectional
  - focus on both timing and duration in childhood is rare
  - health behaviours are underexplored
- Research question:
  - How do the timing and duration of exposure to neighbourhood disadvantage during childhood shape adult health behaviours, and through which pathways (e.g., access vs social context) do these effects operate?

Theoretical background

LIFE LONG MOVE

Mechanisms of neighbourhood influence

- institutional-environmental
  - resource-poor environments -> limited access -> lower health literacy and skills in adulthood
  - toxic environments, including pollution, crowding, and poor sanitation
- social-interactive
  - interaction with peers and adult role models -> providing information, setting norms
  - preventable diseases linked to behavior
    - neighborhoods with higher smoking prevalence -> lung cancer and other smoking-related diseases
    - peer influence to substance abuse and other risk taking behavior -> persisting life course behavioral patterns

Theoretical background

Cumulative exposure

- Short exposure to disadvantage -> lower influence on health
- Longer periods in resource poor environment -> higher influence on health
- Continuous, long-term exposure and interaction -> higher peer effects
- Particularly important for immobile families

Theoretical background

Sensitive periods

- early childhood model
  - Period of primary socialisation - development of cognitive and educational skills
- adolescence model
  - children become more autonomous and explorative, making neighbourhoods more important
  - risky behaviours that peers may encourage

Swedish context

Strong welfare state with universal access to healthcare, education, and social protection.

Recent rise in inequalities:

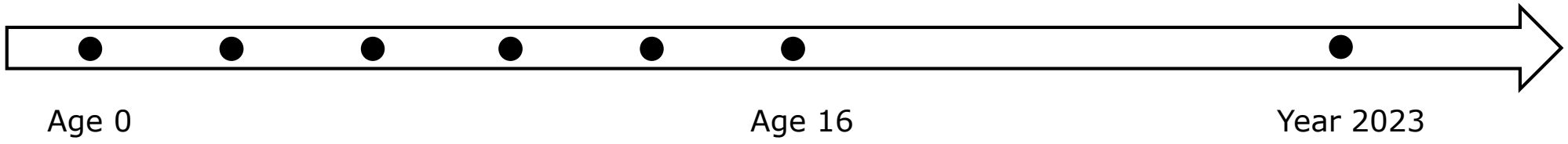
- socioeconomic residential segregation
- ethnic segregation in urban neighbourhoods

Residential inequalities are persistent over time.

Data

Swedish register data

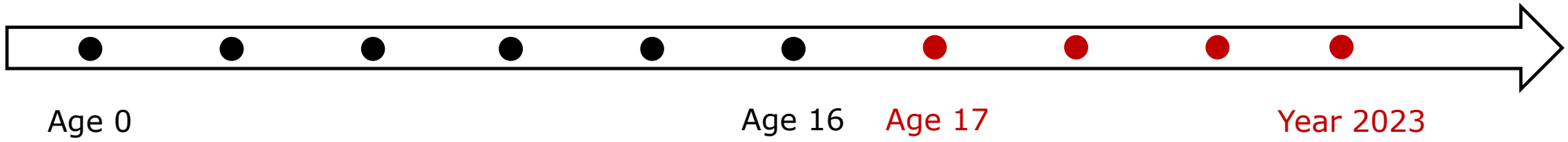
- 1990-1993 cohorts
  - N = 78,172 *(390,861 – 20%)*



Variables

Health behaviors:

- Preventable hospitalisations
  - potentially avoidable hospitalisations through lifestyle or medical prevention
  - binary outcome



Variables

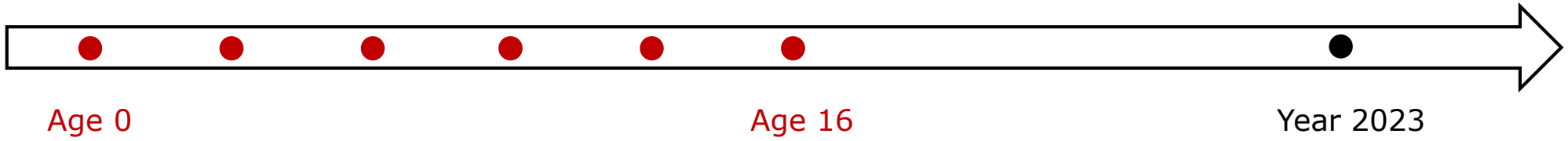
Health behaviors:

- Hospitalisation due to
  - obesity (E66)
  - substance-related disorders (ICD-10 F10-19)
  - injuries and poisonings (ICD-10 S00-T98)
  - potentially avoidable hospitalisations

- 14% (N = 10,944)

Variables

Neighborhood exposure:



- Socio-spatial context of the area → deprivation index
  - individuals aged 25–64 years:
    - low educational status;
    - low income, defined as <50% of the median individual income;
    - unemployment;
    - receipt of social welfare.
  - Each indicator is standardised (converted to z-scores) and summed.
  - Top 20% → disadvantaged.

Variables

Time in-variant

- Gender
- Parental migration status
- Health at birth
- Parental education at birth

Time varying

- Parental income (disposable household income)
- Parental employment (0, 1, 2)
- Number of children in the household (1, 2, 3+)
- Parental union (stable, single parent)
- Parental health behaviours

Method

Neighbourhood disadvantage and family conditions influence each other over time:

Neighbourhood -> family circumstances -> future neighbourhood

This feedback loop creates bias in conventional regression models.

If we control for family resources later, we accidentally block part of the neighborhood effect we want to estimate

Method

Step 1 – model exposure

- At each age, estimate the probability of living in a disadvantaged neighbourhood based on:
  - Past neighbourhood exposure
  - Family characteristics

Step 2 – create weights

- Individuals who had a low probability of their observed exposure history would receive a higher weight

Step 3 – pseudo population

- After weighting
  - Neighbourhood exposure is no longer associated with prior confounders
  - This mimics a situation where neighbourhood exposure is as good as randomly assigned

Method

Step 1: cumulative disadvantage

- continuous measure capturing the total duration of neighbourhood disadvantage experienced throughout childhood

Step 2: sensitive periods

- dummies for disadvantage experienced during early childhood (ages 0-5), the early school years (6-10), and adolescence (11-16)

Step 3: timing and exposure

- never experienced disadvantage,
- only in early childhood,
- only during the early school years,
- only during adolescence,
- two or more periods of childhood.

Method

Comparison to traditional regression models:

- logistic regression without any controls
  - do not account for systematic differences between children who do and do not experience neighbourhood disadvantage
- logistic regression with time in varying controls
  - do not address variations in neighbourhood exposure and family characteristics over time
- logistic regression with time-varying and time-invariant controls
  - biased because time varying variables may themselves be influenced by prior neighbourhood disadvantage

Results

Table 1. Descriptive statistics

Never lived in a disadvantaged DeSO (0 - 16 years)	65%
Only during early childhood	11%
Only during early school years	1%
Only during adolescence	4%
Early childhood and early school years	4%
Early childhood and adolescence	2%
Early school years and adolescence	3%
Continuous disadvantage throughout childhood	11%
Mean total years in disadvantaged DeSO	2.2
Total (N)	78,172

Results

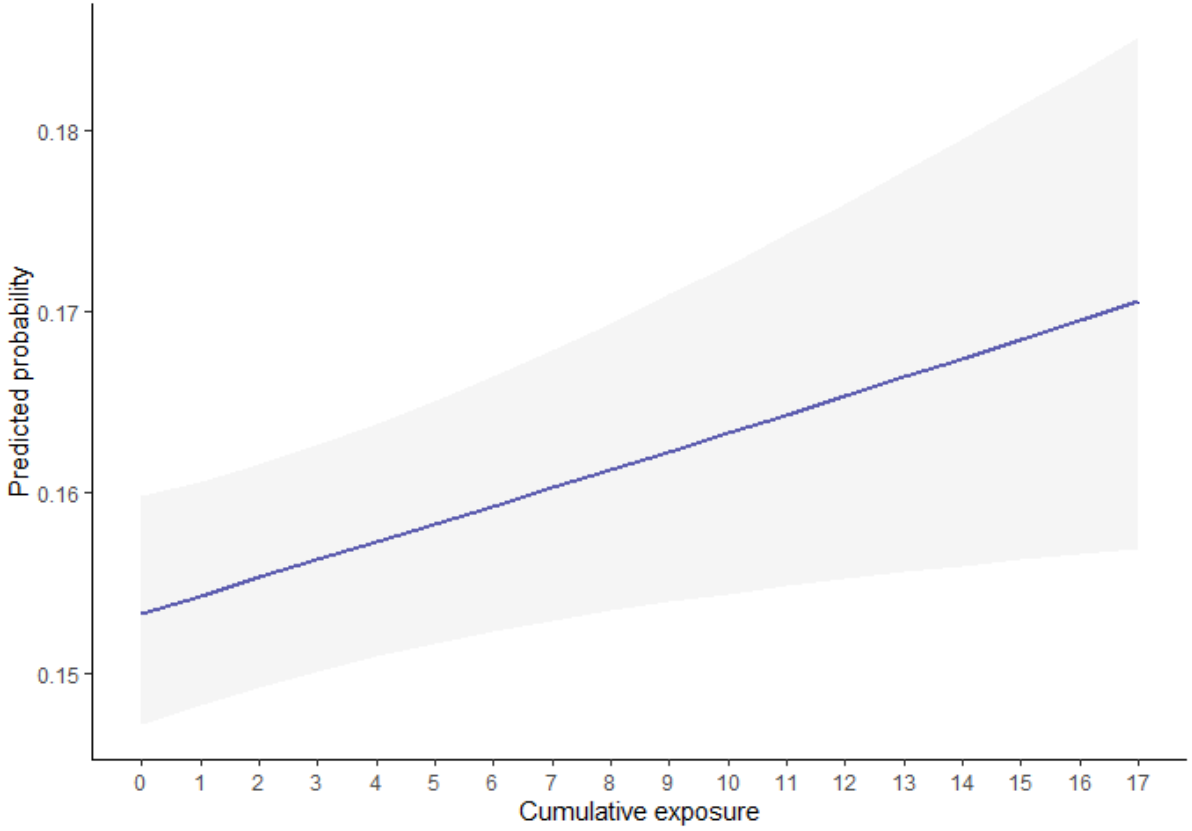


Figure 1. Cumulative disadvantage and health behaviours in adulthood
Notes: 95% confidence interval in brackets, MSM model with IPTW weights with time in varying controls

Results

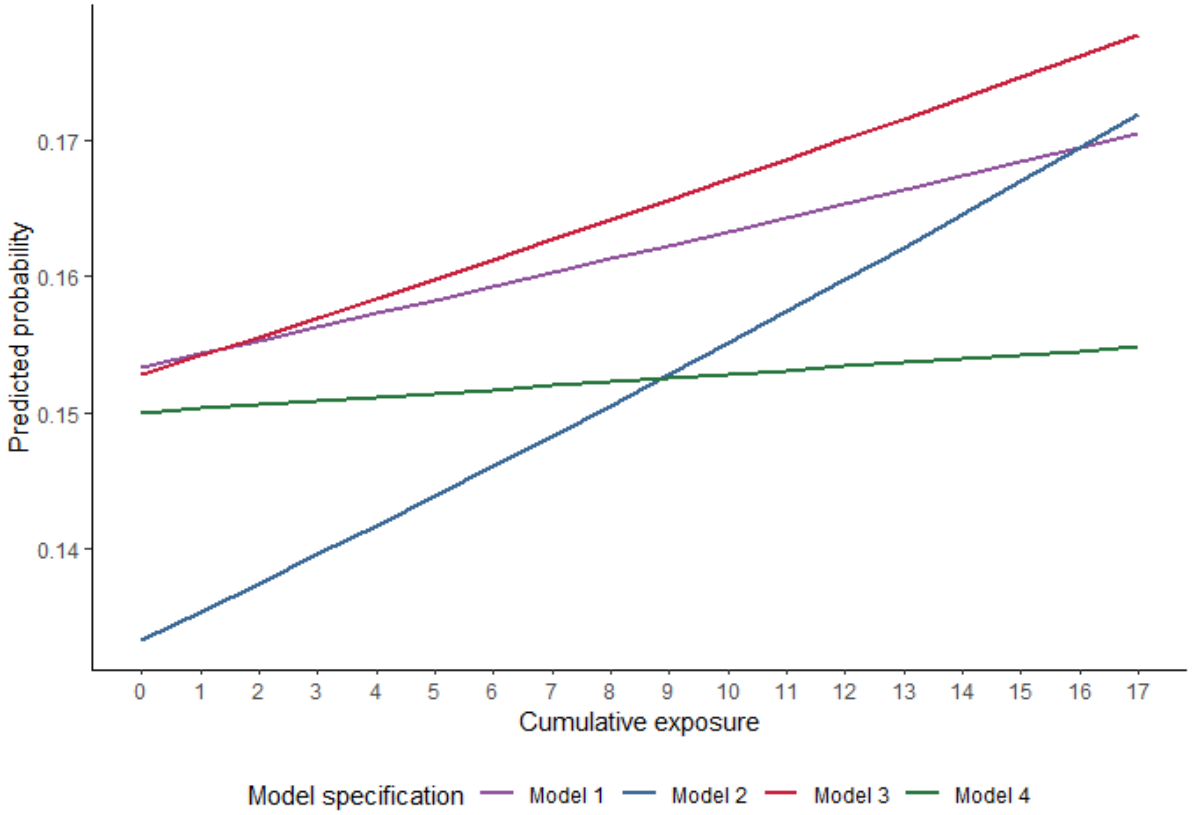


Figure 2. Cumulative disadvantage and health behaviours in adulthood

Notes: 95% confidence interval in brackets. Model 4 contains time-varying confounders. Model 1 is an MSM model with IPTW weights with time in varying controls. Model 2 logistic regression without any controls. Model 3 logistic regression with time in varying controls. Model 4 logistic regression with time-varying and time-invariant controls.

Results

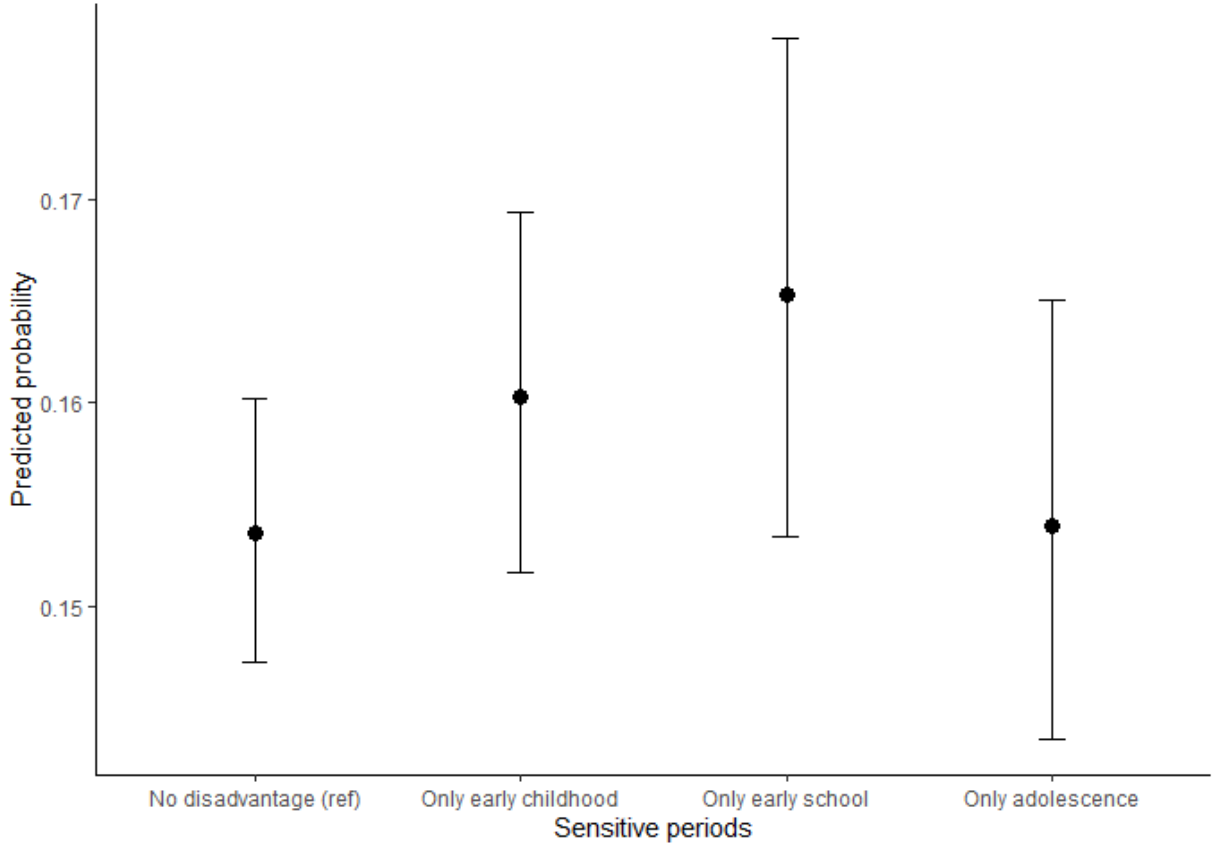


Figure 3. Sensitive periods and health behaviours in adulthood.
Notes: 95% confidence interval in brackets, MSM model with IPTW weights with time in varying controls

Results

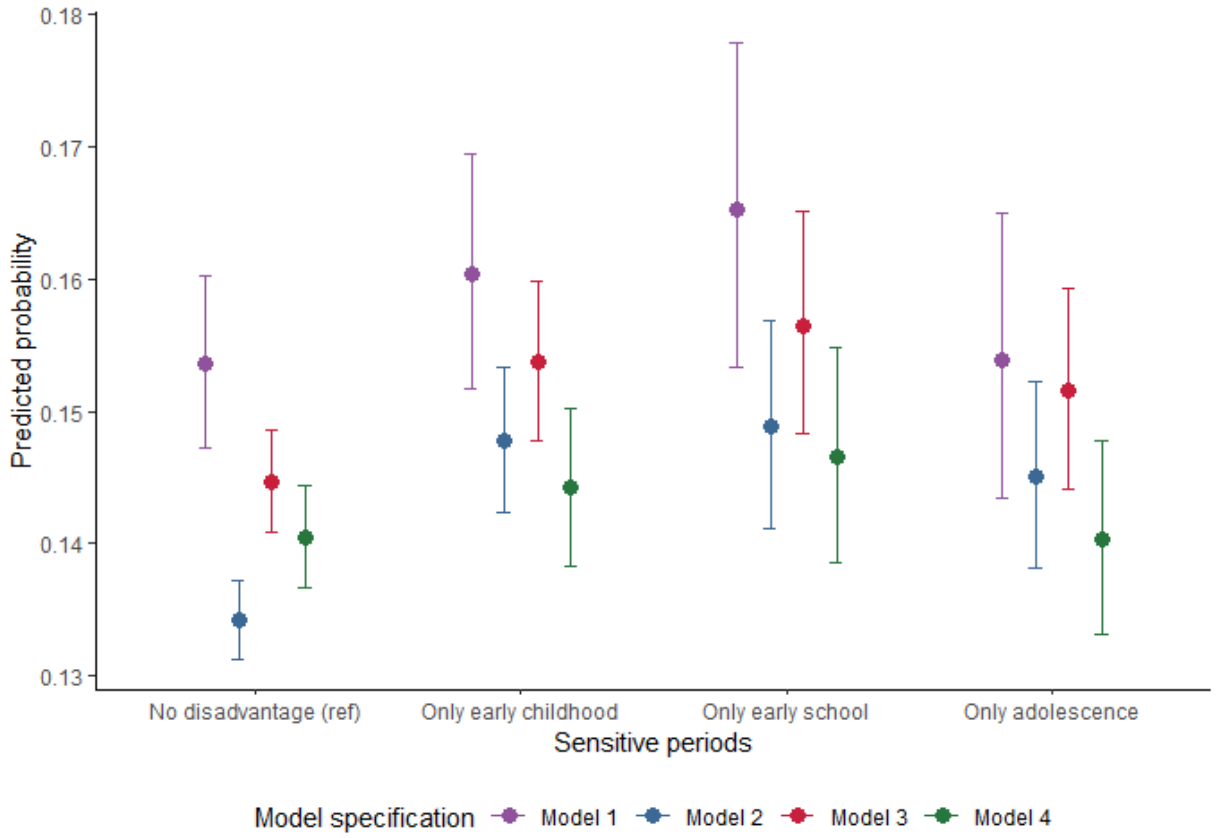


Figure 4. Sensitive periods and health behaviours in adulthood.

Notes: 95% confidence interval in brackets. Model 4 contains time-varying confounders. Model 1 is an MSM model with IPTW weights with time in varying controls. Model 2 logistic regression without any controls. Model 3 logistic regression with time in varying controls. Model 4 logistic regression with time-varying and time-invariant controls.

Results

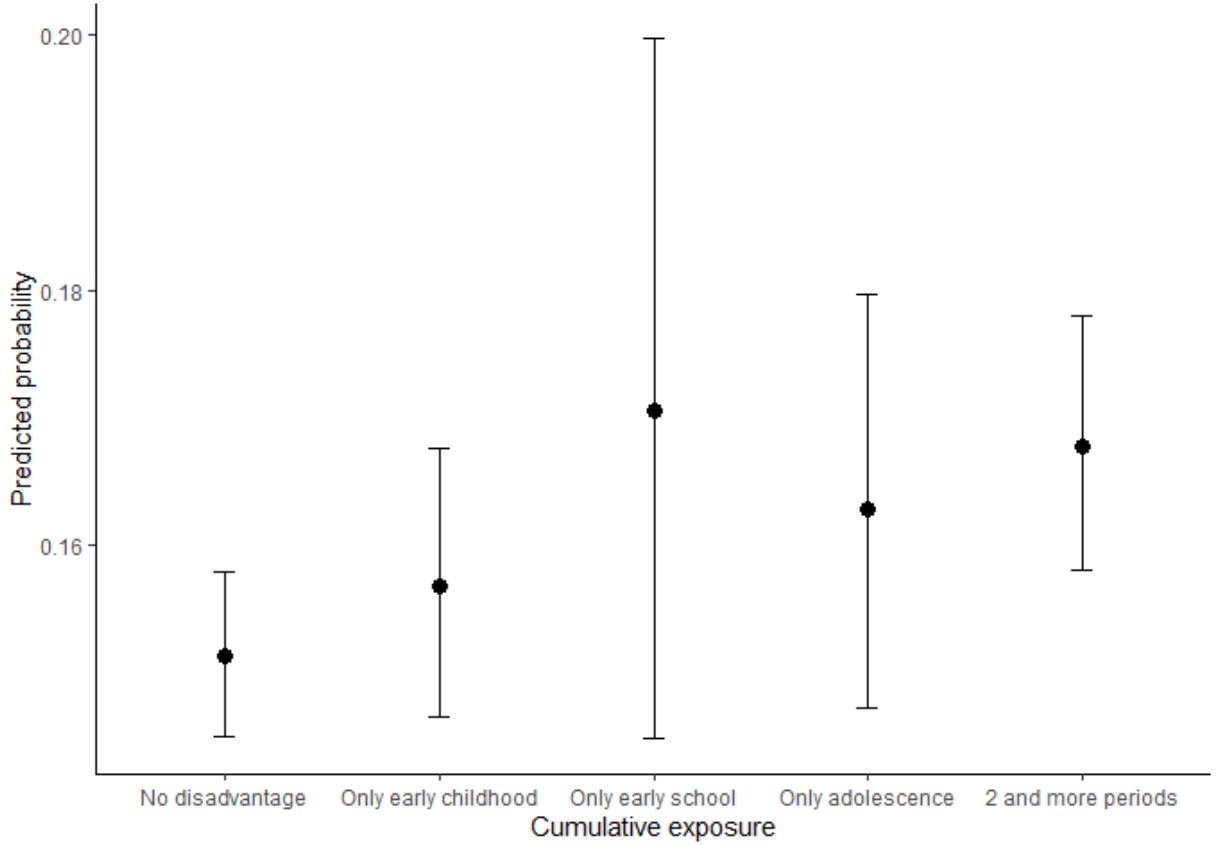


Figure 5. Timing and duration of disadvantage across childhood.
Notes: 95% confidence interval in brackets, MSM model with IPTW weights with time in varying controls

Main takeaways:

- Cumulative disadvantage matters: longer exposure → higher risk of preventable hospitalization
- Persistent exposure is key: disadvantage across multiple childhood stages shows significant effects

Future steps:

- Residential mobility
- Mediation analysis
  - structural access to healthcare resources or social/societal mechanisms

Thank you for your attention!

Justė Lekštytė

Universitat Autònoma de Barcelona, Centro de Estudios Demográficos

jlekstyte@ced.uab.es

LIFELONGMOVE

Understanding spatial mobility from early life into adulthood

European Research Council
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Appendix

Condition	ICD-10 coding	N
Chronic conditions		
Anemia	D501, D508, D509	0
Asthma	J45, J46	79
Diabetes	E101–E108, E110–E118, E130–E138, E140–E148	0
Congestive heart failure	I50, I110, J81	166
Hypertension	I10, I119	993
Chronic obstructive pulmonary disease	J41, J42, J43, J44, J47 J20 if secondary diagnosis J41, J42, J43, J44 or J47	0
Angina pectoris	I20, I240, I248, I249	22
Acute conditions		
Bleeding ulcer	K250, K251, K252, K254, K255, K256, K260, K261, K262, K264, K265, K266, K270, K271, K272, K274, K275, K276, K280, K281, K282, K284, K285, K286	0
Diarrhea	E86, K522, K528, K529	230
Epileptic seizure	O15, G40, G41, R56	5,130
Inflammatory diseases of female pelvic organs	N70, N73, N74	1,765
Renal tubulo-interstitial disease	N390, N10, N11, N12, N136	5,584
Ear, nose and throat infection	H66, H67, J02, J03, J06, J312	18,956