

# Neighborhood socioeconomic status and major depressive disorder; the LifeLines study

Bart Klijs, Eva Kibele, Lea Ellwardt, Marij Zuidersma, Ronald Stolk, Inge Hutter, Rafael Wittek, Carlos Mendes de Leon, Nynke Smidt

# Major depressive disorder (MDD)

## Main symptoms (DSM-IV):

- Severely depressed mood
- Loss of interest in activities

## Disease burden

- Strong impact on quality of life and physical health
- Annual prevalence in NL: 4.2% (males) - 6.3% (females)

## Risk factors:


- Individual, e.g. health, life events, social support, loneliness
- Contextual, e.g. neighborhood

# MDD and neighborhood

- Neighborhood SES is the 'average' SES for individuals living in the neighborhood.
- Physical and social characteristics of neighborhoods with a low SES may be less advantageous for health.
- Evidence on the association between neighborhood SES and depression is inconclusive
- Very limited evidence on factors explaining the association of neighborhood SES and depression

# Theoretical model

## Neighborhood level

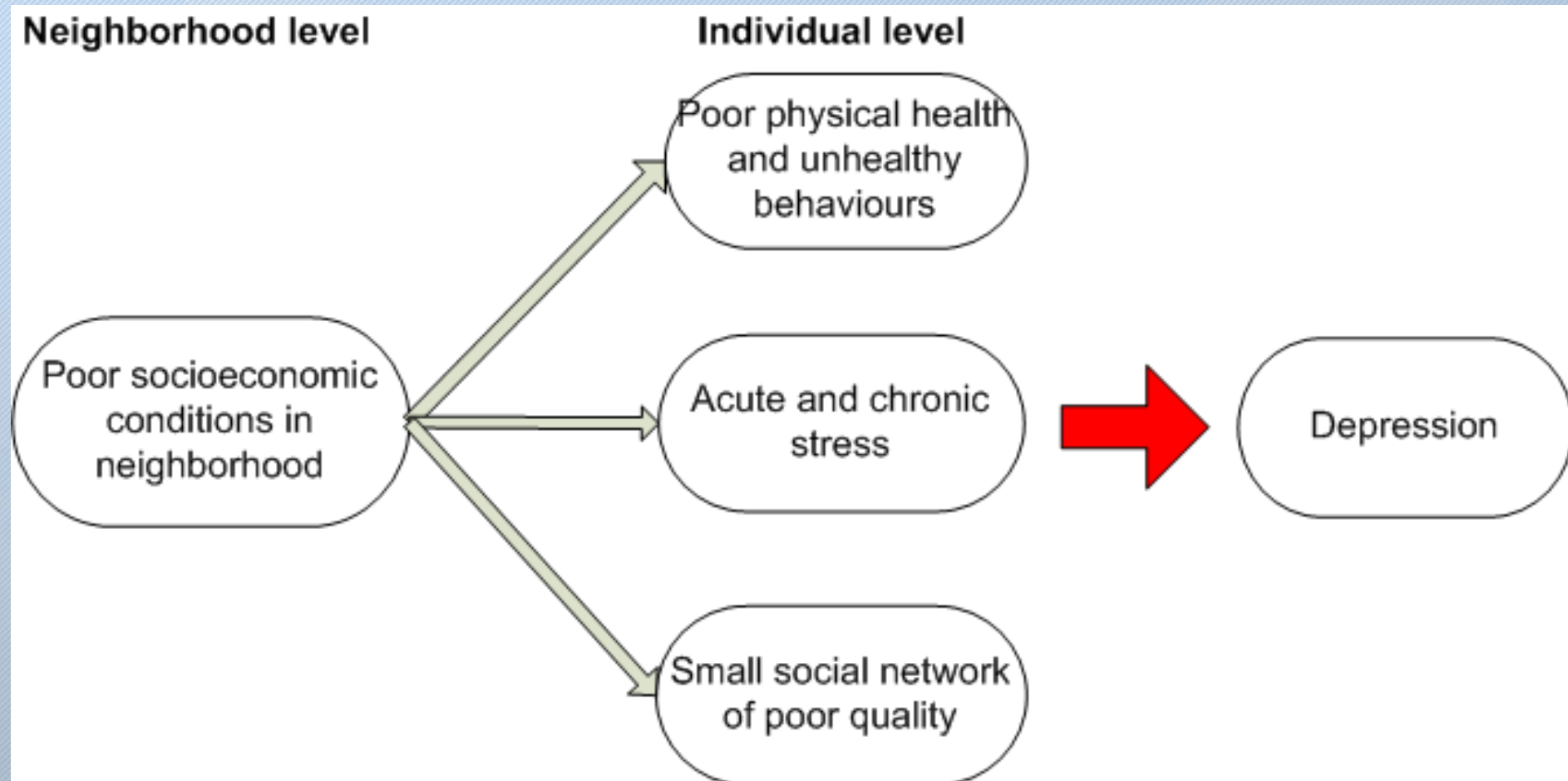


Poor socioeconomic  
conditions in  
neighborhood

Depression



# Theoretical model



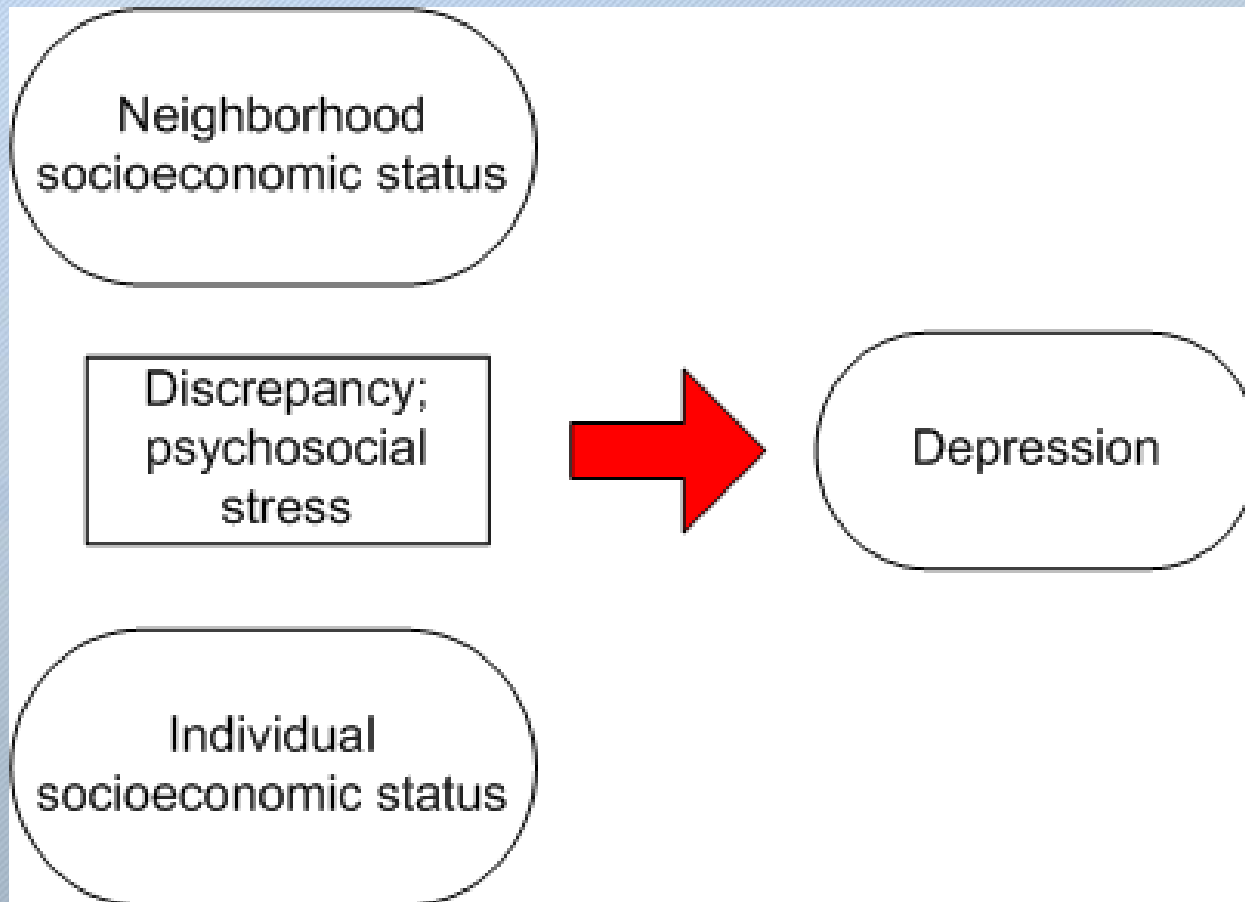
# Theoretical model



# Theoretical model



# Theoretical model





# Hypotheses

1. A low neighborhood SES is associated with a higher prevalence of major depressive disorder.
2. This relationship is partly explained by differences in lifestyle, diseases, acute and longterm stress and the size and quality of the social network.
3. Discrepancy between household SES and neighborhood SES is independently associated with depression.

# Study population

- Baseline sample of LifeLines cohort study

	Missing	Remaining	Percentage
Study sample		94,516	100%
Neighborhood income	21,548	72,968	77%
Depression	1,268	71,700	76%

- 1,649 neighborhoods with a median of 317 participants per neighborhood

# Depression and SES variables

## **Major depressive disorder**

(M.I.N.I. international neuropsychiatric interview, past 2 weeks)

## **Neighborhood SES**

Percentage of households with a low income (Statistics Netherlands)

Continuous, Z-standardized

## **Household SES**

Household equivalent income

Categorical: <1250; 1250-1749; >=1750 Euros/month; missing



# Control variables

## Health related factors

Current chronic disease

BMI, physical activity, smoking, alcohol consumption

## Stress

Acute: List of threatening events

Long-term: Long-term difficulties inventory

## Social Network

Number of different contacts in two weeks

Participation in organized clubs and groups

Quality of social contacts (SPF-IL; affection, behavioural confirmation, status)

# Data analysis

Mixed effects logistic regression, neighborhood random intercept

**Model 1** Neighborhood SES, control for household SES, age, sex, household composition and ethnicity

**Models 2,3,4** Health factors, psychological stress and social network subsequent added

**Model 5** Interaction of Neighborhood SES and household SES



# Results; hypothesis 1

Odds ratios with 95% confidence interval

	model 1
% households in neighborhood with low income	1.16 (1.09-1.24)
household equivalent income	
1250-1749 euro/month	1.71 (1.45-2.01)
<1250 euro/month	2.88 (2.48-3.35)

Model 1: control for demographics

# Results; hypothesis 1

Predicted prevalence of depression for groups varying according to household- and neighborhood SES

	households with low income in neighborhood	
household equivalent income		
>=1750 euro/months	25%	55%
<1250 euro/months	1.9%	2.5%
	5.3%	7.0%

Adjusted for age, sex, household composition and ethnicity

# Results; hypothesis 1

Odds ratios with 95% confidence interval

	model 1	model 2
% households in neighborhood with low income	1.16 (1.09-1.24)	1.12 (1.06-1.19)
household equivalent income		
1250-1749 euro/month	1.71 (1.45-2.01)	1.59 (1.35-1.87)
<1250 euro/month	2.88 (2.48-3.35)	2.42 (2.08-2.81)

Model 1: control for demographics

Model 2: + disease and health behaviours

# Results; hypothesis 1

Odds ratios with 95% confidence interval

	model 1	model 2	model 3
% households in neighborhood with low income	1.16 (1.09-1.24)	1.12 (1.06-1.19)	1.11 (1.05-1.18)
household equivalent income			
1250-1749 euro/month	1.71 (1.45-2.01)	1.59 (1.35-1.87)	1.53 (1.30-1.80)
<1250 euro/month	2.88 (2.48-3.35)	2.42 (2.08-2.81)	2.17 (1.87-2.53)

Model 1: control for demographics

Model 2: + disease and health behaviours

Model 3: + short/longterm stress



# Results; hypothesis 1

Odds ratios with 95% confidence interval

	model 1	model 2	model 3	model 4
% households in neighborhood with low income	1.16 (1.09-1.24)	1.12 (1.06-1.19)	1.11 (1.05-1.18)	1.09 (1.03-1.16)
household equivalent income				
1250-1749 euro/month	1.71 (1.45-2.01)	1.59 (1.35-1.87)	1.53 (1.30-1.80)	1.37 (1.16-1.62)
<1250 euro/month	2.88 (2.48-3.35)	2.42 (2.08-2.81)	2.17 (1.87-2.53)	1.80 (1.54-2.10)

Model 1: control for demographics

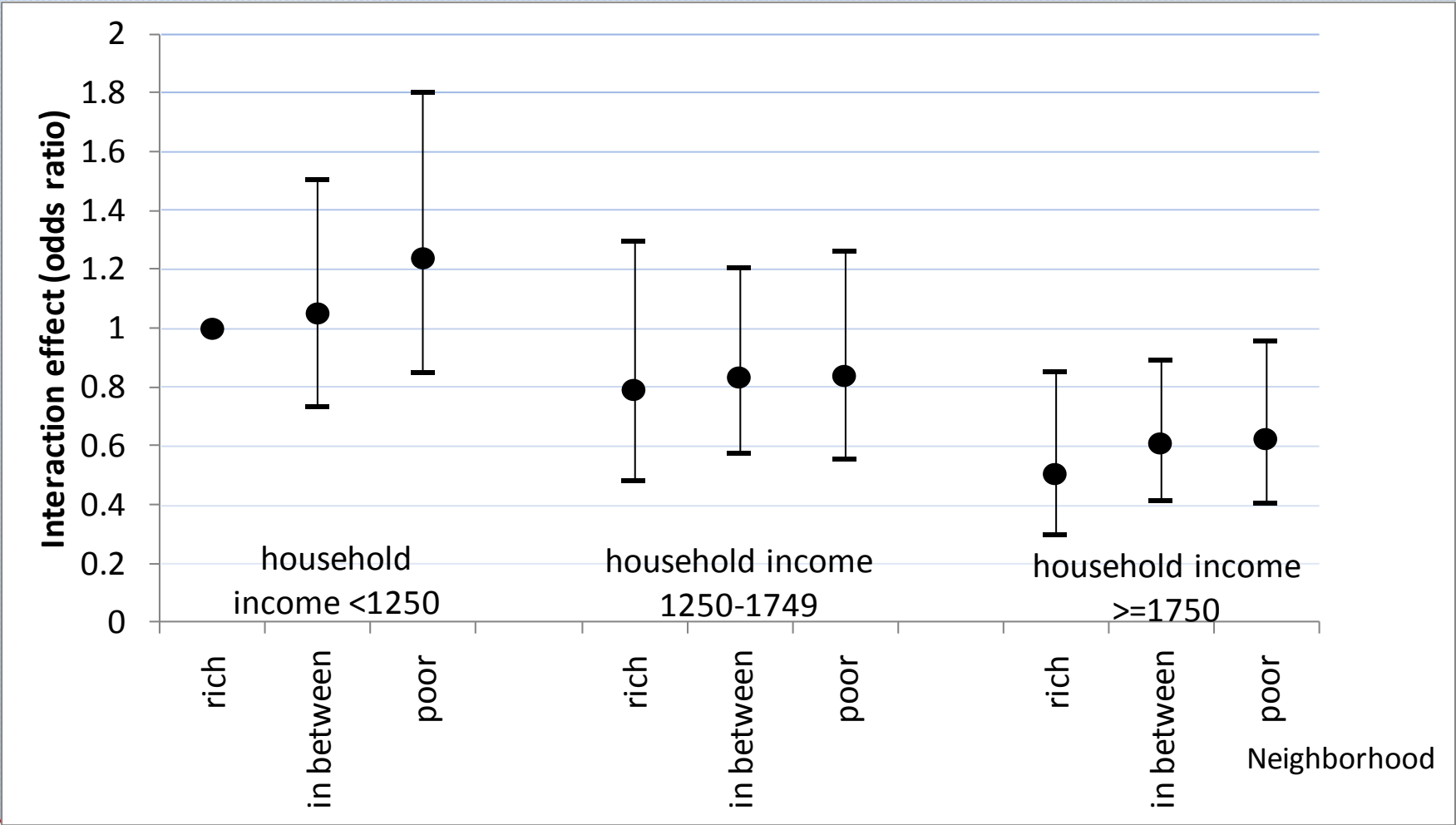
Model 2: + disease and health behaviours

Model 3: + short/longterm stress

Model 4: + size and quality of social network



# Results; hypothesis 3



# Conclusions

1. A low SES of the neighborhood is associated with a higher prevalence of major depressive disorder, independent of household SES.
2. This association is partly explained by differences in diseases and health behaviours, acute and longterm stress and the quality and size of the social network.
3. Discrepancy between household SES and neighborhood SES is not independently associated with depression.