

Parenthood history, allostatic load and health in old age

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Associations between parenthood histories and mortality in later life

- Several, but not all, studies show worse health/higher mortality for nulliparous and high parity women (and men).
- Early parenthood is associated with poorer later health/mortality (women) and poorer later mental health (women and men)
- Late fertility associated better health/lower mortality in both women and men (but some studies the reverse)

These associations may reflect:

- **Selection** and reverse causation
- **Direct effects** e.g. physiological consequences of pregnancy and childbirth.
- **Indirect effects** e.g. costs/benefits of child rearing

Childrearing and health:

Health promoting:

- Incentives towards healthy behaviours and risk avoidance
- More social participation and activity
- Role enhancement
- Social support - in childrearing phases and in later life

Health challenging:

- Physiological demands of pregnancy, childbirth and lactation (although reduced risk breast & some other hormonally related cancers)
- Potential role conflict/role overload
- Stress (and depression)
- Economic strain
- Increased exposure infections
- Disruption of careers/education – especially for young parents

Limitations

Limitations of previous work

- Outcome measures – mortality and ADL limitation- may be too far ‘upstream’ – need indicators of sub clinical morbidity observable earlier in life course
- Failure to identify PATHWAYS through which fertility histories influence later life health
- Limited consideration of early life influences on both fertility histories and later health

Addressing these limitations

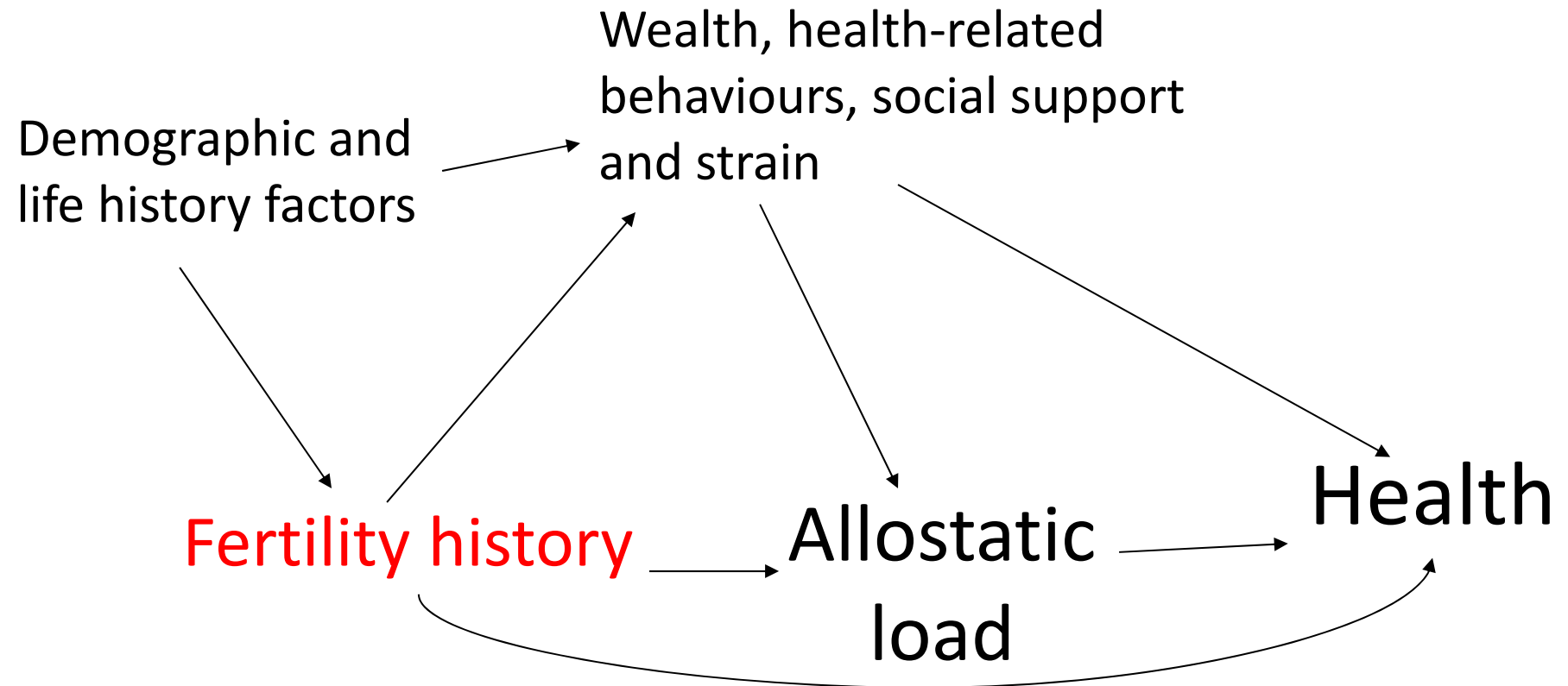
- Measures of allostatic load in mid and later life
- SEM and path analysis to identify pathways
- Modelling including early life indicators

Aims

- Derive a measure of allostatic load using biomarker data from the English Longitudinal Study of Ageing (ELSA)
- Identify pathways from fertility histories to later life health and mediation via allostatic load. Examine the extent to which associations operate through (i.e. are mediated by) wealth, health related behaviours, and social support and strain.

The model to be tested

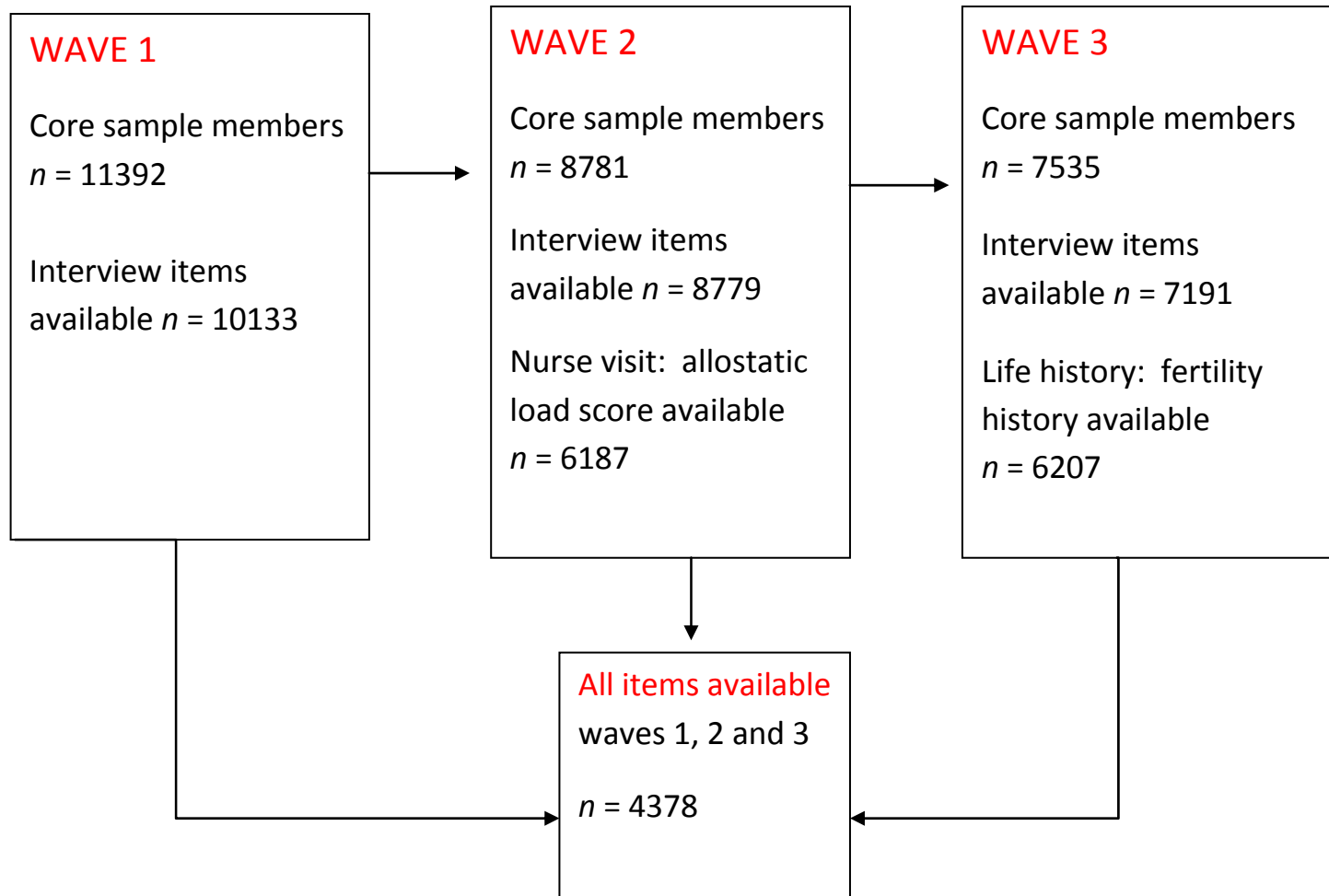
Is the association between fertility history and health mediated by allostatic load?



Data

- English Longitudinal Study of Ageing (ELSA) waves 1 - 3 (2002-2006) - nationally representative survey of men and women aged 50+ (*mean* = 63, *SD* = 9.2 in wave 1)
- Socio-demographic information and self reported health collected in all waves
- Detailed health data including biomarkers collected in alternate waves –biomarker data used to derive an index of allostatic load
- Retrospective life course data collected in wave 3.

Sample derivation and data availability



Measures

Demographic & life course:

Age, education, childhood health problem (retrospective), married/not married, and co-residence/contact with children (time varying); ever divorced, ever widowed (wave 3).

Parenthood history:

Number of natural children (0, 1,2,3,4+); any step child; any adopted child; deceased child; for parents: young (<20/23) age first birth; late age last birth (>34/39).

Intermediate measures:

Wealth; smoking; physical activity; social support and strain (Wave 1)

Health outcomes:

Allostatic load (wave 2); self reported health limitation (wave 3).

Allostatic load scores in ELSA

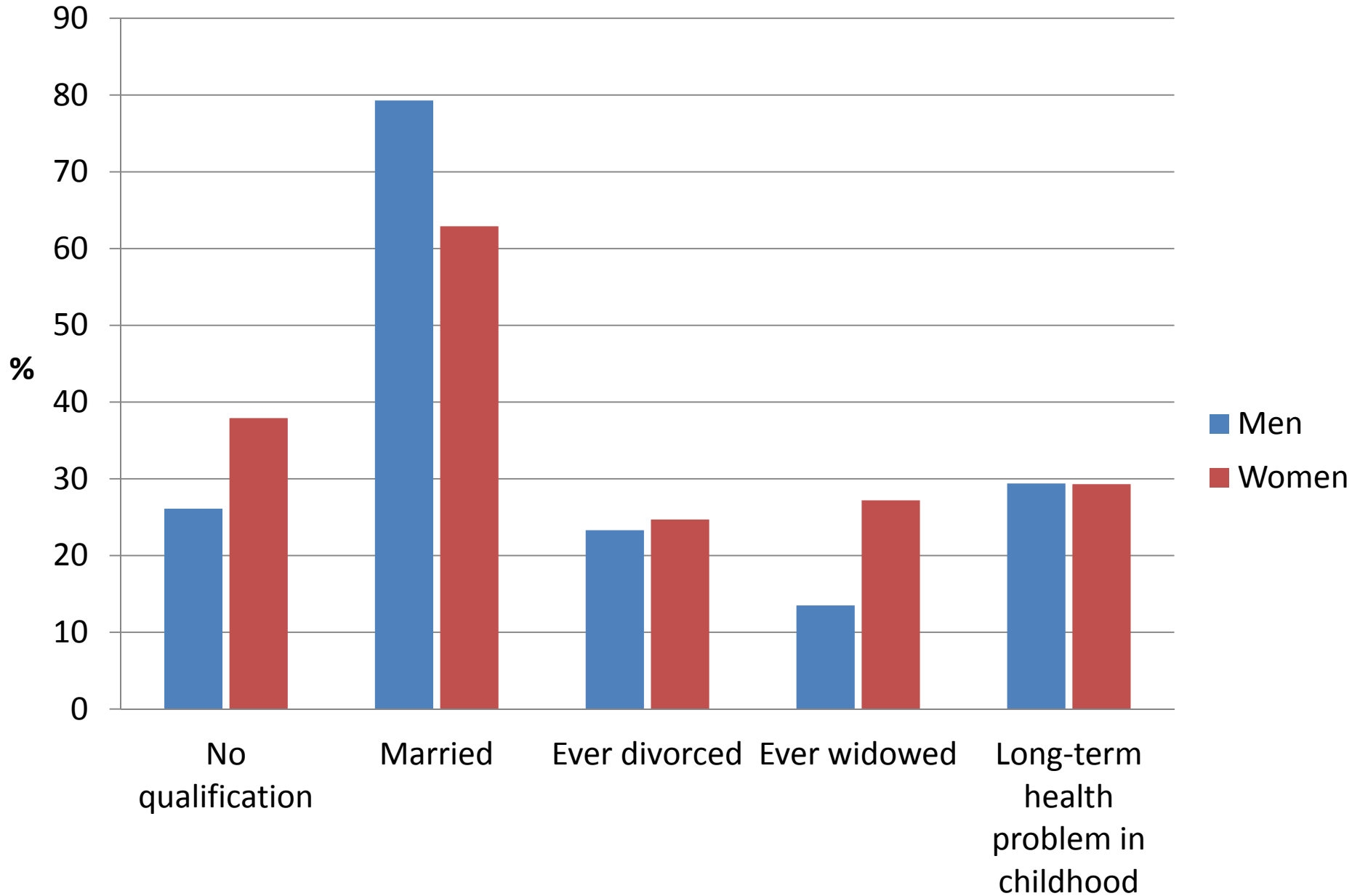
- Allostatic load: multisystem physical dysregulation resulting from long-term exposure to stress
- Grouped allostatic load index: number of biomarkers indicating high risk (25th percentile) calculated separately for men and women (and age group), weighted by the number of markers per system, adjusted for medication

Upper 25 th percentile	Lower 25 th percentile
Systolic blood pressure	Peak expiratory flow
Diastolic blood pressure	
Fibrinogen	
C-reactive protein	
Triglycerides	
Glycosylated haemoglobin	
Total/HDL cholesterol ratio	
Waist-to-hip ratio	

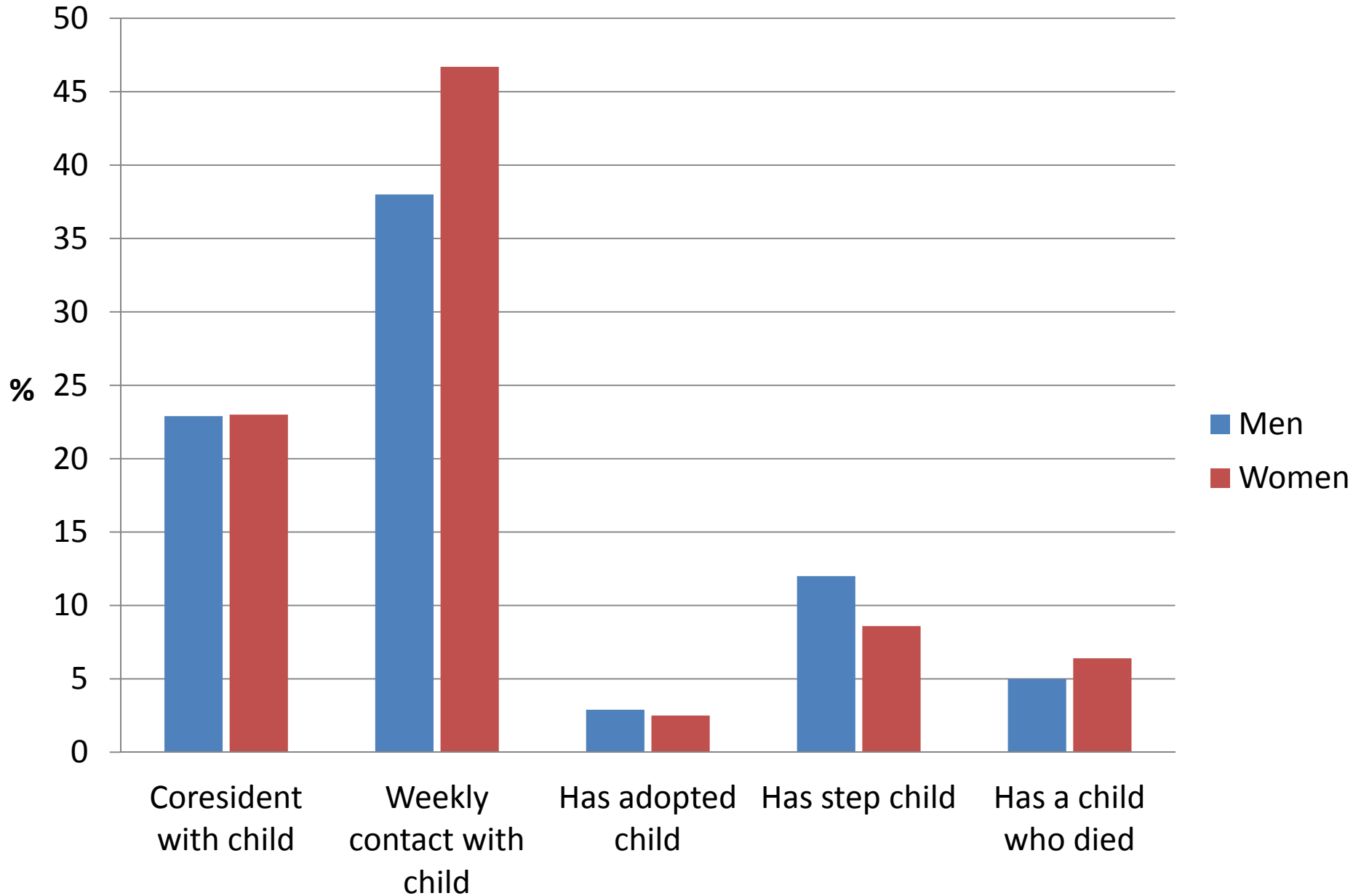
Allostatic load: 25th percentile high risk cut-off points, ELSA in wave 2 (2002).

	Men		Women	
	Aged 51-65	Aged 65+	Aged 51-65	Aged 65+
<i>Inflammation</i>	(n = 1008-1017)	(n = 982-986)	(n = 1219-1232)	(n = 1190-1196)
C-reactive protein	>2.9	>3.4	>3.4	>3.9
Fibrinogen	>3.4	>3.7	>3.5	>3.8
<i>Cardiovascular</i>	(n = 1074)	(n = 1106)	(n = 1319)	(n = 1398)
Systolic blood pressure	>143	>149	>140	>151
Diastolic blood pressure	>85	>80	>83	>79
<i>Lipid metabolism</i>	(n = 1001-1017)	(n = 965-983)	(n = 1219-1233)	(n = 1187-1196)
HDL/Total cholesterol ratio	>5.0	>4.6	>4.4	>4.5
Triglycerides	>2.5	>2.2	>2.1	>2.1
Glycosylated haemoglobin	>5.7	>5.9	>5.6	>5.8
<i>Body fat</i>	(n = 1216)	(n = 1231)	(n = 1486)	(n = 1527)
Waist/hip ratio	>1.00	>1.00	>0.88	>0.89
<i>Respiratory</i>	(n = 1197)	(n = 1190)	(n = 1415)	(n = 1437)
Peak expiratory flow	<506	<406	<344	<265

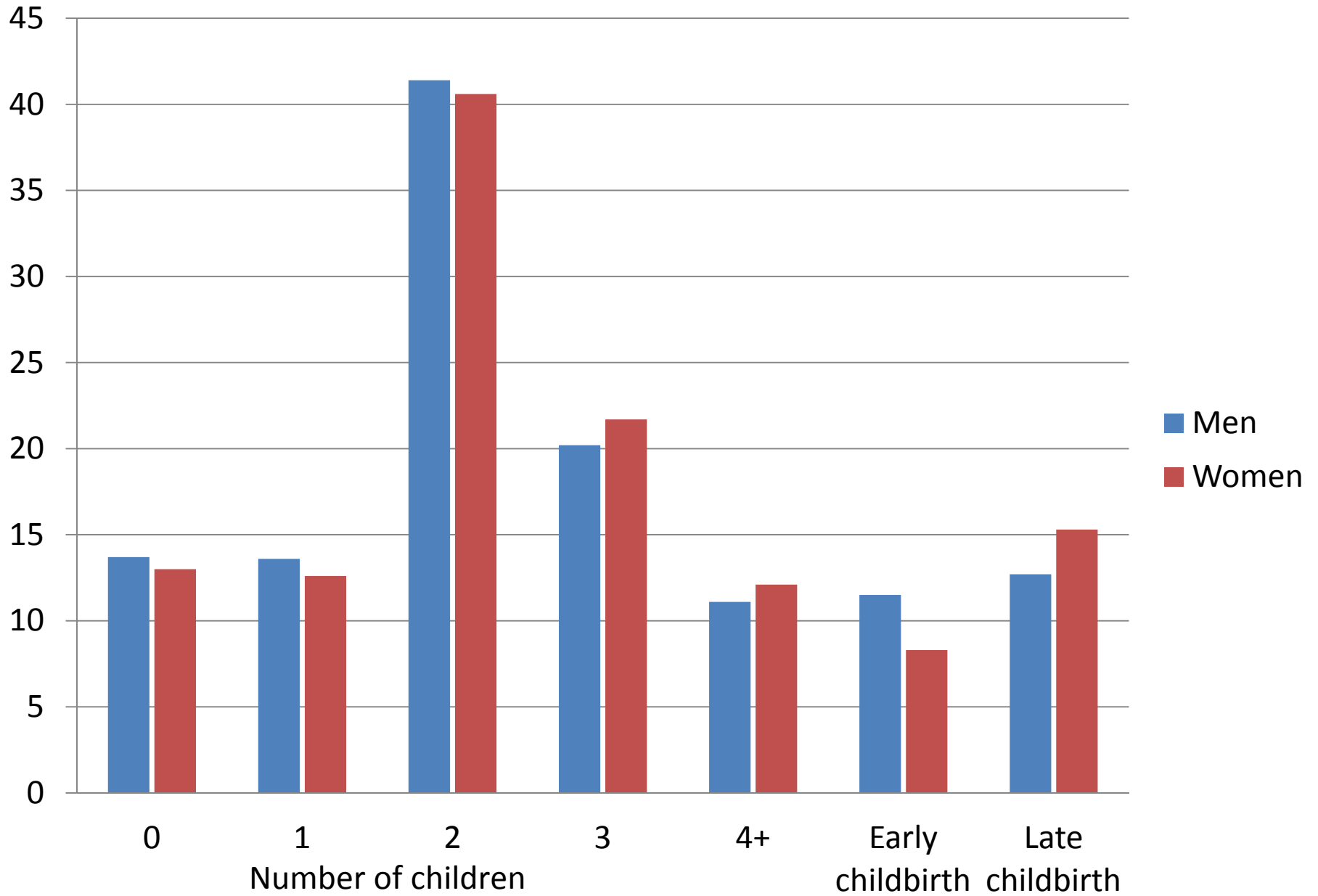
Distribution of the sample by demographic & life history variables



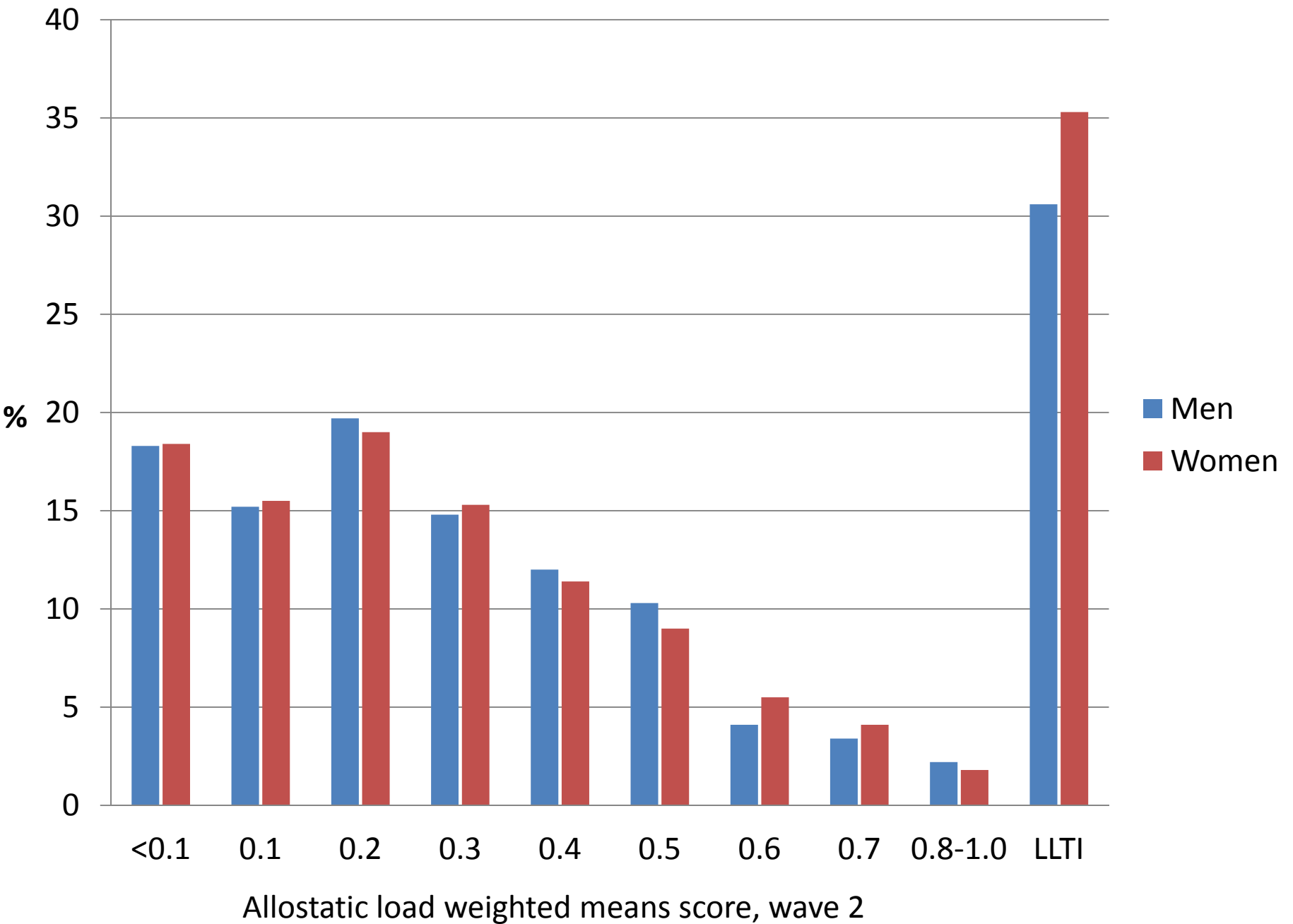
Distribution of the sample by demographic & life history variables



Distribution of the sample by demographic & life history variables



Distribution of the health outcomes



Distribution of the sample by intermediate variables, Mean (*SD*) or %

	Men (<i>n</i> = 1996)	Women (<i>n</i> = 2382)
<i>Intermediate variables</i>		
Wealth quintile, wave 1	3.4 (1.38)	3.2 (1.39)
Physical activity, wave 1	2.2 (0.73)	2.1 (0.78)
Current smoking, wave 1	13.9	15.5
Perceived social support, wave 1	4.2 (0.50)	4.3 (0.49)
Perceived social strain, wave 1	2.7 (0.42)	2.6 (0.45)

Associations between fertility & parenthood variables, allostatic load and health limitation among men (n=2071) and women (n=2519) in ELSA

	Allostatic load		Health limitation	
	Men	Women	Men	Women
No. Natural children (ref = 2)				
0	-0.05	0.04	0.10	0.18
1	0.04	-0.14	0.14	0.07
3	0.01	0.18	0.07	-0.01
4	0.34*	0.29*	0.29*	0.23*
Early child birth ^a	0.51***	0.58***	0.46***	0.43**
Late childbirth ^a	0.10	-0.16	0.29*	-0.23*
Adopted child	-0.15	0.55**	-0.24	0.09
Step child	0.08	0.03	0.30*	-0.09
Child died	0.22	0.03	0.21	0.19

Models include health in childhood; age; education; married/not married; ever widowed; ever divorced; intergenerational contact. Allostatic load adjusted for fasting & inhaler use.

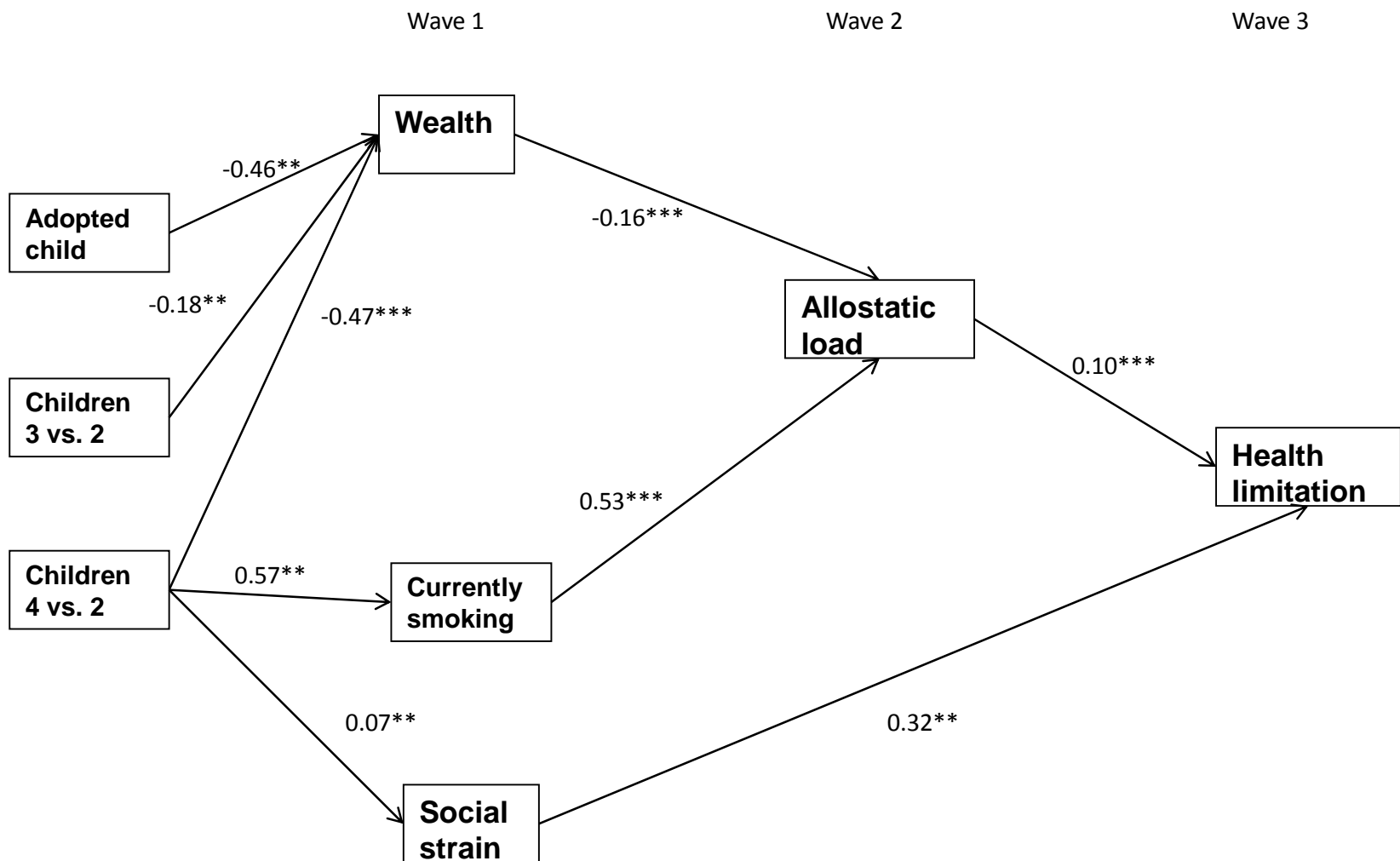


Figure 1. Path model for all women. Model adjusted for age, education, being married, ever divorced, ever widowed and childhood health. Allostatic load adjusted for fasting and inhaler use.

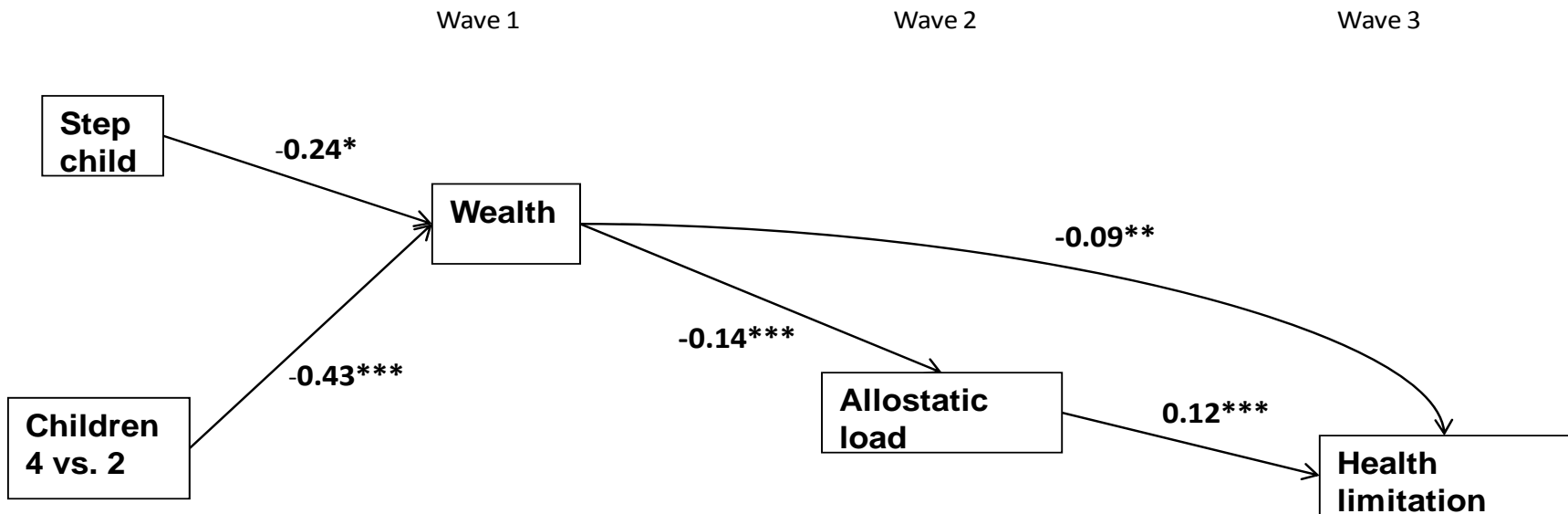


Figure 2. Path model for all men. Model adjusted for age, education, being married, ever divorced, ever widowed and childhood health. Allostatic load adjusted for fasting and inhaler use.

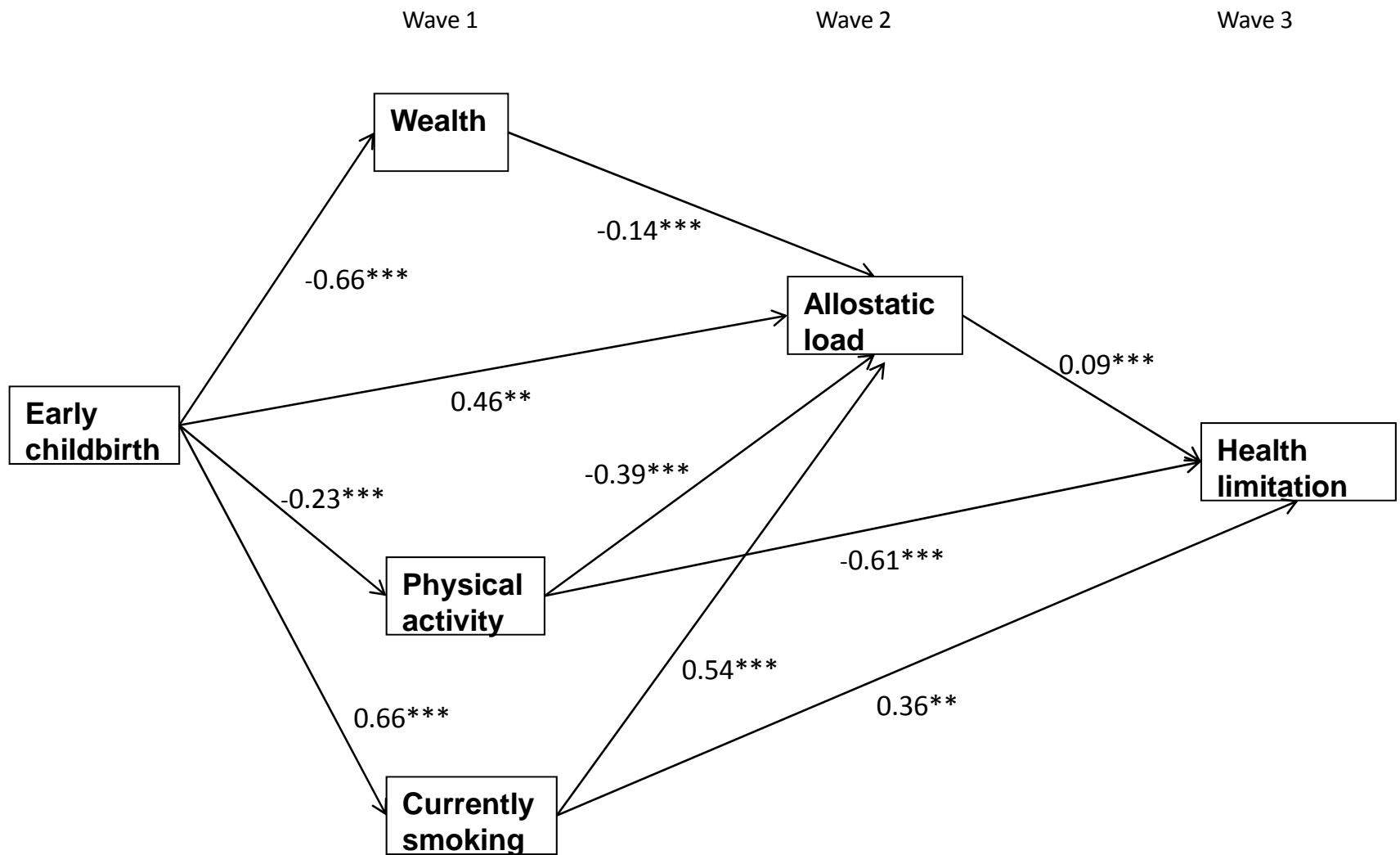


Figure 3. Path model for mothers. Model adjusted for age, education, being married, ever divorced, ever widowed, childhood health, adopted child, number of children, late childbirth and coresidence/contact with child. Allostatic load adjusted for fasting and inhaler use.

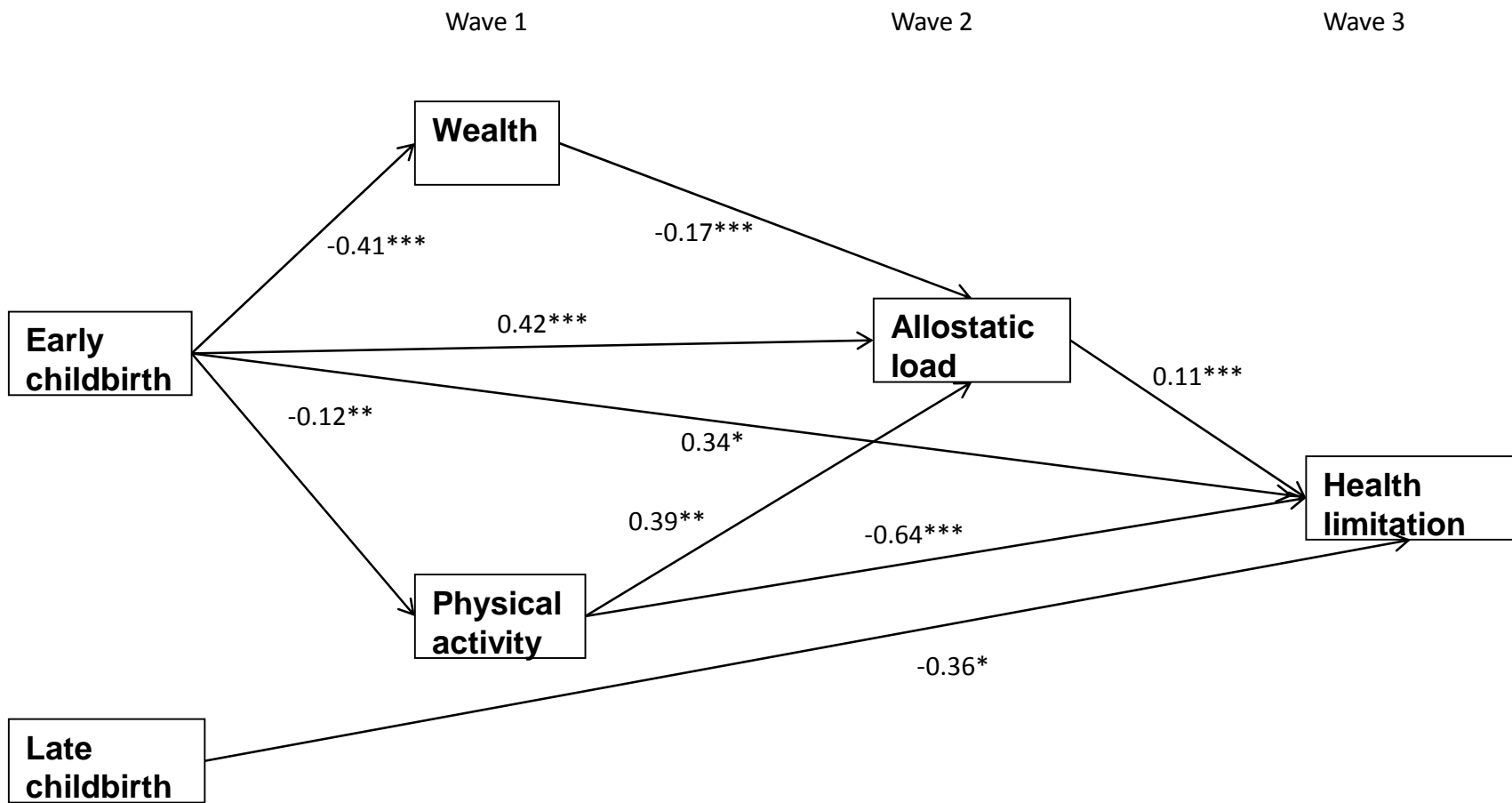


Figure 4. Path model for fathers. Model adjusted for age, education, being married, ever divorced, ever widowed, childhood health, step child, number of children and coresidence/contact with child. Allostatic load adjusted for fasting and inhaler use.

Conclusions & Discussion

- Allostatic load (along with socio-economic position, health-related behaviors and social strain) mediates the association between high parity and later life health
- The health consequences of adopted and step children and timings of births were only partially mediated by allostatic load
- So, as hypothesised, biosocial pathways from parenthood history to health include physiological dysregulation that may be possible to identified before developing disease or disability. Some of the mediation also through economic, social support and health related behaviours – need now to examine in more detail pathways to particular fertility trajectories- especially childhood SES and broader environmental influences (e.g. support from the state).