Family life courses and later life health

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Family life courses and health in mid and later life

- Life course influences are recognized to be important, but most attention paid to socio-economic (and early life) factors
- Largely separate literature has shown differences by marital and household status and social support, more recent attention to partnership and parenting histories
- This literature has examined associations between the fertility histories of women (and less usually men) and mortality or health measured at one point in time
- 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)

Associations between fertility histories and mortality in later life

- **Selection** and reverse causation
- **Direct effects** e.g. physiological consequences of pregnancy and childbirth
- **Indirect effects** e.g. costs/benefits of child rearing, including social support in later life

These effects may have varied over time and between social groups; e.g. risks of pregnancy higher for less well nourished/periods when maternity services were poor; stresses of childrearing higher for poorer unsupported mothers; stresses of childrearing may be offset in supportive environments

- Also trade offs between longevity and reproduction posited by evolutionary theory

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

Effects, and balance between positive and negative, likely to vary by gender, fertility pattern, and socio-economic & socio-demographic factors, including cultural and policy context.

Associations between number of children and at least weekly contact with relatives; friends; & children, relatives or friends. ELSA wave 1.

No. of children (ref=0)	Relatives	Friends	Children/relatives or friends
Men			
1	1.3	1.0	1.7***
2	1.3	0.9	1.7***
3	1.7*	0.9	2.1***
4+	1.4	0.9	2.6***
N			3176
Women			
1	1.2	1.0	1.7**
2	1.2	0.9	1.7***
3	1.3*	0.8*	1.9***
4+	1.5*	0.9	1.9***
N			3835

Controls for age, education, wealth, housing tenure, marital status, health, ADL & IADL limitation. *p<0.05; **p,0.01, ***p<0.005. Grundy & Read JGSS 2012.

Receipt of help from a child at Wave 2 among parents with ADL/IADL limitation, by number of children, availability of daughter and contact with child at Wave 1.

	Help from child at Wave 2			
	Fathers (N=646)		Mothers (N=991)	
N of children (ref = 1)				
2	1.37	1.36	0.98	0.96
3	1.55	1.52	1.39	1.33
4+	1.70	1.69	2.15**	2.12**
Daughter	0.83	0.74	1.56*	1.43
Married	0.40***	0.40***	0.45***	0.44***
Weekly contact with child Wave 1	-	1.74**	-	1.73***

Controlling for age, wealth, education , housing tenure, and baseline general health and long term illness.

Source. Analysis of ELSA, Grundy & Read JGSS in2012.

Outline :Fertility history and later life mortality: outcomes investigated and data used:

:

- *All cause mortality*: Norwegian population registers; ONS Longitudinal Study (E&W): USA Health and Retirement Survey linked to mortality
- *Cause specific mortality*: Norwegian population registers
- *Health, health trajectories*, **mental health**: USA HRS; UK British Household Panel Study; English Longitudinal Study of Ageing (allows consideration of mediating variables such as smoking and emotional support), 1946 birth cohort.
- **Quality of life, loneliness, social contacts, receipt of help from children**: ELSA
- ***Allostatic load and health and limitation and mediation* through lifestyle, wealth and social support variables**: ELSA

Fertility history and mortality ages ~45-69 comparing England & Wales, Norway & USA (controlling for age, marital & socio-economic status &, in USA, race/ethnicity).

	E&W deaths 1980 2000 at ages 50-69	**Norway deaths 1980 2003 at ages 45-68**	**USA deaths 1994 2000 at ages 53-69**
ALL Women/Men:	*OR*	*OR*	*OR*
0	**1.28**	**1.50**	**1.47**
1	**1.10**	**1.31**	**1.34**
2 (ref)	**1.00**	**1.00**	**1.00**
3	**1.01**	**0.95**	**1.21**
4	**1.11**	**0.95**	**1.41**
5+	**1.25**	**0.94**	**1.66**
PAROUS			
Birth before 20 (F)/23 (M)	**1.30**	**1.21**	**1.55**
Birth after 39	**0.94**	**0.86**	**0.74**
Number of deaths	***2,212***	***23,241***	***329***

Analysis of ONS LS data ; Norwegian register data & US HRS, Grundy 2009. P<0.05; P<0.10

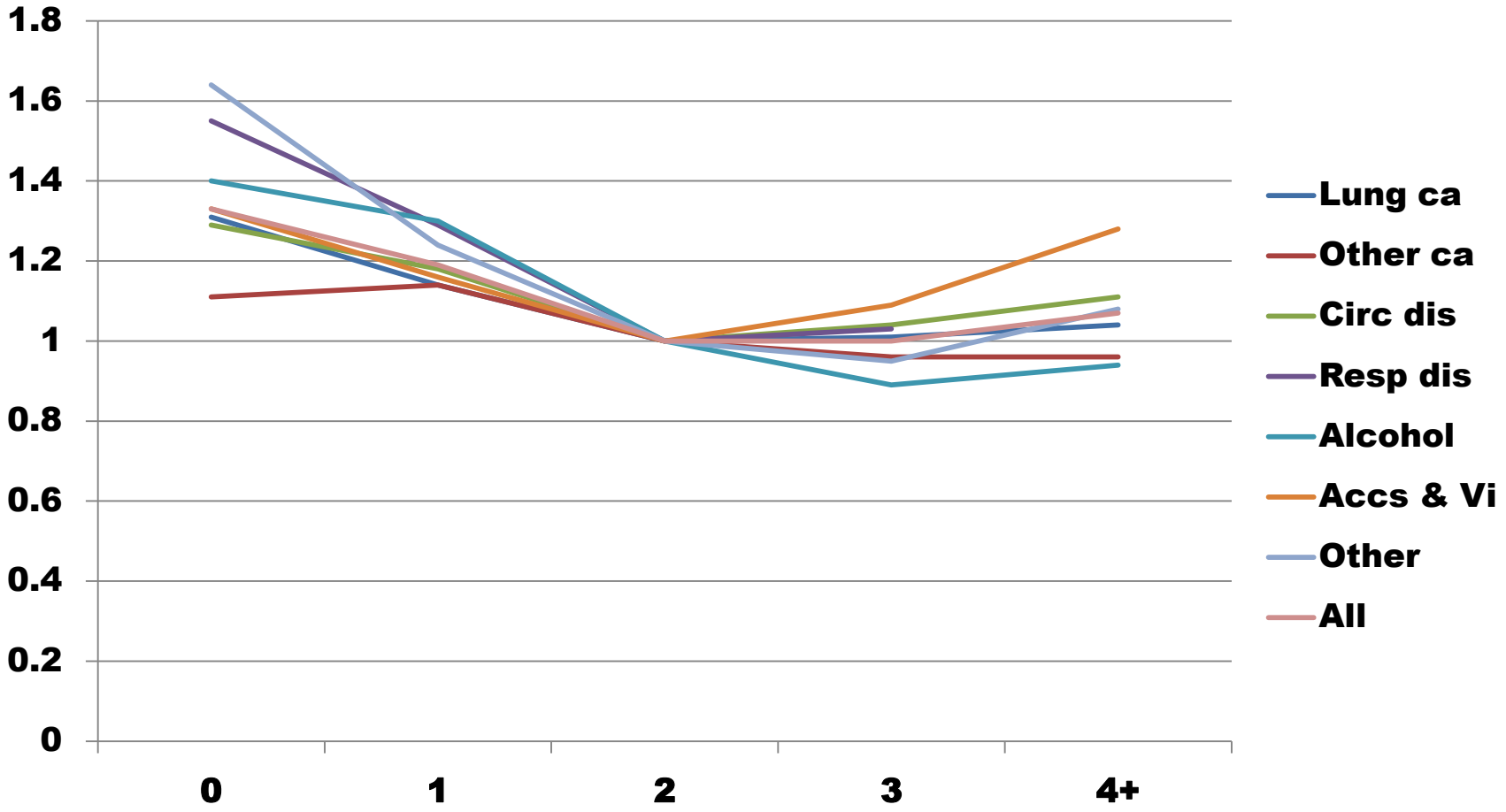
Fertility history and later life all cause mortality:

- E&W, USA and Norway women: higher mortality for nulliparous and (Norway, cohort born 1910-20 E&W) parity 1.
- Norway (and US) similar results men.
- E&W (and US) also higher mortality for high parity women and men – but no or negative association Norway
- All countries apparent lower risk old parents (selection?)
- All countries apparent higher risk for young parents- including in Norway when parental education controlled – other antecedent characteristics?

Fertility history and cause specific mortality: hypotheses:

- Expect nulliparity and low parity (one child) to be positively associated with causes of death associated with early poor health and related behaviours (selection), causes related to lack of social control of health behaviours and lack of social support. i.e.all cause groups but particularly alcohol related diseases; lung cancer; accidents and violence; and circulatory and respiratory diseases.
- Additionally for physiological reasons expect nulliparity and low parity to be positively associated with female mortality from cancers of the breast, ovary and uterus.
- High parity (4+) – possible adverse effects arising from stress, socio-economic disadvantage and lifestyles offsetting or outweighing benefits of parenthood. If so would expect raised mortality from circulatory diseases and accidents and violence, especially among those of lower education.

Associations between parity and mortality by cause group, Norwegian men aged 45-68



Controlling for age, year, education, marital status, region, log population size of municipality (Model 3), Source: Grundy and Kravdal *Soc Sci Med* 2010

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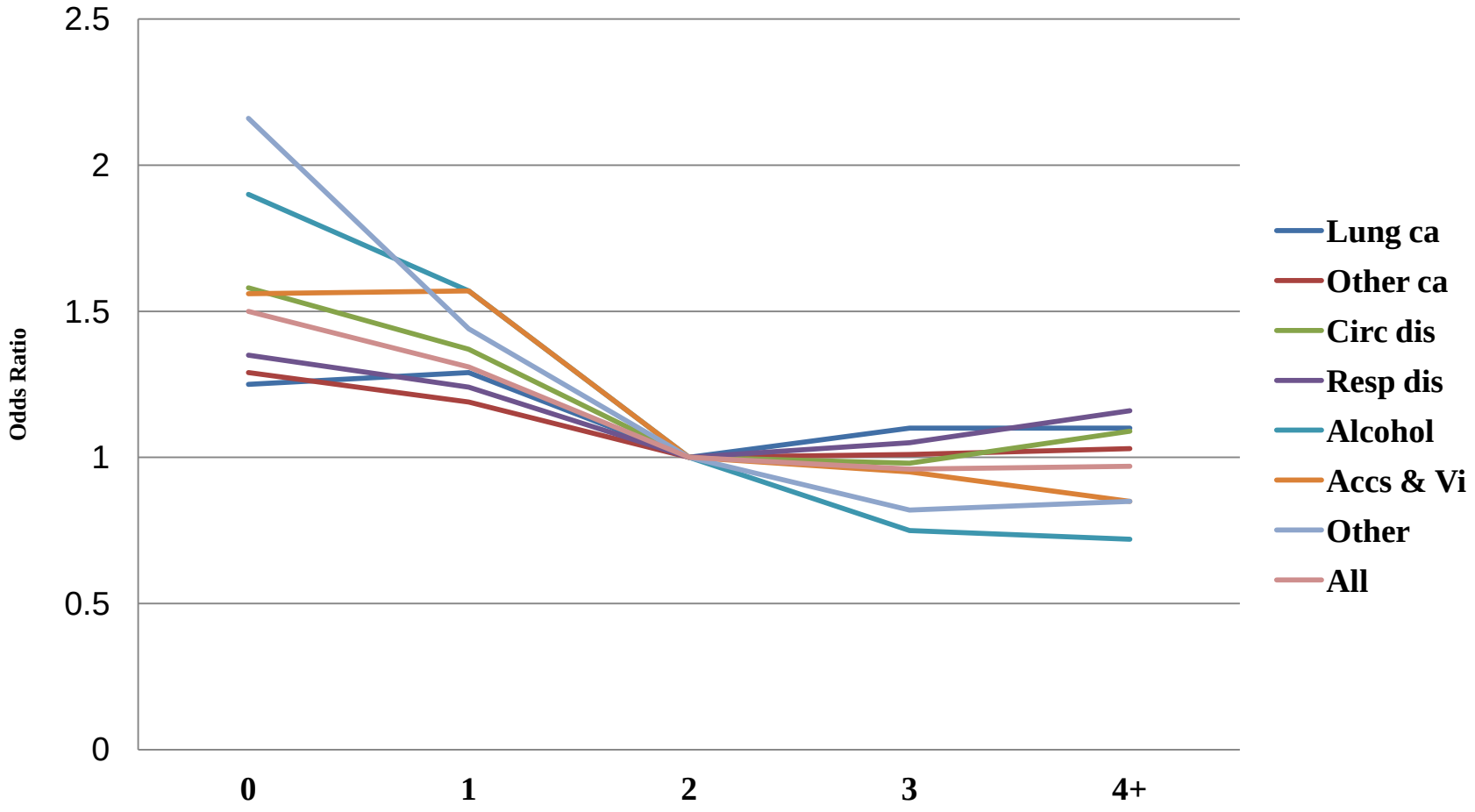


Controlling for age, year, education, marital status, region, log population size of municipality (Model 3): Source Grundy and Kravdal, *Soc Sci Med* 2010.

Conclusions from cause specific analysis

- Results support hypothesis that nulliparity and low parity associated with lack of social control of health related behaviours, lack of social support and adverse selection
- Results for female cancers also as expected, consistent with physiological causes – but also social support
- Limited support for hypothesis that stress of high parity might outweigh beneficial effects (once age at 1st birth and education controlled) **but** in stratified analyses high parity increased risks of circulatory disease mortality for low SES men; results may differ in countries offering less support for parents
- Gender difference in associations between high parity and mortality from accidents and violence – possibly due partly to gender differences in co-residence with children (not measured here)
- Need analyses including data on support exchanges, perceived and measured stress and health related behaviours.

Fertility history, health status and health trajectories: Analysis of the BHPS. Data and Methods

- We investigate associations between fertility histories of women and men with both level and change in two indicators of health
- Sample drawn from British Household Panel Study; 3,450 women and men born 1923-1950 who responded to the 1992 wave, were followed up to 2003 and were then aged 53-80 (6% excluded due to missing data).
- Methods: Multiprocess modelling of retention in sample and health outcomes conditional on retention.

Measures

- *Fertility history*: Number of natural children (0, 1, 2, 3, 4+); for parous:young age at first birth (<20/23); any birth at age >35/39; for parents with 2+ births: any birth interval < 18 months.
- *Co-variates*: Education; marital status; housing tenure; smoking; emotional support; co-residence with children (parents only)- all time varying except emotional support.
- Variables hypothesised to be associated with sample retention- interviewers' reports of problems with interview; recent mover; foreign born.

Outcomes:

- **Self rated health**: Excellent, Good, Fair, Poor, Very poor. Ordinal variable, higher=worse.
- **Health limitation:** "Does your health in any way limit your activities compared to most people of your age?"

Results: Joint logistic regression model of sample retention and health limitation conditional on retention

	Men		Women	
		Health		Health
	Average	Limitation	Average	Limitation
Age[b]	54.7	+++ **	55.0	+
Age squared[b]		- ***		+++ *
Number of children: 0	0.17	*	0.14	+ ***
1	0.14		0.16	
3	0.20	++	0.34	***
4+	0.14	+++	0.22	+++ ***
No Qualifications[b]	0.39	***	0.47	***
Not Married[b]	0.15		0.27	***
Nonowner[b]	0.21	+++ ***	0.24	+++ ***
Smoker[b]	0.28	***	0.29	***
Emotional Support	0.76	--- ***	0.81	-- ***

+/- $p<0.05$; ++/-- $p<0.01$; +++/--- $p<0.001$. ** indicates also associated with retention (interview quality also predicted retention).

Source: Read, Grundy, Wolf, Pop Studies 2011.

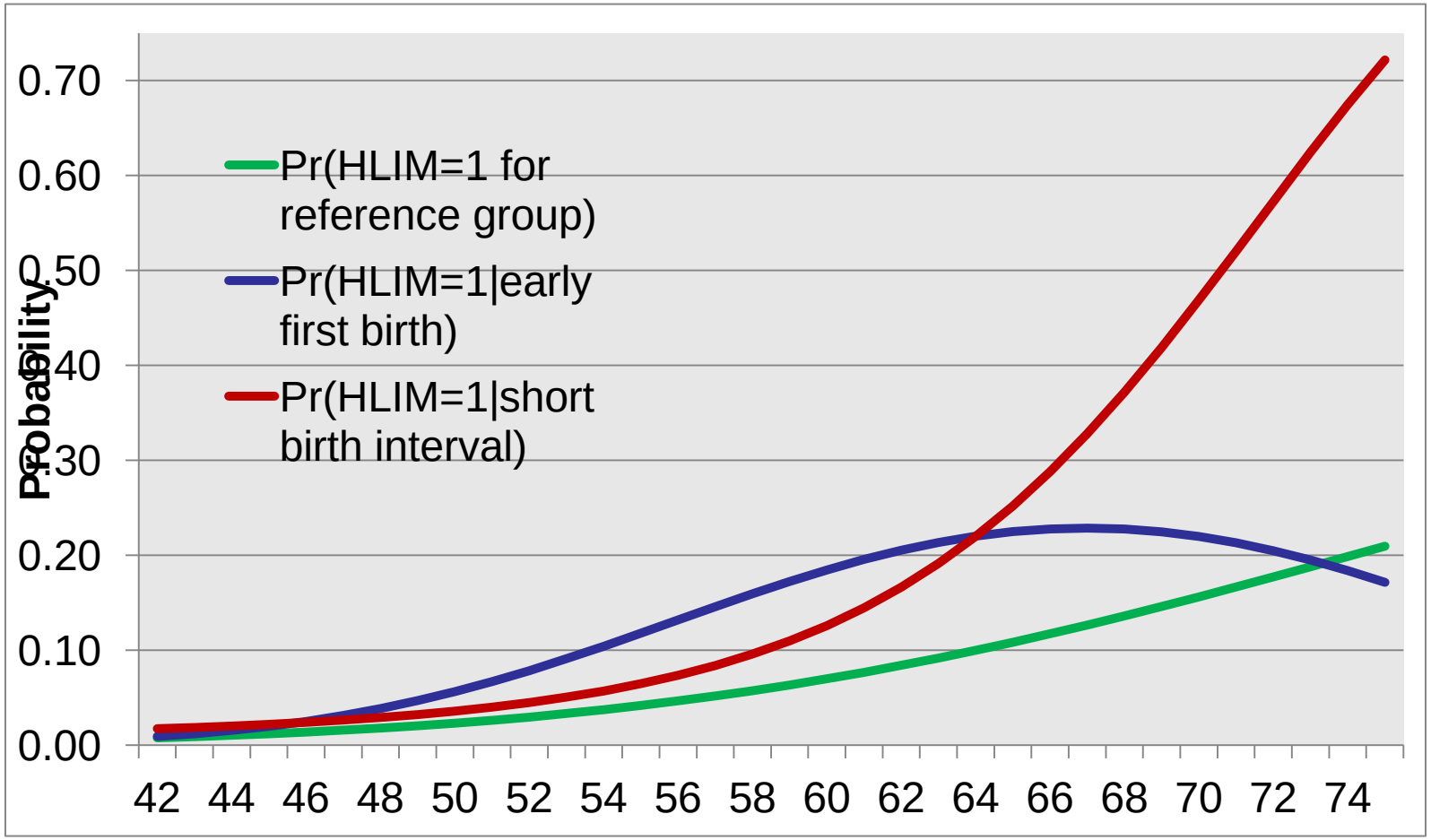
BHPS analysis: Results for a) parous men & women and b) parous with 2+ children

		Health limitations		Self-rated health	
		Men	Women	Men	Women
a) Parous respondents:					
	Number of children:				
	1			+	
	3				
	4+	+++	+++	+++	+++
	Birth before 23/20	+++	+++	+++	++
	Birth after 39/35				
b) Parity 2+; spacing effects					
	Number of children:				
	3	+			
	4+	+++	+++	+++	
	Birth before 23/20	++	+++	+++	+++
	Birth after 39/35				
	Birth interval < 18 months	++	+++	+++	+++

Source: Read, Grundy, Wolf, Pop Studies 2011.

Rate-of-change in health over 11 years: Predicted probability of health limitation by fertility history characteristics, British women born 1923-49

(reference group = women with 2 children born when mother 20-34)



Source: Analysis of BHPS data in Read, Grundy & Wolf, Population Studies 2011

BHPS analysis: key findings

- High parity (4+ children) associated with health limitation and worse self-rated health among women and men (health measured over 11 years)
- Slightly higher risk of health limitation for childless women
- Early parenthood for parous) and short birth intervals (among those with 2+ children) associated with higher risk of health limitation, worse self rated health and faster accumulation of health limitation

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) and examine the extent to which associations operate through (i.e. are mediated by) wealth, health related behaviours, and social support and strain.

Data and Methods

- English Longitudinal Study of Ageing (ELSA) waves 1 -3 (2002-2006)- nationally representative survey
- 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.
- Path models within structural equation modelling framweork using Mplus version 5.21. Maximum likelihood estimation with robust standard errors. Mplus deals with missing data using all available data under MAR assumptions.

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).

Fertility measures:

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

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

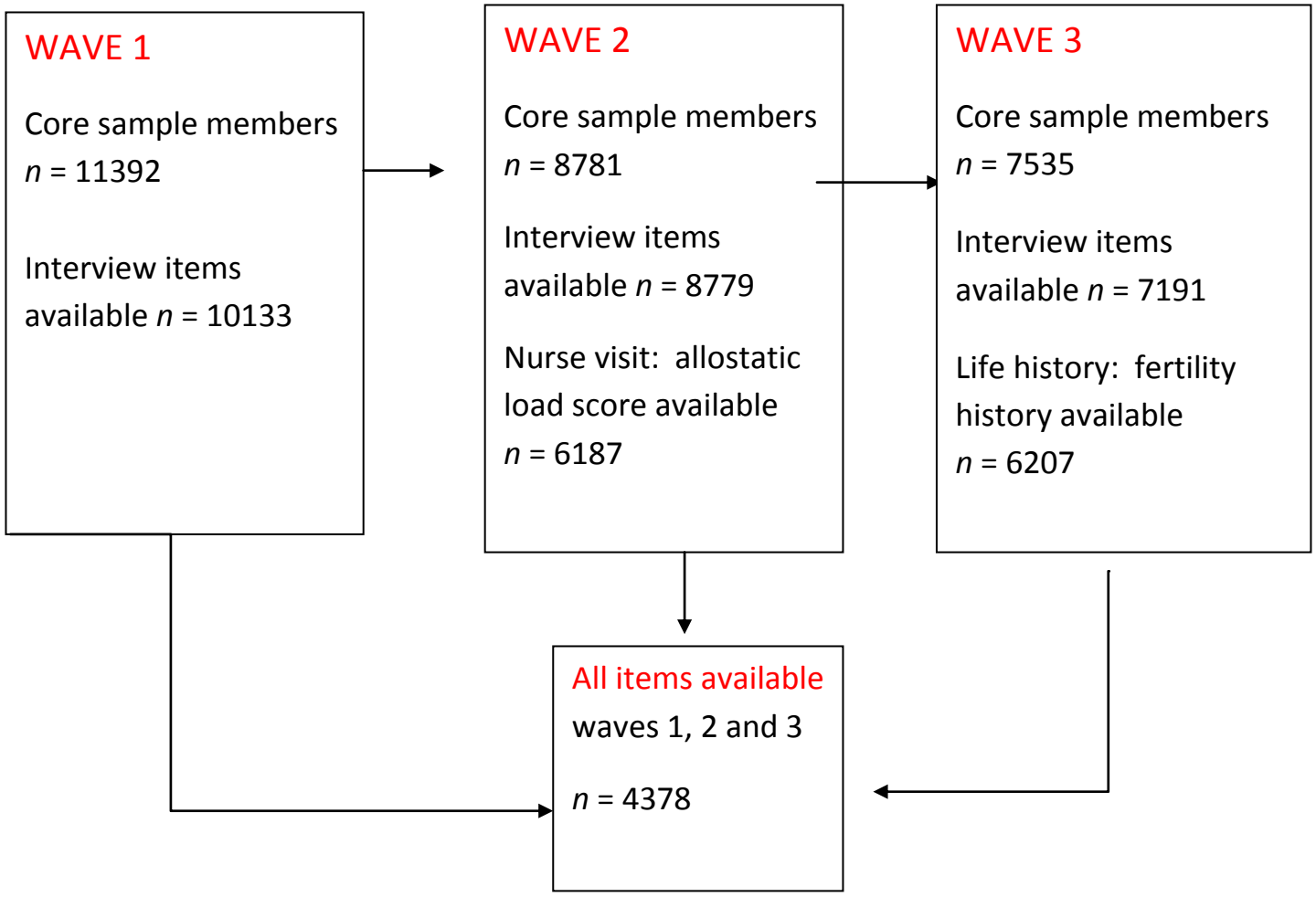
Outcomes: Allostatic load (wave 2); self reported health limitation (wave 3).

Allostatic load scores in ELSA

- **Allostatic load: multisystem physical dysregulation resullting from long-term exposure to stress**
- Grouped allostatic load index: number of biomakers indicating high risk (25th percentile) calculated separately for men and women(and age group), range 0 - 9

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

Sample derivation and data availability



Distribution of the sample by demographic & life history variables

	Men(*n* = 1996)	Women(*n* = 2382)
Age, wave 1	63.2 (9.05)	63.5 (9.33)
No qualification, wave 1	26.1	37.9
Married, wave 1	79.3	62.9
Ever divorced (wave 3)	23.3	24.7
Ever widowed (wave 3)	13.5	27.2
Coresident with child, wave 1[c]	22.9	23.0
Weekly contact with child, wave 1 [c,d]	38.0	46.7
Long-term health problem in childhood	29.4	29.3
Has Adopted child	2.9	2.5
Has Step child	12.0	8.6
Has a child who died	5.0	6.4
Number of natural living children		
0	13.7	13.0
1	13.6	12.6
2	41.4	40.6
3	20.2	21.7
4+	11.1	12.1
Early childbirth *<20/23*	11.5	8.3
Late childbirth [c] *>35/39*	12.7	15.3

, [c]only among parents, [d] Among those who were not co-resident with child

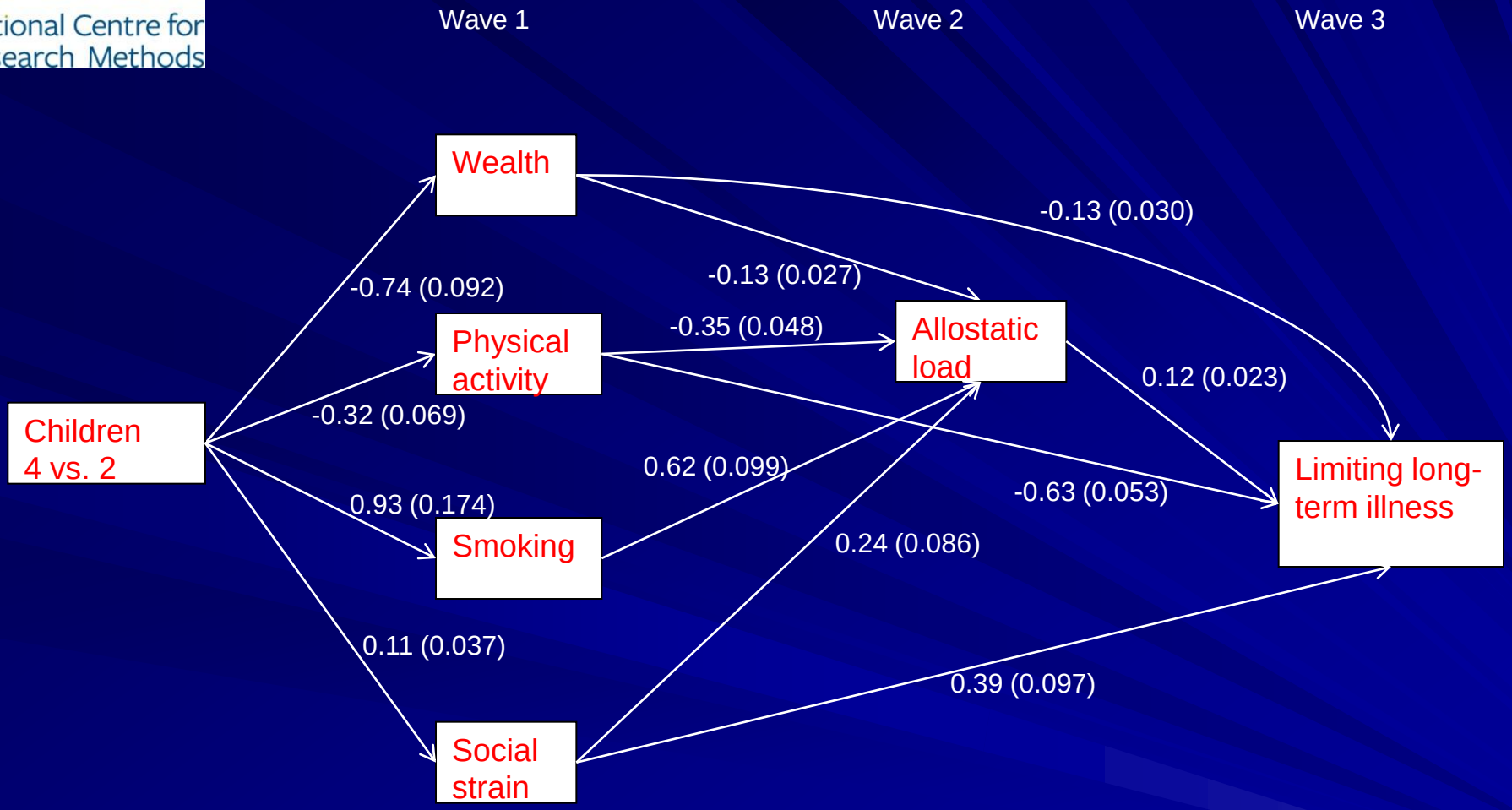
Distribution of the sample by intermediate variables and health outcomes

	Men (*n* = 1996)	Women (*n* = 2382)
Intermediate variables		
Wealth, 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)
Health outcomes		
Allostatic load weighted mean score, wave 2		
<0.1	18.3	18.4
0.1	15.2	15.5
0.2	19.7	19.0
0.3	14.8	15.3
0.4	12.0	11.4
0.5	10.3	9.0
0.6	4.1	5.5
0.7	3.4	4.1
0.8-1.0	2.2	1.8
Limiting long-term illness, wave 3	30.6	35.3

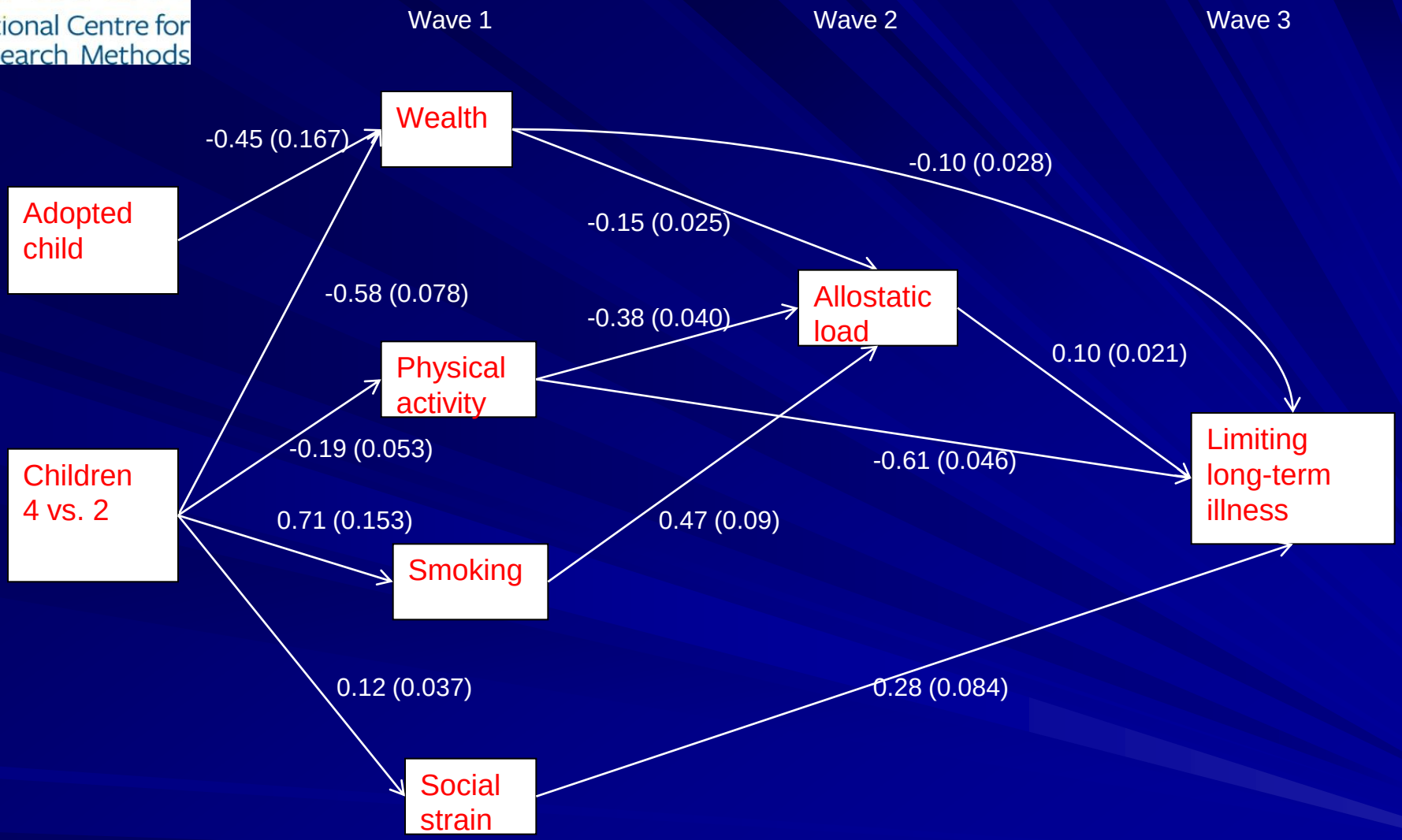
Associations between fertility & parenthood variables, allostatic load and health limitation among men (n=2071) and women (n=2519) in ELSA

	Allostatic load (higher=worse)		Health limitation	
No. Natural children	M	F	M	F
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.



Path model for all men in ELSA. Model adjusted for age, education, being married, ever divorced, ever widowed and childhood health. Significant paths are shown (unstandardized estimate and standard error).



Path model for all women in ELSA. Model adjusted for age, education, being married, ever divorced, ever widowed and childhood health. Significant paths are shown (unstandardized estimate and standard error).

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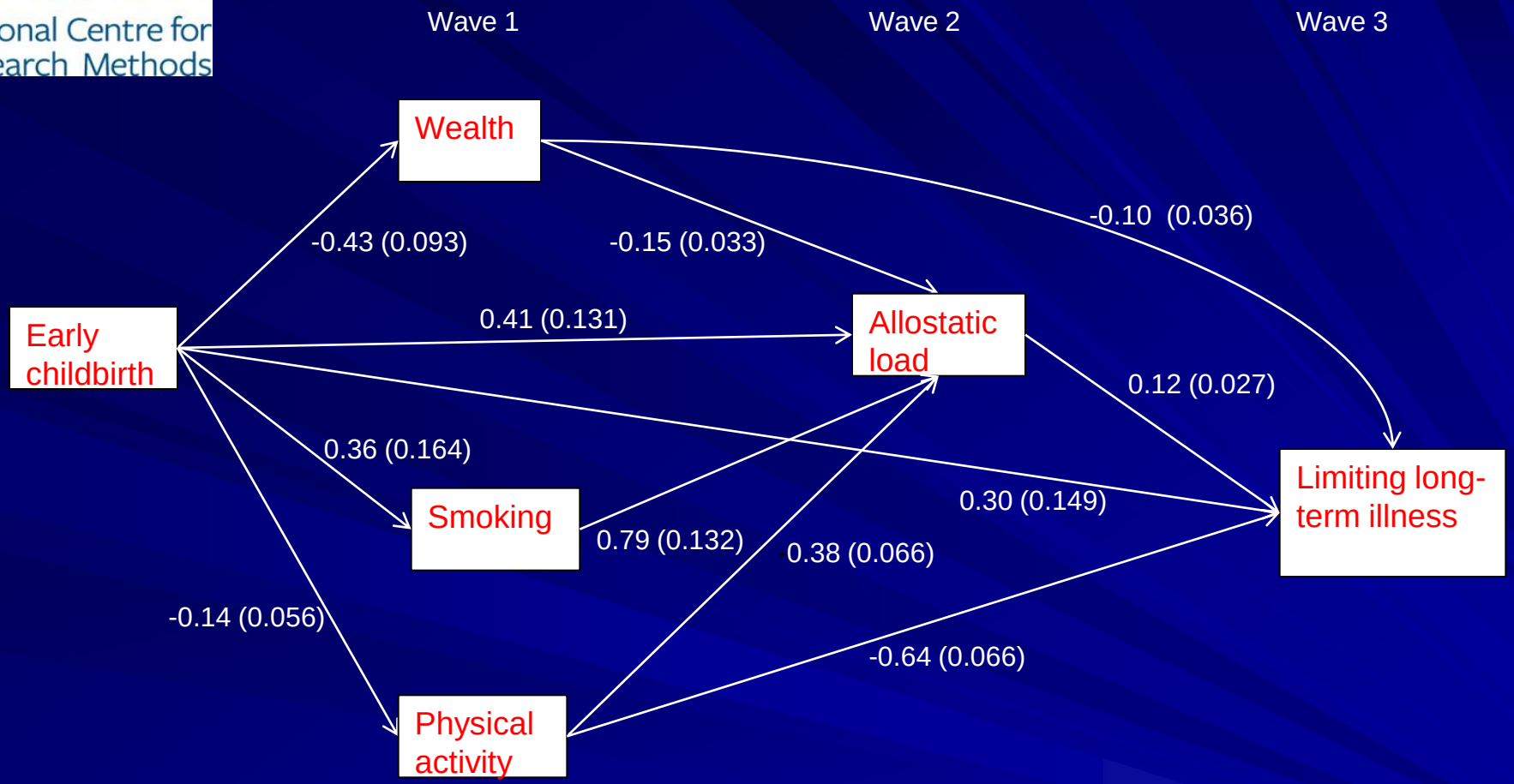
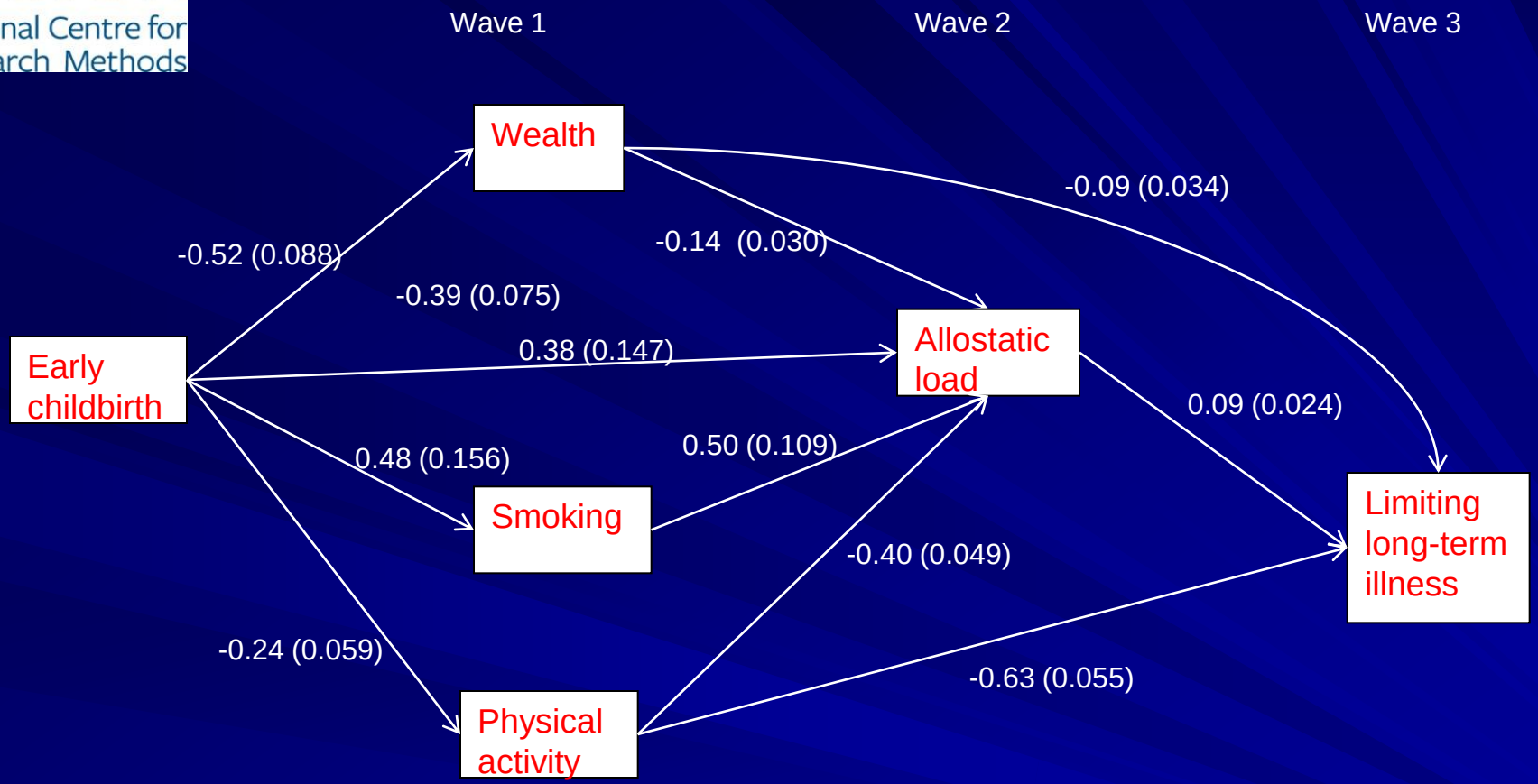


Path model for fathers in ELSA. Model adjusted for age, education, being married, ever divorced, ever widowed, childhood health, and coresidence with child. Significant paths are shown (unstandardized estimate and standard error).



Path model for parous women in ELSA. Model adjusted for age, education, being married, ever divorced, ever widowed ,childhood health, and coresidence with child. Significant paths are shown (unstandardized estimate and standard error).

Conclusions & Discussion

- Association between large family size and allostatic load and health is mediated largely by wealth (M&F), and smoking and social strain (F)– i.e. no direct association once all intermediate factors entered in model
- Mothers – still a direct association between early motherhood and allostatic load, but otherwise associations mediated by wealth, physical activity and smoking.
- Among fathers, direct effects remain to some extent, although some mediated by wealth and physical activity.
- Some effects on health mediated by allostatic load, but not all
- So, as hypothesised, biosocial pathways from parenthood history to health include 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).
- Implications of changing fertility patterns?