

Collecting data on mothers (and fathers) in birth cohorts

Debbie A Lawlor
d.a.lawlor@bristol.ac.uk

The Avon Longitudinal Study

ALSPAC

of Parents and Children

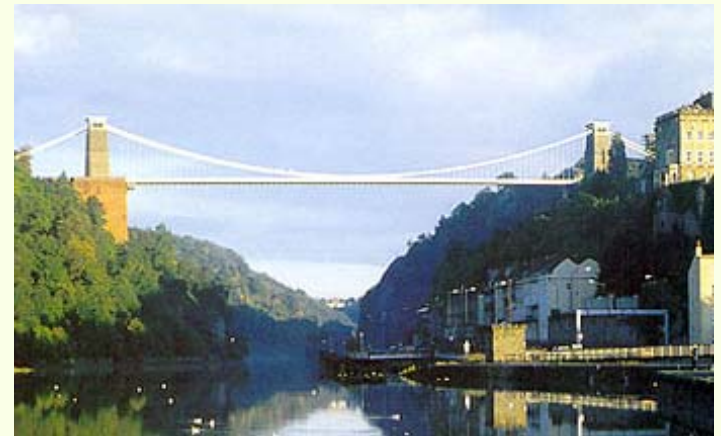


The Avon Longitudinal Study of Parents and Children (ALSPAC)

- Cohort study
- Pregnant with a due date 1.4.91-31.12.92
- Resident in Avon



Based in the old county of Avon
South West England
110 miles from London



ALSPAC enrolment

- Enrolled if mother interested in taking part and completing at least 1 questionnaire
- Enrolled pregnancies 14,541
 - Of these 13,988 live born infants who survived to at least 1 year
- Being followed 13,801 mothers, 13,971 children

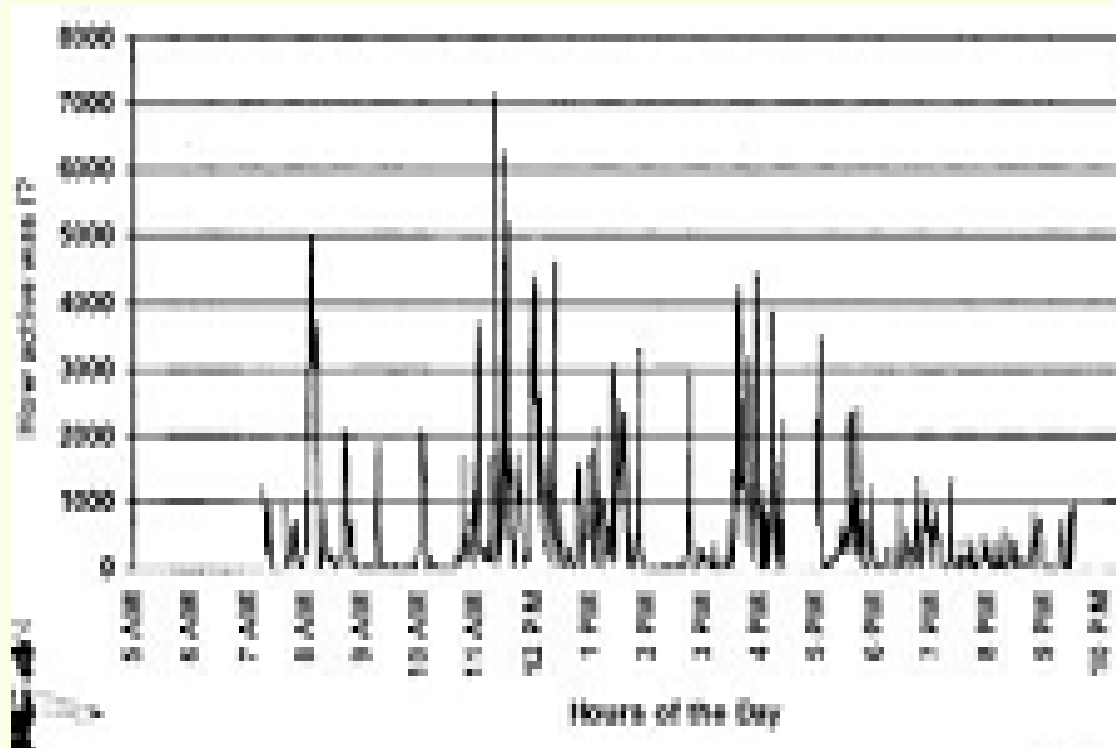
ALSPAC DATA

- Self completion questionnaires
- Health records
- Biological samples
- Environmental monitoring
- Education records
- Hands on assessments
- Record linkage

Close up of Actigraph uni-axial movement sensor



An example of the graphical output from the Actigraph (1 day's recording)









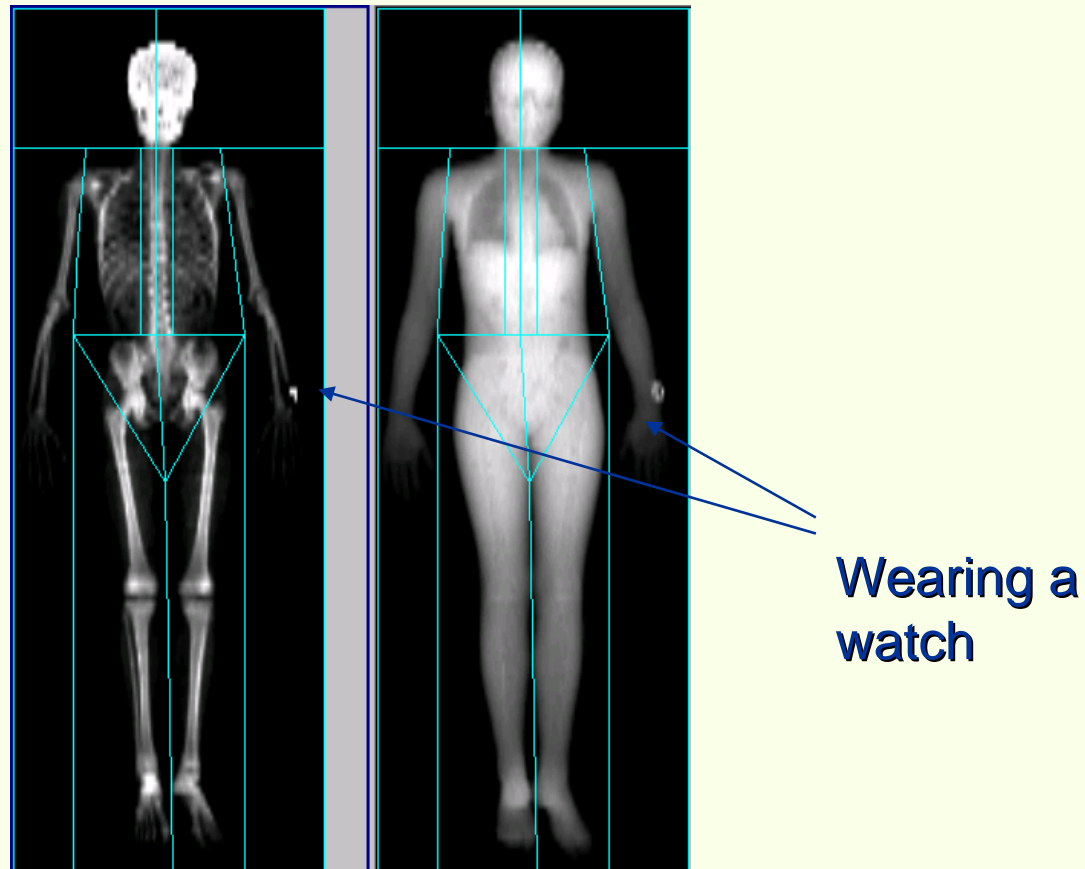




Lunar Prodigy whole body DXA scan in ALSPAC at age 9+ (and 11+, 13+ and 15+)



Total body scan results from the Lunar Prodigy showing the different sub-regions



ASTHMA

- Symptomatology
- Skin prick tests for atopy
- IgE
- Bronchial hyper-responsiveness using methacholine challenge
- Doctor-diagnosed asthma



Why mothers?

- Intrauterine / developmental origins in offspring
- Intergenerational / familial transfer of risk
- Pregnancy as a stress test of mother's later cardiovascular / metabolic health
- Pragmatic: 'Captive cohort'; mothers usually initial recruited participants

Data on mothers

- Obstetric data
- Extracted DNA
- Repeat questionnaire data including:
 - ❖ Reproductive characteristics: previous and subsequent pregnancies; retrospective age at menarche; menstruation; menopause; use contraceptives and HRT
 - ❖ Health: specific diagnoses; medication; validated questionnaires for e.g. depression; family history
 - ❖ Lifestyle: diet; smoking; alcohol; physical activity
 - ❖ Socioeconomic position: education; occupation; housing
- Linkage to NHSCR for mortality and cancer registration data
- Some opportunistic (when attending with child) focus clinic measures of BP, anthropometry and DXA
- Focus on mothers

ALSPAC obstetric data 1

- 13,733 (94% of those recruited) mothers who did not miscarry or terminate pregnancy and agreed to medical record abstractions
- Abstractions not core funded but on specific subgroups relating to funded research
- To date ~12,000 completed abstractions (~10,000 available for preliminary analyses)

Obstetric data 2

- Repeat measurements (from all antenatal clinic assessments or hospital in patient assessments)
 - ❖ Weight; Blood pressure; Glycosuria; Proteinuria; Oedema
- Routine blood test results
- Stored serum (cholesterol, vitamin D,)
- Diagnoses of diabetes, HDP, excessive vomiting
- Hospital admissions during pregnancy
- Progression through labour, mode of delivery, pregnancy outcomes and birth characteristics

Preliminary analyses of obstetric data

Weight

9886 women with at least 1 weight
measure

Median measures=12 (IQR 10,14)

Max = 27

Mean pre-preg wt= 62kg (min 38, max
149)

Multilevel Models

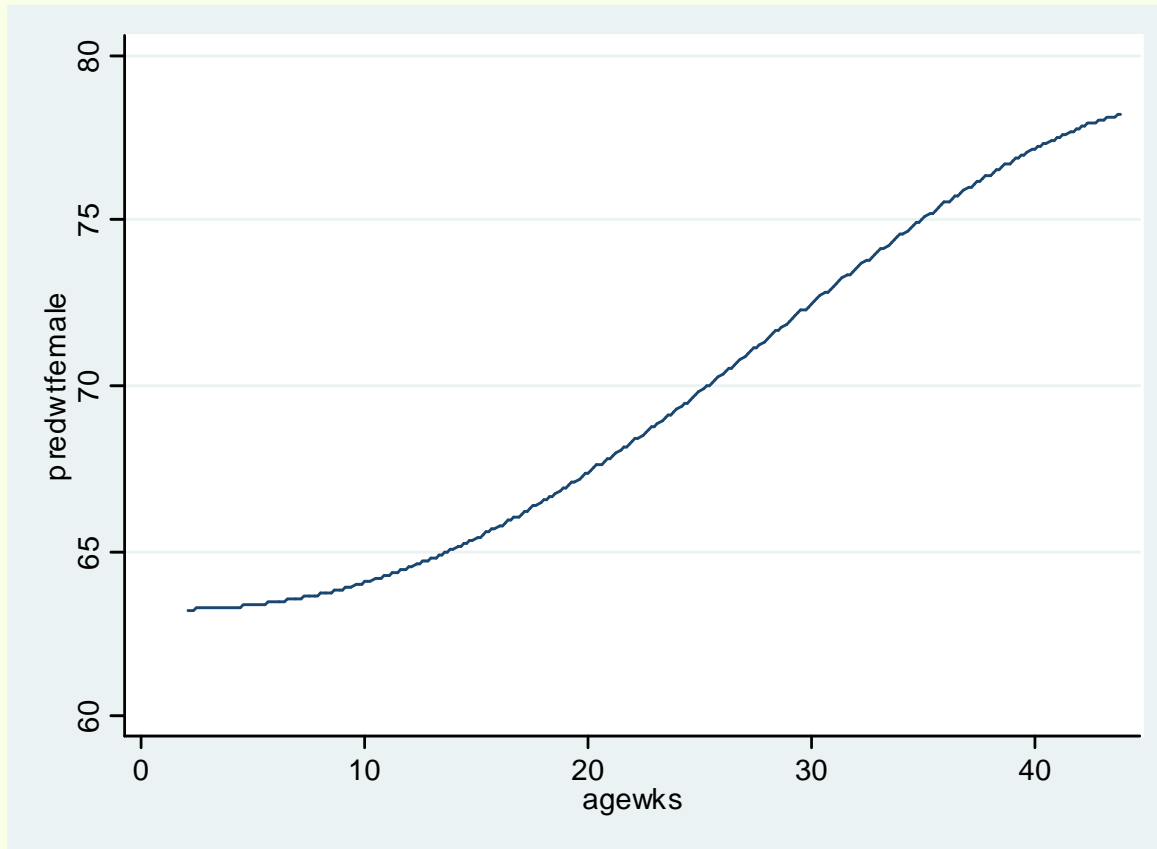
Preliminary!

Use fractional polynomials to derive best-fit curve

Simplify using spline models

Find spline with smallest number of knots which predicts to within 5% of fractional polynomial

Weight



Best –fit polynomial has powers 3 and 33

Focus on mothers

- Started September 2008; 24 months
- Funding (BHF)
- Anticipate at least 7,000
- 2 hour clinic visit with:
 - ❖ DXA scan for fat & lean mass and bone density
 - ❖ Carotid intima media thickness
 - ❖ Blood pressure
 - ❖ Height, weight, waist and hip circumference
 - ❖ Fasting blood samples (funds to complete assays on fasting glucose, insulin, pro-insulin, lipids and to store serum)

Research objectives

- To determine whether routinely collected antenatal data can usefully predict variation in metabolic and vascular traits in women in middle-age
- To examine whether there is a case for re-introducing regular antenatal weight monitoring
- To use genetic variants as instrumental variables to determine the causal effect of modifiable pregnancy and lifestyle characteristics on vascular health in women
- To determine different ways in which pregnancy, lifestyle and genetic characteristics interact with each other to influence metabolic and vascular health in women

Future plans

- GWAS (WT funding just obtained)
- Programme application to MRC (outline submitted April 2009; full programme submission Feb 09)
- Currently completing pilot work on telomere length and DNA methylation
 - ❖ Aim to examine the relationships of women's reproductive health with healthy ageing (focus on cardiovascular, metabolic, cognitive, physical function musculoskeletal health and mental health)
 - ❖ Obtain detailed biomedical, as well as socioeconomic and lifestyle data in order to understand causal mechanisms
- Ultimately make mother's and children's data widely available to scientific community as an intergenerational resource