Collecting data on mothers (and fathers) in birth cohorts

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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

Wearing a watch
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