CLOSER conference
The importance of early years, childhood and adolescence: Evidence from longitudinal studies

British Library Conference Centre
Monday 30 November

@CLOSER_UK    #CLOSERconf

CLOSER website: www.closer.ac.uk
CLOSER Discovery: www.discovery.closer.ac.uk
Understanding early life: resources for research

Alison Park, Director CLOSER
About CLOSER

• Aims to maximise the use, value and impact of the UK’s longitudinal studies
• Consortium of longitudinal studies, the British Library and the UK Data Service
• ESRC and MRC funding
Key areas of work

• Demonstration projects on data harmonisation and data linkage
• Online resources – CLOSER Discovery
• Training and capacity building activities
Key areas of work

- Demonstration projects on data harmonisation and data linkage
- Online resources – CLOSER Discovery
- Training and capacity building activities
Data harmonisation

- **Height, weight and BMI**
  Rebecca Hardy, UCL

- **Socio-economic status and qualifications**
  Claire Crawford, Warwick & IFS

- **Strategies for analysing biological samples**
  Susan Ring, Bristol

- **Visual function**
  Jugnoo Rahi, UCL
Data harmonisation

Childhood environment and adult wellbeing
Mai Stafford, UCL

Review of methods for determining pubertal status
Janis Baird and Hazel Inskip, Southampton

Exploiting CLOSER biomarker data
Meena Kumari, Essex
Key areas of work

- Demonstration projects on data harmonisation and data linkage
- Online resources – CLOSER Discovery
- Training and capacity building activities
Data linkage

- **Linkage to administrative data**
  Lorraine Dearden, UCL

- **Linkage to geographic data**
  Chris Dibben, Edinburgh

- **Linkage to health data**
  Michaela Benzeval, Essex

- **Data linkage in cohorts/longitudinal studies**
  Andy Boyd, Bristol
Key areas of work

- Demonstration projects on data harmonisation and data linkage
- Online resources – CLOSER Discovery
- Training and capacity building activities
CLOSER Discovery

What is it?
• An online resource that helps you find and appraise study content
• Beta launch today

Why do we need it?
• To find out what has been asked on which study and decide whether it meets your needs
CLOSER Discovery

What can I do with it?

• Search for topics, questions, variables
• Explore the context of a question or variable (where, when, how many?)
• Save your results
• Find out how to access data
CLOSER Discovery is an online resource that enables researchers to search and explore the data from eight leading UK longitudinal studies. CLOSER Discovery is currently in beta testing. We need your feedback to help us shape this resource to best meet the needs of its users.

To find out more about CLOSER Discovery visit the CLOSER website or take a look at the FAQs.

System Status: Beta testing

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<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
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<td>N639</td>
<td>Ma's smoking after mth 4 of pregnancy</td>
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<tr>
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<td>Smoking during pregnancy</td>
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<td></td>
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<td>N502</td>
<td>Smoking prior to pregnancy</td>
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<td>Label</td>
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<td>-1</td>
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<td>1</td>
<td>Did not stay-25+</td>
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<tr>
<td>2</td>
<td>Did not stay-24-</td>
</tr>
<tr>
<td>3</td>
<td>Did stay-25 plus</td>
</tr>
<tr>
<td>4</td>
<td>Did stay-24 under</td>
</tr>
<tr>
<td>5</td>
<td>Did not stay</td>
</tr>
<tr>
<td>6</td>
<td>Did stay at sch.</td>
</tr>
<tr>
<td>7</td>
<td>25+min.age 14yrs</td>
</tr>
<tr>
<td>8</td>
<td>24-min.age 15yrs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>4.59</td>
</tr>
</tbody>
</table>

Dataset: Perinatal Mortality Study Dataset
This is your active basket.

**Download**

This basket contains 3 items.

- Download PDF
- Download DDI 3.2

**Variables (2)**

- A0259
  Foetal Heart Rate During Labour
- DQ2340
  S4 TS Mental illness / depression

**Questions (1)**

- q_en_43_xi
  en 43(x)
  Do these specific problem(s) apply to this child? Mental illness / depression?
Today’s launch

• A beta launch
• Please give us feedback!
• Partial content, largely early years focus
• Further content and functionality added 2016 and 2017
• Short demos over lunch (@ 12.50, 1.15 and 1.25)
Key areas of work

• Demonstration projects on data harmonisation and data linkage

• Online resources – CLOSER Discovery

• Training and capacity building activities
Training and capacity building

Workshops and seminars

• **Recent**: data harmonisation, data management

• **Forthcoming**: geographical variables, use of biological samples, participant engagement (Jan 29\textsuperscript{th})

• Regular methodology seminar series
Training and capacity building

Online resources @ www.closer.ac.uk

• Content from seminars and events
• Undergraduate and postgraduate teaching resources

Cross-cohort research: Opportunities, challenges and examples

The rationale behind this event was the belief in the value of cross-cohort comparisons – that is, the ability to compare findings from different cohort studies. Such comparisons allow the findings from one study to be tested and replicated, and more robust conclusions to be reached. Comparison of longitudinal studies that differ by birth cohort or country provide opportunities for understanding the influence of different contexts. Harmonisation of data facilitates pooling of data across multiple studies to increase statistical power and allows cross-cohort comparisons of results in different contexts.

Harmonising data in order to make valid comparisons between studies is challenging. The same can be true of harmonising data across different waves of the same study (for example, when measurement approaches and instruments change). There is no well-established standard procedure for the retrospective harmonisation of data. There are also different approaches to the analysis of cross-cohort data – from pooling in a single dataset, or a 2-step meta-analysis, to coordinated independent analyses of the different datasets.
Thank you

www.closer.ac.uk
www.discovery.ac.uk
a.park@ioe.ac.uk
Thank you

www.closer.ac.uk
www.discovery.ac.uk
a.park@ioe.ac.uk
Tea/coffee break and poster session

11:00-11:30

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CLOSER website: www.closer.ac.uk
CLOSER Discovery: www.discovery.closer.ac.uk
Breakout sessions: Physical health 1
Auditorium

11:30-12:50

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CLOSER website: www.closer.ac.uk
CLOSER Discovery: www.discovery.closer.ac.uk
Further evidence that infant growth influences proximal femoral geometry in adulthood: the Hertfordshire Cohort Study

AE Litwic, M Clynes, H Denison, KA Jameson, A Aihie Sayer, P Taylor, C Cooper, EM Dennison

MRC Lifecourse Epidemiology Unit, University of Southampton, UK
Overview

• Background
• Hertfordshire Cohort Study
• Methods
• Results
• Discussion
Background

- Hip fracture is the most significant complication of osteoporosis in terms of mortality, long-term disability and decreased quality of life.

- Personal impact of hip fracture
  - 50% do not live independently
  - 20% die within 12 months

- Socioeconomic cost
  - 75,000 hip fractures/year
  - 20% orthopaedic bed occupancy
  - Annual cost £2 billion
Background

- Bone mineral density (BMD) is a well-recognised strong predictor of osteoporotic fracture.

- Proximal femur geometry (PFG) parameters have also been proposed to be predictive of mechanical strength and femoral neck fracture risk.
Early life determinants of osteoporotic fracture

- There is accumulating evidence that fracture risk and adult bone mass might be partly dependent on growth during intrauterine and early life.

- It has been suggested that poor growth during early life is associated with altered femoral geometry as assessed by DXA in older age.
The Hertfordshire Cohort Study
The Hertfordshire Records

- Birth weight
- Illnesses/development during infancy and early childhood
- Weight at 1 year
- Method of infant feeding
Hertfordshire Cohort Study Population

42,974 Births recorded in ledgers

39,764 Live births recorded in ledgers

24,130 matched criteria & sent to NHSCR for tracing

21,063 NHSCR traced subjects

8650 Alive in Hertfordshire & sent to FHSA for GP details

7113 registered with Hertfordshire GP

East Herts
2670 subjects contacted

North Herts
1899 subjects contacted

North West Herts
1318 subjects contacted

3205 home visits

3000 clinic visits
Hertfordshire Cohort Study

- Bedfordsire
- Buckinghamshire
- Cambridgeshire
- Essex

MRC Clinic
- Royston 957
- Hertford 1412
- Radlett 631

HCS

MRC Clinic

Life Course Epidemiology Unit
Hertfordshire Cohort Study

Map showing locations of MRC Clinics:
- MRC Clinic Royston
- MRC Clinic Hertford
- MRC Clinic Radlett

Numbers indicate participants:
- North: 957
- East: 1412
- West: 631

Regions:
- Buckinghamshire
- Bedfordshire
- Cambridgeshire

Total participants: 3000
Methods

- Hertfordshire Cohort Study participants
- $n = 488$ men; $431$ women
- Age range 59 – 71 years
Methods

• Health questionnaire information collected

• DXA scan

• Hip axis length and other proximal femur geometry parameters were extracted from scans using standard Hologic software.
## Study Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Men (n= 488)</th>
<th>Women (n=431)</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>64.8(2.5)</td>
<td>66.3(2.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI ((\text{kg/m}^2)^1)</td>
<td>26.6(1.1)</td>
<td>26.8(1.2)</td>
<td>0.497</td>
</tr>
<tr>
<td>Dietary calcium intake ((\text{mg/day})^1)</td>
<td>1214(1.3)</td>
<td>1087(1.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Activity score</td>
<td>64.1(14.8)</td>
<td>61.3(14.7)</td>
<td>0.004</td>
</tr>
<tr>
<td>Birth weight (kg)</td>
<td>3.5(0.6)</td>
<td>3.4(0.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight at 1 year (kg)</td>
<td>10.2(1.1)</td>
<td>9.7(1.0)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

\(^1\)Geometric mean and SD

\( P \) values contrast men and women
# Study Participants

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<tr>
<th>Characteristic</th>
<th>Men (n=488)</th>
<th>Women (n=431)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>Smoker status</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Current</td>
<td>71(14.5)</td>
<td>41(9.5)</td>
<td></td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>252(51.6)</td>
<td>121(28.1)</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>165(33.8)</td>
<td>268(62.3)</td>
<td></td>
</tr>
<tr>
<td>Alcohol consumption (units/week)</td>
<td>9.5(2.5-21.6)</td>
<td>1.5(0.0-6.0)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*P values contrast men and women*
Femoral geometry assessed by DXA

<table>
<thead>
<tr>
<th></th>
<th>Men (n= 488)</th>
<th>Women (n=431)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMD total hip (g/cm²)</td>
<td>1.04(0.13)</td>
<td>0.9(0.13)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hip axis length (cm)</td>
<td>121.2 (6.3)</td>
<td>105.1 (6.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Narrow neck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSMI (cm⁴)</td>
<td>4.4(1.0)</td>
<td>2.6(0.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>width (cm)</td>
<td>3.8(0.2)</td>
<td>3.3(0.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ED (cm)</td>
<td>3.4(0.2)</td>
<td>3.0(0.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ACT (cm)</td>
<td>0.19(0.03)</td>
<td>0.17(0.03)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CMP</td>
<td>0.4(0.0)</td>
<td>0.4(0.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Section modulus (cm³)</td>
<td>2.1(0.4)</td>
<td>1.4(0.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Buckling ratio</td>
<td>11.1(2.3)</td>
<td>11.5(3.0)</td>
<td>0.016</td>
</tr>
</tbody>
</table>

p-value for the difference between men and women

Key: CSMI, cross sectional moment of inertia; ED, endocortical diameter; ACT, average cortical thickness; CMP, centre of mass position
Association between proximal femur DXA variables and birth weight, weight at 1-year and conditional growth\(^a\)

| Variables                     | Birth weight | | Weight at 1 year | | Conditional growth | |
|-------------------------------|--------------|--|------------------||--|-----------------|-----------------|--------|-----------------|
|                               | \(\beta\)    | 95%CI | p-value          | \(\beta\)    | 95%CI | p-value          | \(\beta\)    | 95%CI | p-value          |
| Hip axis length (mm)          | 2.81         | 1.58, 4.05 | <0.001 | 3.81         | 2.06, 7.02 | <0.001 | 0.95         | 0.30, 1.61 | 0.004 |
| Narrow neck                   |              |      |                  |              |      |                  |              |      |                  |
| cross sectional moment of inertia (cm\(^4\)) | 0.24 | 0.11, 0.36 | <0.001 | 0.15        | 0.09, 0.21 | <0.001 | 0.12        | 0.06, 0.19 | <0.001 |
| width (cm)                    | 0.11         | 0.06, 0.17 | <0.001 | 0.07        | 0.05, 0.10 | <0.001 | 0.06        | 0.03, 0.09 | <0.001 |
| endocortical diameter (cm)    | 0.11         | 0.05, 0.17 | <0.001 | 0.08        | 0.05, 0.10 | <0.001 | 0.06        | 0.03, 0.10 | <0.001 |
| average cortical thickness (cm) | 0.00       | -0.01, 0.01 | 0.901 | 0.00        | -0.00, 0.00 | 0.823 | 0.00        | -0.00, 0.00 | 0.764 |
| profile centre distance (cm)  | 0.05         | 0.01, 0.09 | 0.008 | 0.04        | 0.02, 0.05 | <0.001 | 0.03        | 0.01, 0.05 | 0.002 |
| centre of mass position       | 0.00         | -0.01, 0.01 | 0.955 | 0.00        | -0.00, 0.00 | 0.842 | 0.00        | -0.00, 0.00 | 0.805 |
| section modulus (cm\(^3\))   | 0.08         | 0.03, 0.13 | 0.004 | 0.05        | 0.02, 0.07 | <0.001 | 0.04        | 0.01, 0.07 | 0.007 |
| buckling ratio                | 0.35         | -0.18, 0.88 | 0.195 | 0.33        | 0.07, 0.59 | 0.014 | 0.31        | 0.03, 0.58 | 0.030 |

\(^a\) adjustment for age, BMI, social class, physical activity, cigarette and alcohol consumption, and dietary calcium intake, and years since menopause and HRT use in women
Association between proximal femur DXA variables and birth weight, weight at 1-year and conditional growth\textsuperscript{a}

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<tr>
<th>Variables</th>
<th>Birth weight</th>
<th>Weight at 1 year</th>
<th>Conditional growth</th>
</tr>
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<tr>
<td></td>
<td>β</td>
<td>95%CI</td>
<td>p-value</td>
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<td>Hip axis length (mm)</td>
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Association between Hip axis length and birth weight, weight at 1-year and conditional growth

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<td>2.81, 1.58, 4.05, &lt;0.001</td>
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</tr>
<tr>
<td>Endocortical diameter (cm)</td>
<td>0.11, 0.05, 0.17, &lt;0.001</td>
<td>0.08, 0.05, 0.10, &lt;0.001</td>
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<td>Average cortical thickness (cm)</td>
<td>0.00, -0.01, 0.01, 0.901</td>
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<td>Centre of mass position</td>
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Association between CSMI, width and birth weight, weight at 1-year and conditional growth

Adjusted for age, BMI, social class, physical activity, smoker status, alcohol consumption, dietary calcium intake, years since menopause and HRT use

CSMI

\[ \beta = 0.24 \ (0.11, \ 0.36), \ p<0.001 \]

\[ \beta = 0.15 \ (0.09, \ 0.21), \ p<0.001 \]

\[ \beta = 0.12 \ (0.06, \ 0.19), \ p<0.001 \]

Width

\[ \beta = 0.11 \ (0.06, \ 0.17), \ p<0.001 \]

\[ \beta = 0.07 \ (0.05, \ 0.10), \ p<0.001 \]

\[ \beta = 0.06 \ (0.03, \ 0.09), \ p<0.001 \]
Discussion

• The sample investigated is generally representative of the UK population

• DXA images were used for assessment of proximal femoral geometry

• Detailed information on gestational age at birth not available
Conclusions

• We demonstrated further evidence that early growth is an important predictor of proximal femoral geometry in late adulthood.

• These observations suggest a possible mechanism for the previous observation that early growth is a risk factor for hip fracture in late adulthood.
Acknowledgements

Co-authors

Elaine Dennison, Cyrus Cooper, Karen Jameson, Mark Edawrds, Aihie Sayer, Pat Taylor and Hayley Dennison

Study Participants
Further evidence that infant growth influences proximal femoral geometry in adulthood: the Hertfordshire Cohort Study

A Litwic, M Clynes, H Denison, K A Jameson, A Aihie Sayer, P Taylor, C Cooper, E Dennison

MRC Lifecourse Epidemiology Unit, University of Southampton, UK
Lunch

CLOSER search platform demonstrations and poster session

12:50-14:00

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CLOSER Discovery: www.discovery.closer.ac.uk