**Introduction and objectives**

Connections between children's nutrition, childhood growth, and later socio-economic and health outcomes have been recognized since the nineteenth century. However, the social correlates and long-term consequences of impaired growth are not well measured in the past.

We link microdata from a 1918 childhood health survey to socioeconomic data from the 1920 census.

**Research Objectives:**
1. Measure the distribution of childhood height and weight
2. Estimate the effects of family size, birth order and social class on childhood height and weight

**Unique historical microdata**

Health data: Archival microdata from a 1918 survey of 14,000 children aged 0-6 in Saint Paul, MN. Collected as part of federal "Children's Year" campaign

Linked to Demographic & socio-economic data: Complete microdata from the 1920 federal census

72% of children linked.

**Materials and methods**

Children's height and weight change rapidly, and population norms change over time. We compare height and weight at different ages by normalizing to age specific Z-scores from current World Health Organization growth norms.

**Dependent variables**
- Height-for-age Z score
- Weight-for-age Z score

**Independent variables**
- Birth order
- Family size
- Home ownership
- Household head’s Occupation & Ethnic background

We measure the effect of family structure and economic resources on children's height and weight using family fixed effects regressions.

**Linked sample was representative**

Children in the linked sample had similar height- and weight-for-age Z scores as unlinked children, and matched national Children's Bureau growth norms.

The ethnic and occupational profile of the households was similar to the population of Saint Paul.

**Growth faltering for boys and girls**

Height- and weight-for-age means fell with age, similar to developing countries today.

Boys' and girls' growth profiles were similar, suggesting no systematic gender discrimination.

**Social class had large effects on height**

Using a dataset representative of children in urban America in the early twentieth century we provide the first evidence on the social correlates of childhood growth. We find:
1. No evidence of gender discrimination in nutrition
2. Strong evidence that children in larger families and later-born children were shorter
3. Large social class differentials that compounded the effects of family structure

**Birth order affected height and weight**

<table>
<thead>
<tr>
<th>Sibling order</th>
<th>N</th>
<th>Mean Age for Age Z Score</th>
<th>Mean Height for Age Z Score</th>
<th>Mean Weight for Age Z Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>3,280</td>
<td>2.883</td>
<td>-0.641</td>
<td>-0.474</td>
</tr>
<tr>
<td>Two</td>
<td>2,024</td>
<td>2.773</td>
<td>-0.691</td>
<td>-0.454</td>
</tr>
<tr>
<td>Three</td>
<td>1,354</td>
<td>2.801</td>
<td>-0.756</td>
<td>-0.505</td>
</tr>
<tr>
<td>Four</td>
<td>824</td>
<td>2.736</td>
<td>-0.782</td>
<td>-0.536</td>
</tr>
<tr>
<td>Five</td>
<td>465</td>
<td>2.895</td>
<td>-0.964</td>
<td>-0.585</td>
</tr>
<tr>
<td>Six +</td>
<td>765</td>
<td>2.834</td>
<td>-0.925</td>
<td>-0.595</td>
</tr>
<tr>
<td>Total</td>
<td>8,912</td>
<td>2.826</td>
<td>-0.725</td>
<td>-0.496</td>
</tr>
</tbody>
</table>

Children with a lower birth order and children from smaller families were taller. Each additional birth order was 0.03 – 0.06 standard deviations shorter.