Introduction of complementary feeding in 5 European countries

European Childhood Obesity Project (CHOP)
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Definition: Complementary foods (CF)

**WHO 1998**: nutrient-containing foods or liquids other than breast milk

**ESPGHAN 2008**: solid and liquid foods other than breast milk or infant formula and follow-on formula
Recommendations

**WHO:** exclusive breastfeeding until 6 months  
(WHO Expert Consultation 2001)

**AAP:** CF not before 4 to 6 months  (Greer 2008)

**ESPGHAN:** breastfeeding until 6 months; CF between 17 and 26 weeks of age  (Committee of Nutrition 2008)

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# National recommendations

## Introduction CF

<table>
<thead>
<tr>
<th>Country</th>
<th>Time Frame</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>5 to 7 months</td>
<td>Stillkommission, DGKJ</td>
</tr>
<tr>
<td>Belgium</td>
<td>4 to 6 months</td>
<td>O.N.E</td>
</tr>
<tr>
<td>Italy</td>
<td>after 4 months</td>
<td>SIN, ESPGHAN</td>
</tr>
<tr>
<td>Poland</td>
<td>5th month</td>
<td>Mother &amp; Child Institute</td>
</tr>
<tr>
<td>Spain</td>
<td>between 4 to 6 months</td>
<td>AEP</td>
</tr>
</tbody>
</table>
Our questions

- When were CF introduced to breastfed (BF) or formula fed (FF) infants? – solids or energy providing liquids –
- Does the practice of introducing CF meet recommendations?
- Are there differences between countries?
- Do socio-demographic characteristics influence the time of CF introduction?
Subjects and Methods (1)

- Part of CHOP
- Recruitment: October 2002 - June 2004
- Randomized study with 2 groups: FF infants vs. BF infants as control group
- Mothers and infants were followed up in urban areas from Germany, Belgium, Italy, Spain and Poland

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Subjects and Methods (2)

- Monthly 3-day-weighed food protocol at months 1-9 and month 12
- 4186 food items were divided according to their ingredients, and categorized in subgroups
Subjects and Methods (3)

**Definition of solids:**
- milk or milk products
- cereals or bread
- vegetables
- potatoes
- fruits
- egg
- beef
- poultry

**Definition of energy providing liquids (EPL):**
- instant teas
- fruit juices
- vegetable juices
- beverages

- meats
- sausages
- fish
- pulses
- soy or soy products
- fat
- nuts or seeds
- sweets
Results – number of analysed food protocols

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>BF infants</th>
<th>FF infants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>336</td>
<td>849</td>
<td>1185</td>
</tr>
<tr>
<td>6</td>
<td>317</td>
<td>759</td>
<td>1076</td>
</tr>
<tr>
<td>12</td>
<td>286</td>
<td>660</td>
<td>946</td>
</tr>
</tbody>
</table>

At least one informative 3 day-food protocol was available in 1368 of 1678 infants (32% BF, 68% FF)
Solid introduction in BF and FF infants

Solid introduction*  

Percentage of infants that were introduced to solids  

Months of age

*Kaplan-Meier estimate

Schiess et al. JPGN 2010

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Solid introduction in BF infants

*Chi-square test p<0.001

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Solid introduction in FF infants

*Chi square test p<0.01

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Variables significantly associated with timing of solid introduction in BF infants

<table>
<thead>
<tr>
<th>Age 4 months</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country (Belgium vs. Germany)</td>
<td>15.9</td>
<td>4.0 - 63.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Country (Spain vs. Germany)</td>
<td>6.6</td>
<td>1.8 - 24.3</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mothers educational level (low vs. high)</td>
<td>3.1</td>
<td>1.1 - 9.0</td>
<td>&lt;0.06</td>
</tr>
<tr>
<td>Mothers educational level (middle vs. high)</td>
<td>2.7</td>
<td>1.2 - 5.8</td>
<td>&lt;0.07</td>
</tr>
</tbody>
</table>
Variables significantly associated with timing of solid introduction in FF infants

<table>
<thead>
<tr>
<th>Age 3 months</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country (Belgium vs. Germany)</td>
<td>4.0</td>
<td>1.5 - 10.7</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mothers age at birth (≤ 25 vs. &gt; 35 years)</td>
<td>2.9</td>
<td>1.0 - 8.1</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age 4 months</th>
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<th>95% CI</th>
<th>p</th>
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<tbody>
<tr>
<td>Country (Belgium vs. Germany)</td>
<td>3.3</td>
<td>1.8 - 5.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mothers educational level (low vs. high)</td>
<td>1.9</td>
<td>1.5 - 3.0</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Smoking mother (yes vs. no)</td>
<td>1.4</td>
<td>1.0 - 1.9</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>
EPL introduction in BF and FF infants

Breast fed infants  
Formula fed infants

- Instant tea
- Fruit juice
- Vegetable juice

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EPL energy intake (kcal/d) in FF infants

Median ± IQR

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Total energy intake (kcal/d) with or without EPL

Median ± IQR

*Kruskall-Wallis: 5th month p<0.05

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Energy intake (kcal/d) from formula milk consumed with or without EPL

*Kruskall-Wallis: 2nd to 5th month p<0.05

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Energy intake (kcal/d) from solids, consumed with or without EPL

Median ± IQR

Kruskall-Wallis
*4th to 5th month p<0.01
**7th to 9th and 12th month p<0.001

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Summary

- FF infants start earlier with CF than BF infants
- Time point of CF introduction in BF and particularly in FF infants was earlier than recommended
- Although recommendations were similar between the countries, the introduction time point of CF was significantly different
Summary

- Lower maternal educational level, younger maternal age and smoking habits were associated with an earlier introduction of CF.

- Energy intake from formula milk and solids was significantly replaced by EPL consumption.
Conclusions

- Infant feeding practices should be improved
- Health care professionals should intensify consulting of parents of risk groups (FF infants, lower educational level, younger mothers, smoking)

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Thank you very much for your attention!