Childhood vaccination uptake in Flanders in four EPI-surveys between 2005 and 2016

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Flanders’ Vaccination program:

- Implements recommendations made at national level (NITAG)
- Targets infants, school-age children, (and adults)
- Administered at preventive services (well baby clinics and school health centers) as well as by clinicians

- Only poliomyelitis vaccine (IPV) is mandatory
- Central online ordering and registration system Vaccinnet
- Regular surveys to assess the program
Coverage studies in Flanders

- Toddlers
- Toddlers + 14 year-olds who passed 1st highschool
- Toddlers + 14 year-olds who passed 1st highschool
- Toddlers + 16-year-olds

Year and Additional Notes:
- 1999
  - 1997
- 2005
  - 2003
  - 1991
- 2008
  - 2006
  - 1994
- 2012
  - 2010
  - 1998
- 2016
  - 2014
  - 2000...
2-step cluster samples

125 clusters

Total numbers reached:
1349-746 infants
1344-1012 adolescents
Field Work

Selected families receive a letter

minimum 1 week later

Trained interviewer visit

- participate

- Language problem

- Not reached

- refuse

Check vaccination documents

Questionnaire: demographics, vaccinator, ...

2d step
<table>
<thead>
<tr>
<th>Study conducted in</th>
<th>2005</th>
<th>2008</th>
<th>2012</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth Year</td>
<td>°2003</td>
<td>°2006</td>
<td>°2010</td>
<td>°2014</td>
</tr>
<tr>
<td>Age at interview</td>
<td>18-24 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number interviewed</td>
<td>1349</td>
<td>915</td>
<td>874</td>
<td>746</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School Age Boosters</th>
<th>Study conducted in</th>
<th>2005</th>
<th>2008</th>
<th>2012</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polio (6 years)</td>
<td>Not measured</td>
<td>90.8 (89.2-92.4)</td>
<td>90.5 (88.7-92.3)</td>
<td>91.9 (90.1-93.7)</td>
<td></td>
</tr>
<tr>
<td>DT/DTPa (6 years)</td>
<td>Not measured</td>
<td>91.1 (89.6-92.7)</td>
<td>90.8 (89.0-92.5)</td>
<td>92.8 (91.1-94.5)</td>
<td></td>
</tr>
<tr>
<td>MMR 2 (10 years)</td>
<td>83.6 (81.4-85.8)</td>
<td>90.6 (89.0-92.2)</td>
<td>92.5 (90.9-94.1)</td>
<td>93.4 (91.8-95.1)</td>
<td></td>
</tr>
<tr>
<td>HPV (12 years)</td>
<td>Not recommended</td>
<td>4.1 (2.6-5.7)</td>
<td>83.5 (80.6-86.4)</td>
<td>89.5 (86.5-92.4)</td>
<td></td>
</tr>
<tr>
<td>HBV (12 years)</td>
<td>75.7 (73.2-79.2)</td>
<td>89.2 (87.4-90.9)</td>
<td>89.2 (87.3-91.2)</td>
<td>85.6 (83.0 – 88.3)</td>
<td></td>
</tr>
<tr>
<td>dTap (14 years)</td>
<td>Not measured</td>
<td>Not measured</td>
<td>Not measured</td>
<td>87.4 (85.0-89.8)</td>
<td></td>
</tr>
</tbody>
</table>
Coverage infants 18-24 months
Coverage infants 18-24 months

Survey Year
Birth cohort

Polio  DTPa  H Influenzae  Hepatitis B  PnCV  MMR  Meningo C  Rotavirus

PCV for free 2007

%
Coverage infants 18-24 months
Coverage adolescents (school age vaccines)

Survey Year  
Birth cohort

- Polio
- DT/DTPa
- MMR1
- MMR2
- HPV (girls)
- dTpa
- Hepatitis B
- Meningo C

Vaccinnet open to all vaccinators (2006)
Coverage adolescents (school age vaccines)

Survey Year
Birth cohort

- Polio
- DT/DTPa
- Hepatitis B
- MMR1
- MMR2
- Meningo C
- HPV (girls)
- dTpa

HPV
Girls 12y
Recommanded 2007
For free 2010

dTpa booster
15 years (2009)
Recurrent predictors of incomplete vaccination
Identified by multiple logistic regression, per survey

In infants:

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Odds Ratio: range over years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinated outside well baby clinic</td>
<td>1,6-16,7</td>
</tr>
<tr>
<td>&gt; 1 vaccinator involved</td>
<td>2,6-5,1</td>
</tr>
<tr>
<td>Higher number of siblings / birth order</td>
<td>NA</td>
</tr>
<tr>
<td>Indicators of poor socio-economic status*</td>
<td>1,9-5,2</td>
</tr>
</tbody>
</table>

*parental income, employment, education, ethnicity..

In adolescents (school age vaccines):

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Odds Ratio: range over years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed school career</td>
<td>1,05-3,7</td>
</tr>
<tr>
<td>Foreign ethnicity (non-EU)</td>
<td>1,08-3</td>
</tr>
<tr>
<td>Lower family income</td>
<td>1,07-3</td>
</tr>
<tr>
<td>&quot;atypical family&quot;*</td>
<td>1,14-2</td>
</tr>
</tbody>
</table>

*divorced, single parent, no mother, ...
Conclusions

- High vaccination coverage has been achieved in Flanders for recommended vaccines, including at school age.
- Newly recommended vaccines are quickly adopted once implemented.
- Characteristics of underserved children are similar over the past decennium and require new strategies.

Reference: reports available at