Vaccination coverage and determinants of under-immunization in immunocompromised children

EUSUHM Congress
Leuven
September 7th, 2017
Lise Boey
Background

Immunocompromised children: increased risk for infectious diseases
# Recommendations

## Vaccination

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>8 wk</th>
<th>12 wk</th>
<th>16 wk</th>
<th>12 m</th>
<th>15 m</th>
<th>6 y</th>
<th>10 y</th>
<th>12 y</th>
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<tr>
<td>Poliomyelitis</td>
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<td>Diphteria</td>
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<td>Tetanus</td>
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<td>Pertussis</td>
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<td>Haemophilus influenza B</td>
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<td>Hepatitis B</td>
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<td>Pneumococcus (10-valent)</td>
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<td>Rota</td>
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<td>Measels</td>
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<td>Mumps</td>
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<td>Rubella</td>
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<td>Meningococcus type C</td>
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<td>HPV(9)</td>
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+ Annual influenza vaccination
Background

How well protected?

Herd immunity

Vaccination coverage lower in those who are often ill
Lower vaccination coverage in different patient populations

<table>
<thead>
<tr>
<th>(%) and 95% CI</th>
<th>Allergy N = 86</th>
<th>Congenital heart disease N = 118</th>
<th>Diabetes mellitus N = 126</th>
<th>Cystic fibrosis N = 52</th>
<th>Total N = 382</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTaP-IPV-Hib-HBV</td>
<td>75.6% (64.9 – 83.9)</td>
<td>57.6% (48.2 – 66.6)</td>
<td>55.6% (46.5 – 64.3)</td>
<td>61.5% (47.0 – 74.4)</td>
<td>61.5% (56.4 – 66.4)</td>
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<tr>
<td>PCV</td>
<td>84.8% (67.3 – 94.3)</td>
<td>83.7% (68.7 – 92.7)</td>
<td>93.8% (67.7 – 99.7)</td>
<td>71.4% (47.7 – 87.8)</td>
<td>83.2% (74.7 – 89.3)</td>
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<tr>
<td>Rota</td>
<td>76.7% (57.3 – 89.4)</td>
<td>71.1% (53.9 – 84.0)</td>
<td>83.3% (50.9 – 97.1)</td>
<td>61.1% (36.1 – 81.7)</td>
<td>72.4% (62.3 – 80.8)</td>
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<tr>
<td>MMR</td>
<td>80.8% (60.0 – 92.7)</td>
<td>61.2% (46.2 – 74.5)</td>
<td>84.0% (73.8 – 90.8)</td>
<td>73.7% (48.6 – 89.9)</td>
<td>76.0% (68.9 – 82.0)</td>
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<tr>
<td>MenC</td>
<td>87.3% (77.5 – 93.4)</td>
<td>80.2% (70.6 – 87.4)</td>
<td>84.8% (75.4 – 91.1)</td>
<td>82.9% (67.4 – 92.3)</td>
<td>83.8% (79.1 – 87.6)</td>
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<tr>
<td>Booster DTaP-IPV</td>
<td>94.2% (83.1 – 98.5)</td>
<td>80.0% (68.9 – 88.0)</td>
<td>84.4% (75.7 – 90.3)</td>
<td>74.2% (58.5 – 89.7)</td>
<td>83.8% (79.1 – 88.3)</td>
</tr>
<tr>
<td>HPV ♀</td>
<td>33.3% (1.8 – 87.5)</td>
<td>73.7% (48.6 – 89.9)</td>
<td>76.9% (55.9 – 90.2)</td>
<td>42.9% (11.8 – 79.8)</td>
<td>69.1% (55.0 – 80.5)</td>
</tr>
</tbody>
</table>

Flemish children

<table>
<thead>
<tr>
<th>%</th>
<th>93.0</th>
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<tr>
<td>94.9</td>
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<tr>
<td>89.7</td>
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<tr>
<td>96.2</td>
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<td>93.7</td>
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<td>87.4</td>
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<td>89.5</td>
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Aim

- Vaccination coverage
- **Determinants** for potential incomplete vaccination
Monocentric, retrospective study

1. Vaccination dates
2. Socio-demographic data
3. Socio-economic data
4. Determinants of vaccination

Additional data collection: vaccination coverage
Vaccinnet
General practitioners
Overview

- Background
- Methods
- Results
- Discussion
- Conclusion
Completeness of vaccination schedule

Solid organ transplant (SOT)
N = 35
Pretransplant: n = 7
Postransplant: n = 28

Completed vaccination schedule: 51.4%

Primary immunodeficiencies (PID)
N = 149

Completed vaccination schedule: 61.1%
Vaccination coverage

*Study van de vaccinatiegraad in Vlaanderen 2016*
Determinants of vaccination in PID-patients

• Vaccination by paediatrician vs well-baby clinic
  - Hexa: 65.5% vs 83.5%; OR: 0.38
  - PCV: 60.0% vs 97.5%; OR: 0.04
  - MMR: 68.8% vs 96.9%; OR: 0.1

• Vaccination by GP vs well-baby clinic
  - Hexa: 30.0% vs 83.5%; OR: 0.1
  - PCV: 28.6% vs 97.5%; OR: 0.01
  - MMR: 80.0% vs 97.5%; OR: 0.1

• One-parent family

• Unemployed mother

• Higher family income
  - PCV: 91.3% vs 75.6%; OR: 3.4
  - MMR: 78.8% vs 92.2%; OR: 0.3
Determinants of vaccination in SOT-patients

• Vaccination by well-baby clinic
  - Hep A: 63.0% vs 12.5%; OR: 11.9

• Follow-up at well-baby clinic
  - Basic vaccine schedule: 80.0% vs 40%; OR: 6.0

• Employed mother
  - Basic vaccine schedule: 70.0% vs 6.42%; OR: 6.0
  - PCV: 75.0% vs 40.0%; OR: 4.5

• >2 children in a family
  - PCV: 25.0% vs 70.4%; OR: 0.14
Discussion

Immunocompromised children: more likely to have missed vaccinations

Scattered follow-up of immunization by different vaccinators
  School doctor, GP and specialist

Monitor the vaccination state in these children more strictly
  Register in Vaccinnet
  Clear communication to the patient
Conclusion

Vaccination rates were lower in immunocompromised children.

MMR vaccination was often contra-indicated.

Vaccination coverage was associated with:

- > 2 children in a family
- One-parent family
- Unemployment of the mother

- 1. Vaccination in well-baby clinics