Piloting the Danish part of I-MOVE in the 2008/2009 season
A system to estimate influenza vaccine effectiveness

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BACKGROUND
• Described is the Danish part of the pilot phase of I-MOVE (Influenza, Monitoring Vaccine Effectiveness); a European project aiming to get real-time estimates of seasonal and pandemic influenza vaccine effectiveness (VE).
• The Danish population ≥65 years is offered free yearly seasonal influenza vaccinations. Vaccination uptake is 50-55%.

OBJECTIVES
Primary objective To measure influenza vaccine effectiveness (VE) against laboratory-confirmed influenza among people ≥65 years consulting a GP due to influenza-like illness (ILI).
Secondary objectives To estimate influenza VE among the same people ≥65 years with and without additional risks.
To get a timely estimate for the vaccination uptake in the Danish population ≥65 years.

METHODS
This case-control project was carried out within the Danish influenza sentinel surveillance system.
Study period: the weeks with influenza-positive cases.
Forty sentinel GPs were asked to recruit all consenting eligible patients. Inclusion criteria:
• community-dwelling individual ≥65 years.
• influenza-like illness (ILI) according to the EU case definition.
Collected for each ILI-patient:
• a respiratory specimen
• questionnaire: clinical information, vaccination status and data on potential confounding factors, e.g. chronic illness and its severity, previous influenza vaccination, smoking habits.
ILI-patients were categorised as cases or controls depending on their RT-PCR-verified influenza status.

<table>
<thead>
<tr>
<th>ILI-patients</th>
<th>Population register</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza-negative</td>
<td>Influenza-positive</td>
</tr>
<tr>
<td>ILI-controls</td>
<td>Cases</td>
</tr>
</tbody>
</table>

Logistic regression was used in the calculations of VE.

In order to get a timely estimate of the vaccination coverage in the population; 2-4 population controls, matched to cases on date of birth, place of residence and time* were found in the population register and interviewed by telephone.

*) time: interviewed within 14 days of the time of the corresponding case being swabbed.

SELECTED EXPOSURES, FOR CASES AND CONTROLS

<table>
<thead>
<tr>
<th>Cases (n=22 (45%))</th>
<th>ILI-controls (n=27 (55%))</th>
<th>p</th>
<th>OR</th>
<th>VE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza vaccination</td>
<td>11/22 (50%)</td>
<td>20/27 (74%)</td>
<td>0.08</td>
<td>0.35</td>
<td>65% -16% - 89%</td>
</tr>
<tr>
<td>Chronic illness</td>
<td>8/20 (40%)</td>
<td>12/25 (48%)</td>
<td>0.59</td>
<td>0.26</td>
<td>74% 5% - 93%</td>
</tr>
</tbody>
</table>

Vaccine effectiveness (VE) =1 - OR

Crude
Adj. for chronic illness
Adj. for chronic illness, gender, age, smoking, delay, prev.vaccination

<table>
<thead>
<tr>
<th>Vaccine coverage (VC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILI-controls</td>
</tr>
<tr>
<td>VC</td>
</tr>
</tbody>
</table>

CONCLUSIONS
• The results suggest a protective VE against laboratory-confirmed influenza among people ≥65 years consulting their GP due to ILI in the 2008/2009 season in Denmark.
• The small sample size did not allow for precise VE estimates, this issue was addressed by pooling of data with other countries participating in I-MOVE.
• The study population is likely to have an increased health-seeking behaviour, judging by their vaccination coverage.
  • This was addressed by using ILI-controls as control group.
  • Generalizations of results need to be made carefully.
• The design could be used also to calculate VE estimates of a pandemic vaccine.