UK (Scotland) childhood influenza vaccination programme – experience from seasons 2013/14 and 2014/15

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Overview

- Scotland: Demography
- NHS Service Delivery Model
- Scottish Immunisation Programme (SIP)
- Extension of the SIP to offer Live Attenuated Intranasal Influenza Vaccination (LAIV) to children
- Uptake & determinants of uptake
- Impact (positive or negative) on the existing seasonal programme?
- Challenges overcome & lessons for next season
- Summary results across the UK for season 2014/15
854,000 of Scotland’s 5.3 million population are children.

The average number of people per square kilometre in Scotland is 68, among the lowest of the EU countries (i.e. similar to Ireland and Bulgaria). There are huge variations across the 14 health boards.

• Universal free vaccination at the point of access
• General Practice model of delivery for majority of immunisation programme
  – Reimbursement under the global sum paid to General Practices + item of service payment and vaccine cost for selected vaccines (e.g. seasonal influenza vaccine)
• Exceptions offered in the main through secondary school-based programme, e.g.
  – Td/IPV, MMR, MenC – school boosters
  – HPV programme for adolescent girls
All Health issues are devolved from the UK Government to the Scottish Parliament (a Devolved Administration – DA).

Health service policy & delivery increasingly different across UK within each of the three DA’s (Scotland, NI, Wales), e.g.:
- Policy: Minimum pricing for alcohol in Scotland
- Delivery: Health protection within NHS in Scotland c.f. PHE model in England

However, whilst Scottish Government set their own immunisation policy, the risk-based immunisation criteria are identical to those adopted in England in response to serial JCVI recommendations made over more than a decade ago.
The decrease in MenC uptake at 24 months of age in year ending December 2014 (children born January to December 2012) is due to the removal of the second dose (given at four months) from the routine schedule from 1 June 2013.

Source: NHS Scotland Information Services Division.
Seasonal flu programme policy prior to childhood extension (season 2012/13)

Annually

- All those aged 65 or more
- All those under the age of 65 in clinical risk groups at increased risk of clinical complication defined by the Chief Medical Officer (identical CMO groups across the UK)
- All pregnant women (all trimesters)
- All carers

Seasonal flu vaccine uptake 2000/01 to 2012/13

Influenza season uptake

- 65 and over (2000/01 to 2004/5 based on HPS surveillance data, 2005/6 onwards based on GP claims for payment)
- Under 65s in an at risk group (not available prior to 2004/05; 2004/05 to 2010/11 based on HPS surveillance data, 2011/12 onwards based on GP claims for payment)
- WHO target for seasonal influenza vaccine uptake

Source: Health Protection Scotland (HPS).
• Extension of seasonal influenza programme to include all children age 2–17 in annual vaccination with Live Attenuated Influenza Vaccine (LAIV)
  – Implementation over a number of seasons...
  – “... does not adversely affect the (immunisation) programme as a whole”

Rationale for decision

• Modelled data: Even with only 30% uptake, Live Attenuated Intranasal Influenza Vaccine (LAIV) estimated to be cost effective in children aged 2 to 17 years\(^1,2\)

• Based upon:
  – Direct patient protection
    • Vaccine effectiveness of LAIV better than inactivated vaccines\(^3–7\)
  – Indirect public health benefits
    • Reduction in transmission to susceptible groups\(^1\)

## 2012/13 Benefit Realisation – flu: Then, now and next?

<table>
<thead>
<tr>
<th>IMPACT* (Whole population)</th>
<th>Measure</th>
<th>Prior to vaccination programme</th>
<th>Standard Programme (to 12/13) (inactivated vaccine for 65+ and at risk groups)</th>
<th>Programme extension to children (add LAIV for all 2–17 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burden</strong>*</td>
<td>Annual deaths</td>
<td>900</td>
<td>500</td>
<td>300</td>
</tr>
<tr>
<td>Levels of infection/risk of transmission</td>
<td>Consultation rates</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Vaccine uptake (and effectiveness)</td>
<td>Not applicable</td>
<td>75% (30–70%)</td>
<td>75% (50–80%)?</td>
</tr>
<tr>
<td></td>
<td>Transmission</td>
<td>High</td>
<td>Moderate?</td>
<td>Low</td>
</tr>
<tr>
<td>Health care utilisation***</td>
<td>Annual hospitalisations</td>
<td>4,700</td>
<td>2,700</td>
<td>1,600</td>
</tr>
<tr>
<td></td>
<td>Annual GP consultations</td>
<td>100,000</td>
<td>75,000</td>
<td>42,000</td>
</tr>
</tbody>
</table>

*Extrapolation and application to Scotland of Public Health England/London School of Hygiene and Tropical Medicine (PHE/LSH&TM) assumptions for JCVI June 2012: 1. Uptake limited to 30% in 2–16 years; 2. Modelling includes indirect benefit through “herd-immunity” protection of adult groups; 3. Census data 2010/11 England & Scotland population estimates as 53 million & 5.3 million, respectively. Societal burden/health economic costs were also estimated by PHE/LSH&TM.1,2

Recommendation into UK Government policy

- Recommendation accepted by each DA and policy implementation followed for year 1 & 2 (seasons 2013/14 and 2014/15) as follows:
  - single dose (two doses for < 9 years old if naïve & in clinical risk group)
  - Pre-school offer of LAIV
    - 2013/14 all UK: vaccination of all 2 & 3 year old children
    - 2014/15 all UK: all 2-4 year olds (and 5 year olds not yet in school)
  - Children of school age
    - Different policy implementation for each DA in year 1 and 2
    - Scotland: 2013/14 primary school pilots in all boards (~1/4 primary school aged children), 2014/15 full primary school roll out.

Preschool children

- 2013/14 vaccine uptake for 2 & 3 year olds: 50.7%
  - 2 & 3-year-olds at risk (n=3,669): 66.5%
  - 2 & 3-year-olds not at risk (n=116,311): 50.1%

- 2014/15 vaccine uptake for 2 to under 5 year olds (not yet in school): 56.4%
  - 2 to under 5 year olds at risk (n=5,352): 61.3%
  - 2 to under 5 year olds not at risk (n=144,468): 56.2%

Source: Health Protection Scotland.
Preschool children uptake by practice

<table>
<thead>
<tr>
<th></th>
<th>2013/14 - proportion of practices achieving uptake in 2&amp;3 year olds</th>
<th>2014/15 - proportion of practices achieving uptake in 2 to under 5 year olds not yet in school</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥75% uptake</td>
<td>5.2%</td>
<td>15.0%</td>
</tr>
<tr>
<td>≥65% uptake</td>
<td>15.9%</td>
<td>34.6%</td>
</tr>
<tr>
<td>≤40% uptake</td>
<td>19.5%</td>
<td>14.5%</td>
</tr>
</tbody>
</table>

Practice level influenza vaccine uptake in preschool children in Scotland:
2013/14 2&3 year olds, 2014/15 - 2 to under 5 year olds not yet in school

Source: Health Protection Scotland.
School-age children: Scottish programme 2013/14 & 2014/15

• 2013/14: Pilot implementation to maximum of 190,000 doses of LAIV purchased -> offer to ~ ¼ Scottish primary school children across all NHS boards
  – A limited number of whole primary schools AND/OR single year-group cohorts (e.g. all children in Primary 6 and or Primary 7)
  – Nested within these approaches a small number of self-administration pilots

• 2014/15: Full primary school roll out of LAIV offer

• Contraindication to LAIV – asthma: Severity BTS 4 or above
  – TIV offered instead

Source: Scottish Immunisation Programme.
BTS, British Thoracic Society
Primary school: 2013/14 pilots & 2014/15 full roll out

• 2013/14 Primary school pilots
  – mean uptake: 67.2%
  – range between NHS boards: 60.2 - 76.8%

• 2014/15 Full primary school roll out
  – mean uptake: 71.8%
  – range between NHS boards: 62.6 – 83.1%

• Good acceptance for offer of LAIV in the primary school setting

• Lower uptake associated with delivery out with school hours (in school setting) or in GP setting
• Self-administration was difficult for 10 to 12 year olds
• Less than 1% wastage in school setting

Source: Health Protection Scotland.
Primary school: Uptake by SIMD quintile

- Scottish Index of Multiple Deprivation (SIMD) 2012 quintile
- Increasing uptake most deprived to least deprived (statistically significant)
- Caveat: By postcode not catchment area

Source: Health Protection Scotland.
Proportion of pupils from an ethnic minority

- Decreasing uptake: with increasing proportion of pupils from ethnic minority

  - Statistically significant independent of SIMD 2012 quintile
  - Porcine gelatine? (offer of TIV in school did not compensate)
  - Language?
  - Caveat: No data on religion or details of ethnicity composition

Source: Health Protection Scotland.
Seasonal flu vaccine uptake 2000/01 to 2014/15

*Data for 2014/15 based on HPS surveillance estimates at week 13

Source: Health Protection Scotland.
Seasonal programme at Week 13 compared to prior seasons

- **65+: 76.3%** – in line with previous seasons (13/14: 76.9%; 12/13: 76.8%)
- **At risk: 54.0%** – lower (denominator inflation) (13/14: 57.5%; 12/13: 56.1%)
- **Pregnant at risk: - 65.0%** – in line with previous season (13/14: 65.0%; 12/13: 68.7%)
- **Pregnant no risk: 49.5%** – higher (13/14: 47.9%; 12/13: 52.9%)

Source: Health Protection Scotland.
### Interim estimated seasonal flu vaccine uptake by each devolved administration 2014/15

<table>
<thead>
<tr>
<th>Country</th>
<th>Age 65 &amp; over</th>
<th>Age under 65 in an “at risk group”</th>
<th>Preschool</th>
<th>Primary school aged</th>
</tr>
</thead>
<tbody>
<tr>
<td>England¹</td>
<td>72.8%</td>
<td>50.3%</td>
<td>38.5% – 2 years 41.3% – 3 years 32.9% – 4 years</td>
<td>-</td>
</tr>
<tr>
<td>Scotland²</td>
<td>76.3%</td>
<td>54.0%</td>
<td>56.4% - 2 to under 5 year olds not yet in school</td>
<td>71.8% - all primary schools</td>
</tr>
<tr>
<td>Northern Ireland³</td>
<td>73.4%</td>
<td>71.8%</td>
<td>54.4% - 2 to 4 year olds</td>
<td>79.7% - all primary schools</td>
</tr>
</tbody>
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2. HPS National Influenza Report, Scotland, data to 29 March 2015.
Conclusions & lessons for next season

• Offer well accepted in schools, less so in preschool & wastage low (<1%)
• Resources – staff intensive!
  • Pilot 13/14 feedback: “Exhausting effort feels like you have just managed a 12-week outbreak”
  • Self – administration not suitable for primary school age
• Consent – consent form optimisation to reduce administrative burden
• IT development to integrate child health and GP records to allow call and recall, and facilitate invitation
• Porcine gelatine concerns acknowledged – parent choice: offer of inactivated injectable vaccine for belief reasons
Acknowledgements

• Scottish Primary School pupils, parents & staff
• Scottish Local Authority Council Education departments
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• Scottish Government: Nicola Kerr, Jacqueline Campbell, Dr Nicola Steedman
• Public Health England
• Northern Ireland Department of Health, Social Services and Public Safety
• Welsh Government, Directorate for Public Health