Measuring the effectiveness of catch-up MMR delivered by school nurses compared to signposting to general practice on improving MMR coverage: a retrospective cohort study.

Completed in partial fulfilment of MSc in Public Health, UWE

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Aims of dissertation research

Primary research question:

To what extent does the increase in coverage of at least one dose of MMR differ between areas in which school nurses deliver catch-up MMR doses compared to signposting to general practice?

Secondary research question:

To what extent does the increase in coverage of two doses of MMR differ between areas in which school nurses deliver catch-up MMR doses compared to signposting to general practice?
In 2016, the number of measles cases reported in England had risen more than five times to 531 compared to 92 cases in 2015.
Background: shift in burden of disease

Burden of disease has shifted to older teenagers and young adults aged 15-35, the majority of whom have been identified as unimmunised.
Why school nurse delivery of MMR?

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>Total, N</td>
<td>400*</td>
<td>400*</td>
</tr>
<tr>
<td>Not protected, n (%)</td>
<td>98 (24.5)</td>
<td>31 (7.8)</td>
</tr>
<tr>
<td>Protected with at least one dose, n (%)</td>
<td>275 (68.8)</td>
<td>342 (85.5)</td>
</tr>
<tr>
<td>Protected with two doses, n (%)</td>
<td>102 (25.5)</td>
<td>208 (52.0)</td>
</tr>
</tbody>
</table>

* 27 immunisation records missing/incomplete included in the denominator
~ 2 contraindicated and 3 out of area are included in the denominator

Only two previous studies were identified that evaluated the effectiveness of school nurses delivering catch-up MMR doses.
Methods

• Retrospective cohort study design – analysis of secondary data

• Cohort 1: Berkshire, Buckinghamshire, Oxfordshire and Swindon
  • school nurse delivery

• Cohort 2: B&NES, Gloucestershire and Wiltshire
  • signposting to GP

• Sample population
  • all children born between 01/09/2000 and 31/08/2001 that were in school year 9 during 2014/15 academic year

• Baseline: 01/09/2014; first follow-up: 31/08/2015; second follow-up: 31/08/2016

• Ethics approval granted by UWE Research Ethics Committee
Population born 1 September 2000 – 31 August 2001

Sample population with CHIS record of MMR status

School nurses commissioned to deliver catch-up MMR dose(s) at point of Td/IPV delivery

At least one dose of MMR
Two doses of MMR

School nurses commissioned to signpost eligible children to GP for catch-up MMR dose(s)

At least one dose of MMR
Two doses of MMR

TIME

01/09/2014 (Baseline) → 31/08/2015 (First follow-up) → 31/08/2016 (Second follow-up)
Analysis

- Descriptive data for the following variables was presented by locality and cohort
  - gender
  - ethnicity
  - MMR status (0, 1, 2, >2 or unknown) at baseline and each follow-up
  - school deprivation score (at baseline), where available

- Comparison of proportions chi-squared test
  - determines the statistical significance of any proportional increases in coverage of at least one dose of MMR and two doses of MMR between the two independent cohorts

- Additional analyses also conducted to explore the impact of ethnicity and deprivation on proportional increase in coverage
Results

- Total of 27,675 records received - no records were received for Wiltshire
- Once data cleansing was completed this left 27,527 for analysis
- Deprivation data only available for 47% of records (13,060/27,527)
  - Deprivation at school-level only
- Ethnicity data only available in 34% or records (9,415/27,527)
<table>
<thead>
<tr>
<th>Primary outcome (protected with at least one dose of MMR / not protected)</th>
<th>Increase in number vaccinated, n/N (%)</th>
<th>% difference between cohorts</th>
<th>CI</th>
<th>Chi-squared statistic</th>
<th>DF</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T₁ - T₂</strong></td>
<td>207/20,729 (1.0)</td>
<td>0.9</td>
<td>to 1.0541</td>
<td>52.079</td>
<td>1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cohort 1</td>
<td>9/6,582 (0.1)</td>
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<tr>
<td>Cohort 2</td>
<td></td>
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<tr>
<td><strong>T₁ - T₃</strong></td>
<td>334/20,602 (1.6)</td>
<td>1.4</td>
<td>to 1.5986</td>
<td>78.486</td>
<td>1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cohort 1</td>
<td>12/6,579 (0.2)</td>
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<td>Cohort 2</td>
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<tr>
<td>Outcome</td>
<td>Proportional increase in number vaccinated between cohorts</td>
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<tr>
<td></td>
<td>T1-T2</td>
<td>T1-T3</td>
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<tr>
<td>Protected with at least one dose</td>
<td>0.9% ($p&lt;0.0001$)</td>
<td>1.4% ($p&lt;0.0001$)</td>
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<tr>
<td>Protected with two doses</td>
<td>0.9% ($p&lt;0.0001$)</td>
<td>1.3% ($p&lt;0.0001$)</td>
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<tr>
<td>Protected with at least one dose (ethnicity analysis)</td>
<td>BAME</td>
<td>White</td>
<td></td>
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<tr>
<td></td>
<td>0.4% ($p=0.2768$)</td>
<td>1.6% ($p=0.0098$)</td>
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<tr>
<td></td>
<td>0.6% ($p&lt;0.0001$)</td>
<td>1.0% ($p&lt;0.0001$)</td>
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<tr>
<td>Protected with at least one dose (deprivation analysis)</td>
<td>Least deprived (&lt;8.7)</td>
<td>More deprived (≥8.7)</td>
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<tr>
<td></td>
<td>1.3% ($p&lt;0.0001$)</td>
<td>1.7% ($p&lt;0.0001$)</td>
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<tr>
<td></td>
<td>1.8% ($p&lt;0.0001$)</td>
<td>2.8% ($p&lt;0.0001$)</td>
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</table>

T1 = baseline; T2 = first follow-up; T3 = second follow-up
Conclusions & recommendations

Overall increase in coverage of **1.6% of at least one dose and 1.5% of two doses** could be achieved through school nurse delivery of catch-up MMR.

Health inequalities for individuals of BAME ethnicity or attending school in a more deprived area could be addressed through school nurse delivery of catch-up MMR: increase in coverage of **1.7% and 3.0%**, respectively.

**Strengths**: inclusion of a comparison group of eligible children signposted to the GP; large sample size.

**Limitations**: deprivation at school-level; incomplete ethnicity and schools data; lack of demographic indicators.

It is recommended that commissioners of school-aged immunisation services incorporate the delivery of catch-up MMR doses within their contracts with school nurses.
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Thanks for listening – any questions?

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