Controlling hand foot and mouth disease in preschools

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Turning Discovery into Healthier Communities
• Daily screening of all pre-schoolers
• Isolation of infected children for 10d
• School closure following outbreak
In-depth interviews
Semi-structured interview of
- 17 parents
- 4 principals
- 21 teachers
in English or Mandarin
Translated/transcribed and analysed using applied thematic analysis in NVivo

‘Naming and shaming’
Derided by parents and teachers
- Parents don’t see the point: will not influence their decision making
- Teachers find it demoralising: feel no agency over outbreaks

‘Isolation of sick children’
Supported by teachers
But note that parents ‘cheat’
- Not sharing diagnoses and sending kids to school even when sick,
- Exerting pressure to return early, citing reasons why child needs to be at school

Closure ‘effective but onerous’
- Teachers support infection ‘break’
- But causes friction with parents
- Substantial impacts on leave or alternative care

Prevention impacts daily school life
Banning of
- parental access,
- outdoor play,
- playing with other age groups;
Encouraging playing by self
Economic impact
## Cost: to schools

<table>
<thead>
<tr>
<th>Length of closure</th>
<th>1 day</th>
<th>5 days</th>
<th>10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average direct cost</td>
<td>$840</td>
<td>$2340</td>
<td>$4420</td>
</tr>
<tr>
<td>Average staff hours</td>
<td>18</td>
<td>68</td>
<td>141</td>
</tr>
<tr>
<td>Average total cost</td>
<td>$1040</td>
<td>$3070</td>
<td>$5930</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual closures</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>$180 000</td>
</tr>
<tr>
<td>100</td>
<td>$590 000</td>
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</tbody>
</table>
Cost: to families

• One random child selected per family.
• Among all the random children, 35% of them have stayed at home due to HFMD.
• Average number of days absent from school due to HFMD is 6.8 days.
• Caregivers on average takes 4d of paid leave, 1.7d of unpaid leave and 2.1d working from home.
• Average daily cost for staying at home due to HFMD is $320.
• Average total cost for staying at home due to HFMD is $2800, including
  o Medication & consultation
  o Employed parent taking time off
  o Hiring babysitter
  o Transportation
  o Lost of school fees (indirect)

<table>
<thead>
<tr>
<th>Annual cases</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 000</td>
<td>$56 000 000</td>
</tr>
<tr>
<td>30 000</td>
<td>$84 000 000</td>
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Modelling of effect of closure
HFMD is legally notifiable by physicians and childcare teachers, as well as actively screened for in preschool-aged children.

i. Aggregate reported HFMD cases from 2003 to 2012, with the number of daily cases stratified by age;

ii. All ~9000 HFMD outbreaks in childcare centres and kindergartens in Singapore, during the period 2011 to 2016 – cumulative number of cases per day, enrollment size, whether the school were closed due to outbreak, date of closure and reopening.
### Analysis 1: closure due to public holidays

Transmissibility was:
- Reduced by **53%** in the one week following a public holiday;
- Reduced only by **34%** in the second week;
- **No reduction** in the third week.

<table>
<thead>
<tr>
<th>Transmissibility on PH vs normal day</th>
<th>+1 week</th>
<th>+2 weeks</th>
<th>+3 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimates</td>
<td>0.47 (0.38, 0.56)</td>
<td>0.66 (0.57, 0.75)</td>
<td>1.00 (0.91, 1.10)</td>
</tr>
</tbody>
</table>
During vacations, transmissibility was reduced to 93% for children <12; 94% for age 0 to 2; 93% for age 3 to 5; 90% for age 6 to 11, relative to term time.
Analysis 3: closure due to HFMD outbreak
Analysis 3: closure due to HFMD outbreak

Around 7–8% reduction in cases due to closure

Larger schools
Asymptomatic rate
~60 to 70% in preschool aged kids
Take homes:

Although we found that school closure in response to outbreaks does have a positive effect in reducing transmission, the effect is small.

Outbreak-driven (unplanned) closures cause disruptions to parents/families.

Routine use of school closure outside of public health emergencies may not warrant the impact on families and could be relaxed.
Presentation adapted from the following papers: