Components of the Intervention Package

1. Training of MOH primary care facilities personnel consisted of:
   - Awareness on recommended vaccine storage practices
   - Teaching during the audit process by trained MOH nurses
   - Immediate feedback during audit process (MOH primary care facilities/clinical personnel accompanied the audit)
   - Power point presentation by trained MOH nurses on recommended practices

2. Enabling resources and educational materials:
   - Temperature monitoring chart
   - "6 essential messages" card
   - WHO manual on vaccine storage (WHO 1998)
   - Sticker with the words "Open Me Only When Necessary"

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   - Temperature monitoring chart
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This summary is based on:

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VACCINE STORAGE IN MOH PRIMARY CARE FACILITIES 2008

Issue

In Malaysia at least two third of the population, especially children, obtain vaccination services from the Ministry of Health (MOH) primary care facilities. A breakdown in their cold chain system can lead to an increase in morbidity and mortality from vaccine preventable diseases.

There is no available formal data on the quality of vaccine storage practices within the MOH. Although there is a system within the MOH for proper storage of vaccines, policy makers felt there was a need to assess current vaccine storage practices after an audit of vaccine storage in Private Clinics showed inadequate practices.

This is a report of vaccine storage practices in MOH primary care facilities. It addresses the results of the survey.

Key Messages

- There is a need to improve the quality of vaccine storage in MOH primary care facilities, as only 52.9% fulfilled all 4 criteria with drugs.
- Remedial measures that have been taken include immediate rectification of vaccine storage practice in states audited, application for funding for new refrigerators and re-training of staff.
- Future initiatives could include the introducing and routine use of data loggers (continually temperature monitors) to enhance safe vaccine storage

Recommendations for good vaccine storage (based on WHO guidelines):

1. Vaccines should be stored in an appropriate refrigerator.
2. There should be a dedicated refrigerator for vaccines.
3. The vaccine refrigerator should be correctly placed.
4. Vaccines should be correctly placed inside the refrigerator.
5. The temperature of the refrigerator should be maintained between 2-8°C.
6. The internal temperature of the refrigerator should be monitored daily.
Action Points

Effective mechanisms for improving vaccine storage practices is needed. This includes procurement and use of a thermometer, temperature charts, training of government primary care facilities personnel and replacement of old refrigerators. There is also a need for an enforcement agency to routinely audit vaccine refrigerators in all MOH primary care facility.

MOH primary care facilities have an important role to play by ensuring that vaccines are stored according to recommended practices as well as to ensure that periodic monitoring of vaccine storage practice is carried out.

Key Considerations for Policy Makers

- Develop and implement a national quality assurance indicator for the monitoring of vaccine storage practices
- Review supervision and monitoring system for daily, weekly and monthly vaccine storage practices
- Review training of MOH primary care clinic staff in safe vaccine storage and supervision

Other Options

- Provide all clinics with appropriate refrigerators for dedicated vaccine storage and replace old refrigerators
- Consider and implement the usage of data loggers (continuous temperature recording devices) to objectively monitor vaccine refrigerator temperatures. This will replace existing dial and other thermometers
- Infrastructure planning for new MOH primary care facilities or renovation of existing structures must take into account adequate space for correct vaccine refrigerator placement

Background

Good vaccine storage practices are still lacking[2] even in developed countries[3,4,5] among primary care facilities. In Malaysia at least two third of the population, especially children, obtain immunization services from the Ministry of Health (MOH) primary care facilities.[6]

A breakdown in their cold chain system could lead to an increase in the morbidity and mortality rates of the diseases prevented by vaccination.[7] In 2007, in USA, vaccines ruined by poor refrigeration had resulted in more than 10,000 patients from various parts of USA needing revaccination, the majority being children.[8]

The aim of this study is to assess vaccine storage practices, in MOH primary care facilities with respect to WHO guidelines for vaccine storage.

Table 1: Comparison of six essential criteria

<table>
<thead>
<tr>
<th>No.</th>
<th>Essential Criteria</th>
<th>Count (Total units compiled)</th>
<th>%</th>
<th>Lower CI</th>
<th>Upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Two door/top loading refrigerator</td>
<td>453</td>
<td>64.6</td>
<td>61.0</td>
<td>68.1</td>
</tr>
<tr>
<td>#2</td>
<td>Dedicated refrigerator for vaccine</td>
<td>278</td>
<td>39.7</td>
<td>36.0</td>
<td>43.4</td>
</tr>
<tr>
<td>#3</td>
<td>Placement of refrigerator (includes sunlight/frost)</td>
<td>56</td>
<td>8.0</td>
<td>6.1</td>
<td>10.2</td>
</tr>
<tr>
<td>#4</td>
<td>Placement of vaccine</td>
<td>667</td>
<td>95.1</td>
<td>93.3</td>
<td>96.6</td>
</tr>
<tr>
<td>#5</td>
<td>Temperature between 2-8°C</td>
<td>517</td>
<td>73.8</td>
<td>70.3</td>
<td>77.0</td>
</tr>
<tr>
<td>#6</td>
<td>Monitor temperature</td>
<td>644</td>
<td>91.9</td>
<td>89.6</td>
<td>93.8</td>
</tr>
<tr>
<td>#2d</td>
<td>Vaccine &amp; drugs*</td>
<td>555</td>
<td>79.2</td>
<td>76.0</td>
<td>82.1</td>
</tr>
</tbody>
</table>

Note: @ This allowed the refrigerator to also store drugs together with vaccines
Cl= 95% confidence limits
*Analysis at level of units/departments in primary care facility

Table 2: Combination of the essential criteria

<table>
<thead>
<tr>
<th>Combination of the Essential Criteria</th>
<th>Count</th>
<th>%</th>
<th>Lower CI</th>
<th>Upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulfilled all 6 criteria*</td>
<td>13</td>
<td>1.9</td>
<td>1.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Fulfilled all 6 criteria &amp; drug&lt;sup&gt;2&lt;/sup&gt;</td>
<td>19</td>
<td>2.7</td>
<td>1.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Fulfilled all 5 criteria** &amp; (refrigerator type excluded)</td>
<td>21</td>
<td>3.0</td>
<td>1.9</td>
<td>4.5</td>
</tr>
<tr>
<td>Fulfilled all 5 criteria &amp; drug&lt;sup&gt;2&lt;/sup&gt; &amp; (refrigerator type excluded)</td>
<td>33</td>
<td>4.7</td>
<td>3.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Fulfilled all 5 criteria* &amp; (refrigerator placement excluded)</td>
<td>141</td>
<td>20.1</td>
<td>17.2</td>
<td>23.3</td>
</tr>
<tr>
<td>Fulfilled all 5 criteria &amp; drug&lt;sup&gt;2&lt;/sup&gt; &amp; (refrigerator placement excluded)</td>
<td>256</td>
<td>36.5</td>
<td>32.9</td>
<td>40.2</td>
</tr>
<tr>
<td>Fulfilled all 4 criteria&lt;sup&gt;3&lt;/sup&gt;</td>
<td>208</td>
<td>29.7</td>
<td>26.3</td>
<td>33.2</td>
</tr>
<tr>
<td>Fulfilled all 4 criteria &amp; drug&lt;sup&gt;2&lt;/sup&gt;</td>
<td>371</td>
<td>52.9</td>
<td>49.2</td>
<td>56.7</td>
</tr>
</tbody>
</table>

<sup>* This consisted of criterion #1 to #6</sup>
<sup>2</sup> This allowed the refrigerator to also store drugs together with vaccines
<sup>3</sup> The type of refrigerator was excluded from the criterion list
<sup>4</sup> The type of refrigerator and placement of refrigerator was excluded from the criterion list

Method

This cross-sectional study was an extension of a previous study conducted to assess vaccine storage in private practice[2]. This was conducted in 3 randomly selected states in Malaysia. All primary care facilities in selected states were audited. Criteria for assessment of vaccine storage practices, based on WHO guidelines (1998), were:

1. Appropriate refrigerator to store vaccines
2. Availability of a dedicated refrigerator for vaccines
3. Correct placement of the vaccine refrigerator
4. Correct placement of vaccine in the refrigerator
5. Maintenance of refrigerator temperature between 2-8°C
6. Daily monitoring of internal refrigerator temperature

The audit of vaccine storage practices was accompanied by immediate verbal and written feedback to the clinic staff, using the audit form. Research nurses delivered educational materials to each clinic (6 essential messages on vaccine storage, temperature monitoring chart and reminder stickers) in addition to a copy of the audit results.

Key Findings

- A total of 701 primary care units was audited (99.7% response rate).
- Almost two thirds were a Community Clinic (Klinik Desa).
- Most units had a designated staff to handle vaccines, majority of who were community nurses.
- Two thirds of clinic refrigerators were in the recommended 2-8°C temperature range (Table 1).
- Almost all had temperature monitoring.
- 93.3-96.6% had correct placement of vaccine.
- However, up to a quarter of clinics do not have the recommended refrigerator type.
- Almost one quarter stored other things besides vaccines in their vaccine refrigerator.
- In terms of combination of the 6 essential criteria, fulfilment of all 6 essential criteria was almost negligible (1.9%) (Table 2).

This research highlight is based on review done by the institute and its collaborators on health system policy issues in Malaysia.