Country spotlight: Fiji

Fiona Russell,
Centre for International Child Health, WHO Collaborating Centre for Research & Training in Child & Neonatal Health, Dept of Paediatrics, The University of Melbourne

Murdoch Childrens Research Institute, Melbourne
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**NVEP, MCRI**
Adam Jenney
Rita Reyburn
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No declarations
Fiji

- Population of 869,458
- UMIC, ~30% live in poverty
- IMR 18 per 1000 live births
- EPI coverage: >90%
- Universal health care
- Good access to care
Rotavirus surveillance

- Commenced in 2005 (WHO support)
- WHO adapted SOPs
- Tech transfer to MoH: RV antigen testing
- Positives genotyped (PCR), WHO Rotavirus regional reference lab, MCRI
- Joined WHO Global RV surveillance network
- MoH functions as regional reference lab: tested specimens from Kiribati & Solomon Islands outbreak in 2013 & 2015
Fiji: sentinel sites

CWMH, Suva
- Largest hospital, population based
- Commenced in 2005

Savusavu
- Small provincial rural/urban community, population based
- Commenced in 2010
The burden of hospitalised rotavirus infections in Fiji

Adam Jenney\textsuperscript{a,\*}, Lisi Tikoduadua\textsuperscript{b}, Eka Buadromo\textsuperscript{b}, Graeme Barnes\textsuperscript{c,d}, Carl D. Kirkwood\textsuperscript{c,d}, Karen Boniface\textsuperscript{c,d}, Julie Bines\textsuperscript{c,d}, Kim Mulholland\textsuperscript{a,e}, Fiona Russell\textsuperscript{a}

\textsuperscript{a} Centre for International Child Health, Department of Paediatrics, University of Melbourne, Parkville, Victoria 3051, Australia
\textsuperscript{b} Colonial War Memorial Hospital, Ministry of Health, Suva, Fiji
\textsuperscript{c} Murdoch Children’s Research Institute, Royal Children’s Hospital, Parkville, Victoria 3052, Australia
\textsuperscript{d} Department of Paediatrics, University of Melbourne, Parkville, Victoria 3052, Australia
\textsuperscript{e} Infectious Disease Epidemiology Unit, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, United Kingdom
• Accelerate MDG4 progress
• Implemented with support from Australian Aid
• Priorities
  • Community health workers
  • IMCI
  • PCV, RV vaccines
  • Clinical care
  • Nutrition
  • Neonates
Fiji introduces three new and important vaccines

September 2012 will see the introduction of three new vaccines into the Fiji immunisation schedule. These vaccines will target some of the biggest causes of death and disease in Fiji’s women and children namely, pneumonia, meningitis, gastroenteritis and cervical cancer.

Really exciting! Fiji with AusAid help will introduce 3 life saving vax: Pneumo, Rota & HPV in Q3. First country to do so! #vaccineswork
Rotarix introduced Oct 2012: 6 & 14w
New Vaccine Evaluation Project, Fiji

2012-2016
New Vaccine Evaluation Project

• Objectives:
  – Strengthen MoH surveillance of pneumococcal, RV & HPV infections; &
  – Evaluate the impact of the 3 new vaccines on carriage, disease &/or infection
Impact of rotavirus vaccine

• All-cause hospitalised diarrhoea
  – national hospital admission data
  – 3 main hospitals admit ~80% of all patients

• All-cause diarrhoea mortality

• Rotavirus positive diarrhoea
  – Inpatients & outpatients using surveillance

• Intussusception
  – Baseline IR: Level 1, Brighton criteria
    • Medical records, ward registers, theatre lists, pathology records
  – Active surveillance post RV vaccine introduction
    • WHO SOPs
All-cause hospitalised diarrhoea

37%↓  51%↓  29%↓  44%↓  48%↓  33%↓

Hospitalisations per 100,000

* p<0.05

* Pre-RV vaccine (2007-2011)

All-cause diarrhoea mortality

Deaths per 100,000 population

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;1yr</th>
<th>1-&lt;2yrs</th>
<th>2-4yrs</th>
<th>5-9yrs</th>
<th>10-19yrs</th>
<th>20-54yrs</th>
<th>&gt;55yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>19</td>
<td>14</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>36</td>
</tr>
<tr>
<td>2012</td>
<td>22</td>
<td>12</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>48</td>
</tr>
<tr>
<td>2013</td>
<td>12</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>16</td>
<td>48</td>
</tr>
<tr>
<td>2014</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>2015</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>18</td>
</tr>
</tbody>
</table>
### Rotavirus + diarrhoea, CWMH

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total n=2,362</th>
<th>Stool tested n=1,691 (72%)</th>
<th>No stool n=661 (28%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in months, median (IQR)</strong></td>
<td>n= 2,338</td>
<td>n=1,686</td>
<td>n=652</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>13 (8-24)</td>
<td>13 (8-23)</td>
<td>14 (8-24)</td>
<td></td>
</tr>
<tr>
<td><strong>Male, n (%)</strong></td>
<td>n=2,357</td>
<td></td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>1,397 (59)</td>
<td>1,001 (59)</td>
<td>396 (60)</td>
<td></td>
</tr>
<tr>
<td><strong>LOS in days, median (IQR)</strong></td>
<td>n=2,272</td>
<td>n=1,639</td>
<td>n=633</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2 (1-4)</td>
<td>2 (1-4)</td>
<td>2 (1-4)</td>
<td></td>
</tr>
<tr>
<td><strong>Days with diarrhoea before admission, median (IQR)</strong></td>
<td>n=1,911</td>
<td>n=1,411</td>
<td>n=500</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2 (1-3)</td>
<td>2 (1-4)</td>
<td>2 (1-3)</td>
<td></td>
</tr>
<tr>
<td><strong>IV fluid, n (%)</strong></td>
<td>n=1,977</td>
<td>n=1,447</td>
<td>n=530</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>1,283 (65)</td>
<td>976 (67)</td>
<td>307 (58)</td>
<td></td>
</tr>
<tr>
<td><strong>Died during admission, n (%)</strong></td>
<td>n=2,288</td>
<td>n=1,647</td>
<td>n=641</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>41 (2)</td>
<td>23 (1)</td>
<td>18 (3)</td>
<td></td>
</tr>
</tbody>
</table>
### Pre- vs post-RV vaccine, CWMH

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Non-bloody diarrhoea admissions (mean annual admissions)</td>
<td>1,487 (297)</td>
<td>451 (226)</td>
</tr>
<tr>
<td>Rotavirus admissions (rotavirus positivity rate)</td>
<td>452 (38%)</td>
<td>32 (12%)</td>
</tr>
<tr>
<td>Rotavirus annual incidence rate per 100,000 adjusted for stool samples not tested (95% CI)</td>
<td>345 (317-376)</td>
<td>105 (82-132)</td>
</tr>
<tr>
<td>Rotavirus incidence rate ratio (95% CI)</td>
<td>0.30 (0.23-0.39)</td>
<td>P-value: &lt;0.001</td>
</tr>
<tr>
<td>Non-bloody diarrhoea annual incidence rate per 100,000 (95% CI)</td>
<td>933 (887-982)</td>
<td>665 (605-729)</td>
</tr>
<tr>
<td>Non-bloody diarrhoea annual incidence rate ratio (95% CI)</td>
<td>0.71 (0.64-0.79)</td>
<td>P-value: &lt;0.001</td>
</tr>
</tbody>
</table>

70% ↓ in RV diarrhoea admissions in U5s

29% ↓ in all-cause diarrhoea admissions in U5s
Rotavirus + diarrhoea, CWMH

![Graph showing hospitalisations per 100,000 population by age group in months before and after RV vaccine, with significant reductions post-vaccine marked with * P<0.05.](image-url)
## Savusavu, inpatients & outpatients

<table>
<thead>
<tr>
<th></th>
<th>Inpatients</th>
<th>Outpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-vaccine (Mar10-Jun12)</td>
<td>Post-vaccine (Jan14-Dec15)</td>
</tr>
<tr>
<td>Mean annual non-bloody diarrhoea admissions</td>
<td>154 (71)</td>
<td>69 (35)</td>
</tr>
<tr>
<td>Rotavirus + admissions, n (%)</td>
<td>19 (16%)</td>
<td>0</td>
</tr>
<tr>
<td>Rotavirus annual incidence rate adjusted for stool samples not tested (95% CI)</td>
<td>175.60 (113.00-257.75)</td>
<td>0</td>
</tr>
<tr>
<td>Rotavirus IRR (95% CI)</td>
<td>0.00 (-), P-value &lt;0.001</td>
<td>0.29 (0.10-0.73), P-value= 0.013</td>
</tr>
<tr>
<td>Non-bloody diarrhoea annual incidence rate (95% CI)</td>
<td>1075.57 (912.4-1259.49)</td>
<td>535.71 (416.82-677.98)</td>
</tr>
<tr>
<td>Non-bloody diarrhoea annual IRR (95% CI)</td>
<td>0.50 (0.37-0.67), P-value= 0.002</td>
<td>1.32 (1.17-1.50), P-value &lt;0.001</td>
</tr>
</tbody>
</table>
Incidence rate ratio

All-cause diarrhoea admissions, nationwide

RV diarrhoea CWMH admissions

All-cause admissions, nationwide
Intussusception pre-RV vaccination

<table>
<thead>
<tr>
<th></th>
<th>&lt;2yrs n=24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age</td>
<td>6.5m (IQR 4-8.5)</td>
</tr>
<tr>
<td>Male</td>
<td>11 (46%)</td>
</tr>
<tr>
<td>Surgery</td>
<td>23 (96%)</td>
</tr>
<tr>
<td>Median LOS</td>
<td>6 d (IQR 4-8.5)</td>
</tr>
<tr>
<td>Died</td>
<td>0</td>
</tr>
</tbody>
</table>

Pre RV vaccine annual incidence rate:
22.2 (95% CI: 13.9-33.7) per 100,000 infants
Active IS surveillance post RV vaccine

- 23 definite cases which were age-eligible for vaccine
  - 21/23 had surgery, no deaths
  - RV vaccine: 2 doses (n=15), unknown (n=8)
- Known RV vaccination status (n=15):
  - 14 were unrelated to vaccine (+21d after any dose)
  - 1 case: 13 d post second dose
- Unknown RV vaccination status (n=8):
  - 2 were 18 w, 6 were ≥ 20 w
  - If assume vaccine given & administered at 14 w, all were out of the risk period (+21 d post vaccine)
- Among the 47,790 infants at risk (i.e. vaccinated), expect <2 additional IS cases every 5y
Summary

• RV vaccine introduction successful
  – part of comprehensive child health strategy
  – strong EPI program
  – donor support

• First LMIC in the Asia-Pacific region to show a decline in RV diarrhoea, & all-cause diarrhoea admissions post RV vaccine
  – Important to continue surveillance

• Observational study
  – many confounders including improved OPD practices contributed to decline
  – temporal relationship to vaccine introduction compelling

• Expect <2 additional IS cases every 5 years
  – access to surgery good
  – no deaths