Evaluation of Communicable Disease Surveillance in the Republic of the Marshall Islands

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Background

- Republic of the Marshall Islands (RMI) is an independent country in the Western Pacific
- 53,158 people across 29 coral atolls and 5 major islands
- Public health concerns
  - Overcrowding
  - Limited fresh water
  - Mosquito breeding sites
  - Climate change

Need for communicable disease surveillance evaluation

- RMI citizens travel, work, and live in U.S. without visa certifications or health screenings under Compact of Free Association
- Outbreaks in RMI of dengue, cholera, and multidrug-resistant TB
- Recent exportations to U.S.

Objective

- Evaluate national notifiable disease and syndromic surveillance systems to help strengthen RMI Ministry of Health capacity to detect and control infectious disease outbreaks.

Methods

- On-site evaluation: November 23-30, 2011 in Majuro and Ebeye atolls
  - Serve 74% of RMI’s population
- Framework: CDC 2001 guidelines to evaluate operation and performance
- Focus: national notifiable and syndromic surveillance systems
- Data collection: interviews and direct observations

Results

Components: System operation

- National 19 major notifiable communicable diseases (10 (53%) with laboratory capacity for confirmatory testing)
- Syndromic surveillance of 4 WHO standard regional syndromes:
  1. Acute fever and rash
  2. Diarrhea
  3. Influenza-like illness
  4. Prolonged fever

Epidemic Curve of Suspected Dengue Cases, RMI, 2011

Table 1. Public health resources, Majuro and Ebeye, 2011

<table>
<thead>
<tr>
<th>Resources</th>
<th>Majuro</th>
<th>Ebeye</th>
</tr>
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<tbody>
<tr>
<td>Population</td>
<td>21,767</td>
<td>11,486</td>
</tr>
<tr>
<td>Ancillary service-personnel per 100,000 population</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Infection control unit</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Laboratory services</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>National/Health budget per capita</td>
<td>$346</td>
<td>$424</td>
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</tbody>
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Source: Tyler Sharp, CDC

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Figure 2. Field sites of Majuro and Ebeye

Figure 3. Basic data flow

Table 2. Comparisons of public health resources, RMI vs. U.S.

<table>
<thead>
<tr>
<th>Resources</th>
<th>RMI (per 100,000 pop)</th>
<th>U.S. (per 100,000 pop)</th>
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<tr>
<td>Life expectancy at birth</td>
<td>68.0</td>
<td>78.1</td>
</tr>
<tr>
<td>Total expenditure on health as % of GDP</td>
<td>15.0%</td>
<td>17.9%</td>
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<tr>
<td>Registered nurses per 10,000 pop.</td>
<td>63.2</td>
<td>1,021</td>
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<tr>
<td>Physicians per 10,000 pop.</td>
<td>27.6</td>
<td>102</td>
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<tr>
<td>Hospital beds per 1,000 pop.</td>
<td>3.7</td>
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Figure 4. Syndrome surveillance form for data collection and reporting, Ebeye Hospital

Figure 5. Flexibility/timeliness of notifiable disease surveillance

Table 3. Key components of notifiable and syndromic surveillance systems

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<th>Syndromic Surveillance</th>
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<td>10-VQ/CHQ confirmatory tests</td>
<td>4 WHO descriptions</td>
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<td>Reporting</td>
<td>Patient encounter form</td>
<td>Ebeye checklist (Fig. 4)</td>
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Patient encounters doctors, nurses, laboratory

Data in paper form to hospital fiscal contacts and medical directors

Email data to MOH coordinator in Majuro

Findings and insights distributed to public

Compile and email data to international partners (WHO, CDC, Pacific Public Health Surveillance Network)

Figure 5. Syndrome surveillance form for data collection and reporting, Ebeye Hospital

Conclusions

- Epidemiologic, laboratory, and informatics capacity is limited compared to U.S. state health departments.
- Notifiable disease surveillance is limited by laboratory testing capacity, paper-based systems, and non-standard response protocols in the RMI.
- Syndromic surveillance in resource-poor settings with limited confirmatory testing may help prioritize additional investigation including reference laboratory testing.
- Ensure standard syndromic data collection and reporting between Majuro and Ebeye.
- Establish formal reporting protocols for notifiable diseases.
- Strengthen national epidemiologic capacity
  - Training in outbreak investigations and case definitions
  - Develop electronic information systems
- Develop standard investigation protocols for syndromic alerts.
- Compare syndromic trends with notifiable disease reports to adjust alert thresholds.

Evaluative outcomes

- RMI MOH requested CDC InfaId for recommendations on guide hospital-based information systems development
- Invitation by U.S. Navy to conduct surveillance and outbreak response training for RMI MOH staff during Pacific Partnership 2013
- Health diplomacy mission to RMI.
- Pilot project using tablet computers for electronic syndromic surveillance data collection in Ebeye.

Acknowledgments

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