International Review of the Expanded Programme on Immunization in Solomon Islands, November 2012

Ministry of Health and Medical Services, Solomon Islands
World Health Organization
United Nations Children’s Fund
GAVI Alliance
Japan International Cooperation Agency
International Review of the Expanded Programme on Immunization in Solomon Islands, November 2012

Ministry of Health and Medical Services, Solomon Islands
World Health Organization
United Nations Children’s Fund
GAVI Alliance
Japan International Cooperation Agency
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronyms</td>
<td>iv</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>v</td>
</tr>
<tr>
<td>Executive summary</td>
<td>vi</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>II. Achievements and strengths</td>
<td>5</td>
</tr>
<tr>
<td>III. Main issues and recommendations</td>
<td>8</td>
</tr>
<tr>
<td>1. Targeting eligible children (denominator for vaccination coverage)</td>
<td>8</td>
</tr>
<tr>
<td>2. Cold chain</td>
<td>11</td>
</tr>
<tr>
<td>3. Vaccine management</td>
<td>13</td>
</tr>
<tr>
<td>4. Funding</td>
<td>14</td>
</tr>
<tr>
<td>5. Data management</td>
<td>16</td>
</tr>
<tr>
<td>6. Immunization safety</td>
<td>17</td>
</tr>
<tr>
<td>7. Microplanning</td>
<td>18</td>
</tr>
<tr>
<td>8. Supervision</td>
<td>19</td>
</tr>
<tr>
<td>9. Integration of EPI and MCH</td>
<td>20</td>
</tr>
<tr>
<td>10. Vaccine-preventable disease surveillance</td>
<td>21</td>
</tr>
<tr>
<td>IV. Conclusions</td>
<td>23</td>
</tr>
</tbody>
</table>
**ACRONYMS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>auto-disable</td>
</tr>
<tr>
<td>AEFI</td>
<td>adverse events following immunization</td>
</tr>
<tr>
<td>AHC</td>
<td>area health centre</td>
</tr>
<tr>
<td>BCG</td>
<td>bacille Calmette-Guérin (vaccine)</td>
</tr>
<tr>
<td>DPT</td>
<td>combined diphtheria-pertussis-tetanus vaccine</td>
</tr>
<tr>
<td>DPT-HepB-Hib</td>
<td>combined diphtheria-pertussis-tetanus-hepatitis B-\textit{Haemophilus influenzae} type b vaccine</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunization</td>
</tr>
<tr>
<td>EVM</td>
<td>Effective Vaccine Management</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>HCC</td>
<td>Honiara City Council</td>
</tr>
<tr>
<td>Hib</td>
<td>\textit{Haemophilus influenzae} type b</td>
</tr>
<tr>
<td>HIS</td>
<td>health information system</td>
</tr>
<tr>
<td>IEC</td>
<td>information, education and communication</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>MCH</td>
<td>maternal and child health</td>
</tr>
<tr>
<td>MCV</td>
<td>measles-containing vaccine</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
</tr>
<tr>
<td>MHMS</td>
<td>Ministry of Health and Medical Services</td>
</tr>
<tr>
<td>MNT</td>
<td>maternal and neonatal tetanus</td>
</tr>
<tr>
<td>MNTE</td>
<td>maternal neonatal tetanus elimination</td>
</tr>
<tr>
<td>NAP</td>
<td>nurse aide post</td>
</tr>
<tr>
<td>NIP</td>
<td>National Immunization Programme</td>
</tr>
<tr>
<td>OPV</td>
<td>oral polio vaccine</td>
</tr>
<tr>
<td>RHC</td>
<td>rural health centre</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>VVM</td>
<td>vaccine vial monitor</td>
</tr>
<tr>
<td>VPD</td>
<td>vaccine-preventable disease</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
International review members were (by institution and in alphabetical order): World Health Organization (WHO): Damene Alieyu, Consultant; Sara Farnbach, Technical Officer, Maternal, Child and Reproductive Health, WHO Solomon Islands; Benjamin Lane, Technical Officer, Health Systems Development and Health Care Financing, WHO Solomon Islands; Dorj Narangerel, Temporary Adviser (National EPI Manager, Ministry of Health, Mongolia), WHO Solomon Islands; Erin Nunan, Australian Youth Aid for Development, WHO Solomon Islands; Yoshihiro Takashima, Technical Officer, Expanded Programme on Immunization (EPI), WHO Regional Office for the Western Pacific; Jayaprakash Valiakolleri, Technical Officer, EPI/Surveillance, WHO Fiji. United Nations Children’s Fund (UNICEF): Ingrid Hilman, Child Survival Specialist, Child Health Division, UNICEF Fiji; Mahbub Mahmud Talukder, United Nations Volunteer, EPI Officer, Child Health Division, UNICEF Solomon Islands; GAVI Alliance: Raj Kumar, Senior Programme Manager; and Japan International Cooperation Agency (JICA): Naoko Laka, Project Formulation Advisor.

The assistance of Divi Ogaoga, Director of Reproductive and Child Health Division, Ministry of Health and Reproductive Services (MHRS), Solomon Islands; Raymond Mauriasi, National EPI Manager, MHRS, Solomon Islands; Jenney Gaiofa, National Child Health Officer, MHRS, Solomon Islands; Mathias Tamou, National IMCI Coordinator, MHRS, Solomon Islands; Rose Kafa, National Nutrition Coordinator, MHRS, Solomon Islands; Jenney Vao, National Nutrition Support Officer, MHRS, Solomon Islands; Richard Taro, National Cold Chain Coordinator, MHRS, Solomon Islands; Scott Wanebeni, National Cold Chain Assistant, MHRS, Solomon Islands; Jennifer Anga, EPI/CH Officer, Honiara City Council (HCC); Moses Karuni, Education Officer, HCC; Michael Faka, Provincial EPI/CH Officer, Guadalcanal Province; Hedson Taro, Provincial EPI/CH Officer, Makira/Ulawa Province; Johnson Taro, Provincial Cold Chain Officer, Makira/Ulawa Province; Rockson Silota, Provincial EPI/CH Officer, Malaita Province; Philip Wakioasi, Provincial Cold Chain Officer, Malaita Province; Nelmah Quilzepo, Provincial EPI/CH Officer, Western Province; Cedric Hovo, Provincial Cold Chain Officer, Western Province; Anderson Garomo, Provincial EPI/CH Officer, Isabel Province; and Lambert Viggar, Provincial Cold Chain Officer, Isabel Province is gratefully acknowledged.

The views expressed in this report are those of the participants in the 2012 International Review of the Expanded Programme on Immunization in Solomon Islands, and do not necessarily reflect the policies of WHO, UNICEF, GAVI or JICA.
EXECUTIVE SUMMARY

In November 2012, representatives of the World Health Organization (WHO), United Nations Children’s Fund (UNICEF), GAVI Alliance, and Japan International Cooperation Agency (JICA) conducted a review of Solomon Island’s Expanded Programme on Immunization (EPI), which marked the first programme review in the country. The agencies confirmed a high level of international commitment and support for the programme, and identified a number of issues and recommendations that are highlighted in this report. The review focused primarily on operational analyses rather than on reporting or analysing new data on coverage rates or other performance indicators.

An accessible and well-functioning immunization programme should be a key component of public health services in every country. Strengthening routine immunization services is crucial to achieve the Millennium Development Goal 4 of reducing deaths among under-five children by two-thirds by 2015 compared to 1990. Immunizations are highly cost-effective, and as such, they are a useful benchmark for measuring the effectiveness of government investments in public health and should be one of the highest priorities for government health expenditure. The Solomon Islands’ achievements in immunizations are considerable.

Over the past few years, routine vaccination coverage has shown improvement. The country has remained polio-free. Supplementary immunization activities have successfully enabled control of measles, and Solomon Islands is likely to have achieved the regional goal of measles elimination. The incidence of polio, measles and maternal and neonatal tetanus (MNT) has been sustained at zero level across the country. New life-saving vaccines like *Haemophilus Influenzae* type b (Hib) vaccine have been added to the national immunization schedule. Despite this progress, however, routine vaccination coverage in many areas remains low, and many children are vaccinated late.

The key findings of the review include: different estimates for the number of target children; inadequate cold chain; weak vaccine management; inadequate earmarked funds for outreach, supervision and transportation at health facility level; delayed arrival of funds and lack of knowledge about EPI funds; weak
data management; lack of guidelines on adverse events following immunization (AEFI); lack of appropriate equipment for disposal of immunization waste; lack of EPI microplanning; and insufficient regular supportive supervision.

The review team identified several priority areas for consideration by the Government to expand the scope and increase the impact of EPI in Solomon Islands.

Priority recommendations are as follows:

- Establish a national system of birth registration.
- Reassess the cold chain status of health facilities, develop a replacement plan with costing, and designate and protect the budget planned for maintenance at health facility level.
- Forecast and procure vaccines based on targets and needs.
- Develop a national EPI plan including costings for outreach, supervision and transportation at subnational level and earmarking sufficient funds for the above needs for each province.
- Strengthen data management at all levels.
- Develop national guidelines and conduct training for health staff from national to health centre levels on AEFI management and reporting.
- Provide waste disposal equipment (e.g. drums, incinerators) to health facilities, and strengthen capacity-building at all levels.
- Ensure all health facilities develop EPI microplans to identify and vaccinate more eligible children.
- Strengthen regular supportive supervision.
Solomon Islands is a double-chain archipelago of more than 900 islands in the south-west Pacific Ocean, east of Papua New Guinea and north of Vanuatu. Its total land mass of 28 400 square kilometres (km²), or 11 000 square miles, is widely scattered over 1.3 million km² of the Pacific Ocean, with most of its smaller islands uninhabited. The capital city, Honiara, is located on the island of Guadalcanal. The ethnic groups consist of Melanesians (94.5%), Polynesians (3%), Micronesians (1.2%) and others (1.3%). The country is divided into nine provinces and Honiara City Council (HCC). The estimated total population is 515 870,¹ with 57 741 children under the age of five,¹ and 17 759 under one year.² The country is highly dependent on subsistence farming and fishing, and 84% of the population lives in rural areas. The gross domestic product (GDP) in 2009 was US$ 1256 per capita. Life expectancy at birth is 64.9 for males and 66.7 for females.¹ The under-five mortality rate is 37 per 1000 live births, and the infant mortality rate is 26 per 1000 live births.³ Coverage with the first dose of measles-containing vaccine (MCV1) among one-year-olds is 73%, while coverage with three doses of combined diphtheria–pertussis–tetanus–hepatitis B–Haemophilus influenzae type b vaccine, or Pentavalent-3 (DPT-HepB-Hib), is 88% (2011).⁴

---

⁴ EPI administrative coverage, Ministry of Health, Solomon Islands, 2011.
The objectives of the review were: (1) to assess the National Immunization Programme (NIP) in Solomon Islands from the aspects of national, regional and global immunization goals and targets; (2) to identify challenges that would need to be overcome in order to achieve the goals; and (3) to suggest policy options and provide technical recommendations for the Government of Solomon Islands to address strategic issues in NIP with regards to (a) sustaining polio-free status, measles elimination, maternal and neonatal tetanus elimination (MNTE) and accelerated hepatitis B control; and (b) strengthening and expanding the routine childhood immunization programme, introducing new vaccines and integrating other health interventions.
The review included an analysis of published and unpublished documents, stakeholder interviews, and visits to six provinces (out of 10) to evaluate programme performance on site. In each of the six provinces, two zones were visited – one zone with high performance and one with low performance based on reported Pentavalent-3 coverage in 2011. In each zone, one health centre, either a rural health centre (RHC) or nurse aide post (NAP), and one outreach session or one fixed-site vaccination session were reviewed.

The review addressed the following special issues:

- constraints to achieving high vaccination coverage
  - critical challenges in increasing vaccination coverage with outreach and mobile vaccination services (staffing, funding, access, technical and/or managerial capacity of the staff, involvement of and collaboration by community);

- effect of integration of maternal and child health (MCH) and EPI into health centre, outreach and mobile services
  - benefits, challenges and solutions; and

- political commitment and financial support to NIP and integration of EPI and MCH
  - areas that need further political commitment and financial support.

The field review team carried out the following activities (Table 1):

1. desk review (29 October–5 November 2012)
2. training for national and provincial staff (7–8 November 2012)
3. briefing for international experts (9 November 2012)
4. field review (11–14 November 2012)
5. consolidation of teams’ findings and recommendations (15 November 2012)
6. report to the Government of Solomon Islands and international partners (16 November 2012).

---

5 Provinces visited by the review team members were HCC, Guadalcanal, Malaita, Makira/Ulawa, Western and Isabel.
<table>
<thead>
<tr>
<th>No</th>
<th>International Team (from overseas)</th>
<th>International Staff (SOL)</th>
<th>National Staff (MHMS)</th>
<th>Provincial Staff</th>
<th>Area (Zone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Yoshihiro Takashima (WHO Regional Office)</td>
<td>Ms Naoko Laka (JICA SOL)</td>
<td>Mr. Raymond Mauriasi</td>
<td>Ms. Jennifer Anga</td>
<td>Honiara City Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Moses Karuni</td>
<td></td>
<td></td>
<td>1) Zone / Area (High Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Materniko AHC</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Jayaprakash Valaskerleri (WHO Fiji)</td>
<td>Ms. Erin Nunan (WHO)</td>
<td>Dr. Divi Ogaoga</td>
<td>Mr. Michel Faka</td>
<td>Guadalcanal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Scott Wanebeni</td>
<td></td>
<td></td>
<td>2) Zone / Area (Low Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rove AHC</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Raj Kumar (GAVI)</td>
<td>Dr. Benjamin Lane (WHO)</td>
<td>Ms. Jenny Galofo</td>
<td>Mr. Rockson Siliota</td>
<td>Malaita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Philip Wakioasi</td>
<td></td>
<td></td>
<td>2) Zone / Area (Low Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Malu’u AHC</td>
</tr>
<tr>
<td>4</td>
<td>Dr. Damene Alieyu (WHO STC)</td>
<td>Mr. Mathias Tamou</td>
<td>Mr. Hedson Taro</td>
<td>Mr. Rockson Siliota</td>
<td>Makira / Ulawa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Johnson Taro</td>
<td></td>
<td></td>
<td>1) Zone / Area (High Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Auki AHC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Aringana RHC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Baroda RHC</td>
</tr>
<tr>
<td>5</td>
<td>Dr. Dor Narangererel (WHO TA)</td>
<td>Ms. Sara Farnbach (WHO)</td>
<td>Mr. Richard Taro</td>
<td>Ms. Nelmah Quilizepo</td>
<td>Western</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Cedric Hovo</td>
<td></td>
<td></td>
<td>1) Zone / Area (High Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Guns AHC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vonunu RHC</td>
</tr>
<tr>
<td>6</td>
<td>Dr. Ingrid Hilman (UNICEF Fiji)</td>
<td>Mr. Mahbub Talukder (UNICEF SOL)</td>
<td>Ms. Rose Kata</td>
<td>Mr. Anderson Garomo</td>
<td>Isabel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Lambert Viggar</td>
<td></td>
<td></td>
<td>1) Zone / Area (High Penta-3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buala AHC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tatamba RHC</td>
</tr>
</tbody>
</table>

AHC, area health centre; JICA, Japan International Cooperation Agency; MHMS, Ministry of Health and Medical Services; NAP, nurse aide post; RHC, rural health centre; SOL, Solomon Islands; STC, short-term consultant; TA, temporary adviser; UNICEF, United Nations Children’s Fund; VPD, vaccine-preventable disease; WHO, World Health Organization.
II. ACHIEVEMENTS AND STRENGTHS

EPI is one of the eight elements of the primary health care concept introduced at the Alma-Ata conference in 1978 and incorporated into the “Global Strategy Health for All by 2000” in 1981. In its commitment to the concept, Solomon Islands established an EPI programme under the then Maternal and Child Health/Family Planning Unit in the early 1980s. The immunization of infants against hepatitis B infection was added to the programme in 1990. The name of the unit was changed to Reproductive and Child Health Division to show its commitment to the International Conference on Population and Development in Cairo in 1994. The EPI programme has a national coordinator who is responsible to the Reproductive and Child Health Programme Manager and the Director of the Reproductive and Child Health Division. The provinces are represented by EPI/CH officers. Immunization of infants and pregnant mothers is carried out by nurses at hospitals, area health centres (AHCs), RHCs and NAPs during child welfare clinics and outreach/mobile sessions.6

During the civil conflict in 2002, EPI services were interrupted and coverage was lower than official 2001 estimates.6 According to official figures in 2009, immunization coverage was 60% for MCV1 and 77% for Pentavalent-3 (DPT-HepB-Hib). This is a considerable improvement from surveys in 1990 that showed only 36%–38% of children had completed all vaccines by their first birthday, and just over 50% of children were immunized against measles. Over the past few years, vaccination coverage has improved. In 2011, immunization coverage among one-year-olds climbed to 73% for MCV1 and 88% for Pentavelent-3 (DPT-HepB-Hib).7 Caretakers’ interviews showed that over the past two to three years, vaccination sessions at health centres have gotten better due to improved vaccine availability, increased number of staff and faster services.

---

7 EPI administrative coverage, Ministry of Health, Solomon Islands, 2011.
The following achievements were made in the past 10 years:

- Solomon Islands was declared polio-free in conjunction with other countries in the Western Pacific Region in 2000.

- Incidence of polio, measles, and maternal and neonatal tetanus (MNT) has been sustained at zero level.

- In 2003, many provinces conducted a third round of supplemental immunization activities. These involved measles vaccination for all children and catch-up vaccination with all other vaccines. Follow-up measles vaccination campaigns targeting all children aged one to four years have been carried out every three years (2006, 2009 and 2012). Epidemic measles transmission has most likely been interrupted in the Pacific islands, following coordinated measles supplementary immunization activities since 1997.

- Hib vaccine was successfully introduced into NIP as a combined DPT-HepB-Hib vaccine in July 2008. It effectively protects more children from Hib disease, such as pneumonia and bacterial meningitis, which is a common cause of infant mortality in Solomon Islands. The addition of Pentavalent has increased demand and coverage because a single injection covers five antigens. It has also reduced vaccine wastage and injection waste.

- A national measles and rubella campaign was conducted in June 2012 with rapid coverage assessment of 95%.

- National cold chain policy was developed. Currently the cold chain programme is in the process of replacing its kerosene fridges with gas and solar-powered fridges, which are easier to maintain and will be cost-effective in the medium and long term.

- Training on cold chain maintenance and repair was provided for all provincial cold chain managers by an external consultant (total 15 participants). Refresher training on cold chain was done in HCC, Guadalcanal and Western provinces (total of 56 participants).
• Provincial EPI review with basic EPI and cold chain training was conducted in five out of the 10 provinces in 2012.

• The combined EPI and MCH programme has been well integrated at all levels. It has made it easier for caretakers to receive more services in a single visit.

• An effective Vaccine Management (EVM) assessment was conducted in August 2012.

• Community awareness of and demand for immunization have increased.

• A cholera campaign was conducted in two provinces in 2012 (Choiseul Province and the Shortlands Islands of Western Province).

**Figure 2. Administrative EPI coverage in Solomon Islands, 2007–2011**

Source: EPI administrative coverage, Ministry of Health, Solomon Islands, 2007–2011
III. MAIN ISSUES AND RECOMMENDATIONS

1. Targeting eligible children (denominator for vaccination coverage)

Findings

The review team observed that each province provided two different estimates for the number of target children. The first estimate was based on the number of children vaccinated in the previous year (review of “Immunization Registry”). The second estimate, which was prepared by the Ministry of Health and Medical Services/Health Information System (MHMS/HIS), was based on the 2009 census data and the birth rate. The number of target children, i.e. denominator of the vaccination coverage, was higher in all the provinces than the national estimate. At health facility level, the real denominator is unavailable, and for calculating EPI coverage, the denominator is taken from the Immunization Registry. As such, the reported coverage might be higher than the real coverage. There is no mechanism to ensure that the details of children immunized outside of the catchment area are reported back to the respective clinics for registration. Vaccination coverage is calculated at bigger health centres, but not in smaller ones. Vaccination data are missing or incomplete in some instances. High staff turnover in clinics has affected data collection. The denominator problem has affected comparison of vaccination coverage between different provinces, as well as appropriate performance evaluation and vaccine forecasting.

Health centres that had working refrigerators provided vaccinations one day a week. This one-session-per-week schedule and the low frequency of outreach sessions (the average of four rounds per year) have resulted in very low timeliness of vaccination across the country. Even in areas where vaccination coverage is high, timeliness is still low.
To ensure that infants develop protective immunity as early in life as possible, WHO recommends that doses of DPT-HepB-Hib and oral polio vaccine (OPV) be administered at 6, 10 and 14 weeks of age. In the health facilities reviewed, only 50% of infants received the first dose of Pentavalent by the recommended two months of age; 77% received the first dose of DPT-HepB-Hib vaccine by four months of age, and 89% received it by six months of age. With only three to four contacts per year, many infants are being vaccinated after their risks of infection have already reached high levels. The incidence of pertussis, Hib, pneumococcal and hepatitis B infections is substantial during the first three to four months of life. For some vaccine-preventable diseases (VPDs), such as pertussis, where mortality is concentrated in young infants, more deaths would be prevented by achieving on-time immunization at lower coverage levels, than achieving higher coverage without attention to timeliness.\textsuperscript{8} In 2011, approximately 80% of children were vaccinated in fixed sites and 20% in outreach/mobile sites.

One of the objectives set by the Solomon Islands’ EPI policy (July 2008) was to have over 90% of children fully immunized by 15 months of age by the year 2010. Uncertainties in the actual number of births mean that health workers cannot identify the children they need to reach, cannot accurately estimate programme coverage, and are unable to accurately plan for the amounts of vaccines. Given the relatively low number of births per village per year and the strong government network that exists at the grassroots level in Solomon Islands, instituting a system of compulsory birth registration is considered to be feasible and critical for a strong national immunization programme. Many other programmes would also benefit from having accurate data on numbers of births.

Although school-entry immunization is not a substitute for timely infant immunization, teachers are powerful advocates for immunization. The process of implementing school-entry requirements can increase overall community awareness of the importance of immunizations. Schools are often the first opportunity for non-immune children to congregate in sufficient numbers to support transmission of some VPDs; therefore, school-entry immunization requirements can also reduce the potential for school outbreaks.

Missed doses of all vaccines will be caught up at the school-entry visit. School-entry immunization laws in China, Hong Kong (China) and the United States of America have increased vaccination coverage in children entering school by 30%–40%.9 Priority actions for EPI in 2012 and 2013 include: National Child Health Day in 2012 and 2013, introduction of measles–rubella vaccine in 2013, and plans for introduction of pneumococcal vaccine.10 In addition, implementation of the Reaching Every District/Reaching Every Zone strategy will be prioritized for 2013.

Figure 3. **Trends in HepB-0, Penta-1, Penta-3 and MCV1 coverage, 2009–2011**

As depicted in Figure 3, the data collected from immunization registers of the reviewed health centres showed a decline in coverage over the past few years, whereas the administrative data in Figure 2 revealed coverage improvement. The data disparity indicates denominator problems and weak data management.

---


10 Annual progress report, Solomon Islands, 2011.
Recommendations

(1) Coordinate with provinces to estimate the provincial number of target children based on multiple sources of data, e.g. Immunization Registry, Monthly Report of Health Activities and records of births of the National Referral Hospital and provincial hospitals.

(2) Consider establishment of a national system of birth registration.

(3) Develop a joint Ministry of Health and Ministry of Education regulation on national school-entry immunization.

2. Cold chain

Findings

A cold chain system has been established from national to health centre levels in Solomon Islands. National cold chain policy was developed, and the cold chain programme is currently in the process of shifting its fridges from kerosene to gas and solar power, which are easier to maintain and will be cost-effective in the medium and long term. However, the review team noted that some health centres had either no refrigerator or a non-functional one. Some health centres were exposed to frequent interruptions of power supply due to lack of gas, kerosene or electricity. Refrigerators were not maintained or repaired on time, and spare parts were in short supply.
Out of 24 refrigerators in Isabel Province, 22 (92%) were fully functioning including five new SolarChill vaccine coolers. Isabel Province needs three more SolarChill coolers. In Makira/Ulawa, four clinics have kerosene fridges that require replacement with gas or solar fridges. The internal temperature of refrigerators in some health centres was often unstable due to intermittent interruption of power supply. In Malaita, use of vaccine vial monitor (VVM) Phase III (heat exposed) OPV was noted, and the review team was informed that it was necessitated by vaccine stock-outs. Some health centres do not have a refrigerator. In HCC, not including the central cold chain that has an ice-lined refrigerator, all the health facilities have domestic fridges, which are not recommended for vaccine storage. In addition, Gizo Hospital in Western Province has a Sharp refrigerator, and Buala Hospital in Isabel uses an LG refrigerator. Each health facility has only one gas cylinder (no back-up or reserve cylinders). The situation is compounded by delay in refilling.

**Recommendations**

(4) Assess the cold chain status of health facilities immediately, with special attention placed on refrigerators at health centres; develop a cold chain replacement plan with costing; and designate and protect the budget planned for maintenance at health facility level.

(5) Provide new and proper cold chain equipment including spare parts, and repair or replace non-functional or inappropriate equipment (e.g. domestic and kerosene fridges) as soon as possible.

(6) Assign a dedicated cold chain technician in each province for maintenance of cold chain equipment.
3. Vaccine management

Findings

An Effective Vaccine Management (EVM) assessment was conducted in Solomon Islands in August 2012 using the WHO/UNICEF Global EVM Initiative tool. The EVM assessment was conducted to help the country improve the quality of vaccine management from the national store level to the service delivery level. The assessment was also mandatory for receiving GAVI support for new vaccines.11

The review team observed that serious vaccine stock-outs have occurred recently in several provinces (e.g. OPV in Guadalcanal, Malaita and Makira; BCG in Guadalcanal and Western). The stock-outs were mainly due to (1) late arrival of vaccine to the country with not enough time until expiration date, (2) underestimation of target population, and (3) delay of vaccine delivery from the national store to health facilities.

Use of expired vaccines and VVM Phase III was observed at some health centres. Knowledge and skills on proper vaccine management are not adequate at health centre level in some provinces. There was no inventory management at regional or NAP level (either absent or faulty).

Effective tools for vaccine management at health centre level were developed by HCC and used by health centres effectively. In Makira/Ulawa, a vaccine stock control book was available at provincial and zonal levels, but not at clinic level. In Western Province, there was difficulty with inconsistent brands of vaccines and materials. Nurses from Isabel Province have to wait until five children need vaccinations before they can open vials of BCG and measles-containing vaccine. Lack of storage capacity for dry supplies was a problem particularly at national level.

Recommendations

(7) Base vaccine forecasting and procurement on targets and needs provided by each province.

11 EVM report, Solomon Islands, August 2012.
(8) UNICEF to ensure shipment of vaccines with at least 18 months lead time prior to expiry date and not to change vaccine manufacturers to avoid confusion among health workers.

(9) Ensure regular supportive supervision and training on vaccine management at provincial, zonal and health centre levels.

(10) Ensure all health centres are provided with appropriate information, education and communication (IEC) materials (e.g. HCC’s guides on good vaccine management).

(11) Provide storage capacity for dry supplies particularly at national level.

4. Funding

Findings

Health expenditure in Solomon Islands is predominantly paid for by the Government, mainly from general revenues with substantial support from external donors. Of the total health expenditure in 2008 (5.2% of GDP), the general government health expenditure was 93.4%, out-of-pocket payments was 4.4%, and other private sources was 2.2%. External resources for health – comprising 33.5% of total health expenditure – were mainly from Australia, Japan and New Zealand. General outpatient and inpatient services are provided free of charge.12

In Solomon Islands, the gross national income per capita was US$ 590 in 2005,13 Government spending on health was US$ 27 per capita in 2002,14 compared to the estimated US$ 34 per capita required for basic services.15 In 2010, the gross national income per capita was US$ 910, and the health budget per capita was about US$ 120.12 The Government finances all costs associated with routine EPI vaccines, except DPT-HepB-Hib, which is co-funded by GAVI.

Outreach, supervision and transportation of vaccines and supplies are underfunded, seriously hindering further improvement of EPI.

The Government sends lump funds to provinces without earmarking specific EPI activities. Furthermore, funds often arrive late.

The review team noted that outreach, supervision and transportation of vaccines and supplies are underfunded, which is seriously hindering further improvement of EPI in Solomon Islands. Furthermore, the Government sends funds to provinces in one basket, i.e. EPI funds are not earmarked for specific activities, and oftentimes, the funds arrive too late. In Makira Province, no direct fund is given for EPI/outreach activities from provincial to zonal level, but fuel is given in place of funding to clinics to conduct outreach activities. In HCC, funding for immunization activities for satellite clinics has become insufficient because of rapid population inflation due to migration from other provinces. Funding for a dry storage room at the HCC vaccine distributing centre has not been secured. In many of the health centres reviewed, the staff are not aware of budget allocation for EPI activities.
Recommendations

(12) Develop a national EPI/MCH plan including costings for (a) outreach, (b) supervision, and (c) transportation at subnational levels based on provincial microplans.

(13) WHO to provide technical support to MHMS to estimate costings (e.g. renewing Comprehensive Multi-Year Plan for Immunizations).

(14) Ensure sufficient international, national and provincial funds are earmarked for outreach, supervision and transportation at subnational levels.

5. Data management

Findings

The review team found that information and data available for EPI are inconsistent (particularly vaccination coverage) and not fully utilized. Data management capacity is weak at both national and subnational levels. Several existing systems or tools such as MHMS’s “Monthly Report of Health Activities” and “Immunization Registry” can provide useful information and data for further improvement of EPI at both national and provincial levels.

Delays in sending data have been observed at all levels including the national level. At provincial level, nurses who serve also as HMIS coordinators do not enter and analyse data but instead send hard copies to national level. At national level, HMIS staff are not statisticians and there is no programme-specific data manager. The Reproductive and Child Health Division does not have a data manager. Instead, a nurse who has not received data management training has the additional responsibility of entering and analysing data. The low levels of timeliness and completeness of data are considerable. In Western Province, multiple data collection forms were observed with overlap between forms. There is no feedback between levels, and there is no defaulter tracing mechanism in any of the provinces.
Recommendations

(15) Ensure Provincial EPI Coordinators review, summarize and analyse EPI-related information/data included in the “Monthly Report of Health Activities” and send a monthly summary report to the National EPI Coordinator.

(16) Conduct data management training at all levels, and simplify reporting forms to avoid duplication and increase usage.

(17) Conduct EPI coverage survey in the next two years.

6. Immunization safety

Findings

Immunization safety includes ensuring that injections given for immunizations are safe for the patient/client, safe for the health care worker and safe for the community. Vaccines must always be given with sterile needles, the risk of needle-stick injury to staff must be minimized, and the equipment used for immunization must be disposed of in such a way that the public is not at risk of injury from discarded needles or syringes. Auto-disable (AD) syringes, which were introduced formally in 2008, are procured for all EPI injections by the national medical store. Safety boxes for the collection of EPI sharp waste are procured together with vaccines.

In Guadalcanal and Western provinces, knowledge of AEFI among nurses appears to be not adequate. Furthermore, there is no protocol for AEFI at any level. AD syringes and safety boxes have been well adopted and properly used by all health centres, but appropriate equipment for disposal of immunization waste is not available. While hospitals use incinerators for waste disposal (there are only five in the country), health centres use open pit burning and burying of immunization waste. Open pit burning is not recommended because it releases smoke, fumes and toxins into the environment and does not properly destroy the waste.
**Recommendations**

(18) Develop national guidelines and conduct training for health staff from all levels on AEFI management and reporting.

(19) Include AEFI or immunization safety issues (e.g. public concerns on immunization) into “Monthly Report on Health Activities”.

(20) Provide waste disposal equipment (e.g. drums, incinerators) to health facilities. Monitor the appropriate usage of the equipment, and ensure the proper fencing of waste disposal sites.

**7. Microplanning**

**Findings**

While most provinces have not initiated microplanning, the review team observed that microplanning was being carried out successfully by HCC. Good tools and successful experiences for microplanning have been developed by HCC. In Malaita Central Region and Western Province, microplan maps were observed. Some health centres mentioned that the measles campaign served as a good opportunity to enhance the capacity for microplanning (e.g. mapping). In Makira Province, training on microplanning was conducted from 30 July to 1 August 2012. Participants included pharmacy officers, zone supervisors, registered nurses, nurse aides, and Health Promotion Department staff.

**Recommendations**

(21) Ensure all health centres develop a microplan so as to identify and vaccinate more eligible children and to forecast vaccine needs.

(22) Repeat training on microplanning and on-site supportive supervision at provincial and health centre levels.

(23) Share HCC’s microplanning tools and successful experiences with the provinces.
8. Supervision

Findings

Supervision, particularly on-site “supportive” supervision, has not yet been established systematically in all provinces. Supervision is very limited from provincial to zonal levels, and from zonal to health facility levels, due to lack of funds, transportation, time constraints and pressures from competing priorities. No record of supervisory visits was observed at any site visited, and thus quality of supervision could not be determined. A supervisory checklist is being piloted in Guadalcanal.

The review team found that the quality of supervision, monitoring and evaluation was weak. Many problems were readily apparent to the review team members in the zones and health centres visited, including: lack of knowledge on funding; storage of vaccine with VVMs indicating excessive heat exposure; incomplete or incorrect data in vaccination registers; data not disaggregated between children vaccinated at fixed site and outreach sessions; poor vaccination timeliness; lack of IEC materials; vaccine stock-outs; limited use of data to identify problems; and discrepancies in reported coverage data between different administrative levels.

The team also noticed an apparent lack of training and modelling of effective supervisory skills and critical analysis of data and problems. Poor quality of data was also a barrier to improving programme management.

Recommendations

(24) Clarify roles and responsibilities of zonal supervisors.

(25) Conduct on-the-job training (e.g. joint on-site supportive supervision with national/international EPI experts) for the provincial EPI manager and zonal supervisors.

(26) Modify and adopt nationally the supervisory checklist piloted in Guadalcanal.
9. Integration of EPI and MCH

Findings

The Government of Solomon Islands is a signatory to the Programme of Action of the International Conference on Population and Development, which projects the concept of reproductive health care as the constellation of methods, techniques and services that contribute to reproductive health and well-being by preventing and solving reproductive and sexual health problems. As a signatory to the United Nations Millennium Declaration, which includes references to social and cultural determinants of reproductive health, Solomon Islands is committed to meeting the Millennium Development Goals, including targets in maternal and reproductive health.

The recently published Solomon Islands 2006–2007 Demographic and Health Survey showed that 48% of women between the ages of 15 and 49 did not intend to use any modern method of contraception, while an additional 25% were not sure about their options. While most pregnant women in Solomon Islands access antenatal care and deliver their babies with the support of a skilled birth attendant, the proportion of mothers in each province not receiving postnatal care ranges from 23% to 38%. The maternal mortality ratio (MMR) for Solomon Islands is reported as 100 deaths per 100 000 live births.

By integrating MCH and EPI in the existing system, the service delivery package has been expanded to include not only vaccinations, but also services such as antenatal care, postnatal care, contraceptives, micronutrients, nutrition education, deworming and general outpatient service. Integration is occurring at the service delivery level as most health centres have one or two nurses, and the same person or team provides both EPI and MCH services. In all health centres visited, EPI and MCH were well integrated in (1) health activities at health centres (e.g. many nurses were engaged in both EPI and MCH); (2) service deliveries (e.g. health services provided at satellite clinic included immunization and MCH services); and (3)service recipients (e.g. through “Child Health Record”). Oftentimes, activities needed to be combined in view of limited staff at local level. Integration of EPI and MCH is well accepted at

---

community level. It has improved attendance, increased immunization coverage and enabled sharing of resources and provision of more services to mothers and children together. However, integration at programme/national level was not visible.

**Recommendations**

(27) Share good practices, tools (e.g. “Child Health Record”), and successful experiences of integration of EPI and MCH in health centres of HCC with provincial health services and health centres through (a) conduct of annual training, (b) updates during annual national EPI meeting/workshop, and (c) development of national EPI newsletter, etc.

(28) Establish integration at national level: policy, guidelines, data collection and training. Consider similar integration for supervisory visit and training.

**10. Vaccine-preventable disease surveillance**

**Findings**

Infectious diseases are major causes of morbidity and mortality in Solomon Islands. Surveillance for VPDs is the responsibility of the Reproductive and Child Health Division of the Ministry of Health and Medical Services. The surveillance system in Solomon Islands is passive, and no active surveillance activity was observed in the provinces. The review teams observed three types of VPD reporting: (1) “Monthly Report of Health Activities”, developed and sent by all health centres monthly; (2) VPD Surveillance (polio, measles, neonatal tetanus, pertussis, Hib meningitis and encephalitis), reported weekly by sentinel hospitals; and (3) Pacific Syndromic Surveillance (acute flacid paralysis, acute febrile rash), reported weekly by five sentinel hospitals.
The five sentinel sites are located in HCC, Western Province and Malaita Province:

- National Referral Hospital (HCC)
- Gizo Hospital (Western)
- Munda Hospital (Western)
- Kilwfi Hospital (Malaita)
- Atoifi Hospital (Malaita).

Immediate reporting of outbreaks is done by all clinics; however there is a lack of standard forms for outbreaks. Use of VPD surveillance data by EPI to inform programmatic decisions has been uncommon. There is no national public health laboratory for VPDs. In 2012, when a rubella outbreak was reported from HCC, Guadalcanal, Western and Malaita provinces, serum samples had to be shipped abroad. The reported coverage in surveillance underestimates actual coverage, and there is no plan to conduct a national vaccination coverage survey.

**Recommendations**

(29) Establish an active surveillance system with sentinel sites in all provinces. Develop guidelines, case definitions, and forms for reporting VPDs.

(30) Conduct training and establish a national public health laboratory for disease surveillance.
IV. CONCLUSIONS

In conclusion, the review team acknowledges the progress made by EPI of Solomon Islands in the past few years. While a number of indicators can be used to measure the performance of EPI, routine immunization coverage remains one of the most basic and widely used indicators. In 2011, immunization coverage among one-year-olds was 85% for BCG, 88% for Pentavalent-3 (DPT-HepB-Hib) and 73% for MCV1.  

A number of strategies could greatly increase the coverage and impact of EPI. These include allocation of adequate, earmarked funds to the health centres for outreach, supervision and transportation; microplanning; timely vaccine forecasting and procurement based on targets and needs; replacement of kerosene fridges with gas and solar fridges; improving the timeliness of vaccination; and increasing the efficiency of immunization services to vaccinate a high proportion of target children at each fixed-site and outreach session.

Each province provided two different estimates for the number of target children, one based on the Immunization Registry and one prepared by the Government (MHMS/HIS) based on the 2009 census data. The number of target children, i.e. denominator of the vaccination coverage, was higher in all the provinces than the national estimate. At health facility level, the real denominator is unavailable, and for calculating EPI coverage, the denominator is derived from data taken from the Immunization Registry. As such, the reported coverage might be higher than the real coverage. The absence of accurate data on number of births and surviving infants makes it difficult to compare and monitor programme performance. Therefore, establishment of a national system of birth registration and use of accurate targets across the country are crucial.

The review team noted that outreach, supervision and transportation of vaccines and supplies are underfunded, which is seriously hindering further improvement of EPI in Solomon Islands. Furthermore, the Government sends funds to provinces in one basket, i.e. EPI funds are not earmarked for specific activities, and oftentimes, the funds arrive too late. Many health centres receive kerosene or gas for refrigerators in place of funds, and staff are not aware of funds for EPI activities. Sending adequate, earmarked funds for outreach, supervision and transportation needs consideration.

17 EPI administrative coverage, Ministry of Health, Solomon Islands, 2011.
Some health centres had no refrigerator or a non-functional one, while others were plagued with frequent interruptions of power supply due to lack of gas, kerosene or electricity. In general, refrigerators are not maintained or repaired on time, and there is lack of spare parts. Some health facilities have domestic fridges, which are not recommended for vaccines. Assessment of the status of cold chain in the country, particularly refrigerators at health centres, development of a cold chain replacement plan with costing, and provision of appropriate cold chain equipment including spare parts and timely repair need to be implemented as soon as possible.

Supportive supervision is very limited from provincial to zonal levels, and from zonal to health facility levels, due to lack of funding, transportation, time constraints and pressures from competing priorities. No record of supervisory visits was observed at any site visited, and thus quality of supervision could not be determined. Use of supervisory checklists has been piloted in Guadalcanal. Training and modelling of more effective supervisory skills is needed to enable supervision to identify causes and potential solutions for poor performance.

The review team noted the dedication and reliability of health staff as well as their strong relationship with the communities they serve. However, failure to reach vaccination coverage targets and the occurrence of VPD outbreaks are not taken into consideration in the evaluation of work performance or in decisions to promote local (zonal, provincial) government officials. There is no penalty for local EPI staff or health centre staff who consistently perform poorly at work.

Key cross-cutting issues such as inadequate funding, insufficient supportive supervision and unique logistical challenges have certainly played out in all of the areas observed. Despite recent progress, EPI in Solomon Islands needs greater political commitment, adequate and earmarked funding, strengthened cold chain facilities, resolved denominator issues, capacity-building at all levels and access to new life-saving vaccines.

Despite recent progress, EPI in Solomon Islands needs greater political commitment, adequate and earmarked funding, strengthened cold chain facilities, solved denominator issues, capacity-building at all levels and access to new life-saving vaccines.