**Progress Towards National Plans For Measles Elimination**

Measles is a vaccine-preventable disease that remains a leading cause of death among children in the World Health Organization’s Western Pacific Region, claiming the lives of 20,000 to 30,000 children every year.

To combat the problem, the Regional Committee for the Western Pacific in September 2005 approved a resolution (WPR/RC56.R8) setting a goal of measles elimination by 2012.

To achieve the goal, it is important that countries and areas in the Western Pacific Region formulate national plans for implementing the three strategic elements of measles elimination: immunization, surveillance and laboratory diagnosis.

The national plans will provide health workers, immunization programme managers, public health professionals and policy-makers with guidance on what needs to be done to achieve measles elimination. The national plans are invaluable tools for rallying government and donor support. The plans need to address the issues outlined in the WHO *Field Guidelines for Measles Elimination*.

The most important elements of the measles elimination strategy are the achievement and maintenance of 95% population immunity to measles through improved routine immunization and supplementary immunization activities. Surveillance systems need to be sensitive to accurately monitor immunization activities and track progress towards the goal of measles elimination by 2012. In addition, laboratory diagnosis of suspected measles cases is an essential part of surveillance.

In China, representatives of the Ministry of Health, the Chinese Center for Disease Control and Prevention, and the World Health Organization in November 2005 drafted a national plan and timetable for measles elimination. The draft *Framework for National Plan of Measles Elimination in China, 2006-2012* provides for overall coordination by national authorities, with local plans designed by individual provinces. It includes a situation analysis, proposed strategies and plans for their implementation, a schedule of activities and their costs, and a blueprint for ongoing evaluation.

Representatives of several provinces, the Ministry of Health and members of the national Measles Technical Advisory Group carefully examined the draft plan. After suggesting several improvements, they voiced their clear support for the plan, which is expected for release in early 2006.

In Cambodia, representatives of the National Immunization Programme met with the United Nations Children’s Fund (UNICEF) and WHO several times in late 2005 to draft a national plan for measles elimination in Cambodia. The group considered measures to improve measles surveillance in Cambodia and mapped out supplementary immunization activities for 2006. The draft plan includes a situation analysis of measles control in Cambodia and an expansion and enhancement of the surveillance system to reach all districts. The plan focuses on strategies and activities to increase and sustain 95% population immunity against the measles virus. High-risk groups, the under-immunized and isolated populations with poor access to health care are targeted for specific interventions to increase their population immunity. Routine measles immunizations at fixed health centres are particularly addressed as a necessary means to increase measles coverage and population immunity. The Cambodia National Immunization Programme is planning further discussions on the introduction of a second dose of measles vaccine into the routine immunization programme and on resource mobilization to support these efforts.

According to data submitted to the Western Pacific Regional Office, 22 countries and areas are implementing the regional plan for measles elimination. Ten countries and areas have set their own national target dates to eliminate measles before the regional target date of 2012. Overall, the Western Pacific Region is making significant progress in achieving its long-term goal of measles elimination.
In 2001, the Republic of Korea set 2005 as its goal of measles elimination, after having experienced large measles outbreaks in 2000 and 2001. At the fifth-year evaluation of the measles elimination programme conference, which was conducted by the Korean Center for Disease Control (KCDC) on 30 November 2005, it appears that the Republic of Korea has interrupted measles transmission.

Experts from the National Committee for Measles Elimination, university professors, health officials from central and local health offices of the country attended this important event, along with representatives of the Centers for Disease Control and Prevention (CDC), Atlanta; National Institute of Infectious Diseases (NIID) Japan, and the WHO Regional Office for the Western Pacific.

In response to the 2000-2001 outbreaks, the Government conducted large-scale measles immunization campaigns, targeting 5.8 million students from age 8-16 years at elementary and secondary schools. At the same time, the Ministry of Health and Welfare, in close collaboration with the Ministry of Education, implemented a national programme requiring two doses of measles vaccination for school entry and mandatory certification of vaccination. Because it was successful, the school-entry vaccination requirement might be applied to immunization programmes in other countries.

An evaluation of the reported coverage (97.5%-98.8%) concluded that the data were reliable and that school immunization certificate for measles is an effective measure.

A measles seroprevalence study was conducted in 2004 to compare measles seroprevalence before and after the introduction of the elimination programme and the second measles vaccination certificate for elementary school students. The results showed that immunity of the school students reached 95% and that school immunization certificate requirements were an effective way to increase immunization coverage.

Presentations at the conference demonstrated that the Republic of Korea appears to have interrupted measles transmission. From 2002 to 2004, 11 to 13 confirmed measles cases were reported annually. As of 19 November 2005, only two confirmed cases were reported for 2005; these were due to importations. The confirmed measles cases were much less than one per million population per year, which is one of the primary indicators for measles elimination. Adequate blood sample collection rate was 96%. Immunization coverage with two doses of vaccine is over 99%, a serosurvey and other surveys showed identical high levels of immunization coverage.

Furthermore, the Republic of Korea made major progress during the period 2001-2005 in developing the measles laboratory system and in establishing high-quality molecular biological diagnosis and genotyping, in conducting differential diagnosis and in understanding the important role of private diagnostic centres. The Republic of Korea might conduct an expert panel review and validation process according to currently available criteria.

The Republic of Korea demonstrates that measles can be eliminated within a short period of time by implementing the current recommended strategies. The key to success rests with the quality of the activities.
Background. Papua New Guinea, a country of many inhabited islands, has a population over five million. The country is divided into 20 provinces, of which only 25% are linked by road. Most travel must be by air, by boat or on foot.

In Papua New Guinea, measles infection has been described as a “cyclical epidemic”, resulting in more than 30 000 cases and several thousand deaths, mostly among children, since 1998. In 2002 alone, there were at least 400 childhood deaths from measles, many in young infants and some in young adults. Although routine measles vaccinations given at 6 months and 9 months of age have been a national policy since 1982, immunization coverage has not been high enough to suppress and interrupt the ongoing epidemic. In some provinces, measles outbreaks have been identified as a pressing national public health problem. The current routine measles vaccination coverage is 51%.

Implementation: From October 2003 to August 2005 a national supplementary immunization activity (SIA) was implemented to reduce measles incidence and mortality, to interrupt transmission of the measles virus and to increase oral polio vaccine (OPV) coverage to maintain polio-free status. The SIA targeted every child from 6 months to <11 years of age for the measles vaccine, children from birth to 59 months for OPV and children from 6 months to 59 months for vitamin A. The supplementary immunization campaign was held over a period of almost two years. Implementation was done province-by-province depending primarily on access and security issues.

Results. The initial reported coverage of the SIA indicated that the national measles vaccine coverage was 99%, OPV was 98% and vitamin A was 102%, and that coverage in the provinces ranged from 70% to more than 100%. However, a common denominator was not used to calculate coverage and the operational guidelines did not address denominator issues. In a subsequent analysis the population figures in the National Census 2000 (NSO 2000) were used as the standardized denominator, as they are the only nationally approved population figures. When the SIA coverage was calculated using the projected National 2000 Census population data, the measles vaccine coverage figures decreased to 76%, OPV coverage was 83% and vitamin A coverage was 83%. In all provinces, children aged 0 to 5 years participated in the SIA more frequently than any other age group and coverage for OPV and vitamin A were better than measles coverage in all provinces. One out of 89 districts did not participate in the SIA.

A rapid assessment survey was carried out in selected villages of three provinces soon after vaccinations were conducted to verify and compare results of the reported coverage.

Table 1 shows the results of the survey compared to the provincial reported coverage and the coverage based on the population from the Woman and Child Health Project (WCHP). The WCHP coverage is lowest when compared to the provincial reported coverage. The rapid assessment coverage could be compared to the NSO 2000 coverage.

Funding. Over the decades, the Governments of Australia and Japan have invested significantly in the Expanded Programme on Immunization, especially in the past few years. For this national SIA, the Japanese International Corporation Agency (JICA) provided the funds for continued on page 4
the measles and oral polio vaccines and all injection and cold chain equipments, and the Australian Agency for International Development (AusAID), provided all the operational funds. The United Nations Children’s Fund (UNICEF) provided vitamin A capsules and funding for social mobilization assistance at some provinces. The National Department of Health and WHO provided technical support for training, microplanning and monitoring during the implementation phase. Nongovernmental organizations and many other community groups contributed significantly through social mobilization. The total cost of the SIA was approximately 4.7 million Kina (US$ 1.6million). A basic cost-benefit exercise determined that the OPV activity cost US$ 2/dose/child and the measles vaccination cost US$ 1/dose/child.

Conclusions. Papua New Guinea still needs an adequate denominator for its immunization activities. Papua New Guinea also needs to improve the essential components for effective management of vaccine-preventable diseases to attain measles elimination as stated in the Field Guidelines for Measles Elimination. Papua New Guinea needs to ensure that all children receive two doses of measles vaccine so that 95% population immunity can be achieved and maintained in every district.

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Areas</th>
<th># children</th>
<th>Reported coverage</th>
<th>Rapid assessment coverage</th>
<th>WCHP coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Ireland</td>
<td>3 villages</td>
<td>210</td>
<td>110</td>
<td>96</td>
<td>77</td>
</tr>
<tr>
<td>West New Britain</td>
<td>3 health centres</td>
<td>137</td>
<td></td>
<td>98</td>
<td>86</td>
</tr>
<tr>
<td>Milne Bay</td>
<td>1 village, 22 houses</td>
<td>5</td>
<td>101</td>
<td>94</td>
<td>lower than expected</td>
</tr>
</tbody>
</table>
Surveillance performance indicators: important confirmation of progress

Disease surveillance is a critical component of measles elimination efforts. It is used to assess progress and to direct action in control programmes. Surveillance performance indicators give countries an ongoing assessment of the effectiveness of their surveillance system. A system that yields accurate numbers yields an accurate picture of the disease burden that can then be shared with partners and donor agencies.

Typically, the development of a nation’s surveillance system lags behind that of its vaccination efforts. But improvement of surveillance must go hand-in-hand with vaccination. Early on, countries should develop long-term measles control strategies, building a surveillance system that responds to changes in the incidence of the disease.

Laboratory confirmation of measles outbreaks is important in all phases of disease control. During the elimination phase, laboratory confirmation of every suspected case is fundamental for monitoring the measles virus. During all phases, reporting an adequate number (WHO recommends ≥1/100,000 population) of suspected cases provides confidence that the system is looking for every case.

Measles surveillance includes:

- detecting and reporting cases and outbreaks;
- collecting, consolidating and interpreting data;
- investigating and confirming cases and outbreaks;
- producing routine reports and interpreting data;
- feeding data forward to central levels; and
- providing feedback to peripheral levels.

In addition to characterizing the quality of surveillance and identifying areas in need of strengthening, a goal of the indicators is to provide feedback to promote improvement and to provide a basis for comparison of districts and areas.

It is recommended that countries use the following indicators to monitor surveillance performance, identify shortcomings, and confirm progress. These indicators are presented in the WHO Field Guidelines for Measles Elimination (sec 5.9, pg 33):

- Proportion of reporting sites that report each week: At least 80% of surveillance sites should report each week on the presence or absence of suspected measles cases.
- Interval between rash onset and notification: At least 80% of the reported suspected cases should be reported within 48 hours of rash onset.
- Percentage of laboratory tests undertaken in cases with adequate specimen: At least 80% of specimens should be taken from initial contact until 28 days post rash onset and reach the laboratory in a suitable state for testing.
- Percentage of laboratory test results received within 7 days of receipt in laboratory: At least 80% of specimens must be tested and the results reported back to the surveillance unit within 7 days of receipt of the specimen in the laboratory.

The goal of measles elimination places heavy demands on a surveillance system. Case investigations need to be thorough and complete, with sufficient information collected to implement control measures and to monitor patterns of disease. When a country is in the elimination phase, the increasing proportion of cases derived from international importations requires complete investigations of every case of measles to establish origin.

The value of a sound surveillance system cannot be overstated. The use of indicators is a means of monitoring your system, identifying its weak points, and strengthening the system as needed. Once established and functioning, the indicators provide confidence that a surveillance system is capable of confirming the elimination of measles.
<table>
<thead>
<tr>
<th>Country/Territory</th>
<th>Reported suspected cases</th>
<th>Classification</th>
<th>Incidence rate$^a$ (Total confirmed)</th>
<th>Latest date reported by country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Laboratory confirmed</td>
<td>Epi-linked</td>
<td>Clinical</td>
</tr>
<tr>
<td>Australia</td>
<td>11</td>
<td>11$^1$</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>264</td>
<td>3</td>
<td>0</td>
<td>143</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong (China)</td>
<td>83</td>
<td>48</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Japan$^x$</td>
<td>546</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lao People's Democratic Republic</td>
<td>295</td>
<td>7</td>
<td>73</td>
<td>209</td>
</tr>
<tr>
<td>Macao (China)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1,168</td>
<td>140</td>
<td>0</td>
<td>282</td>
</tr>
<tr>
<td>Mongolia</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>New Zealand</td>
<td>20</td>
<td>3</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>719</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Philippines$^y$</td>
<td>166</td>
<td>3</td>
<td>0</td>
<td>108</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>63</td>
<td>5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Singapore</td>
<td>33</td>
<td>33</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>11604</td>
<td>146</td>
<td>234</td>
<td>3</td>
</tr>
</tbody>
</table>

**Pacific Island Countries:**

- American Samoa
- Cook Islands
- Fiji
- French Polynesia
- Guam
- Kiribati
- Marshall Islands
- Micronesia, Federated States of
  - Nauru
  - New Caledonia
  - Niue
  - Northern Mariana Islands
  - Palau
  - Samoa
  - Solomon Islands
  - Tokelau
  - Tonga
  - Tuvalu
  - Vanuatu
  - Wallis and Futuna

**Western Pacific Region:**

14981 399 309 778 11574 585 1

$^a$ Data are based on country reports and other sources available to EPI/Western Pacific Regional Office.

$^b$ Incidence rate per 100 000 population (population figures from World Population Prospects: The 2004 Revision, New York, United Nations, 2005).

$^c$ Suspected cases immunized does not distinguish between 1 or 2 doses.

$^d$ Lab confirmed or epidemiologically linked to a laboratory confirmed case

$^e$ Sentinel surveillance system