REPORT

WHO/UNICEF WORKSHOP ON THE
EXPANDED PROGRAMME ON IMMUNIZATION AND
CONTROL OF VACCINE-PREVENTABLE DISEASES IN
PACIFIC ISLAND COUNTRIES AND AREAS
Suva, Fiji, 30 September-4 October 2002

Manila, Philippines
November 2002
REPORT

WHO/UNICEF WORKSHOP ON THE EXPANDED PROGRAMME ON IMMUNIZATION AND CONTROL OF VACCINE-PREVENTABLE DISEASES IN PACIFIC ISLAND COUNTRIES AND AREAS

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NOTE

The views expressed in this report are those of the participants of the meeting of the WHO/UNICEF Workshop on the Expanded Programme on Immunization and Control of Vaccine-Preventable Diseases in Pacific Island Countries and Areas and do not necessarily reflect the policies of the World Health Organization.

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Immunization / Vaccines / Poliomyelitis – prevention and control / Measles – prevention and control / Hepatitis B – prevention and control / Injections / Pacific islands

This report has been printed by the Regional Office for the Western Pacific of the World Health Organization for the participants in the meeting of the WHO/UNICEF Workshop on the Expanded Programme on Immunization and Control of Vaccine-Preventable Diseases in Pacific Island Countries and Areas, which was held in Suva, Fiji, from 30 September to 4 October 2002.
SUMMARY

A WHO/UNICEF Workshop on the Expanded Programme on Immunization (EPI) and Control of Vaccine-Preventable Disease in the Pacific Island Countries and Areas was held in Suva, Fiji, from 30 September to 4 October 2002. Eighteen Pacific island countries and areas sent national representatives to the Workshop.

Participants reviewed progress made since the last Workshop in April 2001 on a wide range of EPI issues including maintaining acute flaccid paralysis (AFP) surveillance, introduction of new vaccines, measles and hepatitis B control, safety of injections, and vaccine use and supply.

A major issue is maintaining the achievements to date by ensuring that immunization coverage is sustained. A particular concern is improving surveillance quality for rash and fever, given the current critical stage in the measles elimination process.
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1. INTRODUCTION

1.1 Objectives

The objectives of the workshop were for the participants to:

(1) identify future needs, including countries' needs for support for measles control based on a review of control to date;

(2) identify issues for Pacific island countries following a review of the global status of poliomyelitis eradication;

(3) plan for new vaccine introduction, using the lessons learnt from hepatitis B introduction and a review of the *haemophilus influenzae type b* (Hib) disease burden, and consider ways to accelerate control of hepatitis B; and

(4) review the status of routine immunization programmes (including immunization coverage rate, safety of immunization, training, social mobilization and policy/planning by country) and identify ways of strengthening the programmes through the use of supervision and other strategies.

1.2 Organization

The WHO/United Nations Children's Fund (UNICEF) Workshop on the Expanded Programme on Immunization (EPI) and Control of Vaccine-Preventable Diseases in Pacific Island Countries and Areas (PICs) was convened in Suva, Fiji, from 30 September to 4 October 2002. Eighteen PICs sent national representatives to the Workshop. In addition, observers from the Australian Agency for International Development (AusAID), the Japan International Cooperation Agency (JICA), the New Zealand Ministry of Health, and the Pacific Island Health Officers Association (PIHOA) were in attendance, as were WHO Temporary Advisors from the Center for International Child Health, the U.S. Centers for Disease Control and Prevention (CDC), and the Government of Fiji, together with Secretariat members from WHO and UNICEF.

1.3 Opening ceremony

Participants were welcomed to Fiji and to the Workshop by Dr Lepani Waqatakirewa, Assistant Director of Health, Fiji, on behalf of the Minister of Health, who sent his apologies for being unable to attend. Opening remarks were given by Ms Nancy Terreri, UNICEF Pacific Representative; Dr Kazuyo Ichimori, on behalf of the WHO Representative in the South Pacific; and Mr Hideki Tomobe, JICA Resident Representative. The opening speakers acknowledged both the successes of the EPI in controlling vaccine-preventable diseases and the remaining challenges. Notable achievements include maintaining poliomyelitis-free status, interrupting indigenous measles transmission for more than four years, integration of hepatitis B vaccine into the EPI and maintaining other vaccine-preventable diseases at a low level. The speakers highlighted the continuing contributions of immunization programme staff throughout the Pacific in achieving the successes of recent years. Participants were challenged to sustain and expand the success of the EPI programme through careful planning and commitment of resources to ensure safe and effective vaccines for all children in the Pacific. In particular, maintaining measles and poliomyelitis elimination requires ongoing high quality surveillance and immunization.
2. OVERVIEW OF THE EPI: WESTERN PACIFIC REGION

The EPI in the Western Pacific Region commenced in 1977, with the aim of protecting children against five diseases: tuberculosis, poliomyelitis, diphtheria, pertussis and tetanus, with measles being added in the 1980s. From 1992, importance was attached to aggressive disease control, elimination and eradication, particularly the eradication of poliomyelitis. Disease surveillance was used to monitor progress. In recent years, the EPI has evolved into the national immunization programme in many countries, with the introduction of new vaccines, a broader focus and a more comprehensive disease control component.

2.1 Immunization coverage

At the regional level, there is increased emphasis on the quality of routinely reported data, with the use of 'best estimates' as well as reported coverage to adjust for the limitations of routinely reported data. As a result there has been a decline in reported regional immunization coverage. This reflects the change in method and not a real reduction in coverage. However, it does point out the need to increase coverage and improve the quality of routinely reported data.

For the PICs, coverage for diphtheria-tetanus-pertussis (DTP3), oral polio vaccine (OPV3), and measles has been maintained at over 80% since at least 1995, and for HepB3 since its universal use was adopted in the Pacific in 1997. However, some countries continue to experience problems maintaining such levels of immunization.

2.2 Immunization indicators

Using data from the UNICEF/WHO Joint Reporting Form (JRF), there are many indicators that can be monitored at the regional level, such as presence of a national plan, a budget, results of programme reviews, coverage, surveillance reports, etc. From these data, it is clear that most countries have adopted annual and multiyear plans for their programmes. However, it is not clear how consistently and accurately the data reported in the JRF reflect country activities.

2.3 Maintenance of poliomyelitis-free status

Maintaining poliomyelitis-free status remains the top priority for the EPI in the Region. Full-scale national immunization days are no longer recommended. However, sub-national immunization days continue in selected areas of low coverage; none in the PICs. Routine immunization needs to be consistently emphasized and improved throughout the Region. Of utmost importance is maintaining high quality surveillance to detect any importation of wild poliovirus or any occurrence of vaccine-derived poliovirus (VDPV).

In addition, the work on laboratory containment needs to be completed for the global certification process. Only four countries in the Region have not completed the first phase, although all PICs have done so.

2.4 Measles

A draft regional plan for measles will be reviewed at the Technical Advisory Group (TAG) meeting in November (see 5.1 of the report).

The three key strategies for measles elimination are immunization (including provision of a second opportunity), case-based surveillance and laboratory confirmation of suspect cases.
2.5 Safe immunization

Safe immunization includes safe injection and disposal of used injection materials, as well as monitoring of adverse events following immunization (AEFI).

The introduction of auto-disable syringes (ADs) will continue and at the same time appropriate disposal facilities are being established.

2.6 Vaccine and cold chain management

About three-quarters of the countries in the Region, and all of the PICs, have a line item in their national budget for purchase of vaccines.

Sufficient high quality vaccine and supplies must be available at all times and vaccine efficacy maintained. In particular, thermal damage (either excess heat or freezing) to vaccines must be avoided. The vaccine logistics system needs to ensure the delivery of vaccines in the proper amount at the right time and in the right place.

2.7 Introduction of new vaccines

Since 2001, every national immunization programme (NIP) in the Region has included hepatitis B vaccine. However, more work is needed to fully integrate the vaccine into the routine schedule and to make sure that every child is protected against hepatitis B. In the PICs, hepatitis B is already well integrated. It is time to address the issue of adding other new vaccines such as rubella or Hib.

Immunization programmes in countries in the Region have been successful over recent decades and the achievements have been sustained. Certification of poliomyelitis-free status was the signal achievement. Remaining issues include sustainability and the improvement of quality. Programmes are generally in a phase of aggressive disease control and introduction of new vaccines.

3. COUNTRY PRESENTATIONS

A total of 18 countries presented a country report (French Polynesia, Pitcairn, and Wallis and Futuna did not attend). The country presentations reported on the following areas:

(1) immunization coverage from 1997 to 2001;

(2) reported cases of EPI disease from 1997 to 2001; and

(3) significant accomplishments or innovations and important constraints, challenges, and problems in the EPI.

3.1 Immunization coverage

Countries presented national coverage data, as well as disaggregated data by provinces or districts, where relevant. In a few countries, national level data are yet to be compiled.
3.2 Achievements

The achievements of the countries and areas since the last EPI meeting in 2001 are summarized as follows:

(1) Almost all countries continue to achieve overall high levels of immunization with the EPI vaccines.

(2) This high coverage also applies to hepatitis B vaccine, including generally strong success in providing the first dose within 24 hours of newborn delivery.

(3) Reports of vaccine-preventable diseases have remained at a low level.

(4) Most countries now include a second dose of measles-continuing vaccine (MCV) in their routine immunization schedules.

(5) Eleven countries and areas (Fiji, Guam, Kiribati, The Marshall Islands, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu), including most of those in which high two-dose coverage with MCV is not yet attained, undertook a measles mass campaign from 2001 to 2002.

(6) Some countries (e.g. Guam, American Samoa) are developing or expanding computerized immunization registries to facilitate maintenance of records, especially in areas of considerable migration.

(7) Effective examples were presented of information, education and communication (IEC) development (Solomon Islands) and curriculum development (Vanuatu).

(8) Cluster surveys were conducted in selected areas (e.g. The Federated States of Micronesia, The Marshall Islands) to validate routine coverage data.

(9) Several countries were able to assess their Hib disease burden and to consider reasons and mechanisms for introducing Hib vaccine into their routine schedule.

3.3 Challenges/problems

The challenges and problems reported by the countries are summarized as follows:

(1) Many countries are challenged in sustaining high coverage in the face of competing demands, staff shortages and turnover, and resource constraints (financial constraints are especially acute in Solomon Islands).

(2) A few outbreaks of vaccine-preventable diseases occurred in 2001 and 2002, re-emphasizing the need for sustained high coverage and for good surveillance to quickly detect and respond to importations. Outbreaks included Guam (measles), The Federated States of Micronesia (pertussis), Tonga and Fiji (rubella).

(3) Geographic barriers and transport challenges remain a constant constraint to the provision of good services, especially for outer islands.

(4) Several countries reported a need for training and re-training, given a relatively high turnover of staff.
(5) Some countries have discrepancies in the reporting of coverage rates, often due to uncertainties or variability in choice of denominator populations and difficulties in obtaining good numerator data.

(6) Many data elements of the WHO/UNICEF JRF are felt to be either unnecessarily burdensome for small island countries or not necessary every year. Also, the requests for immunization coverage data could more clearly allow specification of the denominators used and the source and quality of the numerator data.

(7) Vaccine supply interruptions have occurred in a few places (e.g. American Samoa, Guam, Niue, Palau), threatening continuity and coverage in the national programme.

(8) Affordable and environmentally-sound methods of safe disposal of injection equipment remain a challenge in many areas, although a few incineration options are now available.

(9) Some countries (e.g. Fiji, Niue, Palau, joining many of the French and American flag territories) have substituted, or plan to substitute inactivated polio vaccine (IPV) for OPV, which may have implications for decisions in other countries and which, while an acceptable alternative in some countries, is not yet a widely-recommended strategy while poliomyelitis eradication efforts are still underway.

(10) A balance is being sought in many countries wishing to introduce new vaccines (e.g. rubella, Hib) between the desire for, and known benefits of these vaccines and the cost and political and financial commitment necessary to ensure successful introduction.

3.4 The Federated States of Micronesia coverage survey

A standard EPI 30-cluster coverage survey of two-year old children was undertaken in Pohnpei, The Federated States of Micronesia, in April 2001 to validate routinely reported data. The results were very similar to reported data (73% to 78% for most vaccines; 59% for measles-mumps-rubella (MMR2), and highlighted the fact that 14% of children had never been seen at the immunization clinic. As a result, it is planned to give the Red Cross the list of children who have not been seen, with a financial incentive of US$5 per child followed up.

4. MAINTAINING POLIOMYELITIS-FREE STATUS

4.1 Global overview

The number of poliomyelitis cases globally declined from 350,000 in 1988 to 480 in 2001. From 2000 to 2001, the number of countries with circulating wild poliovirus declined from 20 to 10. The European Region was certified as poliomyelitis-free in 2002, the third of the six WHO regions to accomplish poliomyelitis-free status. However, there are still many challenges, in particular the increasing number of poliomyelitis cases in India for 2002, and the emergence of circulating vaccine-derived poliovirus (cVDPV) as a problem. There have now been four confirmed outbreaks of cVDPV, including one in the Philippines in 2001. These outbreaks have emphasized the need for sustained, ongoing high quality surveillance and coverage.

Laboratory containment is an important aspect of the poliomyelitis eradication programme. All countries and areas in the Western Pacific Region have undertaken a survey, and all but four have completed their inventory.
The vaccine of choice for poliomyelitis eradication remains OPV as it displaces wild poliovirus and is cheap and easy to administer. However, in some countries with high standards of sanitation and no circulating virus, IPV is being used and has the advantage of not causing vaccine-associated paralytic poliomyelitis (VAPP) or VDPV.

4.2 Maintaining AFP surveillance

Surveillance for acute flaccid paralysis (AFP) has been operating since 1996 in the Pacific and was adequate to enable certification of poliomyelitis-free status. It is essential to maintain that level of surveillance after certification to enable rapid detection of any importation of wild poliovirus or VDPV. For the purposes of AFP surveillance, all the PICs are treated as a single entity. The small size of the population means that only about ten cases of AFP are to be expected per year in the Pacific.

There is active surveillance at 58 hospitals strategically located throughout the Pacific. Each of these hospitals produces a monthly report that also includes rash and fever, and neonatal tetanus, even if there are no cases (a ‘zero-reporting’ system).

For every case of AFP, two adequate stool specimens, collected within 14 days of onset of paralysis, need to be assayed for the presence of poliovirus. Every case also needs to be followed up at 60 days to assess if the paralysis was temporary.

The AFP surveillance system reported 65 cases from 1997 to June 2002 (or an annual rate of 0.94 per 100 000 under 15-year-olds). Of these, only 20 (31%) had two adequate stool samples taken. The number of reports submitted declined in 2000 and 2001, but is improving for 2002. In 2001, 36 (62%) of the hospitals failed to submit any reports, although nearly all had done so in 1999. To date in 2002, eight countries have not submitted their reports.

AFP surveillance will need to continue at least as long as there is still poliovirus circulating in the world because of the risk of importation. However, as the surveillance system is used for other diseases, not just for poliomyelitis, it should continue indefinitely.

4.3 Country experience: Niue’s change from OPV to IPV

Niue has been using (DTP)-(Hib) vaccine since 1998. However, as the manufacturer is no longer able to supply that vaccine, the choice was made to change to diphtheria-tetanus-acellular pertussis (DtaP)-IPV and Hib-HepB, since Niue is now substituting IPV for OPV.

The first supply arrived with no temperature monitors and so it was discarded. The problems with the supplier have now been addressed.

5. MOVING TOWARDS MEASLES ELIMINATION

5.1 Draft regional plan

The WHO Western Pacific Regional Office has prepared a draft plan for the Region to move towards measles elimination. Measles elimination does not mean zero cases, as measles importations are relatively common and there is likely to be some spread following importation. Unlike with poliomyelitis, there is no single measure, or any surveillance standards to define achievement of elimination. However, high quality, case-based surveillance, with laboratory confirmation of suspect cases, is needed to ensure that cases of measles are detected and the likely source of the virus identified.
In the Pacific, measles may already have been eliminated, with no widespread transmission since 1997 to 1998, when there were both outbreaks and national mass measles immunization campaigns. The definition of measles elimination is well illustrated by the experience since that time. Although there have been reported measles cases, only very few were laboratory confirmed as actually being measles. These were three imported cases in French Polynesia in 1999 and an outbreak in Guam in April to May 2002, which had nine confirmed cases without further spread.

The three strategies needed for measles elimination are immunization (including providing a second opportunity for measles immunization), case-based surveillance and laboratory confirmation of suspect cases.

It is necessary to achieve and maintain 95% population immunity to eliminate measles. A single dose of vaccine is only about 85% effective if given at nine months of age and about 90% if given at 12 months, but two doses are >98% effective. Thus, the strategy to achieve sufficient population immunity is to give all children two doses of a measles-containing vaccine.

Related issues for measles include safe injection practices (including disposal of used injection materials), surveillance for adverse events following immunization (AEFI) and the introduction of rubella vaccine through the use of the combination vaccines, measles-rubella (MR) and MMR.

5.2 Pacific overview

In the pre-vaccine era, there were many large outbreaks of measles every year in the PICs. Following the addition of measles vaccine to the EPI in 1982, both the number and size of outbreaks were reduced, although there continued to be about four outbreaks every year in the PICs. Since the 1997 to 1998 campaigns, measles appears to have been eliminated (see above). Case-based surveillance for measles has been added to the AFP surveillance system (as ‘acute fever and rash’).

However, many challenges remain, including complacency about measles and a lack of realization that the Pacific is now in a measles elimination maintenance phase, in which any suspect case of measles must be treated as a public health emergency. In some islands, there is a build up of susceptibles, which could potentially lead to a large outbreak if supplemental immunization activities are not undertaken.

The fundamental need is to maintain high immunization coverage by strengthening routine immunization services and ensuring second opportunities for vaccination, either through a scheduled dose or through regular mass campaigns.

Surveillance also needs to be improved in most countries – both in detecting and reporting cases and in the response to cases. If population immunity is high, there is no need for an immunization response to an outbreak of measles, as it will not spread widely if immunity in the affected community is at least 95%. At present, surveillance is a combination of the active hospital-based system (part of AFP surveillance, see above) and the traditional passive notifiable disease surveillance system, which includes measles. Further attention to sensitive and timely measles surveillance, including rash and fever surveillance, is needed in most countries. Passive reporting of only those cases in which the clinician suspects measles will be inadequate for measles elimination. Obtaining, handling, storing and transporting blood samples from all fever and rash cases has proved very difficult. Much work remains to be done to realize the full potential of the LabNet system.
The main constraint has been the geography of the Marshall Islands, with limited staff and other resources to reach the widely spread population. The lessons learnt include the importance of planning and social mobilization, and the need for adequate supplies and time. Conducting campaigns during school hours would lessen travel time.

5.6 Small group discussion

Participants discussed in small groups how to improve measles control, and then reported back. The problem of staffing and transport are the major issues interfering with access. Using computerized or other registers can help to identify children who are missing out. Going out to the community (e.g. mobile clinic or house-to-house), extending clinic hours and community education are some of the ways to increase first-dose coverage. It was suggested by some countries that increasing first-dose coverage through these various strategies may be more cost-effective than a mass campaign in reaching these children.

The second opportunity for measles immunization still needs to be addressed in many countries. If a country is achieving high (>95%) coverage of the first dose, the second opportunity may be delivered the same way. If not, an alternative delivery mechanism (e.g. at school entry or through a campaign) needs to be considered.

Surveillance is a key area, especially as the Pacific is now in maintenance mode for measles elimination. One issue is that most people are not aware that measles elimination may have been achieved and thus do not respond to a report of ‘measles’ as an urgent public health problem. The result is that staff often do not obtain laboratory confirmation of all suspect cases. It was noted that there may be many other causes of rash and fever, but in fact the surveillance system has been receiving very few reports of any cases.

Laboratory confirmation has to overcome the obstacles of taking blood samples from children and then getting the samples to the laboratory in a timely manner. While there are alternatives to venous blood samples for diagnosis, these are unlikely to be available for the Pacific in the near future.

The Pacific Public Health Surveillance Network (PPHSN), through its LabNet initiative, is addressing issues of laboratory access and support for testing specimens from suspected measles cases. All PICs are encouraged to take advantage of this Network whenever possible, including PacNet (for communications and reporting) and EpiNet (for response to outbreaks).

6. NEW VACCINES

6.1 Hepatitis B regional overview

Hepatitis B is a major public health problem in the Region, including many of the PICs. The Region has about 25% of the world’s population but over 50% of HbsAg+ people. It is estimated that hepatitis B accounts for over half of the premature mortality in the Region. In the pre-vaccine era, eight countries (Kiribati, the Federated States of Micronesia, Nauru, Solomon Islands, Tonga, Tuvalu, Vanuatu and Viet Nam) had carrier rates of >12%.

Every programme in the Region now includes hepatitis B vaccine, with 32 (86%) of the 37 countries and areas now offering hepatitis B vaccine routinely to all infants, including all of the PICs. Coverage is still a challenge, with 15 (56%) of the 27 countries and areas that have provided data achieving HepB3 coverage of >90% and five (19%) achieving <80%.
6.2 Draft regional hepatitis B plan

A meeting of experts on hepatitis was convened in Tokyo in June 2002. The draft *Western Pacific Regional Plan of Action for Control of Hepatitis B through Immunization* followed and will be presented at the 13th Western Pacific Region EPI TAG meeting in Manila in November 2002 for endorsement.

The regional objective is to reduce chronic hepatitis B infection by preventing acute infections through immunization. The key milestone is to have <1% HbsAg+ in each immunized birth cohort. This can be monitored by population-based serosurveys. The major strategies to achieve this are: (1) development and adoption of a national hepatitis B control plan; (2) increasing HepB3 coverage; (3) development and implementation of a system to deliver and monitor a birth dose [delivered within 24 hours of birth]; (4) advocacy and social mobilization; and (5) monitoring and evaluation. It was noted that HepB3 coverage estimates are the primary tool to monitor the impact of the programme. Serosurveys can be used to validate the impact, and surveillance for acute and chronic hepatitis B disease can add additional information.

6.3 Review of the Pacific Hepatitis B Project

The Pacific has some of the highest rates of infection with hepatitis B virus. In 1987, WHO developed a plasma collection scheme whereby vaccine was provided in return for the plasma of carriers collected and supplied by participating PICs. As that arrangement was discontinued, the governments of Australia and New Zealand funded a five-year project that secured the supply of hepatitis B vaccine and also supported the overall EPI infrastructure. Since 2001, governments have been financially responsible for the purchase of hepatitis B vaccine and have fully succeeded in all but one case.

The Hepatitis B Project has led to a reduction in the disease burden in Pacific peoples and will save costs in years to come. The Project has also been useful for the partner agencies as a sustainable model with positive health outcomes in which financial responsibility is eventually taken over by governments.

The Hepatitis B Project provides a good model of regional cooperation, which is especially useful where initial funding is a major constraint. It was noted that almost all countries had already made the decision to introduce hepatitis B vaccine before the Pacific Hepatitis B Project started.

6.4 *Haemophilus influenzae* type b (Hib) disease burden

Hib vaccine has been shown to be safe and very effective in preventing meningitis and pneumonia. WHO has, therefore, recommended adding Hib vaccine according to national capacities and priorities. To assess the priority it is important to have reliable disease burden data. This can be a challenge in the case of Hib as it causes several clinical conditions.

The Centre for International Child Health (CICH) in Melbourne, Australia, was contracted by WHO to undertake an assessment of the Hib disease burden in four Pacific countries (Kiribati [Micronesians], Samoa and Tonga [Polynesians] and Solomon Islands [Micronesians]) using the Hib disease burden rapid assessment tool (RAT). The rate of Hib meningitis was fairly consistent at between 70 and 84 per 100 000 children under five years old (under-5s). This is similar to other estimates from the Pacific and suggests a fairly reliable measure of actual Hib meningitis. There are at least as many cases of pneumonia as there are of meningitis.
6.5 Country experience: Fiji

Paediatricians and the Ministry of Health promoted the introduction of Hib vaccine in Fiji based on a disease burden assessment of Hib meningitis (not using any RAT adjustments) of 20 per 100 000 under-5s. Initially, no funding was available from the Government, United Nations agencies, or vaccine manufacturers. However, in 1994 a manufacturer donated vaccine for a pilot test. Although this ended in 1996, the demonstrable decline in cases gave the Government justification for funding Hib vaccines from 1997 onwards.

6.6 Country experience: Samoa

A meeting was convened to review the findings of the disease burden assessment undertaken in April 2002. The estimate of Hib meningitis was 84 per 100 000 under-5s. The meeting agreed that Hib vaccine should be added to reduce the incidence of Hib disease and that microbiology facilities should be improved to allow the culturing of Hib. Funding remains the key obstacle and Hib vaccine has yet to be introduced.

6.7 Rubella and mumps disease burden

At the same time as assessing the Hib disease burden, the CICH also assessed the rubella and mumps burden in the same four PICs (Kiribati [Micronesians], Samoa and Tonga [Polynesians] and Solomon Islands [Micronesians]). Despite trying various sources, there were insufficient data to make an estimate of the disease burden. A literature review on congenital rubella syndrome (CRS) found an estimate of 173 per 100 000 live births using a model for Fiji.

A decision about rubella vaccine needs to be taken with care. Unless high coverage can be achieved and sustained over the long term, there is a possibility of causing more cases of CRS through a consequent increase in the average age of infection. In contrast, the decision for mumps is primarily based on the cost of the vaccine.

It was noted that there are blood samples, taken for the review of the hepatitis B programme and stored in Melbourne, Australia, which could potentially be used for an assessment of immunity to mumps or rubella.

6.8 Country experience: Tonga

Tonga does not include rubella in its immunization schedule. A substantial outbreak of rubella began in early 2002. The first case of rash illness was recorded in April 2002, and the first case of rubella encephalitis in May 2002. During the outbreak investigation, it emerged that Tonga had experienced previous rubella epidemics in 1990 and 1996. To date, 39 cases of encephalitis have been diagnosed since April 2002 and about 10 in each of the previous outbreak years (1990 and 1996). Encephalitis is an unusual diagnosis in Tonga in non-outbreak years.

The number of cases of rash illness presenting to hospital has continued to increase every month up to August 2002. The epidemic was initially limited to Tongatapu, but has now spread to Vava’u and the other outer islands.

As a result of the epidemic, a Rubella Outbreak Taskforce was convened and has recommended an immunization campaign for all children aged one year to school age and for all women up to 44 years of age. The campaign is to be implemented by the end of November 2002. Tonga has also decided to change its immunization schedule so that MR replaces measles vaccine at 12 months of age, with a second dose of MR 30 days later. There will also be surveillance for CRS to identify any cases arising from this outbreak.
6.9 Country experience: Palau

The last measles outbreak in Palau was in 1993, with 137 probable and 93 confirmed cases. At present, MMR is given at age 12 months and at four to six years of age. However, it is planned to change the second dose to age 15 months, when children come for a well-baby clinic visit. Apart from the general problems of immunization delivery, there have not been any problems with the use of MMR.

6.10 Small group discussion

Participants discussed the Pacific Hepatitis B Project as a potential model for introducing other new vaccines. There was consensus that the Project had been a positive experience for all participating countries, not only in securing the hepatitis B vaccine supply, but also for the associated strengthening of country programmes through the cold chain and technical support that was part of the Project.

Although some countries could have managed to purchase hepatitis B vaccine on their own, for nearly all countries the Project was rated as very important for securing the supply. The additional financial burden, now that hepatitis B is a government responsibility, is not seen as a problem, and countries are grateful to have had the duration of the Project to plan for its funding.

In most countries that have not yet done so, the addition of both Hib and rubella vaccines is seen as being of some importance. The primary barrier to adding these vaccines is the cost, especially for Hib vaccine. An initial period of external support followed by a phased taking over of the payments, as had happened with the Hepatitis B Project, is seen as a very good way to introduce the new vaccines. However, given the high cost of Hib vaccine, support would likely be needed for longer than the five years given to the Hepatitis B Project.

Governments need to consider all the financial requirements of the programme (e.g. cold chain, improving coverage) and not just the added cost of a new vaccine. In other words, the basic infrastructure of funding and delivery needs to be comprehensively assessed before adding any new vaccines. It is necessary to consider all aspects carefully before any decisions are taken because, once the vaccines are added, they should stay in the national immunization schedule indefinitely.

7. STRENGTHENING ROUTINE SERVICES

7.1 Strengthening the EPI Project

The three-year EPI Project builds on the success of the Hepatitis B Project to strengthen routine EPI services. As with the Hepatitis B Project, the EPI Project is funded by AusAID and the New Zealand Agency for International Development (NZAID), and is managed by UNICEF with additional technical input from WHO.

The Project started in 2001 and has five components: routine immunization coverage, quality of services, research/information on new vaccines, surveillance, and management of the Project. Much of the work being undertaken for the Project was presented during the Workshop.
7.2 Social mobilization

A review of IEC materials was undertaken in Solomon Islands and Vanuatu as the first step of a social mobilization project. Very few materials were found in the clinics, identifying the need for additional materials. A small survey of 20 mothers in both countries found that they knew only two or three of the EPI diseases, and were often unclear which vaccines their children were receiving. However, they did accept vaccination and knew the dates on which to return for vaccination. The mothers preferred oral and visual communication methods. An important finding was that neither mothers nor health workers are familiar with the manifestations of the diseases after so many years of good disease control.

Using the findings of the survey, a social mobilization campaign was developed for Solomon Islands. The campaign used t-shirts, caps, posters, banners, billboards and radio slots (including the use of a new jingle). The Department of Health has a daily radio slot so it was easy to get the message across using this medium. The campaign reportedly reached 84% of the population.

An important issue for social mobilization is ensuring that health services are able to meet the demand generated. It is also vital to ensure that the cold chain is functional and there are adequate supplies, as social mobilization must be accompanied by the ability of the health department to deliver services.

7.3 Manual for EPI training

To strengthen pre-service and in-service EPI training, a manual was developed in Vanuatu. The manual was developed over a period of one month, with input from an external consultant and health service staff. It is now in the final stages of review and will be used in a range of training courses to improve the training on the EPI.

7.4 Primary Health Care Project: Reaching the Unreached

This Project was developed in Chuuk State, the most populous of the four states of the Federated States of Micronesia, with 54,000 people (50% of the population). There are 60 inhabited islands in Chuuk, divided into lagoon (close to capital) and outer islands. There is a hospital in the capital, Weno. For the other islands, there are 79 dispensaries staffed by 110 health assistants. The distances between the islands impose considerable challenges in delivering health services.

In general, the health assistants have very limited training, supervision and support, and have not been delivering immunization and other preventive services, these being delivered by public health outreach teams. However, these teams are not able to reach all the islands consistently because of the staff time required, as well as other resource constraints.

The Project was initiated at the request of the Department of Health in response to these constraints. It covered nine dispensaries in five islands, covering both lagoon and outer islands. The Project aimed to increase well-child care, including immunization; increase maternal care; and improve recording and monitoring of care.

The first phase of the Project involved obtaining community and political support. The second involved training of health assistants at their dispensary, followed by a longer training session at the hospital. The final challenge was to deliver vaccines to the dispensaries. To date, two rounds of immunization have been completed, achieving 80% to 100% coverage of the eligible children in most places, with the lowest coverage being 60%. The health assistants have been able to assume immunization responsibilities with the support of supervisory visits. As a result of the Project’s success, it is planned to train more health assistants and to encourage more supervisory visits.
7.5 Pertussis outbreak in Chuuk State, Federated States of Micronesia

The first case was reported on 4 February 2002 in a one-year old child from Paata Island who had not received any DTP vaccine. A public health team investigated 75 suspect cases, of which 15 met a clinical case definition (none were laboratory diagnosed or confirmed). Three more children were classified as cases, making a total of 18 cases. A health assistant had seen the first case over a month earlier, but there was no functioning reporting mechanism. The DTP3 coverage on the island was 24%. Of the 18 cases, 10 (56%) were not immunized, four (22%) were partially immunized and only two (11%) were fully immunized; there were incomplete data on the remaining 2 (11%) children. The ages of the 18 cases were: five (28%) <1 year; seven (38%) one to four years; three (17%) five to nine years; and three (17%) 10 to 14 years. The two fully immunized children were five and nine years old.

Public health authorities instituted an islandwide immunization response and treated the cases. The result was the end of the outbreak, with the last case in March 2002. Earlier reporting and response could have prevented more cases.

7.6 Maternal and neonatal tetanus elimination (MNTE)

The World Health Assembly passed a resolution in 1989 to eliminate neonatal tetanus. Although there has been considerable progress, with 104 countries having since achieved elimination, 57 countries still have neonatal tetanus as a public health problem (i.e. more than one case per 1000 live births in at least some districts). There is a global resolution to eliminate maternal and neonatal tetanus by 2005.

Neonatal tetanus has been eliminated in the Pacific. However, surveillance is important to ensure that the disease does not re-emerge from a failure of antenatal care, immunization delivery and/or clean delivery. Neonatal tetanus is now part of the active monthly reporting for AFP surveillance and needs to be strengthened. In particular, it is necessary to improve the investigation of reported cases to ensure that they really are neonatal tetanus and to address the causes of neonatal tetanus.

The use of the PAB (protected-at-birth) indicator has been of limited value in most countries as an alternative measure of coverage assessment. The PAB is based on the maternal history of having had at least two doses of tetanus toxoid (TT) when the mother brings the child for the first dose of DTP. The denominator is the number of children attending the first immunization visit. PAB measures the proportion that would have been protected based on the mother’s immunization history.

7.7 Vaccine security

Vaccine security is the sustained and uninterrupted supply of affordable vaccines and associated supplies. At the global level, there is a relative shortage of some vaccines, as the vaccine market splits into developing and industrialized country vaccines (e.g. use of whole-cell pertussis vaccine versus acellular pertussis vaccine).

Forecasting is an important part of vaccine security to ensure that the country receives its needs and manufacturers plan their supply because of the long lead-time between demand and supply. When there was a large excess global supply of vaccines this was less important. However, with the loss of that spare capacity, accurate forecasting has become even more important.
UNICEF supplies vaccine for over 40% of the world’s children, but has only 8% of the dollar value of the vaccine market. In 2002, UNICEF will procure 2.8 billion doses of vaccine. To ensure vaccine procurement, countries need to provide an accurate forecast of need to UNICEF. These data are reviewed and consolidated by the UNICEF supply division, in conjunction with WHO Headquarters and regional offices. The forecasts are then used as the basis for initial discussions with the manufacturers.

7.8 Cold chain assessment

To keep vaccines potent and effective, they should be moved through the cold chain as quickly as possible, kept at temperatures of +2 to +8 degrees Celsius at health centre level, and kept at health centre level for not more than one month whenever possible. Care needs to be taken not to expose the following vaccines to temperatures below zero degrees centigrade, as they lose their effectiveness when frozen: hepatitis B, DPT, diphtheria-tetanus (DT), and TT. Freeze watch temperature-monitoring devices should be kept with the vaccines, particularly with hepatitis B vaccine, to ensure that appropriate storage temperatures (+2 to +8 degrees Celsius) are maintained. However, the mainstay of vaccine temperature monitoring is twice daily checking and recording of the temperature of refrigerators and cold boxes where vaccines are stored.

Proper management of the cold chain requires at least a comprehensive assessment of current and future needs, a complete and up-to-date inventory, and long-term planning and budgeting five to 10 years in advance. Funds for repairs and spare parts must be included in the budget.

The Federated States of Micronesia undertook an assessment of their cold chain with the support of a UNICEF consultant. The assessment found widespread use of domestic refrigerators that are unable to keep the vaccines at the proper temperature. In addition, there are no guidelines for the cold chain and a poor vaccine stock management process. To address these issues it was proposed to develop and implement cold chain guidelines and train staff on their implementation. The Government of Japan will provide new cold chain equipment.

7.9 Government of Japan support for the EPI

Japan is committed to helping immunization programmes in other countries. In addition, the Okinawa Infectious Disease Initiative, announced at the Okinawa G8 summit in 2000, called for G8 countries to allocate more than US$3 billion over the next five years to combat infectious diseases. Part of this support is for the EPI through an equipment supply programme. The programme started in the 2000 fiscal year and is to last five years. The budget is 40 million Yen (US$333,333) annually for each of the 11 PICs (Cook Islands, Fiji, Kiribati, the Republic of the Marshall Islands, the Federated States of Micronesia, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu) being supported through the programme. However, this budget is not assured and requires sound implementation of activities, with accountability and effective results.

Two kinds of document are required for application: the A4 form (two pages plus an annex) and a five-year plan, which is needed only in the first year of support. To date, only Solomon Islands has provided a five-year plan.

The A4 form needs to be prepared with JICA, UNICEF and WHO support. The request needs a signature from the Ministry of Health. It is then sent to the Ministry of Foreign Affairs and forwarded, together with a covering letter, to the Japanese Embassy. The Embassy sends the form to the local office of the Japan Ministry of Foreign Affairs, who forward it to JICA Headquarters in Japan.

Only three countries have submitted an A4 form, and only one of these has also submitted the five-year plan. Therefore, Japan has delayed the deadline to 31 October 2002.
7.10 Immunization safety

Immunization safety has three major components: (1) injection safety; (2) AEFI monitoring and response; and (3) vaccine quality control and strengthening of national regulatory authorities (NRAs).

Unsafe injection practices have been linked to the transmission of hepatitis B, hepatitis C, HIV, dengue fever, malaria and other bloodborne diseases. Of all the adverse effects of unsafe injections, hepatitis B and hepatitis C viruses cause the heaviest burden of disease. In many countries where hepatitis B and hepatitis C are highly endemic, unsafe injection practice accounts for a significant proportion of infections. Worldwide it is estimated that 8 to 16 million hepatitis B infections, 2.3 to 4.7 million hepatitis C infections, and 80 000 to 160 000 HIV infections result from unsafe injections on an annual basis.

An area of increasing concern is the safe disposal of used injection equipment, especially as countries move from re-usable to ADs. There is no ideal solution for disposal, but incineration appears to be the best option, taking into consideration both health and environmental concerns. Incineration by the SICIM, Vulcan or the DeMonfort incinerators is highly effective in the destruction of used syringes. This is the best feasible alternative, which guarantees that used syringes and needles will cause no harm after use. If incinerators are not installed, syringes and needles may be destroyed by pit burning, which is less acceptable environmentally, or they may just be discarded without any treatment.

If needles are just discarded into the routine garbage, this will in all likelihood result in infections of hepatitis B, hepatitis C and HIV from needle stick injuries. This has occurred in the past and cannot be permitted to continue. Countries need to develop a policy for disposal that is appropriate for their local situation. The policy should be part of an overall national plan for immunization safety.

A video from Cambodia on injection safety and disposal was shown to illustrate the problems and the solutions being implemented there.

7.11 Surveillance and response

Surveillance is the ongoing, systematic collection, analysis and interpretation of health-related data essential to the planning, implementation and evaluation of public health interventions. The surveillance cycle starts with a health event that is reported, leading to data that are analyzed and interpreted. This information leads to a decision and/or feedback on an intervention that is designed to prevent the illness that was at the start of the cycle. Surveillance is the collection of information for action.

The current fever and rash surveillance system is of key importance now that measles may have been eliminated from the PICs. The system is a sentinel, hospital-based surveillance system that aims to pick up information from selected parts of the health system to identify what is going on in the community. This system complements the long-standing passive notifiable disease surveillance system in place in all countries. The rash and fever surveillance system is not performing well at present, in part because most surveillance efforts have been, and are still going into AFP surveillance and certification of poliomyelitis-free status. There are also issues with clinicians not understanding the need to notify cases of fever and rash and to confirm a diagnosis with a blood test.
The Pacific Public Health Surveillance Network (PPHSN) was established in 1995 to share knowledge, experience, resources and information. It also provides a network for laboratory and other resources that may not be affordable at national level. The core of the PPHSN is the 22 Ministries of Health of the PICs (includes Papua New Guinea). The PPHSN also includes regional agencies, laboratories, training institutions and others as allied bodies. Its work is facilitated by a coordinating body with a rotating membership.

The first action of the PPHSN was to determine the national priorities for surveillance (six Pacific regional priority diseases were defined: cholera, leptospirosis, measles, typhoid, dengue, and influenza). In 1996, PacNet was established, providing email communication for the Pacific. LabNet was established to provide essential public health laboratory support for all countries and EpiNet to provide epidemiological support in responding to outbreaks. LabNet is composed of three tiers. The level-1 laboratories at country level have access to any one of the four level-2 laboratories (Fiji, French Polynesia, Guam, New Caledonia), which have agreed to provide public health diagnostic testing for the six diseases. Level-3 laboratories are the regional reference laboratories providing further support to the Network; the Victorian Infectious Diseases Reference Laboratory (VIDRL) in Melbourne, Australia, is the regional reference laboratory for the PICs for most diseases.

EpiNet has developed surveillance and response protocols for the six priority diseases (through three subregional meetings that also serve to strengthen the network) and has established EpiNet teams in each country, incorporating existing national surveillance and response teams.

7.12 Question and answer session

Several issues were raised during a question and answer session. These included some general questions about how best to access information and the availability of websites and PacNet for those with email access. PacNet-Restricted is particularly useful for sharing information or asking for advice in a confidential way.

The question was asked whether a country should continue with Bacille Calmette-Guérin (BCG) vaccine when there is little or no tuberculosis in the country. It was noted that BCG has relatively limited impact on the level of tuberculosis in the community, but that, in addition to preventing extra-pulmonary tuberculosis in infants, it is very effective at preventing leprosy and that there may be non-specific beneficial effects from the immunostimulatory actions of BCG.

The need to give hepatitis B immunoglobulin (HBIG) in addition to vaccine to babies of carrier mothers was discussed. Although HBIG does provide some small additional benefit, this is at high cost. There was a question as to whether hepatitis B vaccine could be given to carriers. It is clear that it is quite safe to do so, although this does not have any beneficial effect.

Egg allergy is not a contraindication to giving MCV. It was previously thought that, as the virus is grown on egg protein, the vaccine should not be given to egg-allergic individuals. However, several studies (as well as experience in the Guam campaign) have shown that egg-allergic individuals do not have allergic reactions to MCV.

HIV-infected children or children whose status is not known should be given the same vaccines as infected children. The decision to immunize any hospitalized child should be made in consultation with his hospital physician.

There were requests from participants for a video showing good injection technique. Several such videos are available and information on obtaining these was provided.
7.13 Field exercise: Supervision

The participants went to six clinics in the Suva area to assess local practice using supervision checklists. In general, the participants found immunization services of high quality and the supervision checklist (derived from Immunization in Practice) to be useful.

The visit was followed by a panel discussion where the supervision practice in selected countries was described. There are different systems in the various countries and these differ also in how they are integrated into other aspects of health services. The use of guidelines may be useful, but the key is to find an appropriate model for each country and to use supervision as a way to support health workers and improve the quality of services.

8. NATIONAL EPI PLAN OF ACTION FOR 2003 – 2004

This session was allocated for group work on NIPs, through the development of a national plan. An example was given of Solomon Islands, where a template was used to ease and standardize the planning process. Some countries had already developed a national plan of action for immunization, focusing on areas to be improved, while others were still in the process of doing so.

An indicator should be included for each activity to monitor its achievement. The indicator may be for output, outcome or impact. The indicator also needs a means of verification and a time-frame for completion of the activity. The resources and person responsible for each activity need to be specified.

The session provided an opportunity for countries to discuss relevant issues and to individually further develop their national plans of action for immunization. Countries were informed before breaking into groups about the possible areas to be supported by the new Japanese-funded EPI project, Strengthening EPI in Pacific Countries.

The objectives of the exercise were to identify:

- activities to be carried out in 2003-2004; and
- resources required to strengthen these activities.

Countries were requested to identify activities within the following areas, as well as to indicate the ‘time-frame’ and ‘resources required’, for each identified activity:

1. national plan/policy development;
2. capacity building/training;
3. social mobilization/IEC development (e.g. needs assessment, production of materials);
4. cold chain;
5. increasing coverage; and
6. surveillance.
While this brainstorming session provided an overall list of important activities, further work would need to be done at country level to determine priorities and specific activities, time frames, and resource availability and allocation.

9. CONCLUSIONS AND POINTS FOR ACTION

9.1 Strengthening EPI services

(1) The PICs continue to have exemplary immunization programmes. The PICs have been certified as poliomyelitis-free, have practically eliminated measles and neonatal tetanus and have reduced the incidence of other EPI diseases. The PICs have also successfully integrated hepatitis B vaccine into their immunization schedule and taken full responsibility for purchasing hepatitis B vaccine, together with the other EPI vaccines.

(2) Some of the PICs are facing challenges in achieving and maintaining high coverage because of geographical, staffing and/or resource constraints. There is also deterioration in the active surveillance system. The major issues of concern discussed during the meeting, particularly surveillance quality and financial sustainability, should be brought to the attention of the Pacific island Ministers' meeting in Tonga in March 2003.

(3) Routinely reported data, supplemented by coverage surveys and other sources of information, should be used to identify areas of low coverage and strategies should be developed to prevent the build-up of pockets of susceptible children that will lead to epidemics. PICs need to manage their data more effectively so that data provided to concerned agencies can be of improved quality while at the same time reducing the burden on countries. Agencies need to make requests for information clear and of minimal burden.

(4) PICs should develop national immunization policies and multiyear strategic plans for immunization that include a financial sustainability component. The financial sustainability component should identify the funding needs and sources for the immunization programme for the next five years. Progress should be reported at the next meeting.

(5) Supervision is an important strategy for strengthening EPI services. Countries are encouraged to develop training opportunities for supervision, with all immunization staff to have at least an annual opportunity for supervision, and regional meetings should include training opportunities for supervisors.

9.2 Maintaining poliomyelitis-free status

Countries should maintain high quality AFP surveillance, high routine OPV/IPV coverage, and preparedness, coordinated by the EpiNet team, for response to importation of wild poliovirus and cVDPV.

9.3 Measles

(1) The PICs, as a subregion, are on the verge of eliminating measles. Measles transmission has been interrupted since 1998, the two known importations having led to only limited local spread. Elimination does not mean zero cases, as importations will occur and are likely to lead to limited local transmission. As long as population immunity remains high, the re-establishment of measles will be prevented, as has happened in French Polynesia (1999) and Guam (2002).
(2) To ensure measles elimination, all PICs need to achieve and then indefinitely maintain population immunity at 95%. All PICs have demonstrated their ability to provide two opportunities for measles immunization, with high coverage for both doses. The challenge is to achieve this every year for each birth cohort. Countries that are not delivering two doses to 95% of the population through scheduled services will need to undertake regular campaigns. Population immunity of 95% in each birth cohort must be achieved by the time of school entry or earlier.

(3) Consistent high coverage with first-dose measles vaccine allows PICs to consider the introduction of rubella immunization through MR vaccine or MMR vaccine (see also new vaccines section).

9.4 Surveillance

(1) Rash and fever surveillance should be improved and maintained as an integral part of sentinel surveillance at 58 hospitals. PICs should consider ways to strengthen existing notifiable disease surveillance. Improved surveillance is vital to enable detection of any importations and to confirm that ongoing measles transmission has been interrupted. A case of measles needs to be treated as a public health emergency and cases of fever and rash need to have blood taken for diagnosis. Problems in the current surveillance include clinicians who do not understand and participate in reporting and blood specimen collection; delays in transmitting and investigating reports; difficulties in collecting, preparing and transporting blood specimens for serologic assay; and delays in receiving laboratory reports.

(2) PICs are not utilizing the full potential of EpiNet, PacNet and LabNet to maintain poliomyelitis-free status and measles elimination. EPI coordinators should collaborate with national EpiNet members. The PPHSN guidelines should form the basis for laboratory investigation and public health response.

(3) The PPHSN should further develop LabNet (public health laboratory services network) for measles and rubella diagnostic testing and ensure that this support is available to countries. The Network should pursue its strategies of strengthening surveillance, laboratory support and public health response for outbreak-prone communicable diseases, including measles.

9.5 Training

Pre-service and ongoing training, preferably with annual updates, of health workers in EPI is important to improve the quality of services. PICs may need to consider training a broader range of health workers (e.g. health assistants) to deliver immunizations for remote populations.

9.6 Social mobilization

Social mobilization, informed by an assessment of parent and health worker needs, is increasingly important, as the success of the EPI in the PICs means that the EPI diseases are being forgotten. The radio jingle used in Solomon Islands provides a model of effective use of a medium and message that can be adapted to local requirements in other PICs.

9.7 Injection safety

PICs should develop a plan for immunization safety that includes safe injection and disposal policies and guidelines and should report on their progress at the next meeting. Safe disposal practices should be determined and reported at the same time.
9.8 Cold chain and vaccine stock management

(1) PICs that do not yet have a national cold chain plan should undertake a cold chain assessment in order to develop a national plan that includes policies and procedures for vaccine storage and transport, vaccine stock ordering, and management and maintenance of a national inventory of cold chain equipment, including planned replacements. PICs should report on their progress at the next meeting.

(2) Accurate forecasting of future vaccine needs is increasingly important. PICs should develop a robust annual process to calculate future vaccine needs (and associated supplies) over a three- to five-year period, using population data and historical vaccine use data. As well as forecasting vaccine needs, these data should be used to secure funding for vaccines and supplies. Forecasting needs to be tied in with vaccine stock management to reduce wastage and anticipate potential shortages.

9.9 New vaccine introduction

(1) All participants agreed that the Hepatitis B Project was a successful model for new vaccine introduction, with donor support to overcome the initial financial barrier and eventual takeover of financial responsibility by the countries. Before seeking external support for new vaccine introduction, countries need to consider the financial sustainability of their entire programme and their ability to shoulder the additional financial burden after the initial period of donor support.

(2) The available data from PICs show that Hib meningitis incidence is consistently 50 to 100 cases per 100,000 under-5s. There are likely to be at least as many Hib pneumonia cases as Hib meningitis cases. In total, this is a substantial disease burden that could be reduced or even eliminated through the use of Hib vaccine. However, the high cost of the vaccine (~US$7.50 for the three doses needed for each child) is an important barrier to adding the vaccine for the nine PICs that have not yet introduced it. Before seeking external support for new vaccine introduction, countries need to establish its priority compared with other interventions, including increasing coverage and maintaining cold chain infrastructure.

(3) No data have been identified to enable an assessment of the rubella or mumps burden. However, the current rubella outbreak in Tonga demonstrates the likelihood of an important potential burden of CRS cases. The high cost of care and suffering caused by a single case of CRS can justify the addition of rubella vaccine even without precise disease burden data. PICs that have maintained high coverage and can sustain the additional cost are encouraged to add rubella immunization as MR or MMR.

9.10 Next meeting

It was agreed that the next workshop should be held in 12 to 18 months time in Auckland, New Zealand.
10. CLOSING

On behalf of UNICEF, Ms Nancy Terreri congratulated the country participants for their hard work during the week and expressed her appreciation of the outcome of the group work. Mr Frank Rousar, on behalf of WHO, commended the contributions of all participants and recognized their determination to continue effective prevention and control of EPI diseases in the Pacific. Ms Sela S. Paasi of Tonga, on behalf of the participants, thanked WHO and UNICEF.

All those present expressed great appreciation for the substantial contributions to EPI work in the Pacific provided over the years by Mr Frank Rousar and Dr Arnold Calo-oy, who will soon be leaving their posts in Suva at WHO and UNICEF, respectively.