

# Workshop Report

## First Workshop on Lymphatic Filariasis and other Helminthiases for Pacific Programme Managers



9–12 Nov 2009

Port Moresby, Papua New Guinea

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## ABBREVIATIONS AND ACRONYMS

Ag	antigenaemia
ADB	Asian Development Bank
ALB	albendazole
AusAID	Australian Agency for International Development
CDC	Centers for Disease Control and Prevention
CEST	cestodiasis
CNTD	Centre for Neglected Tropical Diseases
COMBI	Communication for Behavioural Impact
CLTS	community-led total sanitation
CTS	child transmission survey
DALY	disability adjusted life year
DEC	diethylcarbamazine citrate
DFID	Department for International Development
DOT	directly observed treatment
EMRO	Eastern Mediterranean Regional Office
EU	European Union
ELIZA	Enzyme-linked immunosorbent assay
FBT	food-borne trematodes
GAELF	Global Alliance to Eliminate Lymphatic Filariasis
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GPELF	Global Programme to Eliminate Lymphatic Filariasis
GNNTD	Global Network for Neglected Tropical Diseases
GSK	GlaxoSmithKline
ICT	immunochromatographic test
IDB	Inter-American Development Bank
ILM	Institut Louis Malardé
IMCI	Integrated Management of Childhood Illness
IMR	Institute of Medical Research
IU	implementation unit
IVM	integrated vector management
JCU	James Cook University
JICA	Japanese International Cooperation Agency
LF	lymphatic filariasis
LLIN	long-lasting insecticide impregnated net
LQAS	lot quality assurance sampling
M&E	monitoring and evaluation
MCH	mother and child health
MDA	mass drug administration
Mf	microfilaraemia
MOU	memorandum of understanding
NGO	nongovernmental organization
NTD	neglected tropical disease
PacELF	Pacific Programme to Eliminate Lymphatic Filariasis
PAHO	Pan American Health Organization
PICs	Pacific island countries
PLF	Pacific Leprosy Foundation
R&D	research and development
RPRG	Regional Programme Review Group
SAC	school-age children

SPC	Secretariat of the Pacific Community
STAG	Strategic Technical Advisory Group
STH	soil-transmitted helminthiases
TAG	Technical Advisory Group
TB	tuberculosis
USAID	United States Agency for International Development
WHA	World Health Assembly



## COUNTRIES

AMS	American Samoa
COK	Cook Islands
FIJ	Fiji
FRP	French Polynesia
FSM	Federated States of Micronesia
KIR	Kiribati
MAR	Marshall Islands
NAU	Nauru
NEC	New Caledonia
NZ	New Zealand
NIU	Niue
NMI	Northern Mariana Islands, the Commonwealth of the
PAL	Palau
PNG	Papua New Guinea
PIT	Pitcairn
SMA	Samoa
SOL	Solomon Islands
TOK	Tokelau
TON	Tonga
TUV	Tuvalu
VAN	Vanuatu
WAF	Wallis and Futuna

### **SPEAKERS' ABBREVIATIONS**

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LSM	Mr Leo Sora Makita (Papua New Guinea)
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MP	Mr Moses Pretrick (Federated States of Micronesia)
MS	Ms Melinda Susapu (Papua New Guinea)
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RC	Mr Ravinesh Kumar Chetty (Fiji)
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WM	Dr Wayne Melrose (James Cook University)

## EXECUTIVE SUMMARY

The **Pacific Island Countries and Territories (PIC)** are renowned in the lymphatic filariasis (LF) community as an area where resurgence of the disease has occurred despite interventions lasting years and in some cases decades. Resurgence has occurred in several PIC such as Fiji, Tonga, Cook Islands and Samoa. It has also occurred in areas with no financial constraints for example in French Polynesia. The main reason for this is thought to be the high efficacy of the local vector, a mosquito specific to certain islands of this region. Additionally, these past efforts were localized and less efficient strategies than those currently used were implemented. In 1999, the Pacific Programme to Eliminate Lymphatic Filariasis (PacELF) was formed as an innovative way of promoting a region-wide approach. This approach included national programs to implement yearly rounds of mass drug administration (MDA), using a combination of two cost effective drugs. In the Pacific, the criteria for elimination was set at a prevalence rate below 1% antigenemia (Ag) in the general population, and an Ag prevalence in children aged 6 years (therefore born after the beginning of the MDA) of below 0.1%. This last criterion for elimination was revised in 2008 during the post-MDA surveillance meeting in WHO Headquarters. The revised target is now an Ag prevalence in 6 year old children of below 1%.

Surveys conducted in 2007 in the Pacific showed that the strategy has been effective when properly implemented and when the initial antigenemia prevalence was below 9%. After only 5 rounds of well conducted MDA, the Ag prevalence of LF in **Vanuatu, Tonga, Cook Islands and Niue** dropped below 1%. This is the threshold considered necessary in order to interrupt transmission of LF. This example shows that elimination is feasible in the Pacific setting. In 2007, a post-MDA surveillance strategy was developed in order to detect remaining foci of transmission and early resurgence of LF in the Pacific. It is anticipated that following the five years of active surveillance outlined in the strategy, *these four countries will reach elimination status in the period of 2014-2016.*

The characteristics of the PIC, including their geographic isolation, and the unique LF transmission pattern which have defied previous LF control efforts, call for specifically tailored interventions. In the **Federated States of Micronesia, Marshall Islands, Palau, New Caledonia and Wallis and Futuna** LF Ag prevalence below 1% has been achieved at national level. However prevalence is as high as 46% in some islands, while other islands are free of LF. With the development of more sensitive surveillance methods, it is now possible to detect these programmatic gaps. To eliminate LF from these countries, a detailed mapping of the prevalence and targeted interventions is now required. This will rely on recently developed surveillance methods. A careful assessment of the current Ag prevalence began in 2007 and will be used to develop island-tailored strategies. It is anticipated that *the five countries of this group will reach elimination between 2014 and 2020.*

A further group of six countries consisting of **American Samoa, Fiji, French Polynesia, Kiribati, Samoa and Tuvalu** present even more specific challenges. These include: geographical issues, logistical issues, and a long history of resurgence of LF despite very low prevalence rates reached in the past. As a result of careful assessments conducted in June 2008 by a group of international experts, which were then analyzed during a Technical Working Group meeting, programmatic gaps were identified. These can now be addressed in a systematic way. For example, it was found that population groups including young males and people previously excluded from MDA, were acting as the reservoir of the disease. Further analysis revealed that this particular situation is due to the continuous non-compliance of these groups, a situation that could not have been anticipated at the beginning of the MDA and can now be addressed. Based on this new understanding of the situation, specific communication strategies (such as Communication for Behavioral Impact, COMBI) together with tailored outreach practices must be implemented. Directly Observed Treatment (DOT) is needed to ensure a true high coverage of the population is achieved. This entirely new approach proved to be highly successful in August 2008 with the additional round of

MDA conducted in Samoa. Here 93% of the eligible population was observed swallowing the drugs and coverage was monitored through a coverage survey. A similar success was also observed in August 2009 in Fiji where coverage rates of above 85% were achieved, the highest coverage since 2000. Alternative country specific actions have also been designed to reach the elimination targets. For example in Tuvalu mass screening of the whole population was conducted to identify and treat only the positive cases (selective treatment scheme), and actively follow these cases up. This approach was feasible because of the small size of the population. It is not realistic in bigger countries. *Using these new approaches it is anticipated that the countries in this group will reach elimination status between 2014 and 2020.*

Six other countries (**Guam, Northern Marianna Islands, Nauru, Tokelau, Pitcairn and Solomon Islands**) are considered as non endemic. An active surveillance strategy tailored to fit the specific challenges faced in the Pacific was developed in 2007. This is currently being implemented in Vanuatu and Tonga where MDA has been stopped due to the excellent progress made in these countries. *This active surveillance strategy must be implemented throughout the region, including these six countries until it is proven that transmission has been interrupted in all neighboring endemic countries.*

**Papua New Guinea (PNG)** provides a unique situation. Since the beginning of PacELF, PNG has faced particular challenges due to the characteristics of this country. These characteristics include: population size, security problems as well as geographic and logistic issues. As a result PNG requires specifically tailored interventions. This may include the use of DEC salt, a potentially cost effective alternative to MDA, which is currently under consideration by authorities. DEC salt was used in China with great success, cutting program time to two years in areas where it was implemented. It was also piloted in the Americas with promising results. LF and Malaria share the same vector in PNG, therefore the impact of the high coverage of long-lasting insecticide impregnated nets (LLIN) distributed as part of the malaria programme with support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) should be further assessed. *If appropriate financial support is secured and implementation of successful control strategies is achieved, it is anticipated that PNG will join the group of countries reaching elimination in 2021.*

Aside from lymphatic filariasis, soil-transmitted helminthiasis (STH) is the most widespread parasitic infection in the PICs. Data on helminth infections is scarce throughout many areas in the WPR. There is little data available between 1997-2007 on food-borne trematodes or cestodes, therefore the true impact of these diseases is largely unknown, however it is suspected to be significant.

Financial resources are critically needed in the PIC in order to appropriately address LF and other on helminthiasis by conducting necessary nation-wide deworming campaigns.

## 1. INTRODUCTION

The First Workshop on Lymphatic Filariasis and Other Helminthiasis for Pacific Programme Managers was held in Port Moresby, Papua New Guinea, from 9 to 12 November 2009. The four-day meeting consisted of two parts. Days 1 and 2 and the morning of Day 3 were dedicated to LF while other helminthiasis control was discussed on the afternoon of Day 3 and on Day 4. In addition to temporary advisers, observers, and WHO Secretariat Members, LF programme coordinators and managers from ten PIC attended the meeting. The agenda and the list of participants are attached as Annexes 1 and 2.

In view of potential integration, the workshop provided the first opportunity in the Pacific Region for LF and other helminthiasis to be discussed at one venue. The specific objectives of the meeting were for the participating countries to:

- (1) review the status of the national LF programme, set targets, and develop country-specific action plans including the verification of elimination;
- (2) provide available data on helminthiasis, share experiences on deworming programmes, and develop country-specific deworming plans for the next three years; and
- (3) adopt the draft regional neglected tropical diseases (NTDs) action plan for the Pacific Region.

### 1.1 Opening remarks

Mr Anthony Gomez  
Programme Management Officer  
WHO/Papua New Guinea

Distinguished participants, ladies and gentlemen:

On behalf of Dr Shin Young-soo, WHO Regional Director for the Western Pacific Region, I would like to extend my warmest welcome to all of you to this First Workshop on Lymphatic Filariasis and Other Helminthiasis for Pacific Programme Managers.

LF is a threat to 1 billion people in 81 countries. Over 120 million people are believed to be infected, 40 million of whom are incapacitated. LF is considered the second leading cause of disability worldwide. The Pacific Programme to Eliminate Lymphatic Filariasis (PacELF) was launched in 2000 under WHO auspices following a World Health Assembly (WHA) resolution that called for the elimination of LF as a public health problem by 2020.

Significant efforts have since been made by the Member States to eliminate LF in the Pacific area. Progress has been made possible, thanks to a close partnership between WHO and the Government of Japan, GlaxoSmithKline's (GSK) generous drug donation programme and the efforts of other stakeholders. Among the endemic countries in the Pacific Region, all but Papua New Guinea have completed at least five rounds of mass drug administration (MDA). Since 2000, about 1.5 million people have been reached by these MDAs.

Papua New Guinea, which represents 70% of the total population of the Pacific Region, was not fully incorporated into the Pacific initiative and hence a high proportion of the at-risk population was not adequately served. There also are enormous challenges in terms of logistics, human resources, and other factors unique to this country. An analysis on salt importation and consumption patterns was carried out in 2007 by the WHO Western Pacific Regional Office to assess the feasibility of using diethylcarbamazine citrate (DEC) fortified salt as an alternative to MDAs. DEC-salt offered a good and less expensive option for Papua New Guinea and would therefore need to be seriously considered by the programme authorities. It is not known if the activities conducted through the malaria control programme in Papua New Guinea may have had an impact on LF as the vector is the same for the two diseases. This issue merits further attention as it offers yet another strategy that could have an impact on LF transmission. Clearly, there are several important challenges to the elimination of LF in the Pacific Region. Among these is the need for Papua New Guinea to scale up its efforts.

In 2008, WHO held a Technical Working Group Meeting on Lymphatic Filariasis Elimination Programmes in the PICs with the participation of international and national experts to review the progress in the Pacific Region, identify obstacles, and formulate solutions that would lead to the elimination of LF in the near future.

Key stakeholders and WHO are increasingly focusing their efforts and resources on promoting programmes that address multiple diseases, especially those involving NTDs, which could benefit from combined treatment regimens. One of the two drugs used in LF, albendazole (ALB), is also a very effective drug against soil-transmitted helminthiasis. There is little data on helminth infections in the Pacific Region. Given the population size in Papua New Guinea, its socio-economic and environmental conditions, the greatest burden of infections in the Pacific Region is expected to be encountered in this country. Yearly MDAs conducted as part of the LF elimination programme since 1999 are believed to have had a significant impact on STH throughout the LF-endemic countries and areas in the Pacific. However, no assessments have been done to determine the magnitude of the impact.

Over the next four days, you will review the progress made by the LF programme during the past 12 months. You will also have the chance to exchange experiences, work on solving common problems, and make plans for the next 12 months, including control of STHs in areas where these represent a public health problem. The key to success in eliminating LF and the control of other helminthiases is political commitment, financial resources, hard work and team spirit. We at WHO look forward to working with you and your staff to achieve the important goal of eliminating LF and controlling other helminth infections in our Region.

Let me wish you fruitful discussions during the workshop and a pleasant stay in Port Moresby.

## **1.2 Health Minister's speech**

Minister Sasa Zibe

Minister for Health and HIV/AIDS, Papua New Guinea

Dr John Ehrenberg of Western Pacific Regional Office, Dr Corinne Capuano of Fiji, Mr Anthony Gomez of Papua New Guinea, Dr Clement Malau, participants from the PICs, Senior Executive Members of the Department of Health Papua New Guinea, distinguished guests, ladies and gentlemen:

On behalf of my Government, the Ministry of Health and the people of Papua New Guinea, it gives me much pleasure as the Minister for Health and HIV/AIDS to welcome you all to Papua New Guinea to participate in the "First Workshop for Lymphatic Filariasis and Other Helminthiasis for the Pacific Programme Managers" in Port Moresby.

This is a very important workshop that will play a vital role in providing guidance and direction for all countries in the Pacific Region in our efforts to eliminate this grossly debilitating infection that has plagued our people for decades. This is a disease that is not life-threatening and yet can cause major disability and other medical conditions such as relapsing fevers. This is a disease that can be easily prevented by the use of mosquito nets and can also be easily eliminated. Other helminth infections are high among rural communities, resulting in stunted growth, anemia, reduced learning capacity for young school children and other health problems.

I would first of all like to thank WHO for agreeing to stage this workshop here in Port Moresby with assistance from the National Health Department. The elimination of LF in the Pacific Region has been a joint collaborative effort between our communities and other international partners, including expertise from individuals. Our partners have been instrumental in bringing us to where we are now. I acknowledge the support provided by WHO in terms of technical assistance and its financial contribution to country programmes and the PacELF Office. I am sure that WHO as our traditional partner will continue to support this effort until LF and other helminth infections are eliminated. I would also like to take this opportunity to thank the PacELF Office in Fiji for the support and guidance it has provided to the country programmes. Japan International Cooperation Agency (JICA) has made tremendous contributions and continues to support the PICs with its donations of DEC tablets and test kits. GSK has also been a major partner in this effort to eliminate LF. Its commitment to continue to provide the ALB tablets until the elimination of LF is appreciated. I want to thank you all for your continuing support in the fight to eliminate LF and other helminths in the Pacific Region. I am sure that without your support and drive to see the Pacific Region free of LF and other worm infections, this fight would be harder. Thank you very much.

LF is a highly endemic mosquito-borne infection in Papua New Guinea and other PICs with this country having the highest infection and transmission rates in the Pacific Region. From recent findings, infection rates vary from 7% in some areas to over 80% in other provinces. Although less people develop severe debilitating elephantiasis and related disabilities, microfilariae load in endemic populations is very high. The global effort to eliminate LF started after the WHA passed the resolution in 1997 calling for Member States to strengthen their activities towards eliminating the disease as a public health problem. Then in 2000, PacELF was formed under the auspices of WHO. Papua New Guinea is one of the countries that are involved in the efforts to eliminate LF from the Pacific Region. As an indication of the importance it attaches to the global effort, the Papua New Guinea Government has in consultation with key partners developed a strategic plan for the elimination of LF in Papua New Guinea from 2004 to 2020. A National Technical Working Group for LF was formed in 2008 and is responsible for monitoring the progress of the national programme and providing technical expertise.



There are two main goals of the Papua New Guinea elimination of LF programme:

- (1) to stop the spread of infection by interrupting transmission between vectors and humans; and
- (2) to reduce suffering caused by the disease through disability prevention and management.

Papua New Guinea conducted its first MDA in Milne Bay Province in 2005 with more than 85% treatment coverage. This was followed by Oro, New Ireland, Autonomous Region of Bougainville, East New Britain and West New Britain, which conducted their first MDA in 2006, while Milne Bay conducted its second MDA. The average coverage for the country was 54%.

Due to the challenging terrain, large and scattered population distribution and poor infrastructure, it is comparatively expensive to conduct and maintain a good coverage of MDA in Papua New Guinea. By the end of 2006, Papua New Guinea was aware that it had to look at other alternatives if it was to reach its target. In 2007, the first feasibility study on the DEC-salt strategy was conducted and a submitted report supported the fact that DEC-salt, if it were to be implemented, would cost much less than the current MDA strategy. We now have the evidence. The challenge is to secure adequate funds towards its implementation. With this in mind, the challenge is to find the best mix of strategies to cost-effectively eliminate LF in Papua New Guinea and the PICs in the context of world economic crisis and competing national health priorities. I have faith in this team of experts to assist us in recommending an effective option, whether it is an integration of strategies or a single strategy that can at least put us in the direction of archiving the target of an LF-free Papua New Guinea by 2020.

My vision as Minister of the current Government responsible for the health of every Papua New Guinean is to focus on service delivery through primary health care. This vision is to be realized through the current health sector reforms and the new 10-year national health plan from 2011 to 2020 that is currently being developed. I can confidently say that the time is right to address the filariasis programme and for new strategies to be investigated apart from MDA alone to control and eradicate LF in Papua New Guinea.

With these remarks, I wish you all the very best in your deliberations during this workshop and hope all you visiting from abroad will have a safe and pleasant stay, enjoy our hospitality and return home with fond memories of the next three days.

I now declare this workshop officially open.

Thank you.



## **2. PROCEEDINGS**

**Day 1: 9 November 2009**  
**Chair: Mr Enoch Posanai**

### **Part I. Lymphatic filariasis**

Updates from global level, Mekong-plus, and the Pacific Region

#### **2.1 The Global Programme for the Elimination of Lymphatic filariasis (GPELF) background, progress, impact, challenges and way forward**

Professor Dato' C P Ramachandran  
Pacific Programme Review Group (PRG)

##### **Background of GPELF**

About 20 years ago, LF was little known to the global public health community. There was:

1. little appreciation of the burden and loss on affected individuals and communities;
2. inadequate means of diagnosis;
3. inadequate tools for treatment;
4. insufficient understanding of how to alleviate the suffering and disfigurement caused by the disease;
5. inadequate strategies to control the infection;
6. insufficient knowledge of the parasite and its pathogenesis; and
7. little hope or anticipation that things would change soon.

##### **Population at risk of LF and world poverty statistics**

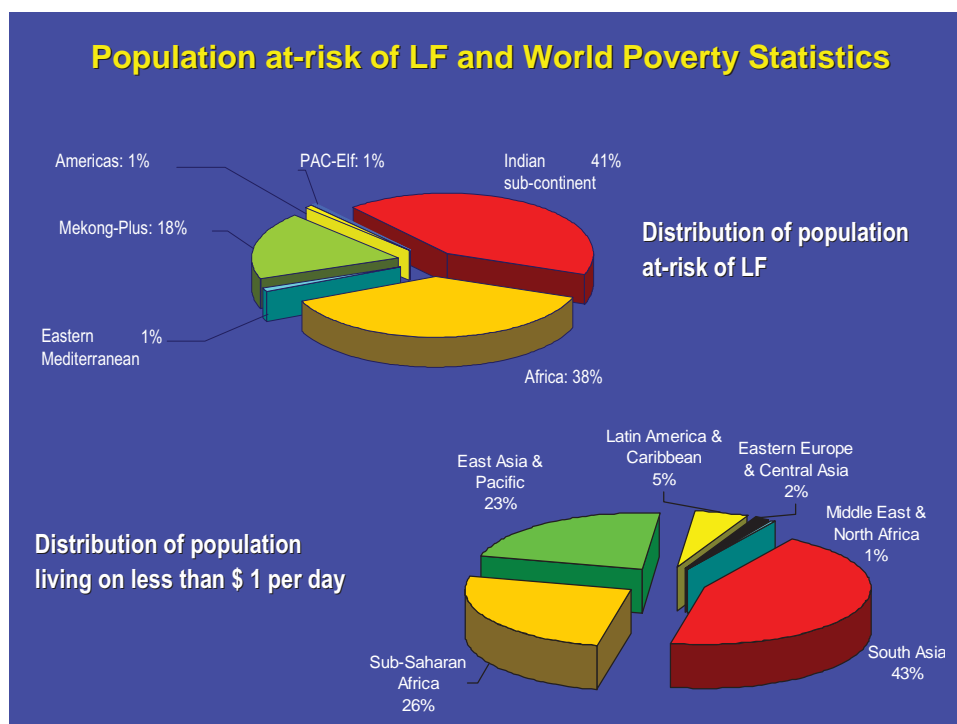
Around the globe, 1.3 billion people are estimated to be at risk of LF. It is well appreciated today that LF is not only a disease of adults but also a disease of children (Table 1). About 500 million children are at risk of LF worldwide. Early detection and treatment are particularly important as they can prevent disabling consequences of LF. The highest disease burden among children is found in South Asia where nearly 300 million children are at risk. There are estimated 50 million people with overt disease (elephantiasis, genital damage, etc.) and an estimated 70 million are living with hidden lymphatic damage.

**Table 1: Population at risk of LF**

REGION	NUMBER OF ENDEMIC COUNTRIES	AT-RISK POPULATION (IN MILLIONS)	CHILDREN AT RISK (IN MILLIONS)
African Regional Office	39	394	176
American Regional Office	7	8.87	3.39
Eastern Mediterranean Regional Office	3	14.9	6.50
Southeast Asia Regional office	9	851	297
Western Pacific Regional Office	23	31.6	11.1
Total	81	1300	494

PICs represent 1% of the world population at risk of LF, a small proportion similar to that of the Americas. LF is considered to be a disease of the poor and there is a strong correlation between disease burden and poverty. The distributions of population at risk and population living below US\$ 1 a day are associated. For example, countries in South Asia (e.g. India, Bangladesh, Myanmar, and Indonesia), where a large number of people live in poverty, remain highly endemic (Figure 1).

**Figure 1: Distribution of population at risk of LF**





As of 2009, the majority of endemic countries have initiated MDA. In 2007, approximately 470 million individuals received MDA among 780 million people targeted. In 2007, the population receiving a two-drug regimen (ALB and ivermectin or ALB and DEC) increased dramatically to 170 million people as a result of India's adoption of a two-drug regimen. As observed at sentinel sites around the world, MDA is highly effective in reducing Mf. By the sixth round of MDA, Mf prevalence was reduced by nearly 95% compared to pre-MDA and nearly two-thirds of sentinel sites where five rounds of MDA were completed experienced a reduction in Mf prevalence to zero.

### **How was this achieved?**

The progresses made so far could not have been possible without effective funding. More than 50% of MDA operational cost has been borne by the Ministries of Health. For example, Brazil, India, Malaysia, the Philippines, and Thailand have totally funded their national MDA programmes. In addition, various organizations have provided financial assistance to global LF elimination. They include but are not limited to:

- (1) Australian Agency for International Development (AusAID),
- (2) Bill and Melinda Gates Foundation,
- (3) GSK,
- (4) JICA,
- (5) Merck & Co. Inc,
- (6) Nongovernmental development organizations (NGO),
- (7) Department for International Development (DFID), and
- (8) WHO

### **Impact**

In its first eight years, GPELF has made a significant contribution to public health worldwide and its benefits have not been limited to LF. Some of the achievements include:

Reach	Nearly 2 billion treatments have been delivered to more than 560 million people in 48 countries.
Dissemination	More than 50% of endemic countries are actively involved in annual MDA.
Child protection	Nearly 176 million children have been treated for LF, and over 6.6 million babies were born into areas now protected by MDA.
Public health impact on LF	More than 6 million cases of hydrocele and 4 million cases of lymphoedema have been prevented, translating into more than 32 million disability adjusted life years (DALYs) averted.
Additional health benefits	<p>More than 310 million treatments of ALB have been delivered to women of childbearing age and school-age children (SAC), providing sustained relief from the negative consequences of STH infections that include maternal anemia, low-birth weight newborns, excess infant mortality, inhibited growth and development, and diminished intellectual performance.</p> <p>Almost 150 million treatments of ivermectin have been delivered to African communities, providing sustained relief from onchocercal skin disease, scabies, lice and important STH infections.</p>

### **Challenges and way forward**

Since 2005, there has been a growing interest in adopting an integrated approach to NTD control, in particular for several diseases targeted by preventative chemotherapy, including LF. In the South Pacific Region, many opportunities exist for integrating LF with STH control (i.e. deworming) and particularly for Papua New Guinea with existing malaria control activities. This “paradigm shift” has resulted in several favourable changes such as:

- (1) the commitment of endemic countries to create budget lines for NTD, including LF;
- (2) Commission for Africa on NTD;
- (3) US\$ 30 million provided by Asian Development Bank (ADB) for NTD in Mekong countries;
- (4) European Union (EU) parliament resolutions on NTDs;
- (5) United States of America's congressional appropriation for NTDs by means of a United States Agency for International Development (USAID) grant of US\$ 100 million over the next five years for NTDs;
- (6) President George Bush's pledge of US\$ 350 million for NTD control in the African Region followed by a substantial commitment from British Prime Minister Gordon Brown;
- (7) President Barrack Obama's recent pledge of over US\$ 80 billion for global NTD control; and
- (8) pledges by RTI International, Global Network for NTD, and DFID to provide further support for LF elimination and NTD control.

A number of challenges exist for global LF elimination, including:

- (1) scaling up of interventions in areas where Loa Loa is co-endemic, complex political situations exist, or resources are scarce;
- (2) ensuring the quality of interventions (e.g. high MDA coverage and drug quality);
- (3) documenting the impact of LF programmes on LF and on other diseases, including STH ;
- (4) defining “end points” of MDA based on data and experiences from the field; and
- (5) implementing post-MDA surveillance capable of detecting disease resurgence early.

In addition, monitoring and evaluation (M&E), which has been an integral part of GPELF, will become increasingly important as a number of countries prepare for elimination and verification.

### **Conclusions**

Significant progress has been made in LF control worldwide. Following the People's Republic of China, which declared LF elimination in 2006, the Republic of Korea was declared free of LF in 2008. In the South Pacific, Tonga, Cook Islands, Vanuatu, and Niue are in their final stages of achieving elimination. Many others are expected to follow.

Since its inception, LF elimination efforts have sent a number of important messages to the global public health community including:

- (1) Health is a basic human right and essential for national development.

- (2) The battle against LF, like HIV/AIDS, tuberculosis (TB), and malaria, is a battle against poverty.
- (3) Linkages and synergies with other initiatives are crucial.
- (4) Country ownership is fundamental to the new paradigm.
- (5) Research is necessary in generating evidence on which policy and practice are based.
- (6) Health systems development is critical in sustaining success.
- (7) Partnerships in fighting the diseases of poverty are indispensable.

## 2.2 The GPELF 2008 updates

Dr Kapa Dasaradha Ramaiah

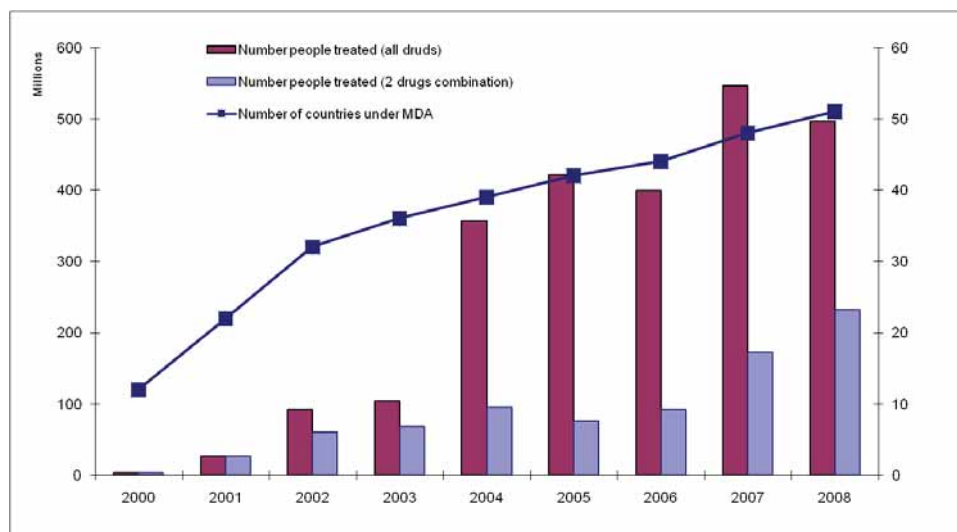
Scientist, Preventive Chemotherapy and Transmission Control (PCT)

Control of Neglected Tropical Diseases (NTD) WHO/Headquarters

There are currently 81 countries considered LF endemic. Mapping has been completed in 66 countries while it is in progress in 13 countries. Two countries are yet to start mapping. Among the endemic countries, 10 countries no longer require MDA and are in the final stages of elimination. Fifty-one among 71 countries requiring MDA are currently implementing MDA. Twenty countries, the majority of which are in the African Region, have yet to start MDA.

In 2008, nearly 500 million, among 700 million people targeted, received treatment, resulting in overall coverage of 71%. As LF MDA targets all ages, this level of coverage has been a significant achievement. In addition, GPELF has protected a large number of children from LF and provided them additional health benefits. In 2008, nearly 64 million children (from ages one to 14) have been reached by MDA. In the South Pacific, 50% of at-risk population was under MDA in 2008. Currently, more than half of the population under MDA receives a single drug regimen (DEC alone). GSK is working to increase ALB production to further increase the coverage of combination therapy.

**Figure 3: Global progress of MDA, 2000-2008**



Over the course of eight years, GPELF has made a tremendous progress in increasing programme coverage globally (Figure 3). It is one of the most affordable public health interventions with

significant public health impacts. As shown by a recent study<sup>1</sup>, 33 million DALYs have been averted and 6.6 million newborns have been protected from the disease.

### **2.3 Progress of the LF elimination programme in the Mekong-plus area of the Western Pacific Region**

Dr John Ehrenberg  
Regional Adviser in Malaria, Other Vectorborne and Parasitic Diseases  
WHO/Western Pacific Regional Office

Dr John Ehrenberg presented an overview of recent progress made in the Mekong-plus countries, including highlights from a recent programme managers meeting held in Cambodia in March 2009. The report of the meeting, the first joint meeting of LF and STH in the Mekong-plus countries, is available online ([www.wpro.who.int/internet/files/mvp/CambodiaLFNTD\\_report2.pdf](http://www.wpro.who.int/internet/files/mvp/CambodiaLFNTD_report2.pdf)). The report describes the past achievements as well as the current status of LF and STH control in the Mekong-plus countries and is an important resource for countries and stakeholders to identify where further investments are necessary.

#### **Background**

LF is still a largely neglected disease despite being the second leading cause of permanent and long-term disability worldwide. Social and economic burdens that patients and their families experience are significant but under-acknowledged. While progress has been made, LF programmes still require continued political commitment to secure human and financial resources amid competing priorities in global public health and to sustain achievements and make further gains. In the past, more emphasis was placed on interrupting transmission while morbidity control, the second pillar of LF elimination, had been largely forgotten. Morbidity control remains to be an issue even in countries where transmission has been interrupted. Limited data on morbidity are available in the South Pacific, including Papua New Guinea where morbidity is expected to be the highest among PICs.

#### **LF in Mekong-plus Subregion**

The Western Pacific Region consists of two subregions: Mekong-plus (11 countries) and PICs (24 countries and areas). Eight countries (Brunei Darussalam, Cambodia, the People's Republic of China, the Lao People's Democratic Republic, Malaysia, the Republic of Korea, the Philippines and Viet Nam) joined the Mekong-plus LF programme starting in 2001. The People's Republic of China and the Republic of Korea have since achieved and verified LF elimination (2007 and 2008, respectively). The key issues that the People's Republic of China and the Republic of Korea currently face are residual morbidity control (particularly in the People's Republic of China) and post-elimination surveillance that would allow early detection of reintroduction or resurgence. Five among six remaining endemic countries are engaged in MDA (Cambodia, the Lao People's Democratic Republic, Malaysia, the Philippines, and Viet Nam). Selective treatment has been recommended in Brunei Darussalam where prevalence has been sufficiently low. In the Mekong-plus countries, the proportion of population at risk to total population is relatively small with the highest being the Philippines where 24 million are at risk (Figure 4). This is one of the important

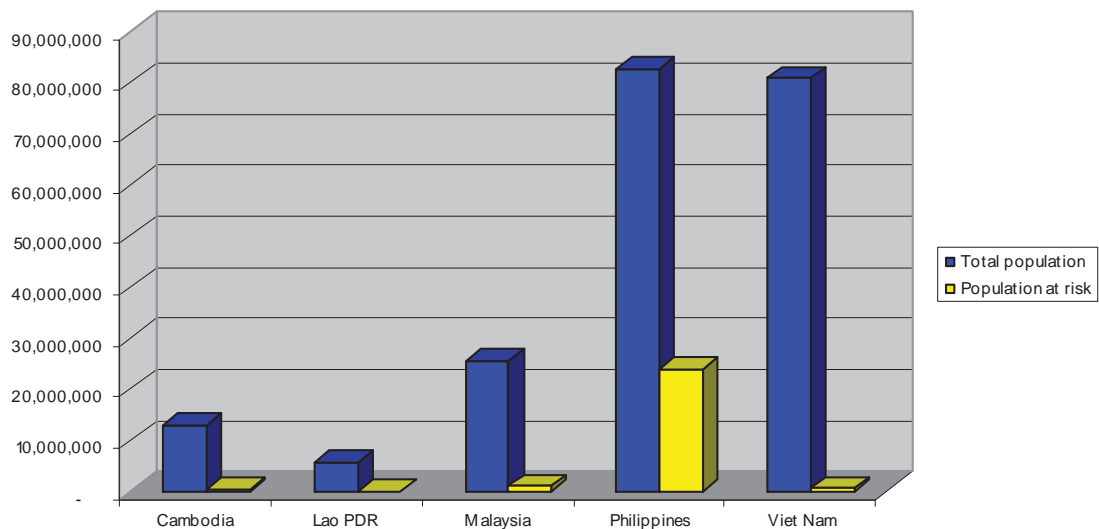
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1. P.J. Hooper, M.H. Bradley, G. Biswas, & E.A. Ottesen (2009), 'The Global Programme to Eliminate Lymphatic Filariasis: Health impact during its first eight years (2000-2007)', *Ann.Trop.Med.Parasitol.* Suppl (1): pp. 17-21.

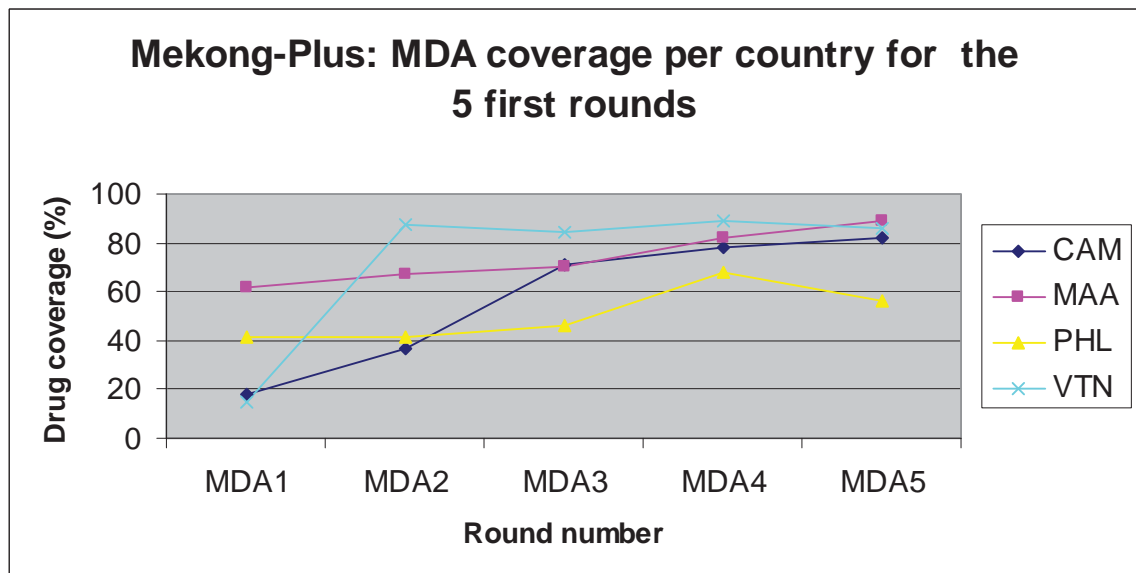


factors that make LF elimination particularly feasible in the Mekong-plus Subregion. While the magnitude of the problem caused by LF may be small in comparison to other diseases of public health importance in the Mekong-plus countries, elimination of a disease, which is a leading cause of disability, will be an important public health achievement.

**Figure 4: Population at risk of LF by country in the Mekong-plus Subregion**



**Figure 5: Changes in MDA coverage in the Mekong-plus LF endemic countries**



### Achievements and challenges

Cambodia, Malaysia, and Viet Nam have completed five rounds of MDA with above 80% coverage in recent rounds (Figure 5). These countries reported below 1% prevalence at sentinel



sites after the fifth MDA and are now preparing for post-MDA surveys and surveillance. The Lao People's Democratic Republic is expected to complete five rounds by 2012 and 2014. In the Philippines, where MDA was first implemented only in a small number of implementing units (IUs), scaling up the programme is underway (i.e. increasing MDA geographical coverage) supported by a strong political commitment. There are yet tremendous challenges ahead for LF elimination in the Mekong-plus Subregion:

- (1) The Philippines: Geographical coverage needs to increase. Five rounds of MDAs in all IUs need to be achieved with required drug coverage.
- (2) Malaysia: Reporting systems need to be improved.
- (3) Cambodia and Viet Nam: There is lack of funds to implement post-MDA surveillance.
- (4) The Lao People's Democratic Republic: In known endemic areas, five rounds need to be completed with required MDA coverage. New foci have been identified.
- (5) Morbidity control is still "the neglected pillar" of LF and needs to be addressed.
- (6) Commitment of major stakeholders needs to increase.

The Global Network for NTDs has been an important partner of the Western Pacific Region and has expressed an interest in providing continued financial support. A regional plan of action consisting of two subregional plans will be prepared to request for additional funds, which would allow further scaling up of programme activities in the Region. In addition, JICA has been an important partner for LF elimination in Western Pacific Region and the partnership will be critical for maintaining the future LF elimination activities in the Region.

## **2.4 Progress of the Pacific programme to eliminate LF since the last Managers' Meeting in 2007**

Dr Corinne Capuano  
Scientist  
WHO/Fiji

Dr Corinne Capuano reported progresses made by PacELF and the national LF programmes in the South Pacific since the last Programme Managers' Meeting in 2007.

### **Background**

Among 22 PICs, 16 countries are considered LF endemic. Fourteen have implemented MDA while New Caledonia and Palau have not engaged in MDA. Twenty percent of 8 million of at-risk population with LF in PICs, including Papua New Guinea have been reached by MDA since 1999. In 2007, a number of issues relating to programme implementation were identified. The issues included data quality, difficulty in assessing true MDA coverage, low (i.e. below 80%) treatment coverage, and inconsistent methodologies used in conducting surveys. These findings led WHO and other experts to recommend better-designed surveys to be conducted by the countries. Subsequently, a number of PICs conducted structured surveys to determine programme status starting in 2007, which is now considered as "the year of surveys."

**Recommendations from 2007 PacELF and PacCARE meetings**

Based on the analysis of data available since 1999, the following recommendations were made in 2007:

- (1) Conduct post-MDA surveys (cluster sampling) in:
  - (a) Kiribati and distribution of LLINs in endemic areas (completed from 2007 to 2008);
  - (b) American Samoa (completed in 2007); and
  - (c) French Polynesia (completed in 2008).
- (2) Conduct second post-MDA surveys (cluster sampling) following one additional round of MDA in:
  - (a) American Samoa (completed in 2007); and
  - (b) Cook Islands (completed in 2007).
- (3) Conduct child transmission surveys (CTS) following results of the C surveys (< 1%) in:
  - (a) Tonga (completed in 2007); and
  - (b) Vanuatu (completed in 2007).

**Due to small population size:**

- (1) Whole population survey in Niue (ongoing in 2009) to confirm 2004 results; and
- (2) Whole population survey and active follow-up and treatment of positives in Tuvalu (2008 onwards, implementing “test and treat strategy”).

Implement one to two rounds of nationwide MDA before considering a post-MDA survey in Fiji securing high coverage (recommendation not implemented, a nationwide post-MDA survey done in late 2007).

**External assessment of the following programmes:**

- (1) Federated States of Micronesia (completed in Yap State);
- (2) Marshall Islands (completed);
- (3) Wallis and Futuna (completed);
- (4) Palau (completed and advised in 2008 to do a survey in high school students);
- (5) Conduct a salt situational analysis in Papua New Guinea (completed); and
- (6) Baseline survey in New Caledonia.

The results of the surveys conducted between 2007 and 2008 are summarized in Table 2. The surveys revealed that (1) countries with high (80% or above) MDA coverage in at least three rounds were able to reach antigeaemia (Ag) prevalence below 1%; (2) a significant number of males “missed” MDA over the years and have become the reservoir of infection in several countries; and (3) populations previously excluded from MDA (i.e. those who are sick, old, pregnant, or lactating) acted as the reservoir in some cases.

**Table 2: Results of the surveys carried out between 2007 and 2008**

COUNTRY	TYPE OF SURVEY	ICT (%)	Mf (%)
AMS	Stratified cluster	2.3	0.3
COK	Total population in North and South	0.3	0
FIJ	Stratified cluster	9.5	1.4
FRP	Stratified cluster	10.7	1.1
KIR	Stratified cluster	1.4	0
SMA	Stratified cluster	2.6	0.6
TUV	Total population	3.4	0.9
TON	CTS	0	ND
VAN	CTS	0	ND
MAR	Stratified cluster	0	0
FSM	Stratified cluster	0.03	0

*Note:* CTS = child transmission survey; ICT = immunochromatographic test; Mf = microfilaraemia. ND= not data

In addition, a group of experts visited Samoa, American Samoa, and Fiji from 1 to 8 June 2008 to review the data available at a country level and identify programmatic gaps. They worked with national programme managers to develop strategies more specifically tailored to address individual situations faced by the three countries.

### **Conclusions and recommendations of 2008 Technical Working Group Meeting**

Following the field visits, the First Technical Working Group Meeting on LF elimination in the PICs was held in Nadi, Fiji from 9 to 11 June 2008. Major findings of this meeting were:

- (1) Common elements of success in Cook Islands, Niue, Tonga, and Vanuatu where < 1% Ag prevalence was reached that include:
  - a. low prevalence since the beginning of MDA;
  - b. directly observed treatment (DOT) with follow-up of people missed during MDA;
  - c. good coverage and high compliance during five rounds of MDA; and
  - d. stable commitment by health departments (e.g. adequate human resources, motivated drug distributors, etc.).
- (2) Significant reduction in Ag prevalence was observed in American Samoa, Fiji, Kiribati, Samoa, and Tuvalu.
- (3) Papua New Guinea remains the biggest challenge.

- (4) High quality data were collected since 2007 providing a solid basis for decision-making.

**Recommendations made during the meeting include (whether or not actions have been taken is noted in parentheses):**

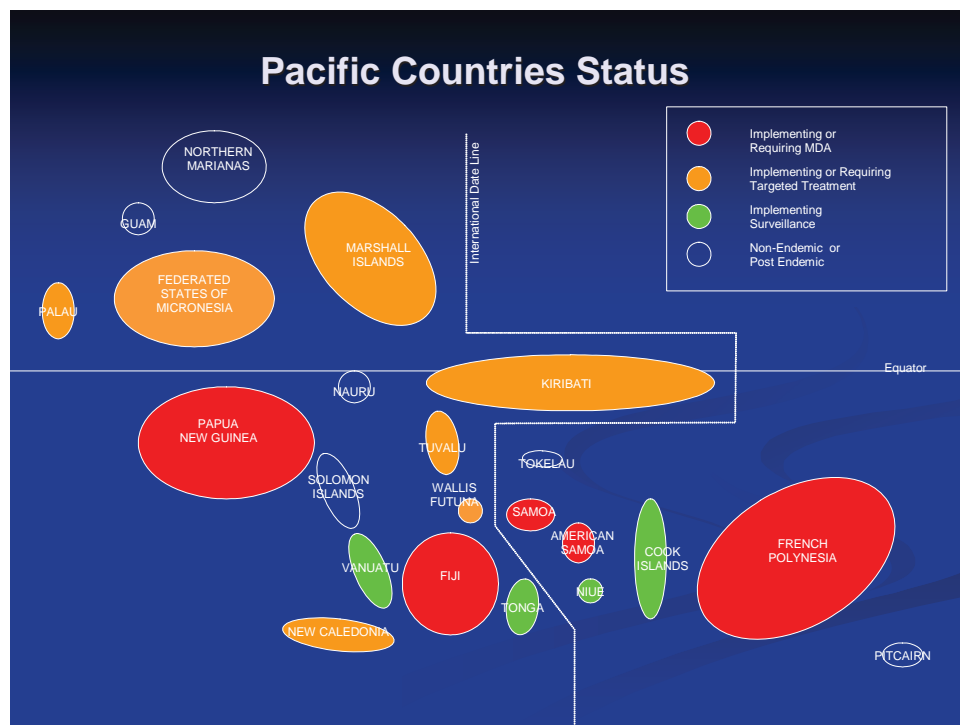
- (1) Stratified cluster method should be regarded as reference for future progress assessment and decision-making at the divisional and nursing zone levels (done).
- (2) Decisions on MDA and surveillance (i.e. whether to conduct another round or stop and go on with post-MDA surveillance) should be data-driven and adopted to the circumstances of each country (done for all countries that completed a survey from 2007 to 2008).
- (3) The use of obsolete census populations should be avoided when estimating drug needs and MDA coverage as it may lead to underestimation or overestimation.
- (4) Data management poses challenges in PIC. Data within MDA registers need to be digitized to protect against data loss, improve data analysis, and form basis of dossiers for verification of LF elimination (done for new registers).
- (5) When the entire population of IU is screened (e.g. Tuvalu) and all positives are followed-up and appropriately treated, MDA should be stopped and active surveillance should be implemented. Similar strategies may be appropriate for other countries or islands.
- (6) ICT positives should be:
  - a. treated by the local staff on a quarterly basis using single dose of ALB/DEC (6mg/kg);
  - b. tested by ICT on a yearly basis until they turn negative; and
  - c. registered with all the results, including follow-up and treatment to be kept at a national level (Tuvalu to report).
- (7) ICT cards need to be tested upon the receipt by WHO (done) before being sent to countries and before use at a country level.
- (8) Future MDA should be based on the following principles (done and it works):
  - a. strong social mobilization plan “reaching the unreached”;
  - b. coverage of at least 80% of the eligible population;
  - c. DOT; and
  - d. 30 cluster surveys to assess coverage.
  - e. Contraindications to treatment should be standardized. Individuals previously excluded from MDA need to be evaluated and those with true contraindications to be excluded from treatment. ICT positives should be referred for treatment under close medical supervision.
- (9) PIC five-year surveillance plan to be discussed in August 2008 in Geneva, Switzerland during the post-MDA surveillance meeting (done).
- (10) LF activities to be integrated with others such as NTD, communicable and non-communicable disease control, and mother and child health (MCH)

**Country specific recommendations were made for:**

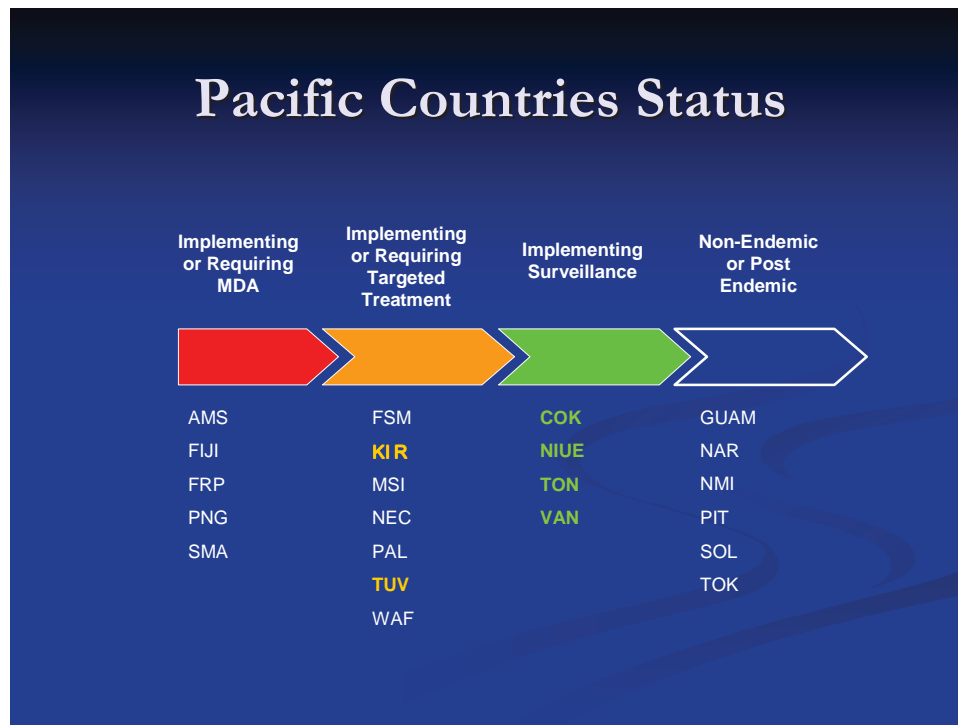
- (1) Cook Islands (whole population screening in Pukapuka and Aitutaki and active follow-up and treatment of positive cases);
- (2) Niue (whole population survey in 2008 targeting 100% and “test and treat” strategy followed by active surveillance);
- (3) Solomon Islands (no evidence of infection for three decades and thus no further control efforts needed);
- (4) Papua New Guinea (commitment at the highest level urgently required); and
- (5) Tonga (second CTS in 2010 or 2011 as no positives found in 2007 CTS).

A new classification scheme for PICs was adopted at the meeting: (non-/post-endemic; implementing or requiring MDA; implementing or requiring targeted treatment; and implementing surveillance) and countries were reclassified according to their status in 2008 (Figures 6 & 7).

**Figure 6: Current LF status by country in the Pacific Region, 2009**



**Figure 7: Four classifications currently used in the Pacific Region based on LF programme progress**



**Additional activities since 2007 include:**

- (1) Communication for Behavioural Impact (COMBI) plan developed for Samoa, American Samoa, Fiji, and French Polynesia;
- (2) morbidity survey conducted in Fiji;
- (3) additional support from partners secured (e.g. GSK, Pacific Leprosy Foundation, and JICA);
- (4) Fiji and Samoa experiences demonstrated that high quality MDA can be done:
  - a. two additional rounds of MDA (2008 and 2009) conducted in Fiji – 2009 MDA followed the above principles
  - b. one additional round of MDA in 2008 conducted in Samoa using the above principles
- (5) Website transferred under WR/SP website (<http://www.wpro.who.int/pacelf>)

**Good news and remaining challenges**

Since the last programme managers meeting in 2007, significant progress has been made towards LF elimination in PICs. PacELF is now re-established on solid scientific evidence. Four countries–Cook Islands, Niue, Tonga, and Vanuatu–have since reached < 1% Ag prevalence at the national level. Most countries have shown a significant reduction in Mf prevalence. A number of countries have adopted strategies tailored at provincial or divisional levels, suggesting that such approaches can be effectively implemented in the South Pacific. Post-MDA surveillance has now been clearly defined and has been implemented in some countries. Furthermore, JICA has extended commitment to provide DEC and ICT for the PICs until 2015.

While these successes should be acknowledged and disseminated, significant challenges remain for future LF elimination in PICs.

Some of the key issues to be discussed during this meeting are:

- (1) developing an appropriate strategy for Papua New Guinea accompanied with a budget;
- (2) LF as not a disease of the past – promoting morbidity assessment and control in the South Pacific; and
- (3) budget to achieve and verify elimination in PICs.

### **Questions and comments**

HB: Some countries have successfully achieved LF elimination. What are the factors common among these countries that contributed to this success?

CC: We do not yet have any endemic countries in PICs achieving elimination status. Four countries previously classified as endemic have achieved Ag prevalence below 1% and are now at the final stages of elimination (green status: implementing surveillance). We have identified three factors: (1) low initial prevalence; (2) high MDA coverage (80% or greater) in at least three out of five rounds; and (3) sustained commitment from Ministry of Health. Compared to countries like Fiji or French Polynesia, the four countries had low prevalence at the beginning of MDA and were able to ensure high coverage throughout the programme. For some countries, having a full-time person dedicated only to LF has been a key. The person from the beginning to the end of MDA rounds was fully aware of what was happening.

CA: In Cook Islands, we tested about 2% of children born after MDA started during the survey in 2007. All of the children tested were ICT and Mf negative. Is it still necessary to conduct CTS?

CC: If MDA is successful, all children born after MDA began should be ICT negative. Each child tested in CTS acts as a marker of what is happening at the community level. An ICT-positive child in CTS suggests that there has been an active transmission in his or her community since MDA was initiated. In the Pacific Region, we have experienced resurgence of LF in the past, especially in places where *Aedes polynesiensis* is a vector. Two main objectives of conducting CTS at regular intervals are: (1) to identify remaining transmission foci that need to be targeted by MDA; and (2) to detect any resurgence. In some of PICs where population is very small, we are talking about a small number of children (in case of Cook Islands approximately 800 children) and we need to ensure all of them are tested. We also need to keep in mind that each country will need to prepare a dossier describing the elimination process, which will be carefully examined by the experts. Without this document, elimination cannot be verified.

WM: I would like to know why the cut-off defined by WHO remains below 1% Mf. We have examples in the South Pacific, for example French Polynesia and Tonga, where nearly 0% Mf prevalence had been achieved in the past but we are seeing resurgence.

CP: PacELF guideline recommends that the threshold should be below 1% Ag assessed using ICT. For Mf, it is below 0.1%. In the South Pacific, LF resurgence could be due to *Aedes polynesiensis*, known to be highly efficient in transmitting LF. The probability of resurgence should be low. In French Polynesia, we need to first ensure whether or not there is an issue of compliance.

CA: In LF elimination, we focus mostly on drug distribution and clinical management. What is the role of integrated vector management (IVM)?



CP: IVM has come into play only recently. There has been a discussion at the Headquarters level on how it can play a role in LF control. Some of the things being discussed in terms of LF are the use of bed nets and other approaches such as integration with dengue vector control. However, it is not mandatory that countries adopt IVM for LF control, although we recognize the importance of vector control in reducing LF, especially in this Region where we have a highly efficient vector. Countries need to review existing vector control programmes and assess how it could benefit the LF programme. That will be very important in Papua New Guinea.

JE: Although we have both a global strategy and the regional plan for IVM, it has been more seriously discussed for dengue and malaria, and less for LF. In Papua New Guinea, where the LF programme is seeking ways to piggyback malaria control, it will be more applicable. In other parts of the South Pacific, it will come into play more in terms of dengue control.

PNG Health Minister: I thank all the presenters for giving us informative presentations on LF, including the global and more specific subregional perspectives. I must say that I feel privileged to be at this meeting. As it was mentioned, Papua New Guinea remains the biggest challenge and we acknowledge that. The health status of Papua New Guinea has been well documented. I would like to make some political remarks. We have a weak and fragile health system with limited funds, however, this will change. We have a responsible government and are now taking appropriate actions. The health plan we are developing now will improve our health system in the next five to ten years. So I would like you to be not too diplomatic and develop an operational strategy specific in addressing the current situation in Papua New Guinea taking into account what the country has done. In this way, it can become the basis of the 10-year national health plan. This is what I want to see and once developed, we can put this in our 10-year plan. We want to have strategic actions that are evidence-based to be taken and I believe you have the expertise to do so.

KR: Thank you, Honourable Minister. On behalf of WHO, I would like to assure you that we have placed more emphasis on developing a plan specific for Papua New Guinea at this meeting. Can you give us one hour of your time to present you the specific plan by the end of this meeting? We will be happy to present the plan for the next ten years to you with a group of technical people. Is it possible for you to have the meeting?

Minister: I feel obliged to do that. I will get my technical as well as senior executive members of the team for the meeting.

## **2.5 Monitoring and epidemiological assessment of LF elimination programme**

Dr Kapa Dasaradha Ramaiah  
Scientist  
Preventive Chemotherapy and Transmission Control (PCT)  
Control of Neglected Tropical Diseases (NTD)  
WHO/Headquarters

### **Background**

LF elimination programmes worldwide have made significant progress over the last few years and many countries, including parts of the Philippines, Sri Lanka, Thailand, Malaysia, and parts of India are entering the post-MDA surveillance period. There is a growing demand for robust assessment methods that would allow effective monitoring of remaining transmission foci and resurgence or reintroduction of LF.



### **Current guideline**

The current WHO guideline for monitoring and epidemiological assessment for LF elimination was published in 2005<sup>2</sup>. The guideline details five steps: (1) baseline surveys; (2) mid-term assessment prior to third MDA; (3) assessment for stopping MDA prior to fifth MDA; (4) passive surveillance system; and (5) post-MDA surveillance. Types of tests used and target population of assessment slightly differ across the five steps (Tables 3 and 4).

**Table 3: Current WHO guideline for monitoring LF programme**

RECOMMENDED TEST	ASSESSMENT TYPE AND TIMING		
	BASELINE SURVEY PRIOR TO MDA 1	MIDTERM ASSESSMENT PRIOR TO MDA 3	FOR STOPPING MDA PRIOR TO MDA 5
Mf prevalence	√	√	√
ICT in two- to four-year-old children			√
ICT in six- to seven-year-old children			√

Stopping MDA under the current guideline

According to the current guideline, the stop MDA procedure can be initiated when four effective rounds of MDA are completed (60% treatment coverage of total population under MDA and 80% treatment coverage of eligible population). The procedure consists of three steps (Table 4).

**Table 4: Current stop MDA procedure**

RECOMMENDED TEST AND SAMPLE SIZE	STEPS		
	STEP 1	STEP 2	STEP 3
Mf prevalence	two sentinel sites two spot-check sites	five to 10 additional sites	
Sample size	$4 \times 500 = 2000$	five to $10 \times 500 = 2,500$ to 5,000	
ICT (two- to four-year- old)	two sentinel sites two spot-check sites	five to 10 additional sites	300 children ( $10 \times 30$ clusters)
Sample size	$4 \times 25 = 100$	five to $10 \times 25 = 125$ to 250	
ICT (six-year-old)			3000 children

2. Monitoring and epidemiological assessment of the programme to eliminate lymphatic filariasis at implementation unit level, World Health Organization, WHO/CDS/CPE/CEE/2005.50.

For example, in culex transmission areas, MDA can be stopped following the current stop MDA procedure when: (1) community Mf prevalence of < 1.0% (assessed using 60ul of blood), and (2) child (two to six years) Ag prevalence of 0% (assessed using ICT). These assessments are to be initiated shortly before the fifth round of MDA, although the fifth round should be conducted, irrespective of the results of the assessment.

Several operational issues have been raised by national programmes regarding the current procedure. They are:

- (1) labour intensive (i.e. high volume of field and laboratory work);
- (2) expensive;
- (3) ICT testing of two- to four-year olds is of limited value as these children were found consistently negative;
- (4) lot quality assurance sampling (LQAS) survey of 3000 children for Ag is logistically difficult as it requires a large number of schools to be visited;
- (5) the criterion of child Ag prevalence of 0% to stop MDA too stringent; and
- (6) about 78% statistical chance of a false negative conclusion to continue MDA (when in fact you could have stopped MDA).

### **New protocol**

To address the above operational issues, a new guideline for monitoring and epidemiological assessment of LF elimination programme was developed in 2008. The new guideline is currently referred as “the new protocol” and is being tested. Once testing is completed, the new protocol can be further revised and is expected to replace the current guideline. The current version of the protocol defines the criteria for stopping MDA as follows (changes from the current guideline in **bold**):

- (1) **five** effective rounds of MDA (65% treatment coverage of the total population and 80% treatment coverage of the eligible population);
- (2) community Mf prevalence of < 1.0% (using 60ul of blood); and
- (3) child (**six to seven** years) Ag prevalence of **1% to 2%**.

The new protocol does not recommend the midterm assessment and has simplified the stop MDA procedure (Tables 5 and 6).

**Table 5: Changes made under “the new protocol”**

TEST	ASSESSMENT TYPE		
	BASELINE SURVEY	MIDTERM ASSESSMENT	FOR STOPPING MDA
Mf prevalence	√	<del>√</del>	√
ICT test in two- to four-year-old children			<del>√</del>
ICT test in six- to seven-year-old children			√

**Table 6: Recommended number of survey sites and sample size under “the new protocol”**

TEST	STEP 1	STEP 2	STEP 3
Mf prevalence	one sentinel site one spot-check site	one to two additional sites	
ICT card test in six-year-old children			< 3000 children

The new protocol proposes two survey methodology options (LQAS or cluster sampling). National programmes would need to carefully examine the pros and cons of each method and determine which method to be adopted. For example, LQAS requires smaller sample sizes (i.e. the number of children to be tested) but more schools to be visited whereas cluster sampling requires larger sample sizes but relatively fewer schools to be visited (Tables 7 and 8). In addition to survey cost, which is largely determined by overall sample size and the number of schools to be visited, school enrolment is another deciding factor. While children (six- to seven-year-olds) can be sampled from either community or school, above 75% enrolment rate is considered necessary for implementing school-based surveys.

**Table 7: LQAS vs. cluster sampling assuming the target prevalence below 2%**

Target prevalence <2.0%					
Population surveyed (6-7 year children)	LQAS Sample size	LQAS critical cut off values	Cluster design Sample size	Cluster design Critical cut off values	Power (1-Type I error)
<400	All	0.02N	Not recommended		1.000
400	284	3			0.7475
1,000	506	6	759	9	0.8193
2,400	614	7	1,228	14	0.7457
4,000	690	8	1,380	16	0.7573
10,000	770	9	1,540	18	0.7603
30,000	778	9	1,556	18	0.7462
>50,000	846	10	1,692	20	0.7687

**Table 8: LQAS vs. cluster sampling assuming the target prevalence below 1%**

Target prevalence <1.0%					
Population surveyed (6-7 year children)	LQAS Sample size	LQAS critical cut off values	Cluster design Sample size	Cluster design Critical cut off values	Power (1-Type I error)
<1000	All	0.01N	Not recommended		1.000
1,000	704	4			0.8278
2,400	1042	6	1,563	9	0.7753
4,000	1214	7	1,821	11	0.7620
10,000	1516	9	3,032	18	0.7820
16,000	1536	9	3,072	18	0.7641
≥18,000	1540	9	3,080	18	0.7606

The validity and operational feasibility of the new protocol are currently being assessed in research studies, supported by the Bill and Melinda Gates Foundation, in selected IUs of the five to six countries. It will take up to one year to review the results and determine whether the new protocol is ready to replace the current guideline. Preliminary results suggest that the new protocol has a good potential.

## 2.6 Wolbachia sterile insect technique yields supplemental strategy for South Pacific filariasis elimination

Dr Hervé Bossin  
Research Scientist  
Head of Medical Entomology Laboratory  
Institut Louis Malardé (ILM)

### LF situation in French Polynesia

Drug distribution for LF control (i.e. MDA) has been carried out in French Polynesia for decades. For example, since 2000 eight rounds of MDA have been conducted. Despite the years of MDA, a survey conducted in 2008 showed relatively high levels of Ag prevalence. While the eight rounds have reduced Ag prevalence, the impact has not been sufficient to achieve elimination in the near future. As discussed by Burkot *et al*<sup>3</sup>, LF elimination in French Polynesia is unlikely to be successful in the absence of appropriate vector control.

3. T.R Burkot , G. Taleo, V. Toeaso, & K. Ichimori K. (2002). 'Progress towards and challenges for the elimination of filariasis from Pacific-island communities', *Ann.Trop.Med.Parasito*, 96 Suppl (2):S61-869.

### **LF vector in French Polynesia**

The most important LF vector in French Polynesia is *Aedes polynesiensis*, a species highly efficient in transmitting the parasite even when prevalence is low. Mosquitos and their breeding sites are abundant on the islands of French Polynesia (Figures 7 and 8). Conventional vector control methods, which effectively control artificial breeding sites, are not as effective in controlling natural breeding sites such as crab barrels. In addition, the vector control programme in French Polynesia faces significant logistical challenges with limited resources thinly spread across many islands. For example, currently adopted vector control methods such as insecticide spraying are inefficient in covering such a large number of islands. The use of bed nets is not an option for LF control as *Aedes polynesiensis* is a day-biting mosquito.

**Figure 8. Mosquitos commonly found in French Polynesia**



**Figure 9: Natural breeding sites for mosquitos commonly found in French Polynesia**

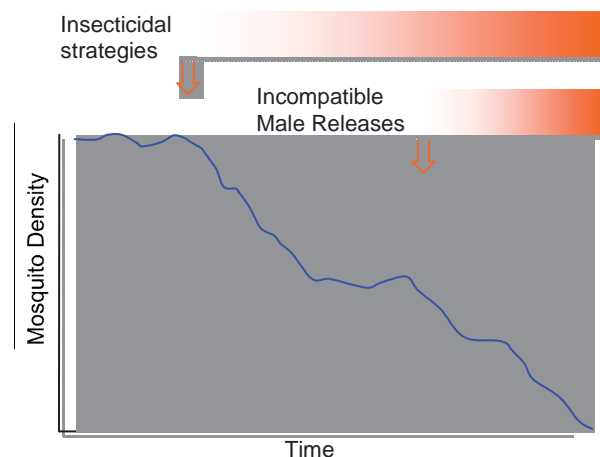


### Supplemental vector control strategy

Considering the limitations of MDA and conventional vector control, a sterile insect technique has been proposed at ILM as a strategy supplemental to the existing LF control strategy. The proposed sterile insect technique utilizes male mosquitos infected with a strain of *Wolbachia* (bacteria commonly found in insects), which will be repeatedly released into the natural mosquito population. Because the *Wolbachia* strain in the infected male mosquitos does not match with a *Wolbachia* strain in the wild female mosquitos, mating between them would not result in the successful reproduction of an offspring (the mechanism is called bidirectional incompatibility). Repeated releases of infected incompatible male mosquitos should significantly decrease the natural mosquito population over a long period.

The geography of French Polynesia is ideal for the application of the proposed method because the vector population is broken into relatively small, isolated populations. A study conducted in Burma in 1960s using a similar sterile insect technique showed that a target mosquito population was nearly eradicated in a study area within 12 weeks of study initiation. In a recent study, repeated release of the incompatible males into a cage population of *Aedes polynesiensis* resulted in a significant decrease in the cage population to almost an eradication level.

**Figure 10: Proposed strategy using the combination of chemical and biological control methods**



An ongoing study in French Polynesia investigates the effectiveness of vector control strategy combining insecticide application and incompatible male release. It is hypothesized that, following insecticidal control, mass releases of incompatible males should further reduce the target mosquito population to a level low enough to suppress LF transmission (Figure 9). The study works closely with community members and is expected to release the incompatible males soon in a study area. Periodic impact assessments will be performed for three to four months following the initiation of the study.

The strategy integrates conventional and biological control methods and is much less reliant on insecticides. Thus, it is a more sustainable and environmentally safer method of vector control. It can be adopted supplemental to the existing LF elimination strategy (i.e. MDA) and will not only help address public health challenges in French Polynesia but also provide valuable information on the utility of vector control for LF elimination programmes.

## **2.7 WHO Collaborating Centre for Control of Lymphatic Filariasis and Soil-Transmitted Helminths**

Dr Wayne Melrose  
School of Public Health and Tropical Medicine  
James Cook University (JCU)

Dr Wayne Melrose, Director, WHO Collaborating Centre for Control of Lymphatic Filariasis, JCU, Townsville, Australia, outlined how the JCU LF Support Centre supports PacELF by providing technical support and training and conducting operational, applied and basic research. In the South Pacific, current LF activities primarily focus on Papua New Guinea. The major source of operational funding is GSK. The main constraints faced by the Center are limited human and financial resources. Currently, the Center has very little funding for STH. Potential activities that the Center can support include M&E, laboratory services, including quality control and training, and assistance/training in scientific manuscript (e.g. publication and grant) writing. The Center does not provide funding for MDA.

### **Questions and comments**

#### **Training opportunities**

JE: WHO is not a foundation and currently does not provide any funding to collaborating centers, including the one at JCU. My question to Dr Wayne Melrose is whether it is possible and feasible for JCU to provide short-term (non-degree) on/off-site training opportunities for country technical personnel. As we start to incorporate STH control activities, we expect the needs for laboratory training will increase.

WM: Yes. Students can come to Townsville or we can run the courses in the countries. We have had courses in diagnostic parasitology in Papua New Guinea and similar courses can be offered in other countries.

JE: Is that something AusAID could support?

WM: Yes, they should be interested.

JE: If we work together to develop a curriculum or programme, would that be feasible?

WM: I would need to discuss with my colleagues, but that is definitely something that we should look into.

#### **Supplemental vector control strategy**

CP: I would like to ask Dr Hervé Bossin a question. While the release of incompatible males is interesting, the success of biological control so far has been limited. I was involved in the study in Burma many years ago. In that study, as soon as you take away the suppression, you get invasion by compatible culex from other regions of Burma and it never really worked. It worked as long as strong suppression was maintained. In French Polynesia, with all these islands, you would need to rear millions and millions of incompatible *Aedes polynesiensis*. A similar study is ongoing in Kuala Lumpur for dengue with *Aedes aegypti*. Although the sterile insect technique works as long as a strong pressure is maintained, it cannot be sustained in a long-term basis. It



works under experimental conditions, but when it comes to field operations its application is still very limited. My first question is how you plan to mass produce *Wolbachia* infected sterile *polynesiensis* males. Second, you will have to sensitize the population. The general population in the country would not be interested in seeing thousands of mosquitos being released and may not be receptive. I am not discouraging you but I would like to wish you good luck.

HB: Biological control is a proven method. For example, it has been well utilized in controlling agricultural pests. The most prominent example is screw worm eradication in the United States of America. To answer your question regarding sterile male production, we have a number of teams working to improve the technology for a large scale production of sterile male mosquitos. We have received funding from Melinda & Bill Gates Foundation to support this study for the next five years. The study will assess the feasibility of the technique at different scales of the operation. I have to emphasize that our goal is not the elimination of the indigenous mosquito population. The goal of the sterile insect strategy is to reduce the vector population and interrupt LF transmission. Maintaining a low level for six to seven years will be sufficient. Regarding engaging communities, it is very important for the success of this programme. Male mosquitos do not bite and thus do not transmit diseases. We need to communicate these points well with the communities and need to work at the community level as we do regularly in public health. So far the perception and the response from the communities have been very supportive.

TM: Do you have any cost estimates to carry out this as a public health programme?

HB: It is still too early. However, the feasibility study will provide information necessary for a cost benefit analysis of the technique. The cost effectiveness of sterile insect techniques has been limited to Western settings. In addition, health and environmental benefits of not using a large quantity of insecticide need to be taken into consideration when performing such analyses.

#### New protocol

CP: Dr Kapa Dasaradha Ramaiah made a presentation on the new protocol. We will need to emphasize that LF programme managers are requested or encouraged to seek technical advice from WHO before making decisions on whether or when to stop MDA. I think this point needs to be clearer. While the new protocol appears much more feasible for the application in the field, I have a comment regarding 60mm<sup>3</sup> of blood required for preparing Mf slides. In India, people are still resistant to giving that much blood and I think 20mm<sup>3</sup> to 30mm<sup>3</sup> may be enough. Also, the cut-off point has been changed from zero Ag prevalence to 1% to 2% Ag prevalence in the new protocol. How did you come up with this number? Does the number indicate lack of transmission or some level of transmission?

KR: India has had LF control programme since 1950s. Many surveys have been conducted to assess Mf prevalence and used 20mm<sup>3</sup> of blood. But when it comes to making decisions on whether to stop MDA, countries should follow the guideline and ensure to use 60mm<sup>3</sup> of blood. WHO will insist on each country, including India, to ensure the correct quantity of blood is collected. Regarding the cut-off prevalence, we have learned from the countries that achieving zero prevalence is extremely difficult if not impossible. Using empirical information currently available, we have come up with 2% for culex and anopheles transmission areas and 1% for *Aedes* transmission areas. The new protocol is currently being tested in the field. As more data become available, the validity of the two values will be more apparent.



## **2.8 Prevention and management of disability in LF**

Professor Dato' C P Ramachandran  
Chairman of Pacific Programme Review Group

### **Introduction**

When the two pillars of LF elimination were instituted many years ago, very little information about the clinical aspects of LF was available. Our understanding of LF pathogenesis has since significantly improved, although disability prevention and alleviation, the second pillar of LF elimination, has been somewhat neglected. It is now well appreciated that the spectrum of the disease is wide and complex. LF programme managers should be knowledgeable about the clinical aspects of the disease to establish a good morbidity control programme.

### **Effect on LF on the lymphatic system and clinical manifestations**

Recent studies have shown that secondary bacterial infections and microfilaria are both responsible for damages to the lymphatic system and that the dilatation of lymphatic vessels caused by adult worms leads to lymphatic dysfunction and not obstruction. Lymphatic dysfunction eventually leads to chronic clinical manifestations of LF such as lymphoedema, hydrocele, or chyluria. Deaths of the adult worms and secondary bacterial infections cause acute inflammatory reaction known as *adenolymphangitis* (acute episodes). Recurrent acute episodes are strongly associated with disease progression.

### **Management**


Prevention and proper management of the acute episodes (careful attention to hygiene and local limb care, etc.) are essential in slowing or stopping disease progression. Lymphoedema of the leg is reversible with proper care at Stage 1 and in some cases at Stage 2. When appropriately managed, progression to Stage 4 elephantiasis can be prevented even if lymphoedema becomes irreversible (Figures 10 and 11). Providing proper treatment at early stages is particularly important for young patients as a long-term disability can be prevented. For hydrocele, the principal treatment is surgery, which is effective, and relatively simple and quick.

WHO has recommended community- and home-based morbidity management for chronic LF patients, which emphasizes patient and family education and promotes a simple set of treatments and hygienic practice. Excellent educational materials are available for programme managers to establish such programmes (e.g. <http://www.who.int/lymphaticfilariasis/resources/en/> ).

Figure 11: Lymphoedema of the leg (Stage 1)

## Stage 1 Lymphoedema of the Leg

- Swelling reverses at night
- Skin folds absent
- Skin- smooth, normal
- Hygiene -- at least once a day
- Treat entry lesions
- Exercise




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Figure 12: Lymphoedema of the leg (Stage 4)

## Stage 4 Lymphoedema of the Leg

- Swelling not reversible at night
- Skin Irregular with folds knobs and nodules
- Hygiene at least twice a day
- Treat entry lesions
- Medicated creams in deep folds
- Prophylactic antibiotics if necessary
- Exercise
- Elevation of the leg



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### **Epidemiology of LF morbidity**

Except for certain parts of South Asia, limited information is available on the current epidemiology of disability due to LF. Fiji is currently conducting a nationwide morbidity survey and preliminary findings that suggest the burden of LF to be greater than initially expected. Papua New Guinea, a country where LF prevalence is expected to be the highest in the South Pacific, is yet to assess the extent of the disease burden. LF remains a highly stigmatizing disease, discouraging many patients from openly talking about their illnesses, which makes it particularly difficult to collect accurate data on LF morbidity. However, morbidity due to LF needs to be

assessed properly for national programmes to strengthen or establish a morbidity management programme and achieve the second objective of LF elimination.

## **2.9 LF morbidity in the Pacific: The wrong belief**

Dr Corinne Capuano  
Scientist  
WHO/Fiji

Dr Corinne Capuano presented preliminary findings from an ongoing nationwide survey in Fiji and argued for the need for patient support in the Pacific Region. All the pictures presented in the presentation were taken this year (2009) during the survey in Fiji.

### **Background**

LF, in particular chronic morbidity due to LF, was long considered a disease of the past in the Pacific Region. However, such statements were often made without any reference to the existing data. A review of recent LF morbidity data has found that such information (up to 2008) existed only for Vanuatu and Fiji out of all PICs. In Vanuatu, a total of 25 hydrocele and 100 lymphoedema cases were identified during MDAs between 2000 and 2005. In Fiji, a survey was conducted between 1991 and 1995. Among 18 253 people examined in the four medical divisions, 2733 people (17%) were identified as having lymphoedema, elephantiasis, or hydrocele. The paucity of recent data indicated that:

- (1) The extent of LF morbidity in the South Pacific was yet unknown.
- (2) While MDA attracted all efforts and attention, the second leg of the programme had been neglected.
- (3) People suffering from the disease may have been neglected.

A lack of information and resulting inaction could negatively impact the overall credibility of the LF elimination programme. To address these issues, a morbidity assessment was initiated in Fiji.

### **Morbidity assessment in Fiji**

In late 2008, the Pacific Leprosy Foundation (PLF), a non-profit organization based in New Zealand, provided funds to WHO for LF morbidity control in the South Pacific. The Foundation has worked many years for leprosy elimination in the Pacific Region and it was its very first support provided to LF. About US\$ 25 000 was given to support a salary of a morbidity control officer for WHO Pacific LF programme. A Fijian male nurse practitioner was recruited in January 2009 for one year.

The agreement was reached between PacELF and Fiji's national LF programme to begin a morbidity assessment in Fiji. Data on morbidity were initially gathered from (1) records available at health centers and hospitals, including theater registers and (2) health professionals, including nurses and community health workers. However, very little information was available and reporting from nurse and community staff indicated only few cases (with no details) existed. The morbidity control officer then developed a plan to visit all health facilities in each division and conduct a thorough community-based survey. At each visit, the officer first met with local health staff and visited and interviewed community members, including shopkeepers and taxi drivers.

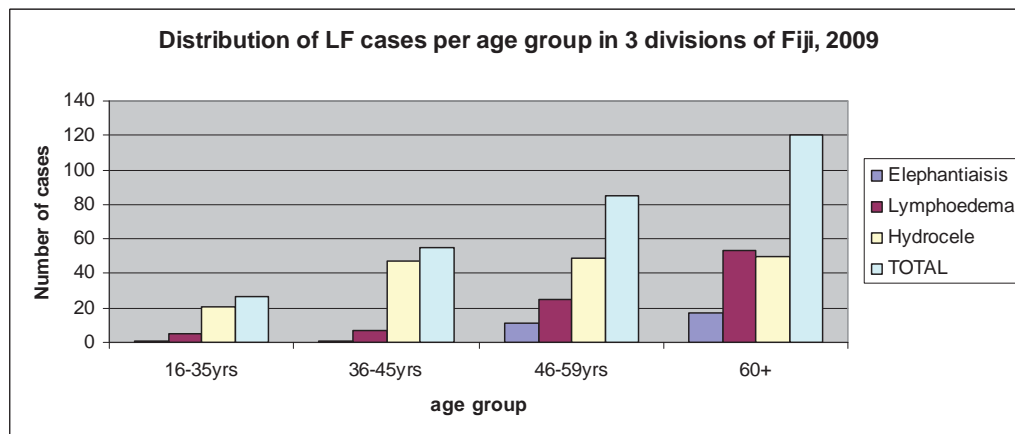
As of November 2009, data collection is completed in three divisions (Northern, Central, and Western). Eastern division will be completed in early 2010.

### **Preliminary findings as of October 2009**

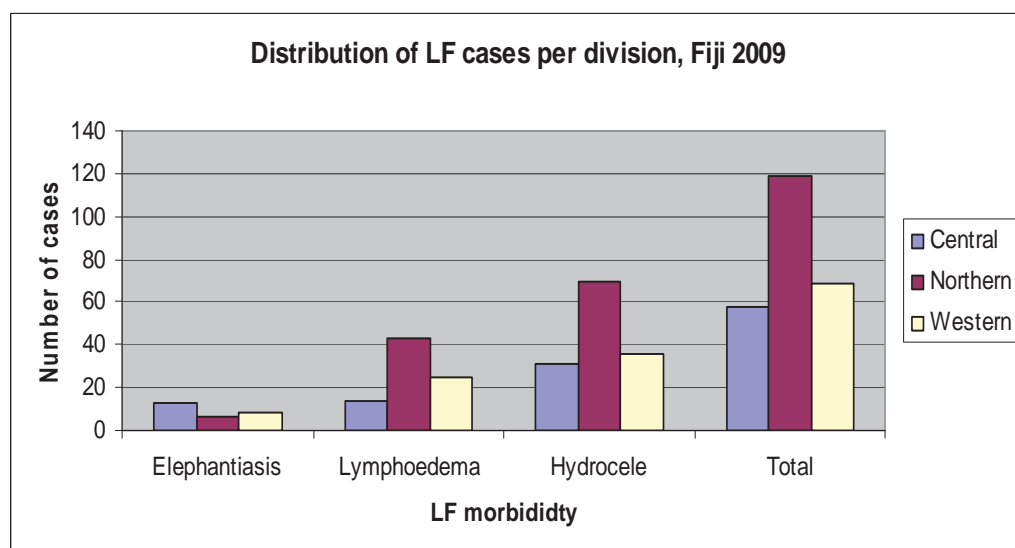
So far 290 cases were identified in the three divisions. Major findings include:

- (1) Fijians are more affected than Indo-Fijians.
- (2) Males are more affected than females.
- (3) Most cases are 46 years or above, although a number of young patients were identified (Figure 12).
- (4) 12 out of 153 or 8.5% were ICT positive;
- (5) 11 out of 250 or 4.4% said they did not swallow the drugs during MDA in 2008.
- (6) There is a higher burden of hydrocele (Figure 13).

**Figure 13: Age distribution of LF cases identified in Fiji, 2009**



**Figure 14: LF cases in Fiji by division identified during the survey, 2009**



The current survey found the prevalence of LF morbidity to be much lower, but the proportion of LF patients suffering from hydrocele to be much greater than the survey in 1990s. Both in Fiji and Vanuatu, it was found that males were more likely to be affected than females and that a large proportion of patients were above 45 years old. The proportion of hydrocele cases to the total cases was much greater in Fiji than in Vanuatu.

These findings are preliminary and more detailed analyses are being carried out. The current survey in Fiji and the survey in 1990s employed different methods to ascertain cases (i.e. active case finding in 2009 vs. examination of whole population in selected areas in 1990s) and were analysed differently. That the proportion of hydrocele cases among all identified patients was much greater in Fiji than in Vanuatu may suggest that hydrocele may have been under-reported in Vanuatu where cases were identified passively (e.g. self-report) during MDA.

**Figure 15: A patient with elephantiasis in Fiji**



**Figure 16: A patient with hydrocele and elephantiasis in Fiji**



### **Lessons learned**

The current survey in Fiji has highlighted several important issues to be addressed for LF morbidity control in the Pacific:

- (1) LF morbidity is a hidden but serious problem (e.g. compared with the number of HIV cases) – *it is not a disease of the past*.
- (2) Patients are not known and not taken care of by the health system.
- (3) Identifying patients must be done actively and it is a full-time job at least to establish the database.
- (4) There is a need for a surgical team to exclusively work on hydrocele treatment, which could address one-half of the existing morbidity due to LF.

Uncovering the hidden morbidity had a significant impact on LF awareness, contributing to improved MDA coverage achieved this year (2009) in Fiji. The current work in Fiji also suggested that morbidity control can be a cost-effective programme. Based on preliminary estimates (assuming US\$ 100 per person for case finding and US\$ 300 per hydrocele surgery), the cost for one patient from detection to treatment is approximately US\$ 400.

### **Next steps**

Activities planned for Fiji in 2010 are:

- (1) completion of the national database: Eastern division survey during the first quarter of 2010;
- (2) provision of individual care and treatment for elephantiasis and lymphoedema patients; and
- (3) a “hydrocelectomy team” consisting of a retired surgeon, an anaesthetist from a private practice, and a nurse aid, established to work exclusively on hydrocelectomy, and visit health facilities around the country starting November 2009.

In 2010, plans for morbidity control in the South Pacific are:

- (1) Complete the patient database in Fiji (Eastern division).
- (2) Develop similar electronic data bases in Kiribati, Tuvalu and Vanuatu.
- (3) Continue surgical treatment of cases in Fiji and do the same in the three countries.
- (4) Start working on morbidity control in Papua New Guinea.

Dr Corrine Capuano concluded the presentation emphasizing the impact of uncovering the hidden burden of LF morbidity on resource mobilization in addition to social mobilization. In Fiji, some patients volunteered to appear on TV or health promotion materials to help raise awareness, which in turn helped the programme to obtain a stronger political commitment from the Ministry of Health. Both increased social awareness and political commitment were essential for achieving high MDA coverage in Fiji.

### **Questions and comments**

CP: Thank you very much for the presentation. The findings from Fiji are not surprising to me as Fiji has been known for many years as one of the countries with the highest disease burden. For



example, *Elephantiasis and filariasis in Fiji* published in the early 1900s describes in detail the high burden of LF morbidity in Fiji. So, I am glad that a thorough survey has been done and cases are being identified. Please let us not assume that the disease is gone just because you do not see the patients in the streets or in a city. There are still people out there suffering from elephantiasis, hydrocele, or acute episodes. Regarding hydrocele surgery, it is a relatively simple low-cost procedure that normally does not require high-profile surgeons. In Fiji, where there is a good medical school, hydrocele treatment is neither too difficult nor too costly to implement. Considering the burden of the disease, US\$ 400 per patient is not a huge cost.

JE: I would like to highlight the role of PLF in funding. We need to tap onto what leprosy programmes have. Morbidity control in leprosy and LF can go hand in hand and there are many foundations supporting leprosy morbidity control, including the Damien Foundation. Some may be interested in supporting LF morbidity control. This will be particularly important for Papua New Guinea to look into. Regarding hydrocele surgery, I think the cost is still high and it is not an easy procedure. It requires certain skills and there could be complications to be dealt with. There is work to be done to ensure the quality of the service and we may need to look at what other countries are doing, e.g. India.

CC: The idea of having a team exclusively working on hydrocele in Fiji was to get it started and have a good set-up for the future. It was also the Ministry of Health's idea to first train people centrally, who will train people locally. The Team will go around each division and provide treatment to patients. At the same time, it will train physicians at the divisional level and at divisional hospitals.

WM: I would like to comment on a lack of chronic pathology in Papua New Guinea. It is in fact a lack of perceived pathology. We recently conducted sentinel site survey in the southern coast of Papua New Guinea. In one village of about 600 residents, we identified nearly 30 patients with chronic morbidity. But we know from our previous work that there are a lot more cases in that village. Those who did not report are simply ashamed of their condition. They are stigmatized and terrified of the disease. Active detection is definitely necessary as patients will not come to you.

LAT: While the issue of morbidity has been discussed by many for a long time, it is still neglected. Community-based health education will play a very important role when creating a morbidity control programme. Once educated, the community, the patients' family members, or the patients themselves can take care of the patients and this approach will not be so costly. A less detailed preliminary list of patients (before the final comprehensive list is ready) may be sufficient to get enough attention from the Ministry in terms of obtaining funds to start up the programme.

CC: Identification of the patients must be done actively. Otherwise, the patients will not show up. I would also like to point out the role of the morbidity control officer. While it was not initially planned, having a male nurse was a key. He is very convincing and has a way to approach people and communicate with them very well. The support of Fiji Ministry of Health was also essential for the success of this survey.

#### Country reports and panel discussion/recommendations

Countries reported activities planned and implemented since the 2007 meeting and presented current plans for the coming year. Dr Corrine Capuano gave the updates for the countries not represented by a participant, except French Polynesia that was presented by Dr Herve Bossin on behalf of the programme manager.

## 2.10 Countries implementing or requiring MDA

### 2.10.1 FIJI

Mr Ravinesh Kumar Chetty

National Filariasis Programme Coordinator, Fiji Centre for Communicable Disease Control, Fiji Ministry of Health

Country background

<b>POPULATION AT RISK OF LF</b>	837 271 (2007 Census)
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Five
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2002, 2003, 2004, 2005, 2006
<b>SURVEYS</b>	“Baseline” : 2001-2002 survey Post-MDA: 2007 filariasis C survey, post-fifth MDA

**Table 9: MDA coverage at the national level, 2002-2009**

<b>YEAR</b>	<b>REPORTED COVERAGE %</b>
2002	70.5
2003	62.4
2004	69.2
2005	70.16
2006	60.00
2007	-
2008	58.12
2009	88.97



**Table 10: Results of surveys conducted since 2001**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS % Mf POSITIVE
2001	convenience	5983	16.6	not available
2002	convenience	3214	14.1	6.3
2003	-	-	-	-
2004	convenience	667	22.8	5.4
2005	-	-	-	-
2006	-	-	-	-
2007	random	6783	9.5	1.4
2008	-	-	-	-
2009	-	-	-	-

Activities implemented between 2008 and 2009

- (1) review of C survey
- (2) two additional rounds of MDA (2008 and 2009)
- (3) vector control – monthly larval survey
- (4) social mobilization based on COMBI Plan
- (5) morbidity assessment and control

In 2008, a group of international LF experts visited Fiji to review the results of the C survey as well as to provide recommendations on the future programme activities. Following the visit, the Ministry of Health decided to carry out the sixth round of nationwide MDA. A WHO expert on COMBI also visited the country and after a tour of all divisions developed a COMBI Plan for Fiji. The COMBI Plan has been partially implemented since 2008, largely due to lack of funding. The assessment of morbidity in Fiji started in early 2009 and has been completed in Central, Western, and Northern Divisions. The findings of the morbidity survey helped to gain a stronger commitment from the Ministry of Health and were also incorporated in the awareness campaign for the seventh round of MDA in 2009 (e.g. images of LF patients on mass media). The time-frame of the seventh MDA was two weeks, much shorter than any of the previous rounds. The vector control unit (independent of the LF programme) was in charge of mosquito control activities in Fiji and has been conducting monthly larval surveys largely as part of dengue control.

#### **Lessons learned since 2007**

- (1) Intense social mobilization played a major role in achieving high MDA coverage.
- (2) Support from senior management and political level play pivotal roles.
- (3) A shorter period of MDA was more effective for achieving higher coverage.
- (4) The appointment of a full-time national LF coordinator improved the coordination of the programme.
- (5) Increased funds enabled the programme to deliver more.

#### **Current plans for 2010-2011**

The national programme has prepared an activity plan for 2010-2011 for each of the four divisions:

- (1) Eastern Division – implement “test and treat” strategy on all islands starting in February 2010.
- (2) Western Division – stop MDA and move onto active surveillance (i.e. management of morbidity cases and CTS survey).
- (3) Northern Division – conduct second C survey to determine the prevalence of LF. Future activities will be determined based on the survey results.
- (4) Central Division – another round of MDA was made due to very low coverage in 2008.

## 2.10.2 KIRIBATI

Mrs Teiti Bwenawa  
Filariasis Programme Manager, Ministry of Health and Medical Services, Kiribati

Country background

<b>POPULATION AT RISK OF LF</b>	Over 53 000
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Culex quiquefasiatus</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Five
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2001, 2002, 2003, 2004, 2005
<b>SURVEYS</b>	“Baseline” : 1999- 2001 survey Post MDA : Post-fourth MDA survey in Christmas Island Post-fifth MDA survey from 2007 to 2008

**Table 11: MDA coverage, 2001-2005**

<b>YEAR</b>	<b>REPORTED COVERAGE %</b>
2001	60
2002	46
2003	49
2004	69
2005	86

**Table 12: Results of surveys conducted since 2001**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS % Mf POSITIVE
2001 <sup>a</sup>	convenience	400	6.75	0
2002	-	-	-	-
2003	-	-	-	-
2004 <sup>b</sup>	convenience	1472	0.8	0
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008 <sup>c</sup>	random	3111	1.4	0
2009	-	-	-	-

Note: a. "Baseline" conducted in 1999-2001: 1.7% in Gilbert group, 6.75% in Christmas Island

b. Post-fourth MDA survey in Christmas Island

c. Post-fifth MDA survey: 1.5% in Line and Phoenix (2007), 0.1% in Gilbert Islands, excluding South Tarawa (2007), and 2.2% in South Tarawa (2008)

### **Activities implemented between 2008 and 2009**

- (1) C survey completed in 2008 (South Tarawa and Maiana);
- (2) LLIN distribution (2008);
- (3) morbidity management, including supply distribution, treatment, and monthly home visits (2008 and 2009);
- (4) deworming (2009):
  - a. integrated with Supplementary Immunisation Activity
  - b. awareness training for teachers; and
- (5) MDA in South Tarawa (2009)
  - a. refresher training on MDA for public health nurses and nurse aides.

### **Issues encountered**

The C survey, started in 2007, was finally completed in 2008 when it was implemented in South Tarawa and Maiana. The delay was largely due to the limited availability of transport and delays in receiving warrant from the Finance Office. The MDA in South Tarawa and "test and treat" activities in Line Islands are all deferred until end of this year (2009) due to financial problems. In addition, programme activities duplicated by different organizations added another barrier to implementing LF programme activities more efficiently. Many workshops were held during MDA for the public health nurses involved in MDA, which made it difficult for the nurses to spend more time for drug distribution.

### **Current plans for 2010-2011**

- (1) Follow up ICT positives identified during the C survey (i.e. treat and test).
- (2) Conduct the second targeted MDA in South Tarawa, including Betio in October.
- (3) Continue morbidity management, including monthly visits.
- (4) Conduct a stool survey in selected schools.
- (5) Conduct deworming of SAC in April and October 2011.
- (6) Follow up, treat, and test those who remain ICT positive.

- (7) Continue twice yearly deworming and morbidity management.

### 2.10.3 FRENCH POLYNESIA

Presented by Dr Hervé Bossin  
Research Scientist, Head of Medical Entomology Laboratory  
Institut Louis Malardé

Country background

<b>POPULATION AT RISK OF LF</b>	260 000
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Eight
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007
<b>SURVEYS</b>	“Baseline”: A type survey – sentinel sites (three endemic islands) Post-MDA: B type survey – sentinel sites

**Table 13: MDA coverage 2000-2007**

<b>YEAR</b>	<b>REPORTED COVERAGE (%)</b>
2000	89
2001	80
2002	78
2003	73
2004	76
2005	85
2006	77
2007	81
2008	-
2009	-

**Table 14: Results of surveys conducted since 1999**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS % Mf POSITIVE
1999	population (Maupiti)	999	2.4	0.4
2000	population (Tevaitoa)	1128	11.7	7.2
	population (Tahuata)	587	17.7	8.9
2002	population (Maupiti)	1069	3.9	0.6
2003	population (Tevaitoa)	1176	13.8	6.4
	population (Tahuata)	633	16.9	5.8
2005	population (Maupiti)	934	5.4	0.1
2006	population (Tevaitoa)	1237	8.0	4.4
	population (Tahuata)	597	9.3	4.4
2007	population > three years old (Afareaitu)*	1018	11.8	2.7
2008	C survey	1179	10.7	> 1.1

\*The survey conducted in 2007 in Afareaitu was part of a Gates Foundation supported multi-center study on LF diagnostics. The results of the nationwide C survey in 2008 will be published in an international scientific journal. Activities implemented between 2008 and 2009

## 2008

- (1) C survey completed (June to October)
- (2) treatment of ICT-positive patients (DEC and ALB one dose every four months)
- (3) consultation with the WHO (November)
  - a. plan of action drafted

## 2009

### First semester

- (1) LF elimination plan of action from 2009 to 2013 finalized
- (2) political endorsement obtained for LF
- (3) training on COMBI concept and methods provided by WHO
- (4) analysis and communication of the C survey results (international publication in-press)
- (5) DEC and ALB stock available

### Second semester

- (1) No action for LF due to dengue and H1N1 outbreaks

## Lessons learned since 2007

Despite eight rounds of MDA since 2000, Ag prevalence remains high across all the archipelagoes. It suggests that MDA coverage needs improvement in some areas and that reaching elimination will require more time than initially expected. In one sentinel site, elimination was not achieved in spite of effective treatment coverage (> 85%). To better

understand the situation, the following questions need to be further studied: (1) heterogeneity of compliance among population; (2) drug efficacy; and (3) role of the vector in French Polynesia. While LF remains a public health problem, it has been challenging for the programme to secure a sustained political commitment.

### **Current plans for late 2009-2011**

French Polynesia currently plans to conduct three more rounds of MDA starting in 2010. These rounds will be “reinforced” with COMBI, DOT, and “test and treat” components to ensure higher coverage. Evaluations are planned before and after the three rounds. Later this year (2009), the national elimination LF plan will be revised to reflect the GPELF and the current availability of resources. A national LF coordinator will be also identified and appointed. Detailed plans for 2010 and 2011 are:

#### **2010**

- (1) spot evaluation before MDA (sentinel sites and spot checks);
- (2) staff training;
- (3) implementation of the first round of new MDA (planned in April 2010); and
- (4) post-MDA evaluation (sentinel sites and spot checks).

#### **2011**

- (1) second round of MDA

### **Questions and comments**

CP: I have questions for each of the three countries that just presented. For Fiji, could you clarify the geographical coverage of MDA between 2008 and 2009? Are you currently planning or implementing morbidity control? In Kiribati, surveys in 2001, 2006, and 2008 had all Ag prevalence above 1% while Mf prevalence was zero. According to the current WHO guideline book, does this mean that Kiribati is not required or is required to conduct more MDAs? Dr Kapa Ramaiah can probably answer this question. According to the presentation, French Polynesia will be doing three more rounds of MDA starting in 2010. The country still sees persistent high Ag prevalence and has experienced low coverage in some MDAs. Is this correct?

RC: Both 2008 and 2009 (sixth and seventh) MDAs targeted the entire population of Fiji. Unlike previous rounds of MDA, these two rounds were implemented in a more divisionalized manner, meaning each division was responsible for achieving above 80% coverage. One factor contributing to the low coverage in 2008 was the human papillomavirus programme, which was competing with MDA. With regard to morbidity management, it was started only this year (2009). There was a need to first identify existing cases and assess what types of morbidity existed in the country. We hope to incorporate morbidity management in LF staff training. In the past, the primary focus of training was MDA and little emphasis was placed on learning about morbidity. No Mf or ICT surveys were conducted since 2007.

KR: (answering the question raised for Kiribati) We cannot change the global strategy based on what happened in one country. We need to examine situations like Kiribati and French Polynesia more carefully. In particular, for French Polynesia, we need to look at the data more critically to answer why Ag is persistently high while Mf is now relatively low.

CP: We may need a clearer answer. Programme managers, for example from Kitibati need advice.

KR: We will need to sit and discuss. LF is complex in South Pacific countries, which are also notorious for having persistently high Ag. We may need alternative or additional strategies to interrupt transmission. For example, French Polynesia, having completed eight rounds since 2000, will need something apart from MDA.

CC: Regarding Kiribati, the first two surveys in 2001 and 2004 used convenience sampling while the C survey from 2007 to 2008 was done using random sampling. So the results of the three surveys are not comparable. The C survey, the only survey that properly followed the sampling guideline, is the one we should use to develop a strategy.

EP: Are there any specific comments and recommendations for individual countries? That would be more helpful for countries for tomorrow's session where countries are to revise plans for the coming years presented today. Let me ask whether there are country-specific questions or comments starting from Fiji.

JE: I have several questions for Fiji. You mentioned about monthly larval surveys. What intervention or controls are you currently implementing based on the results of these surveys? Second, this question relates to all three countries, you only mentioned registered and reported coverage. Do you see any issue with compliance? How do you ensure that an adequate level of compliance has been maintained? Third, for Fiji, have you been able to estimate a budget for setting up the morbidity component? Since you now have a good idea of the extent of morbidity as well as types of morbidity, you may have a more accurate estimate of the budget, which includes other key actions such as training for hydrocele surgery.

RC: These larval surveys are carried out by the vector control unit as part of dengue control. They are not specifically targeting LF. We intend to ask the vector unit to conduct surveys in communities where chronic LF patients are to determine what species are abundant. This would be important because effective control methods are different depending on the species. We are also planning to pilot biological control of *Aedes polynesiensis* breeding in crab holes. We are still trying to bring in the vector unit and work together on LF control. Regarding compliance, in addition to registered and reported coverage, we have requested for the Fiji School of Medicine to carry out a coverage survey, which should take place within the next few weeks. This survey is to assess the coverage of MDA conducted earlier this year (2009), including the proportion of individuals who received tablets in a DOT manner and how figures from the survey differ from reported or registered coverage. It is very difficult to ensure DOT and hopefully this will give us some idea about how well it was implemented. On the budget for morbidity control, once we receive allocation for 2010, we will decide how much to spend for each component. As of today, we have no budget for morbidity control. For hydrocele treatment, we have received funding from WHO.

CP: I would like to hear directly from you what your immediate thoughts or concerns on the 2010-2011 plan of action are. Second, in the context of integrating with other NTDs, what is your direction? We do not want LF to remain as a vertical programme and you will be more and more involved with other programmes such as deworming. This will be important in terms of finding ways to fund your programme.

CC: I just want to clarify. We are asking the audience or panel to make specific points, comments, or questions for individual countries. Tomorrow, the countries will individually work to revise the plan and develop a plan all the way to elimination. These points and comments will be incorporated in the plan.



RC: Regarding integration with other NTDs, Fiji started this year a micronutrient supplementation programme with deworming targeting primary and secondary school children, children from six months to five-year-old attending MCH clinics, and women of childbearing age. Only primary school children were targeted by deworming this year. Starting next year, the programme will be incorporated with LF.

KR: For Fiji, you have developed an action plan for each division and you are focusing a lot more on vector control and morbidity control. How do you think this shift in the direction will affect MDA? While many countries are reporting high coverage, we still have many countries with relatively high Ag and Mf prevalences. We need, for the whole Region of South Pacific, a quality control method to ensure high true MDA treatment coverage. For example, how accurate is reported coverage (i.e. what is the margin of error in reported coverage?) We also need quality control on ICT for the Region.

CC: In Fiji, there seems to be quite a big improvement in coverage this year and the coverage survey, which will be carried out by Fiji School of Medicine, will confirm whether the reported coverage is reliable. If near 90%, as reported, was confirmed, Fiji should use the strategy employed this year for future rounds of MDA. It really helps to have someone, like a full-time coordinator, responsible for and engaged almost solely in an LF programme. That is also my recommendation.

JE: I think this reveals to us a need for disaggregated data down to the IUs, which would allow us to find a gap. Many LF programmes have started asynchronously. You may have started out with two out of 10 IUs, or you may have started with the 10 units but at different levels of treatment coverage. When you start asynchronously, you will not achieve “five rounds of MDA” in every single unit all at once. This is also the case when you have gaps in the programme, for example, the issue of low compliance in certain areas. So we need to be clear what we count as one MDA. There has to be a schematic presentation illustrating MDA progress for each of all IUs in terms of where, when, and what level of coverage was achieved. That would help you find a gap in the programme, which is very important, particularly in countries like Papua New Guinea or the Philippines. These two countries are big and did not start MDA synchronously and have yet to improve geographical coverage. Such tools are also helpful when deciding to stop MDA, or when deciding to scale up. This is particularly critical for Papua New Guinea as the country is still more or less at the beginning of the programme. We need to work together to determine how many IUs you are willing to take on, based on the budget and human resources and how to upscale. When you cannot start MDA in all IUs, if you do not have high coverage from Day 1, you may end up to do MDA even ten or twelve years.

KR: Each IU has to have completed five rounds if one says that five rounds were completed at a national level. When you have high registered coverage but very low reported coverage, it is difficult to say whether the round counts as one MDA.

JE: We will work with you for the next couple of days to prepare the schematic plan. Especially for Papua New Guinea, this would be a realistic approach to develop a plan based on what is feasible with the currently available resources. It seems that other countries are mostly finished with MDA and moving onto establishing surveillance. Results of surveys will tell you how good your programme was but ultimately what we need to find out is where the gaps are, which can be deduced from looking at coverage at an IU level.

CA: What about the “test and treat” strategy? When do we stop regular MDA and move to target treatment like “test and treat”? Also, I am interested in knowing whether microfilaria could possibly develop drug resistance after so many rounds of MDA.



JE: Finding gaps means finding out whether you are treating everybody before asking about resistance. This was the case for Samoa, American Samoa, and Fiji. First, we need to know whether there was a quality control mechanism, as Dr Kapa Ramaiah mentioned earlier, to ensure that the adequate level of coverage was achieved and maintained. In French Polynesia, as I understand, MDA has been irregular. The availability of drugs in certain areas was sporadic and some hard-to-reach areas such as outer islands were not sufficiently covered during various rounds of MDA. This is an example of an asynchronous programme. Once you know that both treatment and geographical coverages are adequate and you complete sufficient rounds, you are done. In French Polynesia and other countries like Samoa, it seems that true geographical coverage and treatment coverage have not been as good as they were reported. When looking only at the aggregated data, like the ones presented, it is difficult to see the gaps present at an IU level. For countries like Cook Islands where MDA coverage has been good and low prevalence has been shown, you are moving onto surveillance. Surveillance needs to be maintained to monitor the movement of people, especially when you have people moving in from places with active transmissions. There has been a history of reintroduction in other regions. However, other than surveillance, you are done.

CC: To answer the question about when to stop MDA, most countries in the Pacific Region gradually stop MDA. We first carry out national MDA. When below 1% Ag prevalence is achieved at a national level, we carry out targeted MDA in areas with above 1% Ag prevalence and implement surveillance. As presented earlier, we have three classifications: (1) implementing or requiring MDA; (2) implementing or requiring target MDA, and (3) implementing surveillance in the Pacific Region before achieving non-endemic or post-endemic status. Countries do not suddenly stop national MDA and move straight to surveillance. There are steps needed to be taken in between.

LK: There seems to be some confusion among countries about the definition of MDA. Can we call MDA as MDA when it achieved only 60% coverage or only when it achieved above certain coverage? Is it also defined at a national level or IU level?

KR: MDA is MDA regardless of coverage, but it is considered effective when treatment coverage is 80% (of MDA eligible population). We need to ensure that the effective coverage is maintained in a number of rounds to reduce LF prevalence.

#### 2.10.4 SAMOA

Ms Miriama Puletua  
Filariasis Programme Manager, Ministry of Health

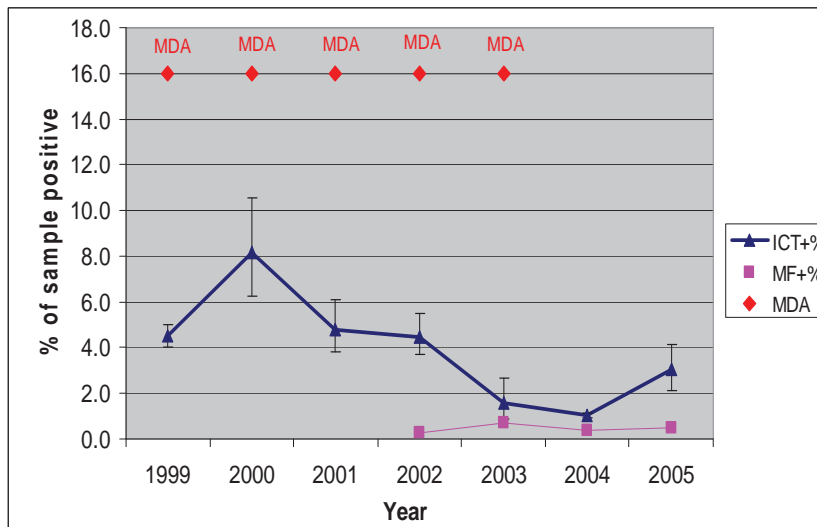
Country background

<b>POPULATION AT RISK OF LF</b>	186 649
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS FROM 1999 TO 2007</b>	Six
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	1999, 2000, 2001, 2002, 2003, 2006
<b>SURVEYS</b>	“Baseline”: 1999 Post-MDA : 2004: Post-fifth MDA C survey 2005: Sentinel site survey 2007: Post-sixth MDA C Survey 2008: Coverage Survey

**Table 15: MDA coverage since 1999**

<b>YEAR</b>	<b>REPORTED COVERAGE %</b>
1999	-
2000	-
2001	-
2002	-
2003	-
2004	-
2005	-
2006	-
2007	-
2008	-
2009	-

**Figure 17: Change in Ag and Mf prevalences in Samoa, 1999-2005**



**Table 17: Results of surveys conducted since 1999**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS % Mf POSITIVE
1999	convenience		4.5	
2000	-			
2001	-			
2002	-			
2003	-			
2004	stratified cluster		1.1	
2005	sentinel site/convenience		3.0	
2006	-			
2007	stratified cluster		1.1	
2008	-			

### Activities implemented in 2008 and 2009

#### 2008

- (1) national MDA
  - a. DOT
  - b. follow-up of people missed during MDA
- (2) coverage survey by WHO (e.g. cluster design, surveyed coverage, 89.2%)
- (3) post-MDA surveillance - awareness programme through TV and radio

#### 2009

- (1) training workshops for the female representatives from Upolu and Savaii on "Preventive Measures for Filariasis"
- (2) community workshops (4) to communicate results on MDA and coverage

### **Current plans for 2010-2011**

- (1) national MDA in January 2010
  - a. survey to validate coverage within two months
- (2) C survey using 2007 method
- (3) based on survey results: MDA targeting non-compliant groups

Another round of MDA was originally planned in 2009 and was postponed until 2010.

### **Comments and questions for countries implementing or requiring MDA**

CC: I would like to comment on Samoa and Fiji. These two countries were able to achieve high coverage after implementing the recommendations made since 2007 for MDA. In particular, having a shorter time-frame for MDA and encouraging DOT were two key factors that contributed to improving coverage. Samoa has surveyed coverage and Fiji is surveying coverage. The principles that I summarized this morning work at a country level and in implementing MDA in the future, we need to stick to these principles.

FM: The issue of compliance was discussed at the MDA committee meeting in Samoa. One of the medical officers questioned whether the efficacy of DEC should be tested prior to the next MDA because there have been so many rounds of MDA in the country. Regarding American Samoa, the country is more responsive to Centers for Disease Control and Prevention (CDC) as CDC has funded many of the activities relating to LF and it has been difficult for the WHO Office to obtain up-to-date information. As far as I know, it started MDA using 100mg (per tablet) DEC for the first time, instead of 50mg DEC. According to the Director of Nursing, DEC dose does not seem to influence compliance. The issue stems from the difficulty in reaching hard-to-access people. In addition, MDA was stopped after the tsunami in September 2009 as well as influenza A (H1N1) and has become a low priority in American Samoa this year (2009).

PL: To clarify Ms Fuatai Maiava's comment, CDC has not funded the programme in American Samoa for several years. However, I would like to use this opportunity to point out that one reason why the programme in American Samoa has been more successful is that we made earlier in the programme an effort to adopt the strategy. The key for achieving higher coverage was drug distribution at churches and we saw a dramatic and rapid decline of ICT prevalence during a period of three years. We are planning to carry out stopping MDA type surveys in spring. In addition, we plan to work with CDC personnel stationed in Samoa to look at individuals who repeatedly missed MDA, in particular, those who were excluded from MDA for medical reasons. We would like to have something systematic set-up within the health system or at hospitals to follow-up this population and involve local health care workers. We are hopeful that CDC's budget will improve during the current administration and that we will be able to work with American Samoa.

FM: One important difference between American Samoa and Samoa is who is in-charge of MDA. In American Samoa, the programme is under nurses while it is under public health in Samoa. In American Samoa, only licensed and registered nurses are allowed to distribute tablets and they are required to observe treatment whereas in Samoa anyone, including women from communities, can give out tablets. The legal requirement in American Samoa has worked as an advantage for the programme.

MA: I think that the issue of DEC efficacy, raised by the Samoan doctor, needs to be looked at seriously. Samoa has been reporting high coverage and we expect much lower prevalence.

PL: Similar issues have been raised for ivermectin but it has almost always turned out to be an issue of compliance. In the Pacific Region, DEC is mostly provided by WHO and quality products are distributed. We have given DEC to individuals who were identified as Mf positive in a community where the issue was raised and we saw complete Mf clearance. So, it is not a quality or resistance issue. It is a compliance issue. We need to communicate with programme people that it is not the drug but a compliance issue.

MA: But Samoa reported almost 90% coverage.

JE: These are “reported” coverage’s. Drugs are distributed but there are many who do not actually take tablets. It is an issue around the world as Dr Kapa Ramaiah pointed out earlier.

WM: We see in Samoa that those ICT positives are clustered. Almost always we find non-compliant males in the middle of those clusters. We need to find a way to make extremely certain that those males take tablets.

CC: Regarding MDA coverage, what Samoa reported on the presentation was “registered” coverage. It is estimated by dividing the number of people who received tablets by the number of people registered during MDA. People registered during MDA, the denominator of registered coverage, includes those whose households were visited but were absent. The denominator of reported coverage should be actual population, which is larger than registered population. Registered coverage thus gives you a false impression of high coverage. In the past, we adjusted reported coverage using SPC population estimates but there were some issues with overestimating population. It is also equally important to do a coverage survey, such as the ones done in Fiji and Samoa to validate reported coverage.

JE: The correct denominator of reported coverage should be population at risk provided that you have solved the compliance issue. I cannot overemphasize what Dr Patrick Lammie pointed out about compliance and it is important first to rule out whether a compliance issue exists. Nevertheless, we have cases like French Polynesia where prevalence remains relatively high in areas with reportedly high coverage. In this particular case, if compliance is not really an issue, we need to think about alternative strategies, for example, use of higher dose or twice a year MDA. But, first, we need to look at compliance.

CA: When PacELF started there were only three statuses: endemic, partially endemic, and non-endemic. How does the new classification presented by Dr Corrine Capuano relate to the former classification?

CC: The programme started with the three groups. Last year, we came up with a new classification and regrouped the countries accordingly to better reflect the current situation in the Pacific Region. PacCARE, a Regional Review Group, will be meeting on Friday and we will review the current epidemiological status of each country.

## 2.11 Countries implementing or requiring targeted MDA

### 2.11.1 FEDERATED STATES OF MICRONESIA

Mr Moses Pretrick

National Environmental Health Coordinator, Federated States of Micronesia National Government, Department of Health and Social Affairs

Country background

<b>POPULATION AT RISK OF LF</b>	108 631
<b>INITIAL STATUS</b>	Partially endemic (Yap State)
<b>MAIN VECTORS</b>	<i>Culex annulirostris</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Four (Yap State)*
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2003, 2004, 2006, 2007
<b>SURVEYS</b>	2008 (Yap outer islands) 2008-2009 (stratified cluster survey of Yap Proper)

\*According to existing records, target MDA was carried out only in Yap in 2003, 2004, 2006, and 2007. No coverage data was reported.

**Table 17: Results of surveys conducted in Yap State**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS % Mf POSITIVE
2004	Population (teens to mid-1980s)	256	34.4	18.7
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	Population (outer islands, two years and up)	3099	0.03	-
2009	Randomized (Yap Proper)	720	0	-

Activities implemented between 2008 and 2009

- (1) national focal point for LF appointed and officially communicated to WHO in June 2009;
- (2) State Directors of Health requested to designate state focal points for LF in April 2009; and
- (3) surveys for outer islands and Yap Proper in Yap State completed.

As state focal points are yet to be appointed, data and activities on LF to date are limited mostly to the Yap State. A survey conducted in 2008 covered the outer islands of Yap. Among 3099 persons (ages two and above) screened, 16 tested positive on the first ICT and only one tested positive on the second ICT. This person was Mf negative and was given treatment on-the-spot. It

is not known to date whether the person was followed up or remains ICT positive. A stratified cluster survey was conducted in Yap Proper in 2009. Five among 720 individuals (ages two and above) tested were positive on the first ICT but none tested positive on the second ICT. Issues encountered since 2007.

While State Directors of Health were requested, state focal points for LF have not been selected. In 2009, public health resources were shifted to supporting pandemic influenza activities and surveys in the other three states (Chuuk, Kosrae, and Pohnpei) have not been implemented. The proposed surveys in the three states have been modified to accommodate available resources and logistical issues:

- Kosrae (consists of one island) – a prevalence survey for the entire island;
- Pohnpei – a prevalence survey for the outer islands and a stratified cluster survey for the main island of Pohnpei; and
- Chuuk – a survey of all high schools.

### **Current plans for 2010 and 2011**

#### **2010**

- (1) Conduct prevalence surveys in Chuuk, Kosrae, and Pohnpei to confirm true LF status.
- (2) Implement mixed MDA in the three states according to survey results.
- (3) Carry out CTS in Yap.

#### **2011**

- (1) mixed MDA in the three states

### **2.11.2 PALAU**

Ms Johana Hana Ngiruchelbad  
Administrator for the Communicable Disease Unit, Ministry of Health, Palau

#### Country background

<b>POPULATION AT RISK OF LF</b>	20 000
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Culex quiquefasiatus</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Zero
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	Test and Treat completed in 2001, 2002, 2003, 2004, 2005, 2006, 2007
<b>SURVEYS</b>	“Baseline”: 2001 13 ICT positives (n = 500)

### **Activities implemented to date**

The “baseline” survey in 2001 tested 500 individuals and found 13 ICT positive individuals who were all linked to one village. Eleven among the 13 cases have completed yearly treatment for six

years. One has passed away while another person has moved out of the country. Besides the treatment of the 11 individuals (completed in 2008) and the baseline survey, there has been no activity for LF in recent years. While the disease is considered by many in Palau as the disease of the past, a recent finding on leprosy suggests that there may be hidden cases still exist for LF.

### **Lessons learned**

The programme in Palau will require strong leadership to ensure LF is not forgotten and will need to consider integration with other forgotten diseases, such as leprosy, to save resources. Partnerships with communities are also essential in implementing activities. LF patients, if identified, can also help raise awareness (e.g. pictures).

### **Current plans for 2010 and 2011**

There is currently no plan for 2010 and 2011. The plan will be developed by the end of this meeting.

### **2.11.3 TUVALU**

Presentation prepared by Dr Nese Conway, Chief of Public Health Division, Tuvalu  
Presented by Dr Capuano

Country background

<b>POPULATION AT RISK OF LF</b>	~10 000
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Five
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2001, 2002, 2003, 2004, 2005
<b>SURVEYS</b>	1999, 2002, 2003: SS (convenience) ICT only 2004: Whole country (mass screening) ICT only 2005: Follow-up of positives from 2004, Mf testing only 2007: Whole country (mass screening) ICT and Mf

**Table 18: MDA coverage, 2001-2005**

<b>YEAR</b>	<b>REPORTED COVERAGE</b>
2001	81.16 (67.49)
2002	46.72
2003	82.59
2004	83.67
2005	76.79



The survey conducted in 2004 was unable to test the whole population. Starting in 2007, the country began conducting mass screening using ICT test. ICT positive persons are being treated quarterly for one year. Those who were not tested are also to receive the quarterly treatment for one year. Those who completed one year of treatment will be tested with ICT. If positive, the person will be treated quarterly for another year. Data entry and analysis are currently in progress. According to preliminary results, Mf prevalence is below 1% (~0.9%) while Ag prevalence is about 3.4%.

#### **Activities implemented in 2008 and 2009**

- (1) data entry and analysis of the mass screening and treatment (ongoing);
- (2) follow-up ICT/MF tests and treatment (ongoing);
- (3) radio programmes on current LF activities (twice a year);
- (4) mass treatment of school children with mebendazole (ongoing);
- (5) screening of returning residents (ongoing); and
- (6) training of nurses on LF records, test and treatment of positives – conducted in July and November 2009.

#### **Lessons learned since 2007**

- (1) delay in entering data, treating the positives – lack of human resources due to one person engaged in many different activities;
- (2) delay in data entering and analysis – incomplete data from survey booklets;
  - a. need for teaching staff involved in survey the importance of using booklets to enter data manually, then enter into a computer database
- (3) delay in treating the positives – lack of support from health personnel in outer islands; and
  - a. need for encouragement and strengthening of health personnel, stressing deadline
- (4) more radio and educational programmes – focus on schools, communities.

#### **Current plans for 2010- 2011**

- (1) continue the follow-up and treatment of positives and test those who completed fourth treatment
- (2) CTS or D Survey
  - a. ICT tests and antibody tests?
  - b. Contact-tracing of households living near positive cases

*Marshall Islands, Wallis and Futuna, and New Caledonia did not send presentations. Dr Corrine Capuano gave a brief presentation for each of the three countries to update the audience.*

#### 2.11.4 MARSHALL ISLANDS

Country background

<b>POPULATION AT RISK OF LF</b>	1008
<b>INITIAL STATUS</b>	Partially endemic
<b>MAIN VECTORS</b>	<i>Culex quinquefasciatus</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Five (only in two islands)
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2002, 2003, 2004, 2005, 2006
<b>SURVEYS PRIOR TO 2007</b>	2001, 2002, 2003, 2004, 2005, 2006: Spot-check (convenience) ICT only

Table 19: MDA coverage in Ailuk and Mejit, 2002-2006

<b>YEAR</b>	<b>REPORTED COVERAGE %</b>	<b>CORRECTED COVERAGE* %</b>
2002	68.90	66.83
2003	68.10	65.02
2004	57.44	53.45
2005		65.98
2006		59.74

\*Corrected using SPC population estimates

In Marshall Islands, MDA was carried out between 2002 and 2006 on two islands – Ailuk and Mejit – where ICT positives were found in the past. In 2007, a STC reviewed LF situation in Marshall Islands and developed a survey protocol utilizing cluster sampling to assess current prevalence. In 2008 and 2009, two sets of 750 persons were tested across the islands, except for the islands of Ailuk and Mejit where entire population was tested. The final results of the survey are not yet available. So far, no ICT positives have been reported.

#### 2.11.5 NEW CALEDONIA

Country background

<b>POPULATION AT RISK OF LF</b>	12 378
<b>INITIAL STATUS</b>	Partially endemic
<b>MAIN VECTORS</b>	<i>Aedes vigilax</i>
<b>NUMBER OF MDA ROUNDS FROM 2000 TO 2007</b>	Zero
<b>SURVEYS</b>	2002: Spot check (convenience), ICT only 2005: Spot check (convenience) ICT only

There has been no intervention implemented in New Caledonia. The results of the 2002 (2.0 % positive) and 2005 (< 0.5% positive) surveys are not comparable as the surveys covered different

geographical areas and employed convenience sampling. The LF situation is largely unknown in New Caledonia, although it is not considered as a public health issue.

## 2.11.6 WALLIS AND FUTUNA

Country background

<b>POPULATION AT RISK OF LF</b>	15,260 (2006 SPC est.)
<b>INITIAL STATUS</b>	Partially endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS FROM 2002 TO 2007</b>	Six
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2002, 2003, 2004, 2005, 2006, 2007
<b>SURVEYS PRIOR TO 2007</b>	2001: "Baseline" (convenience) ICT only 2005: Children five to 10 years, ICT only 2006: Whole country (convenience) ICT and Mf

Table 20: MDA coverage, 2002-2007

<b>YEAR</b>	<b>REPORTED COVERAGE %</b>	<b>CORRECTED COVERAGE % *</b>
2002	60.16	57.97
2003	65.31	61.91
2004	66.37	66.71
2005	59.96	56.16
2006	52.37	52.52
2007		55.62

\*Corrected using SPC population estimates

Wallis and Futuna has been consistently carrying out MDA for the last 30 years and may be the only place in the world to have done MDA for LF for such a long time. In its initial years, MDA was carried out by the military. Wallis and Futuna will not consider stopping MDA unless there is sufficient evidence of transmission interruption and is in need for a clear guidance on assessment methodology to ensure the absence of LF transmission. Some issues, which need to be considered when making recommendations, include relatively low MDA coverage and the primary vector *Aedes polynesiensis*. Options raised by the meeting participants were use of antibody test (Dr Wayne Melrose) and xenomonitoring.

## Comments and questions for countries implementing or requiring targeted MDA

### **Federated States of Micronesia**

JE: Why did MDA stop after four rounds in Yap?

MP: I do not know for sure if they have stopped MDA as I have not received any information from them. They may be still doing MDA. I would like to point out that Yap State has been doing a good job for LF control and that Yap represents only 11% of the whole population.

CP: What is it mixed MDA?

MP: I am not sure. It was one of the activities presented to me by my predecessor but without clear explanation.

CC: Federated States of Micronesia, consisting of four states, has a very complex situation. First, we really need to properly identify endemic areas. Yap has sorted it out but the three other states still require surveys to find out where they are. MDA can be implemented if it is required.

WM: We found very, very high prevalence on the Island of Satawal in Yap but low Mf load. We treated the population in the same day as testing and one year later. No Mf positives were found one year after the second treatment. My concern is Palau. I do not see any evidence of any structured survey that could reliably show the absence of transmission. In Yap, two LQAS surveys were conducted but missed out endemic islands, which were later accidentally found. There may still be transmission foci in Palau that we are not aware of.

CP: What about Marshall Islands? They used to have very high prevalence in some places but now zero?

CC: We do not have the final results from Marshall Islands and do not yet have a big picture.

JE: What about the three other states in Federated States of Micronesia? Do they have vectors?

WM: In Satawal, it did not seem LF existed in the past. People had not talked about having or seeing big legs, for example. We found some interesting cases of fever about 15 years ago, which turned out to be LF, probably introduced by mosquitos from other islands. In Chuuk State, I have not seen any cases.

### **Preliminary Recommendations for Day 1**

JE: I think each of us in the panel can now make preliminary recommendations so that countries can incorporate them into plans tomorrow during individual or group work. Would Professor Dato Ramachandran or Dr Kapa Ramaiah like to start first?

CP: Basically, countries requiring or implementing MDA, starting from Fiji, Samoa, American Samoa, Kiribati to French Polynesia did a really good job. Fiji has come up with a clear and new strategy both on morbidity and MDA and is on the right track. MDA this year (2009) has been completed with high coverage and morbidity control has been implemented as part of the national programme. Shorter MDA was certainly a key to this year's success. Other countries may want to follow this strategy in the future, although some countries may have implemented it already. There is now a full-time person for LF in Fiji. This has made a significant difference. We have discussed about registered, reported vs. true coverage this morning and I think we now have a good understanding. Having an expert from the Headquarters on social mobilization seems to have helped. I had been very concerned about Fiji as I was aware of the history and high LF burden. But I am glad that things are now on the right track for Fiji. I do not have any specific recommendations. Then, we turned to discuss about Kiribati where five rounds were completed prior to 2007. Post-MDA surveys in 2007 and 2008 showed ICT prevalence between 1.5% and 2.2 %. In 2009 and onwards, plans are to treat ICT positives and try to integrate with other NTDs, for example, a stool survey is currently being planned. I do not have specific recommendations. You are doing MDA in South Tarawa. Is this correct?

TB: Yes. It is being done in 2009.

CP: You have found ICT positives but no Mf positives. It would be a good idea to do a survey after MDA this year. I suggest Dr Corrine Capuano or Dr Kapa Ramaiah to make a recommendation. French Polynesia has carried out so many MDAs and is planning to do more MDAs to bring down the high Ag prevalence in October 2010. The coverage reported in the past, 85% plus, seems quite good. Hopefully, MDA in 2010 and 2011 would work out OK. For the Federated States of Micronesia, "test and treat" would be a good idea. No microfilaria positives have been found in Yap and surveys and "mixed" MDA are being planned in the other three states. I am not sure whether you will find new foci, but the main thing is to ensure to follow-up positives and treat them. Palau has done no MDA. Thirteen ICT positives were found in 2001 and were treated. The question is whether to do another survey. I think it is worthwhile to properly assess the absence of transmission. We did not have detailed results, for example, the number of ICT or Mf positives, of the recent survey conducted in Tuvalu. ICT positives have been treated. Marshall Islands did five rounds of MDA between 2002 and 2006 on two islands. Unfortunately, we do not have data from their recent survey yet. For Wallis and Futuna, we have discussed whether and how we can assess transmission interruption. The vector in this country is *Aedes polynesiensis*. Xenomonitoring is a possibility but will require experts. PCR is very powerful and sensitive enough to detect one infected larvae. Xenomonitoring can be used as part of LF programme as a surveillance and monitoring tool as shown by a group in India. We have the technology to do it, although it needs to be tuned up for *Aedes polynesiensis*. I do not have specific recommendations for each country but I would like to mention that countries are on the right track at the moment.

JE: I have a few comments. First, I strongly recommend that the total population should be used as the denominator for calculating treatment coverage. For most countries in the Pacific Region implementing or requiring MDA, population at risk equals the total population, except for countries like Marshall Islands. I would also recommend recent census figures or projections based on census data such as United Nations population projection. Several countries mentioned activities relating to vector control. Kiribati did LLIN distribution in South Tarawa and larval surveys, primarily as part of dengue control, have been done in Fiji. These activities were implemented in the context of other programmes, most often with dengue. Each country has the full right to decide whether or not to incorporate vector control in their LF programme. We will be discussing IVM, largely as one of the key components for the dengue strategy, but that is where we will be finding an entry point. Until then, we would not necessarily be recommending vector control. I think that the issue of compliance is something we really have to come up with a recommendation for. Dr Corrine Capuano worked with you and found out that was a big issue in American Samoa, Samoa, and Fiji. Perhaps I would recommend at this point that the RPRG meeting being held at the end of this meeting comes up with a recommendation. We have countries already asking what to do and how to ensure that compliance is good. It is a very important point as this brings me to a discussion on French Polynesia and it is a unique case. We should closely examine the issue at the RPRG meeting, if indeed compliance is good but Ag prevalence remains high. Given the fact that people have been treated for seven or eight rounds, we would need to think about a possibility of resistance. I would be very reluctant to unless the issue of compliance is completely ruled out. Alternative treatment courses, including higher dosage should also be discussed within RPRG. Many countries were the textbook case of compliance. In Samoa, compliance really was the issue. If you had five consecutive rounds with 80% or greater treatment coverage, you would not have had any issue but since you did not, you need at least need two more rounds of MDA. Again, this is also something that RPRG should discuss. Since you did not do one this year because of all the problems you had, you would do one next year and probably another one a year later. For Palau, a survey is pending to find out what is actually happening. We will work with you to try to understand the extent of LF in Palau. It is important that you budget for the national programme. We will be working on it for the next

couple of days to see what your budgetary needs are. In particular, we realize that US\$ 150 000 may not be enough for Fiji considering the morbidity component. We are working with the Global Network and need to provide an overall estimate of the subregional budget to move forward. Figures you will come up this week will be part of that. We have submitted a guesstimate but if we fine-tune it, we will have a better estimate. All country participants here will need to work on this, trying to get an estimate as close as possible so we will have a better idea on budgetary needs as well as needs for resource mobilization. I will now pass onto Dr Ramaiah.

KR: PICs have the longest MDA history. Now is the time to start thinking about closure. To achieve regional elimination, say in 2015, we need to make sure that countries requiring MDA but with no MDA history, for example Palau, Federated States of Micronesia, and New Caledonia, will implement necessary surveys or interventions. French Polynesia has a special problem. They have completed many more rounds and have reported high coverage. They also have a medical research institution that we collaborate with. We need to look into the problem carefully. Among the countries we discussed today I am more concerned about the countries that have not started MDA or survey. We will need to work with those countries to develop plans. Other issues that came up today include treatment coverage and quality control for testing, for example developing standard operating procedures for ICT.

PL: I will not make any comments for individual country activities as previous speakers have already covered them well. Just to tie with the comments made by Dr John Ehrenberg and Dr Kapa Ramaiah, I like the idea of coming up with a closing or endgame strategy for the Region. We have got a really unique opportunity to package all the activity programmes in the Region under one umbrella or project. I think that it is not well appreciated that the elimination of LF is one of the principal goals of the Obama administration in global health. We now have the opportunity to look across the WHO Region and develop a regional strategy. Financial need of this Region is small, which makes it a very attractive target for one package. I encourage you this week to think very specifically about what (i.e. how much) you need for each one of PICs to have necessary interventions and one comprehensive surveillance plan for the Region.

WM: I would like to comment on the compliance issue. We need to know the structure of non-compliers. For example, I cannot see the point of doing another MDA in Samoa without having good social mobilization targeting those non-compliant males from ages 20 to 50. We need to know what makes up the non-compliant population and how to target them.

CP: We are going to discuss helminths at this meeting later this week. I would like to hear from the participants what they think about the idea of integration with other NTD programmes. At the end of the day, this is what matters. Has anyone had any experience or comment?

PL: There is obviously going to be countries in the Region where maintaining deworming activity is necessary. I do not know about deworming or any data on STH in this Region. In countries nearing elimination in the African Region, they are transitioning from community-wide MDA for LF-plus STH with DEC/ALB or IVM/ALB combination towards ALB or mebendazole treatment in SAC and in some cases including preschool age. In the context of country plans, if you are levelling off MDA for LF, your plan should include that kind of transition. There are many partners around the world willing to provide assistance, for example, for drug supplies or additional support for monitoring. But if there is no plan or no budget, you are not going to be able to ask for that kind of assistance.

JE: Just to remind you that we had a similar meeting in March for Mekong-plus countries on LF and STH. There is a lot of information on STH and schistosomiasis. There has been deworming activities in some of the countries in the Mekong-plus Region. The information is available in the



report. In the Pacific Region, there was a survey in 2002 and Dr Wayne Melrose has been providing updates for some of the countries. Otherwise, there is not much information on STH. Nevertheless, you are doing many rounds of MDA and the impact of MDA on STH is there. One thing that the Region did not do was to collect baseline data on STH before the start of MDA. The 2002 survey may be sufficient to close the gap in data. I think what we are going to focus on in the other helminth part of this meeting is to discuss how to readjust the situation so that helminth data will become one of the proxy indicators of the impact of MDA. My assumption is that if MDA coverage has been good, helminth prevalence should be low because you are doing MDA for many years consistently. We are also going to work under the regional plan for NTD and use the framework for developing national plans. The principal will be Papua New Guinea, and perhaps the Solomon Islands, where we expect to find everything else in addition to STH, for example schistosomiasis and food-borne trematodes (FBT). There, we will need to do quite a bit of groundwork to see what sorts of diseases exist in these countries. We will need a different approach for FBT than preventative chemotherapy. Hopefully, we will be discussing that with you. Hopefully, we will be able to work on budget as well.

**Day 2: 10 November 2009**  
**Chair: Dr Hervé Bossin**

### **Wrap up of Day 1**

Professor Dato' Ramachandran first thanked the Ministry of Health for the success of Day 1 and summarized the major points made during Day 1 including:

- (1) Overall PICs are on the right track towards LF elimination. The biggest challenge remains to be Papua New Guinea. The Honourable Minister, on behalf of the Papua New Guinea Government, stressed the need for a clear strategy for LF control in Papua New Guinea and the importance of not being diplomatic when developing such disease control strategy. He expressed an interest in meeting with a group of WHO experts as well as Papua New Guinea National Staff once the strategy is developed.
- (2) Integration is a global trend. Integrating LF with other NTDs, in particular with STH in the Pacific Region, will be discussed later at the meeting. There is a unique opportunity for PICs to prepare "one package" illustrating control strategies and financial needs for all relevant PICs. The package will be submitted to the Global Network, which has expressed interest in providing financial support.
- (3) M&E remains an essential part of LF elimination programmes. There is a new protocol for M&E currently being evaluated at the global level.
- (4) Fiji has initiated a survey of LF morbidity. Preliminary findings suggest that LF is not a disease of the past in Fiji. Uncovering the hidden burden has helped raise awareness and MDA coverage. The burden of the disease is yet to be assessed in the countries lacking such data. The importance of morbidity control in achieving elimination needs to be emphasized as it is still neglected. Programme managers are encouraged to learn clinical aspects of LF and utilize findings from morbidity assessments as a tool in resource and social mobilizations. PLF is an important partner for morbidity control in the Pacific Region and is currently providing financial support. Similar collaboration should be sought in Papua New Guinea.

- (5) Effective coverage is 80% or above for the eligible population. It is difficult to find programmatic gaps by looking at the way in which coverage is currently reported. Coverage figures at an IU level are necessary to identify the gaps, in particular when an MDA programme is asynchronous (e.g. IUs under MDA gradually increased). A schematic presentation of MDA progress at an IU level with achieved coverage is helpful in visualizing programme gaps and progresses and defining a timeline to attaining elimination.
- (6) The issue of compliance was encountered in American Samoa, Samoa, and Fiji. French Polynesia, where reported coverage has been high but Ag prevalence also remains relatively high, needs to examine the issue carefully to rule out the possibility of drug resistance. Coverage surveys such as the ones conducted in Samoa and Fiji are important.
- (7) Shorter MDAs, having a full-time coordinator for LF, encouraging DOT, and a strong commitment from the Ministry, were key factors that contributed to improving coverage in 2009 in Fiji. Countries experiencing low coverage are encouraged to follow the Fiji's strategy. In American Samoa, only licensed and registered nurses are allowed to distribute tablets. They are also required to observe treatment. In addition to partnering with churches for MDA, this has contributed high coverage in American Samoa.

## 2.12 Countries implementing surveillance

### 2.12.1 COOK ISLANDS

Mr Charlie Ave  
Lymphatic Filariasis Programme Manager, Public Health Department, Ministry of Health,  
Cook Islands

#### Country background

<b>POPULATION AT RISK OF LF</b>	12 000 (residential population estimate 2009)
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes polynesiensis</i>
<b>NUMBER OF MDA ROUNDS UNTIL 2007</b>	Six
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2000, 2001, 2002, 2003, 2004, 2006
<b>SURVEYS PRIOR TO 2007</b>	1999: "Baseline," 2002, 2005, 2007



**Table 21: MDA coverage, 2000-2006**

YEAR	REPORTED COVERAGE
2000	11 928 (62.4%)
2001	11 562 (64.1%)
2002	17 676 (98%)
2003	13 048 (88.39%)
2004	12 900 (92.77%)
2005	
2006	14 494 (98.40%)

**Table 22: Results of surveys conducted since 1999**

YEAR	SAMPLING METHOD	SAMPLE SIZE	RESULTS % ICT POSITIVE	RESULTS* % Mf POSITIVE
1999	convenience	1884	8.6%(162)	NA
2000	-			
2001	convenience	460	7.6% (35)	NA
2002	random	2025	9%	NA
2003	-			
2004	-			
2005	cluster			
2006	-			
2007	complete	4415	0.27% (9)	all negative

\*Mf was not examined in 1999, 2001, and 2002 surveys. Among nine positives in 2007, five were from Aitutaki and four were from Pukapuka. All were Mf negative.

### **Activities implemented in 2008 and 2009**

There was no activity for LF in 2008. Activities carried out in 2009 include:

- (1) completion of blood survey in Mitiaro, Aitutaki, and Pukapuka (October and November, 2009);
- (2) Tutaka programme (ongoing cleaning campaign);
- (3) Strengthening of vector control programme:
  - a. renewing of chemicals used for mosquito control (larvicide: vector bag, and adulticide: Key Pyrethrum); and
- (4) awareness programme.

### **Some problems encountered during MDAs**

Cook Islands identified the following problems encountered during previous rounds of MDA:

- (1) frequent movement of people between islands (15 islands spread out in 1.8 million km<sup>2</sup>);
- (2) DOT not conducted until the last two rounds of MDA;
- (3) drugs being taken home and probably forgotten;

- (4) refusal to take drug – information about drug consumption from people is not reliable; and
- (5) no proper follow-up of the families who may have not taken the drugs.

### **Current plans for 2010 and 2011**

The current plan for 2010 and 2011 for Cook Islands focuses on the following three areas:

- (1) border control
  - a. Screen every migrant worker to Cook Islands from endemic countries (e.g. Fiji) and check through medical records
- (2) screening of blood samples taken for full blood analysis at health facilities (e.g. hospitals) for LF
  - a. supply laboratory services with ICT card – procurement may require external support
- (3) Vector control (routinely done)
  - a. source reduction
  - b. insecticide spraying
  - c. mass cleaning campaign (Tutaka) followed by inspection
  - d. routine inspection of high-risk areas such as waste dump
  - e. awareness campaign to promote the importance of vector control, including personal protection
  - f. law enforcement (Public Health Act, 2004)

### **2.12.2 NIUE**

Mr Manila Nosa  
Chief Public Health Officer, Niue Health Department, Government of Niue

Country background

<b>POPULATION AT RISK OF LF</b>	1500
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Aedes aegypti</i> , <i>Aedes cooki</i>
<b>NUMBER OF MDA ROUNDS UNTIL 2007</b>	Five
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2000, 2001, 2002, 2003, 2004
<b>SURVEYS PRIOR TO 2007</b>	“Baseline” : 1999 – 7% Post-MDA : 2004 – 0.2%

### **Activities implemented in 2008 and 2009**

Niue implemented the following activities in 2008 and 2009:

- (1) 2008: Lab surveillance using ICT
- (2) 2009: Blood survey (ongoing)

Partial laboratory-based surveillance for LF has been implemented since 2008. Migrants are being screened for LF, subject to the availability of ICT cards supplied from Mataika House in Fiji. In 2008, 89 ICT tests were performed and three positives were found (two immigrants and one local resident). ICT positives will be confirmed by Dr Melrose. The second post-MDA survey, targeting the whole residential population of Niue, commenced late October in 2009. The survey was initially planned in 2008, but was postponed for one year due to the Pacific Islands Forum Leaders' Meeting held in Niue in 2008. So far, two out of 14 villages were visited and among 168 tested three "weak" positives were found. ICT positives will be confirmed using filter paper by Dr Melrose.

### **Lessons learned since 2007**

Niue identified the following lessons learned through LF activities since 2007:

- (1) All supplies need to be ready before commencing a blood survey.
- (2) Social mobilization is required to get good coverage (i.e. participation) during a blood survey.
- (3) Political support is essential for the survey.

Based on preliminary results of the ongoing survey and 2008 data from the laboratory surveillance, Niue expects that new or imported filariasis cases may exist. Current plans for 2010 and 2011.

Niue plans to continue the whole island blood survey until all 14 villages are covered. Results of the survey will determine the next course of action for the country. Niue plans to consult with WHO in 2011 to develop a plan for the next step. Surveillance on immigrants is ongoing and will be maintained for the next few years.

### **Helminth programme in Niue**

Deworming programme in Niue has been implemented for about 15 years. It was suspended during MDA and restarted again in 2007. In 2002, as part of a regional stool survey of schoolchildren, a high school in Niue was chosen (there is only one high school and one primary school in Niue). One case of ascariasis was reported among 200 students tested. The case was an imported case.

### **2.12.3 TONGA**

Dr Malakai 'Ake  
Chief Medical Officer, Public Health, Ministry of Health, Tonga

Since the first CTS conducted in 2007, there has been no LF activity in Tonga. The country has not implemented the second CTS, initially planned in 2009, as it was discussed during the experts

meeting in 2008 that a two-year period between CTSs may be too short. Tonga has not received an official recommendation as to the timing of the second CTS. In addition, Dr Malakai Ake expressed concerns regarding the new protocol, in particular, how it relates to monitoring activities in the Pacific Region. In Tonga, the baseline Ag prevalence was about 2% and MDA coverage was maintained at approximately 80%. Two post-MDA surveys have been conducted. The current plan for 2010 and 2011 is dependent on the timing of the second CTS. Tonga would like to conduct the second CTS before the current stock of ICT cards expire.

#### 2.12.4 VANUATU

Mr Peter Malisa

Supervisor, Sanma Provincial Vector-Borne Disease, Provincial Health Office, Ministry of Health, Vanuatu

##### Country background

<b>POPULATION AT RISK OF LF</b>	240 000
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Anopheles farauti</i>
<b>NUMBER OF MDA ROUNDS UNTIL 2007</b>	Five
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2000, 2001, 2002, 2003, 2004
<b>SURVEYS PRIOR TO 2007</b>	“Baseline”: 1997-1998 Midterm evaluation : 2002 C Survey : 2005 CTS: 2007-2008

**Table 23: MDA coverage, 2000-2004**

PROVINCE	INITIAL Mf PREVALENCE (1998)	MDA COVERAGE BASED ON CENSUS (%)					
		2000	2001	2002	2003	2004	AVERAGE
Torba	3.08	83	86	60	88	95	82.4
Sanma	0.24	79	77	82	88	83	81.8
Penama	7.88	92	86	84	95	89	89.2
Malampa	3.58	90	88	88	89	82	87.4
Shefa	0.16	72	90	89	84	92	85.4
Tafea	0.74	81	72	76	85	70	76.8
<b>Vanuatu</b>	2.48	83	84	84	87	85	84.6
Coverage based on census projections	82	80	78	80	76	79.2	82

**Table 24: Results of surveys conducted since 1998**

YEAR	BASELINE 1998	MIDTERM 2002	C SURVEY 2006	CTS 2007	SPOT- CHECK 2007
Number of villages	51	8	133	Whole country	17
Sample size	5119	1167	7584	5657	3400
Number of ICT tested	4362	1167	7584	4752	1824
ICT positives	209 (4.79%)	92 (7.88%)	13 (0.17%)		45(2.47%)
Male	116 (5.79%)	56 (4.79%)	4 (0.05%)	0 (0%)	*
Female	93 (3.94%)	36 (3.08%)	9 (0.12%)		*
Mf positives	106 (2.48%)	9 (0.77%)			
Male	66 (3.40%)	6	0 (0%)	0(0%)	0 (0%)
Female	40 (1.72%)	3			

#### **Activities implemented between 2008 and 2009**

Vanuatu conducted the following activities between 2008 and 2009:

- (1) integrated follow-up MDA with LLIN distribution in North Ambrym;
- (2) filariasis survey in hot spot areas (completed in 2008); and
- (3) distribution of morbidity kits and information on managing disability among health workers and family members.

The results of the recent spot check survey suggest that a significant reduction (> 50%) in Ag prevalence has been achieved in North Ambrym since 1998.

#### **Problems encountered since 2007**

The following issues have been encountered by the programme since 2007:

- (1) Due to limited funding, the LF patient database has not been updated.
- (2) Due to donors' inflexibility with the access to funding, integrating with malaria activities has been difficult.
- (3) As the malaria programme requires periodic reporting, field staff do not have time for other programme activities even when programmes are integrated.

#### **Current plans for 2010 and 2011**

Vanuatu currently plans to:

- (1) Conduct a survey for six- and seven-year-old children in the whole province of Penama in February 2010.
- (2) Conduct the last round of follow-up MDA in North Ambrym in September 2010.
- (3) Update the LF patients' record in 2010.
- (4) Repeat a CTS in 2011.

### Helminths in Vanuatu

Vanuatu introduced deworming in three provinces in 2005 after the completion of the fifth round of MDA in 2004. By 2007, it was expanded to the rest of the country. The current deworming programme targets mainly primary SAC and treatment (ALB 400mg) is given twice yearly. In 2007, ALB distribution for deworming was integrated into the central medical distribution system. No mapping has been conducted in the country. The programme is currently in need of additional funding to: (1) improve the flow of reporting to the national office (i.e. more funds needed for mailing at the provincial level); (2) increase awareness (e.g. development of new IEC materials like integrated calendars and posters for schools and health facilities); and (3) organize provincial workshops to encourage strengthening the collaboration between the health and education sectors. In addition, the programme feels the need to strengthen its supervisory mechanism, for example, by performing supervisory visits to schools and to health workers. For distribution at peripheral levels to be consistent, a sufficient supply of ALB needs to be maintained throughout the deworming cycle.

**Figure 18: Basic country data**

### Basic Country Data

Population	Number/Data
Total population	243,304
1 – 4 years	13,093
5 – 14 years	24,206
School enrolment rate	56%

**Figure 19: Deworming campaign coverage in Vanuatu, 2007-2009**

Mass Deworming Programs (except LF)  
 Population group = Primary school age children

	2007	2008	2009
No. of people at risk (5- 16 years old Census projection data)	72475	73521	74245
No. of people targeted (Primary school children education dept data)	37948	37948	*
No. of people treated 1 <sup>st</sup> Round 2 <sup>nd</sup> Round Total	32380 17817 50197	17069 6582 23651	No complete data
Programme coverage (treated divided by no. at risk x 100)	69.26%	32%	Will submit complete data by Jan 2010

## **Questions and comments for Cook Islands, Niue, Tonga, and Vanuatu**

### **Cook Islands**

CP: One question is for Cook Islands. At a meeting a few years ago, one of the issues brought up was about people coming back from New Zealand to Cook Islands with high Mf load. There was a plan of treating those patients. What has happened to that strategy? Is it still ongoing?

CA: Yes. Dr Joe Williams in Auckland was looking at our population in Auckland. I have not received any response from them and I do not know if there are positives and whether we need to follow-up.

WM: We have been trying to get the migrant screening programme going for the last five years. Last year, we committed an amount of AU\$ 20 000 to the programme. But the problem is an ethical one. The New Zealand Government is asking who is responsible for treating positives. So, it is a government-to-government situation. The Cook Government needs to speak to the New Zealand Health Department. The same goes for other countries. It is possible to screen the entire PIC there but the problem is then what. Who is going to treat them? That is why the programme has not been so successful.

### **Niue**

CP: I have a question for Niue. You indicated one of the main vectors is *Aedes aegypti*. Is that correct? You do not have *polynesiensis*. Second, what was the basis of the decision to start MDA in the particular area (referring to two villages)?

CC: It is a blood survey not MDA.

CP: You are going back to screen the rest of the 14 villages. Based on the results, you are going to continue with MDA. Is that right?

MN: We are screening everyone on the island using ICT and also collecting samples for Dr Wayne Melrose. We are not going to do MDA. Once we find positives, we plan to treat them.

CP: You have only three positives among 164.

MN: Yes. We have finished two villages and found three weak positives so far.

### **Vanuatu**

CP: In Vanuatu, the CTS in 2007 had no ICT positive. Why are you following up negatives? We are talking about elimination as public health problem not eradication.

PM: We just want to ensure that there are no positives before doing any survey.

CC: Surveys in the past pointed us to North Ambrym as having potential foci of transmission. We have planned three rounds of follow-up MDA in North Ambrym and Vanuatu is planning the last round in 2010.

CP: What is the population?



CC: I think about 200 but I am not sure.

CP: Second, I want to ask you in terms of prevalence. You have data on deworming, but you did not provide any data on prevalence, baseline, or types of STH prevalent in the country. Yet, you are treating children with ALB.

PM: We have not got any data yet.

CP: How can you plan a population level treatment without any data? At the end of the day, you need to go back to the data to show the impact of intervention.

JE: Vanuatu did a terrific job with five MDAs and a good transition to deworming. My guess is that after five rounds of MDAs STH prevalence is probably very low. But still it would be nice to have some idea of what the intermediate baseline would be for STH and go ahead with treatment, and then some years later see how the rates change. But the process that you took is, I would say, by the book.

PL: I agree 100%. I think at this point the best evidence suggests that you use the stopping point for MDA to transition into deworming. We just do not have enough evidence to make any real prediction on what kind of STH level to expect under different environmental conditions. WHO is establishing an M&E Working Group. One of its responsibilities has been to come up with a simple survey design that would allow post-endemic countries to do a relatively small-scale focused survey for STH that would give you the information you need to determine treatment frequency, or whether MDA is universally needed for SAC or is needed only for children in particular communities. One of the recommendations that should come out of this meeting is for WHO to follow-up on this to ensure that countries receive appropriate information.

WM: We need to start thinking about the reality as far as resources go. Historically, Vanuatu, Solomon Islands, and Papua New Guinea have lots of STHs. There were surveys done 15 to 20 years ago to prove that. Those days there were people capable of doing parasitology in every laboratory in the country. Today, there are very few people who can identify worms. We need to train local staff to do a survey. At JCU, we have a parasitology course that can be run anywhere and anytime, but we would need funds for that. Surveys are OK, but we need to think about who is going to do them.

### **Other issues**

CC: Just a few comments on the presentation. For Cook Islands and maybe for other countries, I just want to clarify again about the classification. Countries were classified at the beginning of the global programme and there is a list of endemic countries at the global level. Most countries here were classified endemic and you cannot put non-endemic status at this stage yet even when we have another classification in the Pacific Region that better reflects the current situation. Also, I noticed Cook Islands and Niue have implemented border control following the strategy put together in 2007 for the Pacific Region. The question we had at that point was what happens to a country with below 1% prevalence and what the risk of LF reintroduction by people coming in from endemic areas would be. What I would like to hear from you is how many people have been tested and how many positives you have found from border control. Another point I want to make is for Niue. The idea of doing the whole population survey in 2009 was to really get 100% of the population. The previous whole population survey tested only 65% to 70%. I just wanted to emphasize the importance of getting nearly everyone tested to get final results for Niue. For Vanuatu and Tonga about CTS, we discussed this between 2007 and 2008 but I think you are

right Dr Malakai Ake that we have not come up with a final recommendation. These two countries did the first CTS in 2007 and it was suggested initially to do it every second year, which would be this year in 2009. But last year, we said that it should be better to do the second one three years after the first one because LF prevalence is so low that it will take some time for LF to appear even if there are any residual transmission foci. I think it would be a good idea to do it in 2010. Are there any comments? If you do it next year and see what you get, we can discuss at the next meeting what the next step would be.

MA: Regarding the need for the prevalence of worms, it is quite difficult especially thinking about human resources but critical to justify the implementation of deworming activities. It is also an ethics issue. We need to ensure that there is a need for deworming. Otherwise, people will not be convinced to take tablets.

CA: When the template for the presentation was sent, I assumed non-endemic status because LF prevalence in Cook Islands has become so low. I now understand what it meant and will change it back. With regard to the Fijian community in Cook Islands, I have been talking to the laboratory and it has not come across any positive so far. We do not screen Chinese immigrants since LF is gone from the People's Republic of China. We only test people from Fiji. Fijian and Chinese are the two biggest immigrant communities in Cook Islands. I have another question on CTS. In Cook Islands, I mentioned earlier in 2007 we tested a large number of people with ICT. About 984 children were tested from outer island schools, excluding Rarotonga and Atiu. Last year, Dr Wayne Melrose came and we discussed whether it is still necessary to do CTS in Rarotonga and Atiu. Our conclusion was no. So my question is do we need to do a CTS in those two islands?

MN: Regarding immigrants, last time we had a group of Indian farmers coming from the mainland India. We managed to capture two of them in the lab surveillance system and one of them was ICT positive. I asked him whether he had received any treatment or if there was any MDA. He said no. When I asked how many people live in his district, he said more than a million. I wonder if we are going to see this problem in the future. We also have Indonesians but it is hard to approach them as they are recruited by their local fishing agency. I think I want to support what Dr Wayne Melrose mentioned about Pacific islanders in Australia or New Zealand. Niue is going to approach the Ministry of Health about how far we are going to go. If we are successful, we can share our experience at the meeting next year. We may be moving from endemic to non-endemic but we are still not sure how many of our own people in Australia or New Zealand, who migrated before MDA, are infected. I am also quite interested in pursuing that. We will complete the whole island survey this year or next year and will come back to you for advice.

FM: Border surveillance would be more difficult in countries with more international flights than Niue or Cook Islands. For example, movement between American Samoa and Samoa is very frequent. In the past, Samoa was worried about LF from American Samoa because Ag prevalence was higher in American Samoa but now it is the other way around. It is important that both islands work together. But I just wanted to ask how practical it is, considering the already overstretched resources, to set up a border surveillance system and whether it is realistically possible to establish one when movement of people in and out of the country is so frequent.

CA: In Cook Islands, we are not testing everyone on an international flight. Most visitors to Cook Islands stay only for a short period. We only target those coming to work. We look for immigrants intending to stay longer.

MN: We do not routinely screen everyone. We have a similar situation to Cook Islands. We test those who intend to stay long in most cases over one month. If the person has a previous record

of being tested for LF, that is OK. If not, we would ask whether the person is willing to get tested. If ICT positive, we would like to treat them. The problem is that the Ministry is not always aware of every immigrant. Some people come to the hospital when he or she is sick.

CP: Post-MDA surveillance is critical for keeping track of what is going on. Most of the countries in PIC already have low prevalence and keeping track is very important for the next few years, especially for those getting ready for verification. I just want to say that the chance of immigrants coming and re-establishing transmission is very low. LF is not a disease that easily gets re-established and we are talking about only one or two cases. We know this because there has been no evidence of LF reintroduction in immigrants' communities by people from Burma, Thailand, or Brunei Darussalam. I would say the chances are remote, although we need to treat them for ethical reasons. Post-MDA surveillance is more important for you to ensure no children, who might have been exposed to those cases, remain negative.

KR: I think we can wrap up this session. What I can say is that first we need to develop a common set of action for post-MDA surveillance. Second, we need to think about how to go about establishing STH baseline data. We need a plan of action entailing needs for obtaining such information, including survey design, sampling size, and training needs.

PL: I think that most of our experience is unfortunately moving from an endemic to non-endemic area. We do not know what happens in a former endemic area where the condition is right for reintroduction. So, I am going to urge the countries to be conservative and look at opportunities like a work permit programme if there is some formal process. Many countries have TB screening and other activities that are routine. I am thinking if it is possible to work in concert with those programmes for people coming from endemic areas. I think we are going to be looking at a lot of populations around the world. I would be interested if Dr Kapa Ramaiah could share what Indian programmes' concerns are on this issue. This is an issue not restricted to one country. Even in the United States of America, there is beginning to be an interest in involving a test and treat programme for immigrant populations. The initial focus is on LF but they intend to make this applicable across diseases targeted by MDA, not as a public health issue but as an access-to-care or treatment issue. Even if we are not concerned about reintroduction, we should consider a therapeutic approach as more of an ethical issue.

KR: There may be some reactions from immigrant communities. I think issues like immigrants and hot spots need to be discussed when we develop a national plan.

WM: I am thinking that WHO is losing its collective memory. If you look at its website, there are four or five publications on how to establish a programme, including M&E as well as survey designs. Why are we doing it again?

JE: The issue here is that we are assessing STH after five or more rounds of MDA, except for Papua New Guinea where we would need to start from scratch. These are countries conducting six, seven, or even eight rounds of MDA. We need something quick but valid to get an estimate. Some of it may be in those publications it does not satisfy all our needs.

## 2.12.5 PAPUA NEW GUINEA

Ms Melinda Susapu  
National Coordinator (NPELF-Papua New Guinea), Malaria & Vector borne Disease  
Disease Control, National Department of Health

Country background

<b>POPULATION AT RISK OF LF</b>	6.5 million
<b>INITIAL STATUS</b>	Endemic
<b>MAIN VECTORS</b>	<i>Anopheles punctulatus, An.koliensis, An.farautifarauti</i>
<b>NUMBER OF MDA ROUNDS UNTIL 2007</b>	Two
<b>YEARS MDA CONDUCTED (UNTIL 2007)</b>	2005, 2006
<b>SURVEYS PRIOR TO 2007</b>	Baseline surveys conducted between 2001 and 2004 by ICT = 3.7% Surveys conducted in 2006 (IUs starting MDA) = 14.4% Mf, 30% filarial antigen

**Table 25: MDA coverage by province, 2005-2006**

YEAR	PROVINCE (IU)	POPULATION	TARGET POPULATION (> TWO YEARS )	TREATED	COVERAGE (%)
2005	Milne Bay	233 863	219 831	196 858	89.5
2006	Milne Bay	238 250	226 982	160 859	68
2006	Oro	156 130	9982	7592	5
2006	New Ireland	138 864	38 664	32 557	24
2006	East New Britain	258 290	101 700	50 892	20
2006	West New Britain	226 809	214 499	207 859	92
2006	Bougainville	205 522	144 685	131 430	64
Total	Six	1 457 728	956 343	788 049	54

**Table 26: Results of surveys conducted since 2001**

YEAR	SAMPLING METHOD*	SAMPLE SIZE	RESULTS %ICT+	FILARIAL ANTIGEN (%)	RESULTS %Mf+
2001	Convenient	1000	2.0		
2002	Convenient	2364	3.5		
2003	Convenient	1269	3.5		
2004	Convenient	521	8.4		
2005	-				
2006	Convenient	3117		30	11.4
2007	-				

\*All surveys conducted since 2001 are sentinel site surveys.

### **Activities prior to 2007**

Milne Bay Province completed two rounds of MDA in 2005 and 2006. In 2006, four other provinces (Oro, New Ireland, East New Britain, and West New Britain) and Bougainville initiated their first round of MDA. In some of these IUs, MDA was carried on until 2007. Baseline surveys took place between 2001 and 2004. In 2006, JCU carried out surveys in the four provinces. All surveys to date utilized convenience sampling.

### **Activities conducted since 2007**

Papua New Guinea implemented the following activities since 2007:

- (1) increased training in new IUs;
- (2) consultancy for DEC-fortified salt as alternative strategy; and
- (3) formation of National Technical Working Group in 2008.

### **Current plans for 2010 and 2011**

The current plans for 2010 and 2011 are to:

- (1) Secure funding for the continuation of MDA in the island provinces.
- (2) Implement a DEC-salt pilot project in two possible sites.
- (3) Continue MDA in all the provinces which have started MDA.
- (4) Include other provinces which are yet to start MDA.
- (5) Conduct a post-MDA survey in Milne Bay Province and pre-MDA surveys in yet-to-start IUs.
- (6) Conduct a coverage survey in the provinces that have received first MDA.
- (7) Integrate MDA with other established programmes.
- (8) Promote and encourage home-based self-care.
- (9) Report on the impact of LLIN on LF transmission.

The current plans explore the potentials of two alternative or supplemental approaches, DEC salt and LLIN, in relation to LF control in Papua New Guinea. In addition, a strategy to collaborate with other programmes need to be made urgently to realistically accomplish the planned activities. The current National Strategic Plan to Eliminate Lymphatic Filariasis from 2004 to 2020 requires revision to better address the needs and challenges currently faced by the programme.

### **Challenges**

Due to various challenges faced by the programme, little has been accomplished since 2007 in Papua New Guinea. LF has been given a low priority in the country and no separate budget is allocated for the LF programme. This unclear budget allocation from Department of Health has caused major financial constraints for the programme. In addition, lack of human resources and logistical challenges in island provinces have been significant obstacles faced during MDA implementation. There has been a pile of undistributed DEC, donated by JICA, in Port Moresby. JICA has been an important partner in Papua New Guinea and the issue needs to be solved urgently for the future of the partnership.

## **2.13 LLINs and MDA: opportunities and challenges in delivering as one in Papua New Guinea**

Mr Larbi Kwabena  
Malariologist, WHO/Papua New Guinea

### **Current and future situations**

Under the third round (from 2004 to 2008) of the Global Fund, Papua New Guinea has received 2.4 million LLINs. The criterion for distribution is one net every 2.5 persons in a family and distribution is currently taking place in the National Capital District. A recent survey conducted by Papua New Guinea Institute of Medical Research (IMR) reported 33% usage (the proportion of people with LLINs who slept under the net a night before the survey). In comparison to other countries, 33% is not too low. An additional 6.7 million LLINs are to be distributed under the eighth round (from 2008 to 2013) of the Global Fund. Two nets will be distributed to each family and it is expected that the eighth round distribution will cover over 90% of Papua New Guinea population. The LLIN programme hopes to achieve 70% usage with intense awareness and promotion activities.

### **Opportunities for LF**

Two major opportunities that could be explored by the LF programme are:

- (1) Piggybacking for distribution
  - a. MDA distribution can piggyback LLINs distribution as they are both implemented at the provincial level. It was successfully tried in Bougainville and Morobe, where local authorities were able to distribute tablets at minimal cost.
- (2) LLINs distribution and LF prevalence
  - a. Studies conducted by Dr Wayne Melrose and his Team in Papua New Guinea suggest an association between increased LLINs usage and reduced LF prevalence. While the findings need to be confirmed, LLIN's distribution is likely to provide a positive impact on LF control.

### **Challenges**

In exploring such opportunities, the following challenges are foreseen:

- (1) The mode of LLIN distribution in the eighth round is different from third round.
  - a. National Department of Health will not be the principal recipient of LLINs.
  - b. Different groups (i.e. churches, NGOs, and provinces) are responsible for the eighth round of LLIN distribution.
- (2) LLIN distribution has more stringent targets.



- (3) It may be difficult to ensure commitment by the LLIN programme to include MDA in their distribution plans as distribution locations and schedules may not coincide.

### **Knowledge gaps**

While previous experiences in Papua New Guinea suggest that LLINs are likely to benefit LF control, the following questions are yet to be answered before determining the best approach:

- (1) Can LLINs alone ensure LF elimination?
  - a. If yes, what is the recommended coverage and usage to ensure LF elimination?
  - b. If no, what is the optimum mix between LLINs, MDA, DEC salt, etc. to ensure elimination?

## **2.14 Current studies at Papua New Guinea IMR**

Dr Lisa Reimer  
Head of Entomology Unit, Papua New Guinea IMR

Two ongoing studies at IMR relevant to LF control in Papua New Guinea were briefly presented.

### **Observational study of long-term impact of MDA on reduction of LF morbidity and infection**

Jim Kazura, Principal Investigator  
Institute of Medical Research

The study involves 15 villages near Dreikikir in East Sepik Province where MDA was conducted between 1994 and 1997. LLINs were distributed in August 2009. The study aims to evaluate the long-term impact of MDA and assesses the prevalence of Mf, Ag, and LF antigen (using BM14 ELISA). Physical exams and monthly entomological evaluation (mosquito dissection and *Wolbachia* PCR) are also being conducted as part of the study. In high transmission villages, Mf prevalence was reduced from approximately 80% before MDA to 5% soon after MDA while it was reduced from 40% to 1% in low transmission villages. In 2008, about 10 years following MDA, Mf prevalence was approximately 40% in high transmission villages and 5% in low transmission villages. While Mf prevalence, once significantly reduced by MDA, increased over the 10-year period, the study found that mosquito infection rates continue to drop and that Mf load has been significantly reduced.

### **Global Fund to fight HIV/AIDS, Tuberculosis and Malaria & national Insecticide Treated Net distribution project**

IMR is evaluating the implementation and health impact of LLINs distributed by the National Department of Health since 2004. Household surveys have been conducted in 80 villages in 38 districts to determine the coverage among children under five and pregnant women and evaluate the impact of LLINs on health indicators. Entomological (mosquito density, behaviour, species

composition, and *Plasmodium* infection levels) and epidemiological evaluations are also conducted in seven sentinel sites before and after LLIN distribution.

### **Questions and comments for Papua New Guinea**

CP: Papua New Guinea's presentation was historical while it provided some plans of action, which will be discussed further later. One question I have is on the baseline data. In terms of actual prevalence, Dr Wayne Melrose has provided some data but the ones you presented (~25%) seem low. In many of the provinces, particularly in Northern Province, prevalence can go as high as 60%. Has there been any survey conducted by either, Dr Wayne Melrose, you or any other team to have a better idea of mapping situation in the country? Also, the coverage in the two MDAs is rather poor and it is one issue that we will need to discuss. The low coverage – 54% is practically not achieving anything. We need to figure out how in the future we can do better considering the available resources. Political commitment of a priority is certainly what we need at this stage. Yesterday, the Minister more or less indicated that he will commit himself. With Government's commitment, our strategy should be on a firmer ground. Regarding MDA and LLIN, you mentioned that 6.7 million nets are to be distributed and 70% usage is expected. Has there been any social science study on this? Distribution is one thing but sleeping under a net in the tropics is another. I would like to see more information on LLIN usage rather than distribution coverage as well as plans on piggyback. Finally, the studies done by Jim Kazura and his team at IMR are certainly very significant. Even after three or four rounds of MDA, prevalence was significantly reduced and the reduction was maintained in the absence of MDA over a 10-year period. It may be unique to Papua New Guinea but the parasite in the country seems to be very sensitive to the drug. These are my initial comments.

WM: Regarding sentinel surveys, some of you may be wondering why they used convenient sampling. Those surveys were sentinel site surveys. According to the protocol for a sentinel survey, there is no need for random sampling provided that there is a large proportion of the population at a particular site. So, we normally take at least 500 to 1000 per site. We agreed a few years ago in Port Moresby that my research group would do sentinel surveys in southern part of the country and IMR in the northern coast. Sentinel surveys have been completed in Bougainville, East and West New Britain, New Ireland, Oro, and Milne Bay. What Gates Foundation showed was aggregated data from those sites. They were not presented site by site. We just completed a sentinel site survey in Gulf. It is interesting because the survey in 1993 in the village showed 65% Ag prevalence and 35% Mf prevalence. When we surveyed the same village and most of the same people three months ago, Ag prevalence was 35% and Mf 11%. The village never received MDA but LLINs were distributed in 2007. This may be a clue, although there was no scientific study, and we need to look at the impact of LLINs on LF transmission.

LSM: Regarding LLINs coverage, the National Statistics Office just released a report yesterday on Demographic and Health Survey. The survey was conducted a few years ago when nets were distributed in only a few provinces. The usage that they came up was a little bit better than the IMR findings. We know that usage is an issue and that is one of the major things that we are focusing on in Round 8. In Round 8, we specifically appointed a principal recipient to deal with the behaviour change communication component of the malaria programme. I think we can do some MDA during distribution but concentrate on usage. That is something we can discuss later. One of the issues that I would like to highlight here in terms of implementing MDA is that we have three tiers in the government administration, on which I, the Programme Manager, has no power. Some programmes such as HIV and malaria, which have been prioritized, have bypassed this system in implementing activities. This is not the case for LF. We are trying to fit MDA in their provincial plans as a national programme and it has been successful in some provinces, for instance, Milne Bay. But in many provinces, I have not been able to do so. So, we have been



trying to convince provinces to include MDA in their activity plan. Obviously, they would come back and ask “have you got funding?” I think considering the restructuring currently going on, everything as a package could be an approach. Our plan developed a few years back is very good and we worked on it so much. It seems now we need to review it because we cannot implement it. JE: What we are going to do is brainstorm. Papua New Guinea’s situation is very unique. One issue that we need to take into consideration during individual work is the issue of human resources. It is a critical issue not only for LF but also for malaria. Right now, we are thinking of piggybacking on the malaria programme and we certainly need to think about how the malaria programme is structured and what kind of resources they have to implement the 160 million USD from the Global Fund. One approach we could take in Papua New Guinea is to use STH to sensitize the population. To make people take a look at worms has been effective in other parts of the world. Mothers and families can see the immediate effect of MDA. There has been almost no deworming in most of Papua New Guinea and I am wondering whether this could be an entry point for MDA, rather than going the other way around (i.e. MDA then deworming). This would also put you effectively in a multi-disease package. Regarding sentinel sites, is there any possibility for us to work together with IMR, basically to synergize among the three key players not only for sentinel sites but also for MDA? They are already funded to do sentinel surveys for malaria. Also, for STH, we first need to understand the magnitude of STH distribution. We probably need someone like Dr Wayne Melrose to help us identify high-risk areas or groups to start treatment with, which could be a good entry point for MDA. This is independent of the discussion we are going to have on DEC salt, which is another possible arm.

RC: Regarding MDA coverage in Milne Bay, you had good coverage in 2005 but lower coverage in 2006. What are the factors that contributed to poor coverage and have you tried to address those issues? Second, regarding the impact of LLINs on LF, we have distributed some LLINs in Fiji but saw no effect on LF because the vectors in Fiji are not nocturnal. I was wondering if the observed impact is solely due to Papua New Guinea that has nocturnal vectors or if there are other factors assisting with the impact.

CP: Have you got any data, after the initial two years of LLIN distribution, on the impact of LLINs on malaria? Is there any reduction in malaria? Second, we will need a study to show that LLINs have a direct impact on LF.

LSM: Based on the National Health Survey data, malaria is not going down much since LLINs distribution. But we have not looked at data from individual districts or facilities. We should have their data soon and this will be used as baseline for Round 8.

WM: Regarding the impact of LLINs on LF, what I mentioned was not a study but just an observation. We and our colleagues at IMR got very excited and decided to do a proper study.

EP: These kinds of diseases are getting a lower priority in the country as we have huge problems such as HIV/AIDS. For this reason, we are looking for a way forward and trying to package NTDs. For example, we had no coordinator for LF at the national level, which was one of the reasons that the programme is not moving forward over the last few years. We have now packaged into a structure and our strategy is to package these diseases together so that we can get support from the government as well as developmental partners. I think the plan for LF should be included in the NTD strategy. I have asked our programmes to develop an implementation plan for NTDs for the next five years that would fit into the national health plan and we will ensure that LF will be one of them under the NTD strategy.

MA: Solomon Islands and Vanuatu also received funding for LLIN through the Global Fund. For the last few years, despite LLIN distribution, the incidence of malaria was increasing in the two countries. Perhaps, we could also look at the data from the two neighbouring countries.

LV: I am working as a Medical Officer in the WHO Office in Vanuatu. My main focus is on the malaria programme but I can only agree to what has been raised as challenges and ways to address those issues. We have similar experiences in Vanuatu. The Global Fund is quite strict and once it is planned, it would be difficult to add another budget line. So, you need to have a good case to show that, for instance, if you use bed nets, it works for LF. There are many opportunities for good management in human resources, for instance, integrated training, organizing supervisory visits, and engaging provincial health programme managers. We had a huge problem in Vanuatu about many provinces not being reached by the malaria programme. The malaria programme brought together provincial managers and brainstormed on what issues exist and how to address them. That was quite an eye-opener. It can be done within a vector-borne disease programme and you do not need another programme.

## **2.15 For the elimination of LF in PNG, Is a DEC salt distribution strategy justified, feasible and evidence-based?**

Mr Trevor A Milner  
International Public Health Consultant

### **What is DEC salt?**

DEC salt is salt (i.e. sodium chloride of typically > 98% purity with about 0.5% moisture, used as table salt or for cooking and institutional and industrial food preparation and processing), to which DEC has been added at the level of 0.2 % to 0.4 % (mass percentage). In the context of LF elimination, salt is the vehicle of MDA and DEC salt is another form of DEC MDA.

**Figure 20 Salt is the Vehicle**



### **Some facts**

Average daily salt intake is approximately 10g per person in most countries. A recent estimate for Papua New Guinea is 8g. Assuming 0.3% DEC, the current level of salt intake would result in 8.8g of DEC to be consumed in one year ( $8g \times 0.3\% \times 365 \text{ days}$ ).

In Papua New Guinea, DEC is given at 6mg per kilogram of body weight during MDA. A 75kg person will require 450mg of DEC ( $75\text{kg} \times 6\text{mg/kg}$ ). As DEC used in Papua New Guinea contains 50mg DEC per tablet, the person will require nine tablets of DEC ( $50\text{mg DEC/tablet} \times 9$ ) in addition to one tablet of ALB.

### **DEC salt justification**

LF is endemic in 71 out of 85 districts, i.e. in 16 out of 20 provinces in Papua New Guinea. It is estimated that nearly 4.4 million individuals are at risk and 1 million people are currently infected in the country. MDA, started in Milne Bay in 2006 and five other areas in 2007, is currently suspended largely due to financial constraints. The overall coverage achieved during the two rounds of MDA was not adequate. In addition, Milne Bay was unable to maintain the high coverage (89% in the first round) in the second round. These experiences suggest that the present system of MDA is not capable of organizing a large scale distribution in a consistent manner. Logistical challenges, already faced by the programme, require a level of resources (e.g. human resources) that is not available. Scaling up to cover more IUs does not seem practical considering the current situation. Thus, looking into alternative options is justified.

### **MDA vs. DEC salt distribution process**

The most important difference between the two processes is the extent of responsibility that a health department needs to take (Table 27). MDA requires extensive involvement of a public health authority from procurement, distribution to provinces, distribution in communities, to monitoring. In DEC salt distribution, the responsibilities are shared among multiple sectors (e.g. salt importers, health department, etc.), although good management and oversight at a central level are still required.

**Table 27: MDA process vs. DEC salt distribution process – simplified comparison**

<b>MDA (TABLET DISTRIBUTION)</b>	<b>DEC SALT DISTRIBUTION</b>
<ol style="list-style-type: none"> <li>1. Import and store tablets</li> <li>2. Schedule distribution in each area</li> <li>3. Identify and train distributors</li> <li>4. Transport tablets to provinces and localities</li> <li>5. Educate and mobilize community</li> <li>6. Carry out tablet distribution</li> <li>7. M&amp;E process</li> </ol>	<ol style="list-style-type: none"> <li>1. Coordinate with and monitor salt importers</li> <li>2. Educate and mobilize community</li> <li>3. M&amp;E process</li> </ol>

Not a “magic bullet”

Despite its attractive characteristics as alternative to MDA, DEC salt is not a “magic bullet.”

Successful implementation requires:

- (1) ownership by the top levels of government;
- (2) political will and long-term commitment to supporting the programme;
- (3) first-class and intelligent programme management;
- (4) required financial, material, and human resources;
- (5) detailed planning;

- (6) precise execution and flexibility in responding to changes;
- (7) building of public awareness; and
- (8) attention to detail, in particular in data collection, analysis and feedback (M&E).

### **Feasibility**

DEC salt is a feasible strategy when the availability and reach of DEC salt are both ensured. In assessing the feasibility of DEC salt in Papua New Guinea, the current salt situation, safety, and cost have been analysed.

### **Salt situation**

The major findings from a thorough situational analysis on salt in Papua New Guinea include:

- (1) very complex salt situation, constantly changing;
- (2) 8.2g – per capita daily consumption;
- (3) 18 500 tons – annual national consumption (net);
- (4) evidence indicating salt reaching more than the vast majority of Papua New Guinea population;
- (5) good salt quality;
- (6) problems with distribution:
  - a. lower intake in remote areas due to access issue
  - b. inconsistent supplies
- (7) large number of importers (25 to 35) with five major importers;
- (8) Salt imported from multiple countries and manufactured in multiple plants, including Australia, the People’s Republic of China, India, the Netherlands, Thailand, and New Zealand; and
- (9) Salt imported via different ports – opportunity to isolate and target certain areas.

### **Safety**

DEC has been widely used as anti-helminthic for a long time and its safety is well recognized. Overdosing DEC from DEC salt is very unlikely as one would need to consume salt in an excessive quantity (~2kg at once). Salt intake is fairly constant over time and across populations, and thus a risk of over- and under-dosage is minimal.

### **Cost comparison**

The current estimates suggest that DEC salt distribution would be far more affordable than MDA (DEC tablet distribution) in Papua New Guinea (Figure 20).

**Figure 21: Cost Comparison**

COST COMPARISON			
DEC Salt cf Tablets			
	DEC SALT PNG (est.)	DEC TABS PNG (est.)	DEC TABS EGYPT actual)
Prep & MDA Per person per round	U\$0.60	U\$2.05	U\$1.56
Total prep & MDA	\$10,095,500 (6,000,000 persons))	\$66,182,000 (6,000,000 persons)	U\$3,200,000 (1,795,000 persons)
TOTAL Prep & MDA & Post MDA	\$ 15,384,370	\$70,924,439	

### **Evidence**

Numerous studies have been carried out on DEC salt studies. In the People's Republic of China, DEC salt was extensively used in conjunction with DEC tablet distribution, covering an estimated 200 million people, and made an important contribution to elimination. In a recent Cochrane Review, authors systematically examined 21 studies and found large percentage reductions in Mf prevalence (43% to 100%), which were consistent in most studies with high levels of coverage.<sup>4</sup> They concluded that "high population coverage of DEC-medicated salt maintained over at least six months in a community is effective at reducing transmission of LF and can, if maintained over a long enough periods, completely interrupt transmission."

### **Failure and successes**

- (1) In Guyana, DEC salt was introduced as a sole strategy for LF control in 2003. However, the programme has not been as successful due to poor programme management, resulting in inability to respond to problems. This experience highlights the importance of strong programme management.
- (2) In addition to the People's Republic of China, DEC salt has been successfully tried in multiple countries, including Haiti and India. In Haiti, positive results have been reported by a pilot project in Miton and the ongoing programme (requiring additional funding for the scale up). In India, more than 100 000 people have been receiving DEC salt over the past four years.

### **Implementing DEC salt in Papua New Guinea**

Good coordination across different levels of government administration and close collaboration between multiple sectors are essential. Considering these issues, it was proposed that Papua New Guinea should build a team dedicated only for LF elimination and DEC salt implementation. The team should:

4. S. Adinarayanan, J. A. Critchley, P. K. Das, & H. Gelband, 'Diethylcarbamazine (DEC)-medicated salt for community-based control of lymphatic filariasis,' *Cochrane Database of Systematic Reviews* 2007, Issue 1.

- (1) consist of about six persons;
- (2) report to WHO, Department of Health, and SIA Committee;
- (3) approve detailed work plan and funds;
- (4) be fully equipped with transport, communications, and facilities; and
- (5) be responsible for multi-departmental, multi-sectoral coordination.

Potential responsibilities of the team are to:

- (1) Monitor and ensure DEC salt manufacturers in line with standards.
- (2) Set-up and monitor DEC salt quality control system.
- (3) Monitor DEC salt imports, amount, timing, etc.
- (4) Monitor salt supply to communities by coordinating with the distributors.
- (5) Carry out continuous community-based salt consumption surveys nationally.
- (6) Develop and implement national awareness campaign for LF and use of DEC salt.
- (7) Build appropriate relationships with various stakeholders and incorporate their work and ideas into the programme.
- (8) Solve problems as they arise.

### **Conclusions and recommendations**

DEC salt has a good potential as a national LF elimination strategy for Papua New Guinea. The effectiveness of DEC salt has been shown under various circumstances. The recent analysis also suggests the cost effectiveness of DEC salt over tablet distribution. As DEC salt distribution will involve multiple sectors and different levels of government administration, good management and detailed planning are critical. The following recommendations have been made to Papua New Guinea for DEC salt to be implemented in the next few years:

- (1) Department of Health should begin to plan now for the implementation of this strategy along lines outlined.
- (2) Pilot programme should start post haste.
- (3) Project proposal should be written and funding sources should be aggressively courted.

### **Questions and comments**

HB: You have stressed the issue of overdosage to be unlikely. What about under-dosage?

TM: I am not sure what you mean by under-dosage. Do you mean that the correct quantity of DEC would not be in salt?

HB: No, I meant when people do not consume enough salt.

TM: One advantage of using salt as vehicle is that intake is relatively stable and consistent. So DEC intake will also be stable and consistent over time. Over a year, 0.3% DEC in salt would amount to 8g of DEC.

CP: I think you have done a good study on feasibility. A number of studies have been carried out in the past, starting in 1940s in Brazil, then in Tanzania, and many studies in India. All studies have clearly shown that Mf prevalence drops nearly to zero within six months and the low level is sustained more than a year or so. Percentage of DEC per gram of salt seems to vary by study



from minimum of about 0.2%. You could increase it up to 0.4%. Even at 0.4%, very few side-effects have been reported. So, a number of studies, including the one in Papua New Guinea, have shown that DEC salt is a feasible strategy. One issue is quality control, which needs to be maintained starting from manufacturing to distribution. This had been a problem in Guyana. Cost wise, I think it would be a problem if DEC salt cost is more than normal salt when you are trying to convince consumers to buy DEC salt. But if you are able to get manufactures to produce good quality DEC salt, NGOs and other groups would be able to buy DEC salt and distribute it for free. In Tanzania, when DEC salt was free, people were happy to use DEC salt. When it was sold, the cost factor was an issue. One important aspect of DEC salt is that it acts as prophylactic. If you consume DEC from salt on a daily basis, you are protected even when infected mosquitos bite you. It acts as prophylactic as well as curative agent. The question now is how we can proceed. It is a question of implementation, logistics, and management.

TM: I expect we would have minimum interference with the existing salt distribution system. That is where you get comparative advantage (i.e. compared to MDA). In the case of Papua New Guinea, manufacturers are in India, the People's Republic of China, Thailand, etc., and have large sophisticated facilities with good manufacturing practices. This would add some complexity, but once DEC salt is made properly at those facilities with some monitoring by the LF team and the Papua New Guinea regulatory agency, DEC salt is ready and good quality when it comes to Papua New Guinea. We do not want to get involved in salt business.

MA: We know that scientific pieces of evidence support DEC salt. The main thing now is how to sell this idea to Ministry of Health in Papua New Guinea and to the Government. It seems that the prerequisite for success presented is a condition too ideal in reality. In the People's Republic of China, it was possible because of the Chinese Government.

KR: If you ask manufacturers in India or the People's Republic of China to make DEC salt and import it, lots of governmental procedures and policies will be involved. It may be simpler to mix DEC when you repack once salt arrives in Port Moresby, then repackage DEC salt into 1kg or 2kg package. Can we ask one manufacturer to medicate salt with DEC? The rest will produce normal salt. There would be no price increase because DEC has no cost. We need to communicate with DEC importers. This is what we did in a small scale in India.

EP: By law, salt imported to Papua New Guinea is already iodized. We do not import salt unless it is iodized. To build a facility in Papua New Guinea to medicate salt would require a government intervention to ensure that the quality and manufacturing process are in accordance with our laws and standards. Similarly, rice imported to Papua New Guinea needs to be vitamin-enriched. Otherwise, it cannot be imported. I think that is the strategy we can move on with DEC salt. There is already some discussion at the Food Safety Council, which I am the Chairperson, as to how feasible it is to put DEC in salt. We just need to look at what mechanisms are already in place in the country and how we can utilize them in to implement this programme.

TM: What Dr Kapa Ramaiah suggests is that you bring unfortified salt in Papua New Guinea, fortify it with DEC, repackage, and then distribute. What I suggested was to ensure salt comes in already fortified with DEC. Again, this depends on what we have here in Papua New Guinea. There is no local repackaging or bulk importer in Papua New Guinea. All salt comes in packaged and is supposed to be iodized according to the amendment made in 1995 to the Pure Food Act. For DEC salt, there would have to be some regulatory adjustment. Again, it all depends. In a pilot study, you may just want to look at one area of the country. In that case, you may want to ask one manufacturer or if you are looking at only 100 000 people, you may just want to set-up a facility to medicate salt with DEC locally. So things have to be well laid out and tailored to the situation you are dealing with. Once the pilot proves what you wanted to prove and you decide to go national, we go to the manufacturers at source. These are some of the complications of this

programme. I should also add that this is a very different way of working because it involves many departments, including food and sanitation, as well as private sectors, for example, salt importers and manufacturers overseas. It may be different from what we are used to do in public health.

ES: DEC salt is a scientifically good public health intervention. However, there are some prerequisites that need to be in place as presented. Some of the issues raised are lots of commitment, good coordination, and appropriate regulatory approval. To me, the question is not much of scientific evidence, but is there enough managerial capacity and human resources to programmatically move forward. That is the most important issue. In the context of Papua New Guinea, DEC salt is probably the most feasible option for filariasis, but to move forward we need human resources and people who are committed. It is simply using the existing commercial channel, but it requires substantial efforts to get this going. That is where I think the main challenge lies.

JE: Whichever you look at it, whether you chose MDA or DEC salt, it will require very complex groundwork. Especially for DEC salt because there are many suppliers. In Guyana, we had a successful experience in terms of marketing strategies, subsidy issues, and technical issues with fortification and putting DEC salt in a market and competing with other unfortified salts. We managed to solve these and the marketing was quite successful. DEC salt competed out pretty much all the other salts. In Papua New Guinea, we also talked about tin fish but that would add whole another layer of issue dealing with tin fish industry and how do we get them on-board. I would favour a pilot, which gives you an opportunity to work out all the issues.

TM: It is not a magic bullet. Starting in a more controlled fashion may be a way to do a pilot, for example, by choosing areas where you have much more control over many factors. I would also like to comment on tin fish since it was raised. Again, tin fish raises another complicated issue. Fish export is a large industry in Papua New Guinea. You would need to work with manufacturers to segregate, for example, fish going to the United States of America and fish for local consumption. Otherwise, you would get into a big problem. These are some of the issues with tin fish.

EP: What about flour?

TM: For flour, individual consumption levels vary. You may not realize, but you take fairly consistent amount of salt. The level of flour consumption depends highly on individual dietary habit. It is hard to estimate how much DEC would be consumed if flour were to be fortified. But with salt, you would get consistent dosage of DEC.

## **2.16 Verification of elimination of LF**

Dr Patrick Lammie  
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Immunobiology Branch CDC

### **Introduction**

Elimination of LF is defined as reducing transmission of the parasite to a level where continued transmission (and recrudescence) is not possible (or extremely unlikely). To show that LF is eliminated, ideally, endemic countries need to document the absence of transmission. However, this is not possible in most countries due to lack of resources and tools. In practice, countries



should be able to document the absence of significant infection in a sentinel (sample) population. There was an intense discussion on verification process about five years ago. However, since then, little has been acted upon by WHO.

### **Stopping MDA**

The new protocol for stopping MDA was presented earlier by Dr Kapa Ramaiah. In the context of verifying elimination, the stop MDA process is a starting point of surveillance. Globally, PacELF has been a leader in driving a discussion on what surveillance should be for a LF elimination programme. While survey methodologies largely differ between the global and PacELF surveillance strategies, CTS in the Pacific Region has provided much of the underlying principle behind the surveillance strategy currently tested at the global level.

**Figure 22: Stopping MDA**

### **Stopping MDA = Baseline Surveillance**



- **A natural transition from stopping MDA to surveillance**
- **Definitive survey of primary school-age children repeated at 2-3 year intervals**
- **Role of Xenomonitoring?**
- **How many surveys are sufficient?**

### **'Verification' guidelines**

Verification guidelines have not been officially endorsed since they were presented to Technical Advisory Group (TAG). According to the guidelines, the two key elements towards elimination and verification are: (1) adequate surveillance (i.e. surveillance in place and appropriate surveys carried out); and (2) thorough documentation. The second element requires careful monitoring and quality data management. It is absolutely essential for completing the verification process, but unfortunately, it has been universally a weak component of LF programme at a country level.

### **The dossier**

Once all necessary information becomes available, the next step of verification is preparation of a dossier presented as evidence of elimination. The dossiers submitted by the People's Republic of China and the Republic of Korea were a book. For the Pacific Region, PacELF could prepare a book, for which each country will contribute a chapter. The dossier should detail the following four elements:

1. General description

- (a) geographic and economic features of the country;

- (b) adequacy of the health system to detect affected persons and provide them treatment;
- (c) distribution, feeding behaviour, density, and competence of the vector mosquitos;
- (d) immigration patterns to and from filariasis endemic areas; and
- (e) occurrence of LF in neighbouring countries.

## 2. History of LF

- (a) detailed description, including maps, of historic foci of LF transmission;
- (b) evidence for the absence of filariasis in areas considered non-endemic: How were these defined and what surveillance was done; and
- (c) description of filarial disease, including geographic distribution, prevalence, and treatment for the various clinical manifestations.

## 3. Interventions

- (a) detailed description of MDA, and ancillary measures, such as vector control, environmental and economic improvement;
- (b) review of case management for filarial disease;
- (c) detailed description of surveys to evaluate the impact of these measures (e.g. Mf and Ag surveys), including any sampling undertaken as part of the decision to stop MDAs or other interventions; and
- (d) review of any data collected on the impact of interventions on filarial disease. For example, in the Republic of Korea, changes in socio-economic status in the affected communities, comparing 1960s, 1970s vs. 1990s, were examined as they were indicative of changes in transmission risk.

## 4. Surveillance

- (a) full review of any surveillance activities post-MDA, including a description of case follow-up activities completed for each positive case detected: In PICs, how were the positive children identified through CTS being followed and treated?;
- (b) review of the filariasis case reports through routine disease surveillance or other systems for case detection;
- (c) evidence that adequate surveillance was conducted in all previously endemic areas and areas of uncertain endemicity; and
- (d) details on surveys done in cross-border areas and in immigrants from filariasis-endemic areas.

## **The process**

The currently proposed verification process involves the following steps:

- (1) The national programme manager notifies WHO of his or her intent to submit the dossier. The programme manager may request support from the WHO, RPRG, or WHO Collaborating Centre. In the case of PICs, support can be obtained from WHO Office in Fiji, PacCARE, or JCU/Dr Wayne Melrose.
- (2) The programme manager submits the dossier to WHO for initial screening.
- (3) WHO presents the case to RPRG for its comments.
- (4) The TAG\* (STAG) reviews the recommendations of the RPRG and gives its recommendations to WHO.

\*TAG for LF no longer exists. STAG covers all NTDs.

*Key message – Good management of data is crucial for the verification process*

### **Questions and comments**

JE: In terms of tools we are using to verify and certify LF elimination, for example ICT, Mf slides, PCR, ELISA, and xenomonitoring, could you clarify as to what tools we should be using when assessing transmission is really interrupted and the current status of each tool?

PL: I will talk more on this tomorrow when I review Gates Foundation's funded operational research findings. I think that tools currently in use (ICT for *Wuchereria bancrofti*, Brugia Rapid test and pan-filaria for *Brugia*) are not ideal. We have not made a good transition from antigen detection to antibody detection and unfortunately, we have not made much progress over the last five-year period. There are some surveillance studies supported by the Gates Foundation's grants that look at antibody testing and particularly at xenomonitoring. One of the main challenges faced by groups working on xenomonitoring is how to sample a mosquito population in a robust fashion. This has been an issue discussed extensively and there is a protocol developed to start looking at this issue. Sampling is a lot more challenging for mosquitos than for humans. The operational question here is whether xenomonitoring provides us with an adequate representation of transmission in a community. The Gates Foundation is providing some support for Binax Inc. to switch from the horrible and expensive ICT to something cheaper and potentially more robust. If successful, we are hoping that this would cut the cost of testing by at least a third, if not a fourth. For the moment, we have what we have got – tools that we have been using and we have a lot of comforts with, especially in the Pacific Region with ICT. Hopefully, that is going to give you the most information you need.

JE: How is the onchocerciasis group doing now on tools? They have even less ideal tools.

PL: Unfortunately, they have not made much progress on tools either. They may get away with it in Americas but not in African Region.

JE: The dynamics of LF in PICs is very different from the dynamics in the People's Republic of China and the Republic of Korea. We may need a much more sensitive tool than what we had in the People's Republic of China and the Republic of Korea.

PL: That is a good question. From a programmatic side, use the tools you have. One of the questions hopefully answered by some of ongoing operational research is whether or not in the Pacific setting with *Aedes* there are higher concerns for potential reservoirs. In that case, you might switch to older age groups. That is one of the recommendations we could make using existing tools. We do not have enough data to support that kind of recommendation yet and that is why it has not been officially recommended. From a researcher's point of view, I know antibody testing is far more sensitive. I find antibody-positive children in American Samoa but do not see any antigen positives among the same children. Dr Wayne Melrose has also confirmed this in many of the islands. This indicates that there is at least some transmission. That transmission may not be adequate to produce active infections but it is transmission. What is the implication? I do not know but in *Aedes* countries in the Pacific Region, default may be to do another round of surveillance, which can be relatively easily accomplished at low cost in the countries where "2007" surveys were done. Truthfully, the 2007 surveys are the best surveys of the world and this Region has shown the rest of the world how to do the work.

LV: According to your presentation, the dossier needs information on a surveillance system for filariasis cases or a review on filariasis case management. Some of PICs do not seem to have morbidity cases. Is there anything that they are expected to report in this regard?

PL: What I presented was based on the white paper that was global in scope. All of the recommendations are not applicable to every country. One question that a Review Group to Costa Rica, Trinidad, Malaysia, etc. has asked was if the health system has an adequate recognition and follow-up of hydrocele cases or lymphoedema cases, or in a country where non-*Bancrofti* filariasis is endemic, if there is any recognition of, for example, *mansonelliasis*, which is common in the Caribbean Region. If answers to these questions are “no, not yet,” that is a strong indication that the system is not capable of picking up the weakest indicators. There might be slightly different packages for different regions. For example, in areas where malaria is endemic, we could ask if laboratory technologists are capable of identifying filarial parasites.

CA: It there going to be a lot of duplication in reporting. This is going to be a lot of work for programme managers.

PL: Your points are well taken, but for example, annual reports really need to be collated and you need something a little more comprehensive. If your past reports are a good quality, it is not going to take a lot of time to put them together to make something more comprehensive. In the Pacific Region, we are not talking about a book. We are talking about a book chapter. If you have electronic copies of annual reports, it is going to be a cut-and-paste job. It should not take a huge amount of effort.

CP: The verification process itself is not as complex. It is an inspection of data as done in the People’s Republic of China and the Republic of Korea. It is important for the programme manager in the Pacific Region to start thinking about how to put the data together. Regarding verification tools, my feeling is that there is no one way. You have to use what is available. The more you verify the better. Even in a big country like the People’s Republic of China, a number of approaches were used to show the absence of transmission. The People’s Republic of China still has very low level transmission in some foci but it is no longer a public health problem. But in this part of the world, it will be different in terms of transmission. You do not want to have any transmission. Something like PCR may be useful. You may have to work out what countries would be eligible if that is going to be tested.

### **Group and individual work**

Approximately three hours was allocated for group and individual work. Each country was given a draft matrix with anticipated activities and budgetary needs up to elimination prepared based on the earlier presentation. A summary of discussion points from Days 1 and 2 was also provided.

### **Objectives**

For all countries, except for Papua New Guinea, the objectives of individual work were to:

- (1) update the matrix provided until elimination is reached (be realistic...);
- (2) identify possible programmatic gaps that may threatened the updated plan; and
- (3) estimate or revise budget needs.

For Papua New Guinea, a group consisting of technical experts and Papua New Guinea national staff (chaired by Dr John Ehrenberg) was formed to facilitate brainstorming and discussion. The specific objectives of the session were to:

- (1) Brainstorm on bottlenecks: Why was the national plan developed in 2007 not implemented so far?
- (2) Identify realistic options or mechanisms to address and avoid these issues as of now.
- (3) Develop a plan up to the end of 2010 addressing the bottlenecks and targeting top priorities for the LF programme.

At the end of the session, each country was expected to present the following:

- (1) updated matrix, including budget estimates until elimination;
- (2) list of potential issues and how to address them; and
- (3) Papua New Guinea: List of issues faced so far, mechanisms to address them, and a plan until December 2010.

### **Revised national plan and budget to reach verification**

Kiribati (presented by Mrs Teiti Bwenawa)

Activities	2010	2011	2012	2013	2014	2015	2016	2017	2018
Surveys	Cov	post-MDA							
MDA	MDA FU T&T	FU T&T							
Surveillance			CTS CTS CTS		CTS CTS CTS		CTS CTS CTS		
Other								Prep veri	Verification
Subtotal for MDA/ surveillance	12 000	9000	21 000		21 000		21 000		
Subtotal for morbidity	10 000	1000	1000	1000	1000	1000	800	800	500
Total cost (AUD)	22 000	10 000	22 000	1000	22 000	1000	21 800	800	500
Estimated cost required for LF elimination and verification									101 100

*Note: red = South Tarawa; green = Line Islands; blue = Gilbert Islands, excluding South Tarawa*

Cov = coverage survey; FU = follow-up of positive cases; T&T = test and treat; CTS = child transmission survey; prep veri = preparation for verification

Targeted MDA in South Tarawa in 2010 will be followed by a coverage survey. In 2011, a post-MDA survey will be conducted in South Tarawa. In Line and Phoenix Islands, follow-up and treatment of positive cases as well as “test and treat” will continue until 2011. All three areas (South Tarawa, Line and Phoenix Islands, and Gilbert Islands, excluding South Tarawa) will implement CTS in 2012, 2014, and 2016. Following the preparation for verification in 2017, Kiribati aims to achieve verification in 2018. Morbidity control activities currently implemented will continue until verification. Management of elephantiasis cases will be maintained even after verification.

No questions were asked by the panel.

Samoa (presented by Ms Miriama Puletua)

Activities	2010	2011	2012	2013	2014	2015	2016	2017	2018
Surveys	Cov	C survey	Cov	Cov					
MDA	Whole country		Targeted	Targeted					
Surveillance					CTS		CTS		
Morbidity control	Whole country								
Other								Prep veri	Verification
Subtotal for MDA	108 000	30 000	30 000	30 000					
Subtotal for surveillance	5000		5000	5000	30 000		30 000		
Subtotal for morbidity	30 000	10 000	5000	5000	5000	5000	5000	5000	5000
<b>Total cost</b>	<b>152 000</b>	<b>40 000</b>	<b>40 000</b>	<b>40 000</b>	<b>35 000</b>	<b>5000</b>	<b>35 000</b>	<b>5000</b>	<b>5000</b>
<b>Estimated cost required for LF elimination and verification</b>									<b>357 000</b>

Note: Cov = coverage survey; CTS = child transmission survey; prep veri = preparation for verification

Samoa plans to conduct another round of nationwide MDA in 2010 followed by a coverage survey. Following the third C survey in 2011, target MDA for high-risk areas and non-compliers (followed by a coverage survey each year) will be implemented in 2012 and 2013. CTS will be conducted in 2014 and 2016. Following preparation for verification in 2017, Samoa aims to achieve verification in 2018. Morbidity control will be implemented starting in 2010.

No questions were asked from the panel.

Federated States of Micronesia (presented by Mr Moses Pretrick)

Activities	2010	2011	2012	2013	2014	2015	2016	2017
Surveys	Baseline*							
MDA								
Surveillance		CTS (Y)		CTS (Y)		CTS (Y)		
Other							Prep veri	Verification
Subtotal for MDA/ surveillance	83 000	15 000		15 000		15 000		
Subtotal for morbidity	5000	2000	1000	1000	800	800	800	500
Total cost	88 000	17 000	1000	16 000	800	15 800	800	500
Estimated cost required for LF elimination and verification								139 900

Note: Cov = coverage survey; CTS = child transmission survey; prep veri = preparation for verification; Y = Yap

\*Baseline surveys in three states (Chuuk, Kosrae, and Pohnpei)

In 2010, baselines surveys will be designed and implemented in the three remaining states (Chuuk, Kosrae, and Pohnpei). A short-term consultant will be needed for the development of survey protocol for the three states and possibly for post-survey plans. These surveys will be costly (US\$ 83 000) due to expected high transportation cost for island areas. Future activities in the three states will depend on the survey results. Yap State will implement CTS in 2011, 2013, and 2015, which may incorporate a STH survey. Federated States of Micronesia aims to achieve verification in 2017.

**Questions and comments**

KR: The objective of morbidity management is to strengthen the existing health system and it should not be implemented within a vertical programme. LF elimination programmes are not expected to take care of patients. That is generally a responsibility of public health system. Otherwise, it would be very difficult for the programme to implement morbidity management as well as MDA.

CC: The idea of morbidity control in the Pacific Region is to identify the patients first.

KR: But they are supposed to go to the community hospitals. Morbidity management should be integrated with primary care. Health workers need to be trained to take care of the patients and to teach the patients what they need to do to take care of themselves. You cannot change the policy. LF programmes should just refer the patient to the health system and the system should take care of the patient.

MA: The objective of morbidity control is to identify those with morbidity first and to refer the patients. In most of the countries in the Pacific Region, we do not know where the patients are, so the programme will help identify them.

KR: LF programmes are not responsible for morbidity management.



JE: I think we still need to have a budget for training health workers and incorporate training into the health system. At this point, that kind of capacity building for morbidity management should be included in our budget. No health system in our Region is yet capable of taking over LF morbidity management without any support. For example, countries do not normally invest in training surgeons for hydrocele surgery.

Palau (presented by Ms Johana Hana Ngiruchelbad)

Activities	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Surveys	Baseline				Post- MDA						
MDA		Target 2/year	Target 2/year	Target 1							
Surveillance						CTS		CTS		CTS	
Other										Prep veri	Verification
Subtotal for MDA/ surveillance	21 000	1000	1000	500	500	1500	0	1500		1500	
Subtotal for morbidity											
Total cost	21 000	1000	1000	500	500	1500	0	1500	0	1500	0
Estimated cost required for LF elimination and verification											28,500

Note: CTS = child transmission survey; prep veri = preparation for verification

In 2010, Palau plans to:

- (1) survey the whole population in Ngardmau Village (n = 350) where Ag prevalence in 2000 was 3.7%;
- (2) survey using cluster sampling for the rest of the country (short term consultant will be needed for protocol development); and
- (3) screen migrants (about 5000 migrant workers from the Philippines).

These surveys are considered as baseline as no proper survey has been conducted to assess Palau's baseline LF status. The breakdown of 2010 budget is (1) staff hiring US\$ 12 000; (2) printing material/media campaign materials US\$ 5000; (3) training and data management US\$ 1000; and (4) transportation US\$ 3000. Areas with higher prevalence found during the 2010 surveys will receive twice yearly targeted MDA in 2011 and 2012, and once in 2013. According to this plan, CTS will be conducted in 2015, 2017, and 2019 and verification will be achieved by 2020.

### **Questions and comments for Palau**

CC: We worked on the worst case scenario meaning that Palau finds above 1% prevalence in 2010. If it is below 1%, we can verify elimination in 2012. In the worst case scenario, which is what was presented here, they find areas requiring target MDA in 2010. They think they can do two MDA per year. According to the scenario, they will do five rounds of MDAs and five years of surveillance.

HB: Looking at the figure, any reactions or comments from other stakeholders?

CP: Are these budget estimates based on available local resources, or any resources?

CC: The objective of this budget is to estimate how much would be needed to finish the job. We are going to put these together to have an idea. These are all estimates on how much it would cost to achieve verification.

WM: I guess this is a general issue. Regarding the idea of screening immigrants from the Philippines, the Philippines always had *Brugia*. What is the main vector there?

CP: Mansonia.

WM: I wonder if we need to keep that in mind when we do survey.

JE: It does not necessarily mean that they cannot transmit *Wuchereria bancrofti*, is this correct?

LR: I do not know whether that is possible.

WM: We would not be able to test *Brugia* with ICT.

CP: Only certain areas of the Philippines (e.g. Palawan and Mindanao) are endemic to *Brugian filariasis*. Are the migrants coming from Palawan?

JE: No.

CP: Most of the other areas are *Bancrofti filariasis*.

JN: Are you suggesting that it is not necessary to screen the migrants?

WM: I am just wondering whether there is *Brugia* in Palau.

JE: The migrants from the Philippines to Palau are not from Palawan. They are mainly from the mainland.

JN: Some are from Cebu and other areas, but mostly from the mainland.

WM: So, that is not an issue then.

**Day 3: 11 November 2009**  
**Chair: Mr Manila Nosa**

### **Wrap up of Day 2**

Professor Dato Ramachandran summarized the main points during Day 2 including:

- (1) The countries presented on Day 2 (Cook Islands, Niue, Tonga, and Vanuatu) were approaching elimination. The frequency and timing of CTS in these countries with very low Ag prevalence will need to be further discussed.
- (2) Vanuatu and Niue discussed briefly about STH and their current deworming activities. Most countries in the Pacific Region do not have recent STH prevalence data and conducting STH surveys similar to the ones conducted from 2001 to 2002 is important not only to obtain up-to-date STH status but also to assess the impact of MDA on STH.
- (3) Since 2007, little had been achieved in Papua New Guinea. Past MDAs (2005 and 2006) did not achieve effective coverage. Ongoing LLIN distribution funded by the Global Fund may be an opportunity for the LF programme to piggyback, although challenges exist (low usage, programmatic issues with integration, etc.). LLINs may have a direct impact on LF control but further studies are necessary.
- (4) Papua New Guinea's main challenges have been financial and human resource constraints. Logistical challenges in Papua New Guinea also impacted MDA. Lack of commitment by the Government and the Ministry of Health needs to be addressed urgently. A packaged/integrated approach for NTDs has been discussed in Papua New Guinea. This may be a way forward for LF to garner a stronger commitment from the Government and to improve public awareness (e.g. STH as an entry point for MDA).
- (5) DEC salt strategy has a good potential in Papua New Guinea but is not a magic bullet. Good management, detailed planning, and inter-sectoral and inter-departmental collaborations are essential. It is safe and effective. It can be feasible but needs a dedicated team to coordinate all activities from implementation to monitoring. A pilot study should be implemented soon to assess feasibility in Papua New Guinea.
- (6) In preparing for verification, good record keeping and data management are critical. Once all relevant information are ready, a dossier should be prepared. While it is a challenge, all PICs are on the right track towards verification and the process itself is straightforward.

**Cook Islands (presented by Mr Charlie Ave)**

Activities	2010	2011	2012	2013	2014	2015	2016	2017
Surveys	Pukapuka and Aitutaki							
MDA	T&T							
Surveillance		CTS 2004/2005		CTS 2006/2007		CTS 2008/2009		
Other							Prep veri	Verification
Subtotal for MDA/ surveillance	8000	5000		5000		5000		
Awareness and publicity	2000	5000		5000		5000	5000	5000
Total cost	10 000	10 000	0	10 000	0	10 000	5000	5000
Estimated cost required for LF elimination and verification								50 000

Note: CTS = child transmission survey; prep veri = preparation for verification

Cook Islands plans to survey two islands (Aitutaki and Pukapuka) in 2010, where ICT positives were reported in the past. A CTS targeting six- to seven-year-olds will be implemented in 2011 (children born between 2004 and 2005), 2013 (children born between 2006 and 2007), and possibly in 2015 (children born between 2008 and 2009). Cook Islands expects no morbidity issue in the country (thus not budgeted). Awareness and publicity for surveys were budgeted separately. Cook Islands aims to achieve verification in 2017.

**Niue (presented by Mr Manila Nosa)**

ACTIVITIES	2010	2011	2012	2013	2014
Surveys					
MDA					
Surveillance	Screen immigrants		CTS		
Other				Prep veri	Verification
Subtotal for MDA/ surveillance	2500		2500		
Awareness and publicity					
Total cost	2500	0	2500	0	5000
Estimated cost required for LF elimination and verification					10 000

Note: CTS = child transmission survey; prep veri = preparation for verification

In 2010, Niue will not be carrying out CTS, although it was initially planned, since all children on the island will be tested by the ongoing whole island survey. Instead, screening of immigrants will

be carried out. Following a CTS in 2012 (about 40 children), the country aims to achieve verification in 2014.

**Tonga (presented by Dr Malakai Ake)**

Activities	2010	2011	2012	2013	2014
Surveys					
MDA					
Surveillance	CTS		CTS		
Other				Prep veri	Verification
Subtotal for MDA/surveillance	20 000		20 000		
Subtotal for morbidity	5000	5000	500	500	500
Total cost	25 000	5000	20 500	500	500
Estimated cost required for LF elimination and verification					51 500

Note: CTS = child transmission survey; prep veri = preparation for verification

Tonga plans to conduct the second CTS in 2010 and the third CTS in 2012. Following preparation for verification, Tonga aims to achieve verification in 2014. As travel costs have been increasing for the last few years, the estimated cost of surveys is slightly more in this plan than initially expected. Morbidity control will cost more during the first few years as the identification of patients will be the main activity.

**Vanuatu (presented by Mr Peter Malisa)**

Activities	2010	2011	2012	2013	2014
Surveys	Cov*	Post-MDA*			
MDA	Targeted MDA*				
Surveillance	CTS		CTS	Prep veri	Verification
Other					
Subtotal for MDA/surveillance	20 000		20 000		
Subtotal for morbidity	40 000	5000	5000	5000	5000
Total cost	60 000	5000	5000	5000	5000
Estimated cost required for LF elimination and verification					135 000

Note: Cov = coverage survey; CTS = child transmission survey; prep veri = preparation for verification

\* North Ambrym only

Vanuatu plans to carry out the last round of MDA and a coverage survey in North Ambrym in 2010. The second CTS will be implemented in the same year. A post-MDA survey will be implemented in North Ambrym in 2011. Following the third CTS in 2012, Vanuatu aims to achieve verification in 2014. The cost of morbidity control was budgeted up to 2020 (US\$ 5000 per year between 2015 and 2020) to maintain support for case management.

### **Comments and questions for Cook Islands, Niue, Tonga, and Vanuatu**

CP: There are three countries going through verification exercise in 2014, one country possibly in 2012, and the others in 2017 and thereafter. The budgets given so far are relatively small. The highest over US\$ 300,000 in Samoa and others are much less. The whole amount for the Pacific Region will come down to much less than US\$ 1 million. This is a very reasonable amount. It is good to know that the whole thing is coming to the end soon. Why are you delaying the whole process for so long in Cook Islands? You showed your activities are going until 2020.

CA: No. I think that should have been deleted. I meant to say 2015.

WM: In cases of Niue and Cook Islands where we have not seen Mf cases for many years, I wonder whether we need so many surveys. We are doing surveys in the countries where no Mf cases were found for the last five to six years. It seems that we are prolonging the procedure unnecessarily for too long.

CA: Those children born up to 2008 and 2009 will be tested with the three CTS.

MN: Although I presented 2014, we are aiming for 2012. Last year, in Fiji, we were talking about the issue of immigrants and most of recent cases have been those coming from outside the islands. We are hoping to push this to 2012 and we are ready to do it. We will give the next four years a try and see what happens. I am sure that we are one of the areas in the world finishing the business way ahead of time.

KR: I think it is acceptable for these countries to do one CTS in 2010, another one in 2012, and the last one in 2013, then prepare for verification. Regarding morbidity control, I propose that we support workshops or training for medical officers for morbidity management and hydrocele surgery, but we need to integrate the programme with primary care.

JE: We can put this on the agenda for PacCARE and then we will get back to you. I think these suggestions are very valid.

AH: Regarding the budget, we will need to ensure to account for inflation, especially when this is all wrapped up to be presented to our donors.

MA: We presented in 2007 that Tonga will do another CTS in 2009. It was planned for this year. It is not our fault that this process is taking so long. We just got the message this week that we should do the second CTS next year. We can do survey anytime as all officers involved in the first CTS are still in service and they are already trained.

JE: I think the progress that has been made is very impressive, especially with these four countries. The message here is that LF is eliminatable within a political lifetime of a politician. This is a very important observation. All of you have worked hard to compete with other priorities and to put LF as a high priority on the Ministry of Health's agendas. Whoever gets to harvest the success of elimination is going to be remembered for a long time because not so many diseases are eliminatable. That it is able to be eliminated within someone's political life is the most important advocacy tool



we have. When negotiating with politicians, we need to remind them that elimination is possible within their lifetime, and that they are going to see elimination.

**Fiji (presented by Ravinesh Chetty)**

Activities	2010	2011	2012	2013	2014	2015	2016	2017	2018
Surveys	second C survey (N), MDA Cov (C)	C Survey (C)							
MDA	MDA (C)								
Surveillance	CTS (W)	CTS (N)	CTS (C,W)	CTS (N)	CTS (C,W)	CTS (N)	CTS (C)		
Other	T&T (E), ILM-MH cooperation	T&T (E), OR*	T&T (E), OR	OR	OR	OR	OR	Prep Veri	Verification
Subtotal for MDA/ surveillance	157 500	110 000	80 000	20 000	50 000	20 000	25 000	2000	
Subtotal for morbidity	40 000	10 000	5000	5000	5000	5000	5000	5000	5000
<b>Total cost</b>	<b>197 500</b>	<b>120 000</b>	<b>85 000</b>	<b>25 000</b>	<b>55 000</b>	<b>25 000</b>	<b>30 000</b>	<b>7000</b>	<b>5000</b>
<b>Estimated cost required for LF elimination and verification</b>									
<b>549 500</b>									

*Note:* Cov = coverage survey; CTS = child transmission survey; prep veri = preparation for verification

C = Central Division; W = Western Division; N = Northern Division; E = Eastern Division; OR = operational research

\*Review of ongoing operational research in vector control

Fiji has planned activities up to verification for each division. In the Central division, where coverage was particularly low in 2008 and hot spots are expected, another round of MDA will be carried out and a coverage survey will be completed in 2010. The Northern Division will implement the second C survey while the second C survey for the Central Division is currently planned for 2011. The “test and treat” strategy will be maintained in the Eastern Division until 2011. Fiji’s CTS will start in 2010 from the Western Division and is expected to be completed in 2016 when the Central Division completes its third CTS. The budget for 2010 is rather large (expected government allocation is FJD 150,000) due to MDA in the Central Division (e.g. overtime for workers, media campaign to cover a highly mobile population in Suva) and test and treat in the Eastern Division (e.g. transportation costs to outer islands). Morbidity control will cost more in 2010 as a number of hydrocele surgeries and trainings for nurses are being planned. The country aims to achieve verification in 2018.

### **Questions and comments for Fiji**

CP: Good presentation. Fiji is the hot spot in the whole Pacific area. Fiji is one of the first countries in the world to study filariasis in 18th century. One of the earliest reports of clinical diseases was from Fiji and yet Fiji has one of the highest burdens in the Region. By 2020, I hope you will join the group. It is a difficult task, especially with outer islands, but it is manageable with proper management and preparation.

JE: You mentioned coverage was not good in the Central Division and therefore you are planning another round. When we take a look at the gaps of a programme, especially critical for Fiji, it would be important to see the coverage across rounds of MDA in any given division. If coverage went below 80%, I am not sure if you can count that as a round. You may even need to start counting again once coverage goes below 80%. Some of you have been counting low coverage MDA as a treatment round and adding them up. If your C survey or post-MDA surveillance shows low prevalence, you are OK but in Fiji, where you have some way to go, you need to be very picky about how you conduct MDA to ensure high coverage and to have a good understanding of coverage at the district, or smaller, level. When we start in Papua New Guinea, we are hoping to start from scratch and make sure that they have a very careful record of coverage, not at the IU level but further down to the smaller geographical units where the gaps are. This would allow you to identify hot spots more easily. In the case of Fiji, we may need to sit with you and with PacCARE to carefully look at this. Otherwise, we may be dragging out the process unnecessarily over a long period, and you may conduct a post-MDA C survey and come back and say “we have a problem.” How would that be more cost effective than collecting records and identifying gaps? That is something that you may need to consider. Some countries have been able to wiggle through this obstacle. But in the case of Fiji and certainly in Papua New Guinea, we need to ensure we understand the treatment coverage at a lower level. Another issue is compliance. We need to find a way to verify compliance. Programmes have limited human and financial resources, so we have to optimize as much as we can. These are some of the issues that PacCARE needs to take up and discuss carefully.

PL: Can you remind me of the population of the Central Division?

RC: About 345 000.

PL: When we start looking at the unit cost of treatment, it is not very high. Sometimes we get so fixated on the total number and lose sight of unit cost. But this is reasonable. This Region has a lot of challenges in terms of logistics. I am not sure if you have done a good job in highlighting issues like this. It is going to be expensive; especially having outer islands and so forth, but you

do not need to be so defensive about your cost. Your estimates are reasonable even compared to other countries.

MA: This question is for Professor Dato Ramachandran. Most of the cases were found on the island farthest from Tonga, actually closer to Samoa. Samoa is more highly endemic than Tonga. Is there a possibility of getting transmission from other islands? We need to look not only at individual islands but also at neighbouring islands.

CP: I do not have good answers to that. In an ideal world, all the neighbours should behave well, but that is not the reality. I think you should have a surveillance mechanism in place. I think we have similar issues in other parts of the world, for example in Malaysia and Indonesia. There are lots of cases of LF in Indonesia. Malaysia has few cases but many immigrant workers from Indonesia, although the possibility of introduction by immigrants is low.

FM: I think there is no need for Dr Malakai Ake to worry about transmission from Samoa, although those islands are geographically close. Mosquitos do not fly that far. My concern is for American Samoa. American Samoa is concerned about Samoa as Samoa is still slowly achieving elimination. I do not think there is much migration between the Niua group and Samoa.

WM: I think we have to be careful about the idea of migration and risk. For reintroduction to happen, you need to have a reasonable sized group of people move. That happens to be migrants. A small number of people moving between islands would be very unlikely to cause transmission. In Papua New Guinea, some places remain low prevalence even if they are surrounded by high prevalence areas for many years.

## **Papua New Guinea – Outcome of group work**

### **Summary of discussion points**

Mr Larbi Kwabena summarized issues and points raised during the group work in the previous day:

- (1) Two key prerequisites for the Papua New Guinea LF programme to make progress towards elimination are: (a) firm commitment from National Department of Health; and (b) strong support from provincial authorities. The programme needs the National Department of Health to place LF/NTDs on the health agenda and to commit adequate resources to provincial allocation from the national budget. It was agreed that a group of technical staff will meet with the Minister on Thursday.
- (2) All previous MDAs achieved coverage far below effective and thus they are null and void. MDA needs to begin afresh.
- (3) The following opportunities can be explored for potential benefits to MDA:
  - a) more effective or affordable models of disease control (e.g. partnership programme with churches or NGOs, already utilized in previous LLINs and supplementary immunization activity);
  - b) local level politicians to be brought on-board (e.g. Councillors, governors);
  - c) advocacy and communication to be improved (e.g. the upcoming health week to implement advocacy);
  - d) deworming; and
  - e) agreements with partners for accountability, monitoring progress (memorandum of agreement) to be formed

- (4) Challenges identified are: (1) large IUs (currently set at the provinces and may need to be reduced to districts); (2) human resource needs and suitable solutions; and (3) funding.

### **MDA**

- (1) Two provinces (Milne Bay and New Ireland) were selected as pilot “textbook” MDA sites. They were chosen because of a relatively high burden of LF and morbidity, good political commitment, good capacity of health systems and structure at the provincial level, potential for success, and more successful LLINs distribution compared to other provinces. In addition, these two provinces have good access.
- (2) MDA is currently planned from November to December 2009 in Milne Bay. MDA in New Ireland will be in September 2009. Strong long-term partnerships, especially with churches, needs to be developed and the LF programme needs to act immediately to make arrangements to guide future collaborations.

### **DEC salt**

- (1) DEC salt will be piloted. The preparatory work for the pilot study is expected to take nine months and DEC salt will be implemented for two years.
- (2) Three provinces (West New Britain, Bougainville, and Western Province) were tentatively selected as DEC salt pilot sites. The three provinces were chosen because they have a smaller number of suppliers, political commitment, and relatively better access.
- (3) Prior to implementing the DEC salt pilot, the programme will need to:
  - a. Obtain support from the medical profession and community.
  - b. Secure regulatory or ethical approval (Which is faster and/or easier?)
  - c. Identify funds and funding sources.
  - d. Examine cost issues (e.g. more expensive than non DEC salt?, subsidy, free or market price).
  - e. Get baseline for LF burden (prevalence or morbidity).
  - f. Get baseline for tin fish consumption.
  - g. Find a way to synergize with other interventions (e.g. LLINs).
  - h. Address logistical problems for delivery and monitoring, especially in the Western Province.
  - i. Identify suppliers who are willing to collaborate.
  - j. Identify the system of mixing salt with DEC, location and point of mixing.
  - k. Look at other examples to use as guide (e.g. iodization – coverage is about 60% to 70% of all imported salts).
  - l. Budget and develop work plans.

### **Morbidity**

- (1) Mapping LF morbidity can be done starting from sentinel sites but it is difficult to access all sufferers. The LF programme can also work with LLINs household survey teams (for example, adding extra questions on their questionnaires), and collect existing data from IMR or other groups. Raising awareness will encourage patients to register.

## **LLIN**

- (1) To assess LLIN impact on LF, IMR has been conducting entomological studies (infection rates in mosquitos are lower) and plans to undertake epidemiological study next year with pending funding approval. Dr Wayne Melrose volunteered to undertake the cost analysis for IMR study.

## **Budget for 2010 activities**

Papua New Guinea plans to implement the following activities in 2010:

- (1) MDA in Milne Bay (may start as early as December 2009);
- (2) MDA in New Ireland (September 2010);
- (3) morbidity mapping;
- (4) baseline surveys for LF and STH in New Ireland (M&E); and
- (5) preparatory work for DEC salt pilot.

A baseline survey for LF was conducted in Milne Bay in 2005 but it is not necessary. A budget was estimated for each activity. The estimates were presented by Ms Melinda Susapu, the National Coordinator for LF (Table 28). For the DEC salt pilot, a consultant will make a final decision on where to conduct pilot studies. The total cost for 2010 programme activities in Papua New Guinea is estimated to be US\$ 320 000 to US\$ 350 000.

**Table 28: Papua New Guinea budget for 2010**

Activities		PGK	US\$
<b>MDA</b>			
Milne Bay			
(1)	Facility planning and briefings	4000	1532.57
(2)	Officers' and volunteers' allowances	31 210	11 957.85
(3)	Transport and fuel cost	105 680	40 490.42
a.	fuel	30 450	11 666.67
b.	vehicle rental	75 230	28 823.75
(4)	Supervision	8000	3065.13
<b>Total for Milne Bay</b>		<b>148 890</b>	<b>57 045.98</b>
New Ireland			
(1)	Facility planning and briefings	4000	1532.57
(2)	Officers' and volunteers' allowances	30 000	11 494.25
(3)	Transport and fuel cost	52 770	20 218.39
(4)	Supervision	10 000	3831.42
<b>Total for New Ireland</b>		<b>96 770</b>	<b>37 076.63</b>
<b>Total for MDA 1</b>		<b>245 660</b>	<b>94 122.61</b>
<b>Morbidity mapping</b>			
(1)	Training to identify	20 000	7662.84
(2)	Update on questionnaire		
(3)	Training of data collector		
<b>M&amp;E</b>			
Baseline survey (LF in New Ireland)		12 000	4597.70
(1)	ICT costs (1000)/MF		
(2)	Travel to two sentinel sites (New Ireland)		
(3)	Allowance		
Baseline (STH in New Ireland)		10 000	3831.42
(1)	Travel and diagnostic tests		
<b>Human resources</b>			
(1)	Technical officer		200 000
(2)	Programme officer		15 000
(3)	Programme assistant		12 000
<b>DEC salt pilot</b>			
Preparatory work for pilot study			211 000
(1)	Consultant field visit to the two provinces		
(2)	Salt tracking and recording		
(3)	Consultant and coordinator travel to manufacturers		
(4)	Develop marketing plan		
(5)	Develop surveillance and monitoring plan		
(6)	Plan finalization		
(7)	Equipment		
(8)	Miscellaneous		
<b>Grand total</b>			<b>548214.56</b>



### **Questions and comments for Papua New Guinea presentation**

CP: I want to emphasize that what has been presented at this stage is merely suggestions. We want to confirm that is the way forward for Papua New Guinea. There are two components to this proposal. The first component is MDA in the two provinces. MDA was done earlier but now we consider the two MDA as pilot studies. One in Milne Bay will be implemented immediately and another in New Ireland in September 2010. The second part is the DEC salt pilot. It will take nine months of preparation followed by two years of implementation. The most important point we have to consider now is that we need a success story because without it we are not going to sell this. That we did not have any success stories was one of the earlier problems. So, by the end of the next two years, we have to demonstrate to the world and potential donors that we can do it, either through MDA or DEC salt, we have an approach to cover population. Once we have that success, potential donors will consider supporting us. I think the scenario was clearly spelled out in the presentation. As to political commitment, hopefully we will get it from the Minister and Department of Health at the meeting tomorrow. We also have other important issues such as human resource needs, and funding. These were the components spelled out in the presentation. I am not getting into details but what we should do now is to discuss a broad framework of the approaches. Are we happy with the plan that we are trying? The plan is that in the initial two years we will take two provinces for MDA and implement a pilot for DEC salt? Are these plans feasible? Are these the ways we are going to demonstrate successes in Papua New Guinea? I think we need to discuss this a bit more.

WM: One of my staff came back from Gulf Province two weeks ago and she was in tears because she saw all the suffering. There was an old lady lying down because she could not move with a leg so swollen for the last five years. She also saw cases of hydrocele with their scrotum coming down to their knee area. We have to face the reality that Papua New Guinea has a terrible morbidity problem. I would like to see the whole country do it better. We have to make a careful go at these two provinces and have to start thinking about success stories. There are already successful examples of MDA in Papua New Guinea, for example, one where LF was reduced to virtually nothing. We know MDA works in PNG. It is just a matter of getting evidence. I would like get those donors to see what is happening here because people are really suffering. I really support the idea of working on two provinces and a DEC salt pilot.

LSM: From a perspective of someone who has been involved in this programme for a long time, at the beginning we thought we could do it. We failed to consider problems in delivering MDA. We never thought about that one. We are starting again fresh. The idea of approaching it in different ways is the best direction we are taking now. If DEC salt works, it would make a lot of difference. The strategy we discussed yesterday on MDA in two provinces is probably a good one but we need to be careful because we actually need to do a lot of work. It is going to require a lot of advocacy. Without advocacy and without collaborating with NGOs and churches, we cannot succeed. Once that is established, it is possible to ensure higher coverage. In New Ireland, we have one year to do this. Advocacy and establishing the system (i.e. establishing links with NGOs and churches) is something that we are going to concentrate on and what we are going to spend our resources on. If you set it up once, it is going to be there all the time.

TM: When I was doing the DEC salt study, I had an opportunity to look through the records on MDA. I saw the efforts and there was a good plan I saw in Milne Bay and West New Britain. You could see where people really tried. You should not feel bad about it. We just need to come back do it better. One big thing is that there has to be have someone dedicated 24/7 to monitor constantly. Now we have the National Coordinator for LF. That will be a key factor for success.

PL: Mr Leo Makita's comment was to the point. The presentation had a bullet point referring to the role of churches and NGOs. It had question mark but instead it should have exclamation point.

There is a significant task associated with engaging the NGO and church community. But as Mr Makita pointed out, it is an important advocacy component, which is not reflected in the budget. With the investment you make in the initial engagement with the community, you harvest the benefits of the community over a number of years. I do not think anyone in the donor community would be disappointed if we made an appropriate investment in the first year recognizing that it is going to continue to provide the benefit over the subsequent years. One of the specific comments on the budget is that if you look at the per person treatment cost, this is not an expensive programme. For that reason, what you need to do is to allocate one of your people to sit down with church groups, community leaders, and NGO leaders over the next three- to six-month preparation period. We are not arguing for disengaging health sectors. There is going to be an eminent connection between the health sector and NGOs and churches. What is different is their roles. Health workers will be in a supervisory role. It is going to be the ownership, NGO ownership, and community ownership of the programme. In every country where the programme has been operating, the emphasis has always been the health benefits of MDA. Mothers, in particular, appreciate the negative impact that intestinal parasites have on their children. Initially, we made a big mistake by allowing GSK to convince us to minimize health education and social mobilization around deworming benefits. It is not doing that anymore. It is not putting any pressure on us. I think that MDA has a broad health benefit that needs to be highlighted and promoted. I agree with Dr Wayne Melrose that there are a lot of diseases out there. In many places that I have worked LF was considered as spiritual disease and it has been difficult to promote a chemotherapeutic approach (i.e. MDA). I think we have a lot of good ideas that have come out of our discussion and we need to ensure to put them in action.

AH: One of the other groups that could be engaged in this process is tertiary education, particularly schools of nursing. For example, there are schools of nursing in New Ireland. Some nursing students can be engaged and trained as a volunteer. When they go into service and once MDA starts, we have a trained nurse with intimate knowledge of how it works. That can work as advocacy for the programme. You could look at universities in the provinces and undergraduate populations. University students generally have good community acceptance. They are good advocates and tend to have good connections, sometimes political. They could help you make links with communities or local authorities and could help with some of the human resource problems. On the advocacy side, we can think of this more broadly than as health education, but also as a poverty reduction strategy and push the link between NTD and poverty. To support this, we need a good cost analysis.

MA: Some people here will see the Minister tomorrow. I never saw any workshop where a minister comes to provide some advice. For the past ten years, at the workshops on LF elimination, we are sharing our country experiences and we have been talking about the roles of churches, schools, and NGOs in MDA. Our first MDA in Tonga was done on Sunday once every month for one year. The very reason it was on Sunday was that tablets were distributed at churches. There are many examples in the Pacific Region working with churches for MDA. The purpose of doing workshops is to share our experiences and skills.

HB: I cannot emphasize enough the importance for the people of Papua New Guinea to address these issues within themselves. You are the best in terms of communicating with communities. You know the best about your culture and whom you need to reach out to spread the message to the population. In French Polynesia, you do not talk to people in Tahitian population like we do in the United States of America or Europe. First, it is important to recognize seniors. Otherwise, you will not be heard and will not be recognized. You may even jeopardize the perception in the community. In Papua New Guinea, you know this approach. Experts are there to help you.

JE: I agree with what was raised so far. WHO provides technical support and guidance and we try to advise, in the case of Papua New Guinea, realistic expectations based on what you have in terms

of human and other resources. Instead of going with an ambitious plan, we downscale the plan to what you can achieve. Which mechanisms (working with the church and the community, etc.) to be taken is up to Papua New Guinea. Our concern is that if we are to mobilize additional resources or provide technical guidance, we need valid data. Coverage and compliance data will be critical. Once post-MDA surveys are done, you will know how much impact your programme has had. It has happened in the past that countries report 100% coverage, but later when we look at it carefully, we find 60%, 50%, or even 40% coverage. Sooner or later, this will come up, and it will make us look bad. The experiences of churches and NGOs are very important. We recognize the roles and importance of partnerships with the private sector, including religious groups, but we have to find a formal or official link between the Ministry of Health and the private sector. For example, the Department of Health cannot ask for monthly coverage reports, etc., unless there is a formal arrangement. That is something we need to work out. Piggybacking on the Global Fund and the malaria programme are other issues as they have a very fixed idea of what they want to spend money on (i.e. malaria, TB, and HIV). That needs to be negotiated and a formal agreement needs to be made. The bottom line is that we have to be realistic, we have to downsize, and we need good coverage. We need success stories so that Papua New Guinea can prove that they can operationalize it and that it works. So I encourage you to brainstorm realistically. For example, you plan to treat in November, although realistically I think we need to wait until March. If you cannot treat in November but the community expects it, that would put us in a spot. If this plan works on a small scale and we get good coverage and compliance verified, we will stand a very good chance. You will have not only the Minister interested but also outside funding sources interested. That is critical. Also, malaria people will see the side benefits, in terms of surveillance and monitoring. There is already a discussion in the Global Fund to add another arm to include NTD. But ultimately Papua New Guinea is the one that calls the shots and decides how to work with your communities.

LV: Regarding piloting MDA and DEC salt, I would think one province will be more than enough, considering how critical it is to have success and knowing the limitations that you need to get this ready in 2010. In Vanuatu, two provinces have been earmarked for malaria elimination. But one of the provinces is already behind. To do interventions, documents, surveys, and reports, etc. takes a lot of time and effort. So, I am recommending to do just one province. One question that needs to be answered is whether you want to allow malaria money to be used for LF or if you want integrate LF into malaria and other programmes. We need to clarify who is doing what work and whether it is going to be only for LF or combined.

RC: I share the sentiments of our participants. I was wondering based on our experience in Fiji whether Papua New Guinea could consider the use of COMBI Plan. In Fiji, although we could not fully implement the plan, it worked very well and was very helpful in terms of building a good platform for collaboration at the divisional level.

SN: I joined the discussion yesterday and I would like to make one suggestion on budgets. According to the budgeting plan developed by the Department of Planning, last year PGK 900 000 was supposed to be allocated for the PacELF programme but allocation for this programme is uncertain. It would be good to invite someone from the Ministry of Health, who is responsible for budget and planning, to this workshop so we can discuss about allocation.

JE: What is the total budgetary allocation for the LF programme from the Government?

LSM: Zero.

JE: This is the very first thing that we have to put on the table. That the programme does not have any support from the Government does not look good to the outside. We need to have support from the Government and we need budgetary allocation to show that.

KR: We can raise this to the minister. Papua New Guinea has to bring LF to the same level as other diseases with a budget targeted for elimination, e.g. leprosy. LF should be regarded as high priority considering the progress made in other countries in the Region. Even symbolic allocation is important for gaining external support.

JE: The onchocerciasis elimination programme in Ecuador was running on zero budget for six years until they finally decided to allocate US\$ 15 000 a year towards it. It is very little money, but nevertheless, it was the gesture from the Ministry of Health towards the programme that provided the focal point and budget. It was very meaningful. The other issue I want to put on the table is about DEC salt. We are hoping that by starting in a small scale and gradually scaling up DEC salt we can cover a larger population. But, for the meantime, we should be developing other tools and testing, e.g. MDA. DEC salt could come as a back up tool should Papua New Guinea face trouble down the line with MDA. We need to know what our other colleagues in the Region think and whether you are comfortable with the DEC salt approach. Once you put drug in salt, salt becomes drug and we will encounter all sorts of problems. Even when technical issues such as with fortification process are sorted out, there will be many issues. We need to seriously discuss this as we are meeting with the Minister tomorrow.

KR: Unless the Government recognizes it (DEC salt) as a good alternative and is interested, it is very difficult for us and experts to push.

JE: I am not pushing at this point. That depends on you. I am interested in what you think.

LSM: I wanted to clarify about the allocation issue. When the department was restructured sometime ago, vector-borne diseases were lumped in together. Currently, when funds are released, it comes to the malaria programme and you do not have any practical money left for other programmes. What we were pushing with the previous Secretary was to establish a separate budget line, but nothing has happened since the Global Alliance Meeting in Fiji. We are undergoing another restructuring process and it seems that NTD will be established separately as a programme, which means there will probably be a budget line. One of the things that requires assistance from technical people is to ensure the Secretary understands the importance of having a budget line. We can raise this issue tomorrow when we meet the Minister. Regarding the issue of DEC salt, many of senior medical officers at least around Port Moresby are raising a concern about putting medicine in salt. Even after we explained that it has been done and there has been no harm, they are concerned. If you have resistance from certain sectors, our plans will not succeed. This is something that we need to go over. This has to ultimately come from the senior executive management, but it is another issue that we need assistance from technical people and experts to convince the population that DEC salt is safe.

FM: My heart goes to my colleagues in Papua New Guinea because I have seen their dedication and efforts. When we go back to our countries, the “how” is what makes the difference. Traditional systems and institutions we work in make the difference and determine how difficult or easy it is to implement a programme. I think I will support the DEC salt strategy. Aside from regulatory and legal processes they need to go through, it is a long-term process because unlike MDA, which kills parasites much quicker, DEC salt acts slowly and may take many more years for elimination. But we know it works and it is a sure kill.

WM: This programme (DEC salt) could be funded by AusAID. This is not a problem. When I spoke with them a couple of months ago, they said they do not fund the programme because Papua New Guinea does not think LF is important. They would fund it if they were convinced that Papua New Guinea considers NTD or LF as important.

CP: We need a firm commitment from the Ministry and donors depend on that commitment. We need to be successful from this initiative. If we do not, we will not progress very much. One question is who will be giving the green light for salt fortification. Do you have a medical council or committee who makes the decisions on these matters?

LSM: Professional societies such medical societies are not the formal, but informal expert groups who decide on these things. For example, to make changes in a malaria treatment protocol, they informally deliberated on it and made a recommendation to the senior management, where it was officially endorsed. We have been trying to involve them from the beginning of this salt pilot process rather than trying to convince them towards the end. There is no official group that is going to say go ahead. There is an ethics committee for research, but I am unaware of any other committees.

TM: The official procedure would be through the food safety committee. I spoke to some of them but did not detect any problem. Within the Department of Health, I remember nutrition people did not like the idea. But we just began the process of exposing them to this concept and will need more education. They were not able to give any scientific basis for their concern and it was just their gut-feeling at that time. But it would not pose a big problem if we have education, not one time, but repeated continuously. This is part of the problem we are going to face and we have to work hard.

LAT: We really need one full-time LF Manager in Papua New Guinea. We have Mr Leo Makita but he is in-charge of multiple diseases. How much time are you going to be able to dedicate yourself to LF? When the global funding comes, you often need to spend almost all of your time on the Global Fund.

LSM: We had a coordinator for a few years. We need someone who can work independently, not someone who requires assistance continuously. Ms Melinda Susapu is still very new in the position of LF National Coordinator only for a few months. But she is very experienced since she had worked at IMR and on filariasis. There will be issues that she will require my help or input on, but with her there now, that has been sorted out. Regarding the Global Fund, we have proposed some managerial positions, and with ongoing restructuring, there may be a Manager for NTD. These are the actions we have taken to address the issue.

LV: The last few comments show how difficult the situation is in Papua New Guinea. For this reason, I just want to propose that only one province for the first year should be earmarked for success.

LM: I just want to comment that whatever you decide to do do not forget the provincial people because we are the ones implementing the programme. We need a team to ensure all the programmes are implemented. For example, I look after malaria, TB, leprosy, and non-communicable diseases. Now LF is coming on-board. Please do not forget what is happening at the provincial level.



## 2.17 Regional approaches to NTD control and elimination

Dr Patrick Lammie,  
Chief - Immunobiology Section  
Immunobiology Branch, CDC

### The context

NTDs have captured a renewed interest in a crowded global health landscape and NTD is now a “brand.” Supports from DFID and USAID have increased over the last three to four years. The elimination of NTDs has been specifically mentioned as an objective of the Obama Global Health Initiative. Onchocerciasis in the American Region, LF, and trachoma are the potential targets of elimination in the initiative. As the Region approaching the elimination of LF, it is likely that the Pacific Region will become one of the principal beneficiaries of the Obama initiative.

### Rationale of regionalization

There has been a movement in the field of NTD control for regionalization. By promoting regional ownership, regionalization will help:

- (1) adapt programmes to local epidemiology and priorities;
- (2) promote innovative partnerships;
- (3) increase advocacy and resource mobilization; and
- (4) develop technical and managerial capacity.

With a regional ownership, target, and strategy, there is an opportunity to achieve a goal that may not be attainable at a global level.

### Global Network for NTD control

The Global Network for NTD (GNNTD) is an advocacy organization dedicated to ending the suffering from NTDs:

#### **Figure 23: Works of Global Network for NTD**

### **What the Global Network Does**

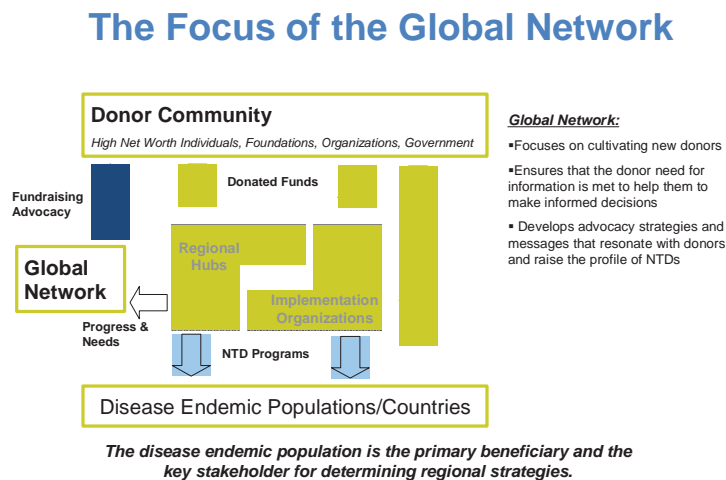
**Policy & Advocacy:** Raise the profile of NTDs among policymakers and the public. Work with the broader NTD community to educate policymakers. Highlight the leaders and heroes of the NTD community, from community drug distributors to scientists to the donors supporting the programs.

**Resource Mobilization:** Engage the donor community to increase and sustain investments in NTDs. Connect donors with affected communities to facilitate high-impact programs.

**Global NTD Solutions:** Through a grant from the Bill & Melinda Gates Foundation, help to support a global campaign to control and eliminate the most common diseases of poverty. Form a network of regional NTD trust funds and cross-regional working groups to catalyze the formation of regional strategies and financing mechanisms.

Since many donors have regional preferences, the Global Network recognizes the need for regionally tailored resource mobilization. Funds generated by the Global Network flow from the donor community directly to the regions and countries. To enable this unique funding mechanism, the Global Network has been working with development banks and other partners to establish regional trust funds.

**Figure 24: Focus of the Global Network**



8

### **Gates grant**

In 2008, the Global Network received US\$ 34 million from the Bill and Melinda Gates Foundation to generate an additional US\$ 200 million from private donors, which will support the regional financial and grant making platforms, including the trust funds and global coordinating mechanisms. The core objectives of the grant are:

- (1) Cultivate new donors through regional advocacy strategies.
- (2) Support development of regional plans for scaling-up treatment.
- (3) Support implementation of integrated NTD control and elimination programmes according to country and regional plans.
- (4) Leverage regional funding by strengthening existing partnerships and financial structures to increase national support for integrated NTD control programmes.

In addition, part of the grant will be used to support global level activities, including:

- (1) support for WHO to develop and adopt regional M&E processes;
- (2) establishment of a global NTD goal (new WHO resolution?);
- (3) identification of funding needs and work towards policies to promote sustainability;
- (4) improved global coordination and information sharing; and
- (5) improved partnership opportunities with other disease-specific programmes and across sectors.

### **Example – Latin America and the Caribbean NTD Trust Fund**

Latin America and the Caribbean NTD Trust Fund is a trust fund established according to an agreement between Inter-American Development Bank and Pan American Health Organization to



support NTD activities in the Latin-American and Caribbean Regions. The three primary objectives of the Fund are to:

- (1) Scale-up rapid-impact health interventions to control and eliminate NTDs.
- (2) Support the strengthening of national and local health systems.
- (3) Harness the potential of inter-sectoral and inter-programmatic approaches.

The Fund is currently finalizing the process of request for proposal, through which the Ministries of Health are expected to apply for funding. Under the Fund, IDB's, water and sanitation projects will be integrated with NTD. The Fund is also taking an innovative regionalized approach to advocacy (e.g. Miss Universe).

Figure 25: Innovative Advocacy in Latin America and the Caribbean



### Current status of regional hubs

Other WHO Regions are also preparing to set-up a similar funding and collaboration mechanism. In the African Regional Office, a NTD stakeholders' meeting with 25 countries represented was held in Uganda, November 2009. In WHO Western Pacific Regional Office, the first stakeholder meeting was held in the Lao People's Democratic Republic in October 2009. Similar meetings are scheduled in South East Asia Regional Office and EMRO for 2010.

### Expanding to other NTDs

There are many diseases with a significant public health burden not yet considered as NTD by donor agencies (e.g. FBTs in Asia). These diseases need to be built into the national plan and appropriately budgeted for advocacy purposes and the possible development of a regional plan.

### **Integration of NTDs**

Total integration packages for NTDs should include:

- 1) water, sanitation and hygiene education components;
- 2) morbidity reduction – medical and surgical; and
- 3) other components?

Integration with other programmes should be also explored, including:

- 1) integrated campaigns for child health
  - a. child health days
  - b. national immunization campaigns
  - c. Vitamin A campaigns
- 2) HIV (schistosomiasis)
- 3) Malaria
  - a. Treatment
  - b. Vector Control

### **Opportunities and challenges**

Regional NTD initiatives are effective approaches for both disease control and advocacy perspectives:

- (1) Countries in the same region are more likely to have a similar profile and epidemiology of NTDs.
- (2) Regional initiatives build on the interest of the Obama administration in elimination of NTDs.
- (3) Regional initiatives can capitalize on existing structures (e.g. RPRG, WHO Collaborating Centre) for technical and managerial support as well as support for capacity development.

One of the main challenges that regional initiatives need to address is to convince the donor community that there is a reliable mechanism capable of handling financial resources and providing necessary technical support. In addition, the following challenges are often faced by regional initiatives:

- (1) Donors have preferred countries and diseases.
- (2) Trachoma is not always included as part of the NTD package, but the SAFE strategy (surgery, antibiotics, facial cleanliness and environmental improvement) represents an integrated approach.
- (3) It is difficult to establish programmatic linkages with HIV and malaria programmes.

## **2.18 Identifying, defining, and mapping “hot spots” of residual infection after completion of LF elimination programmes**

Hayley Joseph, Ms Fuatai Maiava, Dr Patrick Lammie, James Maloney, Shannon McClintock, and Dr Wayne Melrose

(Presented by Dr Wayne Melrose)

### **Introduction**

The current project has been initiated to address issues relating to “hot spots” faced by post-MDA countries in the Pacific Region. The specific questions that the project aimed to examine are:

- (1) Will screening of young children for filarial antibody reveal areas that need to be more intensively investigated for hot spots?
- (2) Can a combination of antibody, antigen, and Mf testing be used to confirm and map the hot spot and define its “geographic influence” to allow better targeting of resources to mop up the residual infection?
- (3) Is there clustering of infected households and what is the relationship between infected households and exposed children?

### **Methods and materials**

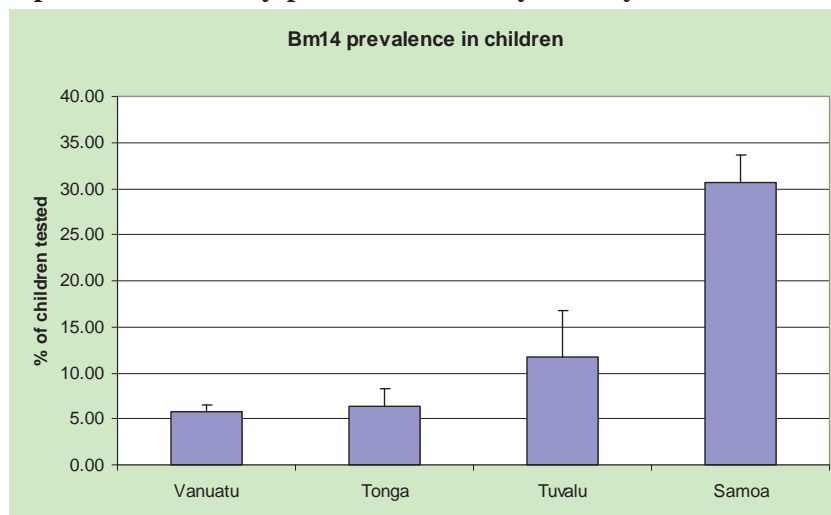
The project has been working in Samoa, Tonga, Tuvalu, and Vanuatu. Three types of tests are being used:

- (1) BM14 filarial antibody test on filter-paper blood spots (children only)
  - a. Filarial antibody develops rapidly in response to exposure to the parasite even when an adult worm does not become established.
  - b. The presence of antibody-positive children is a strong indication that transmission is continuing.
  - c. The absence of antibody-positive children is a strong indication that no exposure is taking place and that transmission has ceased.
- (2) ICT filarial antigen test
  - a. indicates that there is an actual infection with an adult worm; and
  - b. may take up a year or more to become positive depending on the intensity of exposure.
- (3) Microfilaria test – 60ul “three line” Minister Sasa Zibe’s slide
  - a. indicates that adult worms are present and the person is capable of passing the parasite on to others; and
  - b. only 30% to 50% of positive antigen cases have Mf

**Figure 26: Mf slides**



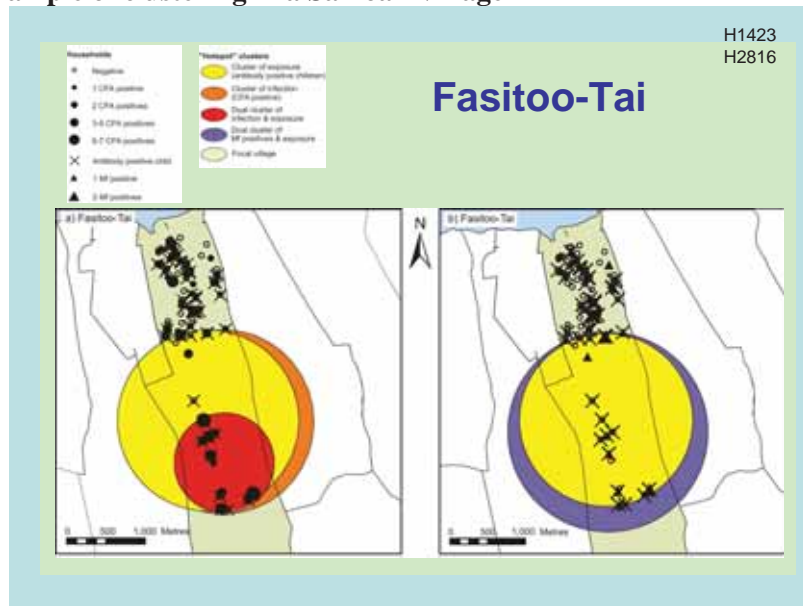
**Figure 27: Proportion of antibody-positive children by country**



### **Preliminary findings**

In Tonga, the proportion of antibody-positive children varied from 0% to > 20% among different areas while the proportion was zero in the majority of study areas (Figure 26). In Samoa, tests were carried out in four villages (three villages identified during a previous survey and one control village). The study observed clustering of cases in Samoa with some clusters containing individuals with a high Mf load (Figure 27).

**Figure 28: Example of clustering in a Samoan Village**



### **What is next?**

The group is interested in further examining the following:

- (1) relationship between clusters;
- (2) environmental overlays: plot vegetation, water sources, etc.;
- (3) occupational exposure of infected people;
- (4) breeding sources and methods of reduction;
- (5) wind direction and flight range to find out why the clusters are orientated in a particular direction;
- (6) difference between *Aedes samoanus* and *Aedes polynesiensis*;
- (7) practical application; and
- (8) application of the method in different geographical settings and other countries.

### **Acknowledgements**

- (1) colleagues in Samoa, Tonga, and Vanuatu and the village people
- (2) colleagues at JCU and CDC Atlanta
- (3) staff of Cellabs Pty Ltd
- (4) financial support provided by GSK

### **Questions and comments**

PL: The challenge of xenomonitoring is that you cannot do cluster analysis because you are collecting a large group of mosquitos at a fixed point. In American Samoa, we looked at the correlation between xenomonitoring data and antigen, Mf, and antibody data. But it did not work so well. The correlation is well established for culex and anopheles. Clearly, additional works are needed for *Aedes*.

KR: What are the implications of this study for the LF programme? You need to be able to characterize these areas, for example, using socio-economic factors, so that programme managers can predict hot spots without doing all those tests. That needs to be built into your study.

WM: You are absolutely right. That is something we need to do.

PL: We had a parallel study across a series of villages in Haiti. In Haiti, we have an issue of systematic non-compliance. In the study, we found that rates of systematic non-compliance were correlated with levels of infection and clustering. So, if the finding holds true in other countries, rapid screening with a questionnaire to look for compliance patterns could be a way to identify those hot spots.

CP: How long do those children remain antibody positive? Is there any possibility that the antibody came from the mother?

WM: A group in French Polynesia, who are experts on antibody, have shown that IgG4 antibodies go away rapidly within a few years after filaria infection clears out. So, IgG4 and total IgG are not persistent. Certainly, there is transfer of IgG4 across the placenta. I have not seen a study that showed the presence of IgG4 in children more than one year after birth. These children that we tested are six- to seven-year olds. So, it is very unlikely that the antibody was the one from their mothers.

CP: How many of the antibody-positive children are Mf positive?

WM: Probably two or three children but very low Mf load. They were also non-compliers.

CP: In Brunei Darussalam, with Brugia Rapid test, we found many antibody-positive children who are also Mf positive. You do not have that situation?

WM: You seem to have active transmission. We do not see that here. These hot spots were not picked up by a national survey. These spots were identified because we found antibody-positive children in the school survey and went back to villages.

CC: The idea of “hot spots” surveys came up as a result of the post-MDA surveillance plan we developed in 2007. What I am interested in is how this study feeds our surveillance plan. According to our CTS protocol, we have to do contact tracing if we find a positive child. How far do we need to go? We still do not have a concrete idea of what is appropriate.

WM: The biggest cluster we found in this study was of 5km radius. One of the barriers is that we do not use antibody as a tool for surveillance according to WHO guideline.

PL: Under the Gates-funded project on survey methodology and MDA surveillance, some of the countries will include antibody and contact tracing. At least a couple of countries from this Region are included.

WM: One of the problems with antibody test is that it requires a good facility and people capable of running assays. There is an ongoing study to develop a rapid screening test for antibody. That would make things easy for you.

KR: WHO does not include the antibody test because it is not a good test. We have adopted Brugia Rapid for *Brugian filariasis*, which is an antibody detection test. Tools for surveillance need to be applicable in the field. This particular antibody test for LF requires facilities and certain expertise, which many endemic countries do not have.

FM: In this study, we found two positive cases in the control village, which we thought was clean based on the C survey. So, my concern is the methodology we used for the C survey because we missed out actual hot spots.

WM: The two positive cases in the control village were non-compliers and it was very hard to get blood. In one case, the mother had to drag the child out to get him tested.

## **2.19 Update on GAELF and the WHO Centre for Neglected Tropical Diseases at the Liverpool School of Tropical Medicine**

Ms Joan Fahy, Programme Coordinator, Centre for Neglected Tropical Diseases (CNTD), Liverpool School of Tropical Medicine

Ms Joan Fahy presented updates from CNTD at the Liverpool School of Tropical Medicine, previously known as the Lymphatic Filariasis Support Centre, and from the Global Alliance to Eliminate Lymphatic Filariasis (GAELF).

The Lymphatic Filariasis Support Centre expanded its activities and became the CNTD in July 2008. The Center remains as the Secretariat of GAELF and is responsible for the management of activities of the Executive Group. The new Director of the Center, Professor Moses Bockarie, was appointed in July 2008. The Center receives funding primarily from DFID, GSK, and Gates Foundation. The Center's new funding from DFID includes funds to provide laboratory strengthening (Pacific Region not included), training workshops for M&E, and six part-time PhD scholarships as well as to support operational research. The next GAELF meeting will be held in Seoul, the Republic of Korea, from 1 to 3 June 2010. The focus of the meeting will be on the future of LF elimination.

### **Questions and comments**

CC: I was given a document from the assistant representative of JICA Papua New Guinea. According to the document, JICA is committed to providing support to Papua New Guinea until 2013 and half of the donation is for DEC and ICT. The funds for this year is expected to be from PGK 400 000 to 500 000. It seems that the same amount will be for the next year and the following year.

HB: My question is to Dr Patrick Lammie. In your presentation, you mentioned about a cross-regional working group and a possibility to establish technical and managerial capacity. Does this include vector control or only programme implementation?

PL: I think that vector control for LF has been a challenge, especially due to cost issues. One of the reasons to look for coordination between LF and dengue in this region or LF and malaria in some areas is to ensure there would be a potential for IVM. How it is implemented differs from region to region. For example in Sub-Sahara Africa, it is a major component because there has been so much interest and focus on LLIN. For technical capacity development, I was pleased to hear Dr John Ehrenberg's comments on support to M&E and laboratory capacity development. Other than Global Network and Gates grants, there is no other kind of support available at this point. We are looking into whether CDC is interested. We are also making sure there would be other donor funds to support this type of activity, for example, to strengthen the network of WHO Collaborating Centre and other support groups. In terms of the working group, WHO nominates original members and most of their responsibilities would be programmatic.



HB: For your information, ILM has secured some money to establish a research center for vector research. Approximately, US\$ 5 million will be spent for building and infrastructure but that should include some funding for training as well. We are interested in receiving trainees from the region for vector control.

PL: To reiterate the point made throughout the last few days, the regional plan here should include dengue so that you can start making those kinds of connections across the Pacific.

JE: Mr Leo Makita should also consider pushing dengue in Papua New Guinea's NTD plan. Dengue is considered as an NTD in most parts of the world. There is going to be a meeting in Viet Nam to take a look at the gaps in surveillance systems to make it more sustainable. There is a lot more support for other diseases, most notably for H1N1. Countries will need to start working towards more integrated surveillance systems, for example, piggybacking with communicable disease surveillance. I cannot foresee a significant amount of support coming in for dengue either from outside or inside, unfortunately. So, this is probably the way to go. Research capacity and capacity building are also important. We have a Western Pacific Regional plan of action for research and it has been a component of regional strategic plans for dengue and malaria. As Ms Joan Fahy mentioned, US\$ 2 million is available for operational research from CNTD. The Center will also grant six PhD scholarships – one for Asia and one for the Pacific. In terms of resource mobilization, we are preparing for regional estimates for LF that are updated and more realistic, which will be submitted to the Global Network. In the Pacific Region, the most important source of funding for LF has been JICA. It has been a steady and loyal supporter for the PacELF initiative for many many years. Now hearing about their commitment for Papua New Guinea, I would really like to thank JICA for its support, on behalf of the Western Pacific Region. Papua New Guinea is not necessarily under the radar of many of the donors and NTDs are still tricky. So we are fortunate to have JICA's support in Papua New Guinea.

CP: There are one or two projects in the area of vector control as a supplementary strategy for LF. One major study is ongoing in India. Vector control has not been included in the global strategy largely due to its cost and human resource needs. We may be able to include it at the regional level once we learn a bit more about it.

## **2.20 Key points and highlights from the workshop on LF**

Dr John Ehrenberg  
Regional Adviser in Malaria, Other Vectorborne and Parasitic Diseases  
WHO/Western Pacific Regional Office

In addition to what was summarized by Dr Dato Ramachandran for Days 1 and 2:

- (1) All participating countries, except for Papua New Guinea, now have a revised national plan until verification with a budget. With the revised plan, countries have a better idea as to where programmatic gaps may exist. The Pacific Region is getting closer to filling those gaps.
- (2) Every country in the Pacific Region is now on-board for elimination. Papua New Guinea has a clearer direction for a way forward with a plan to pilot MDA and DEC salt starting in 2010. Success stories from the pilot projects will prove that the two strategies can be operationalized in Papua New Guinea. Successes are also crucial for gaining further support from the Ministry of Health, Department of Health, and potential donors.

Additional funding is a must for Papua New Guinea to maintain programme activities to achieve elimination.

- (3) Political commitment and the indication of the commitment (e.g. budget line, inclusion in the national health plan) are essential for garnering external supports (e.g. AusAID on Papua New Guinea).
- (4) Additional key messages for LF advocacy are: (1) LF is eliminatable within a political life of a politician; (2) LF programmes help strengthen health systems (e.g. managerial and technical capacity development), and (3) LF is an indicator of poverty.
- (5) While LF programmes will continue to use available tools, there is a need for better tools in assessing elimination. This is particularly important in the countries with *Aedes polynesiensis*. There are opportunities for developing alternative tools that do not require immunology (i.e. antigen or antibody detection). For example, a set of risk factors can be identified and used to pinpoint “hot spots.” Xenomonitoring is another option but requires some more work.
- (6) NTDs are indicators of poverty. Pushing this point will open the opportunity for countries to access more funds such as World Bank and ADB.
- (7) Exchanging country and regional experiences is important.
- (8) According to the revised national plans, approximately US\$ 1.5 million is necessary to finish the job in the Pacific, excluding PNG.

### **Comments**

PL: Ms Joan Fayh will be meeting with USAID. It will be a good opportunity for them to have a look at the regional plan and budget and consider co-funding in the Region.

JE: Yes, we can package it for the Western Pacific Region with Mekong-plus countries and PICs.

CP: There will be Global Alliance meeting in Seoul next year. It will be another opportunity for us to make our case. Papua New Guinea should be heard there.

## **2.21 Part II: Other helminthiases**

Dr John Ehrenberg  
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WHO/Western Pacific Regional Office

### **Background**

There are very limited data on helminth infections other than LF available in the Pacific Region. For most of PICs, the only source of recent data is a series of surveys conducted between 2001 and 2002, which assessed STH prevalence in SAC. Thus, the current epidemiology of other helminth infections in the Pacific Region remains largely unknown.

In countries where multiple rounds of MDA have been conducted, the level of STH infection is expected to be low because ALB is an effective anti-helminthic (i.e. deworming drug). In those countries, data on STH (e.g. prevalence and the intensity of infection) can be thus considered as an indicator of LF programmes. While most LF endemic countries in the Pacific had begun MDA prior to 2001 and thus lack “baseline” STH data in a strict sense, a reduction in STH prevalence or infection level since 2001 indicates a positive impact of MDA on other helminth infections.

The objectives of the session for each country are to:

- (1) provide available data on helminth infections, share experiences on deworming programmes, and develop a country specific plan of action; and
- (2) adopt the regional NTD plan of action draft to the PIC context.

### **Three pillars of deworming**

There are three essential components in implementing a successful deworming programme:

- (1) treatment (preventative chemotherapy – dependent on disease prevalence and burden);
- (2) education (we have been piggybacking education sector for a long time – safely given within a school health system); and
- (3) environmental sanitation (How do we come in with social mobilization, etc. to maximize impact?).

### **Issues to be considered**

The following issues are particularly important when developing the national plan of action:

- (1) political commitment – Is deworming part of the national health plan? Are there relevant policies in place?
- (2) human resources – Is there a focal point assigned? Are there human resources secured for programme activities?
- (3) technical aspects – What kinds of technical supports are needed? Are there plans for M&E, impact assessments?
- (4) Data
  - a. Mapping of population at risk is essential.
  - b. The burden of different helminths (e.g. hookworm, *fascioliasis*) varies among different age groups and countries. These groups must be targeted appropriately for intervention for maximum impact. Ascaris and trichuris data also need to be disaggregated from hookworm data (different at risk age groups) although these three parasites are usually clumped together as STH for stratification of intervention strategies.
  - c. While MDA is reducing the morbidity of several parasites, experts are needed to identify an innovative approach to helminth control for those, especially some of the FBT and cestodiasis (CEST), where MDA is not necessarily the best tool. FBT and CEST informal consultation from 12 to 16 October 2009, in the Lao’s People’s Democratic Republic addressed this issue and has come up with specific recommendations. In the Pacific Region, Papua New Guinea, Solomon Islands, and Vanuatu are likely to have FBT and CEST.
  - d. Assessing the number of people affected is a global challenge – changing in the Pacific because of MDA

- e. The intensity of infection determines morbidity and could be more indicative of programme efficacy than prevalence.
- f. Disease burden needs to be assessed at a district level and by different age groups, especially when there is a wide range in prevalence within a country.

(5) Education

- a. Education has been proven critical to past deworming programmes (e.g. the Republic of Korea), and needs to be continued as an integral part of future parasite control efforts.
- b. Behavioural change and education campaigns are difficult, but not impossible. Helminth programmes may benefit from looking at other behavioural change initiatives in other programmes (e.g. tobacco cessation efforts).
- c. Globally, there is a lack of young, new professionals being trained in parasitology. There is a definite need to develop future expertise to help country and regional capacity building.

(6) Environmental sanitation

- a. key pillar to sustain impact of preventative chemotherapy
- b. could cut across several programmes with potential benefits beyond worm infections

(7) Collaboration

- a. Inter-programmatic: FBTs are a food safety issue. Collaborations with food safety and regulatory sectors would be useful to the control programmes.
- b. Inter-programmatic: With increased funding for avian influenza preparedness and malaria elimination, look for opportunities (e.g. surveillance systems).
- c. A greater collaboration between the preventive control programmes and the health care system must be encouraged (e.g. morbidity management critical in LF, FBT and CEST).

(8) Funding

- a. Effective resource mobilization strategy (national level included) is urgently needed to help countries secure additional funds to sustain and upscale control/elimination efforts in NTDs. Global and regional strategies are being developed.
- b. Better ways to work with the people that are affected by NTDs and their communities need to be found (especially critical with FBT and CEST). If community members and those affected see the need to control these diseases, their contributions (especially in energy and time) could make a big difference.

## 2.22 Update and overview on helminthiases situation in the Western Pacific Region

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### Background

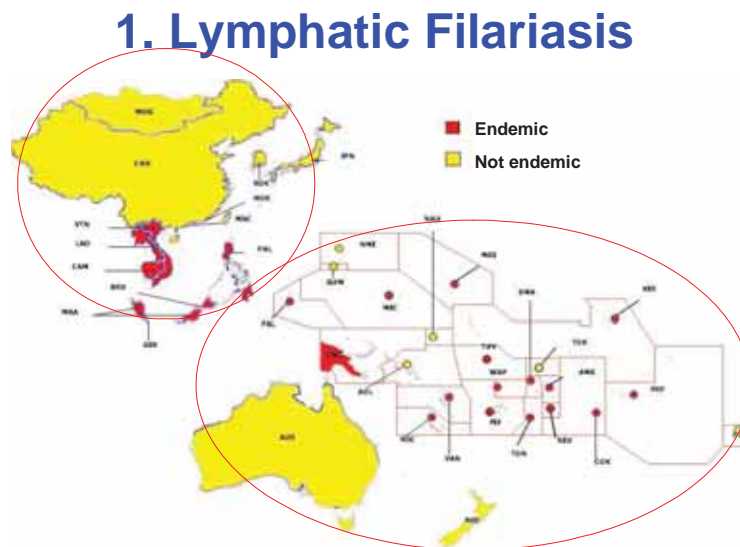
The Western Pacific Region consists of two subregions: the Mekong-plus and the Pacific Subregion. There are 11 countries in the Mekong-plus subregion and 24 countries and areas in the Pacific Subregion. The following helminthiases were discussed:

- (1) LF
- (2) STH
- (3) schistosomiasis
- (4) FBT
- (5) *taeniasis*/cysticercosis or tapeworm (CEST)
- (6) echinococcosis

### Lymphatic filariasis

There are six endemic countries in the Mekong-plus and 16 endemic countries in the Pacific Region.

**Figure 29: Distribution of LF in Western Pacific Region**



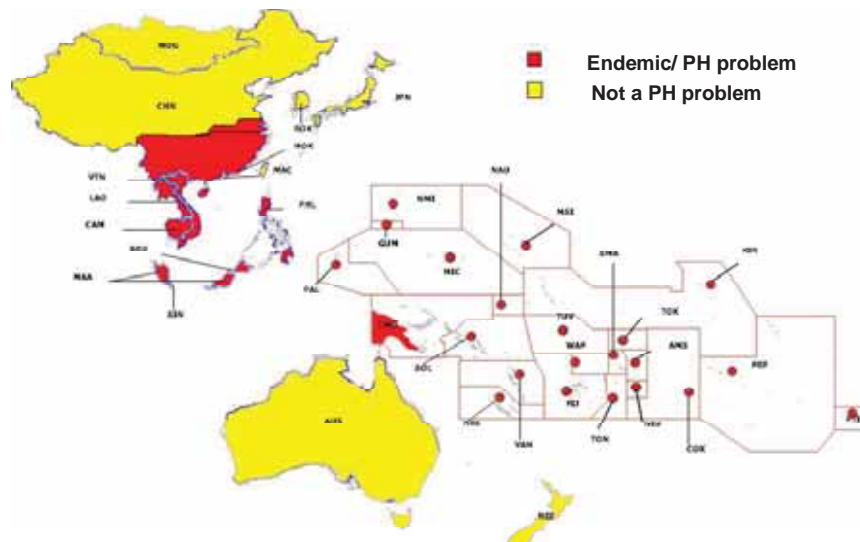
### STH

STHs are widespread in the Region, except for countries such as Australia, Japan, Mongolia, and New Zealand, which no longer consider STHs as public health problem.

- Mekong-plus: Cambodia and the Lao People's Democratic Republic have attained WHO global target of deworming (> 75% of SAC) in recent years, while the Philippines and Viet Nam are reaching the deworming coverage of approximately 40% to 50%. The People's Republic of China is currently conducting deworming.
- Pacific Region: Little data on STHs are available, mostly from 2001 to 2002 surveys conducted in 13 PICs. LF MDA was implemented between 2001 and 2007 in 14 PICs. Very few surveys were conducted since 2001 to 2002 (done only in Vanuatu, Tuvalu, and Federated States of Micronesia) and it is hard to confirm the expected impact of LF MDA on STH. Four countries (Kiribati, Solomon, Vanuatu, and Tuvalu) are implementing deworming.

Figure 30: Distribution of STH in Western Pacific Region

## 2. Soil Transmitted Helminthiasis



**Table 29: STH prevalence in the Pacific Region based on available data**

Country or area	STH prevalence			LF MDA coverage (2000-2007) (%)	Other helminthiases (FBTs and/or CEST)
	Before 2001 (%)	Survey 2001-2002 (%)	After 2002 (%)		
TUV*	-	96.60	70	69.30	-
KIR*	-	96.10	-	57.80	-
MI	-	82.50	-	62.20	-
VAN*	-	48.10	78 → 17 54 → 13	77.90	-
SOL*	-	42.60	-	no MDA	-
NAU*	-	38.30	-	no MDA	-
FSM*	-	28.80	100	10.00	-
TON	-	10.60	-	83.20	-
FRP	-	9.90	-	83.20	-
FIJ*	54.50	9.00	-	68.80	-
AMS	14.00	6.90	-	52.90	-
COK	-	3.00	-	81.00	-
NIU	-	0.72	-	88.10	-
PNG	-	-	68	N/A	-
NEC	-	-	-	no MDA	-
NMI	-	-	-	no MDA	-
PAL	-	-	-	no MDA	-
PIT	-	-	-	no MDA	-
SMA	-	-	-	71.00	-
TOK	-	-	-	no MDA	-
WAF	-	-	-	60.00	-

Note: \*countries with active deworming programme; - no data available

### **Schistosomiasis**

There are four endemic countries in the Western Pacific Region (Cambodia, the People's Republic of China, the Lao People's Democratic Republic, and the Philippines). All four endemic countries are currently conducting MDA. There are no more severe cases found in Cambodia. The People's Republic of China aims to interrupt transmission by 2015. The Lao People's Democratic Republic has restarted MDA since 2007.

### **FBT**

Limited MDA has been in place in selected endemic areas of Cambodia, the Lao People's Democratic Republic, and Viet Nam. Viet Nam also carries out passive and active case detection and treatments. Health education has been combined with MDA in Cambodia and the Lao People's Democratic Republic, with MDA and case detection in Viet Nam. It is systematically included in school curriculum in the Lao People's Democratic Republic. There are efforts to improve sanitation in some endemic areas (e.g. the Lao People's Democratic Republic). There are no data on FBTs in the Pacific Region in the last 10 years.



### **CEST (Taeniasis/cysticercosis and Echinococcosis)**

Several endemic countries in the Mekong-plus are implementing interventions (e.g. selective treatment) for CEST. No recent data is available for the Pacific.

What needs to be done?

Current needs for helminthiasis control in the Western Pacific Region include:

- (1) programmatic and strategic
  - a. mapping completion
  - b. detailed guidelines on control activities, in particular for FBTs and CEST and how to integrate among helminthiasis
  - c. standard reporting system
- (2) political/funding
  - a. low priority and thus low government funding
  - b. most affected countries are poor and must rely on external resources
  - c. not many donors are interested
- (3) research
  - a. Many research studies do not answer the questions from the field.

### **Questions and comments**

CA: Could you show the results of the 2002 survey in Cook Islands?

LAT: The prevalence was 3%, which was the average of at least one rural and one urban school. The 2001-2002 surveys are limited on STH.

JE: When we conducted a 10-year review in 2008, we checked two sources. One was the official data from countries and the other source was peer review journals. It is unlikely that FBT or CEST are endemic in the Pacific Region, except for in Papua New Guinea and perhaps in Solomon Islands.

WM: I would like to clarify the data presented in the table. The prevalence of 70% in Tuvalu was from the survey done in two islands after two MDAs and most cases were *trichrus*, which is not responsive to ALB. The data from Federated States of Micronesia, 100% prevalence, was from Stawaal Island where the whole population tested had at least one worm and it was before the first MDA. There are a lot of historic data in Papua New Guinea, especially between 1970s and 1980s. I expect Papua New Guinea still has a lot of helminth infections because many things have not change drastically in Papua New Guinea.

JE: I recall an outbreak of cysticercosis reported in Papua New Guinea about 10 years ago. Do you think it is still a problem there?

WM: That was only in a small area.

JE: But the message here is that we need to update the data. This is basically our baseline, meaning this is all the data we have got for PICs. Hopefully, we will have very low prevalence in countries where MDA has been implemented.

MA: As you said, we can assume that countries, where the initial prevalence of STH was low and MDA was done with good coverage, have a very low STH level.

JE: You still need to clean up the data. Also, we need to ascertain data for the areas not targeted by MDA. In some cases, MDA can impact the intensity of infection but not do much to the prevalence of STH infection. So you could have lower intensity but not a lower prevalence.

MA: We still need to have surveys to justify deworming or to stop deworming.

JE: Yes, it is important to have data. We are also going to discuss about the need for a rapid assessment method for mapping as we cannot afford to do surveys in the way they were done 20 or 30 years ago. We also need to think about identifying the hot spots and how to plan a survey in a country with areas not necessarily covered with MDA. This is particularly the case for the countries initially classified partially LF endemic.

FM: In 2001 or 2002, at the first PacELF meeting I attended, we had someone who was expert on helminth but somehow we had forgotten about it until now.

LAT: Tuvalu, Kiribati, Solomon, Vanuatu, Nauru, and Federated States of Micronesia currently have or will be doing a deworming campaign. I was also informed very recently about Fiji. Fiji started a deworming campaign a few weeks ago. The question here is do they really need to do a survey again or just do deworming?

CP: The statistics presented here are interesting. It is very clear that we need a reassessment. We have no updated data but as we are using deworming as an entry point of NTD we should have much more clear data. We know that the pathogenesis of STH is related to the intensity of infection. If a child has five or 10 ascaris, the child is fine, but if he has 50 or 100, it is a problem. The same goes for hookworm in terms for anemia. So, I think we need to get not only prevalence but also, to some extent, the intensity of infection. Many studies have shown that the intensity of infection is directly correlated with school performance and cognitive function in school children. These are the selling points for the programmes to make their case that deworming and NTD collaboration are essential. We now have more and more evidence that children with intestinal parasites have a compromised immune system. We have to make it into a case, rather than just presenting the data as statistics.

JE: The STH programme is not an elimination programme. How long do we sustain these programmes? Although that is a decision that countries should make, this is where education and sanitation come into play to sustain the impact of mass treatment. Eventually, you would need to let it go. As soon as the LF programme is finished, anything beyond that needs to be purchased. Although there is a good deal for purchasing generics, you would need to make sure that the quality is good. It is ultimately up to a country to decide how best to resource deworming and how long to keep it going. If we have good education and sanitation programmes in the beginning, we can sustain the benefits of deworming. There are also benefits of education and sanitation beyond deworming. So, here we need to first reassess the problem and the impact of MDA. Based on that, you will then target your interventions, either mass or selective treatment, or treat cases within the health system. My guess is that the problem is small, except for in Papua New Guinea.

CA: When are we going to stop a deworming programme? In Cook Islands, deworming is ongoing for many years.

MA: How long do DEC and ALB stay good?

PL: I think, according to GSK, the shelf life is about four years. DEC is about five years. DEC is very stable, as you know you can even cook with it when it is in salt. The endpoint issue is critical. In the Johnson & Johnson's mebendazole donation programme, the advisory committee agreed to take this on as a question. The working definition of endpoint is "sustainable prevalence of less than 10%." By being sustainable, they mean no additional drug intervention would be required and yet the level stays below 10%. This is not going to happen without an appropriate level of water and sanitation. The challenge to the M&E working group is to come up with a survey design that would allow the countries to quickly determine whether or not that kind of level has been achieved.

JE: Any more comments on this?

WM: Australia is still endemic, especially among indigenous communities. But mass deworming was stopped few years ago because they assumed that socio-economic indicators were high enough.

## **2.23 Regional NTD plan of action – Western Pacific Region**

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### **Background**

The Western Pacific Regional NTD plan of action was initially discussed during an Informal Consultation Meeting in Manila, the Philippines, in March 2009. The overall goal of the plan of action is to contribute to the achievement of the Millennium Development Goals by reducing disease burden due to major parasitic and vector-borne diseases and where feasible, eliminate specific diseases as a public health problem. The action plan has been developed specifically for the Western Pacific region and its objective is to reduce morbidity, mortality, transmission and socio-economic burden, especially in high-risk, vulnerable groups imposed by NTDs.

### **Components**

The Western Pacific Regional plan of action consists of seven distinct components:

- (1) Component I: epidemiological assessment
- (2) Component II: M&E and surveillance
- (3) Component III: resource mobilization
- (4) Component IV: new strategies
- (5) Component V: programme management
- (6) Component VI: research
- (7) Component VII: social mobilization

Each component has a specific purpose and one or more expected results.

### **Epidemiological assessment**

- (1) Component purpose: To identify areas at risk for NTD to guide public health interventions
- (2) Expected result:
  - a. baseline prevalence (including intensity in a subsample or sentinel sites) and distribution of NTDs by geographical area and population group determined

### **M&E and surveillance**

- (1) Component purpose: To monitor NTD programs performance, evaluate impact and implement post-intervention surveillance
- (2) Expected results:
  - a. functional NTD programme performance monitoring system established
  - b. periodic surveys to determine impact of interventions against NTD conducted
  - c. post-intervention surveillance to decide absence of incident infections implemented

### **Resource mobilization**

- (1) Component purpose: To mobilize and make efficient use of national or regional resources to control NTDs
- (2) Expected results:
  - a. national and regional strategies aimed at mobilizing financial support promoted, opportunities to “piggyback” NTD programmes and activities identified and explored
  - b. capacities of programme managers to access funds for NTDs enhanced
  - c. alternative resource mobilize strategies for private (not for profit, for profit and non-government organisation) and non-health sectors initiated

### **New strategies**

- (1) Component purpose: To develop integrated approaches and implement multi-intervention strategies for NTDs in the Region
- (2) Expected results:
  - a. global framework (preventive chemotherapy) for integrated approach adapted to the Western Pacific Region
  - b. existing WHO technical guidelines translated/adapted at the national level
  - c. avenues for advocacy at the highest level of government officials created
  - d. inter-sectoral coordination mechanisms established
  - e. review and analysis of what works in the integrated approach documented

### **Programme management**

- (1) Component purpose: To improve ability of member states to plan, implement, coordinate and supervise programme implementation.
- (2) Expected results:
  - a. capacity of programme managers at the national level strengthened

- b. logistics established for handling of drugs and other commodities and timely delivery of interventions secured
- c. information system established
- d. multi-sectoral inter-programmatic coordinating and collaborating mechanisms established

### **Research**

- (1) Component purpose: To promote a regional research agenda that addresses programmatic issues and gaps and strengthens Member States' operational research capacity in NTD prevention, control and/or elimination.
- (2) Expected results:
  - a. applied and operational research capacity in member states to fill in programmatic gaps strengthened
  - b. new knowledge for effective control of NTDs generated (biomedical, health, epidemiological, behavioural, social, economic, etc.)
  - c. human, animal and socio-economic burden of NTD estimated
  - d. improved mechanisms for sharing and dissemination of research findings and technical research guidelines
  - e. key decision-makers, stakeholders and donors engaged in regional health research agenda and research priorities
  - f. research findings translated into programmes and action

### **Social mobilization**

- (1) Component purpose: To promote community-based action towards NTD prevention, control and elimination
- (2) Expected results:
  - a. social mobilization resource group established
  - b. public and private sector engaged in activities supporting NTD prevention, control or elimination
  - c. capacity of health care system in management, prevention, control or elimination of NTDs strengthened
  - d. NTDs in school curricula included (primary and professional curricula)
  - e. models for community-based action documented

### **Group work: Refining the regional NTD plan**

Participants were divided into three groups. Each group was given one or more specific components of the regional NDA plan of action to brainstorm and discuss. The objective of the group work was to refine the plan so that the Pacific perspective can be reflected in each of the seven components. Group assignments were:

- (1) Group 1: Dr Wayne Melrose (Chair), Samoa, Fiji, Kiribati, and Papua New Guinea
  - a. Rapporteur: Mr Larbi Kwabena
  - b. Components 1 to 3

- (2) Group 2: Professor CP Ramachandran (Chair), Federated States of Micronesia, Palau, and Tonga
  - c. Rapporteur: Dr Lasse Vestergaard
  - d. Components 4, 5, and 7
- (3) Group 3: Patrick Lammie (Chair), Hervé Bossin, Cook Islands, Niue, and Vanuatu
  - e. Rapporteur: Le Anh Tuan
  - f. Component 6

The refined plan incorporating feedbacks and comments from the group work session was included in Annex 3.

**Day 4: 12 November 2009**  
**Chair: Dr Malakai Ake/Dr John Ehrenberg**

## **2.24 Individual Work: Developing/updating national plan for STH/FBT/CEST plans 2010-2011**

Dr Le Anh Tuan first gave a general guideline, which can be followed to develop or update a national plan for helminthiasis control.

- (1) For countries where LF MDA was implemented in the past, the current status of STH should be assessed first. Based on the result of the assessment, an intervention scheme (e.g. mass deworming, deworming SAC, and selective treatment) should be determined.
- (2) For the countries where no or limited LF MDA has been implemented, surveys need to be carried out in high-risk areas to update mapping. The high-risk areas are the areas where historical records (e.g. 2001 to 2002 surveys) have indicated high disease burden. Once mapping is completed, an IU should be defined and an intervention scheme should be determined for each IU based on the survey results.

Some of the key issues to be considered when working on the plan are:

- (1) general criteria, which determines an appropriate type of intervention
  - a. each national health authority has the right to decide the criteria
- (2) sanitation
  - a. Sanitation is one of the three pillars of deworming. Inter-sectoral collaboration is a key. It is important to plan how financial, administrative, and programmatic responsibilities can be distributed among the partners.
- (3) Health education
  - a. The following considerations should be made: (1) integration with school curriculum; (2) reaching out to community-based organizations; and (3) development of culturally sensitive/locally tailored promotion materials.
- (4) M&E on treatment, sanitation, and health education

In addition, each country was provided with an abridged version of the regional NTD plan of action to be used as a guide and an Excel template.

### **Questions and comments**

WM: We have done this before. WHO has the partners for parasite control and they have a book titled, *Helminth control in school age children*. The book has details on how to implement deworming in schools, how to implement school surveys, possible survey protocols, and health promotion materials. It also has a website ( <http://www.who.int/wormcontrol/en/> ). We need to make sure to provide the programme managers all the resources already available.

CC: I think what we are trying to do here is to develop national plans for helminth control or deworming as we never saw them in the past. They need to think about what needs to be done (e.g., reassessment), whether intervention is necessary etc. I believe the book has been sent to all the countries, although it may be another book on the shelf. The idea is for them to go back with a national plan for the next three years. If they need to do a survey, that is fine. They can come back next year to report updates. Try to be realistic. Think about what is missing, what you can do, what you cannot, and try to come up with a budget.

CA: Some countries have developed an infection control component as part of emergency surveillance response, for example hand-washing for H1N1. Are we developing another plan?

LAT: The principle here is if you already have a mechanism to deworm primary schoolchildren, you do not need to develop a new mechanism. For example, Fiji already has a national plan to control anemia, which includes deworming for primary schoolchildren nationwide. So, in Fiji, we do not need another plan. Countries like Fiji should focus on plans to improve health education and sanitation.

MA: To follow-up on what Dr Wayne Melrose said, at the end of the day, most of these countries will need a reassessment. We have done this before and just need to do what has been done. The only difference from MDA is target population. Deworming targets schoolchildren. I am not sure how different the rapid assessment is. Are we going to use new diagnostic methods? I think we need to clarify this so we do not get confused.

LV: I think what we are doing here is to make plans and apply specific tools. If tools already exist, we do not need to make them from scratch. If there is already a specific methodology that we need to follow, we need to ensure we can apply it. For example, there may be a need for training microscopists for the identification of parasites.

MA: We must make a plan. What I am asking is whether you are saying if we are going to change from microscopy to something else to do the assessment?

WM: We are using microscopy.

CC: When we did the 10-year review, we came up with very little in the Pacific Region. There was basically nothing, except for the surveys from 2001 to 2002. As far as we know, there is no national plan. There may be things very organized in the countries but we have no data. So, the idea is to put all these things together and try to get organized in terms of where we are and where we want to go. From our end, we can support you. If we do not know what is happening in a country, we cannot help you. That is why we are having this meeting. We understand that the reassessment is necessary. You can use the same method and tools as you did in the past. You just need to put it in your plan.



WM: I think that the reassessment will be something simple – like taking five schools; something like three schools from places with lower socio-economic indicators and two from other areas. It will be nothing complicated. My guess is that most of countries will have low prevalence. One important thing is to get your microscopists trained so that they can recognize the worms. That is going to be a big issue.

CC: It is similar to what we did for LF in 2007. The surveys gave us the idea of where we are and where we wanted to go. In 2007, it was the year of survey for LF. So can we make 2010 as the year of survey for STH?

RC: How are we planning to monitor or evaluate the progress of health education?

LAT: We monitor the impact of health education using knowledge, attitudes and practices, both before and after. If your country already has ongoing health education on helminths, you do not need to create another plan – you will need to find a way to fortify and enhance. If a school curriculum already incorporates health education, we will use it. We need to optimize our resources and want as less human resources as possible.

RC: In Fiji, we already have a programme to reduce anemia. If we find anemia prevalence reduced after deworming and iron supplementation, can we assume that STH prevalence has been also reduced or we need to do a specific survey for STH?

WM: I think anemia is hookworm and iron deficiency is *trichuris*. Let us not be frightened by these surveys. They are simple. We teach health-care workers in the Northern Territory to do these surveys but never had any problem.

JN: In Palau, we already have a programme for schoolchildren to have a certificate before they enter school (five- to six-year-olds). Some of the things they do is anemia screening and stool analysis. We are thinking of looking at reports from the programme, for example, how many children are positive. Would that be an appropriate plan of action in terms of assessment? What kind of quality assurance activities can we do to ensure that the results are right?

WM: That is a wonderful idea. Except that hookworm spreads in older populations so we would not know about hookworm. Regarding quality control, you could have someone send you preserved faecal sample twice a year and have your laboratory identify them.

JN: Would you be able to do that for us?

WM: Provided that you can arrange so that shipment of the samples would not be an issue, but I think it would be easier for you to ask CDC.

CA: It seems that we already have too much on our plate.

CC: That is OK and you are right. That is why we need a plan. If you cannot do a survey next year, plan it a year after. But it would be nice to assess the impact of MDA soon since you have already done the five rounds. It is up to you. You know what you are doing and what you can do.

## **2.25 National plan for the control of STH, 2010-2012**

Each country presented a draft national plan for STH control prepared during the individual work session. According to the current draft plans, the first actions to be taken by the countries are to review existing data and conduct a survey to assess the current status of STH. The results of the data review and survey will determine the next course of action. In the current draft, most countries prepared a three-year (from 2010 to 2012) activity plan with a budget based on the worst case scenario (i.e. high STH prevalence and burden).

### **Tonga (presented by Dr Malakai Ake)**

#### **Component 1: Epidemiological assessment**

- (1) determine prevalence on STH
- (2) review 2002 data on STHs
- (3) map STH infections by island by urban or rural areas by conducting surveys in:
  - a. main island: two schools in urban area and two schools in rural areas
  - b. outer islands: one school in urban area and one school in rural areas

#### **Component 2: Intervention**

- (1) based on the result of the surveys, carry out a deworming campaign
- (2) drugs to be provided by WHO

#### **Component 3: M&E and surveillance**

- (1) conduct the surveys after the deworming campaign in the above-mentioned schools

#### **Component 4: Resource mobilization**

- (1) depend on the fundraising conducted by PacELF

#### **Component 5: Programme management**

- (1) conduct supervisory visits to four outer islands

#### **Component 6: Social mobilization**

- (1) Health education
  - a. review current health promotion materials on STH prevention and revise if needed
- (2) Sanitation
  - a. strengthen latrine inspection
  - b. ensure clean water supply

Estimated budget from 2010 to 2012 activities: US\$ 26 000

### **Questions and comments for Tonga**

CP: This is great. You first need to know what kinds of helminths you are talking about. Do you have some idea based on historical records which ones are more likely to be endemic?

MA: We have the 2002 data and we are going to review the 2002 data first.

PL: I have a few questions for the Secretariat. Do we have a source of ALB or do you have to actually procure it?

JE: No.

PL: So this is to know how much is needed. Identifying donors is relatively straightforward. My second question to the secretariat is do you have a benchmark that you are going to establish as a guideline for implementing school-based deworming programmes? I think this is a topic that we need to decide before people go home.

JE: The focus of the first year is the surveys. You did the right thing. We are going to be missing a few worms but the first thing is to look at STH because you have been giving ALB. This is to make a case that this (i.e. MDA) is a multi-disease package and has impact on STH. We do not have other sources of ALB. I think there are possibilities there (e.g. Merck, Johnson & Johnsons, etc.). What intervention you need depends on the levels of the intensity of infection and prevalence. My guess is that countries with a successful MDA programme will find that there is no need for preventative chemotherapy. It is just a waste of money. You might go for targeted treatment or you might want to incorporate it with child health or IMCI, or incorporate it into the health services. We can also help you to identify another source of ALB. That will be straightforward once you have the data and you know your target population. Regarding resource mobilization, let us take a look at what is available in the country as well. You can convene a donors' meeting on your own because you might have JICA, EU, the People's Republic of China, tourism, and the Chamber of Commerce, etc. I am putting this here because national/local resource mobilization is what's happening in other parts of the world. I would put that in the plan. You can also try to access funds at embassies. There are great funds at local Rotary Clubs and Lion's Clubs. Do not entirely depend on what PacELF will raise. Another point is that once you reach the low level of infection, you may not need mass deworming but you need to sustain it through education and sanitation. As health education and sanitation have other targets as well, you need to develop a health message that cuts across the programmes. That is missing here too. You may be low on surveillance. Surveys are not cheap. So the budget you have for surveillance may not be enough. This framework can serve as narrative and as a guide to refine your budget as well.

MA: We are aware what organizations are locally available. To be honest, we have poked those organizations. If we increase the budget, even the Minister would throw away the plan.

CP: As a Medical Officer in-charge of the programme, how are you going to work on the issues on water and sanitation?

MA: In terms of sanitation, typhoid, which is a water-borne disease, is more important. We focus on water and sanitation in typhoid control. We have managed to bring down typhoid to a very low level (one or zero case per year) for the last five years so I think we have good water and sanitation. Once a month, we test all water supplies and inspect latrines. The structure of collaboration is already there.

JE: You just need to make sure you include in your plan that you will be piggybacking on the existing programmes and that you are utilizing their resources.

LAT: We did not include education either because Dr Malakai Ake mentioned that it is already in the school curriculum.

JE: You just need put it on the plan. Your budget is still on the lower side because you are missing money for survey and training.

MA: We have laboratory technicians who can already do stool analysis for intestinal parasites and we are sending them to places where the survey will take place.

**Niue (presented by Mr Manila Nosa)**

Component 1: Epidemiological assessment

- (1) stool survey at the primary school (n = 200)

Component 2: M&E

- (1) screen children coming into Niue

Component 5: Program management

- (1) train the laboratory technician for stool examination

Component 6: Social mobilization

- (1) memorandum of understanding between Health and Education Ministries
- (2) include STH education in the annual school medical check

Estimated budget from 2010 to 2012 activities: US\$ 8000

*Note: Niue had an active deworming programme prior to LF MDA for more than 10 years. However, the deworming programme was suspended between 2004 and 2006. The current deworming programme started in 2007 targeting primary schoolchildren (there is only one primary school and one high school in the island). There is only one laboratory technician in Niue who requires additional training for stool examination. Therefore, he will require a form of training that allows him to remain on the island.*

**Questions and comments for Niue**

JE: Your plan looks quite good. I want to encourage everybody, when you see an element in one of the programmes that interests you, to use it in yours. We are going to share these plans with everybody. So when you revise and update your plan, you can look at the others.

MN: What I am going to do is to have a discussion with my colleagues at home once I go back.

WM: Regarding quality control materials, I can send the quality control samples to any labs in the Pacific. If you need any parasite samples, e-mail me and if there are no bio-safety issues, I can send them very easily.

CP: You mentioned that deworming was stopped in 2004. Did you do any assessment at that point?

MN: No. The survey in 2002 was the last one. We screened about 200 school children and one positive for ascaris. That was also an imported case. Now with this round of survey in 2010, it will be very interesting to know whether the level has been sustained.

CP: So, you may be treating an uninfected population.

MN: Yes. But we would not know for sure until we do the survey.

AH: Do people need a refresher or need a full training? Tonga said it has trained technicians already. So there may be an opportunity to come to Niue to train your technicians.

MN: That is a good suggestion. Because we only have one laboratory technician we cannot afford to send people away.

MA: You mentioned deworming was stopped in 2004. But MDA is just like deworming – but only once a year.

MN: Deworming was stopped until 2007. I do not know why they started deworming again. That is why we need to do a survey. It all comes down to the question of whether we can stop deworming.

### **Cook Islands (presented by Mr Charlie Ave)**

#### Component 1: Epidemiological assessment

- (1) conduct prevalence surveys at sentinel sites (three schools: one mainland and two from the islands, age group six- to seven-year-olds, approximately 300 schoolchildren)
- (2) complete analysis and report

#### Component 2: M&E and surveillance

- (1) train health staffs: two laboratory technicians and five public health officers.
- (2) conduct a post-treatment survey to assess impact.

#### Component 4: New strategies

- (1) provide treatment (mebendazole) to schoolchildren six- to seven-year-olds twice a year
- (2) promote good hygiene practices
- (3) improve sanitation infrastructure, including water supply and proper toilet facilities

#### Component 6: Social mobilization

- (1) raise community awareness (e.g. development of information education and communication material such as pamphlets)

Estimated budget from 2010 to 2012 activities: US\$ 78 000

*Note: There is an ongoing sanitation programme implemented by the Ministry of Infrastructure for water supply and sanitation improvement. The current plan hopes to work with the programme by emphasizing their impact on STH and SAC.*

### **Questions and comments for Cook Islands**

JE: I have three questions. Firstly, why do you have only three sentinel sites? Secondly, your M&E only includes training of staff. Do you have everything else in place? For example, do you have information systems already in place, or other programmes you can tap onto? Do you have any needs for equipment?

CA: Yes, that is correct. We have information technology people.

JE: OK. That is good. Thirdly, you do not have anything under programme management. In the best case scenario, you do not need anything and you are done. But if you have areas where you need to do something, you would have to have something under the programme management section in order for you to do it. Or are you relying entirely on other programmes? If you are, that needs to be spelled out. But first, why three sentinel sites?

CA: We are going to do one on the main island, one each on Northern and Southern groups. We could increase the sample size if that's needed.

JE: The question here is whether or not that is going to give you a good catchment area. If that is going to give you a good enough coverage to find out what you have, that is fine.

CA (Cook): In the Northern Cook, we are looking at about 100 children among about 300 school children. In the Southern Cook, we are looking at about 300 to 400. On the main island, we have about 800 to 1000.

CP: Are you planning to do twice yearly treatment?

CA: It depends on this survey but there is an ongoing deworming programme.

CP: So your budget does not include drug cost.

CA: If drugs are not donated, we need to put it in our budget.

JE: Yes, you should include it.

WM: Regarding sentinel sites, how many do you have in Northern Cook Islands?

CA: About five. There are six in the south and 14 on the main islands.

WM: The rough element of survey protocol is you pick three schools per district and look at children in Grades 1 and 2 (50 children per school). You look for schools where people are poorer than normal. So, looking at Northern Cook, are there areas or islands with poorer sanitation? Certainly do a survey in those islands. If you pick only one school, you might pick one that has good sanitation. Socio-economic situation in Rarotonga is good. So urban vs. rural may be enough.

CA: Socio-economic situation is slightly lower in Northern Cook Islands. For example, Pukapuka was hit by a hurricane in 2005 and 40 houses were without toilet.

WM: So you would need to look at those places.

### **Kiribati (presented by Ms Teiti Bwenawa)**

#### **Component 1: Epidemiological assessment**

- (1) collect, compile, and validate existing data (e.g., 2002 survey)
- (2) conduct sero and/or stool surveys, including the assessment of parasite intensity in subsamples or sentinel sites in areas not surveyed before
- (3) resurvey same sites as in 2002 for Tarawa and a prevalence survey in Line Islands
- (4) analyse data and survey results to define and stratify risk areas and to determine interventions

#### **Component 2: M&E and surveillance**

##### **Establishment of M&E system**

- (1) revise the existing deworming form
- (2) train all medical assistants on the use of the form and a deworming campaign
- (3) collect and consolidate the forms (including stock inventory) from all targeted areas
- (4) regularly analyse and review reports
- (5) monitor deworming coverage (i.e. rapid coverage assessment) periodically

Assessment of intervention impact

- (1) provide refresher training to health staff
- (2) conduct surveys in sentinel sites and/or subsamples
- (3) analyse and review survey reports for dissemination and decision-making

Component 3: Resource mobilization

- (1) organize a meeting with UNICEF, NGO, churches, Expanded Programme of Immunisations coordinator, Ministry of Education, etc.

Component 5: Programme management

- (1) prepare annual work and financial plans, procurement plan, and distribution and allocation plan
- (2) procure and distribute required drugs and other commodities
- (3) monitor utilization and inventory

Component 6: Social mobilization

- (1) health promotion unit to develop IEC materials
- (2) radio spots

Estimate budget from 2010 to 2012 activities: US\$ 35 300

*Note: The survey in 2001 found trichuris and hookworm cases in Kiribati. Kiribati has an ongoing deworming programme.*

**Questions and comments for Kiribati**

CP: What is the age group that you are targeting in your survey?

JE: They are school-age children from ages five to 14.

CP: Not below that age group. You did not find any ascaris in your initial survey in 2001. I am a bit surprised by that.

JE: It is a good plan. We will be working with you to ensure that you can do the best possible survey to get an accurate picture. My guess is that infection rates are going to be low because you did MDA. The first question is why only three sites? Do you think that is enough? Second, we need to try to develop the health education and environmental sanitation components. My suggestion is to make it intersectoral. Do not make it specific to STH. You need to coordinate with dengue or other groups to make it a comprehensive environmental and sanitation package.

WM: Ascaris is uncommon in sandy coastal areas. Regarding survey sites, I wonder if you want to pick areas where MDA was not as successful or where sanitation is worse. For example, in Tuvalu, we found one island with very high hookworm. The island had bad sanitation and MDA did not have a good coverage. Had we picked another site, we would have missed the island. So, you need to be careful when you choose sentinel sites. Areas with unsuccessful MDA and poorer sanitation are the places you would want to consider.



**Samoa (presented by Ms Miriama Puletua)**

Component 1: Epidemiological assessment

- (1) review of existing records if available
- (2) conduct a survey in:
  - a. Upolu – three schools from urban areas and three schools from rural areas
  - b. Savaii – two schools from urban areas and two from rural areas
- (3) map the STH infection

Component 2: M&E

- (1) carry out an impact assessment survey in four selected schools

Component 3: Resource mobilization

- (1) seek PacELF/WHO funding allocation
- (2) seek government and local funding opportunities

Component 4: Intervention

- (1) conduct a deworming campaign based on the survey results

Component 5: Programme management

- (1) capacity building/training, drug procurement, and establish information system

Component 6: Social mobilization

- (1) health promotion
  - a. develop health promotion materials on STH prevention and start media campaign
- (2) good sanitation
  - a. strengthen the healthy village and families programme (regular inspection)
  - b. ensure clean and adequate water supply

Estimate budget from 2010 to 2012 activities: US\$ 108 000

**Comment for Samoa**

JE: In Component 1 Epidemiological assessment, you mention you are obtaining “baseline prevalence.” But there will be no “baseline” because there have been MDAs in Samoa unless you have areas where no MDA has been done. So the assessment you will be doing is not a baseline survey. It will be a post-MDA epidemiological assessment and you will be examining the impact of MDA, which will tell you which way you are going to go. Again, if your coverage and compliance are sufficient, you will probably see low prevalence. You may need to search for hot spots.

**Palau (presented by Ms Johana Ngiruchelbad)**

Component 1: Epidemiological assessment

- (1) collect, compile, review and analyse existing data
- (2) conduct surveys in:
  - a. main island: one school in urban areas and one school in rural areas
  - b. three outer islands: one school per island
- (3) map the distribution of STH infection based on the outcome of the survey

Component 2: Intervention

- (1) based on the result of the surveys, carry out a deworming campaign and staff training
  - a. if prevalence high, mass treatment; if low, targeted treatment
- (2) advocate for resource mobilization from national budget

Component 3: M&E and surveillance

- (1) establish information system and train staff
- (2) assess the impact of the deworming campaign, if conducted, in the above-mentioned schools

Component 4: Resource mobilization

- (1) convene a donor meeting to present the action plan (e.g. JICA, CDC, tourism organizations, and ADB)
- (2) convene an inter-sectoral meeting (i.e. agriculture, environment, and education) to tap on their resources

Component 5: Programme management

- (1) conduct supervisory visits to four outer islands
- (2) estimate drug requirements based on the results of the surveys
- (3) provide training on drug distribution and surveillance activities

Component 6: Social mobilization

- (1) health promotion
  - a. review current health promotion materials on STH prevention and revise as needed
- (2) sanitation
  - a. strengthen latrine inspection
  - b. ensure clean water supply

Estimate budget from 2010 to 2012 activities: US\$ 52 000

*Note: Palau has a stool examination at primary school entry. The data from the stool examination will be first reviewed to identify high-risk groups and/or to determine intervention options. If the information found is insufficient, proposed surveys will be implemented. There is already an inter-sectoral collaboration established for dengue, which can be utilized for STH-related activities. Water and sanitation projects are already implemented by the Ministry of Health.*

**Questions and comments for Palau**

WM: According to what Palau said earlier, schoolchildren in Palau have a stool exam at school entry. That is a very valuable source of information that tells you which schools are likely to have a problem. Those are the ones that you should probably take. Other countries do not have that kind of resources.

JN: Yes, that is what we are going to look at first.

JE: I have again a question about the number of schools you are going to survey. Are you picking schools with the largest catchment area? Some countries have selected five schools with the largest catchment area and/or considering socio-economic status, etc. Do you feel comfortable with the number or do you feel you should take a couple more schools in the main island or other islands?

JN: First, we are looking at the results of school stool samples, then we will be able to know how many cases there are and in which areas. We also know the areas with poorer sanitation conditions. These are the criteria we are using to select schools to do a survey and the number we are going to survey may change depending on what we find.

JE: When refining your plan, you also need to keep in mind that you need to make it clearer when you are piggybacking onto other programmes, like dengue. That is a useful structure you have in place that is collecting data and information you may need. The more you mention it, the more attractive your plan will look.

JN: Yes, we also have a very strong food safety programme under environmental sanitation and we are looking for ways to collaborate.

JE: Dr Wayne Melrose, based on historical records, etc., are there any countries other than Papua New Guinea that are likely to have FBT or CEST?

WM: Just to go back to school surveys, the traditional method is to look at three schools per district. For a country with the size of Palau, it could change. Regarding FBT, up to about six months ago, I would have said no but we are finding in Tuvalu about one-tenth of people we examine have some sort of trematode eggs. We think that they are intestinal trematodes that come from eating raw tuna. Regarding CEST, I have not heard of any cases, except for Papua New Guinea, Vanuatu, and Solomon Islands.

LAT: Regarding how to select schools (e.g. considering ecological, sociological, economical, etc. factors) there are only three primary schools in Palau. So if you want to sample more children, you would need to include preschool and go into communities.

WM: I would say you should look at the poorest schools. They are the ones more likely to have the problem.

LAT: But then what is the next step? Are you saying to deworm only that particular school?

WM: I do not think we need to look at random sample. We just need to know where the problem is. If they are capable of looking at random samples, that is fine.

JE: Anyone else? I think it will be interesting to see what we get from Palau.

MP: If you find positive cases, where do you go from there?

WM: If you are interested in publishing your results, you should do random sampling. But if you are interested in looking at a snapshot of a population, you look for the worst case scenario.

JE: If you select a school with the largest catchment area from many different communities and you find a case from one community that is where you want to look into. If the school enrolment rate is low in the community, you will find many children not in school. So you would need to catch those children as well. I would look at the whole community, if the community is not too big in terms of child population. Depending on what kind of infection rates you get, you decide, for example, whether to do deworming just on school-age children, community wide deworming, or treatment of positive cases.

WM: Traditionally speaking, if socio-economic and environmental factors are similar between places, they should have similar epidemiological characteristics.

LAT: What about school enrolment in Palau? What proportion of children are not enrolled?

JN: Over 90% of children are enrolled.

LAT: If you want to look at the worst case scenario, you should look at children not enrolled. They are likely to be from more marginalized population.

JN: But they are hard to find. I think it is easier to find those in the school.

JE: Why don't you do that? You go to the communities where positive children come from. We will take it from there based on what you find.

### **Federated States of Micronesia (presented by Mr Moses Pretrick)**

#### Component 1: Epidemiological assessment

- (1) identify state coordinators and procure laptop computers
- (2) collect, compile, and analyse existing data – provide necessary support to the state coordinators to carry out this activity
- (3) define target population (e.g. school-age children ages five to 14 years old)
- (4) establish an agreement with Ministry of Education
- (5) develop a survey protocol, including appropriate diagnostic tools identified, to assess baseline in the four states
- (6) conduct sero and/or stool prevalence surveys, including intensity surveys in subsamples or sentinel sites in previously unsurveyed areas
- (7) analyse data and survey results to define risk areas and determine interventions

#### Component 2: M&E and surveillance

##### Establishment of M&E system

- (1) train health staff in target areas on guidelines and reporting forms
- (2) collect and consolidate the forms, including stock inventory, from all target areas
- (3) regularly analyse and review reports
- (4) conduct rapid coverage assessment periodically

##### Assessment of intervention impact

- (1) train health staff in target areas on guidelines and survey forms
- (2) conduct sentinel site surveys or in subsamples
- (3) analyse and review survey reports for dissemination and decision-making

##### Post-intervention surveillance

- (1) train programme managers on guidelines
- (2) conduct a post-intervention survey
- (3) analyse data, report, and disseminate results

#### Component 3: Resource mobilization

- (1) identify potential partners in addition to the Ministry of Health (e.g. churches, women's groups, schools, and other Non Government Organisations)
- (2) convene meetings with AusAID, New Zealand, Japan, the People's Republic of China, and United States of America donors to present the national plan and budget for LF/NTD
- (3) produce advocacy materials showing the impact of the NTD programme

Component 4: New strategies

- (1) organize a committee and a meeting involving all national stakeholders to finalize the national plan
- (2) establish inter-sectoral task force and coordination mechanisms (e.g. MOUs between Ministries and institutions)
- (3) produce advocacy materials

Component 5: Program management

- (1) train national and state coordinators
- (2) establish an information system for the NTD programme, including training on Geographical Information Systems and computers
- (3) procure, distribute, and manage drug supplies, including adverse effects registry
- (4) monitor treatment coverage at sentinel sites
- (5) establish quality control for diagnostics

Component 6: Research

- (1) improve the mechanism for sharing information on human, animal and socio-economic burden of NTD
- (2) modify and implement existing plans and strategies

Component 7: Social mobilization

- (1) Promote health (sanitation and hygiene) in schools and communities, including reviewing the current school curriculum, developing advocacy materials, and training environmental health, sanitation, and public health staff

Estimate budget from 2010 to 2012 activities: US\$ 437 607

*Note: Federated States of Micronesia first needs to identify state-level focal points that will be coordinating all relevant activities in respective states. The development of survey protocol, data analysis, and the establishment of surveillance system may require a support of STC.*

**Questions and comments for Federated States of Micronesia**

JE: We should not forget that Federated States of Micronesia was considered as partially endemic for LF. So they have many areas that are untouched. We really do not know what happened with MDA in Federated States of Micronesia. It will be interesting to see what happened there and what results you get from the surveys for STH.

WM: MDA has been done only on one island.

JE: So you will need to get baselines and we are looking forward to working with you.

LAT: Federated States of Micronesia will be starting a deworming campaign very soon. My question is should they wait until the surveys are completed and we have a better idea what the situation is?

JE: Ideally, "baseline" assessments are before deworming so you can base your decisions whether or not to deworm on the results. If we start deworming now, we would not know whether deworming was necessary or effective. That may not be the most cost-effective way. But there are several considerations to be made here. I do not know what kind of political messages you have made, whether or not you have ALB or mebendazole on site or if you already have human

resources available. But I would suggest you hold it until you are in a better shape as far as deworming is concerned so that we know what we are doing and that we are making evidence based decisions. Because most of the country has not done MDA, we should start from the very beginning.

WM: Federated States of Micronesia will be a surprise. We found on one island in Yap ascaris in 100% of children tested. I think there is going to be a real surprise. There are going to be communities with children heavily infected. So it is important to keep the survey until we know what we are doing.

JE: It should not be a problem to wait. It would also give you time to determine how much drug is required.

MP: Thank you for bringing up the deworming campaign, which is under nutrition, starting next year. As I said, this plan is still a rough draft. We will go back with this plan and review, along with other activities already planned, to refine this plan.

### **Vanuatu (presented by Mr Peter Malisa)**

#### **Component 1: Epidemiological assessment**

- (1) review published and unpublished historical STH prevalence data by province
- (2) train six provincial malaria microscopists in STH diagnostic methods, facilitated by national and resource persons
- (3) conduct STH surveys in schoolchildren (Grades 1 to 2) in three provinces (Penama, Shefa, and Tafea)
  - a. surveys in two schools in zones with reported low MDA coverage (< 40%)
  - b. surveys in two schools in zones with reported high MDA coverage (> 80%)
- (4) analyse survey results to identify target areas for deworming

#### **Component 4: Intervention**

- (1) based on the result of the surveys, carry out a deworming campaign in the schools

#### **Component 2: M&E and surveillance**

- (1) establish STH prevalence database and integrate with other health information system data
- (2) repeat STH surveys after the deworming campaign in the selected schools

#### **Component 3: Resource mobilization**

- (1) convene donor meetings (e.g. AusAID, CDC, and JICA)

#### **Component 5: Programme management**

- (1) conduct supervisory visits to selected zones together with provincial zone nurses
- (2) train staff on drug supply and logistics at Central Medical Stores
- (3) train staff in surveillance and M&E
- (4) set-up an information system, including IT equipment

#### **Component 7: Social mobilization**

- (1) health education: Review health promotion materials on STH prevention and revise as needed
- (2) sanitation: Strengthen latrine inspection, ensure clean water supply

Estimated budget from 2010 to 2012 activities: US\$ 70 100

*Note: Vanuatu has an ongoing deworming programme.*

### **Questions and comments for Vanuatu**

LAT: The cost of distribution Vanuatu allocated in this plan seems too small. Also, Vanuatu is in a similar situation as Federated States of Micronesia. Would it be better to hold deworming until you have baseline data?

JE: Vanuatu did MDA and it had a good coverage, so it is not a “baseline.”

LAT: Yes, that is right. It is an epidemiological assessment.

JE: What you are assessing is the impact of so many years of MDA. Also, I think you do need to include distribution costs. I would like to remind you that you are revising the national plan. The plan is just a framework and you would want to have, for your purposes, it narrated. I also urge you to look to the log frame and to relate your plan to that because they have indicators. You now have a list of activities, which would immediately give us your national requirements. But you will need to move up and think about how you are going to measure your activities according to the indicators. The laboratory may be an issue. Because you will be doing a number of surveys, you want to make sure you have a laboratory established. If not, you may need to consider having technicians trained.

PM: Yes, that is already in the plan.

JE: That is perfect. Then after your assessment, you will find out your drug needs. We will ask you to provide this information once your survey is done because we will try to find a source of ALB.

### **Papua New Guinea (presented by Ms Melinda Susapu)**

Component 1: Epidemiological assessment

- (1) review and analyse existing data of STH and other helminths
- (2) map out high-risk areas by province, district, community, and/or school using socio-economic data
- (3) conduct surveys to assess STH prevalence/burden with potential methods, including KAP, stool survey, and medical records based survey

Component 4: Intervention

- (1) based on the result of the surveys, carry out a deworming campaign (potential target population of 2.2 million children)

Component 2: M&E and surveillance

- (1) conduct surveys after the deworming campaign
- (2) provide monitoring tools to staff and train them in filling, analysing and reporting

Component 3: Resource mobilization

- (1) disseminate survey and intervention results to stakeholders and sensitize key decision-makers, donors, communities, and private sector partners



Component 5: Programme management

- (1) ensure that activities are incorporated into national action plan and budgets at both national and provincial levels
- (2) conduct regular supervisory visits to implementing districts
- (3) work with stakeholders (e.g. National Agricultural Quarantine and Inspection Authority, Department of Agriculture, Department of Education, and private partners), for example, semi-annual meetings

Component 6: Social mobilization

- (1) Health promotion: Review current health promotion materials on STH prevention and revise or develop, as needed
- (2) sanitation: Integrate STH prevention and control into the environmental health policy (e.g. raise community awareness on the impact of latrines and clean water on STH)

Estimated budget from 2010 to 2012 activities: US\$ 6 482 500

*Note: Historical and existing records identified through a review will be used to map potential high- risk areas in Papua New Guinea. Based on this mapping exercise, surveys (KAP), prevalence survey, and medical records based survey) will be carried out in provinces between 2011 and 2012.*

**Questions and comments for Papua New Guinea**

JE: According to your plan, travelling cost is very high. Is it more affordable to have your own transport?

WM: This is the worst case scenario based on the current WHO protocol. The protocol recommends three schools per district and 50 children per school, which may not be necessary in Papua New Guinea. But since that is the current protocol, we followed it to estimate the cost. My guess is that we would only need one school per district.

PL: In situations like this, you would need to use a sentinel site type of survey. For the LF programme, the original recommendation was to do two sentinel sites per district for mapping. Clearly, that was not designed for a larger population where the cost of the survey would be prohibitive. I think one of the things that the presentations argues is that you cannot think about helminth control without thinking about the LF programme. Instead of looking at twice yearly deworming and LF MDA separately, you could think about one MDA and one round of deworming or just do twice a year MDA, which I think deserves a serious discussion in Papua New Guinea. You want to catch up with the rest of the world? You do twice a year of MDA.

JE: It is clearly stated that the guidelines have to be adapted to regional settings. When we get a guideline from Headquarters, we very often adapt it to the regional setting and we have liberty to do so. I would also support the suggestion to go for more modest sampling because we are not going to get much more information with the intensive sampling. We are going to get information that we need with sentinel site surveys. We should work more on that. I agree with adapting things and I agree with a more modest sampling size. This is the programme where we want to see LF and STH integrated. There will be a lot of piggybacking between the two programmes. You have done a good job on the LF national plan. Now you use the STH national plan to make a "LF and other helminth national plan" for Papua New Guinea. The first round of drugs will be provided under LF but you may need to purchase drugs after that. I would budget for that anyway. I am confident that you might get some of the companies to donate for the second round. You will

be gradually upscaling LF but still LF and STH should go hand in hand, including the mapping of STH, FBT, and CEST.

PL: I am confident that if the national strategy for LF in Papua New Guinea is twice a year of MDA, GSK will support ALB for second dosage. Although PNG is the large relative to the countries in the Region, the requirement for ALB in Papua New Guinea, compared to India, is a drop in the bucket. So we should be creative here and start looking for ways to accelerate the elimination process.

CP: There are 6 million people in PNG. We are concentrating on children here but we know older people can be affected by certain types of worms. At the moment, our focus is children and that is fine. But at some point, we will come to a stage where people are continuously reinfected. Although it depends on sanitation and the water situation in the older population, I wonder how much of this is going to have an impact on STH transmission.

WM: At our sentinel sites in three places, we see hookworm in older populations. The overall prevalence in the three sites is about 50%. Most of the hookworm cases are in the older age group. About 90% of hookworm infection comes from 10% of the population that is heavily infected. So, doing two rounds of MDA, which targets all age groups, is going to make a huge difference in STH. The strategy of twice a year of MDA is a good one, but first we need to do surveys.

LSM: When we did LF mapping, due to logistical difficulties and cost limitations, we went to boarding schools where students in many districts are enrolled in a given province. That was much easier to do. I am worried about the number of schools for the survey. I am not really sure if we are going to have enough people to do the survey. It will be very difficult because you would be taking away people from other duties. The idea of sentinel sites sounds more manageable. I would go with that. Regarding two rounds of MDA, we need to seriously think about how to do because we still need to establish a network of distribution. Regarding the STH plan, I am not sure how much we can start with for a year. We can probably start with high-risk areas, for example, villages along the coast, where latrine issues are concentrating (e.g. open toilet).

JE: Based on the discussions and presentations on LF, there will be two provinces doing MDA. You need to think about how STH can be integrated. Two MDAs would be OK but first we need to make sure that we can operationalize that and clarify how you are going to be upscaling. I do not see any problem in upscaling. In terms of sentinel sites, we need to think about beyond this year and next year, for example in terms of mapping and how we are going to do surveillance at sentinel sites. But I think for LF we should stick to what we decided during the first couple of days of this meeting.

WM: If you have a really good functional LF programme, do you really need a separate worm programme?

JE: No, you would not. The issue here is not that. The issue is how we are going to upscale. That is a function of your operational and financial capacity. We have decided that we are going to try operationalizing a LF STH joint programme. We are doing one round of MDA in Milne Bay this year and starting MDA in New Ireland next year in September. If we are going for twice a year, we would need to do another round of MDA in the six months prior to that in 2010. That is a serious question. If we are going for twice a year eventually, we may need to skip next year and start in 2011.

PL: The principle of equity holds that you have to cover everyone in your target population at least once before you consider the second round. In other areas, where people followed up STH in the

context of the LF programme, hookworm was gone after two cycles, or at least the prevalence was reduced dramatically. For ascaris and *trichuris*, you need to remember it is a morbidity issue. With annual MDA, you can bring down the intensity of infection but it takes a long time to get rid of them. First you need to ensure 100% geographical coverage in MDA. If agreeable, you would start targeting highly endemic areas based on LF or STH, or your operational issues, and gradually start upscaling to two MDA in those areas.

CP: I think the strategy needs to be clarified. Are we targeting FBT and CEST in addition to STH?

JE: No, not yet. I think we would have to rethink how to set-up for FBT and CEST, meaning that based on the results of mapping, we find high-risk areas. We might even need a separate budget to conduct surveys there.

CP: Do you have any issues with HIV and strongyloides?

WM: Strongyloides is very focal in distribution.

PL: The issue of coinfection with HIV and strongyloides has limited evidence.

JE: I think the idea of CEST and strongyloides is a good one. Another issue is FBT.

LM: We need a set of concrete recommendations so we can act on them and can report next year what we have done.

WM: I do not think we have at the moment reliable diagnostics for FBT.

JE: So, we may need to forget about that for the time being.

LSM: I think for the purpose of planning we need a more concrete recommendation on what we are supposed to do. Otherwise, it is difficult to adjust our plan and start budgeting.

JE: I think you should stick to what we decided already during the first couple of days. To assess the issue of helminths, we need to work out the issue of sentinel sites. But you put something difficult on the table, which is a lack of human resources. I would not go for less than sentinel sites but to do this you do need human resources. So, you need to factor that in and that needs to be budgeted. What is unclear to me is whether or not you would have the resources if you had the money. That is the problem I have. Do you have the resources available but need training or don't you have the resources?

WM: I think we need to be clearer on responsibilities. For sentinel site surveys, JCU has made a commitment that we will do most of the sentinel sites. We have done six of them so far and another two or three this year. IMR has said that it is going to a sentinel survey on the Northern Coast where it is currently working. So we will have a good idea not only for LF prevalence, but also for STH. This has been already budgeted. We have a budget to do at least three or four. The money for 2010 is already there. So we do not need to worry about sentinel sites. That's already taken care of.

JE: Is that sorted out? The results of that would determine whether you would go for MDA twice a year. The assumption is that based on what we already know your helminth prevalence is very high and it would make sense to do twice a year MDA.

KR: I think you should think about your first MDA. If you can do good MDA in the two provinces for the next few years, you can make a decision for the next few years following the MDA based on that.

JE: We should stick to the original plan for LF. In the process, we are going to get information from the sentinel sites and that would allow us to decide which way we are going to go. First, you have to show that you can operationalize the LF plan and MDA. We already have some information from the sentinel sites and we will have additional information that we can take a look at. The WHO Headquarters is not recommending twice a year MDA. But there has been twice yearly MDA in the Americas for onchocerciasis and even upscaling to four times a year. The key element here is proving that with two or more MDA in a year you can cut a programme period by such time.

PL: There is a clinical trial going on under the umbrella of the Gates operational research grant. There is also an approved but yet to be funded project by the Gate Foundation. One of the components of the project is to try to operationalize twice a year of MDA and to look at the impact.

JE: That is critical because you have time. This is why slow scaling up in Papua New Guinea is important so that we can recommend an evidenced-based strategy.

LAT: I was just wondering how feasible the plan is in Papua New Guinea because LF is already under-prioritised.

JE: They are going to have to readjust the budget. For the purpose of the Global Network, we need the LF component, which is going to have an impact on STH as well. Right now, we have two separate budgets, but in the end we are going to have a single one.

SN: We and JICA are hosting a Health Summit on the last day of November in Papua New Guinea. This is an opportunity for donor agencies and civil society organizations such as churches and NGOs to hear about the progress of our health programme. NTD is not on the agenda but it would be a good opportunity for the Department of Health to show their experiences.

KR: This morning, when we met the Health Minister, he seems to have been surprised by looking at the pictures of LF patients. I do not think he had ever had an opportunity to see a LF patient. In doing the two pilot MDAs, we need to think about sensitizing not only the population but also our stakeholders in Papua New Guinea.

JE: The pictures of the LF patients from Fiji certainly had a big impact on the Minister this morning at the meeting. You have just raised a very important point. Pictures do have a big impact.

### **Fiji (presented by Mr Ravinesh Chetty)**

#### **Component 1: Epidemiological assessment**

- (1) perform literature search and health department records to map historic STH data
- (2) review and revise existing survey tools
- (3) conduct a survey of children aged five to seven years olds (approximately 6000 stool and blood samples)
- (4) analyse data and survey results (prevalence and infection density)
- (5) conduct a deworming campaign based on the results

## Component 2: M&E and surveillance

### Establishment of STH monitoring system:

- (1) adopt the reviewed guidelines for effective monitoring
- (2) identify one sentinel school per subdivision
- (3) train staff for monitoring
- (4) consolidate stock forms and records and regularly review reports

### Assessment of intervention impact

- (1) develop and/or adopt the guidelines for evaluation surveys
- (2) provide refresher training on the surveys
- (3) conduct surveys to assess the impact of interventions at sentinel schools (one school per subdivision)
- (4) analyse and review the survey results for decision-making

### Post-intervention surveillance

- (1) develop post-intervention surveillance guidelines and system
- (2) train programme managers for surveillance
- (3) conduct post-intervention surveys after three years of stopping the intervention
- (4) analyse the data and disseminate the results
- (5) continue the post-intervention surveillance at three-year interval

## Component 3: Resource mobilization

### National strategic plan

- (1) draft a national strategic plan for resource mobilization
- (2) identify and meet with people having expertise for resource mobilization
- (3) identify and meet with potential partners to advocate support from donors
- (4) produce advocacy documents to support resource mobilization at the national level

### “Piggybacking” with other NTD programmes

- (1) conduct meetings to identify and integrate relevant programmes at national and divisional levels

## Component 4: New strategies

- (1) identify Ministries or Departments interested in an integrated approach to disease control
- (2) establish coordination between the identified Ministries and/or Departments (e.g. making necessary arrangements and setting up procedures for programme implementation)
- (3) implement programmes in an integrated manner
- (4) document and share experiences and outcomes of integration to identify the programmatic gaps and strategies to address them
- (5) implement the new strategies for programme integration

## Component 5: Programme management

- (1) Capacity development
  - a. conduct training for trainers for programme managers on STH prevention and control at the national level
  - b. subsequently conduct trainings at the divisional and subdivisional level
  - c. assess compliance to the guidelines and programme targets
- (2) Logistics for programme implementation
  - a. prepare annual plans including activity, financial, communication, materials procurement, distribution and allocation plans

- b. procure and distribute drugs and other consumables to the individual IUs
  - c. monitor utilization and inventory
- (3) Information System
  - a. identify data sources (Bureau of Statistics, Ministry of Education, Ministry of Health, etc) and collect relevant data
  - b. establish systems for inter-sectoral information sharing in consideration of existing systems
  - c. conduct consultation meetings to incorporate STH in the existing health information systems
- (4) Establishment of inter-sectoral and inter-departmental collaboration
  - a. conduct inter-sectoral meetings involving various sectors, Ministries, and Departments at the national level
  - b. formalization of MOUs between the partners for collaboration and coordination of the programmes

Component 6: Social mobilization

- (1) convene experts meeting to develop social mobilization network
- (2) adopt, monitor, and evaluate the social mobilization framework
- (3) develop policies, guidelines, plans for advocacy to engage both public and private sectors in STH control (to be incorporated in the National Plan)
- (4) identify and meet with key public and private stakeholders in social mobilization
- (5) arrange a memorandum of agreement between the two sectors
- (6) convene meetings between the Ministries of Health and Education to review and revise the school curriculum
- (7) formalize and adopt the new teaching materials

Estimated budget from 2010 to 2012 activities: US\$ 479 600

*Note: The presented plan is the worst case scenario. The majority of activities presented here are dependent on the results of the survey planned in 2010. There is a deworming campaign currently ongoing (November to December 2009) in Fiji as part of a micronutrient supplementation programme. If the Ministry of Health decides to maintain the deworming activity, it is expected that Mataika House will be in charge starting from 2010.*

**Questions and comments for Fiji**

JE: This is a very comprehensive plan. You did a tremendous job. But you presented the worst case scenario, which is probably not going to be the case. I assume that MDA has had quite a lot of impact on STH. If this is the case, you would only need to implement a portion of what you have in the plan.

RC: Yes, it will all depend on the survey we are planning to carry out.

JE: I think the most important thing is not only for Fiji, but also for other countries, is to look at the results of the epidemiological assessment planned for the next year or the following year. I hope that you will be able to focalize your actions much more. So you need to start gearing up towards the surveys, which will refine your plan for the next course of action. The worst case scenario may not necessarily be the case.



CP: Congratulations for the very comprehensive plan and I hope you will achieve most of them. My first question is who is going to do this. You are already the coordinator for the LF programme. Are you going to have another programme manager for STH? The second question is probably to Dr Ehrenberg. I got an impression that some of us and the countries are talking STH in terms of eradication, elimination, or sometimes control. Are we talking about a STH programme as an eradication, elimination, or control programme? The words have different connotations and we would need different approaches. I think we need to be clear about what we are doing.

JE: The absence of incident infection is not what we are aiming for. We are not going to eliminate STH. What we are trying to do is to reduce it to a point where it is no longer a public health problem, meaning morbidity, i.e. the intensity of infection. I think most of you will need to rewrite “the intensity of infection” into your plan. We really need to look at the intensity of infection to see where we are. I think Fiji’s plan is a model plan even for Papua New Guinea because it is very detailed. I cannot emphasize enough the importance of exchanging information among your colleagues in the Region. For Fiji, I am hoping that you would not be facing the worst case scenario. If you did, it is also an issue for LF, as STH is more or less a proxy indicator for MDA and the LF programme.

RC: Regarding the programme manager, it is not yet confirmed, but it is likely that I am going to be responsible for the deworming programme. If that is the case, I will not be directly involved in the surveys but will be coordinating and giving oversight.

JE: It is good that you are getting support and will be in a supervisory role.

WM: In some areas, Fiji had good coverage but some areas have had poor MDA coverage. Those areas need to be carefully looked at and should be included in the survey. Fiji is a very diverse country – diverse in environment, geography, and climate. So, I expect they have various types of parasites. We need to carefully think about how we pick sentinel schools.

AH: I recognize that we are building a three-year plan. But I just wanted to point out that we probably need to look at more medium-term efficacy of water and sanitation. They are getting more and more expensive but are necessary to secure the results of the programme. The cost here is low, but once we start looking at water and sanitation, it will skyrocket.

JE: I am not too sure about that. I do not think this is about World Bank-type infrastructure projects (e.g. setting up pipelines). For example, in terms of education, it would be to bring this into a school curriculum, as a multi-disease package (e.g. STH, dengue and diarrhoeal diseases). Another example would be the community-led total sanitation (CLTS) approach where village level mobilization and collective decision-making on sanitation issues are highly promoted. This is a poverty issue. Education and environmental sanitation are two key components in helminth control and we are promoting an inter-sectoral approach. We are also advocating for worms as an indicator of poverty. We are heading in that direction.

RC: Fiji has a community-level water and sanitation programme. We may not be able to incorporate them directly into our programme, but we can still work together.

CC: I have put together all the budgets presented, except for Papua New Guinea, and we have arrived at a total budget for approximately US\$ 1.3 million for the next three years (from 2010 to 2012). Two countries, Federated States of Micronesia and Fiji, represent more than US\$ 900 000. So for the rest of the countries, we are looking at only about US\$ 300 000 total for over the next three years.



### **Wrap up for Part II on other helminthiases**

Dr John Ehrenberg

- (1) There is little data available on helminthiases other than LF in the Pacific Region. According to the presented national plans, most countries are reviewing existing records and planning surveys to address this issue. These activities are not only essential for determining whether further interventions are necessary, but also important for documenting the impact of LF MDA on LF.
- (2) Countries with multiple MDA (five or more) are expected to have very low STH infection rates. Yet a surveillance system will be necessary in those countries to detect potentially introduced or residual cases.
- (3) Countries without LF MDA are encouraged to use the regional NTD plan framework to develop a step-by-step plan, like Fiji's, to map STH burden and determine future needs for helminth control. Mapping data will help further tailor the plan for the country.
- (4) There will be needs for technical assistance for countries conducting STH surveys (e.g. protocol development and laboratory capacity development).
- (5) Papua New Guinea will be the biggest challenge for STH control in the Pacific Region due to its large population. Partnerships with the private sector will be essential for the country to optimize available resources and actualize the plan (e.g. sources of funding and partners for drug distribution and health promotion).
- (6) Countries now have comprehensive plans of action for LF and other helminthiases, which can be put together as "multi-disease package."
- (7) Two documents from Western Pacific Regional Office provide important data and information on LF and other helminthiases in the Region. One is review on the epidemiological profile of helminthiases and their control in the Western Pacific Region, from 1997 to 2008, which is a comprehensive 10-year review of STH in the Western Pacific Region. The other is the meeting report from the First Mekong-plus Programme Managers Workshop on Lymphatic Filariasis and Other Helminthiases in March 2009. They are good resources for programme managers and prove the importance of documentation, reporting, and utilizing available data. For example, the data presented at the meeting revealed the previously unrecognized serious burden of FBT in the Mekong-plus Region.

**ANNEX 1**

**FIRST WORKSHOP ON LYMPHATIC  
FILARIASIS AND OTHER HELMINTHIASES  
FOR PACIFIC PROGRAMME MANAGERS**

**WPR/DCC/07/MVP(6)/2009/1A  
3 November 2009**

**Port Moresby, Papua New Guinea  
9-12 November 2009**

**ENGLISH ONLY**

**PROVISIONAL AGENDA**

***A. Lymphatic Filariasis***

1. Opening session
2. Updates from global level, Mekong-plus region and the Pacific
  - Update on the Global Programme to Eliminate Filariasis
  - Lymphatic Filariasis Situation of Mekong-plus countries
  - Progress of the Pacific Programme to Eliminate Lymphatic Filariasis since the 2007 LFMM
  - Update on monitoring and evaluation
  - Morbidity control
3. Country reports and panel discussion/recommendations
  - Country reports: country implementing or requiring mass drug administration (MDA)
  - Country reports : country implementing surveillance
  - Update on the Papua New Guinea Programme to Eliminate Lymphatic Filariasis
4. Group work (Towards elimination: set up a realistic date for each country and development of the plan to reach it)
5. Revised national plans and budget – report from countries
6. Partnerships and resource mobilization
  - Update on Gates Foundation Grant on Operational Research in lymphatic filariasis Partnership in the Global Programme to Eliminate Lymphatic Filariasis: Focus on the Pacific
  - Lymphatic Filariasis support centre and activities
  - Panel discussion and recommendations on the way forward for resource mobilization
7. Conclusions and recommendations
8. Closing

## **PROVISIONAL AGENDA**

### **B. *Other Helminthiases***

1. Introduction and objectives
2. 10-year review of helminthiasis in the Western Pacific Region and data available for the Pacific
3. Panel discussion and recommendations: How to move forward
4. Summary on the Regional Neglected Tropical Diseases Action Plan
5. Group Work 1: Refining the Regional Neglected Tropical Diseases plan
6. Group Work 2: Developing/updating national deworming plans 2010–2012
7. Report from group work by country participants
8. Wrap-up, recommendations and way forward
9. Closing ceremony

## ANNEX 2

**FIRST WORKSHOP ON LYMPHATIC  
FILARIASIS AND OTHER HELMINTHIASES  
FOR PACIFIC PROGRAMME MANAGERS**

**WPR/DCC/07/MVP(6)/2009/IB/2**

**6 November 2009**

**Port Moresby, Papua New Guinea  
9 to 12 November 2009**

**ENGLISH ONLY**

### **INFORMATION BULLETIN NO. 2**

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## ANNEX 3

**Draft WPRO Regional Strategic Plan (2009-2015) on Neglected tropical Diseases (NTDs) with emphasis on helminthiasis with comments made during the meeting in red. Only components and expected results to which comments are made are presented here.**

### Component 1. Epidemiological assessment

Major Activities	Outputs	Responsible agencies/persons	Required budget
<b>Expected Result1:</b> <b>Baseline prevalence (including intensity in a sub sample or sentinel sites) and distribution of NTDs by geographical area and population group determined.</b>			
1.1b Develop tools and obtain agreement on best practice survey protocol, including use of GIS (for future impact evaluation)-	<ul style="list-style-type: none"> <li>▪ Rapid coverage assessment tool available<sup>5</sup></li> <li>▪ Survey protocol established<sup>6</sup> (including periodic updating procedures)</li> </ul> <b>national capacity developed to do above</b>	WHO National programme	Fund, experts, <b>human resources</b>

### Component 3. Resource Mobilization

Activities	Outputs	Responsible	Resources
<b>Expected Result 1:</b> <b>National and regional strategies aimed at mobilizing financial support developed and promoted</b>			
3.1c Convene potential Partners' Meetings to advocate support from donors (bilateral and multilateral) <b>advocate for NTDs in Donor/DP meetings</b>	<ul style="list-style-type: none"> <li>▪ Reports of for a, donor meetings, special events for resource mobilization at national, regional levels</li> </ul>	WHO, WR/CLO, Ministry of Health	Funds, experts
3.1d Produce advocacy materials to support fund mobilization at the national level	<ul style="list-style-type: none"> <li>▪ Advocacy materials for specific target audiences available</li> </ul>	WHO, WR/CLO, Ministry of Health	Funds, experts

<sup>5</sup> EPI rapid coverage assessment tool to be adapted (Dr. Howard Sobel and Dr. Dirk Engels)

<sup>6</sup> Technical guidelines for assessing FBT currently in process of development



<b>and political commitment</b>			
<b>Expected Result 2:</b> <b>Opportunities to “piggy-back” NTD programs and activities are identified and explored</b>			
3.2a Conduct bilateral and multilateral meetings to identify relevant programs ( <b>country level intra-agency meetings e.g., Unicef, WFP, NGOs, churches</b> )	<ul style="list-style-type: none"> <li>Integration of NTDs in ongoing or planned programs (national and regional)</li> <li>Integration of NTDs in specific activities at local levels (provincial, community levels)</li> </ul>	WHO/WPRO + Ministries of Health  Programme Managers	Political will to support NTDs
<b>Expected Result 3:</b> <b>Capacities of programme managers to <b>mobilize and</b> access funds for NTDs enhanced</b>			
3.3a Conduct proposal writing training	<ul style="list-style-type: none"> <li>Attractive proposals prepared by trained participants</li> </ul>	WHO Ministry of Health, Academia	Funds, experts

## Component 4. New strategies

Activities	Outputs	Responsible	Resources
<b>Expected Result1:</b> <b>Global framework for integrated approach adapted to the WP region</b>			
4.1a Create a network of experts with field experience in economics, agriculture, veterinary, aquaculture, education, environmental management, NTD, community organizing	<ul style="list-style-type: none"> <li>Inventory of experts by inter-sectoral themes</li> </ul>	WPRO Programme Managers  <b>Relevant ministers and heads of authorities and institutions</b>	Funds, experts
<b>Expected Result 2:</b> <b>Existing WHO technical guidelines translated and adopted at the national level</b>			
4.2a Organize training for Programme Managers to develop national plans	<ul style="list-style-type: none"> <li>Number of programme managers trained</li> </ul>	WHO/ WPRO <b>together with, Ministers of Health</b>	WPRO provides Regional platform for funding NTD activities, <b>co-funded by national sources</b>
4.2b Organize meeting with key national stakeholders and Programme Managers	<ul style="list-style-type: none"> <li>National plans drafted</li> </ul>	<b>WHO/WPRO together with Ministers of Health</b>	<b>WPRO provides Regional platform for funding NTD activities, co-funded by national sources</b>

Activities	Outputs	Responsible	Resources
<b>Expected Result 4:</b>			
<b>Inter-sectoral coordination mechanisms are established</b>			
4.4a Identify Ministries that can realistically be engaged	<ul style="list-style-type: none"> <li>List of Ministries with high chance of coordination success</li> </ul>	Programme Managers, <b>Directors of Public Health</b>	
4.4b Establish coordination arrangements and procedures	<ul style="list-style-type: none"> <li>MOU specifying inter-sectoral coordination arrangements and procedures</li> </ul>	Programme Managers, <b>Directors of Public Health</b>	
4.4c Implement programs of mutual interest	<ul style="list-style-type: none"> <li>Number of programs implemented inter-sectorally</li> </ul>	Programme Managers, <b>Directors of Public Health</b>	
<b>Expected Result 5:</b>			
<b>Review and analysis of what works in the integrated approach documented</b>			
4.5b Conduct meetings/ conferences to share experiences or include in regular agenda of regular meetings	<ul style="list-style-type: none"> <li>Programme managers are updated on good practice</li> </ul>	Meeting minutes/ Conference proceedings <b>Meeting organizers and secretaries</b>	Funds, experts

## Component 5. Program Management (supervision) including capacity development

Activities	Outputs	Responsible	Resources
<b>Expected Result 1:</b>			
<b>Capacity of program managers at the national level strengthened</b>			
5.1c Conduct training at the local level ( <b>provincial, district etc.</b> )	<ul style="list-style-type: none"> <li>Local training conducted</li> </ul>	MOH	
Activities	Outputs	Responsible	Resources
<b>Expected Result 2:</b>			
<b>Logistics established for handling of drugs and other commodities and timely delivery of interventions secured</b>			
5.2a Prepare annual work and financial plan, procurement plan, distribution and allocation plan	<ul style="list-style-type: none"> <li>Annual work and financial plan, procurement plan, distribution/allocation plan</li> </ul>	MOH <b>National and provincial programme managers, Central Medical Stores</b>	
5.2b Procure and distribute needed <b>drugs and other commodities</b>	<ul style="list-style-type: none"> <li>Needed <b>drugs and other commodities</b> procured and distributed</li> </ul>	MOH <b>National and provincial programme managers, Central Medical Stores</b>	

5.2c Monitor (including utilization and inventory)	<ul style="list-style-type: none"> <li>Monitoring and inventory report</li> </ul>	MOH <b>National and provincial programme managers, Central Medical Stores</b>	
<b>Expected Result 3:</b> <b>Information system established</b>			
5.3a Identify sources of data (FBT, CES, others)	<ul style="list-style-type: none"> <li>Sources of data identified</li> </ul>	MOH, <b>Ministry of Agriculture etc.,</b>	
5.3b Collect data from member states (LF, STH, SCH)	<ul style="list-style-type: none"> <li>Data report/review</li> </ul>	MOH, <b>Ministry of Agriculture etc., WHO</b>	
5.3d Establish system for inter-sectoral information sharing considering existing mechanisms (for SCH, FBT, CES) (e.g. AI)	<ul style="list-style-type: none"> <li>Mechanisms in place</li> </ul>	MOH, <b>Ministry of Agriculture, and others</b>	
5.3e Conduct consultation meetings to include NTDs in national health information system	<ul style="list-style-type: none"> <li>Integrated information system</li> </ul>	MOH, <b>National Statistic Offices, Academic Institutions</b>	

<b>Component 6. Research</b>			
<b>Activities</b>	<b>Outputs</b>	<b>Responsible</b>	<b>Resources</b>
<b>Expected Result1:</b> <b>Applied and operational research capacity of existing academic/research institutions and programs in member states enhanced</b>			
6.1c Identify research gaps and priority needs  <b>Potential topics</b> <ul style="list-style-type: none"> <li><b>Immigrants, hot spot (rapid assessment tools),</b></li> <li><b>New diagnostic tools</b></li> <li><b>Tools for determining interruption of transmission (WAF, VAN, NIU, COK, TON) Drug resistance (FRP)</b></li> <li><b>Frequency and duration of</b></li> </ul>	<ul style="list-style-type: none"> <li>Grant application</li> </ul>	Research Community	

<b>deworming,</b> <ul style="list-style-type: none"> <li>▪ <b>Impact of LLIN distribution on different vectors</b></li> </ul>			
Activities	Outputs	Responsible	Resources
<b>Expected Result 2:</b> <b>New knowledge for effective control of communicable diseases generated (biomedical, epidemiological, social, behavioral, economic, health systems, etc.)</b>			
6.2a Conduct Research to develop new tools and strategies for example, community-based strategies to control food-borne trematodes  <b>Potential topics</b> <ul style="list-style-type: none"> <li>▪ <b>Community-based vector control</b></li> <li>▪ <b>Area-wide IVM assessment</b></li> <li>▪ <b>DEC salt: operationalization of DEC salt strategy</b></li> <li>▪ <b>Validation of T&amp;T strategy</b></li> <li>▪ <b>Enhance utilization of LLIN and other vector control interventions</b></li> <li>▪ <b>Identify culturally appropriate social mobilization strategies</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Research findings</li> </ul>	Research Community	
<b>Expected Result 3:</b> <b>Burden of disease estimated</b>			
6.3a Identify current gaps in our understanding of the burden of NTDs  <b>Potential topics</b> <ul style="list-style-type: none"> <li>▪ <b>Ivermectin for scabies</b></li> <li>▪ <b>Baseline NTD prevalence</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ Summary of virtual or actual discussions</li> </ul>	Research Community	

<ul style="list-style-type: none"> <li>Public health implication of co-infections</li> </ul>			
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## Component 7. Social Mobilization

Activities	Outputs	Responsible	Resources
<b>Expected Result1:</b> <b>Social mobilization resource group established</b>			
7.1a Convene experts' meeting  <b>Tap on expertise outside health sector (i.e., private sector including NGOs, Global Network, universities, chamber of commerce, tourism organizations)</b>	<ul style="list-style-type: none"> <li>Meeting report</li> <li><b>In kind contributions</b></li> </ul>	WHO, <b>Directors of Public Health, Programme Managers, Marketing Companies, (e.g. Fisheries)</b>	
7.1b Develop framework on social mobilization  <b>Involve outside expertise and interest groups to develop social mobilization strategies</b>	<ul style="list-style-type: none"> <li>Availability of framework</li> </ul>	<b>MOH</b>	
7.1c Adopt social mobilization framework to country setting	<ul style="list-style-type: none"> <li>Implementation plan developed</li> </ul>	<b>MOH in collaboration with involved parties</b>	