Meeting Report

INFORMAL CONSULTATION ON POST-ELIMINATION SURVEILLANCE OF NEGLECTED TROPICAL DISEASES

13–14 June 2017
Siem Reap, Cambodia

World Health Organization
Western Pacific Region

WORLD HEALTH ORGANIZATION

REGIONAL OFFICE FOR THE WESTERN PACIFIC

RS/2017/GE/26(KHM) English only

MEETING REPORT

INFORMAL CONSULTATION ON POST-ELIMINATION SURVEILLANCE OF NEGLECTED TROPICAL DISEASES

Convened by:

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

Siem Reap, Cambodia
13–14 June 2017

Not for sale

Printed and distributed by:

World Health Organization
Regional Office for the Western Pacific
Manila, Philippines

February 2018

NOTE

The views expressed in this report are those of the participants of the Informal Consultation on Post-elimination Surveillance of Neglected Tropical Diseases and do not necessarily reflect the policies of the conveners.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for Member States in the Region and for those who participated in the Informal Consultation on Post-elimination Surveillance of Neglected Tropical Diseases in Siem Reap, Cambodia from 13 to 14 June 2017.

CONTENTS

SUMMARY

ABBREVIATIONS

1. INTRODUCTION 1
   1.1 Meeting organization 1
   1.2 Meeting objectives 1

2. PROCEEDINGS 1
   2.1 Opening session 1
   2.2 NTD post-validation surveillance situation in the Western Pacific Region 1
      2.2.1 Achievements and emerging challenges in elimination and control of NTDs in the Western Pacific Region 1
      2.2.2 Current WHO guidelines on post-elimination surveillance 2
      2.2.3 Discussion regarding the purpose of NTD post-elimination surveillance 3
   2.3 Potential risks of transmission recrudescence 3
      2.3.1 Using historical TAS results to identify areas to prioritize post-elimination surveillance 3
      2.3.2 Persistent transmission in geographical foci 4
      2.3.3 Importation of transmission by migrants 6
      2.3.4 New clinical cases 6
   2.4 Platforms and tools for post-elimination surveillance of NTDs 7
      2.4.1 Potential diagnostic tools 7
      2.4.2 Potential platforms and lessons learnt 9
      2.4.3 Sentinel site surveillance 9
      2.4.4 Discussion on the scope and framework of NTD post-elimination surveillance 10
   2.5 Capacity for NTD post-elimination surveillance in selected countries 11
   2.6 Country breakout sessions: where, how, when and who to implement LF post-elimination surveillance 13
   2.7 Discussion on next steps 15

3. CONCLUSIONS AND RECOMMENDATIONS 16
   3.1 Conclusions 16
   3.2 Recommendations 16
      3.2.1 Recommendations for Member States 16
      3.2.2 Recommendations for WHO 17

ANNEXES

Annex 1 - LIST OF PARTICIPANTS

Annex 2 - PROGRAMME OF ACTIVITIES

Annex 3 - SUMMARY OF SELECTED DISEASE SURVEILLANCE PLATFORMS FOR BOTH COMMUNICABLE AND NONCOMMUNICABLE DISEASES (NCDS)

Keywords:
Neglected diseases – epidemiology, prevention & control / Elephantiasis, Filarial / Disease eradication / Communicable disease control

ABBREVIATIONS

Ab	antibody
Ag	antigenaemia
CFA	circulating filarial antigen
DEC	diethylcarbamazine citrate
ELISA	enzyme-linked immunosorbent assay
EU	evaluation unit
FTS	filariasis test strip
HBV	hepatitis B virus
ICT	immunochromatographic test
IU	implementation unit
LF	lymphatic filariasis
MDA	mass drug administration
Mf	microfilaria
NCD	noncommunicable disease
NTD	neglected tropical disease
PCR	polymerase chain reaction
RDT	rapid diagnostic test
STEPS	STEPwise Approach to Surveillance
TAS	transmission assessment survey
USAID	United States Agency for International Development
US CDC	United States Centers for Disease Control and Prevention
WHO	World Health Organization

SUMMARY

During the last two years, six countries from the Region were validated by WHO as having eliminated lymphatic filariasis (LF) as a public health problem. Two countries have also been validated for having eliminated trachoma as a public health problem in 2017. A few more countries are in the pipeline for validation of LF elimination in 2017 and many other endemic areas in other countries have completed the required rounds of mass drug administration (MDA) and are currently conducting post-MDA surveillance activities. However, there is a risk of recrudescence from remaining local pockets of transmission leading to re-emergence of diseases as a public health problem and possible reintroduction of diseases to areas that have achieved elimination from other countries and areas of the WHO Western Pacific Region and in neighbouring regions where active transmission is still present. There is an urgent need to establish post-elimination surveillance that can be integrated and sustained within the general health system.

The Informal Consultation on Post-elimination Surveillance of Neglected Tropical Diseases agreed that the objectives of post-elimination surveillance are to help ensure re-emergence does not happen and ultimately in the longer term to confirm interruption of transmission.

There is limited evidence at present for WHO to recommend any specific post-elimination surveillance strategies. However, it is clear that post-elimination surveillance will need to be country specific and should be prioritized in geographical areas with potential risks of resurgence of transmission or specific population groups with risks of introduction of transmission. This could include areas with persistent presence of positives in originally endemic areas, specific high-risk occupation groups and migrants from other endemic countries. Also, post-elimination surveillance should be feasible and thus integrated within the country's health system for its sustainability.

The Consultation developed a list of priority operational research items to generate further evidence to define risk areas or population groups for which post-elimination surveillance should be prioritized and to determine feasible, cost-effective and sustainable post-elimination surveillance options for neglected tropical diseases (NTDs).

In the meantime, relevant countries are encouraged to determine risk areas or population groups to prioritize post-elimination surveillance as well as to identify and pilot opportunities of existing regular national and subnational representative surveys and sentinel surveillance activities to integrate and sustain post-elimination surveillance.

WHO should collaborate with partners and assist Member States in implementing the priority operational research agenda identified at the Consultation to generate needed evidence to determine feasible, cost-effective and sustainable post-elimination surveillance options for NTDs.

1. INTRODUCTION

1.1 Meeting organization

The Informal Consultation on Post-elimination Surveillance of Neglected Tropical Diseases was held 2017 in Siem Reap, Cambodia, on 13–14 June, with financial support from the United States Agency for International Development (USAID). The meeting was attended by six temporary advisers, five national neglected tropical disease (NTD) programme managers/focal points, four national focal points of communicable disease surveillance and representatives of four stakeholder organizations. The full list of participants is in Annex 1 and the meeting agenda is in Annex 2.

1.2 Meeting objectives

The objectives of the meeting were to:

1) discuss the scope and framework of post-elimination surveillance of NTDs;

2) identify opportunities for integration of post-elimination surveillance of NTDs in the existing disease surveillance activities; and

3) discuss plans for operationalizing post-elimination surveillance of lymphatic filariasis (LF) as a proof of concept.

2. PROCEEDINGS

2.1 Opening session

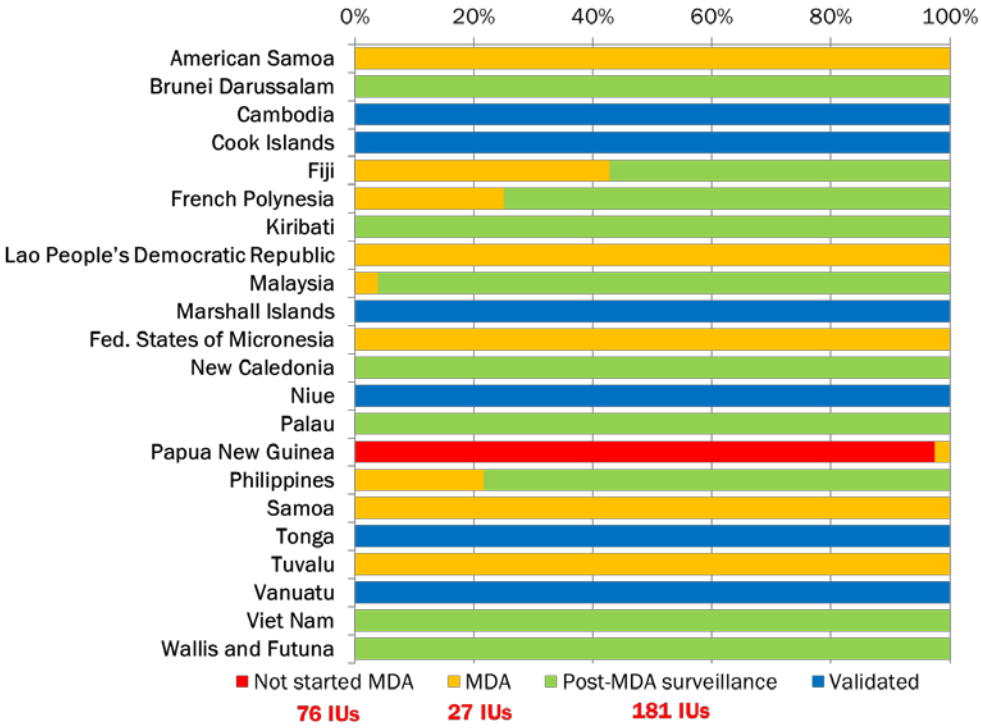
Dr Rabindra Abeyasinghe delivered the opening remarks on behalf of Dr Shin Young-soo, WHO Regional Director for the Western Pacific. The Regional Director commended Member States for the significant progress made towards eliminating and controlling NTDs in the Western Pacific Region, particularly elimination of LF. During the last two years, six countries from the Region were validated by WHO as having eliminated LF as a public health problem. A few more countries are in the pipeline for validation in 2017 and many other endemic areas in other countries have completed the required rounds of mass drug administration (MDA) with reported high treatment coverage and are currently conducting post-MDA surveillance activities. However, since active transmission of these NTDs is still present in some countries and areas of the Western Pacific Region and in neighbouring regions, there is a risk of possible reintroduction of diseases to areas that have achieved elimination. He emphasized the urgent need to establish post-elimination surveillance that can be integrated and sustained within the general health system. In closing, he conveyed his appreciation to all the participants for sharing their expertise and experience to guide Member States in establishing sustainable post-elimination surveillance for NTDs as an integral part of existing public health surveillance systems to prevent re-establishment of transmission.

2.2 NTD post-validation surveillance situation in the Western Pacific Region

2.2.1 Achievements and emerging challenges in elimination and control of NTDs in the Western Pacific Region

Progress on elimination and control of NTDs continues in the Western Pacific Region. WHO has validated six countries for having eliminated LF as a public health problem since 2016: Cambodia, Cook Islands, Marshall Islands, Niue, Tonga and Vanuatu. Cambodia and the Lao People's Democratic Republic were also validated for having eliminated trachoma as a public health problem in 2017. Even in countries that have not achieved validation of LF elimination status, the large number of implementation units (IUs) in the Region, except in Papua New Guinea, have already stopped MDA and undertaking post-MDA surveillance (Fig. 1).

Fig. 1. Proportion of IUs by LF elimination programme steps by country/area, June 2017 (presented by Dr Aya Yajima)



However, there are still countries and areas in the Region and neighbouring regions with ongoing transmission, which can lead to the possible risk of reintroduction of transmission. Even in countries that have gained validation status, there might be small foci of infected individuals that potentially pose a risk of recrudescence of transmission. This has most recently been exemplified by re-emerging transmission in American Samoa. Migration, specifically in Palau, will continue to pose a risk of re-emergence if not properly addressed, especially in the face of rapid globalization. Guidance on protocol of post-elimination surveillance that can be sustained even in absence of LF-specific resources after validation of elimination as a public health problem is urgently needed in the Western Pacific Region.

To this end, the Consultation discussed the following specific questions regarding post-elimination surveillance:

- What are the objectives of post-validation surveillance?
- What diagnostics should be used?
- What age group should be tested?
- Should point prevalence or trend over time be examined?
- When and how to respond?
- With which existing platforms can post-elimination surveillance be integrated?
- What steps are required to use such existing platforms?

2.2.2 Current WHO guidelines on post-elimination surveillance

The Generic Framework for Control, Elimination and Eradication of Neglected Tropical Diseases1 defines elimination as a public health problem as achievement of measurable global targets for both infection and disease, for which, when reached, continued actions are required to maintain the targets and/or to advance the interruption of transmission. The 2011 Global Programme to Eliminate

[1] WHO (2016) Generic framework for control, elimination and eradication of neglected tropical diseases. World Health Organization, Geneva. http://apps.who.int/iris/handle/10665/205080

Lymphatic Filariasis transmission assessment survey (TAS) manual2 also clearly states that the status of elimination of LF as a public health problem is potentially reversible and that the Member States should continue to undertake post-elimination surveillance and are also responsible for ensuring that surveillance data are made available to WHO. In pre-validation countries nearing elimination, the manual recommends implementation of periodic surveys to repeat a TAS every 2–3 years and use of ongoing surveillance activities, such as routine screening of military recruits, university students, blood donors or hospital patients, to ideally cover the entire endemic area in a country to detect any sign of recrudescence of transmission before validation.

So far, however, there are no standardized methodologies recommended for post-validation surveillance to detect and respond to new cases which may be found in the post-validation phase. The challenge in developing such guidance is to determine: (i) which methods are sustainable at the post-validation phase as determined by applicability to the local settings; (ii) specific standard operating procedures (SOPs) to make a best estimate of indicators in the population; and (iii) which combination of indicators provide sufficient evidence of the absence or decline in transmission. In addition, post-elimination surveillance should be cost-feasible and opportunistic with the objective to demonstrate decreased infection rate and/or exposure after stopping MDA. The priority is to identify and pilot post-elimination surveillance options in selected post-validation areas or countries; apply new diagnostic tests to strengthen existing monitoring and evaluation (M&E) and post-validation activities; and measure cost (including opportunistic cost), feasibility and value to aid development of standardized WHO guidance.

The current WHO guidance on elimination of trachoma as a public health problem is that post-validation surveillance to monitor re-emergence of active trachoma is not considered a requirement but a system to identify and manage incident trachomatous trichiasis cases with evidence of appropriate financial resources should be demonstrated during the validation process and should be in place for the post-validation phase. National programmes are encouraged to monitor and report any evidence on the issue of re-emergence of active trachoma at the post-validation phase.

2.2.3 Discussion regarding the purpose of NTD post-elimination surveillance

It was acknowledged that recent successes in disease elimination can largely be attributed to successful preventive chemotherapy campaigns rather than the work of strengthened health systems with surveillance and response capacities. Countries are at risk of recrudescence of transmission since many health systems have not been strengthened adequately to tackle these diseases outside of MDA campaigns. The geographical proximity of many countries and high rates of migration/travel between countries, the continued presence of vectors or their conditions conducive to the transmission of these diseases in post-validation countries further increase the risk of re-emergence, although little is known about how higher rates of infection in migrants impact local population infection rates. Palau, American Samoa and Samoa are examples of continued concern of recrudescence of or persistent LF transmission because of the movement of populations including migrants. Although WHO has not yet drawn up clear guidance, countries are encouraged to be proactive in designing and piloting integrated post-elimination surveillance, wherever possible, so that more evidence is gathered to inform development of the WHO guidance.

2.3 Potential risks of transmission recrudescence

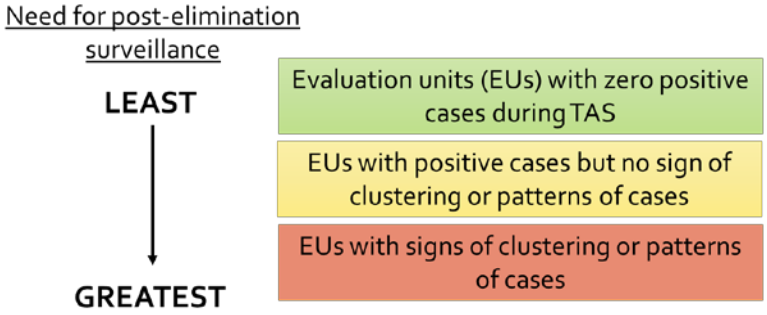
2.3.1 Using historical TAS results to identify areas to prioritize post-elimination surveillance

Experience has revealed that results of TAS implemented in the past are useful for identifying the areas to be targeted by post-elimination surveillance. Prioritizing areas for surveillance based on high baseline prevalence before initiation of MDA, areas with low MDA coverage or areas that historically have had problems with persistent transmission allows countries to use resources more effectively and simplify post-elimination surveillance (Fig. 2). Clusters of cases observed in the past TAS may indicate a potential for re-emerging infection in a particular area; however, it is still unclear what

[2] WHO (2011) Lymphatic filariasis: monitoring and epidemiological assessment of mass drug administration - A manual for national elimination programmes. World Health Organization, Geneva. http://apps.who.int/iris/handle/10665/44580

amount of clustering merits concern. Spatial and temporal analysis of clusters in a series of the past TAS must be performed to determine if there are any visible patterns that may be able to guide future intervention plans. TAS results should always be examined in the context of country-specific information.

Fig. 2. Suggested prioritization of areas for LF post-elimination surveillance (presented by Dr Katie Gass)



2.3.2 Persistent transmission in geographical foci

American Samoa

The current challenges in American Samoa regarding persistent transmission in specific geographical foci were presented. In American Samoa, MDA was implemented annually between 2000 and 2006. In 2010, a seroprevalence study conducted using a serum bank collected for a leptospirosis study indicated a presence of significant clustering of antigenaemia (Ag) positive adults.[3] However, the study finding had limitations due to small sample size and lack of testing in children. In 2011–2012, a school-based TAS 1 using an immunochromatographic test (ICT) passed with two Ag-positives out of 949 tested against a critical cut-off threshold of six.

In 2014, 1132 adults from suspected hotspots and adult workers in other selected areas were tested and showed evidence of ongoing transmission in hotspots compared to adult workers who lived elsewhere, including Ag prevalence of 26.9% (using ICT or Og4C3 Ag enzyme-linked immunosorbent assay (ELISA)) among adults and 5% among children aged under 15 years in Fagali'l.[4] Nonetheless, a school-based TAS 2 using ICT in 2015 passed again with only one Ag-positive, which was from the same school in Ili'ili as in the 2011 TAS.

However, American Samoa finally failed TAS 3 as part of the TAS strengthening study in 2016, with nine filariasis test strip (FTS) positives out of 1143 children tested, against the critical cut-off of six. The Ag-positive children came from five schools. They were followed up at home and 58 out of 65 household members were tested, 12 of which were also found to be FTS positive. The same study also conducted a community-based survey targeting all age groups equal to or above 8 years old, which discovered the presence of small-scale household-level clustering of Ag-positive people throughout the island with large variation between villages (Figs 3 and 4).

[3] Lau CL, Won KY, Becker L, Soares Magalhaes RJ, Fuimaono S, Melrose W, et al. (2014) Seroprevalence and spatial epidemiology of lymphatic filariasis in American Samoa after successful mass drug administration. *PLoS Negl Trop Dis*, 8(11): e3297.

[4] Lau CL, Sheridan S, Ryan S, Roineau M, Andreosso A, Fuimaono S, et al. (2017) Detecting and confirming residual hotspots of lymphatic filariasis transmission in American Samoa 8 years after stopping mass drug administration. *PLoS Negl Trop Dis*, 11(9): e0005914.

Fig. 3. Prevalence of circulating filarial antigen (CFA) by village in American Samoa, based on the community-based survey in 2016 (presented by Dr Colleen Lau)

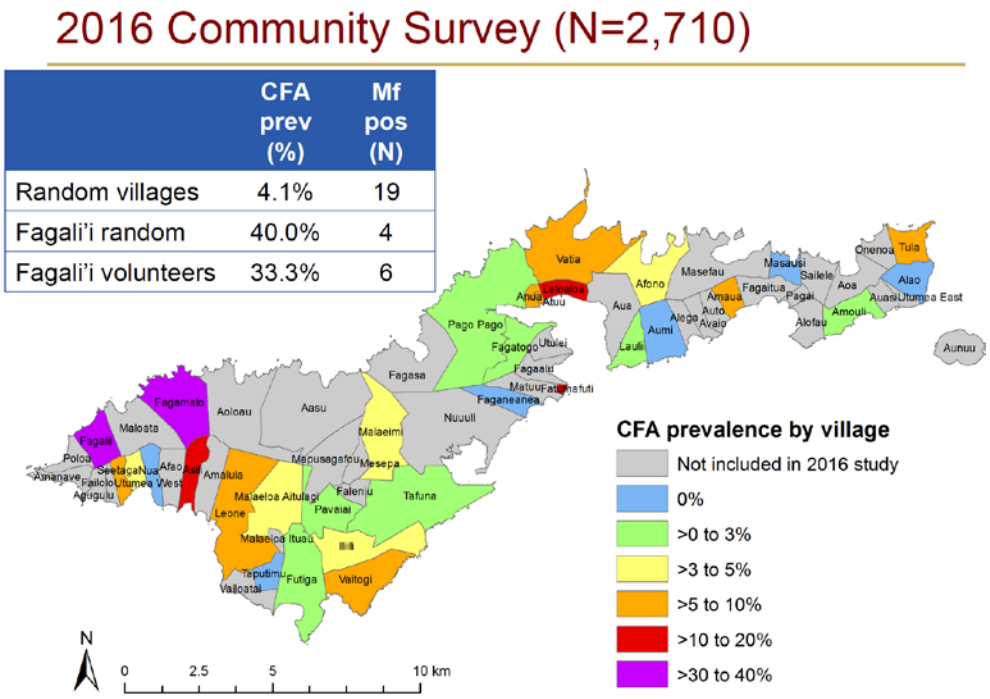
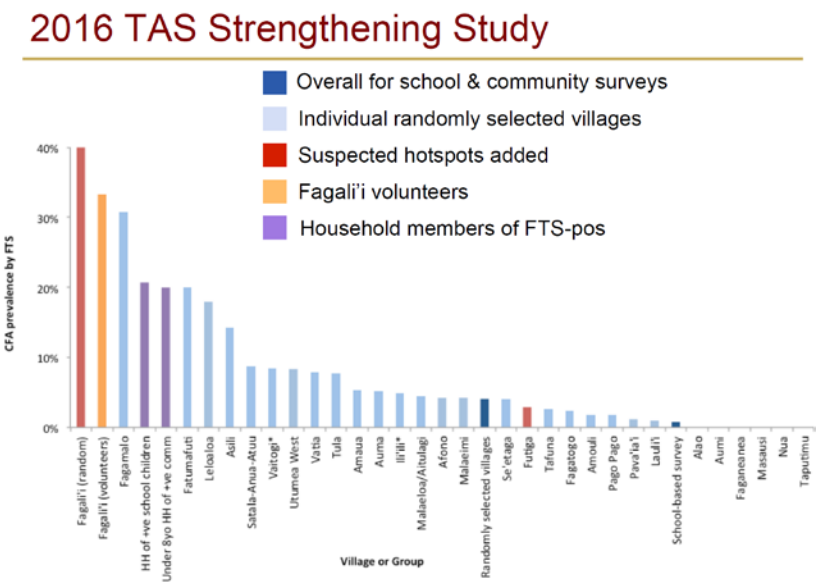


Fig. 4. CFA prevalence by village in American Samoa, based on the TAS strengthening study in 2016 (presented by Dr Colleen Lau)



This study is significant because it proves that TAS can be useful for identifying clusters of re-emerging or persistent infection. Failing TAS 3 is an important indication to redirect attention and elimination efforts towards clustered areas that may have otherwise gone unnoticed.

Sri Lanka

Sri Lanka has a long history of LF elimination efforts. It originally had eight endemic districts in the coastal eastern-southern belt with about 10 million residents. The national anti-filariasis campaign was inaugurated in 1947. Initially, mass screening with selective treatment was conducted. From 1999 to 2001, MDA with diethylcarbamazine citrate (DEC) alone was conducted, then MDA with DEC and albendazole was conducted from 2002 to 2006. Sri Lanka passed stopping-MDA surveys using the

2005 WHO guidance in 2007–2009 and subsequently TAS 3 in 2012–2013. The WHO validated Sri Lanka as having eliminated LF as a public health problem in 2016.

However, a number of operational research projects continued in Sri Lanka, as new infections and clinical cases had been reported from time to time and also there was no clear guidance on post-elimination surveillance. As a result, both community-based studies and a xenomonitoring study revealed the presence of residual transmission at specific geographical foci, mostly along the coast.[5] Based on the experiences in Sri Lanka, it is recommended that countries be careful in designing evaluation units (EUs). The studies also suggested the usefulness of monitoring using antibody (Ab) and xenomonitoring (*Culex*) to detect residual infection and identify areas that may need closer surveillance.[6]

2.3.3 Importation of transmission by migrants

The current LF situations in American Samoa and Palau raise a question on whether migrants can contribute to re-emergence of LF cases. Emphasis was placed on how easily migrant LF cases can be missed with the current TAS protocols. For example, there is a significant movement of people between American Samoa and Samoa on a regular basis, which is believed to have contributed partially to resurgence of LF transmission and failure of TAS 3 in American Samoa.

Palau is another Pacific island that has a substantial amount of migrant workers entering the country from other LF-endemic countries such as Bangladesh and the Philippines. Palau was almost ready to be officially validated when the LF survey among migrant workers in 2017 discovered a high prevalence of LF among those coming from Bangladesh and the Philippines. Since the Philippines and Bangladesh both are known to have made good progress in their LF elimination efforts, it raises questions of why there is such a high LF prevalence among these migrants. The survey results are currently being analysed in detail in order to understand their travel patterns and backgrounds and to determine the next steps.

The migrant situation in these Pacific island countries highlights the need to consider migrants in post-elimination surveillance, such as screening and treatment of migrant workers when they are leaving their home country or entering the host country. Cross-border strategies might be required to ensure that surveillance plans in both countries complement each other to become more effective and neither country has to absorb too much of the burden.

2.3.4 New clinical cases

The purpose of this session was to discuss possible guidance on actions to take when a new clinical case is reported in either the pre- or post-validation phase. Actual country examples were presented where suspected lymphoedema cases were reported through the health system in non-endemic areas or where patient with fever tested microfilaria (Mf) positive at a health centre in an area with ongoing MDA. Any recommendations or guidelines regarding new clinical cases are particularly relevant in post-validation settings because there might be no longer activities in place to address suspected LF patient. Participants were asked to consider how these cases should be investigated and the possible treatment and monitoring responses.

No clear consensus on specific actions was reached; however, there was an agreement that while all clinical cases should be treated and managed efficiently, intense follow-up and surveillance of family or community members based on one case may not be worthwhile. It was suggested that it is best to simply treat symptoms and, for this purpose, countries should keep a supply of albendazole and DEC in health facilities to treat individual cases that may arise.

---

[5] Rao RU, Nagodavithana KC, Samarasekera SD, Wijegunawardana AD, Premakumara WDY, et al. (2014) A comprehensive assessment of lymphatic filariasis in Sri Lanka six years after cessation of mass drug administration. PLOS Neglected Tropical Diseases 8(11): e3281.

[6] Rao RU, Samarasekera SD, Nagodavithana KC, Punchihewa MW, Dassanayaka TDM, et al. (2016) Programmatic use of molecular xenomonitoring at the level of evaluation units to assess persistence of lymphatic Filariasis in Sri Lanka. PLOS Neglected Tropical Diseases 10(5): e0004722.

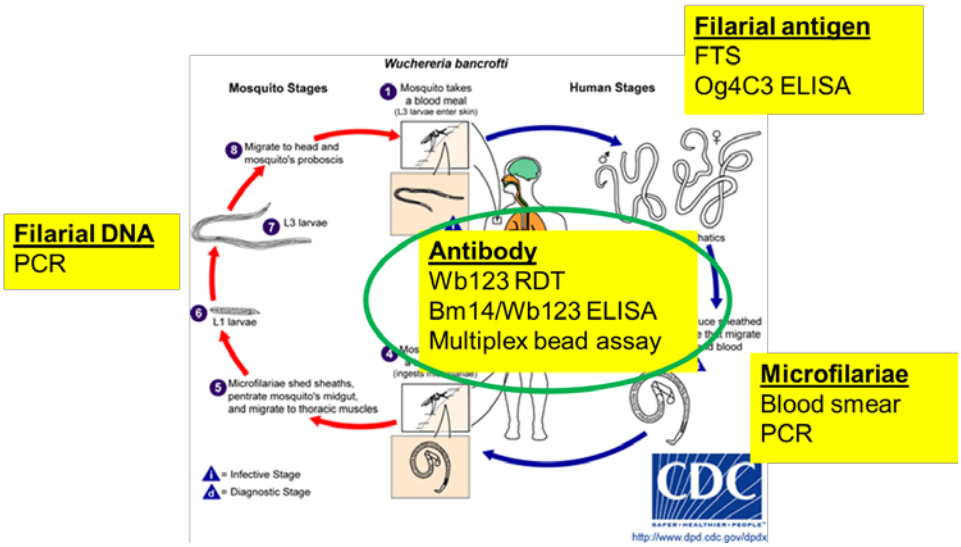
2.4 Platforms and tools for post-elimination surveillance of NTDs

2.4.1 Potential diagnostic tools

Provisional Ab level cut-off

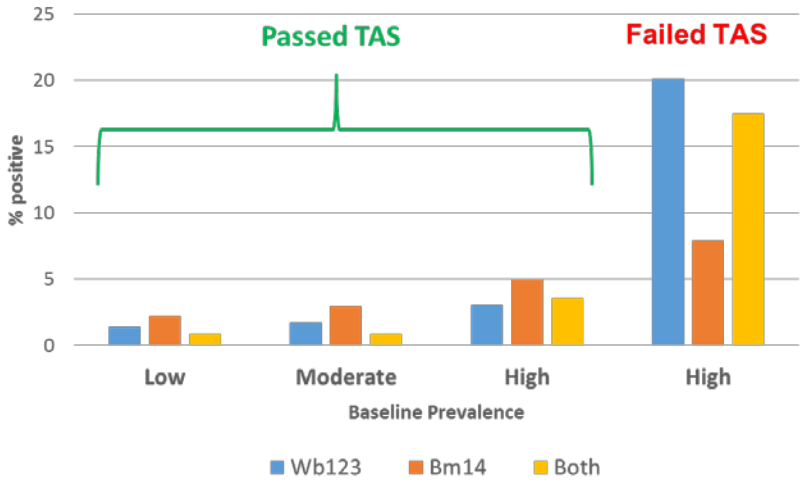
Currently available diagnostic tools that can be used for post-elimination surveillance of LF according to the stage of the filarial worm were discussed (Fig. 5).

Fig. 5. Currently available diagnostic tools for post-elimination surveillance of LF and their targets of measurement according to the stage of filarial worm (presented by Ms Kimberly Won)



Ab is the first response to appear after exposure/infection, and detection of Ab is also more sensitive than detection of Ag and Mf. Quantitative evidence demonstrates that the Ab level declines after MDA and there is a clear difference in Ab level in arears with ongoing transmission (Fig. 6). The evidence also indicates that the persistence of Ab responses is not lifelong, which means that an absence of Ab responses is a strong indicator of interrupted transmission.

Fig. 6. Difference in Ab responses in areas with ongoing LF transmission (presented by Ms Kimberly Won)



Currently available Ab testing tools include: the enzyme-linked immunosorbent assays (ELISA), multiplex bead assays, and Wb123 rapid diagnostic tests (RDTs) (under review). Further exploration of the possible uses and applications is necessary before official WHO recommendations can be issued.

Multiplex platform

The multiplex platforms have been developed as a tool for a single, integrated surveillance method for the measurement of intervention impact across multiple programmes such as immune status survey for vaccine-preventable diseases and efficacy surveys such as malaria, water, sanitation and hygiene (WASH) interventions and various NTDs. The Luminex®-based multiplex bead assays being developed by the United States Centers for Disease Control and Prevention (US CDC) requires only less than 1 µl of serum that can be easily collected from a finger prick or from serum samples or dried blood spot samples that have been already collected for other purposes. Dried blood spots are easy to collect in the field, dry in a few hours, can be shipped at room temperature and can be stored short term at 4°C. For the following NTDs, serum samples have already been defined and the sensitivities and specificities of the assays have been determined in controlled laboratory settings: LF, *Strongyloides stercoralis*, trachoma, cysticercosis, *Onchocerca volvulus*, *Schistosoma mansoni* and ascaris. For the following NTDs, full characterization is incomplete, but coupled Ag are capable of binding antibodies: dengue, yaws and Chikungunya virus.

The multiplex assays have the ability to contribute to surveillance platforms by providing indications of programme status, highlighting community differences, and measuring changes and trends over time. In Cambodia, for example, a population-based serosurvey to assess population immunity for tetanus among women of childbearing age provided an opportunity to generate a national estimate of seroprevalence for LF, malaria, cysticercosis, strongyloidiasis, dengue and Chikungunya. Challenges include producing the beads necessary for the multiplex and the extensive knowledge required to operate the test correctly. US CDC is actively working on ways to improve the test, define optimal sampling strategies for surveys and make it more field-friendly. Collaboration between US CDC and the Pan American Health Organization to address the remaining challenges is ongoing, and potential use of this test to improve post-validation surveillance in the Western Pacific Region may also be further discussed.

Xenomonitoring protocol

Molecular xenomonitoring of LF intends to detect filarial DNA of any stages (Mf or developing larvae) in mosquitoes that are believed to be indicative of human reservoir of infection. A series of operational research projects have led to development and testing of a standardized sampling strategy for *Culex*: (i) clusters are randomly selected (n = 30); (ii) households are selected systematically within each cluster; (iii) appropriate mosquito traps are located next to selected households; (iv) the collected blood-fed mosquitoes are grouped into pools of 5–25; (v) polymerase chain reaction (PCR) analysis is conducted on pools; and (vi) data are interpreted using PoolScreen software. The provisional target thresholds for prevalence of filarial DNA are summarized in Table 1.

Table 1. Provisional target thresholds for prevalence of filarial DNA in LF xenomonitoring[a)]

Species	Threshold (filarial DNA prevalence)	Sample Size[b)]
Anopheles	<1%	1,700
Culex	<0.25%	7,000
Aedes	<0.1%	17,000

[a)] Thresholds are based on criteria outlined in: World Health Organization (2009). The role of polymerase chain reaction (PCR) Technique for Assessing LF Transmission. Report of a Workshop, Copenhagen, Denmark. 7-10 November 2006. WHO/HTM/NTD/PCT/2009.1

[b)] Approximate sample sizes, assume α=0.05, power = 75% and ***assumes design effect*** = 1 (due to PoolScreen software limitations)

However, the studies found that xenomonitoring is a labour- and resource-intensive method that requires sophisticated laboratory equipment and entomological expertise. Results are highly accurate, but the sample size required for surveillance is very large. For these reasons, WHO does not currently recommend xenomonitoring as a key component for post-elimination surveillance. However, countries that wish to conduct xenomonitoring studies are not discouraged from doing so. Participants discussed the potential of using this technique in areas where it is difficult to get voluntary blood donations, but more research needs to be done on whether or not these areas have the necessary laboratory capacity or the ability to ship biosamples to other laboratories overseas.

2.4.2 Potential platforms and lessons learnt

The list of existing disease surveillance platforms for both communicable and noncommunicable diseases (NCDs) that have significant potential for integration of NTD post-validation surveillance as well as their typical survey populations, sample size, diagnostic tools used, locations of testing, implementers in the relevant ministries and frequency of surveys were presented. The summary of such platforms is in Annex 3.

Hepatitis B virus (HBV) and HIV surveillance are two major communicable disease surveillance platforms that can potentially be expanded to include LF post-validation surveillance as they already involve collection of a relatively large number of blood samples for preschool children (for HBV), pregnant women or specific occupation groups (for HIV). Several NCD survey platforms such as national nutritional health surveys, monitoring of iron and folic acid supplements, global school-based student health surveys, and the NCDs STEPwise Approach to Surveillance (STEPS) Step 3 were highlighted as they typically target a large population nationwide and often include blood testing.

Vanuatu indicated ongoing trachoma impact assessment as an immediate option for NTD post-elimination surveillance, especially for LF. Additionally, routine health information system (HIS) data might be able to report LF-related morbidity cases. In Cambodia, the Ministry of Health works closely with the Ministry of Education, so school surveys may be a potential area for integration of NTD post-elimination surveillance. Furthermore, as discussed earlier, Cambodia conducted a national population-based tetanus survey using the multiplex platform, which successfully integrated detection of other diseases including LF. This can serve as an example for other countries on how to implement integrated disease surveillance and complete more comprehensive disease mapping. However, there are still diseases that do not have established serological diagnostic assays so it is not a complete solution. In the Philippines, there are existing household surveys and national demographic surveys that are funded by the government that can integrate NTD post-elimination surveillance. However, these surveys often fail to capture males that might fall into the high-risk group for LF. In addition, the timing and location of the surveys might not match with the schedule or high-risk areas needed for LF post-elimination surveillance.

Every country has its own unique situation and challenges. It is therefore recommended that each country review the potential platforms and opportunities presented in this session and identify a solution that works for its specific needs.

2.4.3 Sentinel site surveillance

Bangladesh

The results from three years of operational research in Bangladesh were shared. The study is being conducted to compare potential strategies for ongoing surveillance and also to monitor filarial transmission at a district that had stopped MDA and one that was originally mapped as non-endemic and never treated. The study targeted adults aged 18 years or above attending health-care facilities, specifically outpatients with a laboratory test prescription or inpatients in district and subdistrict hospitals. In addition, all people who attended a migrant clinic in Dhaka for medical screening before leaving Bangladesh to work overseas between February 2014 and February 2017 were tested. Both Og4C3 Ag and Bm14 Ab detection was done by ELISA and multiplex.

The study demonstrated that, on the district level, sentinel site surveillance at health-care facilities is feasible on a small scale and achieves satisfactory geographical coverage allowing identification of

positive Ab signals from each subdistrict. However, it was found to be programmatically challenging to implement it in all endemic districts. Sentinel site surveillance using a national central location, on the other hand, was found to be logistically easier but most participants came from non-endemic districts and thus it presented a risk that the population included might not be representative of the entire country or include those populations at highest risk. Additionally, the study results showed that while age curve estimates of Og4C3 Ag declined over three years, those of Bm14 Ab did not differ over three years.

Overall, the study suggested that regular surveys rather than ongoing surveillance may be an easier, more sustainable option for the future. It also indicated that a more systematic selection of participants over a longer follow-up period is required to monitor decline in Ab levels over time in the post-elimination stage.

American Samoa and Fiji

Examples of integrating LF surveillance with other projects in American Samoa and Fiji were presented. In American Samoa, serum banks that were created during a leptospirosis study in 2010 were opportunistically used for LF studies as a platform to fill in serological data of adults for whom other data were not collected during the TAS such as detailed demographic data, travel history and household location. The study, as discussed earlier, was able to identify a presence of significant clustering of Ag-positive adults, indicating possible hotspots. The same serum bank has also been used for a study of seroprevalence of dengue, rickettsia and Ross River virus in American Samoa. Fiji also implemented an eco-epidemiological study of leptospirosis with extensive collection of blood serums. The serum samples have successfully been used for arbovirus studies and ethics approval is awaited for use of samples for LF studies.

Such platforms potentially provide a rich data source, which makes a very cost-effective method for integrated surveillance. It might be able to provide data that are not usually collected in routine TAS such as those of adults as well as community-level and longitudinal data. However, the data are originally collected with a focus on one disease, so the study population may not be ideal for all diseases. There are also often challenges in obtaining ethics approval to use serum banks. Nonetheless, the Consultation participants recommended cost-effective surveillance such as those targeting workplaces and clinics for samples, and using samples already stored in laboratories to screen for other diseases. Member States are encouraged to consider such cost-effective methods if applicable in their respective countries.

2.4.4 Discussion on the scope and framework of NTD post-elimination surveillance

The objectives of post-elimination surveillance should help ensure recrudescence has not occurred and confirm interruption of transmission. Post-elimination surveillance should be inexpensive and thus should be targeted at specific at-risk areas or populations. The first step, therefore, should be identification of areas of risk or resurgence or introduction of transmission. This could be specific geographical areas such as EUs with clusters of positives or an increasing trend of positives in the past TAS in originally endemic areas or specific population groups such as migrants from endemic areas/countries.

The aim of post-validation surveillance could be to identify positives to trigger further actions or to demonstrate that the prevalence is decreasing over time. Sentinel monitoring and past TAS results may be used to prioritize areas for surveillance and response to follow up Ag positives.

Diagnostic tools that a country selects are dependent on the target age group. At the post-validation stage, Ag level is more informative for adults whereas Ab level is more informative for children. The multiplex assays could be a potential tool, but further capacity-building is needed before it is field ready. Xenomonitoring is not considered feasible at the moment due to the high costs and the labour-intensive nature of the procedure. New clinical cases such as lymphoedema and hydrocele should ideally be detected within the health system for providing standard case treatment (with DEC and albendazole) and ensuring that a minimum package of care is available but not for triggering further investigation on transmission.

Finally, the participants emphasized that Member States should avoid creating new surveillance systems that may be complicated and costly, but instead identify existing programmes where NTD post-validation surveillance can easily be integrated. Ideally, surveillance activities can be combined with existing national population-based survey platforms that occur in countries every 2–3 years to identify sites to trigger further action. Sentinel surveillance at health-care facilities is another option but experience in Bangladesh indicated that it might be feasible only on a small scale. In the absence of definitive evidence of effectiveness of one option over the other, more research is needed to pilot and assess cost-effectiveness of various options at the country level.

2.5 Capacity for NTD post-elimination surveillance in selected countries

Each participating country presented the existing national capacity to implement and sustain NTD post-elimination surveillance within a country in terms of: (i) laboratory; (ii) diagnostics, treatment and reporting within the health system; (iii) entomological capacity; and (iv) potential financing sources for sustainability.

Cambodia

1) There is a capacity to conduct ELISA at the national level only. The Pasteur Institute may be used as a partner for ELISA testing but procurement of supplies may take up to 3–6 months to arrive after ordering.

2) RDTs for LF are not readily available in the county. Albendazole and DEC are also not currently in stock. Any suspected LF cases must be referred to the central level, as the subnational levels do not currently have the capacity to handle LF case diagnosis.

3) Entomologists are available at the national level, but technical partners to aid the Ministry of Health with designing and operationalizing xenomonitoring are currently not available. PCR supplies are not easily accessible and might take up to 3–6 months to arrive after ordering.

4) There is no national or international funding for post-elimination surveillance at present.

Malaysia

1) All state hospitals and national and regional public health laboratories (Johor Bahru, Ipoh, Kota Bharu and Kota Kinabalu) are capable of conducting serological tests. Six public universities can also help the Ministry of Health run ELISA tests. Commercial kits for ELISA are easily available in the country.

2) LF RDTs (PanLF Rapid™ and Brugia Rapid™) are manufactured in the country. Albendazole and DEC are available at the moment because of a donation by WHO (and current stockpile holdings) as there are still IUs with ongoing MDA. Surveillance using night blood slides and RDT for Ab testing is ongoing with treatment given in the field and patients followed up for three years by the district health offices.

3) There are 136 entomologists in the country at all levels under the Ministry of Health and in various institutions such as the Institute for Medical Research and public universities. Xenomonitoring is being done by the national public health laboratory and the Institute for Medical Research. PCR testing is available in the above-mentioned institutions and public universities.

4) In 2018, a national health survey will be conducted (once every five years) and Malaysia might explore integration of LF surveillance in this survey. All LF-related activities are funded by existing operational budget of the Ministry of Health and will continue to be available for post-elimination surveillance.

Philippines

1) There are currently 416 laboratories nationwide and 3 collaborating centres, and 46 out of 416 tertiary laboratories have a capacity to conduct microscopy, haematology, clinical chemistry,

immunology, microbiology and histopathology. There are also other partners that can support the Department of Health to run ELISA, if necessary. ELISA supplies are easy to obtain in the country.

2) RDT is available for LF and there is a local distributor for ICT/FTS, but not currently one for Brugia Rapid™. However, USAID is helping the Philippines obtain these supplies at present. Albendazole and DEC are locally available. Reporting of patients with hydrocele and elephantiasis is currently included in the official field health surveillance information system. There is supposed to be the database for recording all chronic cases, but this system is not yet complete.

3) Entomologists are available at the national level (at the Research Institute for Tropical Medicine) and in all regional offices. Most academic institutions also have entomologists. PCR facility is available at the Research Institute for Tropical Medicine but often faces problems with primers.

4) The allotment of the budget for post-elimination surveillance may be unsustainable because there is currently no line item for this kind of expenditure in the national budget. For a budget allotment to happen, a sustainability plan will need to be created for the Annual Work and Financial Plan of the programme. There is funding from USAID at present to help provide technical resources on this issue and establish the NTD laboratory network in the country.

Vanuatu

1) There is one private laboratory with ELISA facilities. There is also a general laboratory carrying out GeneXpert under the tuberculosis programme with funding by the United Nations Development Programme. The Ministry of Health is currently discussing with donors the possibility of setting up an ELISA laboratory. All supplies are currently donor-supported.

2) ICT is not readily available. Albendazole is available through the central medical supply chain in six provinces. DEC is also available through the central medical supply chain but with limited stock. LF is a notifiable disease and any suspected case must be reported. Currently efforts are under way to introduce the District Health Information Software 2 (DHIS2) system for online reporting at the health centre level.

3) One entomology position has recently been established through the dengue elimination programme, but xenomonitoring and PCR capacities are not available.

4) There is a need to develop an integrated surveillance plan with other programmes and coordinate with local nongovernmental organizations for implementation. Activities to generate revenue for surveillance might be explored, or the plan should be included in the business plan of the Ministry of Health for budget allocation.

Viet Nam

1) The national and provincial levels have ELISA capabilities. There are also many in-country partners that can perform ELISA such as research institutes, medical universities and private clinics/hospitals. Supplies for ELISA and other laboratory testing are easily available.

2) No RDT for LF is available except for use in small research studies. Albendazole is easily available at pharmacies nationwide, but DEC is not available. The health system at the community level can detect LF and refer all cases to the national level.

3) There are many entomologists in the country at the National Institute of Malariology, Parasitology and Entomology, the Institutes of Malariology, Parasitology and Entomology, and Pasteur Institute that have capacity to conduct xenomonitoring. Supplies for PCR testing are easily available but might not be available for some specific mosquito species.

4) No resources are available for post-elimination surveillance and the Ministry of Health budget is very limited. To mobilize domestic funding for NTDs, a well-established plan needs to be submitted to the Ministry of Health. Donor help would be greatly appreciated.

2.6 Country breakout sessions: where, how, when, and who to implement LF post-elimination surveillance

In this session, each country participant, with support of designated facilitators, analysed the history of LF elimination efforts in the country, identified potential risks to prioritize post-validation surveillance, and explored methodologies and existing platforms for integrating post-elimination surveillance.

Cambodia

Wuchereria bancrofti was historically endemic in six IUs (two provinces and four districts in two provinces) with an at-risk population of 502 982 across 18 districts. MDA was implemented from 2005 to 2009, with constantly over 65% treatment coverage. A stopping-MDA survey was implemented in 2010 with prevalence in the range of 0.11–0.67%. TAS 2 and TAS 3 were implemented in 2013 and 2015 with no Ag positives, respectively. The past TAS results thus indicate the absence of areas with historical persistent transmission. There is also no specific occupation group considered at high risk, nor notable cross-border or internal migration issues.

In such a situation, where there is no evidence of high-risk geographical areas or population groups, LF post-elimination surveillance in Cambodia can be most effectively incorporated into ongoing surveillance activities, such as community-based malaria elimination surveys, many that are ongoing in formerly co-endemic areas. For example, the current malaria and dengue surveillance activities cover both adults and children in all LF-endemic provinces. Collection of blood samples for malaria or dengue might be also used for LF Ab ELISA testing and can be conducted continuously. However, the NTD programme needs to meet with the malaria and dengue programmes to discuss the logistics of integration and also consider representativeness of sampling under their programmes. Additional research is necessary to determine if this approach is practical and to compare the impact of active versus passive surveillance.

Malaysia

Brugia malayi was endemic in 116 endemic IUs (46 districts in eight out of 14 states) in Malaysia in 2003, but the national LF elimination effort made significant progress and there were only six endemic IUs in 2016 (two states and four districts, all of which are in East Malaysia). All 70 originally endemic IUs in West Malaysia have already stopped MDA. However, the remaining IUs in East Malaysia have experienced failure in either TAS or pre-TAS. There are 20 IUs with an increasing trend of TAS positives or persistent transmission of LF (Table 2). Cross-border migration from other LF-endemic countries such as Bangladesh, India, Indonesia, Myanmar and Nepal is also a concern in Malaysia.

Table 2. List of IUs/EUs with an increasing trend or persistent presence of Ag positives in Malaysia

Name of IU/EU	Risk situation
Kerteh	Increasing TAS positives
Rompin	Increasing TAS positives
Simunjan	Increasing TAS positives
Dalat	Increasing TAS positives
Matu	Increasing TAS positives
Tubau	Increasing TAS positives
Sangan	Increasing TAS positives
Loyang	Increasing TAS positives
Limbang	Increasing TAS positives
Mendamit	Failed TAS 2
Sundar	Failed TAS 2
Lawas	Failed TAS 2
Kuala Sapi	Passed TAS 1 after 9-cycle MDA
Tangkarason	Never passed pre-TAS
Sungai-sungai	Passed TAS 1 after 9-cycle MDA
Bangkalalak	Failed TAS 2
Padas Damit	Passed TAS 1 after 9-cycle MDA
Gadong	Passed TAS 1 after 9-cycle MDA
Weston	Passed TAS 1 after 9-cycle MDA
Klias	Passed TAS 1 after 9-cycle MDA

Malaysia identified repeating TAS every 2–3 years, potentially integrating it with the malaria control programmes in eight endemic states, and screening of ethnic groups and migrant workers as the best options for post-validation surveillance to ensure sustained commitment of domestic funding. Malaysia is also considering treatment of all foreign workers with a single dose of albendazole and DEC when they enter the country from other endemic countries because this may be more cost-effective than conducting MDA in all at-risk populations or individually testing all incoming migrants. However, there are some ethical and logistical issues that would need to be addressed before this can happen. Further operational research is also needed to compare detection of Ab levels using Brugia Rapid™ in adults versus children in order to determine whether the adult population can be effectively used for post-validation surveillance, which more easily allows integration of post-validation surveillance with other programmes.

Philippines

There were originally 44 endemic provinces with *W. bancrofti*, of which 10 are co-endemic with *B. malayi*. As of June 2017, 10 provinces have passed TAS 3 and urgently require a plan for post-validation surveillance. Eight provinces are still implementing MDA and the rest are undertaking TAS. There are six provinces that identified clusters of positives and of which, three provinces (Romblon, Albay and Sorsogon) continue to find clusters of positives in TAS 3. Additionally, cross-border travel from Borneo (Malaysia), Kalimantan and Sulawesi (Indonesia), India and Nigeria, as well as the areas with indigenous people and armed conflicts in Mindanao are all potential at-risk population groups of concern for re-emerging transmission.

While the Philippines does not have a clearly defined post-elimination surveillance plan yet, the country plans on investigating priority areas (which have been determined as those that have found LF-positive children during TAS 3) and analyse data before next steps are taken. Post-elimination surveillance for adults may be integrated with the NCD-STEP surveillance, which occurs every 3–4 years. There are no ongoing surveys that collect biological samples from children at present, but the Philippines is also exploring integration with the national nutrition survey. The existing Philippine Integrated Disease Surveillance and Response (PIDSR) is also a potential platform to integrate vector-borne and vaccine-preventable diseases surveillance activities, but currently there is only facility-based reporting based on clinical case definition. The HBV survey to be conducted in the next few

years was also discussed as a potential opportunity. Risk stratification is needed to appropriately allocate future resources, regardless of what surveillance action is decided upon.

Vanuatu

W. bancrofti was historically endemic in Vanuatu. MDA was conducted in 2000–2004 with treatment coverage constantly over 80%. A stopping-MDA survey in 2005–2006 demonstrated a national Ag prevalence of 0.2% and none of the 13 ICT-positive persons were Mf-positive. Subsequent TAS also found no positive children in 2007–2008 and in 2012. A strong focus on malaria control is also considered to have provided protection against the re-establishment of transmission. The past TAS results thus indicate the absence of areas with historical persistent transmission. There is also no specific occupation considered at high risk, nor notable cross-border or internal migration issues, except for overseas students coming from other endemic Pacific island countries.

A trachoma impact assessment will take place in June 2019 that could potentially integrate post-validation surveillance once questions of feasibility are clarified. Currently, LF is on the list of notifiable diseases. Vanuatu has expressed interest in using the multiplex platform as soon as it becomes more commercially available, though funding from donors will be necessary. Yaws surveillance may be another viable option for integration of post-elimination surveillance. The question was raised on how long this post-elimination surveillance should continue and if there is any possibility to set up a NTD reference laboratory in the Pacific.

Viet Nam

There are four districts in two provinces (Khanh Hoa and Ninh Thuan) endemic for *W. bancrofti* and two districts in two provinces (Ha Nam and Hung Yen) endemic for *B. malayi*. MDA was implemented in 2003–2008 with treatment coverage constantly over 80%. There was one Ag-positive in Khanh Hoa province in TAS 1 (2011) but TAS 2 (2013) and TAS 3 (2015) both found no Ag-positives. There is no internal or cross-border migration of concern. Rural farmers who work in forests without bed nets might be of concern, but these population groups are targeted by the malaria programme for delivery of bed nets. In the past, there have been a few reports of new clinical cases and confirmed with Ag or Mf testing.

Viet Nam has identified NCDs-STEPS surveys and the malaria programme as potential platforms for integration because these programmes cover all LF-endemic provinces. However, implementation of surveillance activities will require funding, technical support and a clear action plan.

2.7 Discussion on next steps

There is limited evidence at present for WHO to recommend any specific post-elimination surveillance strategies. However, it is clear that post-elimination surveillance will need to be country specific as the types and magnitude of risk of resurgence of transmission significantly differ by country, based on differing baseline prevalence, migratory patterns, vectors and other factors. Bearing in mind that LF transmission is inefficient and relatively hard to establish, post-elimination surveillance should be prioritized in geographical areas with potential risks of resurgence of transmission or specific population groups with risks of introduction of transmission. This could include areas with persistent presence of positives in originally endemic areas during the past TAS, specific high-risk occupation groups and migrants from other endemic countries. For sustainability, countries are encouraged to explore various existing platforms for potential integration of post-elimination surveillance rather than to establish a new separate system.

Ongoing and future TAS provide opportunities to conduct operational research, for example to compare use of Ag and Ab response in children and adults and follow up residual Ab response in children and adults from pre-elimination stages. Strengthening TAS, analysing the results carefully and following up positives properly are also important steps to reduce future risks of resurgence of transmission.

There is no clear answer yet to the question of how long post-elimination surveillance should be continued after validation of elimination as a public health problem. In China, it took 7–8 years for the Mf prevalence to drop from 1% to 0%. At present, more sensitive Ag testing is being used. Additionally, China then did not have significant migrant issues from other endemic countries. Therefore, it might take up to 10 years of post-elimination surveillance after stopping MDA.

The following operational research items were identified as a priority to generate further evidence to define risk areas or population groups for which post-elimination surveillance should be prioritized and to determine feasible, cost-effective and sustainable post-elimination surveillance options for NTDs:

1) Pilot implementation of different post-validation surveillance options in countries with different levels and types of risk of resurgence or reintroduction of transmission and evaluate feasibility and cost-effectiveness.

2) Compare use of Ag and Ab response in children and adults in post-validation surveillance.

3) Follow up post-MDA residual Ab response in children and adults to determine the prevalence threshold to indicate absence of transmission and required sample size to be tested.

4) Determine contribution of Ag- or Mf-positive migrants to reintroduce transmission in an originally endemic country/area.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

- The objectives of post-elimination surveillance are to help ensure re-emergence does not happen and ultimately in the longer term to confirm interruption of transmission.

- Post-elimination surveillance will need to be country specific and should be prioritized in geographical areas with potential risks of resurgence of transmission or specific population groups with risks of introduction of transmission. This could include areas with persistent presence of positives in originally endemic areas, specific high-risk occupation groups and migrants from other endemic countries.

- The Consultation developed a list of priority operational research items to generate further evidence to define risk areas or population groups for which post-elimination surveillance should be prioritized and to determine feasible, cost-effective and sustainable post-elimination surveillance options for NTDs.

3.2 Recommendations

3.2.1 Recommendations for Member States

1) Relevant countries are encouraged to determine risk areas or population groups to prioritize post-elimination surveillance.

2) Countries are also urged to identify and pilot opportunities of existing regular national and subnational representative surveys and sentinel surveillance activities to integrate and sustain post-elimination surveillance, in consultation with epidemiologists or surveillance experts with thorough understanding of the broader health systems.

3) Countries may further use the list of priority operational research items to generate evidence for feasible, cost-effective and sustainable post-elimination surveillance options.

3.2.2 Recommendations for WHO

1) WHO is requested to develop a provisional algorithm to assist countries in selecting appropriate platforms for integrating surveillance activities, diagnostic tools, sample sizes and the thresholds for actions for post-elimination surveillance of NTDs.

2) WHO should collaborate with partners and assist Member States in implementing the priority operational research agenda identified at the Consultation to generate needed evidence to determine feasible, cost-effective and sustainable post-elimination surveillance options for NTDs.

ANNEX 1

LIST OF PARTICIPANTS

Dr Khieu Virak, NTD Programme Manager, National Helminth Control Program
National Center for Parasitology, Entomology and Malaria Control, 477, Corner st. 92, Trapeang Svay Village, Sangkat Phnom Penh Thmey, Khan Sensok, Phnom Penh, Cambodia
Tel.No.: +855 12 67 72 44, Email: virak.khieu@gmail.com

Dr Tep Chhakda, Chief, Lymphatic Filariasis Control Program, National Center for Parasitology, Entomology and Malaria Control, 477, Corner st. 92, Trapeang Svay Village, Sangkat Phnom Penh Thmey, Khan Sensok, Phnom Penh, Cambodia, Tel.No.: +855 12 95 75 75
Email: chhakdat81@gmail.com

Dr Khairiah Ibrahim, Senior Principal Assistant Director, Filariasis Unit, Disease Control Division
Ministry of Health, Level 4, Block E 10, Parcel E, Federal Government Administrative Complex
62590 Putrajaya, Malaysia, Tel.No.: +03 88834264, Email: drkhairiah_i@moh.gov.my

Dr Norita Binti Shamsudin, Public Health Specialist, Zoonosis Sector, Disease Control Division
Ministry of Health, Level 3, Block E 10, Parcel E, Federal Government Administrative Complex
62590 Putrajaya, Malaysia, Tel.No.: +03 88834510, Email: dr.norita_sham@moh.gov.my

Dr Leda Hernandez, Division Chief, Infectious Disease Office, Department of Health
3rd Floor, Building 14, San Lazaro Complex, Sta. Cruz, Manila, Philippines
Tel.No.: +632 6517800 local 2354, Email: dr_ledamher@yahoo.com

Dr Genesis May Samonte, Medical Specialist III, Epidemiology Bureau, Department of Health
2nd Floor, Building 19, San Lazaro Compound, Sta. Cruz, Manila, Philippines
Tel.No.: +632 4950513, Email: genesis.samonte@gmail.com

Dr Louise Simone Fonua, Senior Medical Officer, Communicable Diseases, Vaiola Hospital
Taufa'ahau Road, Tofoa, Private Bag 2026, Nuku'alofa, Tonga, Tel.No.: +676 23200
Email: reynoldofanoa@gmail.com

Ms Macklyne Katenga Garae, Neglected Tropical Disease Officer, Health Department
Ministry of Health, Port Vila, Vanuatu, Tel.No.: +678 22512 Ext 2104,
Email: gmackline@vanuatu.gov.vu

Dr Nguyen Duc Khoa, Medical Officer, General Department of Preventive Medicine
Ministry of Health, 138A – Giang Vo – Ba Dinh, Hanoi, Viet Nam
Tel.No.: +84 4 3 8456 255, Email: khoa8668@gmail.com

Dr Vu Thi Lam Binh, Vice Head, Parasitology Department, The National Institute of Malariology, Parasitology and Entomology, 245 Luong The Vinh Street, Nam Tu Liem District
Hanoi, Viet Nam, Tel.No.: +84 4 3 8544326, Email: drvulambinh@gmail.com

Dr Christine Dubray, Medical Epidemiologist, Centers for Disease Control and Prevention
1600 Clifton Road, Atlanta, GA 30329, Tel.No.: +1 505 615 5739, Email: ffg5@cdc.gov

Dr Peter Fischer, Associate Professor of Medicine, Infectious Diseases Division
Washington University School of Medicine, R 4182A, 4444 Forest Park Blvd
St. Louis Missouri, United States of America, Tel.No.: +1 314 4547876
Email: Pufische@wustl.edu

Dr Patrick Lammie, Senior Scientist, Centers for Disease Control and Prevention and
Task Force for Global Health, 325 Swanton Way, Decatur, GA 30030, U.S.A.
Tel.No.: +1 404 718 4135, Email: plammie@taskforce.org

Dr Colleen Lau, Research fellow, Department of Global Health, Research School of Population
Health, College of Medicine, Biology and Environment, Australian National University
Canberra ACT 2601, Australia, Tel.No.: +61 402 134 878, Email: colleen.lau@anu.edu.au

Dr Rahman Binti Noordin, Professor, Institute for Research in Molecular Medicine
Universiti Sains Malaysia, 11800 Penang, Malaysia, Tel.No.: +6012 522 8485
Email: rahmah8485@gmail.com

Ms Kimberly Won, Health Scientist, Centers for Disease Control and Prevention
1600 Clifton Road, Atlanta, United States of America, Tel.No.: +1 404 718 4137
Email: kfw7@cdc.gov

Dr Mark Bradley, Director, Global De-worming, Global Health Programs
980 Great West Road, Brentford, Middlesex, TW8 9GS, United Kingdom
Tel.No.: +44 0 20 8047 5521, Email: mark.h.bradley@gsk.com

Dr Kaname Kanai, Executive Technical Advisor, Human Development Department
Tokyo 102-8012, Japan, Tel.No.: +81 3 5226 6341, Email: Kanai.Kaname@jica.go.jp

Ms Sachiko Kuno, Associate Expert, Health Team 3, Human Group 2
Human Development Department, Tokyo 102-8012, Japan, Tel.No.: +81 3 5226 9163
Email: Kuno.Sachiko@jica.go.jp

Ms Miriam Breaugh, 900 Rockville Pike, Bethesda, Maryland 20892, United States of America
Tel.No.: +1 310 483 6465, Email: miriam.breaugh@gmail.com

Ms Molly Brady, NTD Advisor, 701 13th Street, NW, Suite 750, Washington, DC 20005
United States of America, Tel.No.: +1 202 728 2080, Email: mbrady@rti.org

Dr Katherine Gass, Epidemiologist, Neglected Tropical Disease Support Center
325 Swanton Way, Decatur, Georgia 30030, United States of America, Tel.No.: +1 404 974 3548
Email: kgass@taskforce.org

Dr Eric Ottesen, Director, Neglected Tropical Disease Support Center, 325 Swanton Way,
Decatur, Georgia 30030, United States of America, Tel.No.: +1 404 371 0466
Email: eottesen@taskforce.org

Dr Joseph Shott, Public Health Advisor, Division of Neglected Tropical Diseases
Office of the Infectious Diseases, Bureau of Global Health, 1300 Pennsylvania Ave, NW,
CP3, 8100A, Washington, DC, U.S.A., Tel.No.: +571 551 7378, Email: jshott@usaid.gov

Dr Rob Henry, Senior Public Health Advisor, Ronald Reagan Building Washington, DC
United States of America, Tel.No.: +202 712 0000, Email: rhenry@usaid.gov

Dr Gautam Biswas, Coordinator, Preventive Chemotherapy and Transmission, Department of Control
of neglected Tropical Diseases, Avenue Appia 20, 1211 Genève, Switzerland
Tel.No.: +41 22 791 3850, Email: biswasg@who.int

Dr Jonathan King, Scientist, Lymphatic Filariasis Elimination, Preventive Chemotheraphy and
Transmission Control, Department of Control of neglected Tropical Diseases
Avenue Appia, 1211 Geneva 27, Switzerland, Tel.No.: +41 22 791 1423
Email: kingj@who.int

Dr Rabindra Abeyasinghe, Coordinator, Malaria, Other Vectorborne and Parasitic Diseases
Regional Office for the Western PacificP.O. Box 2932, 1000 Manila, Philippines
Tel.No.: +632 528 9725, Email: abeyasingher@who.int

Dr Aya Yajima, Technical Officer, Neglected Tropical Diseases, Malaria, Other Vectorborne and Parasitic Diseases, Regional Office for the Western Pacific, P.O. Box 2932, 1000 Manila, Philippines
Tel.No.: +632 528 9754, Email: yajimaa@who.int

Dr Luciano Tuseo, Scientist, Malaria, Other Vectorborne and Parasitic Diseases,
P.O. Box 1217, Phnom Penh, Cambodia, Tel.No.: +855 23 216610, Email: tuseol@who.int

Dr Padmasiri Eswara Aratchige, Medical Officer, Neglected Tropical Diseases, Level 4, Provident Plaza One, Downtown Boulevard, 33 Ellery Street, Suva, Fiji, Tel.No.: +41 22 791 3850
Email: aratchigep@who.int

Ms Fasihah Taleo, National Programme Officer, Neglected Tropical Diseases,
PO Box 177 Port Vila, Vanuatu, Tel.No.: +0 678 27683, Email: taleof@who.int

ANNEX 2

The Informal Consultation on Post-elimination Surveillance of Neglected Tropical Diseases
13-14 June 2017; Siem Reap, Cambodia

PROGRAMME OF ACTIVITIES

Day 1: Tuesday, 13 June 2017		
08:30 – 09:00	Registration	
Opening Session		
09:00 – 09:30	Welcome address	WHO WPRO
	Meeting objectives	Dr Rabindra Abeyasinghe Coordinator, WPRO/MVP
	Self-introduction of participants and observers	
	Nomination of co-chairs and rapporteur	
	Administrative announcements	Dr Aya Yajima, NTD focal point, WPRO/MVP
Session 1:	***NTD post-validation surveillance situation in the Western Pacific Region***	
09:30 – 10:00	Achievements and emerging challenges in elimination of NTDs in the Western Pacific Region	Dr Aya Yajima
	Current WHO guidance on post-validation surveillance	Dr Jonathan King, WHO/HQ, LF focal point
	Discussion on purpose of NTD post-validation surveillance	All
10:00 – 10:30	*Group photograph followed by coffee/tea break*	
10:30 – 12:30	Potential risks of transmission recrudescence o Using historic TAS results to identify areas to prioritize surveillance o Persistent transmission in geographical foci – American Samoa – Sri Lanka o Importation of transmission by migrants o New clinical cases	 – Dr Patrick Lammie, Task Force for Global Health, USA – Dr Colleen Lau, Australian National University, Australia – Dr Peter Fischer, Washington University School of Medicine, USA – Dr Colleen Lau – Dr Aya Yajima
	Discussion	All
12:30 – 13:30	*Lunch break*	
Session 2:	***Platforms and tools for NTD post-validation surveillance***	
13:30 – 14:30	Potential diagnostic tools o Provisional antibody level cut-off o Multiplex o Xenomonitoring protocol	 – Dr Kim Won, US CDC, USA – Dr Patrick Lammie – Dr Kim Won
	Discussion	All
14:30 – 15:00	Potential platforms and lessons learnt o Overview of potential opportunities o National-level population-based surveys (tetanus survey in Cambodia)	 – Dr Aya Yajima – Dr Patrick Lammie
	Discussion	All
15:00 – 15:30	*Coffee/tea break*	

15:30 – 16:30	o Sentinel site surveillance o Bangladesh o Sri Lanka o Pacific Island countries	– Dr Christine Dubrey, US CDC, USA – Dr Peter Fischer – Dr Colleen Lau
	Discussion	All
16:30 – 17:00	Discussion on scope and framework of NTD post-validation surveillance	All
18:00 – 20:00	*Cocktail reception*	

Day 2: Wednesday, 14 June 2017		
09:00 – 09:10	Wrap-up of Day 1	Dr Aya Yajima
Session 3:	***Capacity for NTD post-validation surveillance***	
09:10 – 10:30	Existing capacity to implement and sustain post-validation surveillance in country on: i. Laboratory ii. Diagnostics, treatment and reporting within the health system iii. Entomological capacity iv. Potential financing sources for sustainability (5 min per each country) o Cambodia o Malaysia o Philippines o Tonga o Vanuatu o Viet Nam	– Ministry of Health, Cambodia – Ministry of Health, Malaysia, – Department of Health, Philippines – Ministry of Health, Tonga – Ministry of Health, Vanuatu – Ministry of Health, Viet Nam
	Discussion	All
10:30 – 11:00	*Coffee/tea break*	
Session 4:	***Operational planning of NTD post-validation surveillance with LF as a proof of concept***	
11:00 – 12:30	Country break-out sessions – WHERE, HOW, WHEN and WHO to implement LF post-validation surveillance	All
12:30 – 13:30	*Lunch break*	
13:30 – 14:30	Country presentation – plans and methodologies of post-validation surveillance o Cambodia o Malaysia o Philippines o Tonga o Vanuatu o Viet Nam	– Ministry of Health, Cambodia – Ministry of Health, Malaysia, – Department of Health, Philippines – Ministry of Health, Tonga – Ministry of Health, Vanuatu – Ministry of Health, Viet Nam
14:30 – 15:00	Discussion	All
15:00 – 15:30	*Coffee /tea break*	
15:30 – 16:30	Discussion on next steps for: o Countries o WHO o Operational Research	All
16:30 – 16:50	Conclusions and recommendations	Dr Rabi Abeyasinghe
16:50 – 17:00	Closing	The Chair

Annex 3. Summary of selected disease surveillance platforms for both communicable and noncommunicable diseases (NCDs)

Disease/ conditions	Survey population	Sample size	Methodology	Where to collect samples?	Who implements?	How often?	Remarks	Reference
Anemia	Women of reproductive age, PreSAC		Blood test (finger prick) using HemoCue	Blood collection at health facilities, testing at central lab	DHS, MICS	Every five years, but depend on fund availability		
Micronutrients	Women of reproductive age, PreSAC, Adult men (depending on purpose)		Blood test	Blood collection at health facilities, testing at central lab	DHS, MICS	Depend on fund availability		
National nutrition health survey	Women of reproductive age, PreSAC or all age nationwide	Random selection of living quarters; could be close to or over 10 000 people	Blood test	Blood collection at health facilities, testing at central lab	Nutrition programme	Every two to three years	Philippines - every two years Malaysia - every five years	Annex 4 - http://iris.wpro.who.int/handle/10665.1/13423
Monitoring of iron and folic acid supplementation programmes	Women of reproductive age	Three-stage cluster sampling, 500 per school	Biological assays (blood test)	Blood collection at health facilities, maternity homes, paediatric services, testing at central lab	Iron and folic acid supplementation programmes	Six monthly or annually	Only in countries or areas where the programme has been implemented (Cambodia, Lao PDR etc)	http://www.wpro.who.int/publications/docs/FORwebPDFFullVersionWIFS.pdf
Global school-based student health survey (GSHS)	SAC (13-17 year) nationwide	Two-stage cluster sampling, depend on country, could be over 2 000	Questionnaires, BMI	Primary or secondary schools	Programmes related to school health, Supported by WHO and US CDC.	Annually or every two to three years		https://www.cdc.gov/GSHS/ http://iris.wpro.who.int/handle/10665.1/13423 (Annex 3)

NCDs - STEPS # 3	All adults aged 18 to 69 years nationwide	2000-2500 people (for STEPS #3)	Biochemical measurement (blood collection)	Health facilities	NCD programme	Every five years		http://www.who.int/chp/steps/STEPS_Manual.pdf?ua=1
Malaria	At-risk populations		Fever screening and/or parasitological examination	Community	Malaria programme	Reactive to case reports or outbreaks		http://apps.who.int/iris/bitstream/10665/44852/1/9789241503334_eng.pdf
Syphilis	Sex workers, pregnant women		Blood test (finger prick)	Health facility based	HIV programme	Annual or service-based		
HCV	At-risk populations (sex workers, drug users etc)		RDTs	Community	HIV programme			
HBV	Pre-SAC (<5 years old)	Two-stage cluster sampling, depend on population prevalence	Blood serum collection for serological marker	Blood collection at health facilities, testing at central lab	Hepatitis programme	Every 5 years		http://apps.who.int/iris/bitstream/10665/70876/1/WHO_IVB_11.12_eng.pdf
HIV	Special groups (military recruits, at risk occupations etc)	Depend	Enzyme immunoassays or RDT	Both at community and clinical settings	HIV programme	Depend		http://www.who.int/hiv/pub/surveillance/en/ancguidelines.pdf
	Pregnant women	200-400 per province	Enzyme immunoassays or RDT	Antenatal care facilities	HIV/ANC	Every year		
Tuberculosis	At risk groups (geographical areas with a high prevalence, subpopulations with poor access to health care and with other associated risk factors, residential institutions)	Depend	Smear microscopy of sputum	In hospital for outpatient and inpatient departments; primary health care centres	Tuberculosis programme	systematic screening for risk groups only		http://www.who.int/tb/publications/Final_TB_Screening_guidelines.pdf

preSAC: preschool-aged children; DHS: Demographic and Health Survey, MICS: Multiple Indicator Cluster Surveys; ANC: antenatal care

www.wpro.who.int

World Health Organization
Western Pacific Region