Assessment of Current Surveillance, Recording and Reporting Systems for Malaria in Philippines

Mr Steven Mellor & Dr Robert Condon
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List of acronyms and abbreviations

BHS	Barangay Health Station
DOH	Department of Health
DPCB	Disease Prevention and Control Bureau
EB	Epidemiology Bureau
ESR	Events-based Surveillance and Response
EMR	Electronic Medical Record
FHSIS	Field Health Services Information System
iClinicSys	Integrated Clinic System
IHR	International Health Regulations
iHOMIS	Integrated Hospital Operations and Management Information System
ITR	Individual Treatment Record
KMITS	Knowledge Management and Information Technology Service
LGU	Local Government Unit
MCT	Monthly Consolidation Table
MDG	Millennium Development Goals
MOP	Malaria Operations Manual
MTRS	Malaria Text Reporting System
NMP	National Malaria Program
NSPCEM	National Strategic Plan for Control and Elimination of Malaria
PhilMIS	Philippine Malaria Information System
PIDSR	Philippine Integrated Disease Surveillance and Response
PHIE	Philippine Health Information Exchange
RHU	Rural Health Unit
RO	Regional Office
TCL	Target Client List
TPR	Test Positivity Rate
TWG	Technical working Group
UP	University of Philippines
WAH	Wireless Access for Health
WHO	World Health Organization

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Executive Summary

The Malaria Program in the Philippines is transitioning from a focus on malaria control to one of elimination, in line with the National Strategic Plan for Control and Elimination of Malaria (NSPCEM) vision of a Malaria-free Philippines by 2030. This was reaffirmed at the 10th East Asia Summit (EAS) held in Malaysia in November 2015, where the Philippines was one of 18 countries to endorse the Asia-Pacific Leaders Malaria Alliance (APLMA) Malaria Elimination Roadmap for malaria to be eliminated from the region by 2030.

Overall, the Philippines continues to make steady progress towards malaria elimination. Between 2003 and 2014, there was a 90% reduction in reported malaria cases and a 94% reduction in reported malaria deaths; the country had achieved its Millennium Development Goals target for malaria by 2011. By 2014, just 47 municipalities in 13 endemic provinces remained in the malaria control phase; all other areas of the country were classified as in pre-elimination or elimination phase, or certified as malaria free and focusing on prevention of re-introduction.

One of the NSPCEM strategies is strengthening of the surveillance, reporting and recording systems for malaria. Currently, the Philippines has a number of disease surveillance systems that contain malaria related data including: the Philippine Malaria Information System (PhilMIS); the Philippine Integrated Disease Surveillance and Response (PIDSR); the Field Health Services Information System (FHSIS); the Malaria Text Reporting System (MTRS); and the Events-based Surveillance and Response (ESR). Malaria elimination (and the sub-national certification process) requires surveillance systems that are robust and comprehensive, with 100% coverage and reliable real-time recording and reporting of data. This enables national, regional, provincial and municipal malaria teams to detect and respond to malaria events, to act quickly to prevent re-introduction and to block local transmission, in order to sustain the gains achieved in reaching elimination and malaria-free status.

An assessment of the gaps between the existing surveillance landscape and the ideal system for the elimination phase is an important precursor to establishing elimination oriented systems. In this regard, the Department of Health National Malaria Program (DOH-NMP) engaged the services of the consultants to conduct this assessment, identify the gaps between the existing surveillance systems and a feasible, elimination-oriented system, and formulate recommendations and a plan of action.

The consultants were in country for 4 weeks during November / December 2015. They consulted with a wide range of Government health officials from within and outside the Malaria Program at all levels from national to barangay as well as non-Government partners, the WHO and donors. A series of field visits were undertaken to provinces representing the range of stages from control (Palawan), elimination (Tarlac) to prevention of reintroduction (Iloilo). During these visits the consultants visited Regional Health Offices, Provincial Health Offices, hospitals, Rural Health Units (RHU) and Barangay Health Stations (BHS). At the end of the consultancy, meetings were held with the Technical Working Group (TWG) to present the findings of the assessment and to agree on a plan of action.

In the places visited it was found that staff at all levels reacted promptly and appropriately to cases and outbreaks with prompt alerts (often 24 hours or less) by whatever means (radio, phone, text, etc.) from midwives to RHUs, RHUs to PHO, PHO to Region; responses (often at RHU level) are often already appropriate to 'elimination mode', and include case investigation and classification, investigation of potential transmission foci, and response. Staff at all levels were, for the most part, diligent in completing their malaria reporting requirements. A typical RHU has to use a number of different forms to capture and report a malaria case through FHSIS, PhilMIS and PIDSR; the different forms often gather duplicate data. FHSIS and PIDSR potentially have a national reach, whereas PhilMIS has been implemented in 37 malaria endemic provinces only (and supported in 13). Clearly there is an opportunity to make the reporting system more efficient by reducing the malaria reporting burden on RHU health staff.

At the same time, many hospital and rural health services are introducing electronic medical record (EMR) systems. The available EMR packages are, in many aspects, consistent with the Philippine Health Information Exchange (PHIE) architecture, may be able to export activity level data to FHSIS, but generally do not have full functionality in linking to acute reporting systems (e.g. PIDSR, ESR) or PhilMIS.

The current reporting systems, particularly PIDSR and PhilMIS, were originally designed for malaria control and have served the Program well in helping to greatly reduce the malaria burden in the last decade; however, they do not currently serve the data needs of an elimination program. The Malaria Program is already undertaking actions

to reorient the program from control to elimination and has articulated a vision for a '1-3-5' system – similar to the Chinese '1-3-7' system. The '1-3-5' system aims for case notification within 1 day, case investigation & classification within 3 days and focus investigation & action within 5 days. Specifically, the Program has plans to:

- Upgrade malaria from a PIDSR category 2 disease to category 1, which will mandate all malaria cases to be reported from all facilities (including private facilities) within 24 hours, by law (i.e. the '1' of a '1-3-5' system).
- Implement a new malaria case reporting and investigation form for PISDR (i.e. covering '1-3') with detailed travel history and classification of cases as either local or imported.
- Introduce an online version of PIDSR (although it is not clear if this is currently planned to launch for all diseases simultaneously or to be implemented disease by disease).
- Finalize and refine the Malaria Operations Manual (MOP) to include forms and protocols for elimination phase activities like foci investigation, management and response (i.e. '5').

These activities are a good start but more work needs to be done to streamline and modernize the recording and reporting systems for malaria to support '1', '3' and (eventually) '5'.

This report identifies 5 key areas that need to be addressed to move the Philippines to a malaria recording and reporting system that will support elimination; this will enable the reporting system to catch up to the actual situation in the majority of provinces, where the Program is already effectively operating in elimination mode and EMRs are starting to be introduced. These key areas are:

1. **Develop a single national online case registry of all malaria cases, including travel history and classification**
2. **Fully implement the 1-3-5 model, including creation of a foci registry**
3. **Improve malaria case recording in EMR systems**
4. **Upgrade program management reporting**
5. **Implement data quality control at all levels**

For each of these areas, this report identifies a number of specific recommendations that should be implemented but the main activities can be summarised as follows:

- Adopt the new PIDSR malaria form as the sole reporting mechanism for malaria cases (i.e. the '1' and the '3' in the 1-3-5 system).
- Upgrade the PIDSR to an online system for all 33 notifiable diseases at the same time rather than disease by disease.
- Remove case reporting from the PhilMIS system as the new PIDSR case report and investigation form will make it redundant; this will reduce a level of duplication in malaria case reporting.
- Upgrade PhilMIS (minus the case reporting) to an online system so it can be linked to the online PIDSR malaria case reporting and allow the programmatic aspects of PhilMIS to become available to all provinces not presently covered by PhilMIS.
- Expand PhilMIS to cover the response part of the 1-3-5 system (the '5') by including a foci investigation and management protocol and form as the basis for a national registry of active and potential foci.
- Incorporate the PISDR malaria report into the EMR systems currently being used in the control areas to ease the reporting burden on RHU staff.
- Relax the 1-3-5 reporting timeframe for areas still in control and use the existing PhilMIS staff to encode the case data into PIDSR in these areas.

The report also sets out a suggested timeline for completing these activities by the end of 2016 and highlights specific activities that may need external technical assistance and funding or management support.

Refinement of MOP protocols for management of cases and foci according to standard WHO guidance for elimination phase surveillance and response would take place concurrently (subject to acceptance of the recommended plan of action).

1 Background

The Malaria Program in the Philippines is transitioning from a focus on malaria control to one of elimination.

To accelerate the transition from control to elimination, the Department of Health National Malaria Program (DOH-NMP) has developed the Philippine National Strategic Plan for Control and Elimination of Malaria (NSPCEM; the Strategic Plan), containing the strategies and interventions to be implemented in 2014-2020. The vision of the NSPCEM is a Malaria-free Philippines by 2030 – reaffirmed at the 10th East Asia Summit (EAS) held in Malaysia in November 2015, where the Philippines was one of 18 countries to endorse the Asia-Pacific Leaders Malaria Alliance (APLMA) Malaria Elimination Roadmap for malaria to be eliminated from the Asia-Pacific region by 2030.

Currently, out of the 81 provinces, the majority are already in the pre-elimination, elimination and prevention of reintroduction stages with over 70% of cases reported in 2014 from just one province, Palawan[1].

One of the strategies of the NSPCEM is the strengthening of the surveillance, reporting and recording systems for malaria. Currently the Philippines have a number of disease surveillance systems that contain malaria related data including: the Philippine Malaria Information System (PhilMIS); the Philippine Integrated Disease Surveillance and Response (PIDSR); the Field Health Services Information System (FHSIS); the Malaria Text Reporting System (MTRS) and Events-based Surveillance and Response (ESR). The elimination mode (and the subsequent sub-national elimination certification process; Section 2.2) requires surveillance systems that are robust and comprehensive, with 100% coverage and reliable real-time recording and reporting of data. This enables national, regional, provincial and municipality malaria teams to detect and response to malaria events, to prevent re-introduction and block local transmission, in order to sustain the gains in achieved in reaching elimination and malaria-free status.

An assessment of the gaps between the existing surveillance landscape and the ideal system for the elimination phase is an important precursor to establishing elimination oriented systems. In this regard, the DOH-NMP engaged the services of consultants to conduct this assessment, identify the gaps between the existing surveillance systems and a feasible, elimination-oriented system, and formulate recommendations and a plan of action to bridge the gaps.

The full TOR is included in Annex 1 of this report. The main purposes of the consultancy are:

1) To assess the current capacity of the existing surveillance, reporting and recording systems against the needs of elimination;
2) To recommend strategies and interventions to take to meet the needs of elimination;
3) To develop a plan of action to implement the said recommendations, with activities, cost and timeline; and
4) To inform the Technical Working Group (TWG) of the assessment findings, recommendations and plan of action in preparation for actual implementation.

Methodology

The consultants were in country for 4 weeks during November / December 2015 and, during that time, consulted with a wide range of Government health officials from within and outside of the Malaria Program at all levels from national to barangay, as well as non-Government organization (NGO) partners, the World Health Organization (WHO) and donors. A full list of persons consulted is included in Annex 2.

A two-day workshop was held at the beginning of the consultancy (see Annex 3) for the consultants to gain an understanding of current systems of disease reporting in Philippines and for participants at all levels to consider their reporting requirements and to learn from the experiences of the NMPs in China, Malaysia and Thailand in reorienting their malaria surveillance systems to elimination mode. A series of field visits were then undertaken to provinces representing the range of stages from control (Palawan), elimination (Tarlac) to prevention of reintroduction (Iloilo). During these visits the consultants visited provincial health offices, hospitals, rural health units (RHU) and barangay health stations (BHS). At the end of the consultancy meetings were held with the TWG to present the findings of the assessment and to agree on a plan of action going forward.

[1] World Malaria Report 2015, Philippines sub national data

2 The Malaria Program in the Philippines

2.1 Health system context

The progressive elimination of malaria as a public health problem in the Philippines is important to the national health and development agenda. Under the country's devolved health system, responsibility for the delivery of malaria services is shared between the national and local levels of Government.

At the national level, the Malaria Program is part of the Infectious Diseases Office (IDO) under the overall authority of the DOH Disease Prevention and Control Bureau (DPCB). The IDO is responsible for: setting the Malaria Program's policies, standards and guidelines; providing technical training; augmenting logistics and anti-malaria commodities; managing quality assurance (QA) schemes for diagnostic and vector control measures; designing health promotion materials; and Program monitoring and evaluation (M&E) and reporting.

At the regional level, the DOH Regional Office (RO) provides technical and some commodities procurement support to provinces through a Regional Malaria Coordinator (RMC) and provincially-based DOH Extension Offices.

At the city, provincial, municipal and community (barangay) levels, the Malaria Program is fully integrated with primary and secondary diagnostic and treatment services. Local government units (LGU) in malaria endemic areas – i.e. those in the control or pre-elimination phase – generally have designated malaria technical staff to support primary health care staff in the implementation of malaria prevention and control activities.

Local level interventions are determined by annual micro-stratification of transmission risk, based on the pattern of malaria transmission and receptivity at the barangay level over the preceding three years.

LGU health facilities submit data for disease surveillance (through PhilMIS, PIDSR, FHSIS and occasionally ESR) and monitoring of Program performance (through PhilMIS only); these data are consolidated at the provincial and RO level prior to onward transmission to the national Epidemiology Bureau (EB) and the Malaria Program.

Since 2003, the Global Fund has provided the majority of financial resources for the Malaria Program – most recently through the Pilipinas Shell Foundation Inc. (PSFI) as the sole principal recipient. The Government-funded portion of the total malaria budget has increased in recent years, from just over one-quarter in 2011 to just over half in 2015.

The current Global Fund grant, worth USD 15.7 million over three years (2015-2017), provides commodities and operational support in 13 high-priority control and pre-elimination provinces. Savings on the procurement of long lasting insecticidal bed nets (LLIN) will allow some flexibility to support elimination and health system priorities.

2.2 The National Malaria Strategic Plan

A detailed, independent review of the Malaria Program was undertaken in 2013, in preparation for development of the NSPCEM 2014–2020.

The review validated the technical approaches of the national Program, but also noted the fragmentation of data inherent in the multiple surveillance systems and numerous challenges in program monitoring.

The Strategic Plan adopts a health systems approach to maintaining universal access to quality malaria services, strengthening governance and human resources, maintaining malaria financing, and ensuring timely and accurate information management. Progress is measured by a continued reduction in malaria cases and deaths overall, and a strategy of progressive elimination of malaria at the sub-national level.[2] Its targets include an annual malaria incidence rate below 1.6 cases per 100,000 nationally by 2020, while maintaining close to zero deaths from malaria; the number of provinces declared malaria-free will have increased from 27 to 50, and another 21 provinces will have zero (or almost zero) local malaria transmission.

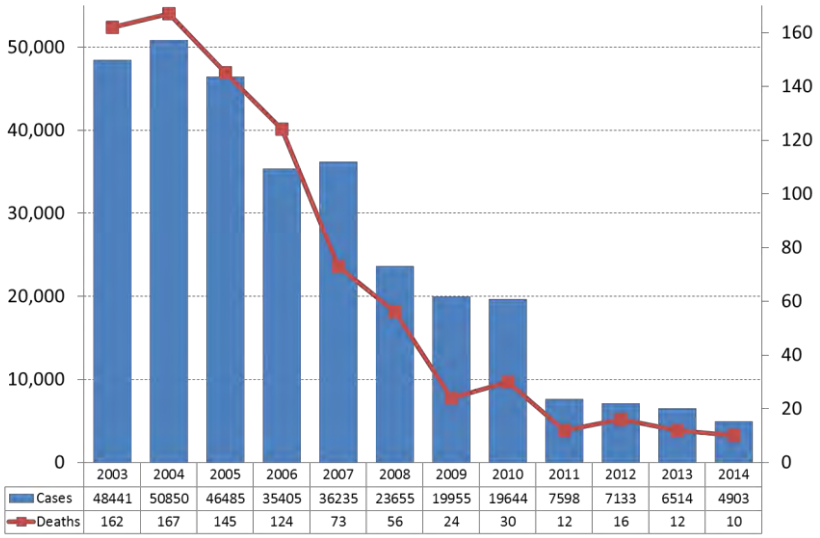
[2] DOH Administrative Order 2011-0019: Guidelines in Evaluation of Low-Endemic Provinces for Declaration as Malaria Free

Technical policies and procedures for enhanced malaria control are articulated in a detailed Manual of Operations (MOP), and are overseen by the TWG (which includes representation from the Program, PSFI, EB, WHO, and academic and research partners).

2.3 Overview of current malaria situation

Overall, the country continues to make steady progress towards malaria elimination. Between 2003 and 2014, there was a 90% reduction in reported malaria cases and a 94% reduction in reported malaria deaths (Figure 1); the country achieved its Millennium Development Goals (MDG) target for malaria in 2011.

Figure 1: Reported malaria cases and deaths, by year, Philippines, 2003-2014



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cases	48441	50850	46485	35405	36235	23655	19955	19644	7598	7133	6514	4903
Deaths	162	167	145	124	73	56	24	30	12	16	12	10

Source: World Malaria Report 2015

Figure 2 (page 9) summarizes the reduction in the number of provinces reporting malaria cases between 2003 and 2013.

Most years, Palawan has contributed around 50% of cases; the outer Sulu Archipelago (Sulu and Tawi-Tawi), the Zamboanga Peninsula and parts of Mindanao and northern Luzon contributed most of the remainder. All of these areas have seen significant reductions in malaria transmission, with the number of reported malaria cases in Palawan falling from 16,897 in 2003 to 4,662 in 2013, and in Tawi-Tawi from 4,492 in 2003 to 1,968 in 2013.

Results of the stratification exercise in 2013 revealed that just 47 municipalities in 13 endemic provinces remained in the malaria control phase; all other areas of the country were in pre-elimination or elimination phase, or certified as malaria free and focusing on prevention of re-introduction.

Figure 3 (page 9) shows the geographic distribution of the currently endemic municipalities.

Figure 2: Distribution of reported malaria cases by province and municipality, Philippines, 2003 and 2013

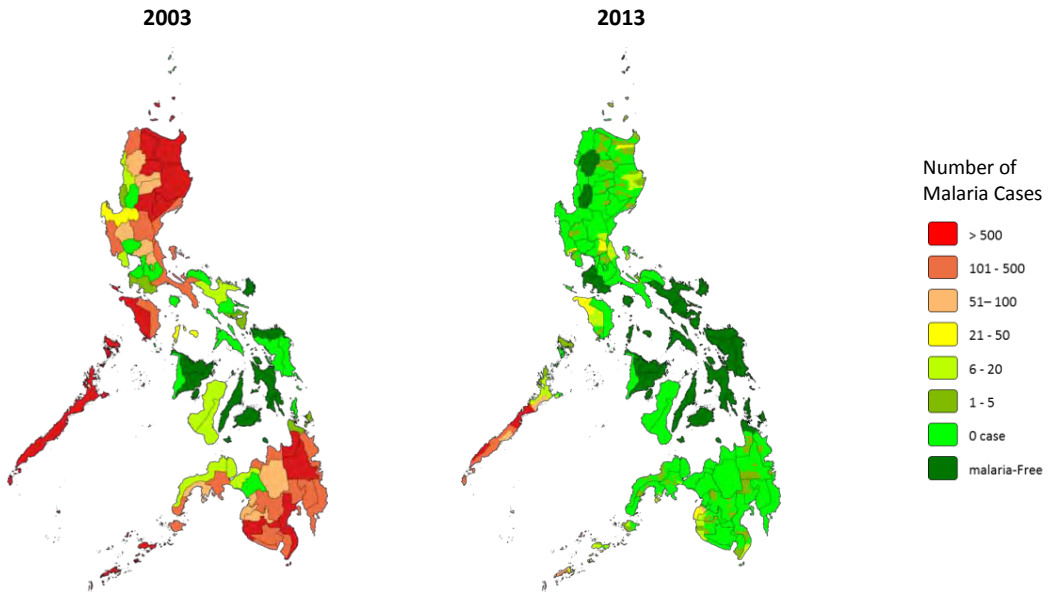


Figure 3: Distribution of malaria-endemic municipalities (in red), Philippines, 2014

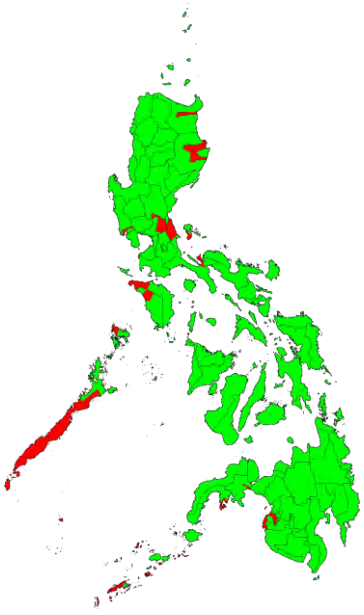
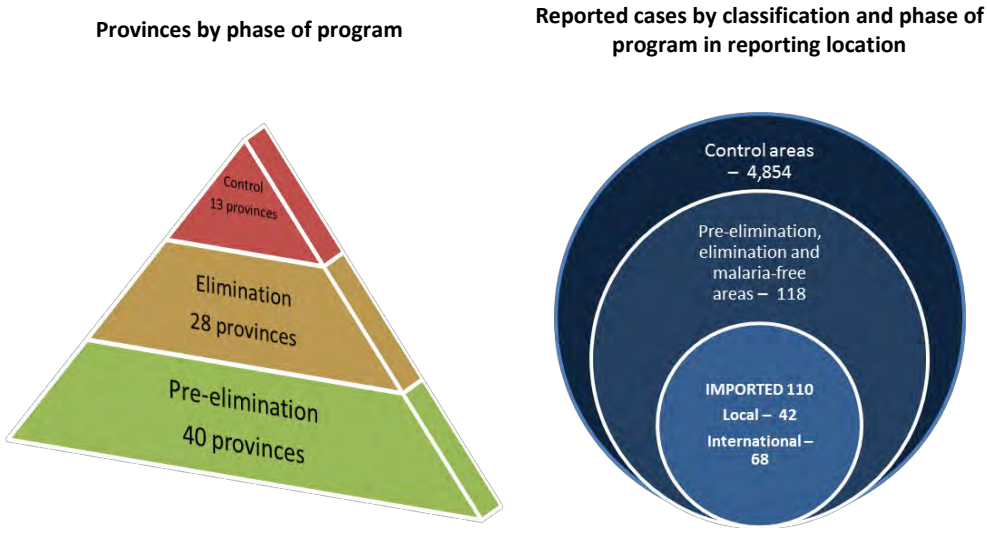


Figure 4 shows the proportion of provinces and reported cases in each phase.

Figure 4: Distribution of provinces by phase of control or elimination (left) and of cases by classification and phase of reporting location (right), Philippines, 2014



2.4 Emerging priorities and challenges for the Malaria Program

2.4.1. Higher transmission areas and vulnerable groups

Malaria incidence and progress towards control and elimination remain fragile in some parts of the country. In particular, there has been a resurgence of malaria in southern Palawan during 2015 with the number of reported cases increasing to 6,075 in the first 9 months of the year; further investigation of risk groups and the quality of Malaria Program interventions is planned for early 2016. Elsewhere, outbreaks have been reported from Davao del Norte, Maguindanao and Sultan Kudarat in western Mindanao – these are thought to be due to a combination of cross-border population movement and delayed detection, reporting and response.

Mobile groups in remote forested areas – whose mobility is related to cultural, occupational and socio-economic factors – continue to experience a greater risk of malaria, and represent one of the biggest challenges for the Program. In 2015, 42% of reported cases have been in indigenous minorities.

Nation-wide, more than half of all malaria cases are reported in children (25% in children less than 5 years of age and 33% in school-aged children). In the presence of high reported bed net utilisation, this probably reflects a combination of human and vector behaviour (e.g. outdoor activities before bed-time in the presence of at least some outdoor biting by mosquitoes).

A reduction in the proportion of cases due to *P. falciparum* is an indication of the effectiveness of control measures. The Philippines is the only country in the Asian region that still reports more than 50% of cases as due to *P. falciparum* (75.8% of microscopy- or RDT-positive cases in 2014, rising to 83% of cases so far in 2015).

Progress has been maintained in Tawi-Tawi and Sulu, where only 116 and 10 locally-transmitted cases of malaria, respectively, have been reported in 2015. Just 18 sporadic cases have been reported from other areas of the country, where elimination is probably just a matter of time but the Program still needs effective re-orientation towards elimination phase surveillance systems and activities.

2.4.2. Accelerating progress in pre-elimination and elimination areas

To achieve malaria elimination, each case must be detected, treated, reported and investigated promptly, and the potential for any further local transmission eliminated. This requires a very strong epidemiological surveillance and response capability; it includes the assessment and management of known and potential foci of transmission to identify all people carrying malaria parasites (including asymptomatic individuals and those with gametocytes) and ensure that they become non-infectious as soon as possible.

The new MOP provides additional guidance on Program transmission towards elimination-oriented surveillance, response to individual cases and outbreaks, and management of known or suspected foci of residual transmission in elimination areas. It is currently being revised following peer review by Regional Malaria Coordinators.

A new case investigation form has been developed for use in conjunction with PIDSR reporting, but a focal investigation and management protocol, form and registry remain urgent needs for the Program.

Provinces of the Philippines with long-standing sub-national certification as malaria free rarely report cases of malaria (despite significant population movement both nationally and internationally for occupational reasons, including to areas with active malaria transmission). Parts of these provinces remain receptive to malaria, and it is a priority to strengthen surveillance, reporting and response capability in these areas to bolster the prevention of re-introduction.

Elsewhere in the region, China, Korea and Malaysia are at the stage where they report on, investigate and classify every case and focus of transmission. In China, case-based surveillance and response are managed according to a '1-3-7' protocol where cases are reported within 24 hours, are confirmed and investigated within 3 days, and the necessary public health response to prevent further transmission is completed within 7 days.[3]

Based on China's experience, the Philippines Malaria Program has set itself the vision of introducing a '1-3-5' surveillance and response protocol nation-wide to accelerate progress towards elimination.

2.4.3. Program management and financing

The new MOP is due to be rolled out in early 2016. Ready access to this technical guidance will be essential, especially for areas implementing enhanced case-finding activities against a background of low reporting rates (see also Section 4.4).

In preparation for the eventual withdrawal of donor support for the Malaria Program, further studies on the financing requirements for elimination and financial sustainability of the Program are needed.

While malaria is a notifiable disease in the Philippines (and about to become subject to 24-hour notification; see Section 3.2), engagement of the Malaria Program with the private sector varies greatly between provinces. Provincial and Municipal health services will need to develop close cooperation with private practitioners and facilities to ensure maximum case ascertainment, reporting and investigation.

3 Disease reporting systems in Philippines

There are many disease reporting systems in the Philippines but, for the purposes of this report, only systems that have (or potentially have) relevance to malaria are discussed below.

3.1 Field Health Services Information System (FHSIS)

The Field Health Services Information System has been implemented nationwide since 1990 and provides the DOH with management information on the different public health programs implemented by all Government health

[3] Cao J, Sturrock HJW, Cotter C, et al. Communicating and Monitoring Surveillance and Response Activities for Malaria Elimination: China's ''1-3-7'' Strategy. *PLOS Med* 2014; Volume 11 (5); e1001642,

facilities other than hospitals. It is the official system of the DOH and designated national health statistics as per Executive Order No. 352.

The stated objectives of the FHSIS[4] are:

- To provide summary data on health service delivery and selected program accomplishment indicators at the barangay, municipality/city, and district, provincial, regional and national levels.
- To provide data which when combined with data from other sources, can be used for program monitoring and evaluation purposes.
- To provide a standardized, facility level data base that can be accessed for more in depth studies.
- To minimize the recording and reporting burden at the service delivery level in order to allow more time for patient care and promote activities.

The FHSIS consists of a number of recording tools to assist the health staff (primarily midwives and nurses) with day to day management of their activities and a number of reporting tools for summary reporting to provincial, regional and national levels.

The recording tools within the FHSIS are:

- **Individual Treatment Record (ITR)** - This form records the date, name, address of patient, presenting symptoms or complaint of the patient on consultation and the diagnosis, treatment and date of treatment. This record is maintained as part of the system of records at each health facility on all patients seen.
- **Target Client List (TCL) –** Target Client Lists help to plan and carry out patient care and service delivery by enabling midwives/nurses to monitor service delivery to clients in general and in particular to groups of patients identified as "targets" or "eligibles" for programs of the DOH. The primary advantage of maintaining the TCLs is that the midwife/nurse does not have to go back to individual patient/family records as frequently in order to monitor patient treatment or services to beneficiaries and to complete the FHSIS Reporting
- **Summary Table** - The Summary Table is a form with 12 month columns retained at the facility (BHS) where the midwife records monthly data relating to health program accomplishments and morbidity trends within the health facility.
- **Monthly Consolidation Table (MCT)** - The Consolidation Table is located at the RHU and records the reported data per indicator by each BHS or midwife.

The reporting tools within the FHSIS are:

- **The Monthly Reports (M1 & M2)** - M1 contains selected indicators relating to maternal care, child care, family planning and disease control and are copied from the TCL and Summary Table. M2 contains a list of diseases by age and sex. Monthly reports are submitted to the provincial level for consolidation into the quarterly reports.
- **The Quarterly Reports (Q1 & Q2) –** These reports are quarterly consolidations of the monthly reports.
- **The Annual Forms (A-BHS, A1, A2 and A3)** - The Annual Forms consists of data and indicators needed only on a yearly basis. A-BHS is a midwife's report containing on demographic, environmental and natality data. Nurses at the RHU/MHC use the A1 to report on vital statistics such as demographic, environmental, natality and mortality. A2 lists all diseases and their occurrence in the municipality/city broken down by age and sex and A3 lists all deaths occurred in the municipality/city broken down by age and sex.

Malaria data within the FHSIS

The monthly / quarterly FHSIS forms include the following, limited summary malaria data:

- Malaria case among less than 5 years of age and above 5 years of age

[4] Electronic Field Health Service Information System Manual of Operations

- Confirmed malaria cases by species: *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale*
- Confirmed malaria cases by method: Slide and Rapid Diagnostic Test (RDT)
- Number of malaria deaths
- Population at risk (noting that the definition of the population at risk of malaria may vary as the country progresses towards elimination)
- Households given Insecticide Treated Nets (ITN)

The malaria data within the FHSIS is of limited use to a malaria program in the elimination stage apart from providing the opportunity to cross check number of cases reported through PIDSR and PhilMIS from government health facilities (excluding hospitals). This would be a very useful exercise at all levels to ensure all cases are being reported but apart from some individual health facilities that indicated that they regularly cross checked cases reported via FHSIS with other systems this was not done at any of the provincial offices visited or at national level.

There are a number of obvious gaps in the FHSIS malaria data which could be addressed during the next form revision, specifically:

- Expand the species list to include mixed infections and *P. knowlesi*
- Include the total number of tests (slide and RDT) as well as the number of positives, as this will enable calculation of test positivity rate (TPR) and annual blood examination rate (ABER) – both important indicators of Program performance for the elimination phase
- The age breakdown <5yrs, >5yrs is not really relevant to the current epidemiological situation (see Section 2.4.1); if there is to be an age breakdown, it should follow the WHO guidelines (although, given that PIDSR and PhilMIS are case based systems, there is a case to be made to drop the age breakdown).

The FHSIS is online and accessible for RHU's to upload their data at http://uhmis2.doh.gov.ph/efhsis/login.php but, in the provinces visited, it appeared that the process was largely manual up to provincial level.

3.2 Philippine Integrated Disease Surveillance and Response (PIDSR)

The Philippine Integrated Disease Surveillance and Response System was established in 2008 to improve the current disease surveillance systems in the Philippines and to comply with the International Health Regulations (IHR), adopted by the World Health Assembly in 2005, which highlighted the urgent need to adopt an integrated approach for strengthening the epidemiologic surveillance and response system of each WHO member nation.

PIDSR encompasses all diseases and syndromes covered by the Republic Act 3573[5] which requires all individuals and health facilities to report notifiable diseases to local and national health authorities.

Notifiable diseases are selected because they are epidemic prone disease, are targeted for eradication or elimination, and subject to international health regulation. At present there are 33 notifiable diseases (see Figure 5) which are split into category 1 (report within 24hrs) and category 2 (report weekly).

Currently, there are plans in 2016 to include chikungunya as a notifiable disease and to reclassify malaria from category 2 to category 1.

[5] http://www.chd11.doh.gov.ph/webfiles/pdf/resu/ao2008-0009.pdf

Figure 5: Notifiable diseases reported through PIDSR

Category 1 (Should be reported within 24 hours)	Category 2 (Should be reported weekly)
1. Acute Flaccid Paralysis 2. Adverse Event Following Immunization (AEFI) 3. Anthrax 4. Human Avian Influenza 5. Measles 6. Meningococcal Disease 7. Neonatal Tetanus 8. Paralytic Shellfish Poisoning 9. Rabies 10. Severe Acute Respiratory Syndrome (SARS) 11. Outbreaks □ Clusters of diseases □ Unusual diseases or threats 14. MersCov 15. Ebola 16. SARI	1. Acute Bloody Diarrhea 2. Acute Encephalitis Syndrome 3. Acute Hemorrhagic Fever Syndrome 4. Acute Viral Hepatitis 5. Bacterial Meningitis 6. Cholera 7. Dengue 8. Diphtheria 9. Hand, Foot and Mouth Disease (HFMD) 10. Influenza-like Illness 11. Leptospirosis 12. Non-neonatal Tetanus 13. Pertussis 14. Typhoid and Paratyphoid Fever 15. Acute Meningitis Encephalitis Syndrome 16. Chikungunya 17. Malaria

For each disease, there are guidelines on case definition, laboratory confirmation, case detection and reporting, and outbreak investigation and control and there are forms for each disease with different levels of complexity from simple line listings to detailed individual case data and lab results.

The reporting of PIDSR diseases at the lower levels is largely manual using whatever means available (radio, phone, text, email, etc.) but, at higher levels such as hospitals and PHO and above, the system uses a series of Access databases which are eventually merged into regional and finally national databases.

The regions and provinces implement the reporting system in slightly different ways. For instance, in Tarlac, data is entered into the PIDSR database at province level to avoid duplication if cases are referred to other health facilities; in Iloilo, data is entered at facility level and validated at provincial level to remove any duplicates. Both these approaches seem to work well as the emphasis in both provinces is to ensure that the correct people are notified within the required reporting timeframe and the appropriate response is initiated.

In Palawan, which has a high burden of malaria, it was noted that in some areas the PIDSR reports were not always completed as they did not see the need to report malaria cases using PIDSR when the cases are already reported through PhilMIS – even though the aims of the two systems are different. This causes issues at national level when trying to reconcile cases from both systems to come up with a definitive number of malaria cases in the country.

There are plans to upgrade the PIDSR to an online system and, in the case of severe acute respiratory infection (SARI; Figure 5, Category 1 column), there is already an online system for this disease. The Knowledge Management and Information Technology Service of the DOH (KMITS), which is primarily responsible for most of the DOH software development, is working with the Epidemiology Bureau on the planned upgrade of the PIDSR reporting to an online system and they are looking to engage two programmers to work on this in early 2016.

As part of their mandate to harmonize disease reporting as far as possible, KMITS understands that the best course of action is to upgrade the PIDSR for all diseases rather than by one disease at a time but the current plans for moving the PIDSR to an online system appear to be based around a disease by disease approach and this appears to be driven largely by financial considerations as certain donor-supported projects provide funding for certain diseases. There may have to be some thought as to how to harness these funds effectively to upgrade all PIDSR diseases to online reporting at the same time.

One of the strengths of the PIDSR system is the fact that it is a 'one stop shop' for all notifiable diseases with one reporting form, harmonized software and integrated human resources for reporting and response at LGU level. Whilst the advantages of moving to an online system are many, if this is done on a disease by disease basis it runs the risk of increasing the workload of the users of the system if they need to log in to different systems for each disease. Whilst it is strongly recommended to move the PIDSR online, it is also recommended to do this for all notifiable diseases at the same time.

Malaria data within the PIDSR

As a category 2 disease (weekly reporting), the reporting requirements for malaria are a basic line listing with species, recent travel (yes/no), blood transfusion (yes/no), classification and outcome – less than the data required for PhilMIS. As part of the reclassification to a category 1 disease (24hrs), the reporting requirements will be increased to cover all the data currently collected by PhilMIS plus additional sections for clinical data and detailed case investigation, including detailed travel history and activities after onset of symptoms to identify possible onward transmission. This new form will constitute the '1-3' section of the proposed '1-3-5' system.

The new malaria form seems to be comprehensive and has already gone through some acceptance testing. One possible area for improvement would be 'source of identification' which at present is surveillance / outbreak and it is recommended that this be changed to 'Passive surveillance' / 'Active Case Detection (ACD) – Case follow up' / 'ACD – other' so it will be possible to also identify cases that are detected during follow up of an index case or during routine follow-up management of a potential focus of transmission (i.e. in the absence of a new index case).

3.3 Event-based Surveillance & Response System (ESR)

The Event-based Surveillance & Response System was introduced in 2004 to complement PIDSR, which was the existing surveillance system within the DOH to report notifiable diseases, clusters of diseases and unusual diseases or threats. ESR was designed to complement the PIDSR in terms of its ability to easily pick-up information on health events that may pose a risk in the communities and provide an appropriate response to those places where PIDSR was not yet fully functional or established and to cater for those diseases and other health events (e.g. chemical spills, food poisoning, etc.) that are not covered by the PIDSR.

There are two types of data capture into ESR:

- **Active** - daily gathering of health events by the ESR staff through surfing the internet and other media sources such as television, radio and print.
- **Passive** - capture of health events reported by the media people, health facilities such as DOH and other attached agencies, partner agencies and local Government Units through email, fax, phone calls or text messages to the ESR staff.

After data about a health event is captured by the system there is a process of filtering, verification, assessment and response.

- **Filtering** is the process of reviewing which reported events should be discarded or investigated further.
- **Verification** is the process of substantiating the details of the event within 24hrs usually by confirming the details with health staff that have knowledge of the event.
- **Assessment** is the analysis of the event and classifying the event into one of a number of classifications which then determines the appropriate response.
- **Response** can involve local, provincial, regional or national staff depending on the assessment of both the event and the capacity of staff at various levels to respond.

Details of each event are captured on a verification form which is entered into an online system which is can be viewed by registered users.

Malaria data within the ESR

Of the 2000+ health events in the online ESR for 2015 (as of December 2015), there were 37 malaria events. As the ESR is designed to only capture rare events, it is to be expected that only cases of malaria that occur in provinces in elimination phase (i.e. very rare cases) would be reported to the ESR and this is in fact the case. Tarlac (with only one reported imported case in 2014) reported a case to the ESR in June 2015 which, after an investigation, was classified as a health event of local concern (the case was imported); no outside assistance was deemed necessary. In the Tarlac case the provincial staff viewed the ESR as the most responsive system as they aim to respond within 1-3 days whereas the PISDR system is slower as malaria is a category 2 disease (reporting weekly).

As malaria becomes a rare event (with a reduction of cases), it is to be expected that the ESR will pick up more of these cases but, as malaria is reclassified as a category 1 disease (24hrs) in PIDSR, it would make sense to link the PISDR system with the ESR – if a case is identified through PIDSR (with the more in depth reporting required by it being re-listed to Category 1), it will automatically trigger an event in ESR. This would obviously be very easy if the PISDR system was also online.

3.4 Philippine Malaria Information System (PhilMIS)

The Philippine Malaria Information System was developed in 2005 by the then National Epidemiology Center of the DOH in collaboration with the NMP, by modifying and improving on a previous system that had been developed and piloted in the province of Agusan del Sur: the Rural Health Unit-Malaria Information System (RHU-MIS). The development was made possible through the technical and financial support of the WHO-AusAID Roll Back Malaria Project and the Global Fund malaria grant.

The Philippine Malaria Information System aims to:

- To provide information in a computerized form needed for planning, implementation, monitoring and evaluation of malaria control program.
- To standardize the collection of malaria data using the same reporting and recording forms in malaria endemic provinces.
- To achieve quality malaria data.
- To easily retrieve malaria indicators required for programme management and those needed by funding agencies and other stakeholders.
- To avoid the delay in generating the required information through prompt reporting system.

The PhilMIS system captures individual malaria cases, deaths, vector control and other programmatic data and was designed to be used in malaria endemic provinces. The original rationale, still valid today, was that neither the PIDSR nor the FHSIS generated enough data to support a more detailed analysis of program implementation or disease transmission dynamics. By 2009, PhilMIS had expanded to 37 of the 40 provinces supported through the Global Fund grant but since then, due to the country's success in reducing the malaria burden, the number of provinces actively using PhilMIS has declined to the 13 provinces with the highest burden (those supported by the current Global Fund Malaria project; Section 2.1). The data collection cycle is monthly from both government and some private faculties and the data is entered into access databases that are merged at provincial, regional and national levels.

PhilMIS was designed for controlling malaria and there is now a recognition that, as the program moves to elimination mode and malaria becomes a category 1 notifiable disease, PhilMIS needs to undergo a further transformation to meet the evolving needs of the malaria elimination program. The original rationale to collect individual malaria case data is no longer valid as the new PIDSR form will provide all the case data required for the "1-3-5" system which PhilMIS cannot provide (such as the detailed travel history) and will provide this data for the whole country which PhilMIS cannot. However, in the elimination stage there is also an increasing emphasis on the response side, case and foci investigation become key activities, the "3-5" of the "1-3-5" system and there is an ongoing need for programmatic data which cannot be met by the PIDSR system. There will be a need for a foci registry containing the data in the 'yet to be developed' foci investigation form and it is recommended that PhilMIS should be expanded to include this data and, in effect, guide and monitor the "5" of the "1-3-5" system. Such a system would need to be available nationwide – not just in the Global Fund supported provinces – and the best

way to achieve this would be to put the PhilMIS online where it could also be linked to the malaria cases in the planned online PIDSR.

3.5 Malaria Text Reporting System (MTRS)

The Malaria Text Reporting System is an SMS based alert / reporting tool designed to facilitate:

- **Early Warning of Disease Occurrence** – early warning system to be aware of the occurrence of cases and monitor trends and disease emergencies (outbreaks).
- **Logistic Management** – to ensure that there is no stock out of anti-Malaria drugs in the facilities.

Health workers first have to register on the system which can be done by sending and SMS in a prescribed format to a number supplied by one of the three participating telecom companies. After registration the health worker can used prescribed SMS templates to report the following:

- **Malaria Report** – individual case report sent immediately after a malaria case is diagnosed.
- **Death Report -** RHUs and hospitals can report malaria deaths
- **Stock Status Report –** users can report stock inventory
- **Stock Out Report –** users can report stock outs

Data sent though the system is then available to be viewed on a website.

None of these reports are meant as a replacement for existing systems such as PhilMIS, but are designed to be used as an alert mechanism with the intention of initiating a prompt response. It was noted during the field visits that the community based health workers often used SMS (i.e. free-text, without the MTRS template) to alert RHU staff about new cases. This tool could therefore be very useful as long as the SMS template is not too complicated, and would be even more appealing if it could be made free to the user.

The present system tries to fit a lot of data into the message, and this could result in error messages if the message is not in the correct format. It is recommended to try to reduce the amount of data included in the SMS as much as possible. Similarly for the stock control aspects, this could be a useful tool for monitoring stock levels at remote facilities and alerting managers to stock outs.

3.6 Remote Microscopy Diagnostics

The University of Philippines (UP) is developing a system to use mobile phones to transmit images of slides (malaria and others) via an mHealth app to be read remotely and linked to a website where results and be viewed and mapped using Google maps. The system consists of a device to attach any mobile phone to the microscope and an Android application that allows the user to verify the image and send (with a text message) the image via MMS to a central server where the images can be viewed and verified online.

The system is still in the development and testing stage but could form a useful tool for: refresher training for medical technologists in elimination settings that do not see many positive slides; performing QA of malaria slides (verification of positives and a percentage of negatives) without the need to physically transport the slides; and for prompt remote verification of slide in cases where the medical technologist may need a second opinion.

3.7 Electronic Medical Records (EMR)

The Philippines has a well established National eHealth Program which was established by the Department of Health in collaboration with the Department of Science and Technology, Philippine Health Insurance Corporation, University of the Philippines – Manila, and Commission on Higher Education.

This program has a roadmap[6] towards a vision that by 2020 "*eHealth will enable widespread access to health care services, health information, and securely share and exchange patients' information in support to a safer, quality health care, more equitable and responsive health system for all the Filipino people by transforming the way information is used to plan, manage, deliver and monitor health services.*" One of the critical steps in this roadmap is that all health facilities have certified electronic medical records systems that are able to exchange data through the Philippine Health Information Exchange (PHIE) to ensure to harmonized data sharing and avoid repetitive processes, double counting and redundant data collection by providing a single unified view of the patient's data or record across and between various health facilities. For instance if all health facilities were to have EMRs, and assuming those EMRs captured all the data required by the different disease programs there would be no need for disease specific vertical programs. The country has not yet achieved this milestone but they are well on the way with most hospitals and a sizable minority of rural health facilities with functioning EMRs.

The Government, through the Knowledge Management and Information Technology Service (KMITS) of the DOH, has developed EMRs for hospitals (iHomis) and for RHUs (iClinicSys) and these are complemented by a number of privately developed systems for hospitals and RHUs (Shine, CHITS, WAH, etc). In Tarlac, all RHUs use the WAH system and, in Palawan, some of the health facilities visited were also using WAH; in Iloilo, one of the facilities was using CHITS.

All privately developed EMRs should include the minimum datasets prescribed by KMITS for the PHIE to enable reporting for FHSIS, PIDSR etc but in practice this was not observed to be the case. Of the EMRs in use in the facilities visited for this assessment, they were able to produce reports in the format for FHSIS but not yet for PIDSR. Particularly in Palawan and its high malaria burden, where a facility will see many malaria cases, if the EMR (in the facilities visited this was WAH) was able to capture, at the point of consultation, and report all the relevant data from malaria patient to satisfy the new PIDSR form then the reporting burden on the facility staff will be very much reduced. It is therefore recommended that the EMRs in use in high burden facilities in Palawan be supported to accelerate the introduction of the PIDSR malaria reporting form into their software. For facilities without EMRs, it should be noted that having an EMR with PIDSR reporting capacity will greatly improve their capacity to report malaria cases in a timely manner but this should not be the main reason for introducing the EMR into a facility as moving from a paper based system to and EMR requires many changes to all aspects of the facility's work flow and as such should be carefully planned.

4 Assessment of malaria reporting in the Philippines

4.1 Current situation

The places visited during this assessment were chosen to represent areas in pre-elimination, elimination and prevention of reintroduction modes. In these places it was found that staff at all levels reacted promptly and appropriately to deal with cases and outbreaks with prompt alerts (often within 24 hours or less) by whatever available means (radio, phone, text, etc) from midwives to RHUs, RHUs to PHO, PHO to region. Appropriate responses were generally undertaken (often at RHU level, which are often already in 'elimination mode'), including case investigation and classification, foci investigation, and response (ACD, spraying, LLIN distribution, etc).

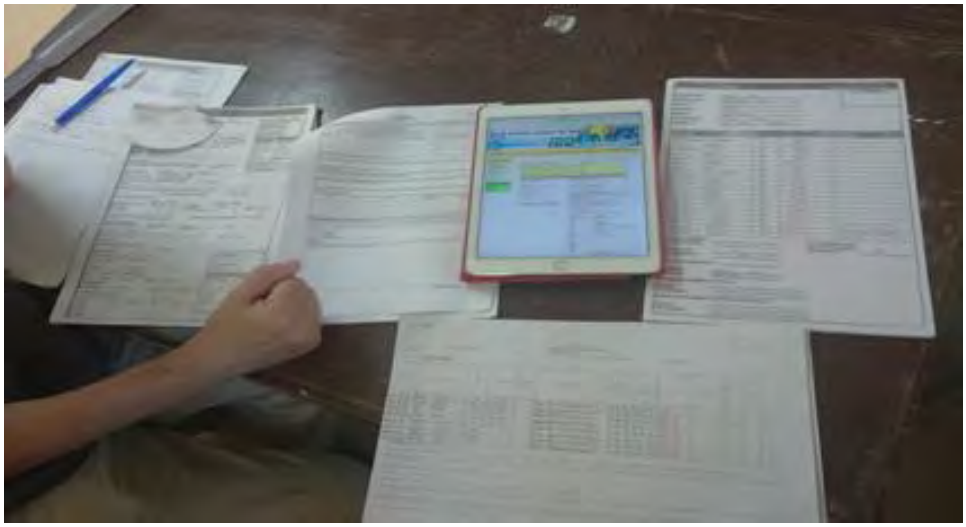
Staff at all levels were, for the most part, also diligent in completing their malaria reporting requirements, which were found to consist of numerous forms – some of which contained duplicate data. Figure 5 shows a sample of forms used at Narra RHU in Palawan to capture and report malaria case including the WAH electronic medical records system, FHSIS, PhilMIS and PIDSR. Clearly the malaria reporting burden on the RHU health staff needs to be reduced.

These reporting systems, particularly PIDSR and PhilMIS, were originally designed for malaria control which have served the program well in helping to greatly reduce the malaria burden in the last decade but do not currently serve the data needs of an elimination program and specifically the recording and reporting requirements of the proposed 1-3-5 system which requires detailed case and foci investigation '3-5' in addition to the existing data that

[6] http://uhmis.doh.gov.ph/images/pdf/Philippines_eHealthStrategicFrameworkPlan_April152014_Release03_OK.pdf

is captured about case diagnosis and treatment '1'. This data also needs to be captured much faster than the current weekly reporting cycle (PIDSR) and monthly cycle (PhilMIS).

Figure 5: Recording and reporting forms for malaria at Narra RHU in Palawan



4.2 The way forward

Eliminating malaria requires a robust surveillance system to rapidly capture, classify and respond to all cases; identify and map foci; and also to satisfy the vigorous requirements for DOH (sub-national) and WHO (national level) certification. Essential elements of such a system are:

- Policy - mandatory (by law) reporting from public and private facilities in a specific timeframe (usually 24-48 hours)
- 100% coverage nationwide
- National Case Registry
- Detailed case investigation with travel history – classification of local / imported cases
- Prompt response to each case
- Foci investigation, classification and continuing management
- Mapping of cases and foci

The 1-3-5 system

The Malaria Program is already undertaking actions to reorient the program from control to elimination and has articulated a vision for a 1-3-5 system similar to the Chinese 1-3-7 system. The '1-3-5' system aims for case notification within 1 day, case investigation & classification within 3 days and focus investigation & action within 5 days. Specifically the program has plans to:

- Upgrade malaria from a category 2 disease in PIDSR to category 1 that will mandate that all malaria cases be reported from all facilities (including private facilities) within 24 hours by law.
- Implement a new malaria case reporting and investigation form for PISDR ('1-3') with detailed travel history and classification into local / imported cases.
- Introduce an online version of PIDSR (although it is not clear if this is to be planned for all diseases at the same time or to be implemented disease by disease; as of December 2015, two programmers are being recruited to work with KMITS and Epidemiology Bureau on the new malaria online form).

- Finalize and refine the malaria Manual of Operations to include forms and processes for foci investigation and response ('5').

These activities are a good start but more work needs to be done to streamline and modernize the recording and reporting systems for malaria to support 1, 3 and (eventually) 5.

4.3 Recommendations to improve recording and reporting systems for malaria in Philippines

There are 5 keys areas that need to be addressed to move the Philippines from a recording and reporting system for malaria control to one of elimination and enable the reporting system to catch up to the actual situation in the majority of provinces where the program is already effectively operating in elimination mode. These key areas are:

1. **Develop a single national online case registry of all malaria cases, including travel history and classification**
2. **Fully implement the 1-3-5 model, including creation of a foci registry**
3. **Improve malaria case recording in EMR systems**
4. **Upgrade program management reporting**
5. **Implement data quality control at all levels**

For each of these areas, there are a number of specific recommendations that should be implemented.

Develop a single national online case registry of all malaria cases, including travel history

The current system of reporting captures basic diagnosis and treatment data for each case ('1') but not case investigation data ('3'). To refocus the reporting system to efficiently capture 100% of all case and case investigation data in a timely fashion (1 day for case reporting, 3 days for case investigation) and to reduce duplicate reporting in control areas, the following are recommended:

1. The proposed new PIDSR malaria case investigation form with travel history (for malaria as a category 1 notifiable disease) should be adopted with a suggested modification to 'source of identification' which at present is surveillance / outbreak and it is recommended that this be changed to Passive surveillance / ACD – Case follow up / ACD – other, so it is possible to identify which cases are identified during follow up of an index case or routine ongoing management of a potential focus of transmission.
2. Upgrade the PIDSR to an online system **for all 33 notifiable diseases – i.e. simultaneously**. This is already planned with KMITS and the Epidemiology Bureau identifying funds to recruit two programmers to develop the online malaria PIDSR reporting system. It is also understood that there are plans and funds to move other PISDR diseases to an online system similar to what has already been done with the SARI system. The strong recommendation is to find a way to use available resources to do a 'one off' development of an online system for all PIDSR notifiable diseases at the same time. This approach will be in line with the eHealth strategy to harmonize disease reporting as much as possible and will make the adoption of the new online system easier for the LGUs who see the PIDSR reporting system as a single integrated system and not 33 separate disease reporting systems.
3. Form an **implementation task force** to guide the PIDSR developers. This project will involve many different partners covering all of the notifiable diseases and users of the system from national level to the LGUs and it is important that the requirements of all the programs and users be taken into consideration by the programmers when designing and testing the new system.
4. The new system should be flexible enough to allow regions and LGU partners to determine the level at which data are entered online to fit within existing PISDR reporting processes in their province. The regions and provinces implement the current PISDR reporting system in slightly different ways (as discussed in relation to Tarlac and Iloilo; see Section 3.2). Both these approaches seem to work well as the emphasis in both cases is

to ensure that the correct people are notified within the required reporting timeframe and the appropriate response is initiated. This flexibility should be maintained in the new online system.

5. The new PIDSR online system should have analysis, mapping and alert capabilities so that users at all levels can see summary data on cases for the whole country and detailed case data for their particular area of responsibility. There should also be links to the online ESR for cases that satisfy the criteria for an ESR report.
6. Remove the case malaria case reporting module from PhilMIS to eliminate duplicate case reporting. The introduction of the new PIDSR case reporting and investigation form extends reporting to the national level and makes the existing case data collection in PhilMIS redundant; this should therefore be removed.

Fully implement 1-3-5 including creation of foci registry

In order to fully implement the 1-3-5, consideration needs to be given to the '5', response, for pre elimination and elimination areas but also the effect of implementing 1-3-5 on areas that are still in control mode and still have a high burden of malaria. To fully implement the 1-3-5 and to manage the change in control areas the following is recommended:

7. Cases to be reported within 24 hours to PISDR in pre-elimination and elimination settings (i.e. "1").
8. Case investigation, including the relevant section of the form, to be completed in 3 days (i.e. "1-3") in pre-elimination and elimination settings. For inpatients, both are likely to be completed in one day as part of initial consultation (i.e. "1-1").
9. Relax the reporting timeframe, and possibly the requirement to complete the case investigation section of the form, for control areas with significant burden of disease (and reporting) and use existing PhilMIS staff and infrastructure to encode the cases into PIDSR as soon as possible. As the PhilMIS staff will no longer have to enter the case data into PhilMIS, these same staff could be used to enter the new malaria forms into PISDR.
10. A foci investigation form and registry is needed for non-control areas. This form is mentioned in the MOP but still needs to be developed.

Improve malaria case recording in EMR systems

As part of the national eHeath strategy, RHUs are increasingly adopting electronic medical records systems; notably, this includes a number of RHUs in Palawan. This gives us an opportunity to improve the reporting of malaria cases in the new PIDSR format whilst reducing the reporting burden on health facility staff by adopting the following recommendations:

11. Require all EMRs, especially those used in RHUs, to capture all data required for PIDSR diseases and produce reports in PISDR format
12. Automate SMS alerts for notifiable diseases (i.e. '3-5')
13. Consider accelerated support (funding) to implement PIDSR reporting for malaria in EMR systems in use in malaria control areas to reduce reporting burden and assist in the transition to case based ('1-3') reporting

Upgrade program management reporting

The original rationale to collect individual malaria case data within the PhilMIS is no longer valid as the new PIDSR form will provide all the case data required for the "1-3-5" system; however, in the elimination stage there is also an increasing emphasis on the response side, case and foci investigation become key activities (the "3-5" of the "1-3-5" system) and there is an ongoing need for programmatic data which cannot be met by the PIDSR system. It is recommended to upgrade the PhilMIS as follows:

14. Upgrade the program management part of PhilMIS to an online system to enable links with PIDSR malaria case registry, and to make it available to all provinces.
15. Incorporate a foci reporting and management tool into the online PhilMIS (foci registry).
16. Include links to an online version of the MOP.
17. Expand PhilMIS analysis and mapping capabilities to map cases and foci.

18. Use the online PhilMIS to capture 'missing' data such as number of slides / RTDs examined (a longer term alternative is to include this in FHSIS; see Section 3.1).

Implement data quality control at all levels

There appears to be very little cross checking of data from the various systems to ensure that cases do not go unreported and this could be improved with some very simple data quality control such as:

19. Cross check PIDSR cases with iHOMIS in hospitals. The reporting of notifiable diseases in hospitals is usually the job of specific nursing staff responsible for surveillance and is done as part of the daily bed census. Final diagnosis data is usually entered into the hospitals EMR system at a later date and there are usually no checks to ensure that the data reported to through the EMR matches that reported through PIDSR.
20. Cross check PIDSR cases with FHSIS reported cases in RHUs, provinces and regions. The malaria data within the FHSIS is of limited use to a malaria program in the elimination stage apart from providing the opportunity to cross check number of cases reported through PIDSR from RHUs. This would be a very useful exercise at all levels to ensure all cases are being reported but, apart from some individual health facilities that indicated that they regularly cross checked cases reported via FHSIS with other systems, this was not done at any of the provincial offices visited or at national level.

4.4 Consistency with national Strategic Plan priorities for surveillance and response

The recommended approach addresses a number of priorities (gaps and challenges) identified in the NSPCEM 2014-2020.

First, we have confirmed that systems for malaria data management and collation remain fragmented and that there are system inefficiencies related to multiple surveillance systems and reporting formats and duplicate data entry at the RHU level; these different reporting streams are, in turn, managed by different individuals at the PHO. Our proposed approach starts to reduce this duplication through convergence of the case management data entry in PhilMIS and PIDSR under a single, new electronic platform for PIDSR – to eventually also be linked to EMRs.

Second, we propose extending the reach of case-based malaria surveillance to the national level through the single PIDSR platform. Provinces outside the core group of 13 control phase provinces (or the 27 other provinces previously supported by the Global Fund grant) potentially also gain access to the national elimination surveillance database through the registry of transmission foci; on-line links to the MOP will support improved program quality. This will also help to address the uncertainties around zero reporting from provinces with long-standing status as having interrupted local transmission, and will strengthen the functionality of the Elimination Hubs.[7]

Third, the new PIDSR case investigation form contains all necessary fields to guide case investigation, follow-up and case classification; i.e. it is functional as both an administrative and an epidemiological tool (with some minor modifications; see Recommendation 1), allowing convergence of PhilMIS case reporting under PIDSR.

Finally, the close links between the Malaria Program and the Epidemiology Bureau proposed under this plan will introduce the Program to an important role in surveillance and more nuanced analysis of the data than is currently undertaken in routine EB reporting. Where unusual events (outbreaks, cases in malaria-free areas) are managed through ESR, close links with the Program will strengthen the quality of the technical response.

4.5 Implementation plan

A list of key activities and a suggested timeframe for implementation (taking into consideration the current DOH plans for developing the online PISDR) are show in Figure 6.

[7] DOH Administrative Order 2013-0007: Guidelines on the Establishment of Malaria Elimination Hubs

Figure 6: Key activities and timeline for implementing the recommendations of this assessment

	Activity	2016 Q1			2016 Q2			2016 Q3			2016 Q4			2017 Q1			Funding
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	**Online malaria case registry**																
1.1	Finalize new malaria PIDSR form design																GoP
1.2	Setup task force to support implementaion of online PIDSR																
1.3	Develop online PIDSR																GoP
1.4	Beta testing online PIDSR with new malaria form																GoP/GF
1.5	Pilot testing online PIDSR with new malaria form - site 1																GoP/GF
1.6	Pilot testing online PIDSR with new malaria form - site 2																GoP/GF
1.7	Regional training online PIDSR with new malaria form																GoP/GF
1.8	National roll out of online PIDSR with new malaria form																GoP/GF
2	**Online PhilMIS / foci registry**																
2.1	Develop foci investigation forms																GoP/WHO
2.2	Testing of foci investigation forms																GoP/GF
2.3	Develop online PhilMIS (ex case reporting) with foci module & links to case registry																GoP/GF
2.4	Pilot testing of online PhilMIS / foci module & foci forms																GF
2.5	Regional training online PhilMIS / foci module & foci forms																GoP/GF
2.6	National roll out of online PhilMIS & foci forms																GoP/GF
3	**Upgrade RHU EMR's to include PIDSR reporting**																
3.1	Issue guidence to EMR providers on PIDSR reporting requirements																GoP
3.2	Support EMRs in control areas to implement PIDSR malaria module																GF
4	**Project Management**																
4.1	Technical support to project implementation																WHO/GF
4.2	External project progress evaluation																WHO/GF

A more detailed plan with indicative funding requirements will also be produced separately and will form the basis of a 'living' plan and budget that can be adjusted as the project proceeds.

4.6 Risks and potential limitations

Like any project the successful process of reorienting the recording and reporting of malaria in the Philippines from control to elimination mode will be subject to many risks and limitations, the more serious of which are:

- Lack of funding
- Delays due to political issues in an election year
- Poor management and oversight of project implementation
- Online PIDSR implemented disease by disease instead of as a harmonized system covering all diseases.
- Lapses in PhilMIS reporting before PIDSR-based system fully functional
- Need alternative strategy for monitoring TPR and ABER in RHUs either through FHSIS, by retaining the relevant fields for total tests conducted in PhilMIS, or through an annual survey. In hospitals the TPR is available in the Hospital Statistical Report which is being submitted by all hospitals to DOH's Hospital Operation and Management Services.
- Commercial EMRs do not update their systems to reflect the PIDSR reporting requirements
- Inadequate internet connection and computer systems (laptops, iPads, etc.) for sites piloting electronic data entry
- Detailed elimination strategies and foci management not fully worked out in new MOP (i.e. also need to be piloted)

- Lack of engagement with the private sector to report all malaria cases (which require local partnerships and solutions to support compliance with mandated 24 hour reporting of malaria)

We acknowledge that drawing all malaria case reporting and investigation into the PIDSR platform may increase the reporting and compliance burden on provinces that currently have a relatively high incidence of malaria and have not yet transitioned into the pre-elimination phase (in particular, Palawan and Maguindanao). This risk may be mitigated by implementing provisional, "relaxed" malaria reporting rules in those provinces with a high case load as per recommendation no. 9. This would be assessed during the proposed progress evaluation in the second half of 2016 (Figure 6, activity 4.2).

The implementation time line (Figure 6) is relatively tight and work needs to commence as soon as possible. Risks associated with slow progress or poor implementation of the project will be the responsibility of the implementation task force, which should be established as soon as possible. This task force would include representation from EB, KMITS, BDCP and the Malaria Program, and selected development partners (e.g. PSFI on behalf of the Global Fund, WHO).

The task force would oversee the progress evaluation, which would be funded as a separate activity.

Annex 1:

Terms of Reference

Consultant – Assessment of Current Surveillance, Reporting and Recording Systems for Malaria

Background

Malaria cases and deaths have continuously and significantly decreased, enabling the transition of the country from malaria control to elimination. Currently, out of the 80 provinces, 17 remain in control phase, 14 in the pre-elimination phase, 23 in the elimination phase, while 27 are officially declared malaria-free (includes Metro Manila). To accelerate the transition from control to elimination, the DOH-National Malaria Program (DOH-NMP) has developed the Philippine National Strategic Plan for Control and Elimination of Malaria, containing the strategies and interventions to be implemented in 2014-2020. One of the strategies is the strengthening of the surveillance, reporting and recording systems for malaria. Current systems running include the Philippine Malaria Information System (PhilMIS), the Philippine Integrated Disease Surveillance and Response (PIDSR), the Field Health Services Information System (FHSIS), the Malaria Text Response System (MTRS) and the Events-based Surveillance and Response (ESR). The elimination mode requires the surveillance systems to be robust and comprehensive, with reliable real-time recording and reporting of data, for This enables national, regional, provincial and municipality malaria teams to detect and response to malaria events, to prevent re-introduction and block local transmission, in order to sustain the gain in achieved elimination and malaria-free status. An assessment of the gaps between the existing surveillance and the ideal system in elimination phase is an important precursor to establish elimination-oriented systems. In this regard, the DOH-NMP wishes to engage the services of a consultant to conduct this assessment, identifying the gaps between existing and ideal elimination-oriented surveillance systems, and formulate recommendations and a plan of action to bridge in these gaps.

Purpose

The purposes of the consultancy are:

1) To assess the current capacity of the existing surveillance, reporting and recording systems against the needs of elimination;
2) To recommend strategies and interventions to take to meet the needs of elimination;
3) To develop a plan of action to implement the said recommendations, with activities, cost and timeline;
4) To inform the Technical Working Group of the assessment findings, recommendations and plan of action in preparation for actual implementation;

Eligibility

1) Vast knowledge, skills and experience in design, implementation and upgrading modern surveillance/information systems especially for diseases for elimination;
2) Experience worked within a national malaria program or national health information system is advantage;
3) Experience with in Asia culture is an advantage;
4) Able to facilitate discussions, workshops and planning sessions;
5) Fluent in oral and written English;

Responsibilities/Deliverables

a. Describe the characteristics of each of the surveillance, reporting and recording systems currently used for malaria;

b. Make a comparison of the characteristics of these different systems to identify points where they complement and points where they contrast;
c. Determine the effect of these complementary and contrasting characteristics to the quantity and quality of data produced at the national level;
d. Define how the current data being produced, in its current state, affect what kind of decisions are made at the municipal, provincial, regional and national level, in terms of routine program implementation and non-routine responsive actions;
e. With the complementary and contrasting points as bases for actions, formulate a set of recommendations on how to strengthen, streamline and integrate the existing systems with the element of real-time surveillance and reporting;
f. Visualize and demonstrate how these recommendations can improve the quantity and quality of data produced especially for decision-making purposes;
g. With close consultation with the Malaria Technical Working Group, develop this set of recommendations into a plan of action that would specify what activities should be done, including the estimated cost and the timeline;
h. Disseminate the plan to all the members of the technical working group, including all partners and stakeholders for eventual implementation.

Tasks:

1) The consultant shall hold a consultative meeting and planning workshop to discuss with the technical working group the mechanics of the assessment, including the methods for data collection;
2) The consultant shall work in close collaboration with the National Malaria Program Coordinator and members of the technical working group, in all stages of carrying out the assessment;
3) The consultant shall present the results of the assessment to the Technical Working Group, including the recommendations;
4) The consultant shall work with the TWG to translate the recommendations into a final plan of action;
5) The consultant shall hold a meeting with the TWG, program implementers, partners and stakeholders to disseminate the finding of the assessment, the recommendations and plan of action for eventual implementation;
6) The consultant shall provide the DOH-NMP with print and electronic copies of the final assessment document, which includes the recommendations and plan of action, along with pertinent annexes and references;

Duration of Assignment:

November - December 2015 (one month in-country)

Annex 2: Persons consulted

Dr Mario Baquilod	-	Director, Disease Control and Prevention Bureau
Dr Vito Roque	-	Director, Epidemiology Bureau
Mr Herdie Hizon	-	Epidemiology Bureau
Mr Allan Ignacio	-	Programmer, Epidemiology Bureau
Ms June Cantata Corpuz	-	PIDSR Program Manager, Epidemiology Bureau
Ms Regine Pedron	-	PIDSR Malaria Point Person, Epidemiology Bureau
Mr Rhandy Tolentino	-	FHSIS Coordinator, Epidemiology Bureau
Ms Marissa Ortega	-	FHSIS Coordinator, Epidemiology Bureau
Ms Cherrie Esteban	-	KMITS
Dr Jessie Fantone	-	Regional Epidemiology Surveillance Unit Head, Central Luzon
Ms Gelda CabaGui	-	Nurse, Tarlac Provincial Hospital
Ms Joane Fe Taluyo	-	Nurse, Tarlac Provincial Hospital
Ms Cecille Lopez – Zuazula	-	Nurse, PESU, Tarlac Provincial Health Office
Ms Ma Teresita Lacdac	-	FHSIS Coordinator, Tarlac Provincial Health Office
Ms Marilyn Punsalan	-	Nurse, RHU I Bamban, Tarlac
Ms Fausta Datugan	-	Midwife, RHU II Bamban, Tarlac
Dr Reagan Patriarca	-	Development Mngt Officer IV, Tarlac DOH PHTL Office
Mr Noel Orosco	-	Regional Epidemiology Surveillance Unit Head, MIMAROPA
Dr Mary Ann Navarro	-	Provincial Health Officer, Palawan
Ms Lorna Loor	-	PIDSR Coordinator, Palawan Provincial Health Office
Mr Benny Osorio	-	FHSIS Coordinator, Palawan Provincial Health Office
Ms Aileen Balderian	-	~~Director~~Program Manager, Kilusan Ligtas Malaria, Palawan Provincial Health Office
Mr Allan Gonzales	-	PhilMIS Encoder, Kilusan Ligtas Malaria, Palawan Provincial Health Office
Ms Susan Espina	-	PhilMIS Encoder, Kilusan Ligtas Malaria, Palawan Provincial Health Office
Ms Geraldine Erro	-	Records Clerk, MMG Cooperative Hospital, Palawan
Ms Jolly Ann Mansera	-	Records Clerk, MMG Cooperative Hospital, Palawan
Ms Lovely Rodriguez	-	MMG Cooperative Hospital, Palawan
Ms Lesandra Diploma	-	Nurse II, Ospital ng Palawan
Ms Elisea Tuling	-	Disease Surveillance Point Person, Ospital ng Palawan
Mr Jenifer Alcorano	-	Disease Surveillance Nurse II, Ospital ng Palawan
Ms Anna May Gerner	-	Supervising Nurse, Ospital ng Palawan
Ms Vilma Godoy	-	Southern Palawan Provincial Hospital
Ms Adela Palanca	-	Baptist Hospital, Roxas, Palawan
Ms Andrea Lyn Tangug	-	Malaria Point Person, RHU Narra, Palawan
Ms Edith Longno	-	FHSIS Coordinator, Nurse IV, RHU Narra, Palawan
Ms Camille Arroyo	-	Encoder, RHU Narra, Palawan
Ms Florinda Ruiz	-	Barangay Microscopist, Brgy Urduja, Narra, Palawan
Dr Bonifacio Estarmino	-	Municipal Health Officer, San Vicente Palawan
Ms Dolly Santos	-	Medtech/Disease Surveillance Point Person, RHU San Vicente, Palawan
Ms Agnes Grace Sabuya	-	FHSIS Coordinator, RHU San Vicente, Palawan
Ms Juliet Penon	-	PhilMIS Point Person, RHU San Vicente, Palawan
Dr Josieveline Damalerio	-	Municipal Health Officer, Quezon, Palawan
Ms Shiela Toren	-	Municipal Malaria Point Person, Quezon, Palawan
Ms Ziforah Levaneigh Sotomil	-	PIDSR – PESU Coordinator, Iloilo Provincial Health Office
Mr Hubert Desquitado	-	Disease Surveillance Officer, Iloilo Provincial Health Office
Mr Christopher Lee	-	Disease Surveillance Encoder, Iloilo Provincial Health Office
Dr Patricia Grace Trabado	-	Provincial Health Officer II, Iloilo Province
Ms Ma Elena Mediodia	-	Surveillance Officer, Ramon Tabiana Memorial District Hospital, Cabatuan, Iloilo
Ms Erlisa Emboltorio	-	Encoder, Ramon Tabiana Memorial District Hospital, Cabatuan, Iloilo
Ms Marisyll Moleta	-	Surveillance Officer, RHU San Joaquin, Iloilo
Ms Victoria Villaflor	-	Sanitary Inspector, RHU San Joaquin, Iloilo
Dr Abraham Elgario	-	Municipal Health Officer, RHU San Joaquin, Iloilo
Ms Rosario Palmos	-	PIDSR/Surveillance Coordinator, Rep. Pedro Trono Memorial Hospital
Ms Kate Gellangala	-	Encoder, Rep. Pedro Trono Memorial Hospital
Engr Antonietta Ebol	-	Regional Malaria Coordinator – Davao Region

Ms Josephine Villafuerte	-	City Health Officer, Davao City
Ms Farah Clamon	-	City Epidemiology Surveillance Unit Officer, Davao City
Dr Neil Erasmo	-	Regional Malaria Coordinator – Central Visayan Region
Mr Dan Sabug	-	Provincial Epidemiology Surveillance Unit Officer, Antique
Dr Ric Naciongayo	-	Provincial Health Officer, Antique
Ms Rashel Gozar	-	Barangay Microscopist, Semirara Island, Antique
Dr Annabelle Rebollido	-	Medical Doctor, Semirara Mining Power Corp Hospital
Ms Maria Angelica Sabile	-	Medical Doctor, Bicol Medical Center

Dr Rabi Abeyasinghe	-	WHO – WPRO
Dr Zaixing Zhang	-	Medical Officer – WHO Philippine Country Office
Ms Maria Jeunessa Sto Nino	-	Surveillance, Monitoring and Evaluation Officer, WHO Philippine Country Office
Ms Honeylin Todavia	-	Surveillance, Monitoring and Evaluation Officer, WHO Philippine Country Office
Dr Kevin Palmer	-	WHO Consultant
Mr Wilson Lo	-	M&E, Global Fund
Ms Cecil Hugo	-	ACTMalaria
Dr Pilarita Rivera	-	UP Manila College of Public Health
Ms Marvi Trudeau	-	Program Manager, Pilipinas Shell Foundation, Inc
Dr Antonio Bautista	-	Deputy Program Manager, Pilipinas Shell Foundation, Inc
Mr Ray Angluben	-	Deputy Program Manager, Pilipinas Shell Foundation, Inc
Ms Ynna Doblado	-	M&E Officer, Pilipinas Shell Foundation, Inc
Mr Ike Montederamos	-	Programmer for PhilMIS, Pilipinas Shell Foundation, Inc
Mr Felipe Canlas	-	Wireless Access for Health
Macquel Serrano	-	Supervising Partner for Platform Innovation, Wireless Access for Health

Annex 3: CONSULTATIVE MEETING ON THE ENHANCEMENT OF MALARIA CASE REPORTING, INVESTIGATION AND RESPONSE IN THE PHILIPPINES

Objectives:

At the end of the workshop, the participants are expected to have:

1. gained an understanding of the malaria surveillance and reporting systems being implemented in the country;
2. developed an awareness of the real-time reporting systems used for malaria surveillance being implemented in other countries;
3. reached an initial analysis of the strengths and weaknesses, together with the factors contributing to such, of the current country surveillance and reporting systems for malaria;
4. identified and discussed strategies and or modifications necessary to improve the current malaria surveillance and reporting system in the country.

Program Flow:

Day 1 – Nov 24		
8:00-8:30	Registration	
8:30-9:00	Welcome ,Opening Ceremonies, and Introduction	
9:00-9:30	National Malaria Program status with emphasis on surveillance and reporting	Dr Mario Baquilod
9:30-10:00	Overview of PIDSR and FHSIS	Dr Vito Roque Jr / Ms Marissa Ortega and Ms June Corpuz
10:00 – 10:30	Overview of ESR	Mr. Herdie Hizon
10:30-11:00	Overview of KMITS	Ms Cherie Esteban
11:00-11:30	Overview of PhilMIS and MTRS	Mr Ray Angluben
12:00 – 1:00	LUNCH	
1:00 – 2:00	Break-out session 1 – WHICH SURVEILLANCE SYSTEMS OPERATE IN YOUR LOCALITY OR FACILITY Local level status of implementation of reporting and surveillance systems	
2:00 – 2:30	Plenary	
 2:30 – 3:00 3:00 – 3:30 3:30 – 4:00	Country Presentations with Q&A Malaysia Thailand China	
4:00 – 4:20	Global Trends: Information/Disease Surveillance Systems	Mr Steve Mellor
4:20 - 4:40	1-3-5 reporting system for malaria – a vision	Dr Mario Baquilod
4:40 - 6:00	Break-out Session 2 - DELAYS, BARRIERS AND GAPS IN MALARIA SURVEILLANCE AT DIFFERENT LEVELS OF FACILITY What information is needed? By whom? How soon? Why? How well do these present systems meet the needs and the gaps?	
Day 2 – Nov 25		
8:30 - 9:30	Plenary of Session 2	
9:30 – 11:00	Break-Out Session 3 – ADDRESSING THE DELAYS, BARRIERS	

	AND GAPS YOU HAVE JUST IDENTIFIED How to get there? What is needed to achieve timely reporting, case investigation and response? Do we need to change what we do and how we do it? How? Think in terms of: • Policy (national and local), • Logistics and communications, • Manpower, • Access to guidelines and expert advice, • Others	
11:00 -12:00	Plenary of Session 3	
12:00 - 1:00	Lunch Break	
1:00 - 2:30	Continuation of Plenary Session 3	
2:30 – 3:00	Summing up: Review and re-affirming of expectations	
3:00 – 4:00	What next: Planning and Guidance for the Field Work, follow-up discussions with TWG and development of a plan	