e-Health Bulletin

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Special Edition for ASEAN Dengue Day 2017

THE ASEAN DENGUE DAY: SUSTAINING THE "UNITED FIGHT AGAINST DENGUE"

The ASEAN Dengue Day is an advocacy event held every 15 June to increase public awareness of dengue; to mobilize resources for its prevention and control; and, to demonstrate the commitment of ASEAN in to tackling the disease.

The advocacy event was agreed upon during the 10th ASEAN Health Ministers Meeting in Singapore in 2010. Indonesia hosted the Launching of ASEAN Dengue Day in Jakarta in 2011. The event has been commemorated simultaneously through various activities that have been conducted at regional, national and sub-national levels amongst ASEAN Member States. These activities have been supported by WHO and international and local partners.

As the most rapidly-spreading mosquito-borne viral disease in the world, Dengue is major public health concern in the region. ASEAN is currently experiencing increasing number of dengue infections. Growing population densities, unplanned urban development, poor water storage and unsatisfactory sanitary conditions contribute to the worsening burden of this mosquito-borne disease.

The disease has significant impact on the socio-economic status of the ASEAN Member States (AMS). Dengue cannot be fought by the health sector alone. Tackling dengue is everyone's concern. As such, ASEAN together with WHO and other relevant stakeholders at the regional, national and community levels calls for a "United Fight Against Dengue".

After the regional launching of ASEAN Dengue Day including its core messages and logo in Indonesia in 2011, Myanmar hosted the regional conference and observations of ASEAN Dengue Day in 2012, followed by Viet Nam in 2013, Philippines in 2014, Lao PDR in 2015 and Thailand in 2016. These regional conferences and observations were attended by representatives of ASEAN Member States, ASEAN Secretariat, Development Partners, private sectors, civil society organisations, and community groups or members.

This ASEAN E-Health Bulletin Special Edition on Dengue is published to commemorate the ASEAN Dengue Day 2017. The bulletin provides updates from AMS highlighting the dengue situation, national prevention and control programmes, as well as challenges and future priorities.

Dengue Situation in Brunei Darussalam

Brunei Darussalam lies on the northwest coast of the Island of Borneo, facing the South China Sea. The country has a land area of 5,765 sq km., and a coastline of about 161 km[1]. It is divided into four main districts: Brunei Muara, Tutong, Belait and Temburong, with the largest district being the Belait. The capital of Brunei Darussalam, Bandar Seri Begawan, is located in the smallest district of Brunei Muara, which is inhabited by more than 70% of the total population.

The Ministry of Health (MOH) is responsible for the provision, management, delivery and regulatory functions of health in Brunei Darussalam. The Government of Brunei Darussalam provides free medical and health care to the citizens. The MOH aspires to improve the health and wellbeing of the people of Brunei Darussalam through a high quality and comprehensive health care system which is effective, efficient, responsive, affordable, equitable and accessible to all in the country.

MOH equally places high priority on public health aspects to ensure that the people of Brunei Darussalam continue to enjoy a high standard of living. As a result of its monitoring and surveillance activities and various preventive programs, such as vector borne diseases surveillance, the country has a low burden of major communicable diseases.

The Communicable Disease Surveillance System is well established based on disease notifications received from medical practitioners as well as laboratories. It is supported by the provision of the Infectious Disease Act Cap 204 which has a list of 59 communicable diseases gazetted for mandatory notification. All health care providers from public and private healthcare settings, including laboratories, are required to notify all gazette diseases, including vector-borne diseases such as Dengue, to respective District Health Offices and Disease Control Division (DCD). Notifications are received through electronic system, *Bru-HIMS* (Brunei Darussalam Healthcare Information and Management System), fax and dispatch-paper based notifications.

DCD under Public Health Services is the central level notification center for disease surveillance including data collection, analysis, and communicable disease case investigations including contact tracing. DCD ensures timeliness, complete reporting and information collection and also promoting awareness of occurrence of infectious diseases locally and internationally.

Disease prevention and control efforts for vector borne diseases is mainly implemented in coordination and collaboration with Environmental Health Division and Environmental Health Units in respective District Health Offices. Vector control activities and entomological surveillance are conducted particularly for vector-borne disease cases and in hotspots where previous cases such as Dengue have been reported.

Public Health Services follow the principles underlying 'Integrated Vector Management' in the prevention and control of Dengue, amongst which includes collaboration with other stakeholders and involvement of the community. This is in line with one of the strategic priorities of the MOH: "Health is Everyone's Business", whereby the community and other relevant stakeholders play an important role in the fight against Dengue. A multisectoral approach, including participation and empowerment of the community through grassroots leaders, has been vital in ensuring private and public areas are kept in a clean state and in reducing breeding sites for mosquito vectors.

Entomological surveillance is also routinely carried out in villages, housing and business premises throughout the country to determine vector behavior, mosquito densities and its identification. For areas identified as hotspots, other than provision of advice and health education, pesticide application such as fogging and larviciding are carried out. These pesticides are periodically tested to ensure that the mosquito vectors are susceptible and effective. *Aedes Albopictus* has been identified as the most common vector relevant to Dengue, and secondly *Aedes Aegypti* in certain areas identified through entomological surveillance throughout the country.

Brunei Darussalam is also involved in regional surveillance of Dengue and other vector borne diseases in sharing information on imported cases of vector borne diseases especially Dengue Fever and Dengue Hemorrhagic Fever through International Health Regulation (IHR) National Focal points, World Health Organization and UNited In Tackling Epidemic Dengue (UNITEDengue).

1 Brunei Darussalam in brief. Department of Information, Prime Minister's Office, Brunei Darussalam. 2013.

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Figure 1: Monthly Number of Dengue Cases (2016-2017)

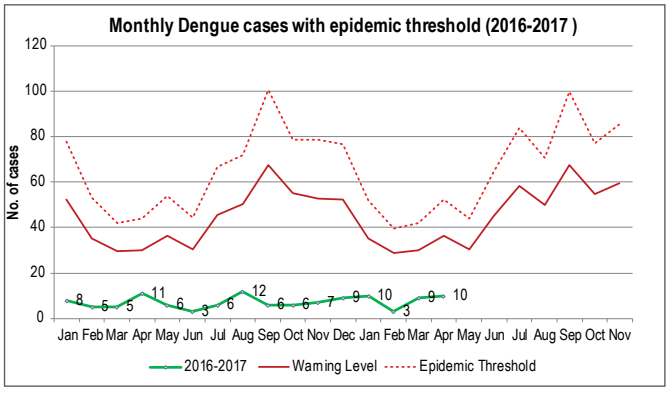
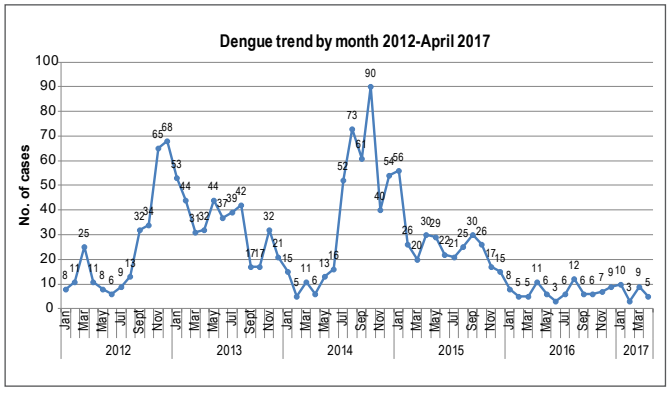


Figure 2: Trend of Dengue Cases (2012-2017)



Trend of Dengue cases (2012-2017)

In Brunei Darussalam, the number of Dengue cases varies over the last few years with the highest number of Dengue cases recorded in 2014 at 436 cases. The lowest number of Dengue cases from 2012-2016 was recorded in 2016 at 84 cases. For the year 2017 until end of April, the number of Dengue cases remained low and below the epidemic threshold as shown in Figure 1 (please see page 2).

Figure 1: Cumulative Incidence of Dengue Cases by District in Cambodia

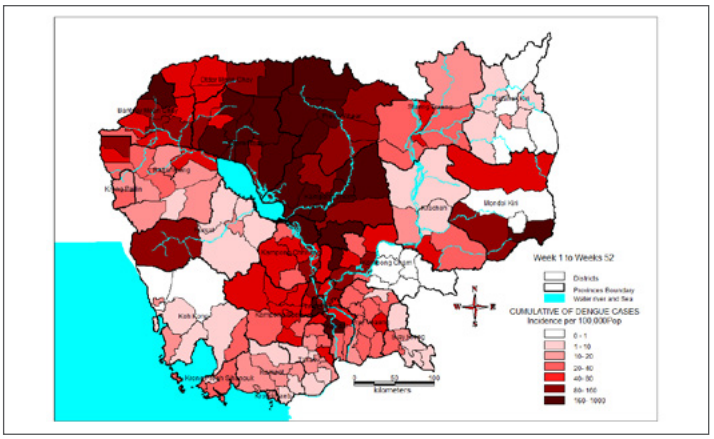


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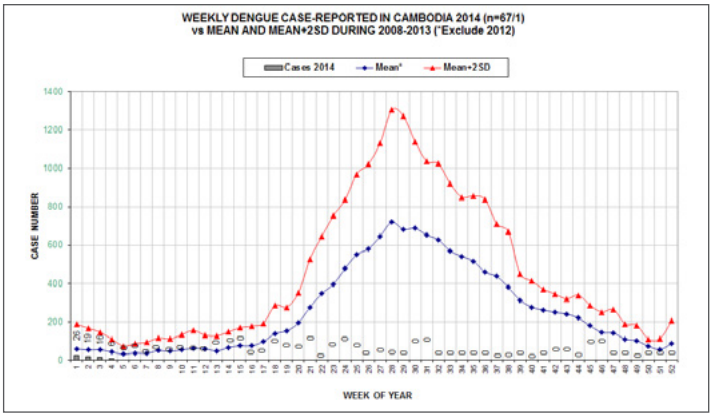
Figure 2: Forecasting: Dengue Situation in Cambodia, 2015 (IR: <312.4 and CFR: <0.5%)



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Note: The cyclical epidemic of dengue in Cambodia in every 3-5 years interval meantime is 2015-2017 respectively. Here is only the example trend.

Dengue Infections in Cambodia

Background

Disease incidence data are needed to guide decision-making for public health interventions. Although dengue is a reportable disease in Cambodia, the true disease burden is unknown due to under-reporting. We utilized dengue incidence calculated from laboratory-confirmed outpatient and inpatient cases from national and provincial health facilities to estimate the magnitude of dengue under recognised, and to establish more accurate disease burden estimates for these countries.

Our analyses of data from prospectively followed cohorts with laboratory confirmation of dengue cases show that, in Cambodia, dengue incidence is under recognized by more than eight-fold. The magnitude of the outpatient burden caused by dengue is not assessed or reflected by the national surveillance data. We estimate that a median of more than 340,000 symptomatic dengue virus infections occurred annually in children less than 15 years of age in Cambodia between 2003 and 2007.

During 2015-2016, nearly 28,256 dengue fever cases reported, of those, in all of 2015, total 15,413 cases of dengue, including 38 deaths, reported from 25 provinces, and, nearly 12,843 dengue fever cases were reported from 25 provinces of Cambodia in 2016, of which 18 were reported dead, according to the National Dengue Control Program (NDCP), Ministry of Health of Cambodia.

The dengue situation in Cambodia can be summarised as:

- Dengue situation showed steeply increasing pattern, may be relating with:
  - A high accuracy of the surveillance system
  - An improvement of public health facility
  - A community KAP positive effect
  - Other contribution factors (climate, social, biological, etc)
- Dengue spread from locations with high dengue incidence in the previous year to the adjacent locations.
- Lower IR in 2014 but a bit higher of edge including Dengue virus serotypes (DNV) were potentially changing from DNV-1 to DNV-4 ➔ potential epidemic in 2015 – 2017 respectively.

Objectives of the NDCP

The NDCP of Cambodia, and the dengue surveillance system, was established to:

- Provide strategies for public health actions
- Monitor dengue trends and virus circulation over time
- Generate data to estimate the burden of the disease
- Detect and predict outbreaks
- Monitor trends of endemic dengue
- Educate communities to reduce mosquito breeding sites

In Cambodia, the case definitions for reporting of DF and DHF are adapted from the WHO clinical case definition, but only hospitalized cases and cases <15 years of age are reported. The case definitions are based only on clinical and hematological criteria (according to

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WHO guideline these are "suspected" dengue cases) and do not completed from laboratory confirmation. For DF, the presence of fever with 2 or more of the following signs is required: Red face or conjunctival injection, headache, retro-orbital pain, painful muscles or joints, rash, and hemorrhagic signs. Leucopenia may be present. For DHF, besides the above listed DF-signs and hepatomegaly or abdominal pain the following hematological findings are required: Increase in hematocrit ≥20% and drop in platelets below 100,000/mm.

Figure 4

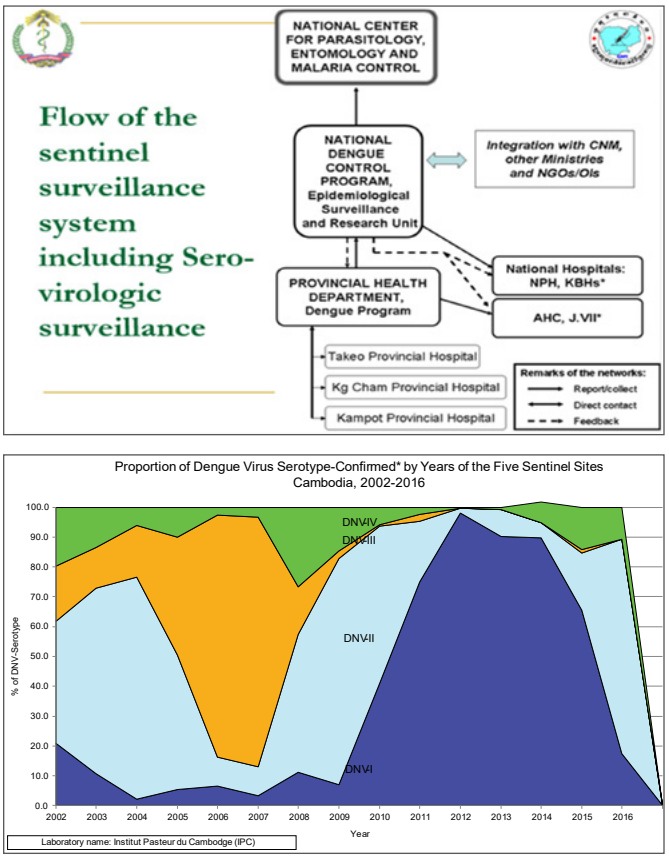

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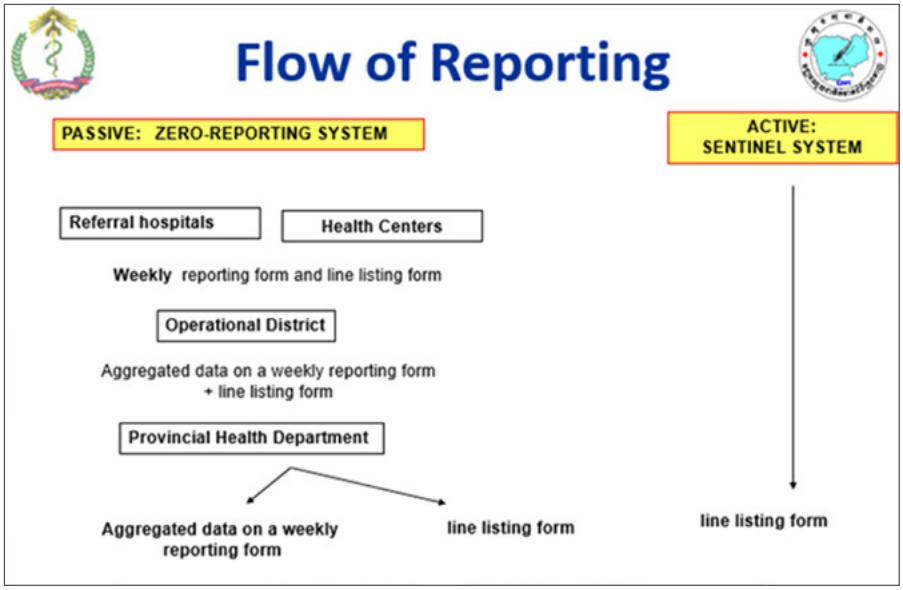
Figure 3



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Data collection and analysis

Surveillance data are collected and analysed through the following:

- Passive surveillance (aggregating forms) - since 1980, reporting from all public health facilities
- Active (Sentinel) surveillance (line-listing forms) - since mid - 2001, through three foundation pediatric hospitals, AHC and KBH (in PP & SRp) and four public pediatric hospitals: 1 in Phnom Penh (NPH) and 3 in provinces (Takeo, Kg Cham, Kampot)
- Sero-Virologic surveillance - since 2000, through five hospitals: NPH, AHC, Kg Cham RH, Takeo RH and Battambang RH, and Performed by Institute Pasteur - Cambodia (IPC).

See Figure 3 for the flow reporting.

In Cambodia, the sentinel surveillance system for dengue is aimed to:

- Acquire high **quality** surveillance data from a relatively small number of facilities in order to monitor dengue trends in Cambodia
- **Rapidly** detect large-scale epidemics

See Figure 4 for details of the sentinel surveillance system, including sero-virologic surveillance.

The system allows classification between DF, DHF, or DSS through the use of discharge data. Only hospitalized cases are monitored, data from health centers are excluded.

For virologic surveillance, sentinel hospitals collect blood samples to 5-10% of the total suspected cares and send these specimens to Pasteur Institute (IPC).

- Data analysis regularly conducted on a weekly basis at NDCP
- Types of output generated according to the objectives of NDCP and the surveillance system
- Analyses performed using Epi-info and Excel software and MapInfo/GIS-Arcview 3.3
- Individual data from the sentinel hospitals are compiled weekly so that routine analyses can be done in a timely manner

1 House 1 Jumantik Movement a Call for Action

Introduction

Dengue infection is the most common mosquito-borne viral disease of humans that in recent years has become a major international public health concern. Globally, 2.5 billion people live in areas where dengue viruses can be transmitted. The geographical spread of both the mosquito vectors and the viruses has led to the global resurgence of epidemic dengue fever and emergence of dengue hemorrhagic fever (dengue/DHF) in the past 25 years with the development of hyperendemicity in many urban centers of the tropics. Transmitted by the main vector, *Aedes aegytpi* mosquito, there are four serotypes of virus that cause dengue. Recovery from infection by one provides lifelong immunity against that serotype but confers only partial and transient protection against subsequent infection by the other three. There is a good evidence that sequential infection increases the risk of a more serious disease resulting in DHF.

National Dengue Control Programme in Indonesia is currently implementing WHO Global Strategy 2012-2020 that promotes coordination and collaboration among multisectoral partners, an integrated vector management approach and sustained control measures at all levels. Dengue is an ecological disease therefore coordination and collaboration by all sectors within the government, communities, civil societies, private sectors, and media need to be strengthened. All sectors should harmonize the prevention, surveillance (entomological and epidemiological) and case management with the existing health systems, in order to make the program sustainable, cost-effective and ecologically sound. The goal of this Global Strategy is to reduce the burden of dengue. Its specific objectives are: 1) to reduce dengue mortality by at least 50% by 2020, 2) to reduce dengue morbidity by at least 25% by 2020, 3) to estimate true burden of the disease by 2015 (the year 2010 is used as the baseline). The implementing strategy is expected to pave the way for reducing dengue morbidity and mortality nationwide through strengthening local and national capabilities, as well as regional coordination.

Dengue hemorrhagic fever in Indonesia firstly reported in 1968 from two big cities: Jakarta and Surabaya. The number of reported cases was 58 cases with 41% of them reportedly died. Since then, the reported cases and the number of infected districts/area are increasing.

Although National Dengue Prevention and Control Program has been established and implemented, both the incidence and case fatality rate are still high. There are still two challenges that need to be handled, namely how to increase people awareness against dengue and how to involve people directly to conduct vector control in their houses.

Preventing or reducing dengue virus transmission depends entirely on vectors control (*aedes sp*) or interrupt the human–vector contact. Activities to control transmission should target *Ae. aegypti* (the main vector) in the habitats of its immature and adult stages. *Ae. aegypti* proliferates in many purposely-filled household containers such as those used for domestic water storage and for decorative plants, as well as in a multiplicity of rain-filled habitats – including used tires, discarded food and beverage containers, blocked gutters and buildings under construction.

1 House 1 Jumantik Movement

Since there are no vaccine and drugs to treat this disease, the most effective way is to prevent dengue infection by cutting the life cycle of vector. The main activity is to undertake the source reduction of mosquito habitats, both inside and outside house. There are three activities, well known as 3M Plus in Indonesia to cut the life cycle of mosquito, namely:

1. ***Menguras***: Cleaning and brushing water container/water storage once a week.
2. ***Menutup***: Covering all domestic water storage
3. ***Mendaur ulang***: Reusing or recycling garbage such as: discarded food and beverage containers, used tires, plastic, bottle, can, etc.

Plus means every effort to avoid human-vector contact such as using repellent, mosquito net for kid when napping, using larva predator (fish) in water container and using mosquito repellent plants like lavender, etc.

All activites above need active participation from the community. In the celebration of 2015 ASEAN Dengue Day, Ministry of Health launched a movement named 1 House 1 Jumantik as the most effective way to prevent dengue virus transmission. ***Jumantik*** stands for ***Juru Pemantau Jentik*** (someone who responsible for monitoring larvae mosquito). This activity is based on a family approach, meaning that every household encourages to have 1 Jumantik in that house called *Jumantik rumah*. For public places such as market, airport, seaport, mosque, church, etc the Jumantik is called as *Jumantik Lingkungan*.

Pic. 1. Declaration of 1 House 1 Jumantik in ASEAN Dengue Day 2015

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1. ***Jumantik Rumah:***

   Jumantik rumah is one of the family members living in one house who is assigned to do monitoring larva once a week. They can be mother, father or other family members. The task and role of *Jumantik Rumah* are as follows:

   1). Campaigning for PSN 3M to all family member as the most effective way to prevent dengue
   2). Collaborating with all family members to do PSN 3M Plus once a week indoor and outdoors.
   3). Checking possible breeding sites and water container inside and

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outside house from existing larva mosquito

4). Recording the result of monitoring in Jumantik card every week.

2. *Jumantik Lingkungan*

Jumantik Lingkungan is one or more persons assigned to monitor larva in public and working places. The task and role of Jumantik Lingkungan are as follows:

1). Checking the mosquito breeding sites and implement PSN 3M Plus in working places and public places.

2). Recording the result of larvae inspection on Jumantik card once a week

3. *Jumantik Coordinator*

Jumantik Coordinator is one person assigned in neighbourhood association, the lowest level administrative unit in community. One Jumantik coordinator responsible for 10 Jumantik Rumah. Task and role Jumantik Coordinator as follows:

1). Campaigning for PSN 3M Plus to community individually or in a group.

2). Mobilizing the community to implement PSN 3M Plus in their neighborhood.

3). Organizing a plan / schedule of visits to all buildings both house and public / working places at least once in 2 weeks.

4). Conducting visits and coaching to houses / residences, public and working places every 2 weeks.

5). Monitoring larvae inside and outside houses and buildings

6). Collecting data / recapitulation of monitoring results of larvae house, public and working places once a month.

7). Reporting the results of larva monitor to Jumantik Supervisor once a month.

4. *Jumantik Supervisor*

Jumantik Supervisor is one person designed in hamlet / village or urban village level. Task and role Jumantik Coordinator as follows:

1). Checking and supervising the work plan of the Jumantik Coordinator.

2). Providing technical guidance to Jumantik Coordinator.

3). Calculating Free larvae index in its working area

4). Undertaking local area monitoring (PWS) and mapping per RW / area every month with Jumantik Coordinator.

5). Reporting the results of Jumantik and PWS activities to the local puskesmas.

6). Conducting coaching and upgrading of skills / training of PSN 3M Plus activities to Jumantik Coordinator.

7). Counting free larvae index

8). Reporting Free Larvae Index to primary health care center every month.

The structure of 1 House 1 Jumantik organization can be seen as picture below:

Pic. 2. Home Visit by Jumantik Coordinator

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Pic. 3. The Structure of 1 House 1 Jumantik Organization

© Ministry of Health, Indonesia

Implementation of 1 House 1 Jumantik Action

After the declaration of 1 house 1 Jumantik as a national movement, Ministry of Health started to socialize and implement this project to some districts. The implementation is not only in residential area but also in working area of health port office in airport and seaport. Working area health port office divided into perimeter area and buffer area. Perimeter area means the center of port activities (inside the port), the location of warehouses, the loading and unloading of goods, the government and private offices, and buffer area is outside of port radius of 400 m from the perimeter limit.

This movement strongly need the participation from linked sector and community and considered successful if free larvae index reached 95% or more in residential area and in port area reached 100% (perimeter area) and 99% in buffer area.

Dengue Newsletter for Lao PDR

Dengue is one of the fastest growing emerging infectious diseases in the world and Asia and the Pacific bears 75 per cent of the global burden. The Association of Southeast Asian Nations (ASEAN) has called for collective efforts at the 10th ASEAN Health Minister Meeting in 2010 and since then, ASEAN Dengue Day is observed every 15th of June annually by all ASEAN Member States.

In Lao PDR, dengue is one of the 17 notifiable diseases reported under the National Surveillance System. Dengue is being discussed in the monthly high-level government meeting and weekly at the Emergency Operation Centre (EOC), the command and control centre of the Ministry of Health where key decisions are taken.

The ownership by the Ministry of Health in organizing dengue preparedness activity can be seen with the involvement of provincial and district governors, local authorities, mass organization and key partners, including the ASEAN-UNITEDengue, World Health Organization (WHO), Asian Development Bank (ADB), US Centre for Disease Control (US CDC), Microbiology Laboratory in Mahosot Hospital with the Lao Oxford Wellcome Trust Research Unit, and Institut Pasteur du Laos (IPL). These partners have provided both monetary and technical support, for larvae surveys, vector control, community mobilization, reagent and kit supplies and laboratory confirmation.

The Department of Disease Control (DCDC), National Center for Laboratory and Epidemiology (NCLE) and Center for Malaria Parasitology and Entomology under the Ministry of Health coordinate the dengue prevention and control activities in the country. NCLE has been closely monitoring the dengue situation through Lao Early Warning System (LaoEWARN) and weekly surveillance report are being submitted to the central level for decision making.

The laboratory based dengue surveillance allows monitoring of dengue trends and circulating dengue serotypes; detect irregularities so that epidemics will be detected rapidly and early intervention can be introduced. However, laboratory testing for confirmation of dengue can only be done at the central level. It will be good to strengthen testing capacity at the provincial level.

This information enables the EOC to recommend preparedness activities in provinces which shows increase in dengue activity. Case in point - in January this year, some provinces had dengue at epidemic level and immediate actions were taken on larvae surveys to be conducted in nine (9) districts as a pilot project and community clean-up vector control activities were organized in these provinces.

The Ministry of Health officials were concerned of a possible repeat of 2013 dengue outbreak and the Health Minister had issued an order at the beginning of the year to enhance dengue control in all provinces. There were collaborations with the Ministry of Education and Sport and a signing of a Memorandum of Understanding was done to ensure that school compounds remain dengue-free during school breaks.

The regular updates and reports were shared with provincial governors and stakeholders, and strategies were developed ahead of the rainy season in case of an increase in vector activity. Also, health officials were sent to coordinate with affected provinces to increase surveillance, risk communication and implement community clean-up activities. To date, the cumulative number of suspected Dengue from January 2017 is 847 cases (Week 18). Dengue 4 (66.0%) is mostly detected, followed by Dengue 1 (27.0%), Dengue 2 (6.0%) and Dengue 3 (1.0%) as of 30 April 2017.

Climate change is one of the major challenges affecting dengue control activities but the Ministry of Health will continue to take proactive steps to implement dengue prevention and control activities. With this, communities are being informed regularly by the media to participate in clean-up activities.

The Vientiane Capital Health Department will mark the ASEAN Dengue Day this year by distributing 3 million guppy fishes to communities. Students are asked to participate in film making competition using their mobile phones to record prevention messages. During the school holidays, these students will be mobilized to clean up their school compounds regularly and participate in poster design competition to share dengue messages within their communities.

Lao PDR is fully committed as a member of ASEAN to work towards dengue control and the Government and Ministry of Health have an instrument in engaging the community. This year's ASEAN Dengue Day will be marked on the 15th June and stakeholders are expected to support this activity by advocating and mobilizing them.

Dengue Control Program in Malaysia

Dengue Epidemiology in Malaysia

Dengue fever has remained as one of the major public health problem in Malaysia. In the year 2016, a total of 101,357 confirmed dengue fever cases and 237 dengue deaths were reported. This was however, a reduction of 16.1% in cases and 29.5% in deaths compared to the year 2015 (Figure 1). In 2016, dengue cases had the incidence of 328 cases per 100,000 populations, while the Case Fatality Rate (CFR) in the year 2016 was 0.23%, a slight reduction compared to the previous year which was reported as 0.28% (Figure 2).

Looking at age distribution and dengue cases as well as deaths, it is apparent that dengue occurrence is higher in the reproductive age groups. Meanwhile, CFR by age group was notably high with 0.72% in the 60 years old and above (Figure 3).

Malaysia has all four serotypes of dengue virus present in the population. In the year 2016, several serotype shift occurred, with DEN 1 more prominent in the early of the year and then shifted to DEN 3 at the end of the year (Figure 4).

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Integrated Management

Focusing on environmental cleanliness is the way forward and long term solution to overcome the dengue burden in Malaysia. Therefore, in the effort to empowerment of the people and, community participation and social mobilization in dengue prevention and control will be strengthen through the implementation of COMBI project especially in the hotspot areas will be the main focus of the dengue prevention and control program. As of December 2016, there are 3,082 COMBI projects with 63,000 volunteers all over the country. Besides that, other local agencies as well as neighbourhood groups also assist in mass clean up activities in the community. Ministry of Health of Malaysia also celebrates ASEAN Dengue Day every year in order to promote dengue awareness and to gain community participation.

In further efforts to reduce the dengue burden in Malaysia, from July 2014, following the national level meeting chaired by the Deputy Prime Minister, a National Dengue Task Force was established to overcome issues regarding dengue including solid waste management, environmental cleanliness and architecture design that play a role in being potential Aedes breeding sites that are beyond the Ministry of Health authority.

This task force consists of seven Ministries which include the Ministry of Health, Ministry of Housing and Local Government, Ministry of Human Resource, Ministry of Education, Ministry of Internal Affairs, Ministry of Defence and Ministry of Works. The concept of Integrated Management is applied together in collaboration with the multiple Ministries and agencies in implementing dengue prevention and control activities. This includes utilizing each Ministry resources and financial allocations. The sustainability of this task force is very crucial and has been proven till today. Initiated with weekly task force committee meeting from July 2014 until 2015 and later to two weekly meeting chaired by the Director General of Health. After two years of sustained implementation of Integrated Management, a significant impact has been evident with the nationwide reduction of dengue cases.

Through this task force the dengue prevention activities such as source reduction has been included in the school's curriculum. Besides that, Guidelines for Dengue Prevention Education and Management in School, Guidelines for Aedes Free Building Structures and Guidelines for Dengue Prevention in Construction Sites were developed through this task force. Ministry of Communications and Multimedia provides free periodical media slots in radio & TV as well as conducting dengue prevention campaigns to increase community awareness.

Dengue Virus Surveillance System (DVSS) in Malaysia

The Dengue Virus Surveillance System (DVSS) is an important strategy in the National Dengue Strategic Plan (NDSP)

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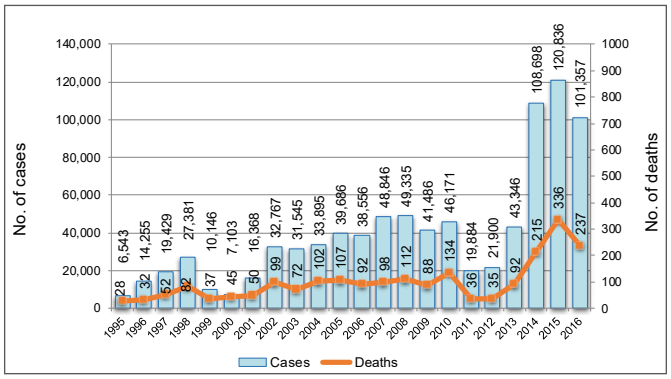
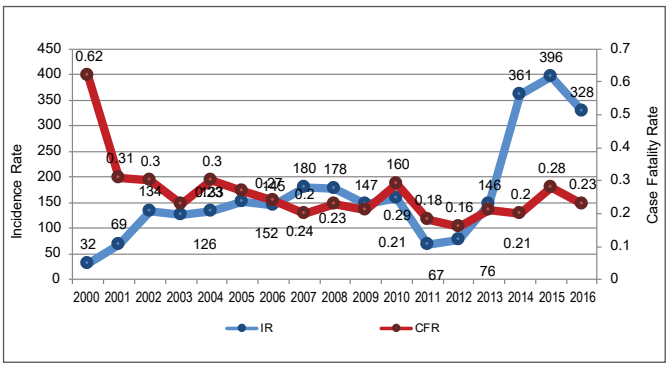
Figure 1: Reported Dengue Cases and Deaths in Malaysia (1995-2016)



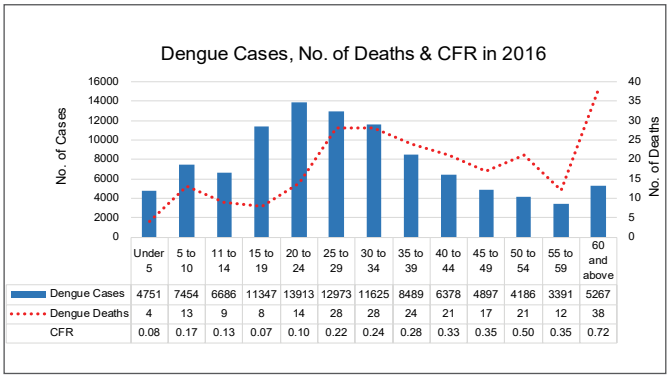
Source: Disease Control Division, MOH

Figure 2: Incidence Rate and Case Fatality Rate of All Reported Dengue Cases in Malaysia, 2000-2016



Source: Disease Control Division, MOH

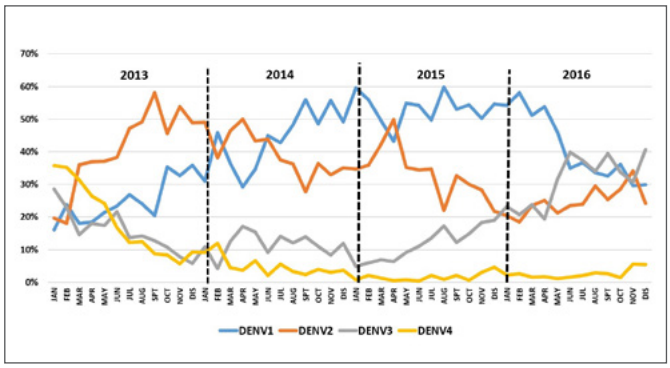
Figure 3: Dengue Cases, Number of Death and Case Fatality Rate (CFR) by Age Groups in Malaysia, in 2016



	Under 5	5 to 10	11 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 and above
Dengue Cases	4751	7454	6686	11347	13913	12973	11625	8489	6378	4897	4186	3391	5267
Dengue Deaths	4	13	9	8	14	28	28	24	21	17	21	12	38
CFR	0.08	0.17	0.13	0.07	0.10	0.22	0.24	0.28	0.33	0.35	0.50	0.35	0.72

Source: Disease Control Division, MOH

Figure 4: Dengue Serotype Year 2013, 2014, 2015 and 2016



Source: Disease Control Division, MOH

since its inception in 2009 and is coordinated and monitored by the National Public Health Laboratory (NPHL). The objectives of DVSS are to monitor the circulating dengue serotypes / genotypes, associate the findings with clinical diagnosis, detecting impending outbreak and if possible to predict epidemics. It started with five sentinel sites and by the year 2012 the virus surveillance system has expanded to all 14 states with a total of 48 sentinel sites. Samples are collected on a weekly basis and sent to NPHL and four other regional Public Health Laboratories (PHL) for testing.

The circulating virus is being monitored via a web-based system as a common regional database. This database includes information on serotypes and genotypes of the virus. In order to generate comparable data across the country, NPHL has developed a standard protocol for serotyping and genotyping for all PHL. Apart from that, intensive technical training together with consultations are provided to enhance the laboratory capability in respective PHL. Equipments, reagents and materials such as positive control and primers are also supplied to sustain the surveillance system.

Achievements of DVSS

Based on DVSS data in 2015 and 2016, a total of 12,870 sera were tested with RT-PCR to determine the DENV serotypes and 10,673 were positive (82.9%). Of them, 1,748 samples were successfully sequenced and analyzed for E gene using the same laboratory protocols by UNITEDengue (Table 1). In sequence to achieve UNITEDengue's aim, our data which comprises of cases and virus information is deposited into the UNITEDengue web-portal on a monthly basis. Aggregated data will be manipulated to determine the disease trend and dominant virus strain to be shared with fellow ASEAN Member States (AMS) for further understanding of dengue transmission and mutual warning of impending outbreaks in the region.

Table 1: Samples Sequenced and Analyzed for E Gene Using the Same Laboratory Protocols by UNITEDengue

Year	No. of Cases tested for PCR	No. of cases serotyped	Serotype composition				No. of cases genotyped
			DENV1	DENV2	DENV3	DENV4	
2015	6,258	5,101	2,741	1,631	643	86	595
2016	6,612	5,572	2,255	1,402	1,767	148	1,153
Total	12,870	10,673	4,996	3,033	2,410	234	1,748

There are many ongoing efforts in virus characterisation since 2012. With the help from Canada Global Partnership Programme (GPP) support funding in April 2015, laboratory capabilities in virus characterization were enhanced specifically in sequencing and phylogenetic analysis of viral genes to determine their genotypes. The genotyping works have progressed well in the past two years with increased number of samples sequenced by 93.7%, which were 595 and 1,153 samples in 2015 and 2016 respectively. Genotype surveillance revealed that there were 3 main strains – DENV-1 genotype Ic, DENV-2 Clade Ib and DENV-3 genotype I that were responsible for the dengue transmission in those years.

UNITEDengue is an excellent platform which offers opportunities to all AMS especially in strengthening laboratory capacities. Malaysia was honoured by ASEAN GPP Project to facilitate the technical training during workshop in Lao PDR in March 2016. It was a great opportunity to share our knowledge and skill with all ten AMS. During the emergence of Zika virus, a teleconference was conducted and we have shared our information and experience to all AMS especially on the technical aspect. Besides that, the meetings conducted in end of 2016 was a pathway in sharing the current protocols and testing algorithm for dengue as well as the newly established flavivirus surveillance.

Progress and Challenges

All regional PHL have been on the positive track by showcasing a significant progress in terms of setting up their sentinel surveillance system and streamlining virus typing (serotype/genotype) protocols. However, the level of technical capacity and competency among PHL varies. Noticeably we are also lacking in technical expertise in bioinformatics as well as the capacity to analyse data to predict outbreaks.

Even with the positive progress shown, a limited public health funding is still the biggest challenge to sustain the local DVSS to conduct virus typing/characterization on a routine basis especially after the ASEAN-GPP fund ends in September 2017. Other than that, extra cost will incur to provide EQA materials to regional PHL to strengthen their competency.

Technology has advanced rapidly and molecular method has been the major role player to date due to limitations in serological diagnostic method. Serological method has been used as a common test in detection of dengue infection worldwide. However, Malaysia being a dengue endemic country implies a disadvantage in utilizing this method for other flaviviruses (e.g. Zika) in terms of cross reactivity.

Despite close monitoring by NPHL, few sentinel sites have not been sending samples on weekly basis. Therefore, sentinel site need to be reviewed from time to time according to their performance. This is to ensure that the data collected are regionally representative and will contribute to future improvements in the epidemiological knowledge in Malaysia.

The Way Forward

In December 2016, Malaysia has considered Zika as a new starting point to expand and enhance the existing DVSS beyond dengue with Flavivirus surveillance. Funds are needed to support this nationwide surveillance acitivity. A series of training that are needed have been identified, namely in bioinformatics and data analysis to predict an outbreak in a timely manner. Besides that, in order to build and access the competency, NPHL will provide EQA materials on dengue-like illness (e.g dengue, chikungunya and zika) to all PHLs.

Dengue Control Programme in Myanmar: Challenges and Way Forward

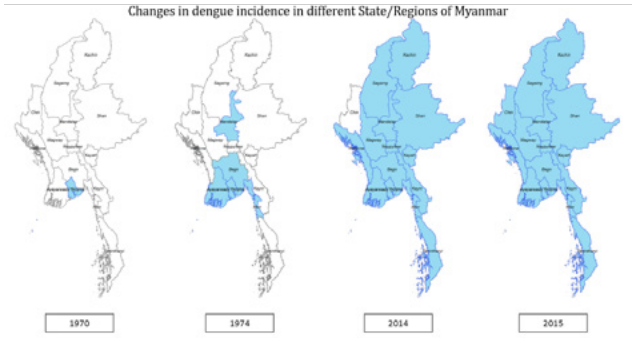
The population of Myanmar is 51,486,253 according to Census 2014. There are 1 Nay Pyi Taw Union Territory and 14 States and Regions. In these 15 sub-national areas, there are also 330 townships which are key functional units to deliver both public health and medical care services.

Dengue is classified as notifiable disease since 1964 in Myanmar. In 1970, first dengue outbreak occurred in Yangon. It resulted in 1,654 cases and 91 deaths. Then, it spread to other States and Regions (Figure 1). In 2015, all States and Regions have reported dengue cases. The highest number of cases (42,913) was reported in 2015 and highest number of death (444) was reported in 1994. In 2016, the dengue cases and deaths were 10,770 and 58, respectively. The dengue cases and deaths declined by 75% and 59%, respectively in 2016 compared to 2015. In 2017 (January to 4 April 2017) there are 663 cases and 2 deaths.

Generally, dengue cases increase during rainy season and are usually at the highest peak in July (week 27-29) (Figure 2, top). Previously, there were no reported cases before March and after September, but nowadays dengue case is recorded throughout the year. Children under 15 years old are mostly affected from dengue, especially those in 5-9 years age group (figure 2, bottom). Infants under six months were also affected. Adult dengue cases were reported from public and private hospitals, but it is noted that adult dengue cases are under-reported. Both males and females are equally affected from dengue.

Aedes (Stegomyia) aegypti (Ae. aegypti) and *Aedes (Stegomyia) albopictus (Ae. albopictus)* are the two most important vectors of dengue. *Aedes albopictus* has been recognized as a secondary vector that is also important for the maintenance of the viruses. In Myanmar, all four serotypes of dengue virus in circulating and the serotypes changes are being noticed in the country. Also, mixed serotypes are found. This is important in clinical and public health because secondary infection with another serotype or multiple infections with different serotypes lead to severe forms of dengue such as dengue hemorrhagic fever and dengue shock syndrome.

Figure 1: Dengue Case Mapping



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Obviously dengue endemicity has increased year by year up from 1970 to 2015 (1,654 in 1970 to 42,913 in 2015). Fortunately, CFR dramatically decreased from 5.50% in 1970 to 0.33% in 2015.

Just like the other dengue prevention and control programmes of ASEAN Member States, there are significant challenges to actualize dengue prevention and control activities in Myanmar. The most important challenge is limited engagement of the communities in both urban and rural settings. There are geographically hard to reach areas such as remote villages and politically hard to reach areas such as non-governmental control areas. In addition, the hard-to-reach areas do not necessarily mean for remote villages only, but it also means those areas which are tightly locked urban sky-rocketing buildings. Currently, the dengue surveillance only captures Dengue Hemorrhagic Fever (DHF) admitted in the hospitals. Actual number of Dengue cases is undermined as the programme does not capture the majority of outpatient cases.

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Figure 2: Top: Seasonal Outbreak of Dengue; Bottom: Age Distribution of Dengue Cases

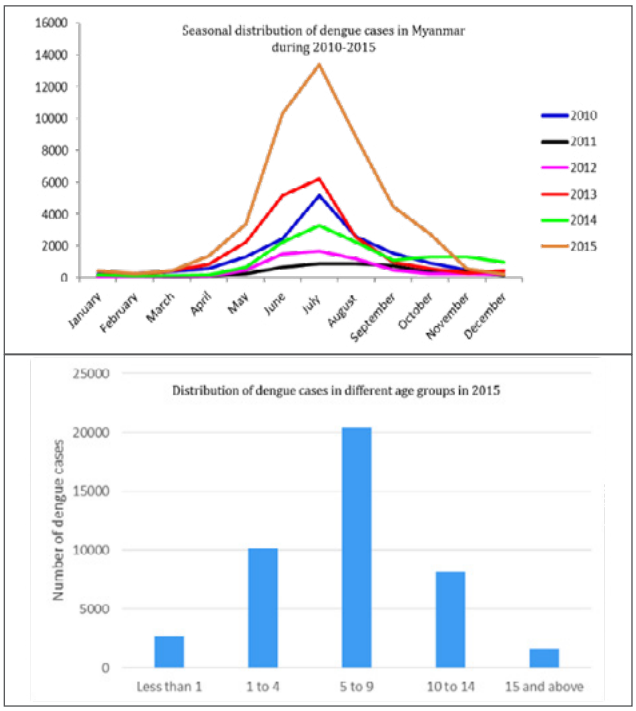

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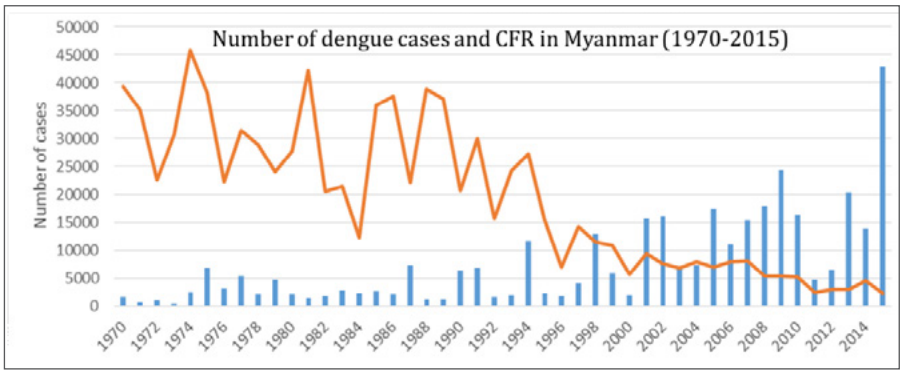
Figure 3: Trends of Dengue Cases and CFR in Myanmar (1970-2015)



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As a developing country, Myanmar encounters widespread water storage practices and poor waste disposal management. These situations lead to effective vector breeding. Now, Ministry of Health and Sports has developed new communicable disease law and by-laws which is yet to be submitted to the Parliament. One of the articles in by-laws will address law enforcement for dengue prevention and control. However, implementation of law enforcement for dengue prevention and control could be another challenge in addition to community involvement. As a neglected tropical disease (NTD), dengue is itself NEGLECTED as there is limited domestic funding and also there are limited national and international donor funds.

Currently, National Dengue Prevention and Control Program plans to strengthen laboratory-based dengue surveillance system in collaboration with UNITEDengue Project by making major adjustments in all aspects viz. system, infrastructure and laboratory. Software-based dengue surveillance system, operational costs for surveillance as well as transportation for blood samples from sentinel sites to National Health Laboratory, consumable reagents-RDTs, PCR primers for serotyping and training for genotyping are needed.

Although there is gap, there is a strong programme commitment. The programme has also drafted the National Strategic Plan (2016-2020) to achieve the following national objectives aligned with the Global Strategy for Dengue Prevention and Control (2012-2020):

(1). To reduce dengue morbidity by at least 25% by 2020 and 50% by 2025 in comparison to 2015 baseline (42,913 cases in 2015);

(2). To reduce dengue mortality by at least 50% by 2020 and 90% by 2025 in comparison to 2015 baseline (140 deaths in 2015) and

(3). To maintain Case Fatality Rate (CFR) <1%.

Strengthening Laboratory Capacity, Contributing to Effective Prevention and Control Strategies for Dengue in the Philippines

Background

Dengue fever / Dengue hemorrhagic fever has emerged as a major public health problem in the past 20 years, with an increasing incidence and expanding geographical distribution in both the vector and the disease (Gubler, 2002). In the Philippines, Dengue continues to be a significant burden on health services, with an estimated 200,000 suspected cases reported annually (Figure 1 in page 12).

As with any disease control program, the laboratory plays a crucial role in providing evidence of the disease or agent. The Research Institute for Tropical Medicine (RITM) designated as the National Reference Laboratory (NRL) for Dengue and other arboviruses has been contributing to the surveillance, outbreak, and other researches efforts since 1985. However, the decline in regular financial support has led to deterioration of its equipment and loss of technical expertise.

Recognizing these gaps, a 5-year plan was proposed to the Dengue control program mainly to: 1) To **increase the capacity of the NRL** to be able to respond to the needs of the country; 2) To **establish a network of sub-national laboratories** in order to decentralize testing; 3) To **standardize and improve the quality of case detection and diagnosis** through training on clinical management and laboratory detection.

Activities

1. Laboratory capacity building

In 2012, the World Health Organization (WHO) provided grants to the NRL to be trained by world renowned leader in arbovirus research, US Armed Forces Research Institute for Medical Sciences (US-AFRIMS) in Bangkok, Thailand. A team composed of laboratory technicians, and epidemiologist trained in different laboratory assays for Dengue detection such as virus isolation, ELISA, HI, PRNT, PCR and sequencing analysis; and integration of case and vector data to detect hotspots using geographical information system (GIS). This training allowed the assays to be set up in the NRL. Likewise in 2014, the NRL invited a team of experts from the National Reference Laboratory in Melbourne, Australia to provide training on the basic principles of External Quality Assurance Schemes (EQAS). The NRL Australia training module 1 discussed the importance of EQAS, quality management and standards, EQAS designs, characterization of samples, panel preparation, pilot EQAS, and data analysis and reports. The training involves situational analysis and planning sessions.

Capacity building activities were organized by the NRL as part of its mandate to train medical workers. Since 2014, the NRL organized the annual Training Workshop on Clinical Management and Laboratory Diagnosis of Dengue (Figure 4).

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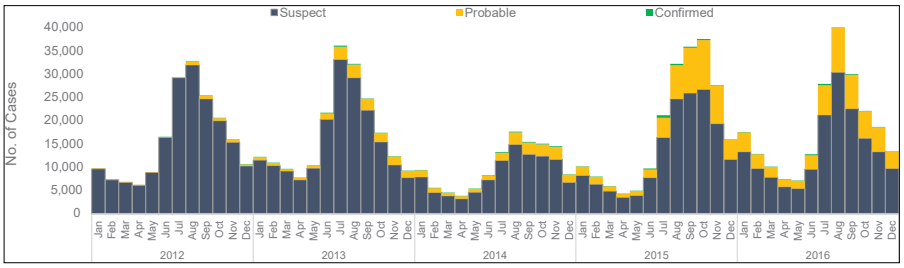
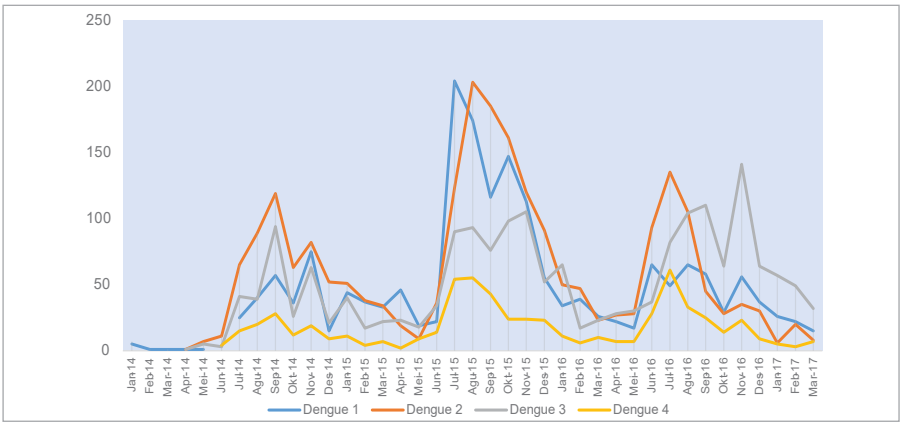
Figure 1: Incidence of Reported Dengue Cases, 2012-2016



Note: Data from the Epidemiology Bureau, Philippine Integrated Disease Surveillance and Response (PIDSR)

Figure 2: Incidence of Dengue by Serotype, 2014-2017



Through a collaboration with the Pediatric Infectious Disease Society of the Philippines (PIDSP), physicians and medical technologists from the sentinel hospitals attended with the following outcome: increased awareness in the proper clinical management of Dengue following the standard Dengue treatment guidelines thus enabling the hospitals to increase detection rate and decrease mortality rates for patients with Dengue infection; increased knowledge in the laboratory diagnosis of Dengue in the performance of different diagnostic methods available, maintaining quality assurance, interpretation, and selection of testing methods appropriate for the different phases of the infection.

2. Improving evidence-based decision making

2.1. Establishment of a Laboratory-based Surveillance

In 2008, the Epidemiology Bureau (EB) launched the Philippine Integrated Disease Surveillance and Response (PIDSR), which Dengue is one of the 26 notifiable diseases. However, large proportion of the cases was detected through the clinical symptoms and sample collection for confirmation was limited and unsystematic. Therefore in 2014, a laboratory-based surveillance was established in 21 sentinel hospitals throughout the country. In order to monitor the Dengue serotypes trends, the sentinel hospitals collects 5 samples from suspect Dengue cases per week and sends them to the NRL for testing using real-time PCR methods. Feedback on the serotypes is then provided to EB for analysis after a week.

From 2008 to 2011, Dengue serotype 3 remained to be the predominant serotype, followed by the predominance of Dengue serotype 1 starting 2011 to 2013. From 2014, Dengue 2 emerged as the most common while both Dengue 1 and 2 were common in 2015. In 2016, a serotype switch was observed around August, leading to the predominance of Dengue 3 in succeeding months until early 2017 (Figure 2 and Figure 3).

2.2. Increased capacity for virologic detection through UNITEDengue

In 2014, through the invitation of the National Environmental Agency (NEA) in Singapore, the Philippines became part of the UNITEDengue. This is data sharing platform that allows free flowing information among member countries, usually ASEAN Member States (AMS) on epidemiological data and viral strains. Through this platform, Dengue virus serotyping assay was improved and the genotyping procedures were established using the reagents and protocols provided.

For 2015, Dengue 1 genotype II (D1 GII) was circulating while Cosmopolitan genotype for Dengue 2, Dengue 3 was genotype I and Dengue 4 genotype II. This is same with 2016 virus strains with the addition of Dengue 1 genotype I being detected.

3. Expansion of Dengue testing to the Sub-national Laboratory (SNL)

In 2010, as a response to the Influenza pandemic, the Department of Health established 5 Subnational laboratories (SNL) located in major cities in the country to decongest RITM in the testing of samples. To maximize the infrastructure and capabilities that were built, the NRL proposed to expand their capacity to include Dengue testing using real-time polymerase chain reaction (PCR). Likewise, additional two (2) SNLs were added to the network: the Bicol Public Health Laboratory (BPHL) in Legaspi (Region 5) and Western Visayas Medical Center (WVMC) in Iloilo (Region 6).

Way Forward

The Philippines is at its strategic position as it implements the school based Dengue vaccination program and at the same time faces the threat of a Zika outbreak. With the full support from the Department of Health, the laboratory capacity has increased and is now ready to respond to the needs of the country. Nevertheless, use of new and emerging technologies should still be pursued to

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Figure 3: Distribution of Dengue Serotypes in the Philippines, 2008-2016

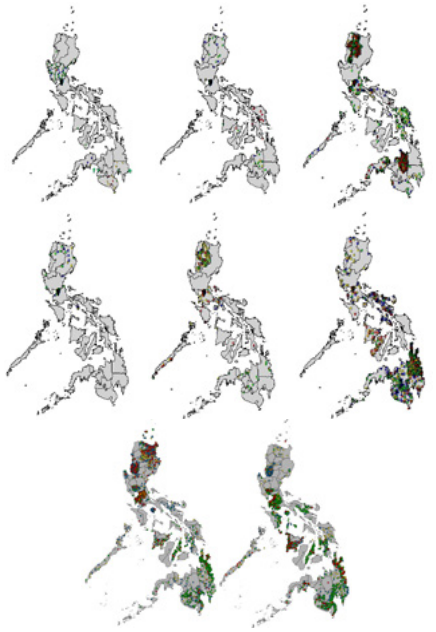

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Figure 4: Capacity Building Activities of the NRL

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further improve pathogen detection and data analysis.

While efforts have been made to the laboratory capacity, this is but one piece of the overall strategy. The only way to effectively control dengue is through a unified effort among the national control programme, surveillance, virology and entomology experts, and much remains to be done. The current system needs to be fully integrated and to evolve to one that can not only control, but also, predict and prevent future outbreaks.

Laboratory-based Dengue Surveillance Programme in Singapore: Situation Update, Challenges and Future Priorities

Introduction to laboratory-based surveillance programme

Dengue has been endemic in Singapore since the first recorded outbreak in 1901. Dengue became a legally notifiable disease in 1966, subsequent to the first outbreak of dengue haemorrhagic fever (DHF) in 1960 [1]. The nationwide *Aedes* prevention and control programme was launched in 1969. The programme, which was fully implemented in 1973, was strategized on the source reduction, health education and law enforcement. Subsequent programme reviews led to an enhanced approach that included the current integrated surveillance framework supported by four main pillars; 1) enhanced case surveillance that improved operational response; 2) virus surveillance for early warning of outbreaks; 3) entomological surveillance for understanding the distribution of vectors and their density in time and space; 4) environmental parameters for understanding the relationship between these parameters and outbreak risk by statistical modelling [2].

The case surveillance relies on an island wide network of general practitioners, public and private hospitals and laboratories that mandatorily notify all clinically-suspected and laboratory-confirmed dengue cases and deaths to the Ministry of Health within 24 hours of detection. Dengue cases are confirmed by using either NS1 antigen or polymerase chain reaction (PCR) assays. Virus surveillance, on the other hand, monitors the serotype and genotype of circulating virus strains by PCR and genome sequencing on a weekly basis [3]. The overall aim is to provide timely updates on the composition and distribution of Dengue virus (DENV) to detect any emergence and replacement of predominant serotype/genotype. Replacement of predominant serotype has been associated with outbreaks in the last 12 years [4].

Current update

In 2016, there were 13,091 dengue fever (DF), 24 DHF cases and nine (9) fatalities (0.07% mortality). In comparison, 11,282 DF, 12 DHF cases and five (5) fatalities (0.04% mortality) were reported in 2015. Of them, serotypes were confirmed in 6,094 (46.6%) cases and genotypes in 2,841 (21.7%) infections. All four serotypes circulated in the country, indicating hyper endemic transmission. DENV-2 was the most dominant serotype (51%), followed by DENV-1 (27%), DENV-3 (19%) and DENV-4 (3%). The genotype analysis revealed consistently high overall virus diversity. However, DENV-2 population was highly homogenous, with 93% of 1,495 DENV-2 viruses genotyped belonging to a genetically similar group of cosmopolitan genotype. In comparison, DENV-1 population (n=693) consisted of three major strains; two belonging to genotype I (50%) and a remaining genotype III strain (32%).

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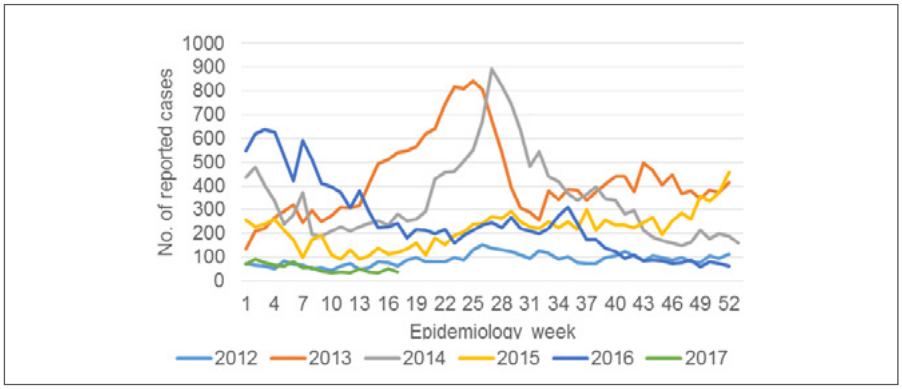
Figure 1: Weekly Dengue Case Trend from 2012 to 2017



Note: Data was gathered through the island wide surveillance programme. All cases are laboratory-confirmed.

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Challenges and future priorities

Even though the control strategies implemented in 1970's lead to a sharp reduction in *Aedes* premises index and low disease incidence [5], epidemics have occurred every 5-6 years since late 1980's despite a consistently low *Aedes* house index (below 1%) [6]. However, dengue serotype prevalence among residents has continued to fall over the decades [7], implying potential success of control efforts. This is supported by the declining estimates of force of infection (per capita rate of acquiring infection) since the 1960s [8]. These observations suggest that the apparent increase in case burden could be attributable to improved diagnostic and notification rates over the years. Nevertheless, the widening susceptible age range [9], geo-expansion of *Aedes aegypti*, the primary vector of DENV in the country and introduction of new viruses through trade and travel [3, 10] will continue to be challenging. While mitigating the local factors, the borderless nature of dengue spread emphasizes the importance of cross-border surveillance and capacity building through projects involving regional stakeholders (ASEAN Member States) and collaborators (ASEAN Secretariat and Global Partnership Programme, Canada) that ride on platforms such as UNITEDengue (UNited in Tackling Epidemic Dengue). On the other hand, these challenges also indicate the need for novel approaches to support the conventional control strategies.

The release of *Ae. aegypti* carrying *Wolbachia* bacterial strains is a novel technology used either to replace or to suppress the indigenous vector populations. Project Wolbachia–Singapore is evaluating the use of male *Wolbachia-Aedes* mosquitoes to further suppress *Ae. aegypti* mosquitoes in the local community. A small-scale field study was launched in October 2016, involving releases of *Wolbachia*-carrying male *Ae. aegypti* mosquitoes to test various parameters and pave the way for further trials that would be necessary before actual field deployment of this new technology. Singapore has already licensed the tetravalent vaccine for DENV (Dengvaxia®). Even though a vaccine is an ideal preventive tool that enables a fast-track, high population penetration, its effectiveness in the local dengue landscape is yet-to-be determined.

References

1. Chan YC, Lim KA, Ho BC: **Recent epidemics of haemorrhagic fever in Singapore.** *Japanese journal of medical science & biology* 1967, **20 Suppl:**81-88.
2. Shi Y, Liu X, Kok SY, Rajarethinam J, Liang S, Yap G, Chong CS, Lee KS, Tan SS, Chin CK, et al: **Three-Month Real-Time Dengue Forecast Models: An Early Warning System for Outbreak Alerts and Policy Decision Support in Singapore.** *Environmental health perspectives* 2015.
3. Hapuarachchi HC, Koo C, Rajarethinam J, Chong CS, Lin C, Yap G, Liu L, Lai YL, Ooi PL, Cutter J, Ng LC: **Epidemic resurgence of dengue fever in Singapore in 2013-2014: A virological and entomological perspective.** *BMC infectious diseases* 2016, **16:**300.
4. Lee KS, Lai YL, Lo S, Barkham T, Aw P, Ooi PL, Tai JC, Hibberd M, Johansson P, Khoo SP, Ng LC: **Dengue Virus Surveillance for Early Warning, Singapore.** *Emerg Infect Dis* 2010, **16**.
5. Goh KT, Yamazaki S: **Serological survey on dengue virus infection in Singapore.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* 1987, **81:**687-689.
6. Goh KT: **Changing epidemiology of dengue in Singapore.** *Lancet* 1995, **346:**1098.
7. Low SL, Lam S, Wong WY, Teo D, Ng LC, Tan LK: **Dengue Seroprevalence of Healthy Adults in Singapore: Serosurvey Among Blood Donors, 2009.** *Am J Trop Med Hyg* 2015, **93:**40-45.
8. Ng LC, Tan HK, Tan LK, Chong CS, Ho D: **Evolving dengue control programme in Singapore.** *Epedemiological News Bulletin* 2016, **42:**11-15.
9. Low SL, Lam S, Wong WY, Teo D, Ng LC, Tan LK: **Dengue seroprevalence of healthy adults in Singapore: serosurvey among blood donors, 2009.** *The American journal of tropical medicine and hygiene* 2015, **93:**40-45.
10. Lee KS, Lo S, Tan SS, Chua R, Tan LK, Xu H, Ng LC: **Dengue virus surveillance in Singapore reveals high viral diversity through multiple introductions and in situ evolution.** *Infect Genet Evol* 2011, **12:**77-85.

Reported Dengue Fever (DF)/ Dengue Hemorrhagic Fever (DHF) Cases in Thailand

Introduction

Dengue Fever / Dengue Hemorrhagic Fever (DF / DHF) case is an endemic disease in tropical and subtropical countries in Asia, Africa, America and South America. In Thailand, the dengue cases have been widespread transmitted across the country reported by Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health (Fig.1). In 2016, a total of 63,310 cases were reported in 77 provinces and morbidity rate was 96.76 / 100,000 population. There were 61 death cases and the percentage of death was 0.10

Dengue is now one of the important public health problems in Thailand. There is an outbreak every two years because of the changing of dengue serotype predominant. This may produce epidemics and severe dengue diseases (Fig.2). The recirculation pattern seems to be predictable for dengue outbreaks.

Thailand has just participated in the project of ASEAN-Canada's Global Partnership Program (GPP) UniteDengue (year 2014-2016) in March 2016 led by Malaysia

Figure 1: The Morbidity Rate of DF / DHF Cases in Thailand from 2016

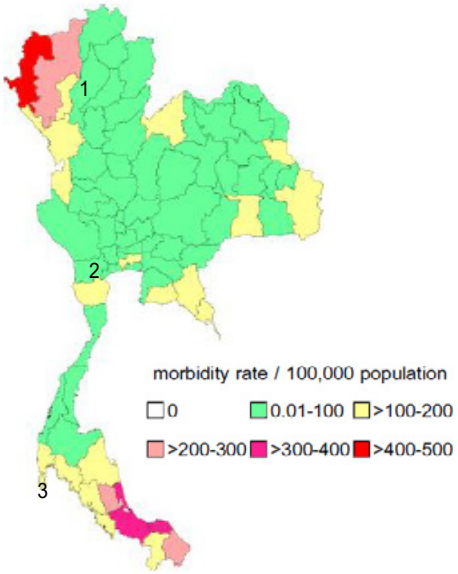

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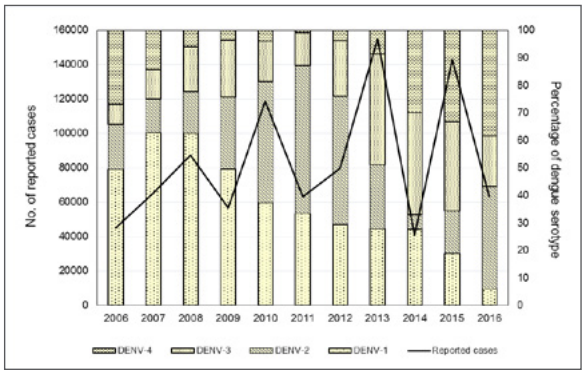
Figure 2: DF/DHF Reported Cases and Circulation of Dengue Serotypes in Thailand between 2006 - 2016



and Singapore. The three sentinel sites have been established for surveillance of dengue serotypes in Lampang province (Northern region), Ratchaburi province (Central region) and Phuket province (Southern region) (Fig.1). The specimens have been collected from suspected patients who have been diagnosed with dengue infection by clinician hospital. The container of patient specimens were then stored in liquid nitrogen tank and sent to Arbovirus section, National Institute of Health, Department of Medical Sciences, Thailand by public transportation.

Process of Diagnosis

Virus isolation and identification: the patients' specimens collected at the acute stage were inoculated into mosquito cell line (C6/36 cells) in a 24-well plate and rocked for 90 minutes. The culture media (L-15; Gibco-BRL, NY, USA) containing 1% heat-inactivated fetal bovine serum was subsequently added. After the 7-day incubation at 28 °C, the infected fluid was collected for further dengue PCR products genotyping. The remaining infected cells were detected for dengue serotypes identification by immunofluorescence assay (IFA).

Molecular detection: Reverse transcription-polymerase chain reaction (RT-PCR)/real time RT-PCR was finally used for confirmation of negative specimens from virus isolation and identification. Extraction of viral RNA was then performed with their acute plasma/serum specimens using QIAamp viral RNA mini kit (Qiagen, Hilden, Germany). RT-PCR was done by using the one-step RT-PCR kit with dengue-specific oligonucleotide primer while Real time RT-PCR was using commercial kit.

Genotyping: The positive samples from both virus isolation and RT-PCR testing were then being genotyped. Complementary DNA was amplified from extracted dengue RNA for PCR products of E gene at the Arbovirus laboratory, Thailand. The PCR products were further sent to the ASEAN-GPP project in UNITEDengue web-portal in Singapore for performing sequencing and analysis.

Results: There are 30 cases qualified specimens that is out of 99 dengue virus positive (VI&RT-PCR) specimens for sequencing in this project and their virus data from the three sentinel sites that are shown in the Table 1. The sequencing analysis has shown (data not shown) the dengue 4 serotypes being common in Asia. The predominant genotype of DENV1 is Genotype I (GI), DENV3 as genotype III (GIII) and DENV4 as genotype I (GI). Those genotypes were circulated in three regions. For DENV2, it is separated to two genotypes which the first one is genotype Asian I that is circulated in the north and central region of Thailand. The second was genotype cosmopolitan clade1b circulated in the southern region (Table 2).

Summary

The number of reported dengue cases in Thailand in 2016 are 63,310 cases. The cumulative number of cases compared to the morbidity rate in the year 2015 is less than 2.3-folds (142,925 cases) shown on the website of the Bureau of Epidemiology, Department of Disease Control. All the laboratory results of dengue serotypes circulated in every region of Thailand has been posted on the NIH website and DMSc website for more information to the community.

Table 1: Circulation of Dengue Serotypes in 3 Sentinel Sites of Thailand in 2016

Province	Month	D1	D2	D3	D4
Lampang	Feb				1
(1 in Fig.1)	Mar				1
	Apr				2
	May	1		2	
	Jun		1		
	Jul		7	3	2
	Aug		13	1	3
	Sep		4		
	Oct		1		1
	Nov	1			1
	Dec		1		
	Total	2	27	6	11
Ratchaburi	Jan	1	1	2	2
(2 in Fig.1)	Feb	1			
	Apr	1			1
	Jul				1
	Sep	1		1	
	Nov	1	1	1	
	Total	5	2	4	4
Phuket	Feb		1		2
(3 in Fig.1)	May		1		1
	Jul		4		1
	Aug		6		3
	Sep	1	2	2	
	Oct	1	2		
	Nov		3		1
	Dec	1	6		
	Total	3	25	2	8

Table 2: Genotypes of Dengue Serotype 2 in Sentinel Sites of Thailand, 2016

Public ID	Genotype	Serotype	Location		Month/2016
			Regional	Province	
1|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Aug
2|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Aug
3|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	Sep
4|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	Sep
8|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	Jul
9|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	Aug
10|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Jun
11|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Aug
21|THA|D2Asian|	Asian I	DENV2	Central	Ratchaburi	Jan
22|THA|D2Asian|	Asian I	DENV2	Central	Ratchaburi	Jan
23|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	May
24|THA|D2Cosmolb_13	Cosmopolitan clade1b	DENV2	Sounthern	Phuket	Feb
25|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Jul
26|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Aug
27|THA|D2Asian|	Asian I	DENV2	Northern	Lampang	Sep

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- ASEAN Canada's GPP Project

Dengue Infections in Viet Nam from 2015-2016

Dengue is an emerging health problem, especially in the central and southern part of Viet Nam. Since 1959, it has become endemic across the whole country. It has become a year-round threat with peak transmission in the warmer rainy season, April through October in the north and June through December in the south.

From 2015 to 2016, nearly 150,000 dengue fever cases were reported. According to the Ministry of Health of Viet Nam, in the year 2015, 54 out of 63 provinces were affected by the disease with a total of 97, 476 cases including 61 deaths. While in the year 2016, there were nearly 92,000 cases including 30 deaths were reported from 55 provinces.

The spread of dengue is heavily concentrated in southern Viet Nam (approximately 70% of the reported cases), higher levels of infection were reported in central and highland areas (Table 1). The significant different age group of dengue infection was indicated in northern part of the country with predominant of patients over 15 years old group (90%), while there was also a determined high rate for school-age children, 6-15 years old group (50.2%).

During the study period, the four dengue serotypes are circulating in Viet Nam. Among them, the DEN1 as dominant strain (60%), followed by the DEN2 and DEN3. The DEN4 circulates only at low level (Figure 1).

Arbo-viruses laboratory in National Institute of Hygiene and Epidemiology, a member of UNITEDengue conducted virology surveillance in the North of Viet Nam. It has used RT-PCR and MAC-ELISA tests in determining the dengue infection, while viral isolation and molecular characterization were applied for samples collected in Ha Noi.

In 2016, based on UNITEDengue, there is a total of 1,541 suspected dengue cases (31.2%). 263 samples of it were tested by ELISA while 219 samples were tested by RT-PCR. That is significant increasing of tested samples compared to the 4.93% that have been done in 2015 (Table 2). Phylogenetic tree of DEN1-Ha Noi was contributed in the total of 58 viruses recovered by inoculation C6/36 cells. The result showed that the DEN1-Ha Noi was grouped in genotype 1 and concentrated in cluster 3 and 5.

In 2015, the World Health Organization declared that the mosquito-borne virus known as Zika is an international public heath emergency. The first microcephaly case associated to Zika infection reported in Viet Nam was in November 2016, that became a widespread warning in the country. Because the principal vector carrying Zika is the *Aedes* mosquito, thus, differential diagnosis for dengue and Zika infection is a requirement. Laboratory to be faced with a large sample when the pregnant monitor project set up. The scheme of zika and dengue detection is not finalization, the Standard Operating Procedures of Zika detection are evaluating, and lack of reagents and equipment are challenging recently.

Continuing virology surveillance on dengue infection in northern Viet Nam and molecular characterization DEN 2 and others are our future works.

Table 1: Mortality and Mobility of Dengue Infection in Viet Nam, 2015-2016

Year	2015		2016 (by October)	
	Cases	Dead	Cases	Dead
North	16,913	0	1,541	0
Central	23,907	10	19,045	3
Highland	6,765	3	24,403	1
South	48,989	45	45,701	26
Total	97,484	62	90,690	30

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Figure 1: Circulation of Dengue Viruses in Viet Nam, 1988-2016

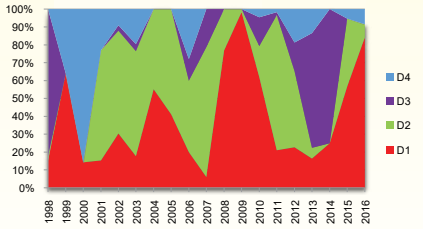

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Table 2: Tested Samples in 2015-2016

Year	No of cases(N)	Number of test (n)			Rate (n/N)
		MAC ELISA	RT-PCR	total	
2015	16.913	550	284	834	4.93
2016	1.541	263	219	482	31.2

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