

WHO/WPRO/SEARO Meeting on DengueNet Implementation in South-East Asia and the Western Pacific, Kuala Lumpur, 11-13 December 2003

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Dengue/DHF – Global public health problem

Epidemic dengue fever and dengue haemorrhagic fever (DHF) have emerged as a global public health problem in recent decades, with the development of hyperendemicity in urban and peri-urban centres of many tropical and subtropical countries. Asia-Pacific countries have more than 70 % of the disease burden; in several of them, DHF has become a leading cause of hospitalization and death among children. Latin America and the Caribbean appear to be following the same DHF epidemic trend, with the disease affecting all ages and case-fatality rates as high as 10-15 % in areas with limited health service infrastructure. The African and Eastern Mediterranean regions are much less affected. Air travel is also facilitating the rapid global movement of dengue viruses and increasing the risk of DHF epidemics through the introduction of new serotypes. Globally, 2.5 billion people live in areas where dengue viruses can be transmitted: an estimated 50 million dengue infections occur each year, with 500,000 cases of DHF and at least 22,000 deaths, mainly among children. Although dengue is a notifiable disease in many endemic countries, only a small proportion of cases are reported to WHO.

Rationale for DengueNet¹

DengueNet, WHO's global surveillance system for dengue fever and DHF, has been created as a web-based central data management system to collect and analyse standardized epidemiological and virological data in a timely manner and to present epidemiological trends as soon as new data are entered. Strengthening epidemiological and virological surveillance of dengue and DHF, including implementation of DengueNet, for early detection, planning and response is one of the four main priorities of WHO's global prevention and control strategy, adopted in resolution WHA55.17 in May 2002. DengueNet, when fully implemented, will facilitate WHO's global outbreak and response activities and support the GOARN².

Epidemiological and laboratory-based surveillance is required to monitor and guide dengue/DHF prevention and control programmes whether these are based on vector control or possible future vaccination with a safe, effective and affordable vaccine. Recent and encouraging research developments have made it likely that a dengue vaccine will become available. As a consequence, the public health community

¹ See No. 36, 2002, pp. 300-304.

² Global Outbreak Alert and Response Network.

needs to define the burden of dengue for society, so that adequate cost-benefit analyses can be presented to government leaders before they decide to use the vaccine. Standardized global dengue surveillance data, one of the principal results expected from the establishment of DengueNet, have become critical.

Phased implementation of DengueNet

First meeting in San Juan, Puerto Rico, July 2002

The first DengueNet meeting was held jointly with WHO/PAHO and the WHO collaborating centre for dengue/DHF at the Centers for Disease Control and Prevention (CDC Dengue branch; San Juan, Puerto Rico). Its objective was to describe and demonstrate DengueNet to prospective users and to launch a pilot, building on the existing reporting systems and network of dengue laboratories in the Americas. Epidemiologists and virologists from eight countries in the Americas, three countries in Asia and five WHO collaborating centres provided recommendations for the administrative and technical procedures involved in making DengueNet operational.

Second meeting in Kuala Lumpur, Malaysia, December 2003³

After pilot use of DengueNet by four Member States and one network

³ This meeting was organized by the WHO Department of Communicable Disease Surveillance and Response, Global Alert and Response, jointly with the WHO Regional Offices for South-East Asia and the Western Pacific, and the WHO Collaborating Centre for dengue/DHF at the University of Malaya in Kuala Lumpur, Malaysia, with technical and financial support from the US Centers for Disease Prevention and Control.

representing 20 island countries in the Americas, and after changes to the supporting computer hardware, software, and routines, a second meeting was convened jointly with WHO/WPRO/SEARO and the WHO collaborating centre for dengue/DHF at the University of Malaya in Kuala Lumpur, 11-13 December 2003. The objective was to expand the pilot to South-East Asia and the Western Pacific, building on the lessons learned from the pilot conducted in the Americas. About 70 participants included national epidemiologists, laboratory specialists, and clinicians from 19 Asia-Pacific countries, three countries in the Americas, six WHO collaborating centres, and WHO HQ, regional and country staff⁴.

The plenary presentations and discussions focused on: (1) the challenges and need for standardized global epidemiological and laboratory surveillance of dengue and DHF; (2) the activities of the Pediatric Dengue Vaccine Initiative (PDVI); (3) the national surveillance and reporting systems in the participating countries in South-East Asia and the Western Pacific; (4) the activities of the participating WHO collaborating centres; (5) the WHO global

⁴ Participants included:

- **South-East Asian and Western Pacific regions:** national programmes from Bangladesh, Cambodia, China, Fiji, French Polynesia, India, Indonesia, Lao People's Democratic Republic, Maldives, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Singapore, Thailand, Viet Nam; the bi-regional Mekong Basin Disease Surveillance Network; WHO collaborating centres and research institutes in Australia, India, Japan, Malaysia, Thailand.
- **Americas:** DengueNet pilot country Brazil; WHO collaborating centres in Cuba and USA; interim director of the Dengue Pediatric Vaccine Initiative (PDVI).
- **WHO:** HQ; regional offices (PAHO, SEARO, WPRO); country offices (India, Malaysia).

strategy and regional programmes; (6) WHO's global outbreak and response activities and GOARN; (7) the DengueNet pilot and lessons learned; (8) presentation of DengueNet and a "hands on" session with the "new" prototype web site in Global Atlas.

Two working groups were convened. The first reviewed and defined the epidemiological data and reporting requirements for DengueNet, modifications needed to the present format, identification of countries for expanding the DengueNet pilot to Asia-Pacific regions, and roles and responsibilities of national and international partners. A subgroup also reviewed and defined the objectives of DengueNet. The second working group reviewed the existing laboratory capacity in South-East Asian and Western Pacific countries in relation to DengueNet, identifying the current needs (and gaps) for laboratory standards, quality control, and dengue serological diagnosis and virus isolation, as well as for reporting and information exchange. The group made recommendations that focused on strengthening regional dengue laboratory diagnosis capacity, so that laboratories participating in DengueNet are able to report data of the highest quality possible within their working environment.

Meeting outcomes

Objectives of DengueNet

The participants agreed that the overall objective of DengueNet is to improve capacity for effective national and international planning for the prevention and control of dengue and that the specific objectives for implementing this global surveillance system are:

- to provide early warning of potential outbreaks of dengue disease or of the introduction of dengue viruses into epidemiologically silent areas, for the purpose of implementing timely control measures and notifying decision-makers in institutions whose occupations or livelihood may be affected;
- to strengthen and standardize epidemiological surveillance of DF and DHF;
- to promote the use of standardized clinical case definitions and reporting criteria for dengue illnesses, permitting comparisons between countries and over time;
- to strengthen the network of collaborating centres and national laboratories for serotype determination and strain characterization;
- to promote improvement in the quality of laboratory data reported at national and international levels;
- to provide a standardized database for epidemiological research and analysis;
- to provide data useful for estimating the burden of disease (including the social and economic burden) on a national, regional, or global scale;
- to support the improvement in national and international alert and response capacity for dengue/DHF outbreaks; and
- to promote the free and timely exchange of epidemiological information between affected countries, their neighbours, and other stakeholders in order to facilitate and promote dengue control activities within the region.

Recommendations of the laboratory working group

To strengthen the regional dengue laboratory diagnosis capacity, the participants of this group made the following recommendations for national laboratories, WHO collaborating centres, WHO, and government health authorities.

Quality control

- Quality control/proficiency testing should be undertaken by the national laboratory/WHO collaborating centre for other laboratories in the country concerned.
- A reference centre should be established at the WHO Collaborating Centre for Tropical Viral Diseases, Nagasaki, Japan, to undertake coordination of quality assurance/control for other WHO collaborating centers and designated national laboratories in the two Regions.
- The Nagasaki reference centre should coordinate, organize, and distribute a WHO panel of reference sera for validation of tests/kits/rapid tests by WHO, national laboratories, and WHO collaborating centres.

Reference services

- Countries that do not have facilities for virus isolation should send appropriate samples to a WHO collaborating centre of their choice after consultation with that centre.
- WHO should recommend capacity-building for virus isolation to the ministries of health of countries that lack facilities.

- In collaboration with WHO country and regional offices, WHO collaborating centres should provide reference reagents to national laboratories – standard inactivated antigens, monoclonal antibodies, standard sera, cell lines for virus isolation, and prototype dengue virus strains.

Laboratory training

- WHO should organize regional training courses on laboratory diagnosis of dengue and other flaviviruses.
- WHO should develop a laboratory manual for dengue diagnosis.
- WHO HQ should establish a global technical advisory group, including representatives from collaborating centres, to meet annually to advance laboratory training, capacity building, reagents, quality issues, and DengueNet.

Reporting and information exchange

With regard to collection of laboratory data and information transfer, the group identified a strong need for government health authorities to develop a reporting system to collect, centralize, and disseminate these data, identify key laboratories to participate in this system, and designate a focal point for DengueNet.

The group recommended that WHO support national health ministries to assess current laboratory status in Asia-Pacific countries and to plan mechanisms to strengthen laboratories for DengueNet. A draft DengueNet laboratory assessment tool is available for review and use.

The group expressed appreciation of the efforts made to develop DengueNet and

recommended that WHO work with partners to develop strategies for raising crucial resources.

Recommendations of the epidemiology working group

The group reviewed currently available data and reporting practices in the Asia-Pacific countries in relation to DengueNet. The discussion was organized around the principal epidemiological variables of time, place and personal characteristics, plus information about the virus. The group made recommendations on the modifications to be made to the present format of the DengueNet prototype in Global Atlas, on strengthening epidemiological surveillance, and on a framework for implementation of the DengueNet in Asia-Pacific regions with emphasis on the quality of available data and the active participation of national programmes.

Data collection

Epidemiological data

- To accommodate currently available case classification reporting practices, countries should provide three categories – DF cases, DHF/DSS (dengue shock syndrome) cases, total dengue cases (DF/DHF/DSS). These data should be provided monthly, at state/department level by large countries and at island level by island nations.
- Countries should provide data, monthly when available, on “dengue deaths” (probable or confirmed).

- Countries should provide annual epidemiological data by sex and age groups.

Rate calculations

- Both incidence and mortality rates should be expressed per 100 000 mid-year population; countries should provide updates to DengueNet in the event of significant change.
- The system should not show incidence and mortality rates for countries that report data only from sentinel sites.

Virus serotype data – all available

- Data should be entered (when provided by the laboratory) as the cumulative number of isolations of each serotype in the country from 1 January.

General recommendations

For countries

Countries should promote implementation of the WHO recommended surveillance standards for dengue. (Participants were provided with copies of these standards.)

For DengueNet

A country information page should be provided on the DengueNet web site for all country-specific information, definitions, and methods used (e.g. sentinel site information, reporting by time of onset or notification, case classification other than according to the WHO definition, etc.).

WHO-recommended surveillance standards should be made available on the DengueNet web site.

Roles and responsibilities of the partners in this network

Countries will collect, validate, and provide epidemiological and laboratory data. They will designate the participating centres and focal points, and WHO country offices will facilitate the process. WHO collaborating centres will provide laboratory support, proficiency panels, and training to national laboratories. WHO regional offices will implement the country support activities, and WHO HQ will maintain and moderate the DengueNet web site. WHO regional offices and HQ will seek financial support for dengue surveillance activities.

Country participation

A major outcome of the meeting was that representatives of all participating countries showed interest in collaborating with DengueNet and agreed to present the meeting's recommendations to their health ministries. Country participation will require a letter of request from WHO to the ministry of health; ministry authorization for participation and designation of a national DengueNet focal point; and, for some countries, an external budget.

The DengueNet pilot will be expanded to countries in American, South-East Asian, and Western Pacific regions in 2004 after modifications to the system have been made in Global Atlas. The lessons learned from the pilot will be used to develop a consensus framework for DengueNet implementation for standardized global surveillance of dengue and DHF.