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Dengue surveillance and response in Vanuatu

This article is based on the author's presentation given at the 2nd Regional EpiNet Workshop held in Noumea 7–11 June 2004.

Background

Like other Pacific Island countries and territories, Vanuatu is prone to dengue outbreaks and epidemics. The country has experienced five major outbreaks since 1970: DEN-2 in 1972, DEN-1 in 1975, DEN-4 in 1980, DEN-1 in 1989 and DEN-2 in 1998-99. The worst episode, which occurred in 1989, was a DEN-1 outbreak that resulted in over 3000 admissions and 12 deaths. Sporadic dengue cases continue to be reported, since the last DEN-2 outbreak in 1998–99.

Aedes aegypti is the predominant vector. It is mostly confined to urban areas. An important factor conducive to the breeding of aedes mosquitoes is the rapid expansion of squatter settlements around urban areas (especially Port Vila, the capital) where poor environmental hygiene, unreliable water supply and traditional water storage practices are commonplace.

The prime responsibility for counteracting the threat of dengue rests with the Vector Borne Diseases (VBD) Program of the Ministry of Health, which also takes care of the other two mosquito-borne diseases of public health importance in Vanuatu — malaria and filariasis. A network of provincial control officers and sentinel clinicians located in selected facilities ensures the programme functions smoothly.

The 1989 dengue outbreak was a wake-up call for Vanuatu. The country realised the explosive and extensive nature and impact of dengue epidemics, and thenceforth took steps to upgrade and strengthen its surveillance and control system. With the assistance of the Pacific Regional Vector Borne Diseases (PRVBD) Project (1997–2001), the Ministry of Health's blueprint dengue preparedness plans were developed and consolidated.

Major dengue control strategies used

Broadly speaking, the main control strategies employed in Vanuatu fall into three categories:

- **Capacity building.** Training staff to better manage routine and emergency dengue vector control activities, and upgrading clinicians' skills in dengue management.
- **Prevention.** Passive and active surveillance, maintaining public awareness, and conducting routine larval and mosquito surveys in priority areas.
- **Outbreak.** Applying standard vector control measures in situations of emergency aedes control.

Routine surveillance

Dengue is a notifiable disease in Vanuatu. Both active and passive surveillance methods — clinical, laboratory and entomological — are routinely used to monitor its activity. Based on experience from previous outbreaks, selected high-risk peri-urban areas have been designated for active and closer monitoring.

A key component of the surveillance system is the Dengue Early Warning System, which actively monitors four parameters that have the potential to signal the arrival or resurgence of dengue in the country or communities:

- Clinical surveillance — reports from sentinel clinicians
- Laboratory surveillance — use of rapid tests for dengue, e.g. PANBIO
- Fever surveillance — weekly surveillance of malaria-negative slides
- Mosquito larval surveillance — using the Breteau and other indices

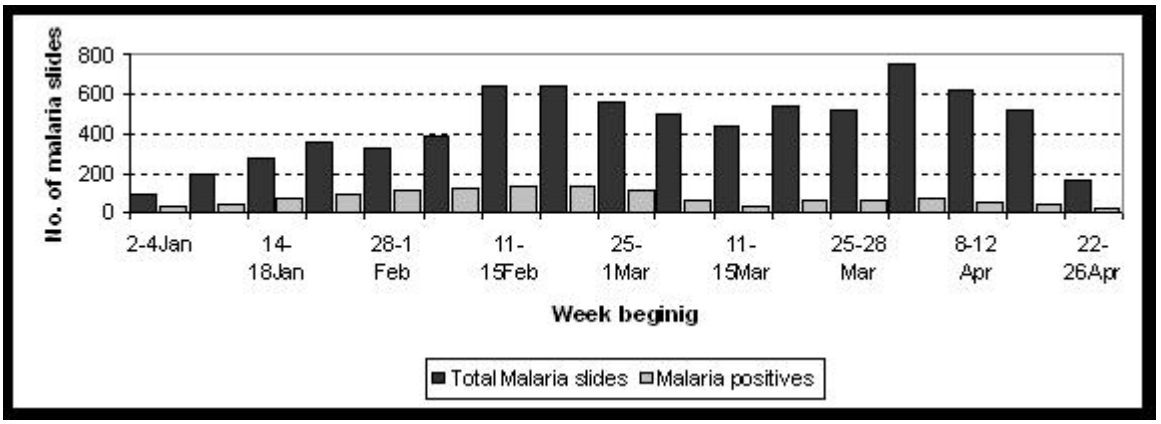
The system had proven itself to be simple, sensitive, practical and effective. In addition, links have recently been established with PacNet for regular updates on dengue activity in the region.

Fever surveillance — monitoring of malaria-negative slides

Because malaria is highly endemic and prevalent in Vanuatu, health workers generally require all patients with a fever to have a blood slide examined for malaria parasites. An outbreak of non-malaria febrile illness will increase the number of malaria-slide requests, as well as the malaria-slide negativity rates.

The malaria-slide requests and slide negativity rates are monitored weekly in the laboratories. The first indication of a potential outbreak of dengue in an at-risk community might be an increase in the number of patients presenting with a febrile illness to local health facilities, with consequent increases in the number of malaria-slide requests and slide negative rates. The cut-off numbers of 200 for the number of malaria-slide requests and 100 for the number of malaria-negative slides per week are used to trigger a prompt clinical and laboratory investigation to determine the cause of the outbreak.

Dengue weekly surveillance based on negative malaria slides, Vila Central Hospital January-April 2002



This form of fever surveillance may be unique to Vanuatu and other malaria-endemic countries, because its application in non-malarious countries is a little more difficult. However, experience has shown that dengue fever is often mistaken for an outbreak of measles, or even influenza. Thus, it is envisaged that, in future, clinical surveillance for dengue in sentinel sites should be integrated into an overall fever surveillance system covering these three diseases and malaria, because of similarity in symptoms.

Response to an outbreak

Once a case of dengue or an outbreak is suspected (based on surveillance data), systemic action is applied according to an agreed operational plan (see diagram "Vanuatu dengue surveillance and control structure"). The key actions include:

1. Activation of Dengue Committee and Task Force
2. Confirmation of case, in Brisbane, Australia
3. Appropriate management of suspected/confirmed case(s)
4. Mobilisation of outbreak response teams to guide:
    - Enhanced fever and clinical surveillance in sentinel centres
    - Information dissemination to public
    - Emergency vector control measures
    - Community-wide campaigns for source reduction/environmental management
5. Follow-up on vector control activities to monitor resurgence potential

The identification and setting up of priority or high-risk peri-urban sampling locations ensures that the limited available resources are used judiciously.

Community involvement

Because the aedes breeds in and around houses, it can be controlled by appropriate and sustained individual and community action. The Vector-borne Unit involves communities extensively in its awareness and clean-up campaigns to create community motivation in dengue control. One activity worth a mention is the establishment of community projects to mobilise communities to carry out source reduction vector control activities. The community sustains the project through nominal monthly financial contributions towards purchasing garbage bags for collection of empty containers and transporting these for disposal. There is now a shift in emphasis towards community-based vector control.

Current status of dengue

Undoubtedly, the dengue control programme in Vanuatu had achieved a lot in the last decade in keeping dengue outbreaks at bay. The country is now better prepared and equipped to fight dengue. Also, the general public is more aware of the potential impact of the disease and the importance of seeking early care and community action in vector control.

However, constraints continue to plague the programme, especially financial resources. The programme has increased its scope in relation to fighting the three important mosquito-borne diseases, but without a corresponding increase in budget and human resources. Also, since malaria is more prevalent in Vanuatu, more resources are used on this disease than dengue. This unfortunately means some of the gains (e.g. in surveillance) made during the life of the PRVBD Project have not been fully sustained.

Future direction

Based on lessons learnt so far, Vanuatu's dengue programme is reassessing and refocusing its surveillance and response system to make it more effective, practical and sustainable before another serious outbreak strikes. In particular, we need to focus on the following areas:

- Strengthening the dengue early warning system
- Feasibility of setting up an integrated fever surveillance covering diseases with similar clinical symptoms (dengue, measles, influenza, influenza-like illnesses and "fever of unknown origin")
- Encouraging and enhancing intersectoral collaboration and community-based vector control

- Extending dengue surveillance activities to other provinces and rural areas
- Developing a dengue emergency contingency and epidemic preparedness plan
- Regular evaluation of the programme's activities

For long-term sustainability, the Ministry of Health intends to progressively transfer the key responsibilities and motivation for dengue control from government to communities — for example, by establishing a control mechanism that can be activated and sustained at village/community level.

Conclusions

Dengue continues to be an important public health problem in Vanuatu as elsewhere in the Pacific. Given its high epidemic potential and impact, adequate monitoring of its activity is critical to good control. This can be achieved with a combination of mosquito vector surveillance, fever surveillance, sentinel clinicians and laboratory screening. Coupled with this, a timely response to a confirmed outbreak, including early detection and management of cases and implementation of emergency community-wide control strategies, is also vital to contain dengue. The strategies currently available are effective. They just need to be strengthened and sustained at country level.

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VANUATU DENGUE SURVEILLANCE AND CONTROL STRUCTURE

SURVEILLANCE