

Vector-Borne Diseases in India

Report of a Brainstorming Session
9 November 2006

Introduction

In recent years, vector-borne diseases (VBD) have emerged as a serious public health problem in countries of the South-East Asia Region, including India. Many of these, particularly dengue fever, Japanese Encephalitis (JE) and malaria now occur in epidemic form almost on an annual basis causing considerable morbidity and mortality. Dengue is spreading rapidly to newer areas, with outbreaks occurring more frequently and explosively. Chikungunya has re-emerged in India after a gap of more than three decades affecting many states. Outbreaks have also been reported from Sri Lanka, Mauritius, the Reunion Island, and Maldives. The risk factors, which play a key role in the spread and transmission of dengue and chikungunya, include globalization, unplanned and uncontrolled urbanization, developmental activities, poor environmental sanitation, human behaviour relating to water collection, lifestyles, widespread travel and human migration, both within the country and across borders. These are causes for much concern and highlight the need to comprehensively address the challenges faced in combating vector-borne diseases in the country. The recent outbreaks of dengue and chikungunya have been widely reported by and discussed both in the electronic and print media. Japanese Encephalitis is currently endemic in 135 districts in 15 states and Union Territories of India. A large outbreak in Uttar Pradesh last year took many lives, mostly of children. Presently, nearly 330 million people are considered to be at risk.

To discuss the problem of VBDs in India, an informal brainstorming session was organized at the WHO Regional Office for South-East Asia, New Delhi on 9 November 2006. The meeting was attended by the following experts, officials from the Government of India and WHO:

- (1) Dr Shiv Lal , Additional Director-General & Director, NICD, Delhi
- (2) Dr P. L. Joshi, Director, National Vector Borne Disease Control Programme, India
- (3) Dr Sarala K. Subbarao, Consultant, Indian Council of Medical Research, New Delhi
- (4) Dr V. P. Sharma, Former Director, Malaria Research Centre, Delhi
- (5) Dr K. Raghavendra, National Malaria Research Institute, Delhi
- (6) Dr N. K. Yadav, Director Health Services, Municipal Corporation of Delhi
- (7) Dr Jai P. Narain, Director, Department of Communicable Diseases, WHO/SEARO
- (8) Dr Sangay Thinlay, Coordinator, HTM, WHO/SEARO
- (9) Dr Chusak Prasittisuk, Coordinator, CDC, WHO/SEARO
- (10) Dr Khanchit Limpakarnjanarat, Regional Adviser, CSR, WHO/SEARO
- (11) Dr Rajesh Bhatia, Regional Adviser, BCT, WHO/SEARO
- (12) Dr Derek Lobo, Regional Adviser, Communicable diseases targeted for eradication/ elimination
- (13) Dr Sampath Krishnan, WHO Country Office, India
- (14) Dr A Chatterjee, WHO Country Office, India
- (15) Dr C K Rao, WHO Country Office, India

(16) Dr Shalini Pooransingh, CSR Unit, WHO/SEARO

(17) Dr Ratnesh Lal, CSR Unit, WHO/SEARO

(18) Dr Karma Lhazeen, VBC Unit, WHO/SEARO

The meeting was chaired by Dr Shiv Lal and had the following objectives:

- (1) To review the recent outbreak of Dengue fever/DHF, Chikungunya and JE;
- (2) To discuss issues related to surveillance and outbreak response, clinical management and prevention, and
- (3) To recommend actions for prevention and control of vector-borne diseases.

2. Review of the situation and issues

The meeting reviewed the situation of dengue and chikungunya outbreaks in various states of India as well as the salient features of the Japanese encephalitis outbreak in Uttar Pradesh last year. Clearly, there was concern at the ever-increasing frequency of outbreaks of dengue, Japanese encephalitis and, of course, malaria which led to loss of many lives. In 2006, till 8 November, 2950 cases of dengue with 65 deaths were reported from Delhi alone. Other states that reported dengue cases were Kerala, Rajasthan, Gujarat, West Bengal, Uttar Pradesh, Tamil Nadu, Punjab, Maharashtra, Karnataka and Andhra Pradesh. Also, during the year, several states in India were simultaneously affected by chikungunya outbreaks leading to more than 1.37 million clinically suspected cases from 188 districts in 12 states and Union Territories. The affected states are Andhra Pradesh, Andaman & Nicobar Islands, Delhi, Gujarat, Karnataka, Kerala, Maharashtra, Madhya Pradesh and Tamil Nadu. The largest number of cases have been reported by Karnataka (752,245), followed by Maharashtra (258,998). The disease carries a high attack rate, which was observed to be up to 45% in some areas.

The meeting discussed various technical, epidemiological, clinical, operational, social and behavioural aspects relating to these outbreaks. Inadequate surveillance for vector-borne diseases, especially in urban areas was considered to be a major impediment, due to which good quality data on vectors/or on the disease could not be used for action at ground level. Several examples were cited of human behaviour and practice that had led to unchecked vector breeding. Fulminant breeding of mosquitoes in households, in peri-domestic areas, in water and garbage collections including in hospital settings, schools, other public places, increasing use of water coolers in office buildings and at home, inadequate emphasis on solid waste management as well as on regular emptying of water coolers & other water containers were only a few examples of the enormity of the challenges faced by the states/UTs including the Municipal Corporation of Delhi. These practices, if unaddressed, would facilitate occurrence of similar outbreaks in the future. There was reluctance on the part of the media to highlight this aspect, which has a direct bearing on disease transmission. The media seemed more focused on the issue of treatment, in particular with the 'platelets' issue.

At the same time, the meeting noted many impediments in the way of effective management and control of vector-borne diseases, such as growing urbanization, unregulated

construction work in mega-cities, general lack of water and sanitation facilities and enormous opportunities for water collection in the neighbourhood be it in Kerala or Delhi. Without effective interventions by the Government, in collaboration with other relevant sectors and cooperation of the community, this situation could get worse.

It was further recognized that both in urban as well as in rural areas, there was a need to develop surveillance, epidemiological and entomological, as well as laboratory capacity to recognize the problem early through an early warning system and to mobilize the community including the resident welfare associations, the builders etc. to ensure reduction in vector breeding as much as possible. There is also a need to take greater advantage of vector-borne disease seasonality in the efforts to interrupt transmission or to even pre-empt the occurrence of an outbreak.

Recommendations and follow-up actions

In view of the emergence of vector-borne diseases as a major threat from the political, socio-economic and public health perspectives, the following recommendations were made:

Policy and programme

- (1) While the public health system has to play a critical role through institution of preparedness and early warning mechanisms as well as a rapid containment capacity, comprehensive management of VBDs warrant a **broad multi-sectoral response and** social mobilization for full involvement of the community.
- (2) A medium-to long-term **strategic plan**, with allocation of adequate resources, should be developed including public health, environmental and legislative measures needed to prevent and control vector-borne diseases. Vector control or prevention of vector borne diseases should be among the **healthy public policies**, to ensure that that before any developmental activity is planned or implemented, the public health concerns are taken into consideration.
- (3) **Partnership building** and enhancing the role of various sectors such as education, public works, tourism, industry, the private sector, NGOs, etc. is critical. Each sector should be sensitized about its role in the prevention and control of vector-borne diseases. Taking locally acceptable measures to prevent such diseases must receive a high priority. Active participation of inter-sectoral partners is needed, right from the programme planning stage to its implementation and evaluation.
- (4) **Operational research** on disease transmission and risk factors as well as on the health and socio-economic impact of dengue are urgently needed. Data from **outbreak investigations** on disease distribution and determinants can also provide valuable information for formulating appropriate control measures. In addition, such data can help us in better understanding the epidemiology, as well as the pathogenesis of disease, clinical manifestations and response to management in Indian settings. The results of such studies can be gainfully employed in revising the policies and strategies.

Surveillance and outbreak response

- (5) The present surveillance system for VBDs need to be strengthened to make it more practical; therefore a **standardized passive and active laboratory-based surveillance** system for DF/DHF, with **emphasis on an early warning predictive capability** should be developed urgently and implemented during the epidemic and inter-epidemic periods. The surveillance data should be effectively used to prevent vector-borne disease outbreaks or to take a pre-emptive epidemic response.
- (6) Standard **case definitions** of various VBDs such as dengue fever, chikungunya, etc, should be developed and used for reporting purposes as a part of surveillance and during outbreak investigation.
- (7) Vector-borne diseases are mainly a rural phenomenon but dengue and chikungunya have assumed greater importance over the past few years due to their high epidemic potential and to **developmental activities leading to mosquito breeding in urban areas**. In urban areas, surveillance requires that the multiplicity of health care providers must report regularly to a central agency using a standard case definition. In rural areas, dengue fever and vector surveillance should be a part of the Integrated Disease Surveillance Project (IDSP) and provide for an early warning system.
- (8) Vector surveillance including monitoring the presence and density of **vector species and their breeding sites** and the effectiveness and efficiency of vector control interventions should be carried out in each locality on an ongoing basis in order to ensure better planning and implementation of vector control strategies. Laboratory capacity building and networking within and outside the country are areas that require urgent attention.

Prevention through social mobilization

- (9) A prerequisite for prevention of vector-borne diseases is **scaling up the most effective interventions including integrated vector management** in the form of insecticide residual spray, bed nets and other personal protection measures. Source reduction and measures to control the vector population are integral components of disease prevention and outbreak response.
- (10) Intensified efforts towards creating **public awareness and mobilizing the community** regarding the preventive measures they can take and regarding the early seeking of medical attention by those suffering from vector-borne disease are crucial. Communication messages using the mass media as well as inter-personal approaches can help bring about a change in the behaviour of the population. The services of a communications expert may be employed to formulate effective risk communication strategies.

Similarly, school children can be involved in prevention activities through school health programmes.
- (11) Population groups such as **Residents Welfare Associations and Housing Societies** can play an important role in encouraging and enforcing preventive activities in

their respective areas. Targeting these groups with risk communication can lead to a cascading preventive effect amongst many people.

- (12) The management of dengue and chikungunya can be enhanced through holding a **“dry day” every week** when all residents would dry up their coolers once a day in a week for only half day (preferably forenoon). This should be supported by a legal framework to ensure compliance. In residential areas, the dry days could be observed on Sundays and in offices or educational institutions on a week-day, i.e. Tuesdays. **A sanitation day**, as envisaged by the Govt of India, in a year (i.e. 2nd October) should be observed throughout the SEA Region in order to create awareness regarding sanitation and hygiene for disease prevention and control.

Case management

- (13) Standard case management is **critical for reducing morbidity and preventing mortality** due to dengue haemorrhagic fever (DHF). For example, health care workers should ensure **appropriate and rational use of platelets** for case management. Development of standard guidelines, their dissemination and extensive training of physicians at all levels of the health care system are key elements to ensure good clinical practices. Since transfusion of platelets in DHF saves life, availability of safe blood products warrant strengthening the capacity of blood transfusion services to respond effectively during outbreaks.
- (14) **Laboratory support** for diagnosis and case management is not widely available. Access to quality reagents is limited. Forging a network of laboratories can assure quality and enhance access to diagnostic tools.
- (15) Emphasis should be placed on programmes to **educate physicians, nurses and others** in the medical community in dengue fever/dengue hemorrhagic fever, its diagnosis, management, prevention and control.

3. The road map

- (1) A national strategic plan for delivery of vector-borne disease prevention and control services with multi-sectoral involvement exists. However, it would require strengthening in view of recent outbreaks of chikungunya. A National Steering Committee should be set up to mobilize multi-sectoral involvement (March 2007).

Action: Govt. of India

- (2) Adequate resources should be mobilized and made available to the National Vector Borne Disease Control Programme to plan and coordinate national preparedness and response to vector-borne diseases (ongoing).

Action: Govt. of India

- (3) Vector-borne disease control adopted as one of the healthy public policies with an inbuilt mechanism for ensuring compliance (July 2007).

Action: Govt. of India

- (4) Surveillance of vector-borne diseases, with special reference to vector and laboratory-based active disease surveillance, supplemented by research on the ecological and environmental determinants should be established at local/regional levels to generate information and evidence for early warning and rapid outbreak response as well as to formulate vector management strategies in the communities as a part of the ongoing programme. Studies should be carried out to document the recent outbreaks and obtain greater understanding of disease epidemiology, current treatment practices and behavioural aspects (ongoing).

Action: Govt. of India/MCD/ICMR/WHO

- (5) In southern India, e.g. Kerala, *A. albopictus* has also been reported as a vector species. The ecology of this species is different from *A. aegypti*, therefore, an action plan for surveillance and control of *A. albopictus* should also be prepared.

Action: Govt. of India

- (6) Various methods of vector management should be advocated and scaled up to prevent breeding of *A. aegypti*, particularly in receptacles e.g. desert coolers, flower pots etc. Screening of doors and windows in all residential areas, office buildings and hospital wards needs to be emphasized.

Action: Govt. of India

- (7) Development and strict adherence to standard case management guidelines and a plan for capacity building of all relevant sectors should be initiated urgently.

Action: Govt of India/WHO

- (8) A working group on VBD should be established in the WHO Regional Office for South-East Asia with full participation of the GOI representatives as well as the WHO country office. It should meet periodically to review the national and regional situation and provide technical inputs to NVBDCP (Dec. 2006).

Action: WHO/SEARO

- (9) The WHO Regional Office should urgently revise the 1999 guidelines on dengue prevention and control on the basis of the regional experience and also develop an emergency response plan that can be effectively implemented at an appropriate time such as when outbreaks occur.

Action: WHO/SEARO

4. Conclusions

The prevention and control of vector-borne diseases is beset with many challenges and requires high political commitment, multi-sectoral collaboration and community participation. Though the health sector will continue to remain central to disease control activities, containment of VBD requires active support and commitment from many partners to obviate the factors that promote and facilitate breeding of vectors. Collective national efforts with strong inputs from international technical agencies are prerequisites for success in these efforts.