WER Sri Lanka – 2007

Mobilizing Research To Control Dengue

Incidence of dengue has increased rapidly in recent decades worldwide. Rapid urbanization, demographic transition, large-scale migration and travel have contributed to it being endemic in more than 100 countries, and is a major international public health concern at the moment. The global dengue burden has increased more than four-fold in the last 30 years, making it the most common mosquito-borne viral disease. South East Asia and the Western Pacific are the worst affected regions. There has also been a rapid increase in the Americas. Along with this trend, more virulent strains of the virus have also appeared. As a consequence, outbreaks are occurring with greater frequency and intensity, with the potential to overwhelm unprepared healthcare systems.

So far, there is no effective drug treatment nor is there a vaccine against dengue. The clinical management is also complicated by difficulties in proper diagnosis and variation in medical skills. In addition, vector control has posed enormous challenges in terms of sustainability and resource allocation. These phenomena are common to all regions affected by dengue. Therefore, the challenge to reduce the populations of *Aedes aegypti* mosquitoes below a threshold that could reduce dengue viral transmission is enormous.

Improving surveillance tools for vector control, examining the potential for ecosystem management with a multi-disciplinary approach and testing diagnostic tools to improve clinical case management have been initiated as research strategies to overcome this threat by the Special Programme for Research and Training in Tropical Diseases (TDR), sponsored by UNICEF, UNDP, World Bank and WHO (website www.who.int/tdr).

Improving surveillance tools for vector control

This mainly refers to the development of effective methods to measure 'pupal productivity' in different breeding sites. This aims to identify the most important breeding grounds for the vector in a given setting or community, and then target vector control and clean-up activities towards the most 'productive' containers or sites. Studies conducted in Asia, Africa and Latin America have already demonstrated the ability to differentiate epidemiologically important breeding sites from those which are not. It is yet to be ascertained whether interventions targeted at the most productive containers can be more effective in reducing dengue virus transmission over time.

Similarly, more selective biologically-based vector control tools are being developed to control *Aedes* breeding sites. These include improved formulations that are safe and acceptable for use in drinking water.

Ecosystem management interventions

Ecosystem management interventions are considered an important multi-faceted task to control dengue. A major research initiative to examine the ecological, biological and social ("eco-bio-social") factors affecting dengue transmission will focus on Asian high-endemic countries including Sri Lanka. Interactions will be examined between ecosystem factors such as climate

Contents

Global Dengue Statistics

- **Some 2.5 billion people, two-fifths of the world population is at risk of dengue.**

- **There are 50 million dengue infections per year.**

- **Up to 500,000 people annually contract more serious forms of dengue.**

- **An estimated 21,000 people die from dengue-related illnesses.**

- **Some 653,000 DALYs (disability adjusted life years) are lost due to dengue each year.**

and the urban environment: biological factors such as vector density: social factors, and the functioning of vector control measures and other public health services. The most effective interventions for specific eco-settings will be identified.

A similar pilot project conducted in Brazil to examine eco-bio-social factors responsible for the re-emergence of dengue in Latin America has been a success. One of the findings of that survey was that poorer neighbourhoods had many more mosquito breeding areas than more affluent areas since the piped water supply in the poor community was irregular, leading to more water storage in containers.

Testing diagnostic tools to improve clinical case management

Rapid diagnosis is essential for proper clinical management of dengue patients. However, the reliability and accuracy of many diagnostic tests have not been established systematically. Existing and new diagnostic tests will be evaluated for their field performance using a network of laboratories in Asia and Latin America. A multicentre prospective clinical study is already underway in 7 countries to improve the current dengue case classification system and to better identify early warning signs of severe dengue across regions, age groups and nutritional levels. It is hoped that this will facilitate better case management, and thus save many lives.

Future directions: vaccine prevention

A dengue vaccine is considered by many as a more long term sustainable solution to the worldwide resurgence of dengue. Yet special challenges exist in vaccine development, since any dengue vaccine must provide very high level protection against all 4 dengue strains to prevent possible vaccine-induced enhancement of disease. Responsibility for dengue vaccine development in World Health Organization recently passed to the WHO Initiative for Vaccine Research. The production of live attenuated vaccines is
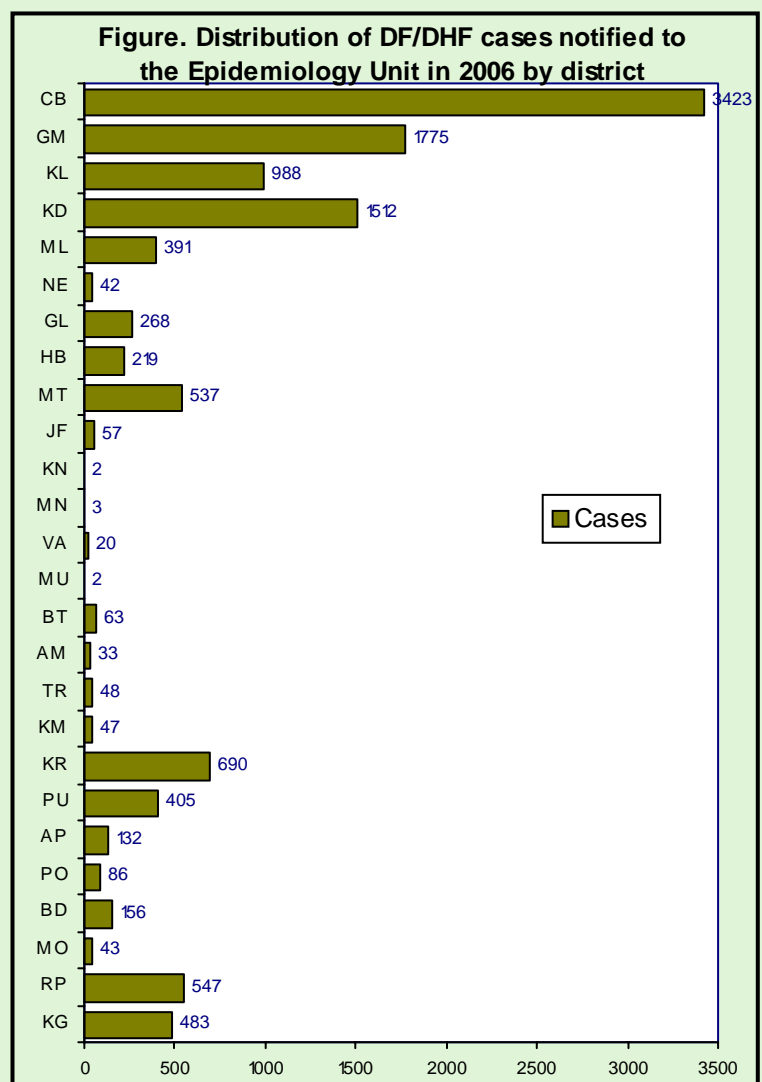
considered the most advanced strategy, even though experts believe that it will take some time for an effective vaccine to be developed.

It is evident that important advances in dengue research will contribute to the design of new intervention strategies, accelerated development of diagnostic tools, vaccines and drugs, and improved dengue case management. New vector control tools and approaches for vector surveillance are also being developed. In addition, modern information technology is being tested for its cost and usefulness in supporting district-level decision-making, where vector control takes place.

This multi-faceted endeavour to control and prevent dengue by mobilizing experts from a variety of fields is encouraging. It probably gives the best chance to halt the epidemiological and geographical expansion of dengue at present.

DENGUE CASES AND DEATHS IN 2006

In total, 11,972 DF/DHF cases were notified to the Epidemiology Unit during the year 2006. In addition, there were 47 deaths due to dengue with 12 reported from Colombo. The case load had gradually risen since the middle of the year to record the highest levels in November (1363) and December (1559).

Figure. Distribution of DF/DHF cases notified to the Epidemiology Unit in 2006 by district

District	Cases
CB	3423
GM	1775
KL	988
KD	1512
ML	391
NE	42
GL	268
HB	219
MT	537
JF	57
KN	2
MN	3
VA	20
MU	2
BT	63
AM	33
TR	48
KM	47
KR	690
PU	405
AP	132
PO	86
BD	156
MO	43
RP	547
KG	483

Source: Weekly Return of Communicable Diseases. See page 3 for district codes.

Table 1: Vaccine-preventable diseases & AFP   17th – 23rd Feb 2007 (8th Week)

Disease	No. of Cases by Province								Number of cases during current week in 2007	Number of cases during same week in 2006	Total number of cases to date in 2007	Total number of cases to date in 2006	Difference between the number of cases to date between 2007 & 2006
	W	C	S	NE	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	00	00	00	00	00	01	13	24	-45.8%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00.0%
Measles	00	00	01 GL=1	00	00	01 AP=1	00	01 RP=1	03	01	07	04	75.0%
Tetanus	00	00	00	00	02 KR=2	00	00	00	02	01	09	10	-10.0%
Whooping Cough	00	00	00	00	00	00	01 MO=1	00	01	01	07	11	-36.4%
Tuberculosis	01	05	44	21	06	00	00	31	108	171	1480	1575	-6.0%

Table 2: Diseases under Special Surveillance   17th – 23rd Feb 2007 (8th Week)

Disease	No. of Cases by Province								Number of cases during current week in 2007	Number of cases during same week in 2006	Total number of cases to date in 2007	Total number of cases to date in 2006	Difference between the number of cases to date between 2007 & 2006
	W	C	S	NE	NW	NC	U	Sab					
DF/DHF*	43	05	07	04	07	02	00	04	72	198	1188	1892	-37.2%
Encephalitis	00	00	00	00	00	00	00	02 RP=2	02	03	45	19	+136.8%
Human Rabies	00	00	00	00	00	00	00	00	00	02	16	14	+14.3%

Table 3: Newly introduced Notifiable Diseases   17th – 23rd Feb 2007 (8th Week)

Disease	No. of Cases by Province								Number of cases during current week in 2007	Total number of cases to date in 2007
	W	C	S	NE	NW	NC	U	Sab		
Chickenpox	15	02	15	05	10	06	02	09	64	420
Meningitis	00	00	00	00	00	00	00	00	00	36
Mumps	07 CB=2 GM=2 KL=3	00	01 MT=1	00	03 KR=3	00	02 BD=1 MO=1	02 KG=2	15	104

*DF / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.
NA= Not Available.
Sources:
Weekly Return of Communicable Diseases:
Diphtheria, Measles, Tetanus, Whooping Cough, Human Rabies, Dengue Haemorrhagic Fever, Japanese Encephalitis, Chickenpox, Meningitis, Mumps.
Special Surveillance:
Acute Flaccid Paralysis.
National Control Program for Tuberculosis and Chest Diseases: Tuberculosis.
Details by districts are given in Table 5.

Provinces: W=Western, C=Central, S=Southern, NE=North & East, NC=North Central, NW=North Western, U=Uva, Sab=Sabaragamuwa.
DPDHS Divisions: CB=Colombo, GM=Gampaha, KL=Kalutara, KD=Kandy, ML=Matale, NE=Nuwara Eliya, GL=Galle, HB=Hambantota, MT=Matara, JF=Jaffna, KN=Killinochchi, MN=Mannar, VA=Vavuniya, MU=Mullaitivu, BT=Batticaloa, AM=Ampara, TR=Trincomalee, KM=Kalmunai, KR=Kurunegala, PU=Puttalam, AP=Anuradhapura, PO=Polonnaruwa, BD=Badulla, MO=Moneragala, RP=Ratnapura, KG=Kegalle.

Table 4: Laboratory Surveillance of Dengue Fever   17th – 23rd Feb 2007 (8th Week)

Samples	Number tested	Number positive *	Serotypes				
			D_1	D_2	D_3	D_4	Negative
Number for current week	11	00	00	00	00	00	00
Total number to date in 2007	190	08	00	01	02	00	04

Source: Genetech Molecular Diagnostics & School of Gene Technology, Colombo.   * Not all positives are subjected to serotyping.

Table 5: Selected notifiable diseases reported by Medical Officers of Health
17ᵗʰ - 23ʳᵈ Feb 2007 (8ᵗʰ Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptos-pirosis		Typhus Fever		Viral Hepatitis		Returns Re-ceived Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	28	363	00	30	00	03	00	17	00	01	00	24	00	01	01	08	93
Gampaha	08	129	03	39	00	05	02	13	00	01	05	14	00	06	01	25	93
Kalutara	07	86	12	50	00	01	02	11	00	04	01	19	00	00	00	09	91
Kandy	05	157	01	36	00	00	03	13	00	02	05	24	01	16	04	48	82
Matale	00	45	09	37	00	03	00	03	00	00	01	12	00	02	02	35	75
Nuwara Eliya	00	17	01	30	00	00	01	18	342	342	00	04	04	12	01	53	86
Galle	04	38	02	21	00	04	00	04	00	03	02	15	01	10	00	06	63
Hambantota	01	14	02	12	00	00	01	03	00	01	03	12	01	14	01	04	73
Matara	02	36	05	46	00	02	01	10	00	01	01	20	01	49	00	04	88
Jaffna	00	02	00	19	00	01	00	95	00	00	00	00	00	58	00	04	00
Kilinochchi	00	00	00	00	00	00	00	02	00	00	00	00	00	00	00	02	50
Mannar	00	06	00	10	00	00	00	22	00	00	00	00	00	00	00	02	25
Vavuniya	02	10	01	11	00	00	00	07	00	05	00	02	00	00	00	03	25
Mullaitivu	00	00	00	04	00	02	00	08	00	00	00	00	00	00	00	00	20
Batticaloa	01	03	09	35	00	02	01	07	00	02	00	00	00	00	21	83	91
Ampara	00	00	00	18	00	00	00	02	00	00	00	00	00	00	00	02	14
Trincomalee	01	18	03	17	00	01	01	08	00	17	00	00	00	00	01	06	44
Kurunegala	04	86	04	52	00	00	00	14	00	04	01	09	02	19	00	05	72
Puttalam	03	55	00	20	00	09	00	13	00	00	00	03	00	00	00	23	100
Anuradhapura	01	12	00	21	00	04	01	12	01	01	00	08	02	07	00	14	89
Polonnaruwa	01	16	00	37	00	02	00	03	00	00	00	11	00	00	00	03	57
Badulla	00	09	07	79	00	00	00	14	03	08	00	13	01	17	07	43	67
Monaragala	00	05	04	42	00	00	01	10	00	00	02	12	02	13	02	04	80
Ratnapura	02	34	18	95	02	06	01	17	01	05	03	15	02	05	02	19	94
Kegalle	02	46	01	26	00	00	01	08	00	00	00	20	01	07	00	11	82
Kalmunai	00	01	03	18	00	00	00	03	00	00	00	00	00	00	06	41	58
SRI LANKA	72	1188	85	805	02	45	16	337	347	397	24	237	18	236	49	457	80

Source: Weekly Returns of Communicable Diseases (WRCD).
***Dengue Fever / DHF** refers to Dengue Fever / Dengue Haemorrhagic Fever.
****Timely** refers to returns received on or before 3 Mar. 2007. Total number of reporting units = 290. Number of reporting units data provided for the current week: 231.
A = Cases reported during the current week. **B** = Cumulative cases for the year.

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