



National Center for Parasitology, Entomology and Malaria Control

National Dengue Control Programme

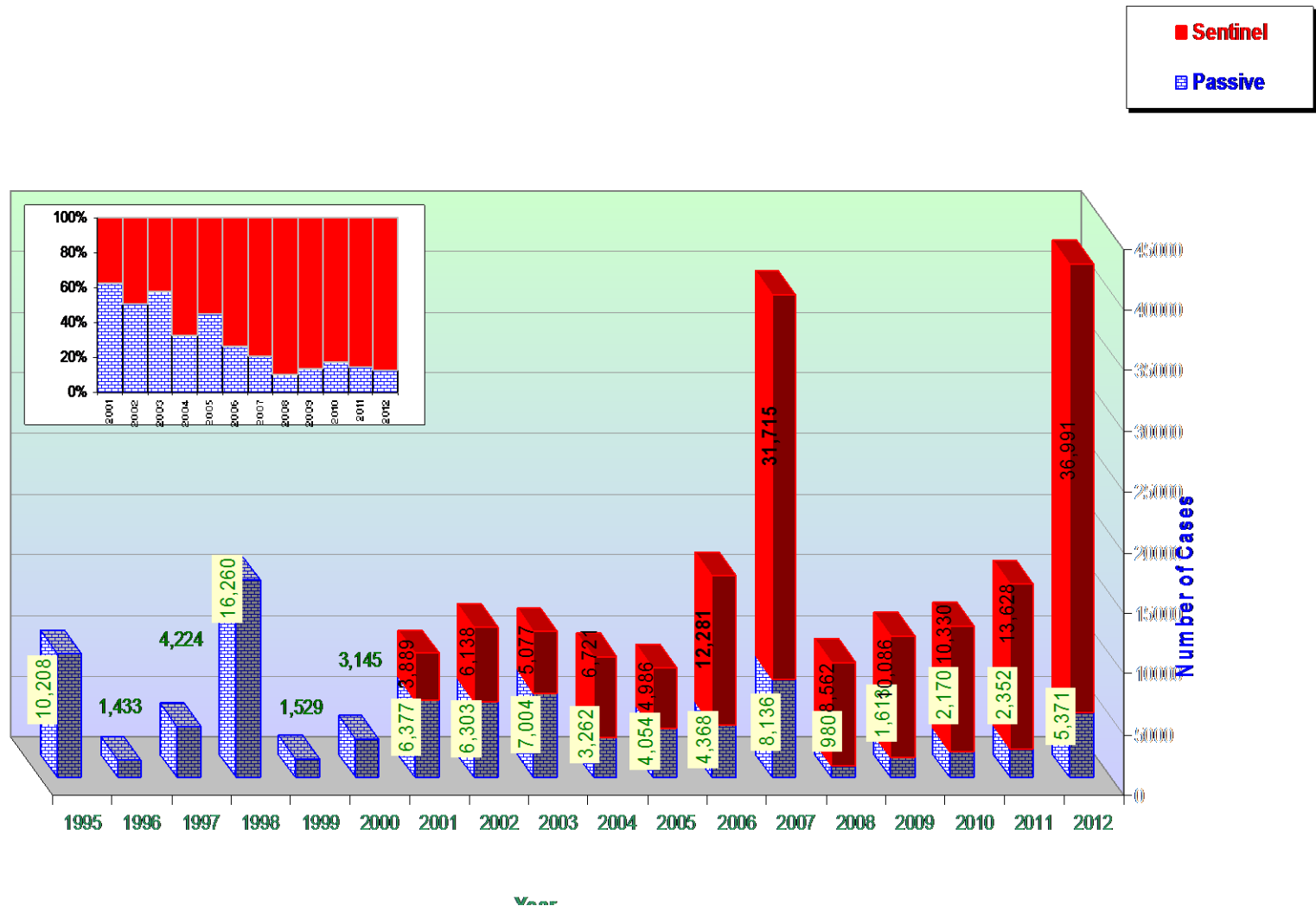
Assoc Prof. NGAN CHANTHA MD. MPH
National DHF Control Program Director
Deputy-Director of CNM

Mr. HUY Rekol, MD, MPH, DTM&H, FETP
Contact: 012 829 481; rekolh@cnm.gov.kh

Outlines

- ⑩ Dengue situation in Cambodia, and its control activities, 2012;
- ⑩ Dengue contribution factors;
- ⑩ Dengue Strategic Plan;
- ⑩ Dengue situation in 2013;
- ⑩ Discussion and conclusion.

DISTRIBUTION OF DENGUE CASES BY YEAR THROUGH THE NDCP

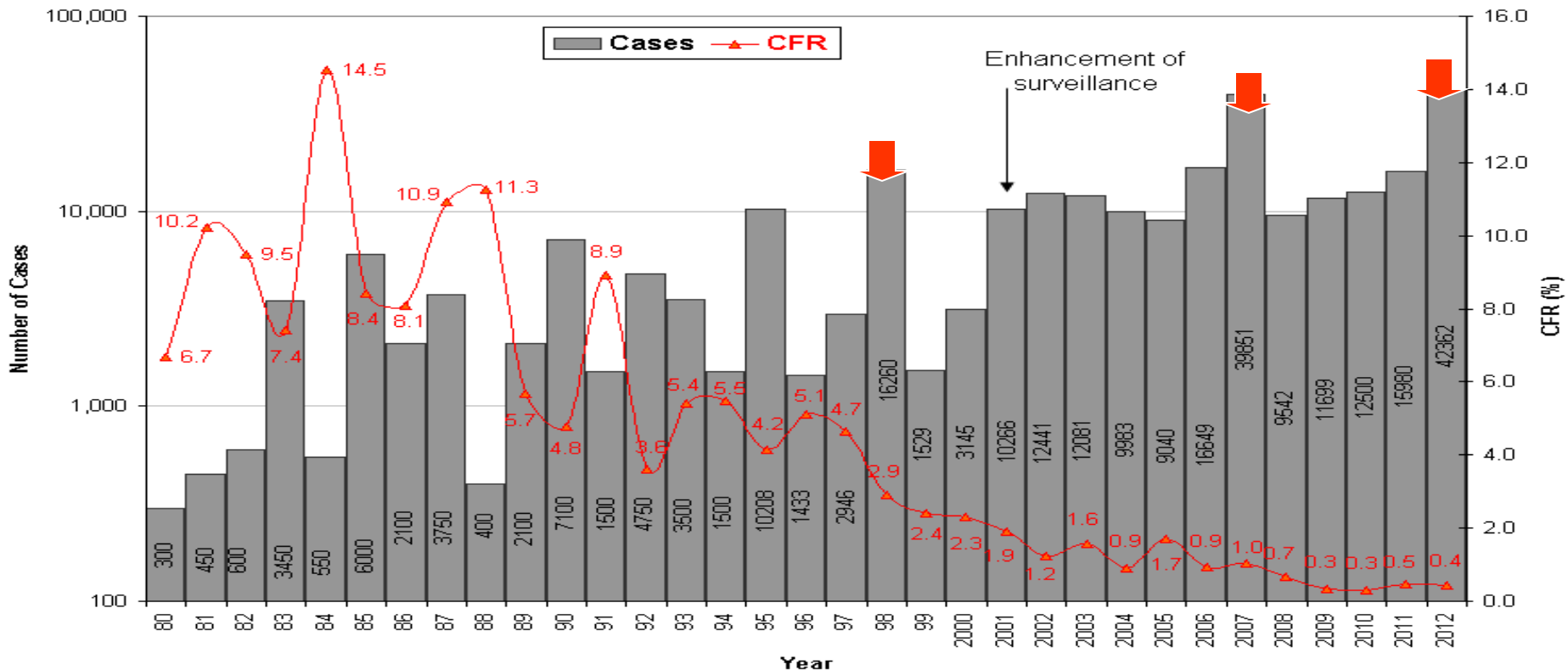


Two major epidemics occurred with 16,260 and 39,851 and 42,362 reported cases in 1998 and 2007 and 2012 respectively,

Dengue Situation in Cambodia, 1980-2012

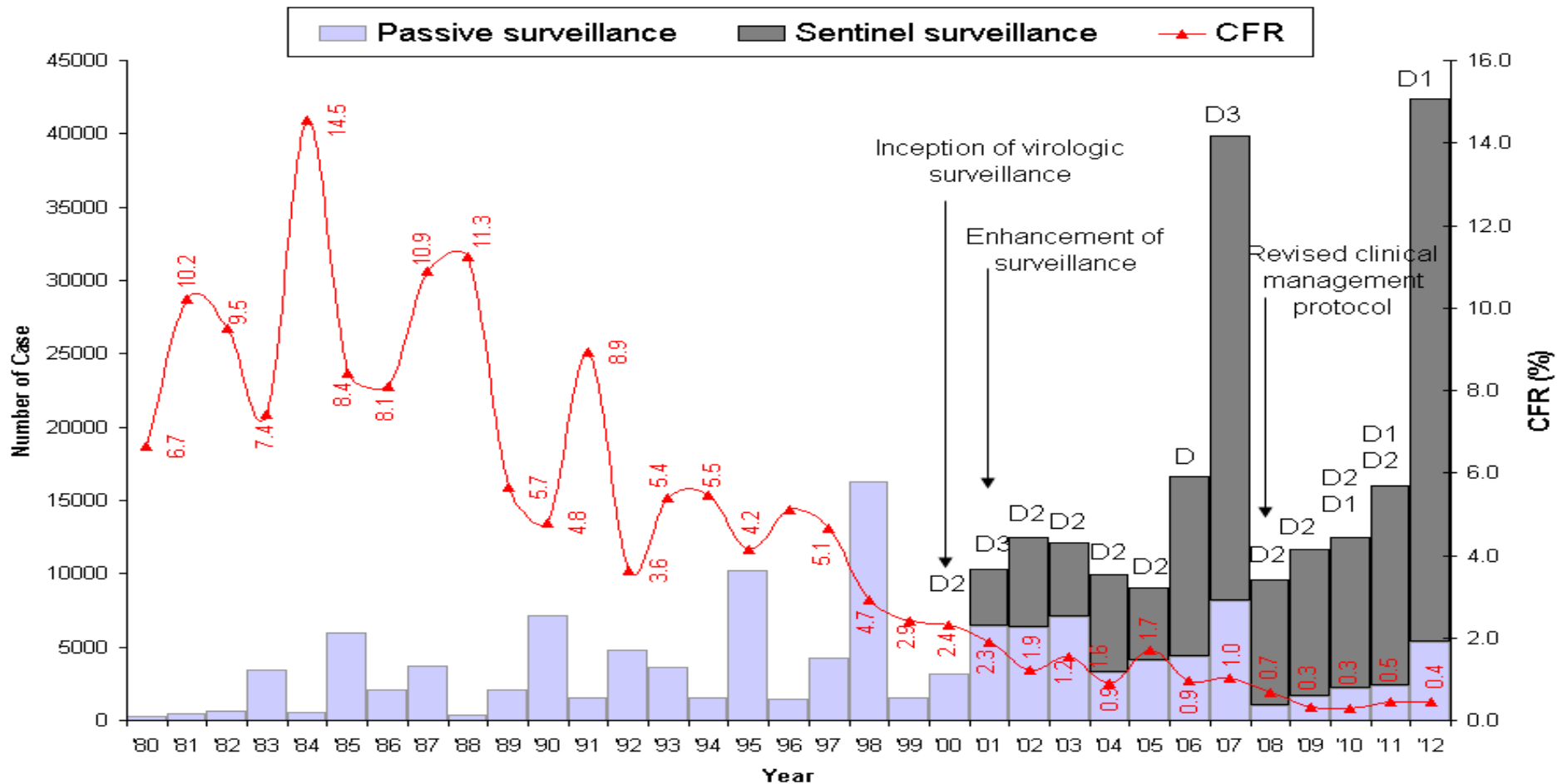
- Total reported cases **275,965** (IR: 0.7-3.0/1000 during '01-'12) by public health care facilities, but only from pediatric wards.
- Secular trend showed cyclical pattern of epidemics at intervals of **3-5 years** but less distinguishable since enhancement of the surveillance system in 2001.
- **Two major epidemics** occurred with 16,260 and 39,851 and 42,362 reported cases in **1998** and **2007** and 2012 respectively, *but how about 2002 & 2003?*

Yearly Reported Cases and Case Fatality Rate (CFR) of Dengue in Cambodia, 1980 - 2012



Dengue Situation in Cambodia, 1980-2010

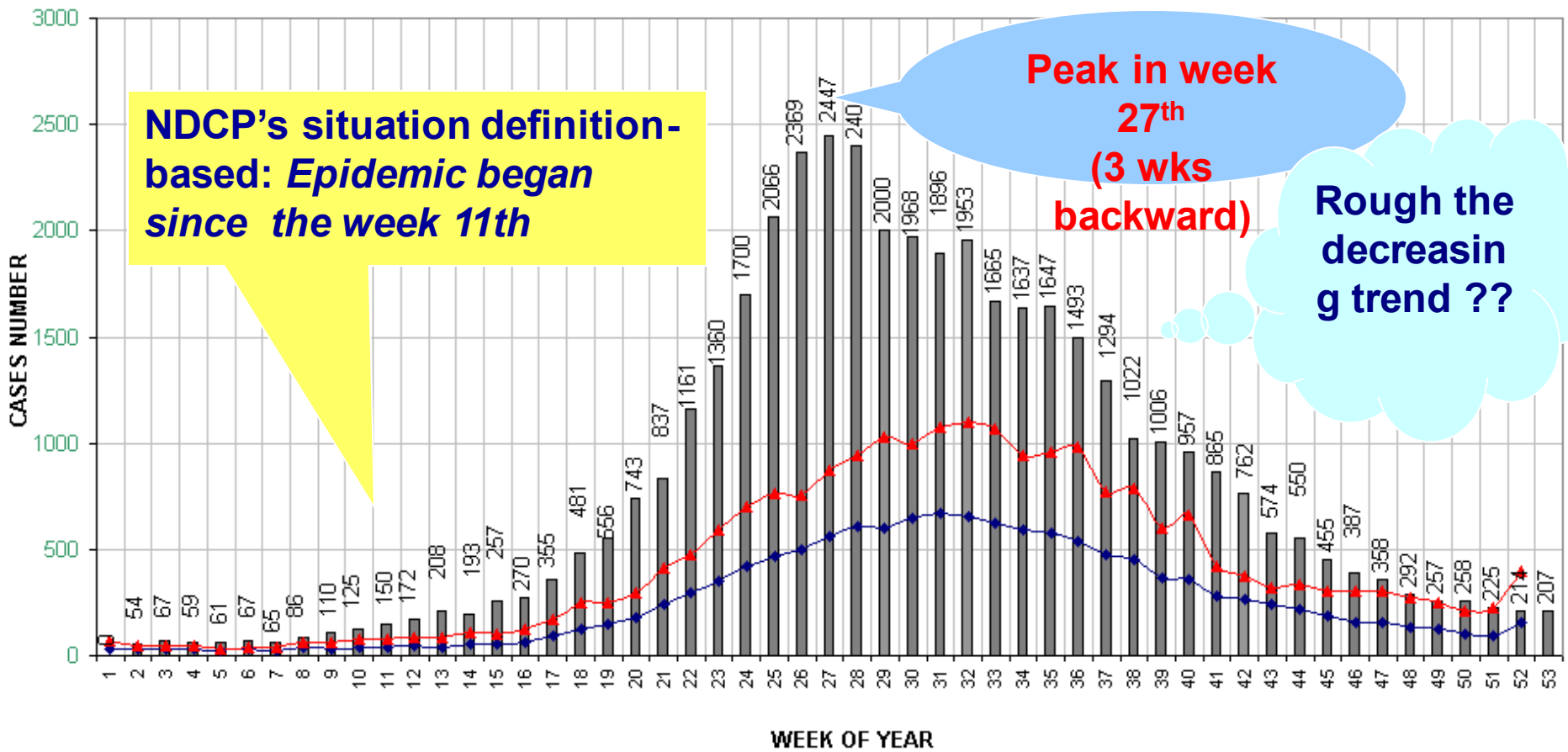
- CFR ranged from **15 to 0.3%** (CFR <1.0% after the clinical Management Protocol-Revised in 2008).
- All 4 serotypes have circulated yearly with alternate predominance of serotypes **D2 and D3 then D1** while the interval around 4 years.



Dengue Situation in Cambodia, 2012

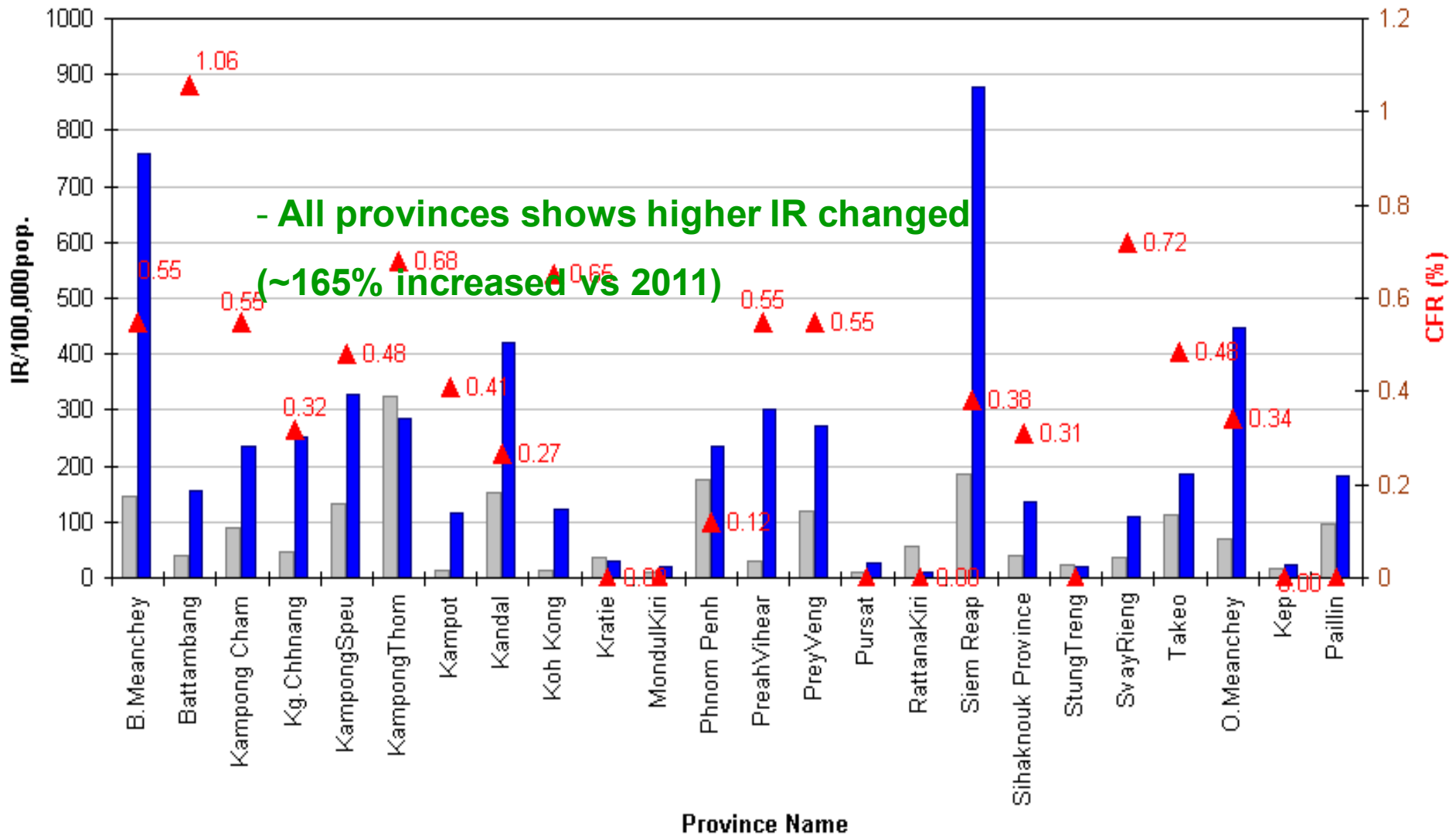
RELATIONSHIP OF DENGUE CASES BY WEEKS IN CAMBODIA 2012
WITH Mean AND Mean+2SD DURING 2006-2011 (*Excluded 2007)

Cases 2012
 Mean 06-11*
 Mean+2SD



COMPARISON OF DENGUE INCIDENCE RATE (IR) BY PROVINCE IN CAMBODIA
 2011 (n=15,980/73; CFR:0.5%) VS 2012 (n=42,362/189 CFR: 0.4%) (Completed 53 weeks)

IR-2011 IR-2012 CFR-2012

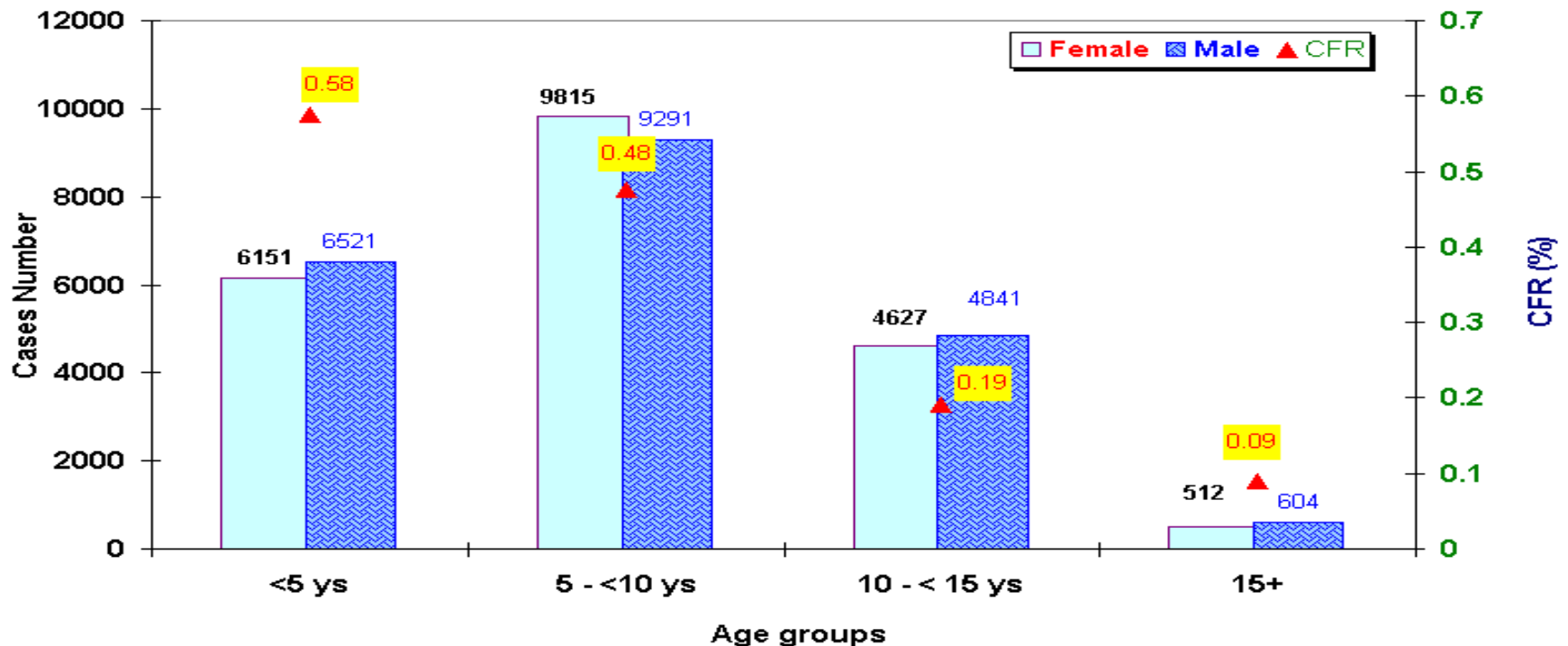


Dengue Situation in Cambodia, 2012

(n=42,362/189; IR: 297.5, CFR: 0.46%)

- The high risk age group is commonly from 5-9 years, but the high CFR is commonly for <5 years. No significant different for gender.

Distribution of Dengue-Reported Cases & Cases Fatality Rate (CFR) by Age and Gender, Cambodia-2012 (n=42,362/189)



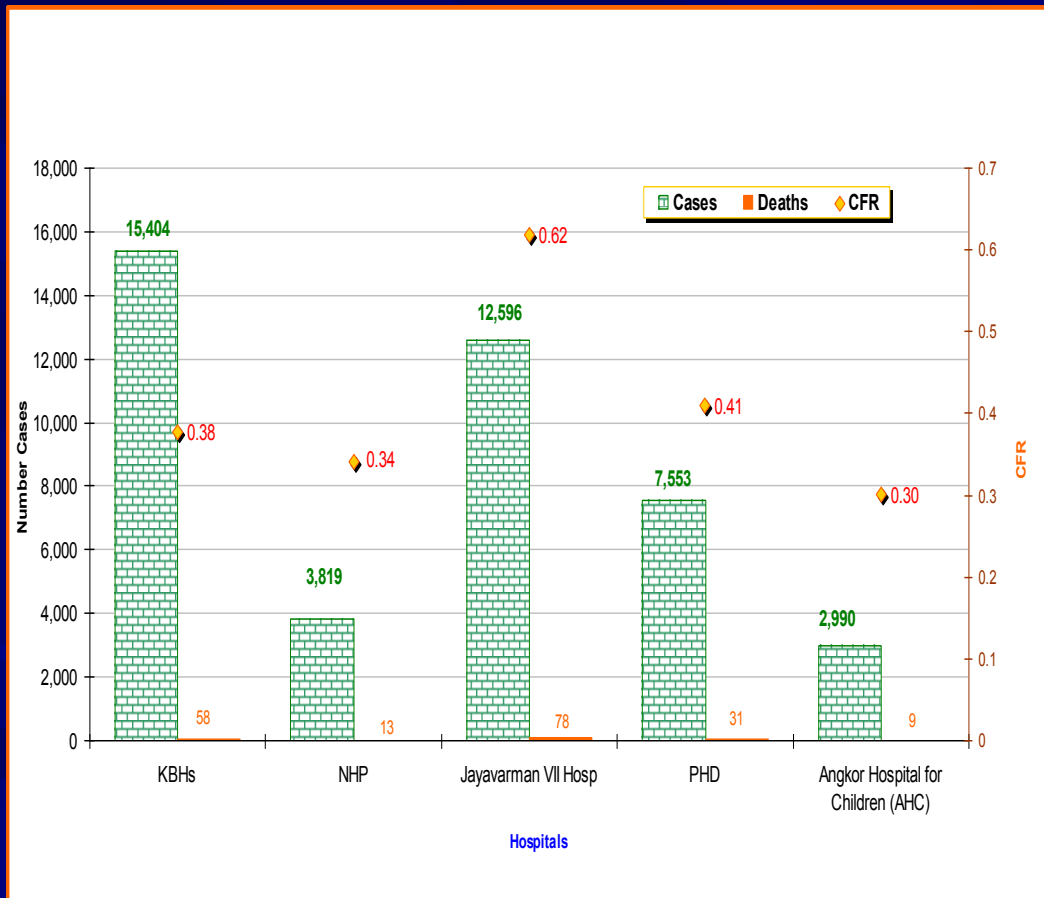
Dengue Situation in Cambodia, 2012

Achievement 2012:

- Dengue Incidence Rate: IR: 297.5,
- CFR: 0.46%

Target 2012

- 266.0,
- CFR: 0.6%)



- **Kantha Bopha**, Phnom-Penh (36.36%)

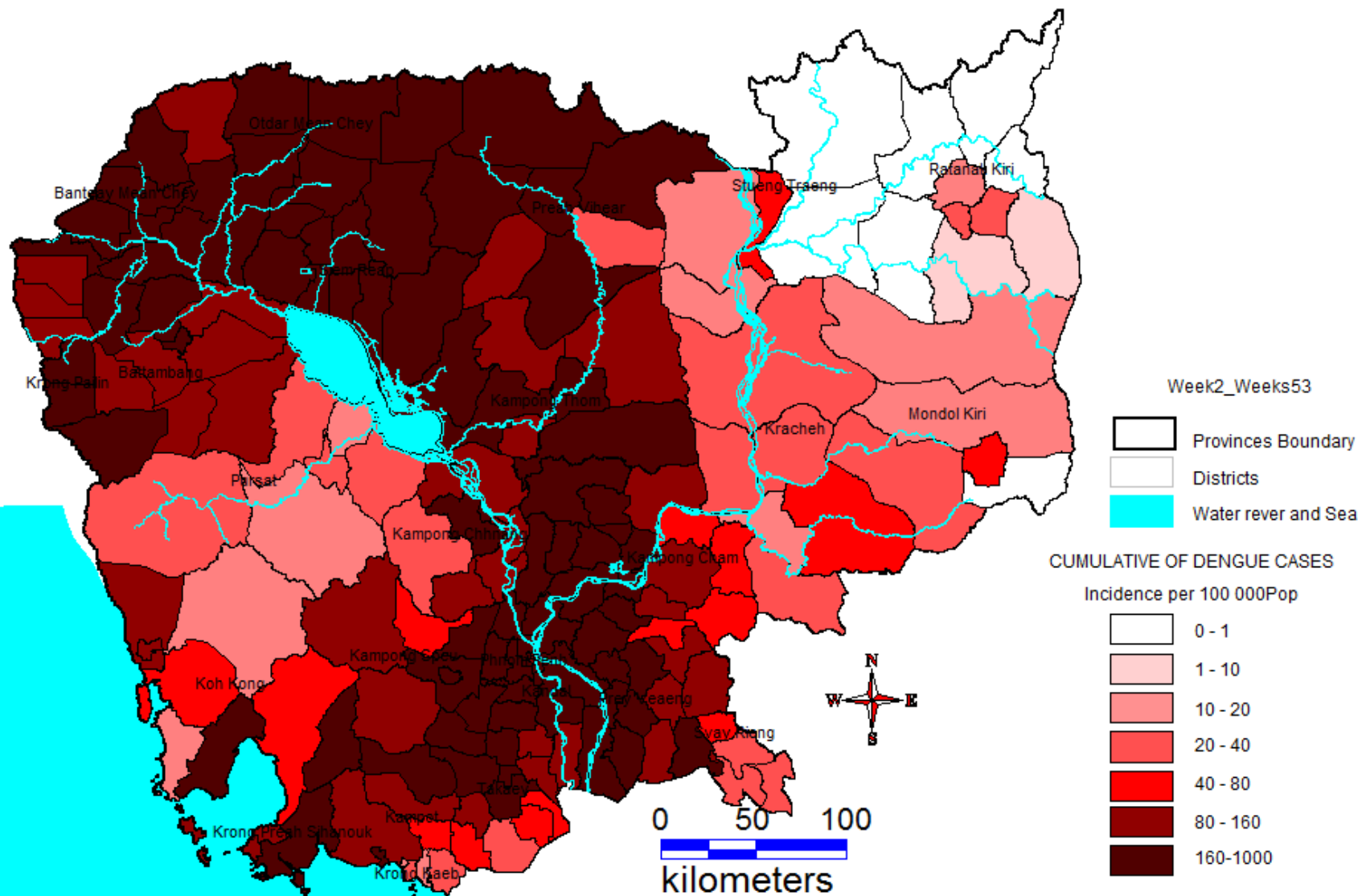
- **National Pediatric Hospital**, Phnom Penh (9.02%),

- **24 Provincial Hospitals** (17.83%),

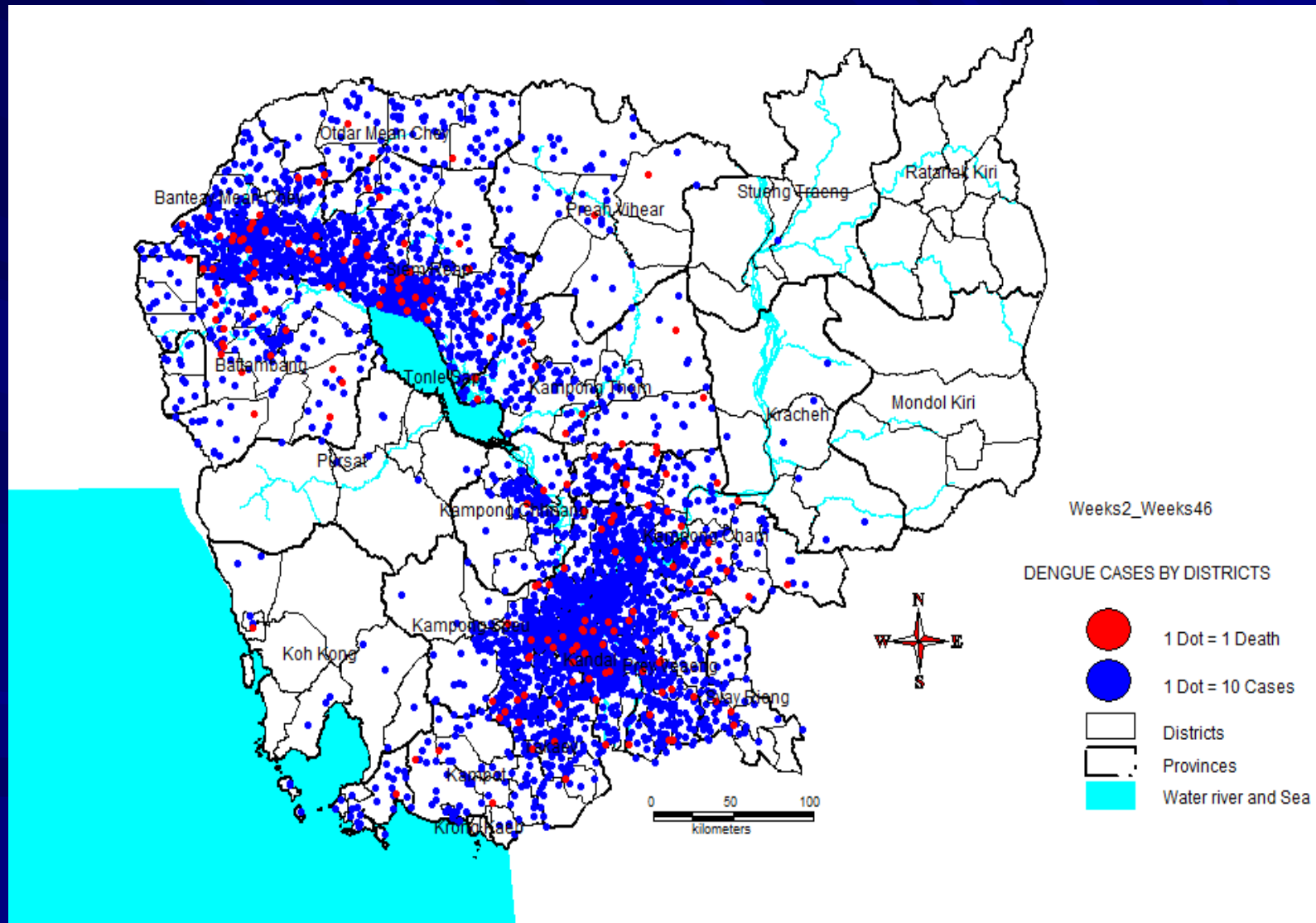
- **Jayavarman VII children hospital** in Siem Reap (29.73%) and,

- **Angkor Children Hospital**_Siem Reap (7.05%).

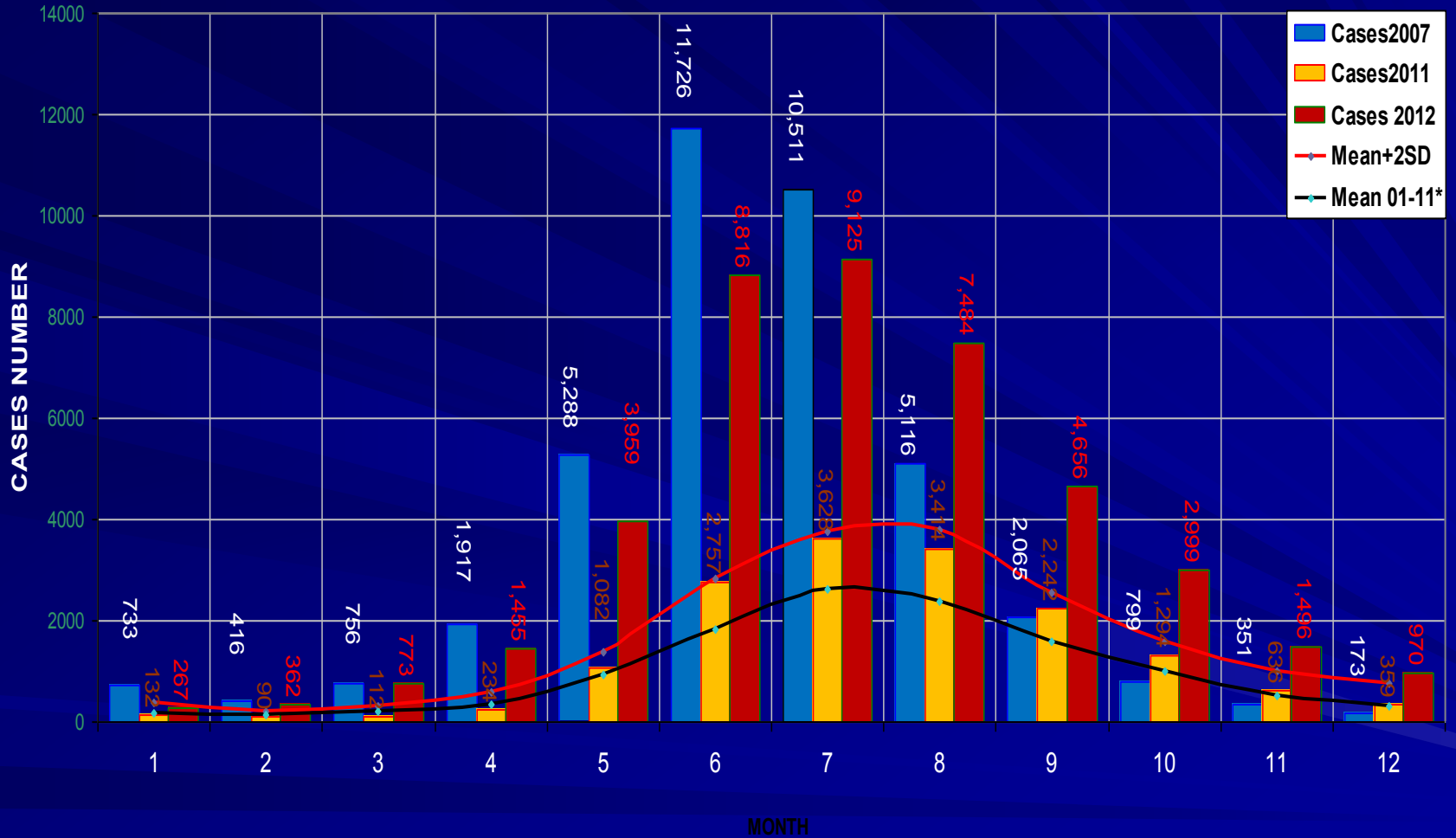
Cumulative Incidence of Dengue cases by District in Cambodia 2012 (42,362/189)



Cumulative Incidence of Dengue cases and Death by District in Cambodia 2012 (42,362/189)

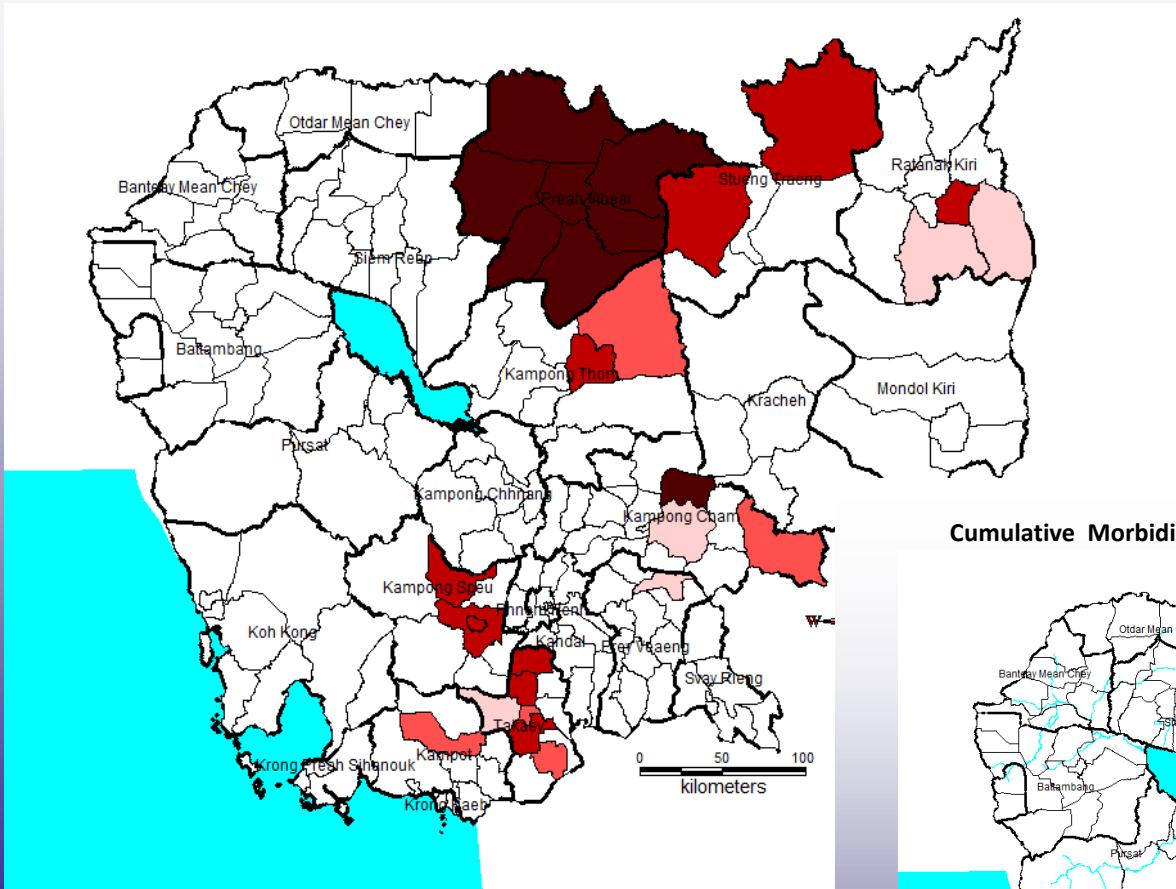


CUMULATIVE CASES OF DENGUE-REPORTED BY MONTH COMPARE WITH BASELINE OF 2006-2011 (* Excluded 2007), CAMBODIA, 2012

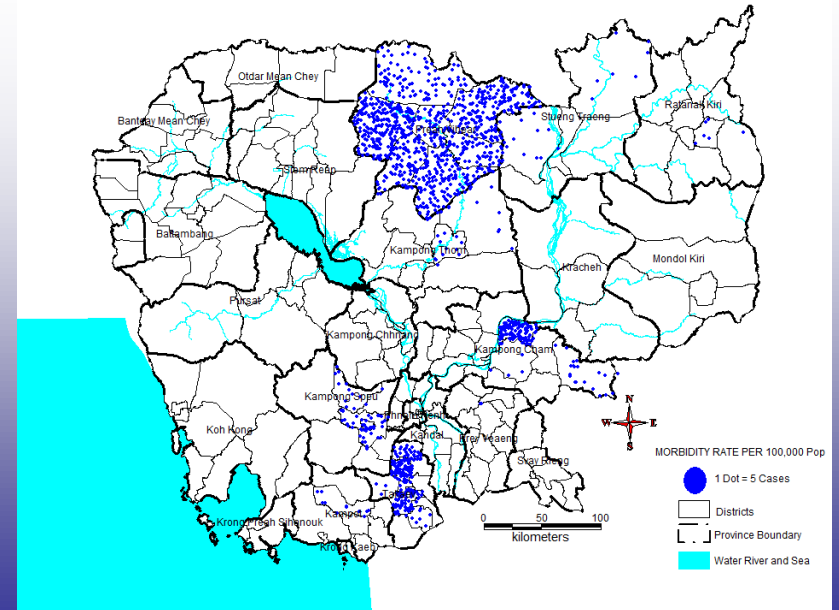


Chik Situation in Cambodia, 2012 (Jan – Jul. 26th)

Morbidity Rate (6.25 - 6,031.68 per 100,000 pop.) by District
(n=12,541)

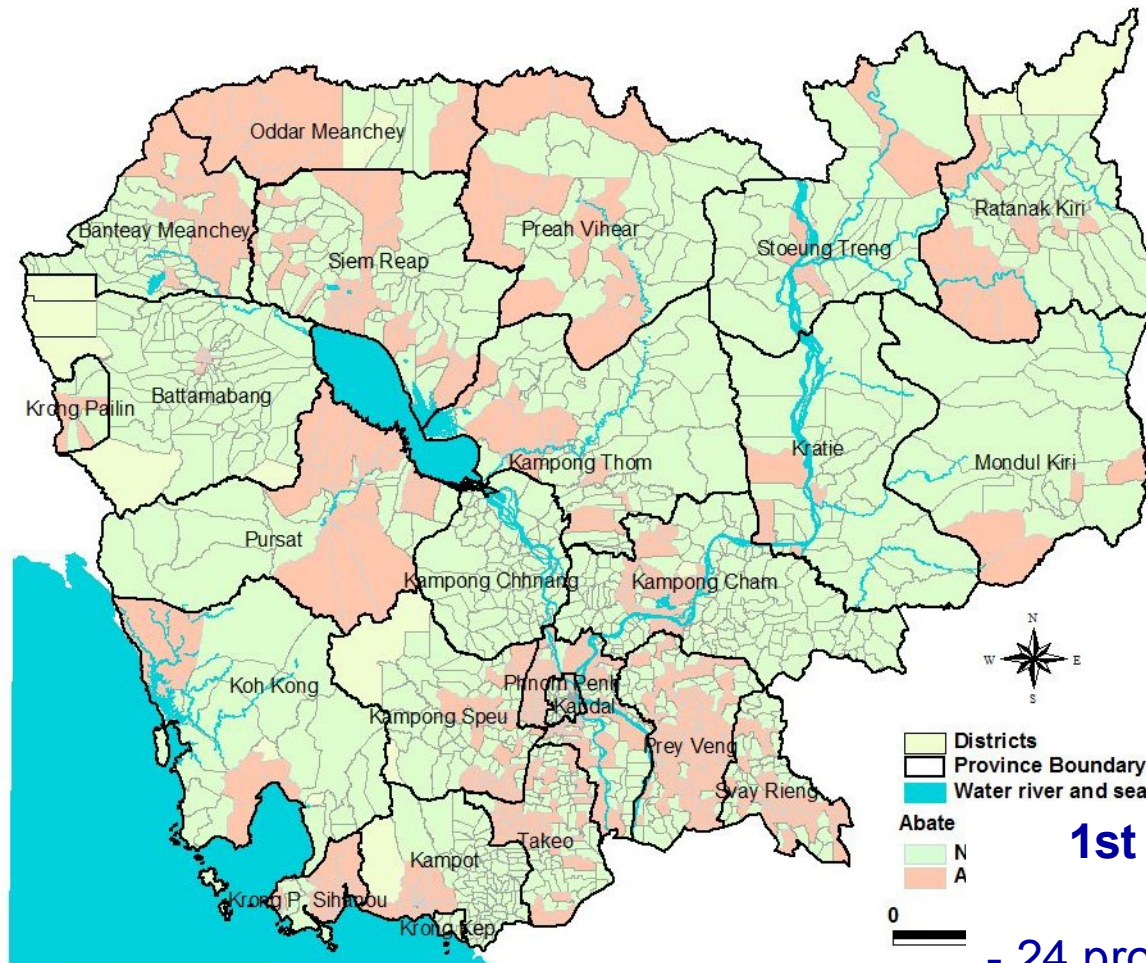


Cumulative Morbidity Rate of Chik by Districts in Cambodia 2012



- **Prah Vihea:** Eight districts (Choam Ksaan, Sangkum Thmei, Tbaeng Mean Chey, Kuleen, Chhaeb, Rovieng, Chey Saen and Prah Vihea Krong)
- **Kg Speu:** (March- April), Korng Pisey district (Trapaang Roka village, Pich Mony commune), Samrong Torng district (Prey Kya village, Sen Dei commune) and Borsedth districts. 500 patients have been clinically identified and 4 blood samples were lab diagnosis positive by NAMRU-2., Tporng (4villages= 500 patients, Phnom Srouch, Prey Khmeng commune 60 patients.
- **Takeo:** (May), Sramor Krom village, Kvav com -mune. 49 patients have been identified and 8 blood samples have been sent to IPC for confirmation. All blood samples were lab positives (4 IgM positives, but PCR negatives, and another 4 were IgM negatives, but PCR positives). Roneam commune, Traang district, Bati district. Taing Dong commune, Daun Keo district.
- **Phnom-Penh:** (May) khan Po Senchey, occurred at Pong Ro village, Ov Lork commune,
- **Kg Cham:** Memot, Kroch Chhma, 5blood samples have been sent to IPC are all positives (PCR: 3+, IgM:2+),
- **And some other provinces**, Kg Thom, Stung Traeng, Kampot, Rattanakiri, Prey Vaeng,.....etc

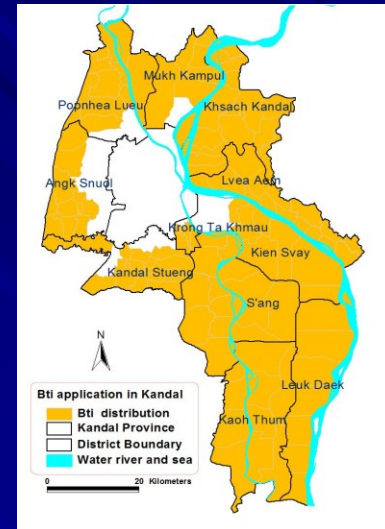
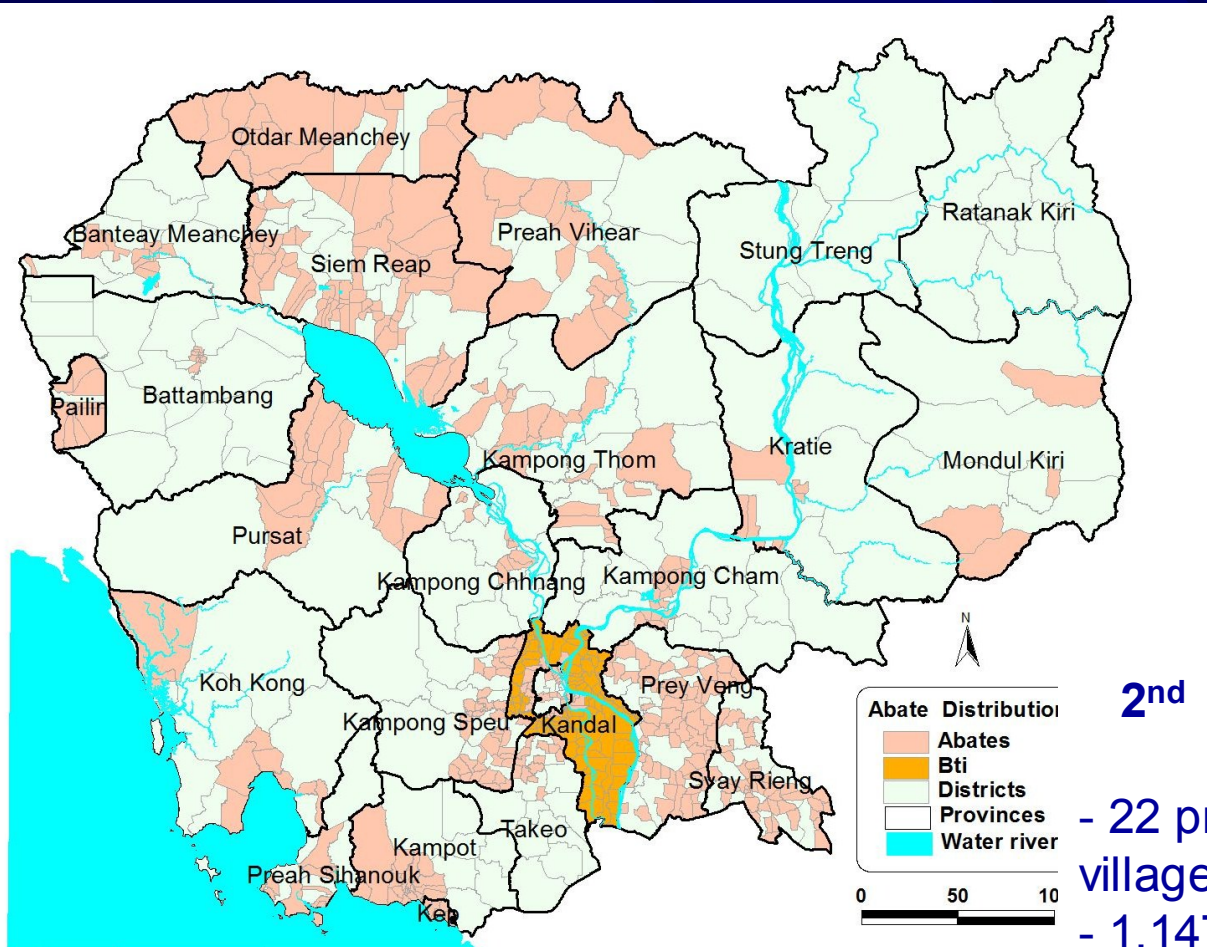
Result on 1st round of Abate Application 2012



1st R Mass Larvicide (May- Jun, 2012)

- 24 provinces= 128 districts= 4,737 villages,
- 1,377,751 houses covered,
= 3,719,700 jars/containers
And protected 4,668,172 million people
- 147,337.45 Kgs Abate used.

Mass Larviciding, 2nd Round Application, August- Sept 2012



2nd R Mass Larvicide (Jul- Aug ,2012)

- 22 provinces= 105 districts= 5,242 villages,

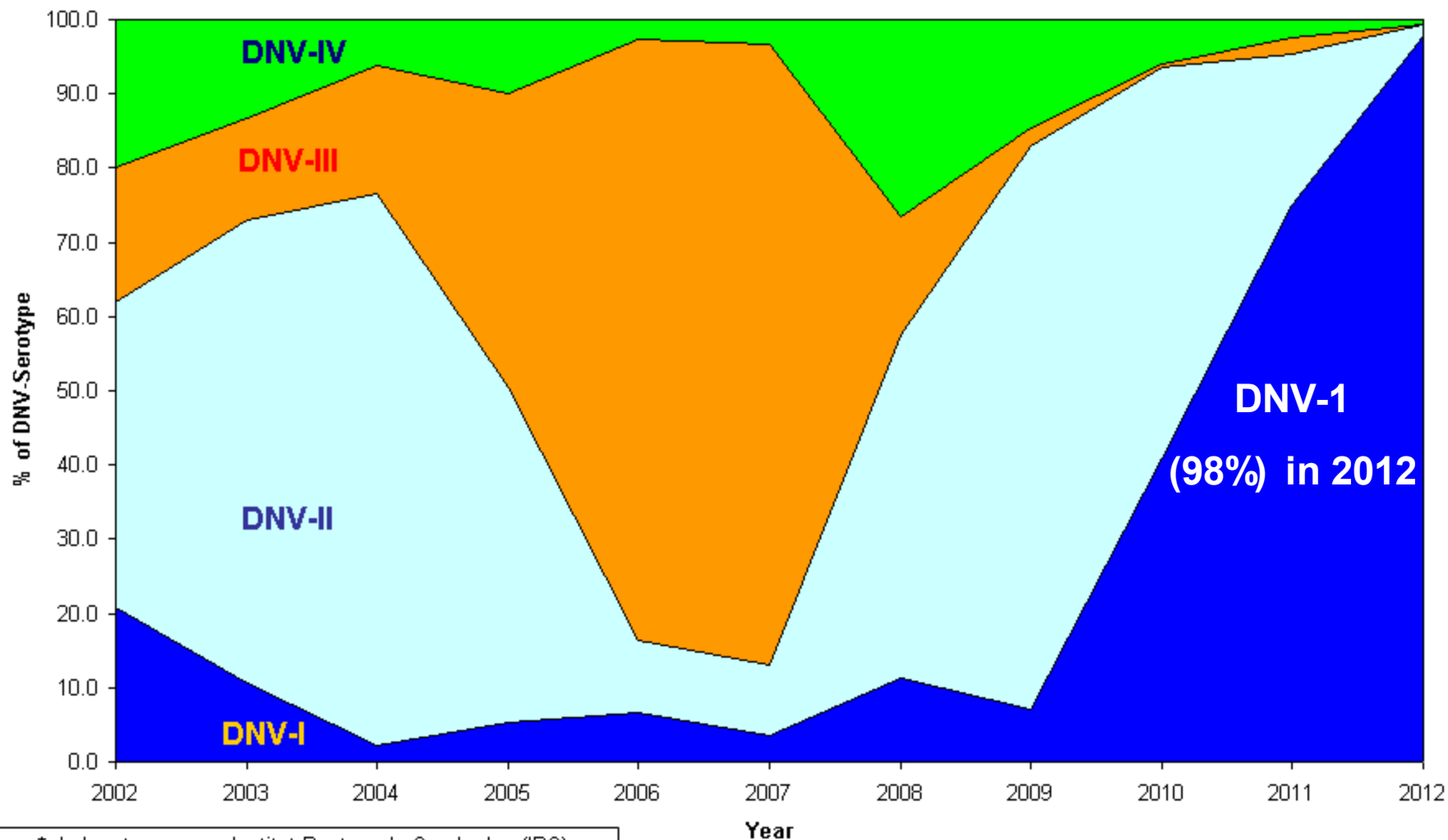
- 1,147,587 houses covered,
= 4,476,420 jars/containers

And protected 5,218,885 million people.

117,731.61 Kgs larvicide used
(111,898.78 Abate + 5,832.83 Bti)..

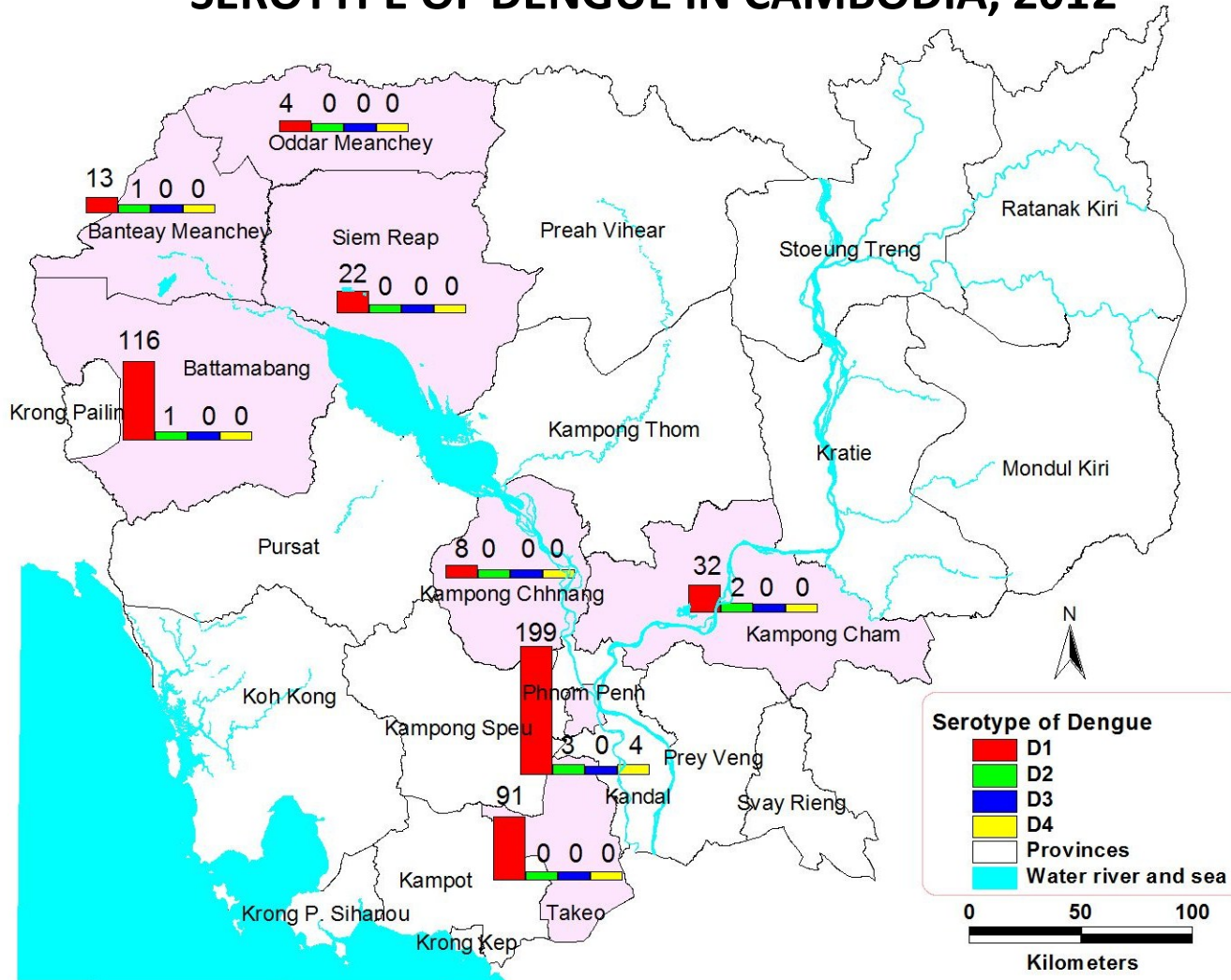
Dengue Virus Circulation in Cambodia, '02-'12

Proportion of Dengue Virus Serotype-Confirmed* by Year from the Five Sentinel Sites, Cambodia, 2002-2012



* Laboratory name: Institut Pasteur du Cambodge (IPC)

SEROTYPE OF DENGUE IN CAMBODIA, 2012



Dengue Virus Circulation in Cambodia, '12

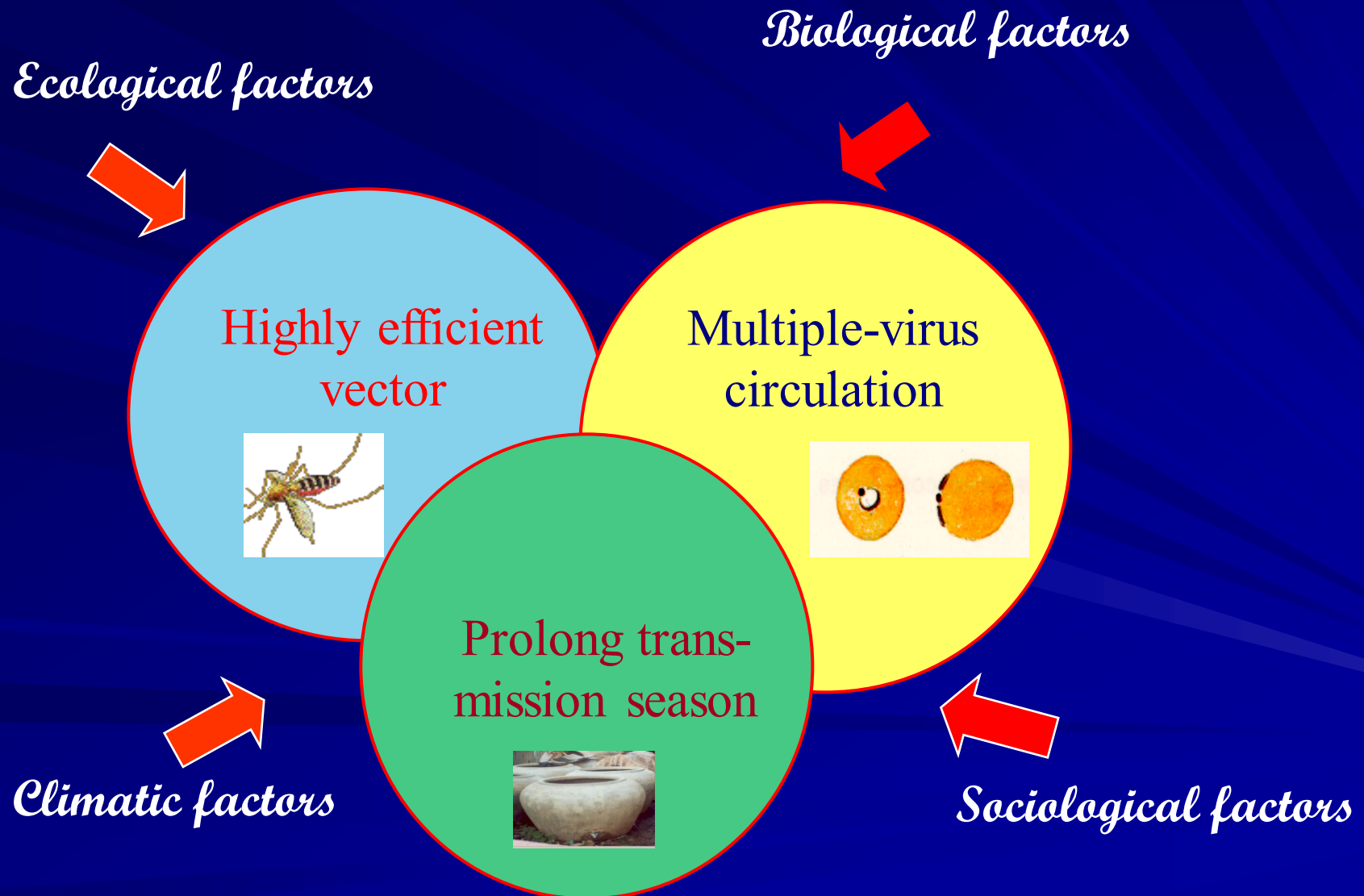
Total of 678 blood samples sent from sentinel sites and outbreak provinces to IPC for testing:

- DENV-1 : 432 (53) cases
- DENV-2 : 07 cases
- DENV-3 : 00 cases
- DENV-4 : 04 cases
- DEN IgM : 40(4) cases
- CHIKV : 49 cases
- CHIK IgM : 25 cases
- JEV : 00 case
- Flavivirus : 60 (5) cases
- Undetermined status (US) : 61 (11) cases

Dengue,

What are the contribution factors ?

Environment factors, ... Risk ?



Dengue's Increasing due to global warming ? (1)

- Mosquitos breeding and more active and risk of Dengue may relating with :
 - tropical environment (increase of breeding)
 - global warming (increase of mosquito activity)
 - extension of geographic areas (increase in transmission)
 - unremitting rainfall (Dengue aggravation)

* Ref. Xun Li, Ling-Zhong Xu; *Dengue aggravation in developing countries in 2007*. *BioScience Trends* 2007;1(1):4; and others:

Dengue's Increasing due to global warming ? (2)

- Social factors:

- 1- Urbanization and population growth may cause substandard housing and inadequate water, sewer, and waste management systems; (Rapid country's development and increase in urban growth in high burden region since 2000; ***Ref. UN population Division 2005***) .
- 2- Tourism may an ideal mechanism for infected human transport of dengue viruses then resulting in a frequent exchange of dengue viruses and other pathogens.
- 3- Poor hygiene is another significant risk factor for dengue infection.

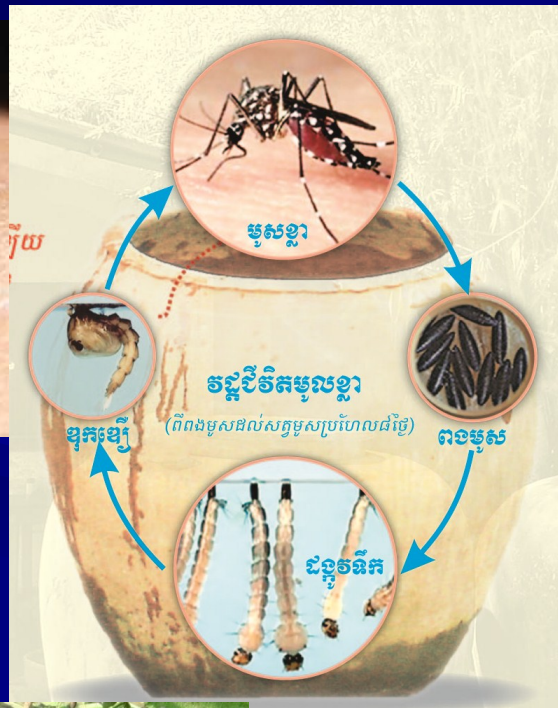
■ Effective mosquito control is virtually nonexistent in most dengue-endemic countries.

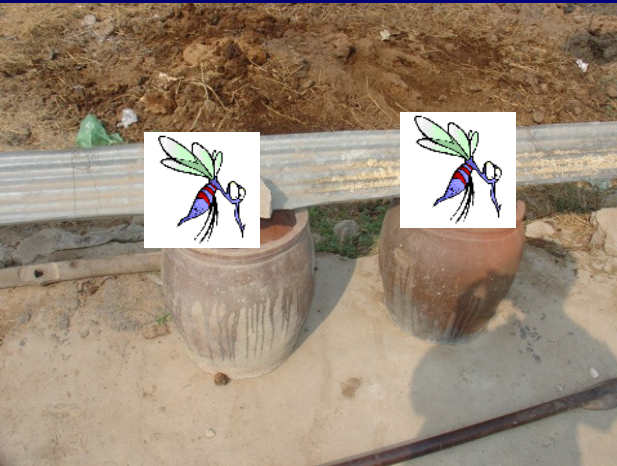
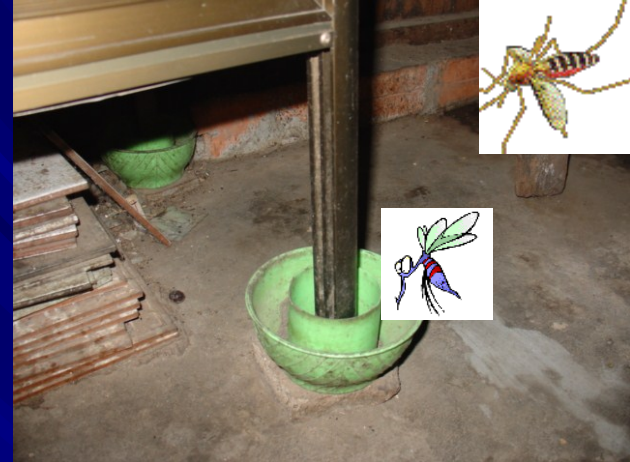
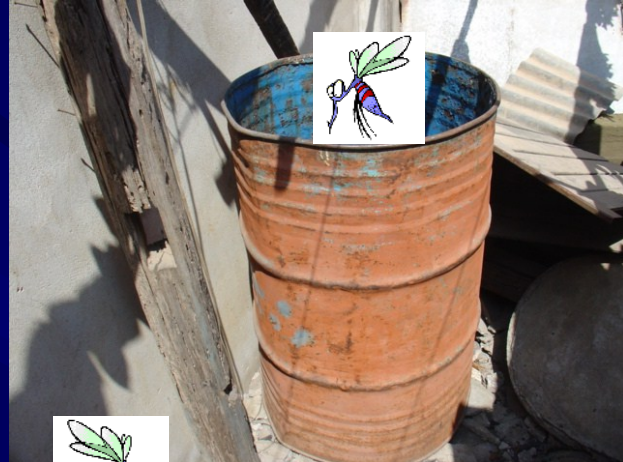
* ***Ref. Xun Li, Ling-Zhong Xu; Dengue aggravation in developing countries in 2007. BioScience Trends 2007;1(1):4; and others:***

Dengue contribution factors, Cambodia :

Why so many manmade containers ?

Substandard housing and inadequate water supply in Cambodia, only 33% in urban and 0.7% in rural; Ref. WHO 2005.





National Dengue campaign Day



■ School-based dengue prevention:

- TOT: Prey Vaeng;
- follow-up training (Prah Vihea, Takeo, Kampot, Mondolkiri, Kg Cham and Kg Speu,.....) and
- extend training courses (Svay Rieng))

■ Mobile HE at the outbreak localities

■ TV Bayon, TVK, Hang Meas, and Apsara,

■ 2 Radio stations (102MHz, 102.5MHz) and

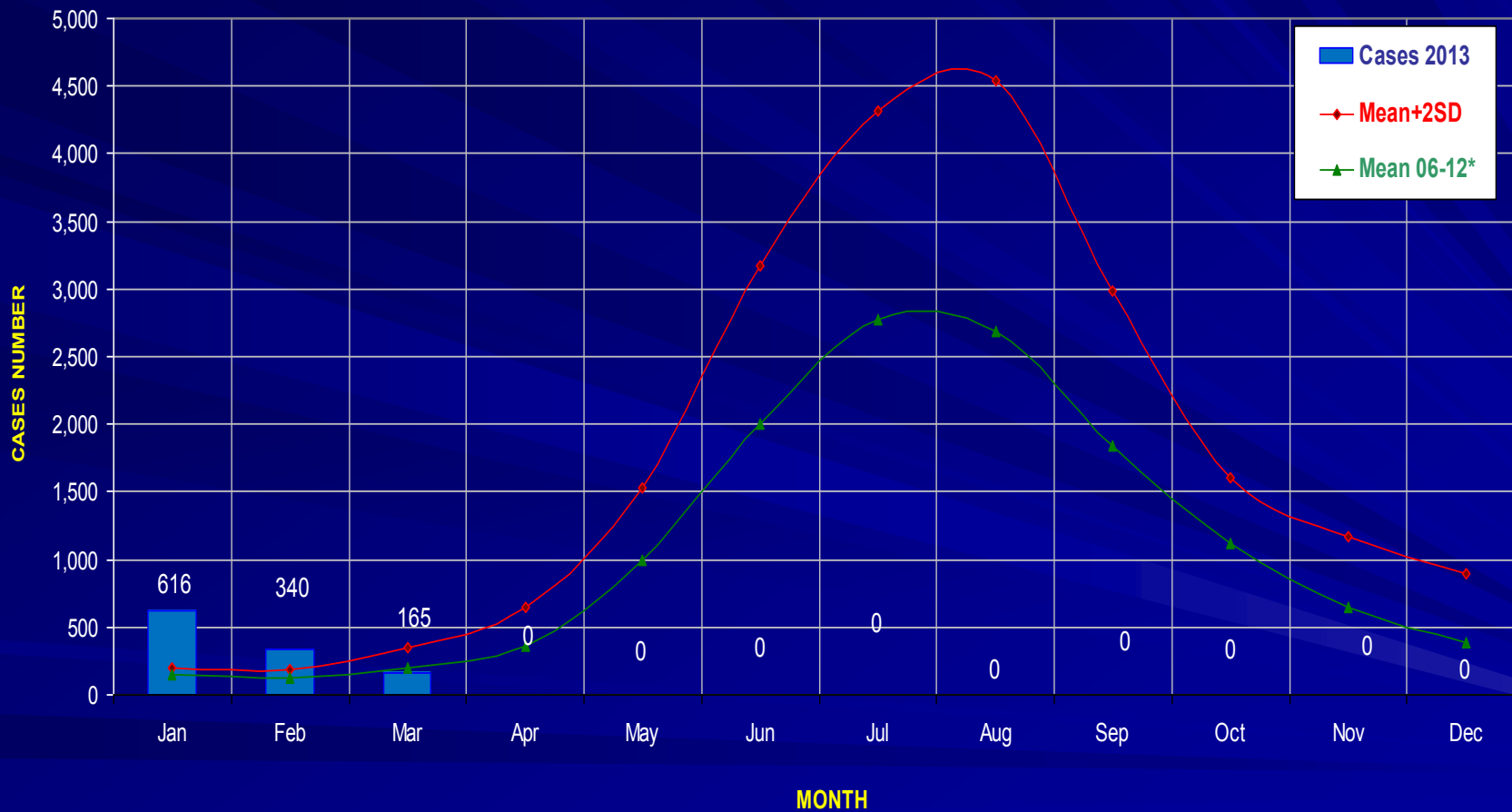
■ 3 Newspapers (Koh Santepheap, Raksmei Kampuchea and Kampuchea Thmei)

■ Training:

- 5 sessions of Clinical Management to MDs,
- 6 sessions of Nursing care training to all health staff of public health facilities ,
- Follow-up training and supervision of drugs and medical supplies prior and during outbreaks,
- Revised the National Dengue Guideline,
- 2 sessions Dengue epidemiology surveillance and GIS training to the sentinel sites,
- 3 sessions on Rational use of Public Health Insecticide.

■ Rapid response activities in the outbreak locations.

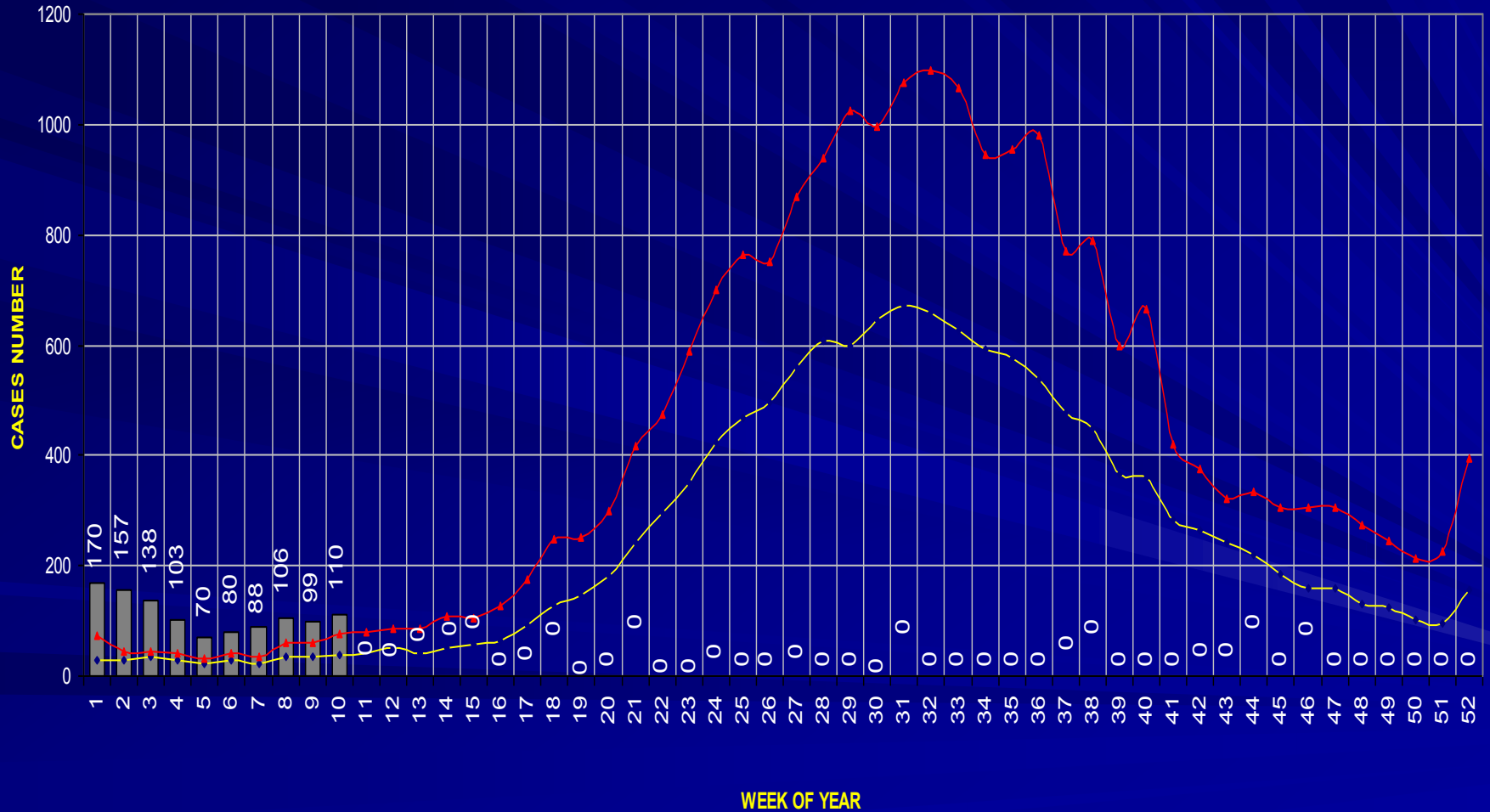
CUMULATIVE CASES OF DENGUE-REPORTED BY MONTH COMPARE WITH BASELINE OF 2006-2012 (* Excluded 2007 and 2012), CAMBODIA, 2013



RELATIONSHIP OF DENGUE CASES BY WEEKS IN CAMBODIA 2013 WITH Mean AND Mean+2SD DURING 2006-2012 (*Exclude 2007 and 2012)

12Mar: 1,121/04

Cases 2013
-♦- Mean*
 -♦- Mean+2SD



Strategic Plan and Activities, 2012

- Improve and strengthen the quality of the existing surveillance system;
- Strengthen emergency preparedness and outbreak containment;
- Promote awareness of people (community/school-based health education, TV broadcasting);
- Implement mass larviciding in high risk provinces as preventive control measure (2 rounds/ year);
- Improve health staff capacity on clinical diagnosis and management;
- immediate carry-out a rapid responding activities (vector management, regularly data analysis, mobile HE, ...etc.);
- Accelerate operational research.

2013 Dengue AOP: What have been done ?

	Y	N
■ Strengthen Epidemiological and Serological surveillance,	X	
■ Program Management,	X	
■ Preparedness for outbreak intervention:		
- National Dengue Health Campaign Day,		26 Apr
- Supervision,	X	
- 2 rounds of Mass larviciding application (Apr-May and Jul-Aug),		Apr-May
- Training (CMT to MDs-MAs and Nursing care, School-based training,		
- Health Education,	X	
-,		
-	X	
■ Vectors Survey (PP, KDL, BMC, Siem Reap and Mondulkiri),		
■ Outbreak Response: Rapid Response activities:	X	
- Field Investigation and Rapid Response,		
- Training (Epi-GIS training, VC training,...)		

Summary of Dengue Situation, Cambodia up to 2012

- Dengue situation showed increasing trend, 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 ...?)

- Dengue in 2012:
 - Epidemic situation since the 11th week
 - Peak backward in 3weeks but rigorously the decreasing trend
 - reaching the national indicator for only CFR (<0.6%) neither IR (>265.8)
 - Dengue serotype (DENV) 1 was predominant within 4 years interval from DENV-3 in 2007.

Discussion & Conclusion

- Dengue in Cambodia shows steeply increasing trend, why?.
- Nevertheless, effective dengue prevention and control on time, why?.
- Currently, no Dengue vaccine available.
- Very high breteau index during the rapid response activities at the dengue outbreak locations of outbreak provinces and high dengue cases reported at the end of the year, over the lower limit of 5 previous years, year 2012 should pay attention of dengue outbreak during next dry season of year 2013.
- The dramatic global emergence of DF/DHF are **complex and not well understood**, thus **Early Warning System** should be focused for reducing burden of Dengue (*e.g. epidemiological surveillance system, water monitoring, and climate monitoring system, but how to integrate ?*).

Acknowledgements

Donors and technical advisors:

- Ministry of Health, Cambodia;
- USAID; WHO;
- HSSP2-Pooled Fund;
- ADB-GMS/CDC2;
- CCCA Trust fund;
- IPC; NAMRU2; REDI-Singapore
- KBH- NPH and PSH;

Collaborations:

- Provincial health departments- Municipality health department, Phnom-Penh;
- NGOs and OIs
- School health department, MOE;
- Local authorities