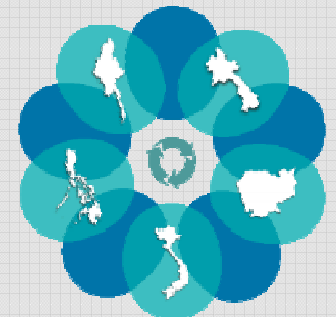


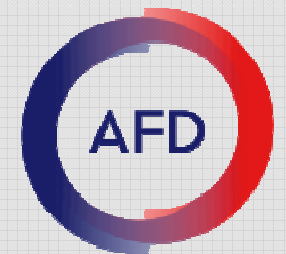
Steering Committee 15-16 January 2019 - Hanoi

Vector Control Intervention in Schools to Measurably Reduce Transmission of DENV in the Community

Sowath LY, Sebastien BOYER, Veasna DUONG, Philippe DUSSART, Patrice PIOLA,
Vichheka KHUON, Rithea LEANG, Didier FONTENILLE



ECOMORE II



WP CAMBODIA





ECOMORE-2, WP Cambodia



- Involvement of authorities
 - National Dengue Control Program, Ministry of Health
 - Ministry of Education, Youth and Sports

- Implementing the study by Institut Pasteur du Cambodge (IPC)
 - Entomology Unit
 - Virology Unit
 - Epidemiology Unit



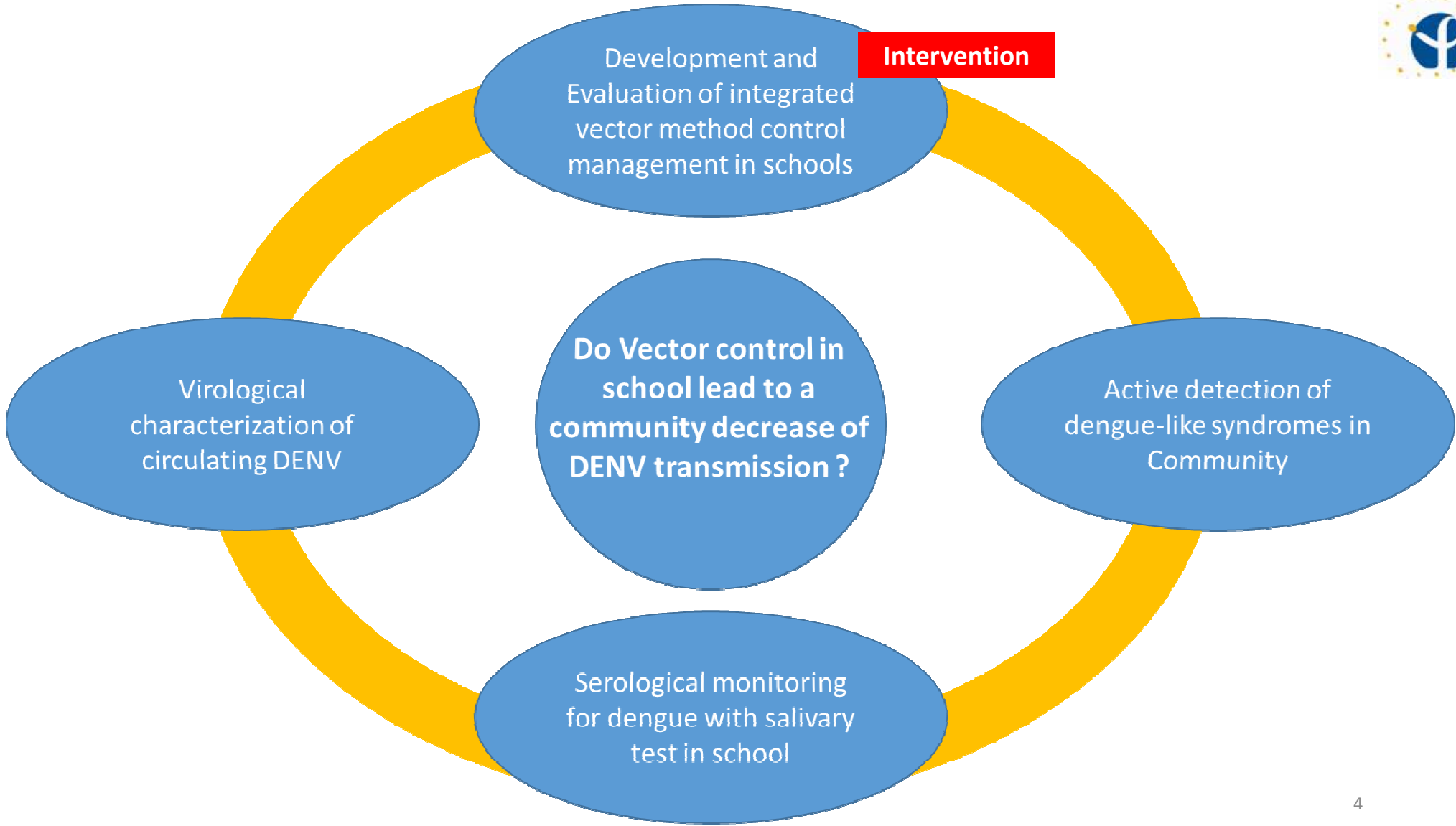
ECOMORE-2, WP Cambodia



Schools could be hot spots for transmission of dengue among children in Cambodia



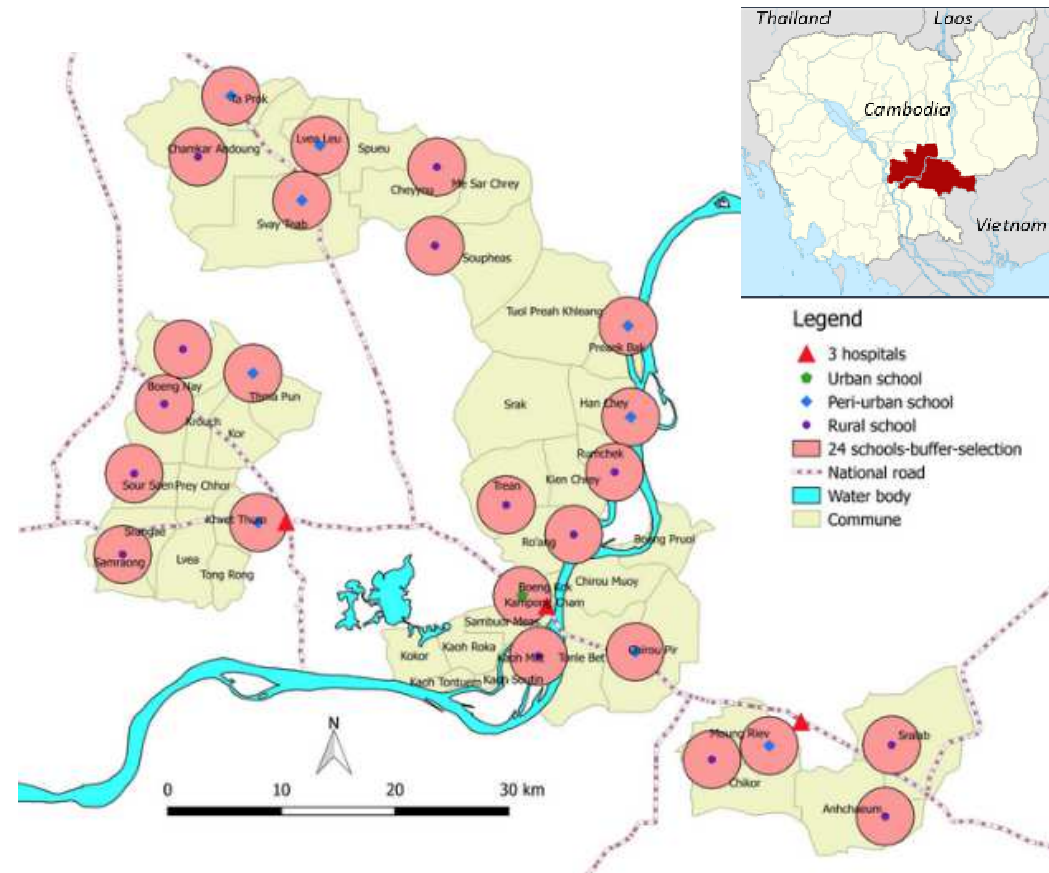
**Do Vector control in school
lead to a community
decrease of DENV
transmission ?**

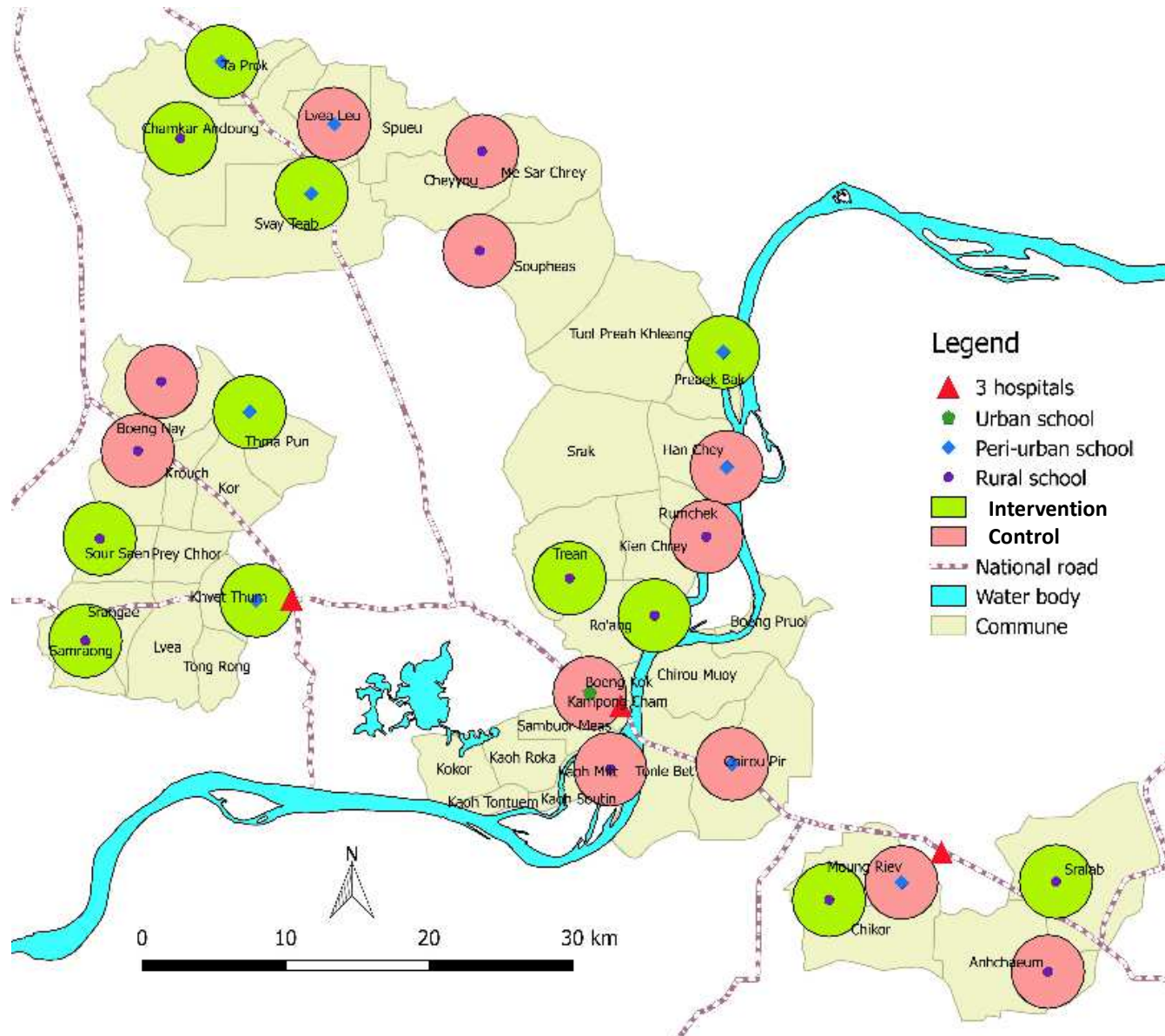


Cluster Randomized Controlled Trial Study Kampong Cham & Tbong Khmum Provinces



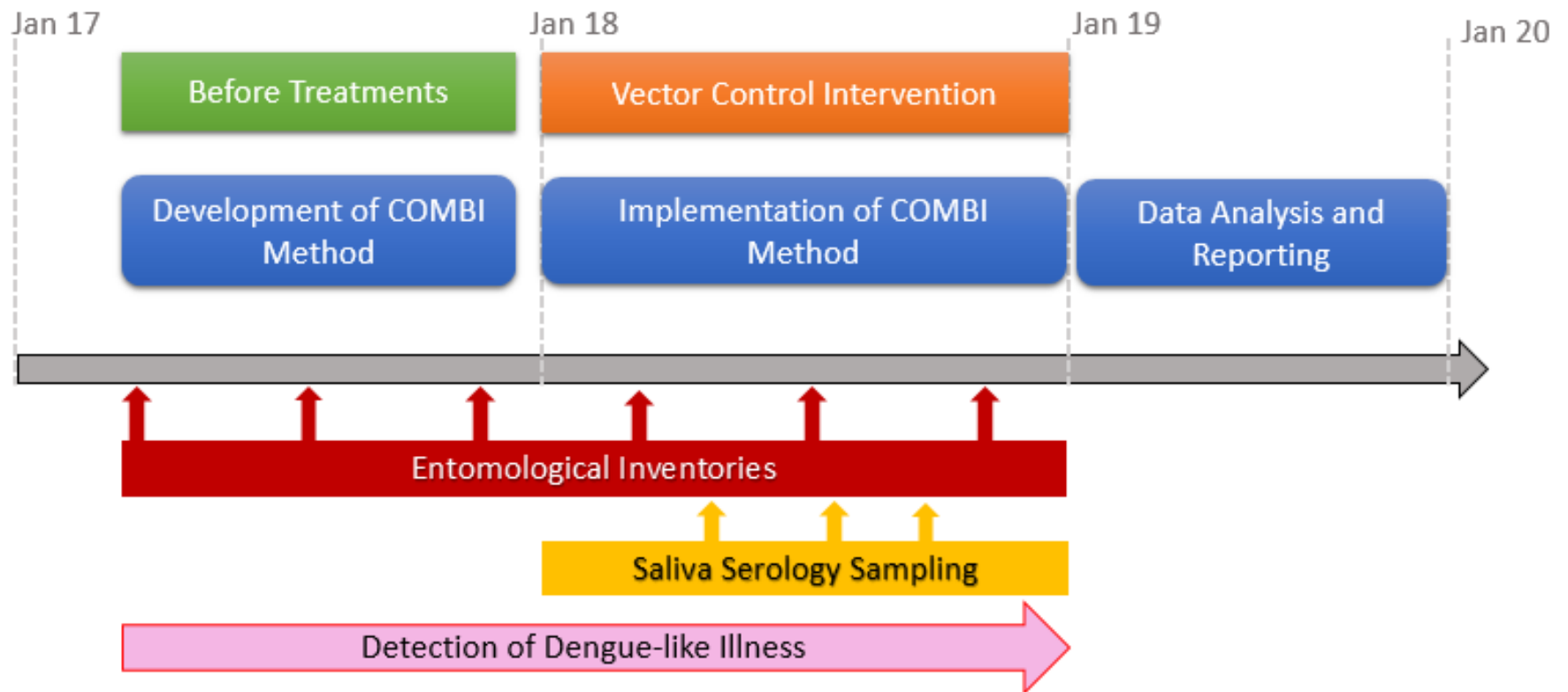
- 24 clusters in 5 districts
 - 71 villages (26 in urban/peri-urban)
 - 78,741 population
 - ~15,000 children aged 5-15 years old
- Defining each study cluster
 - One SCHOOL with primary grade
 - Several VILLAGES (300+ children aged 5-15 y.o.) surrounding and depending on that school
- Intervention arm (12 clusters)
 - Integrated vector control strategy





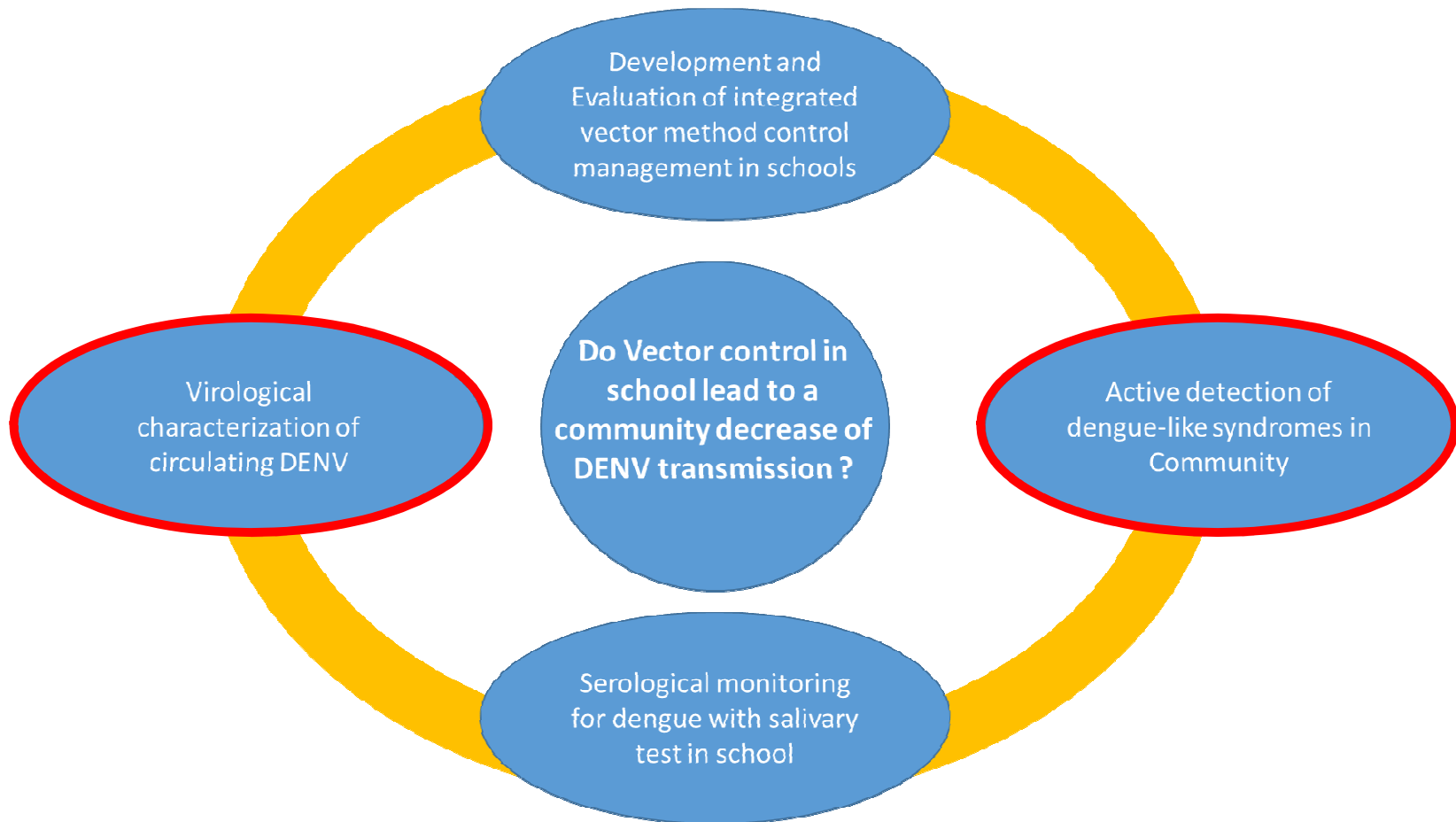


Project Timeline





Active Surveillance of Dengue-like Illness in Communities In Children Aged 5-15 Years Old





Active Surveillance of Dengue-like Illness in Communities In Children Aged 5-15 Years Old

Epi Team at IPC (5 pple)



Nurses from
Health Centers
(42 pple)



Village Health Volunteers (90 pple)



Local Monitors
Kg Cham (6 pple)



Detection of Fever Cases

Weekly Home Visit by Village Health Volunteers (VHV)



= No fever



= Not available



= Refusal or
Move to live
elsewhere

**Record
Temperature**

= in case
of fever

កម្មវិធីត្រួតពិនិត្យ... ឃុំ... ឆ្នាំ... ប្រភេទ... ឆ្នាំ...

ខែ មិថុនា ឆ្នាំ ២០១៧

ក្រប	មេត្រូឡា	សមាជិក	ភេទ	ថ្ងៃខែឆ្នាំ កំណើត	អាយុ	Calendar by month														
						1	2	3	4	5	១	២	៣	៤	៥	៦	៧	៨	៩	១០
1	ស្រី	ស្រី	ស្រី	០១-០៥-៧១	៤៣															
2	ស្រី	ស្រី	ស្រី	០១-១៨-០១-២០០៥	១២															
3	ស្រី	ស្រី	ស្រី	០១-១៩-០១-២០១២	៥															
4	ស្រី	ស្រី	ស្រី	០១-១៣-៥-២០	៤៧															
5	ស្រី	ស្រី	ស្រី	០១-១០-០៧-៧០	៤៧															
6	ស្រី	ស្រី	ស្រី	១១-៣០-០៨-២០០៩	៧															
7	ស្រី	ស្រី	ស្រី	១១-០២-០១-២០០៨	៩															
8	ស្រី	ស្រី	ស្រី	១១-១២-១១-២០០៧	៩															
9	ស្រី	ស្រី	ស្រី	០៥-០៦-៨៦	៣០															
10	ស្រី	ស្រី	ស្រី	០១-១៥-០៧-២០	៥៥															
11	ស្រី	ស្រី	ស្រី	០១-០៧-១០-២០០៧	១១															
12	ស្រី	ស្រី	ស្រី	០១-០៣-៥-៨៣	៣៤															
13	ស្រី	ស្រី	ស្រី	០១-០៤-១២-២០១២	៥															
14	ស្រី	ស្រី	ស្រី	០១-០៥-៨១	៣៦															
15	ស្រី	ស្រី	ស្រី	១១-០៨-២០០៧	១៣															

Temperature logbook
Children aged 5-15 years old

- ID code
- Name
- Age & DoB
- Gender



Identification of Dengue-like Illness by Village Health Volunteers (VHV)

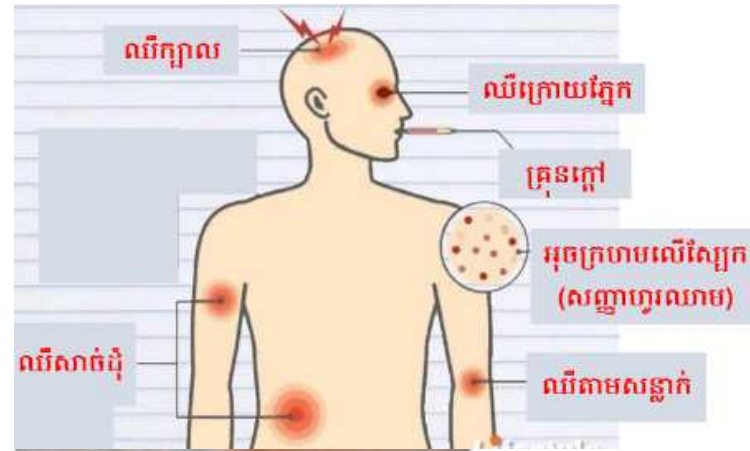


Acute fever ($T^\circ = \text{or} > 37.5^\circ\text{C}$)
with at least 2 other signs below:

- Headache
- Retro orbital pain
- Muscle pain
- Joint pain
- Skin rash
- Bleeding sign at eyes
- Bleeding sign at nose
- Bleeding sign at gum
- Hematemesis
- Melena



Blood sampling for testing at IPC
(acute and convalescence samples within 10-14 days)

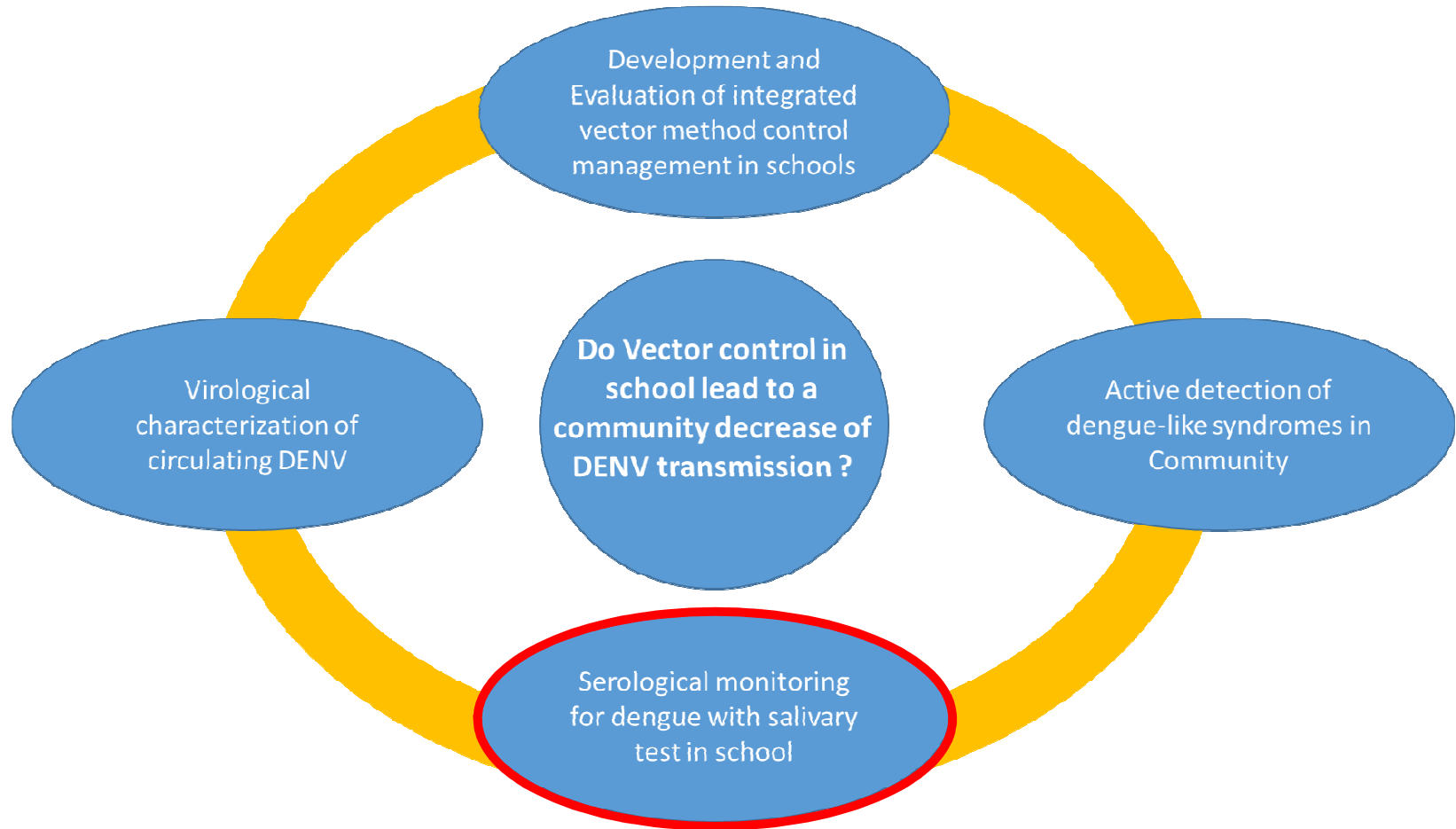


រោគសញ្ញាញរលោម



- ក្អិតមានឈាមឈាមក្រហម
- ដុះមានឈាមឈាមក្រហម ឬ ឈាមក្តៅ (ញរលោមក្នុង ពោះវៀន)

Saliva Testing for Dengue in School Children – Age 5-15 years old

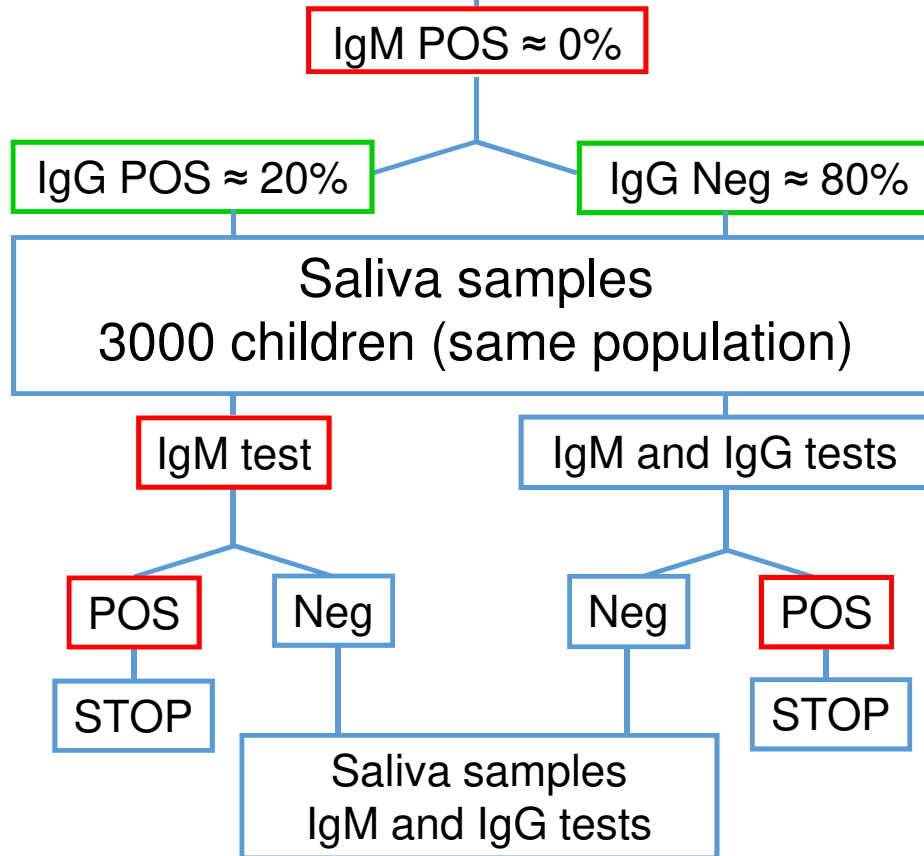




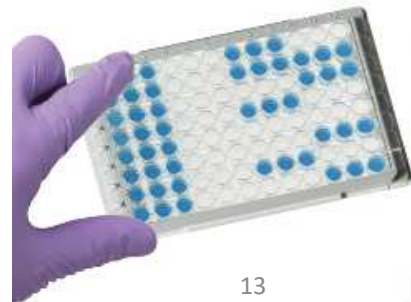
Survey 1
Baseline
21-27 May

Saliva samples - 3000 children, 5-15 y/o
(1500 non-treated area vs 1500 treated area)
Indirect IgG ELISA / MAC-ELISA assays

Survey 2
9-15 July



Survey 3
27-31 August



Saliva Testing for Dengue in School Children – Age 5-15 years old



Saliva collection	Date of collection
Survey 1	May 2018
Survey 2	July 2018
Survey 3	August 2018
Survey 4	November 2018
Survey 5	January 2019

2 additional surveys

Low season
After flooding
and school
holiday



School with flooding



Preliminary Results

Active Surveillance of Dengue-like Illness in Community

Time period	Jun-Oct 2017	May-Nov 2018
Number of villages	71	70
Pop. Aged 5-15 years old	13 000	13 000
Fever	813	1149
Dengue-like Illness	210 25.8% among fever 1.6% among age 5-15 yrs	597 51.9% among fever 4.6% among age 5-15 yrs
Dengue Positive by PCR	12 5.7% among DLI 1.5% among fever	70 11.7% among DLI 6.1% among fever



Collecting blood samples from cases of DLI



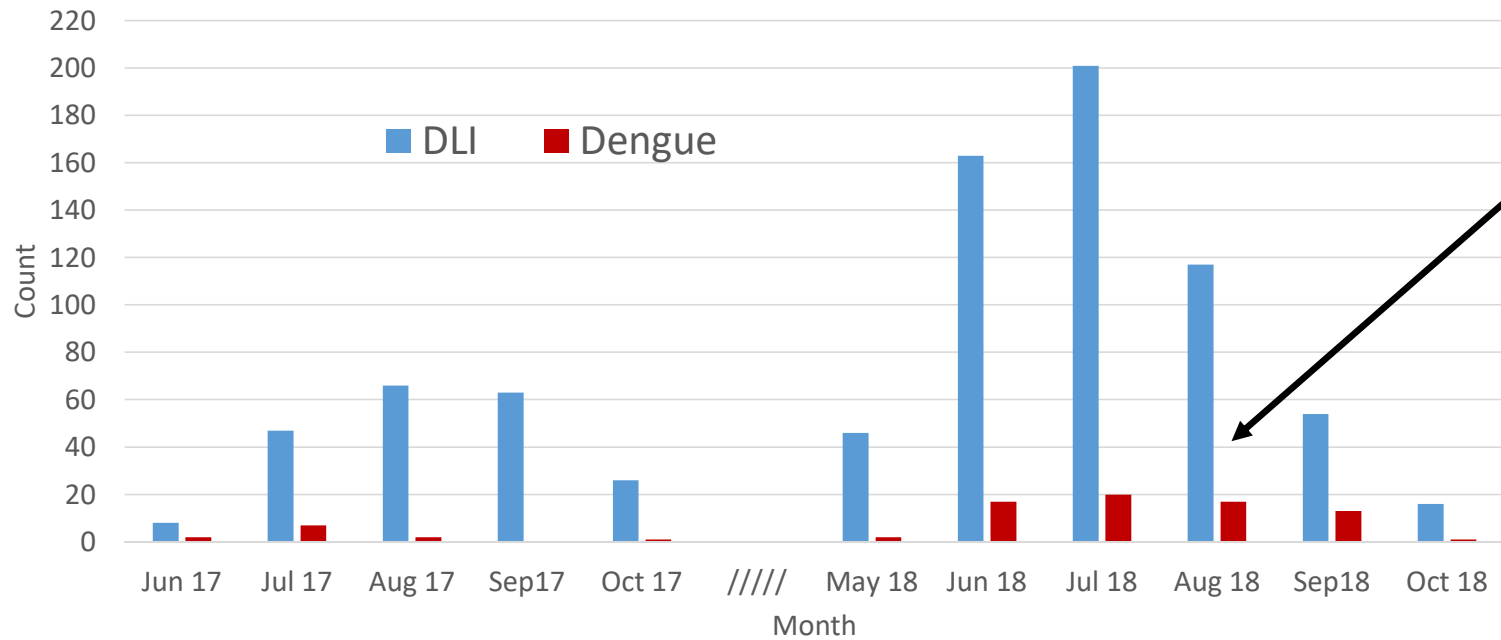
Monitoring - checking VHV temperature record



Preliminary Results

Active Surveillance of Dengue-like Illness in Community

Dengue-like Illness (n=807) and Dengue Positive (n=82)
Active Surveillance, 2017 and 2018 Seasons

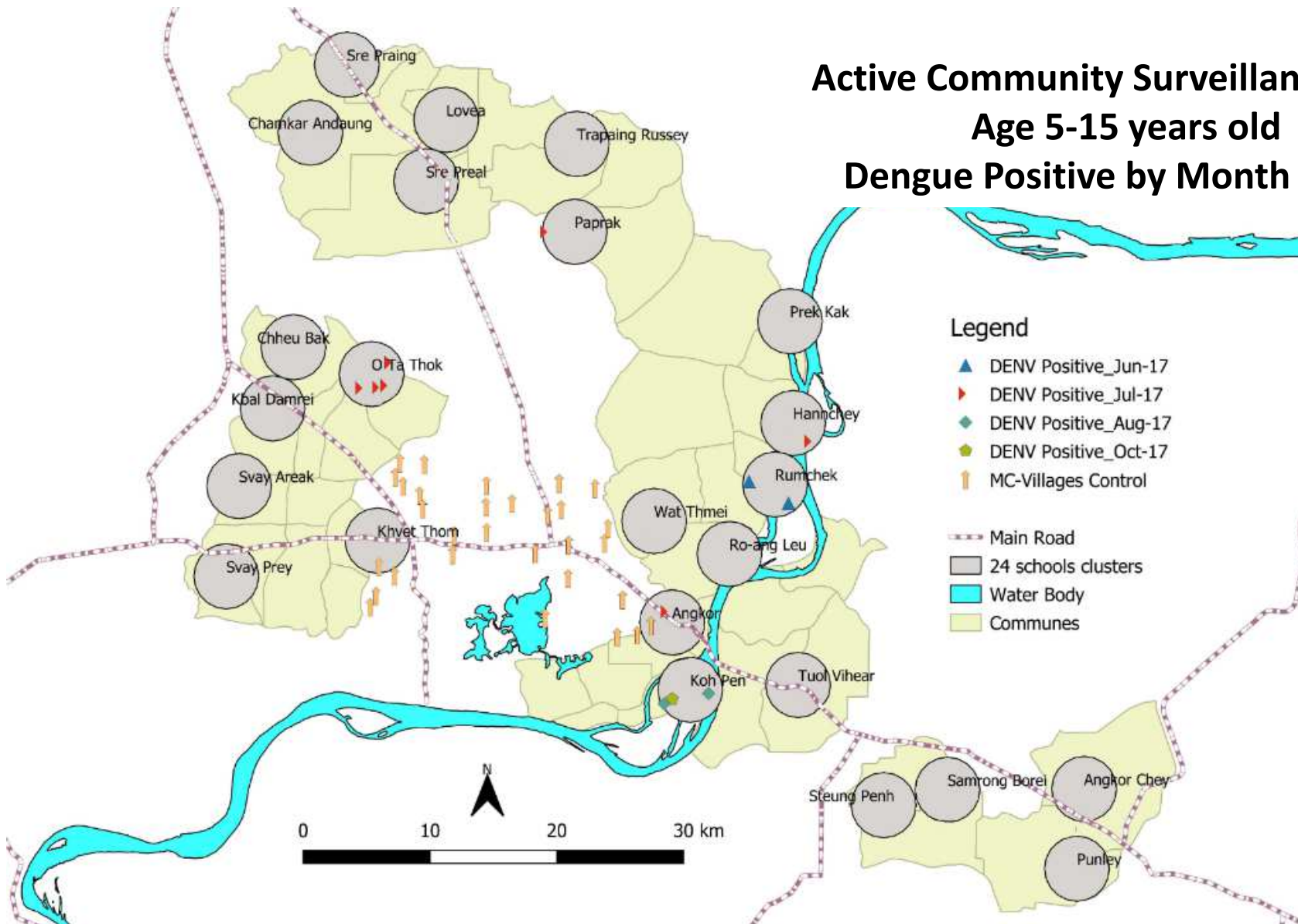


2 clusters affected by flooding during August 2018

Active Community Surveillance, 2017

Age 5-15 years old

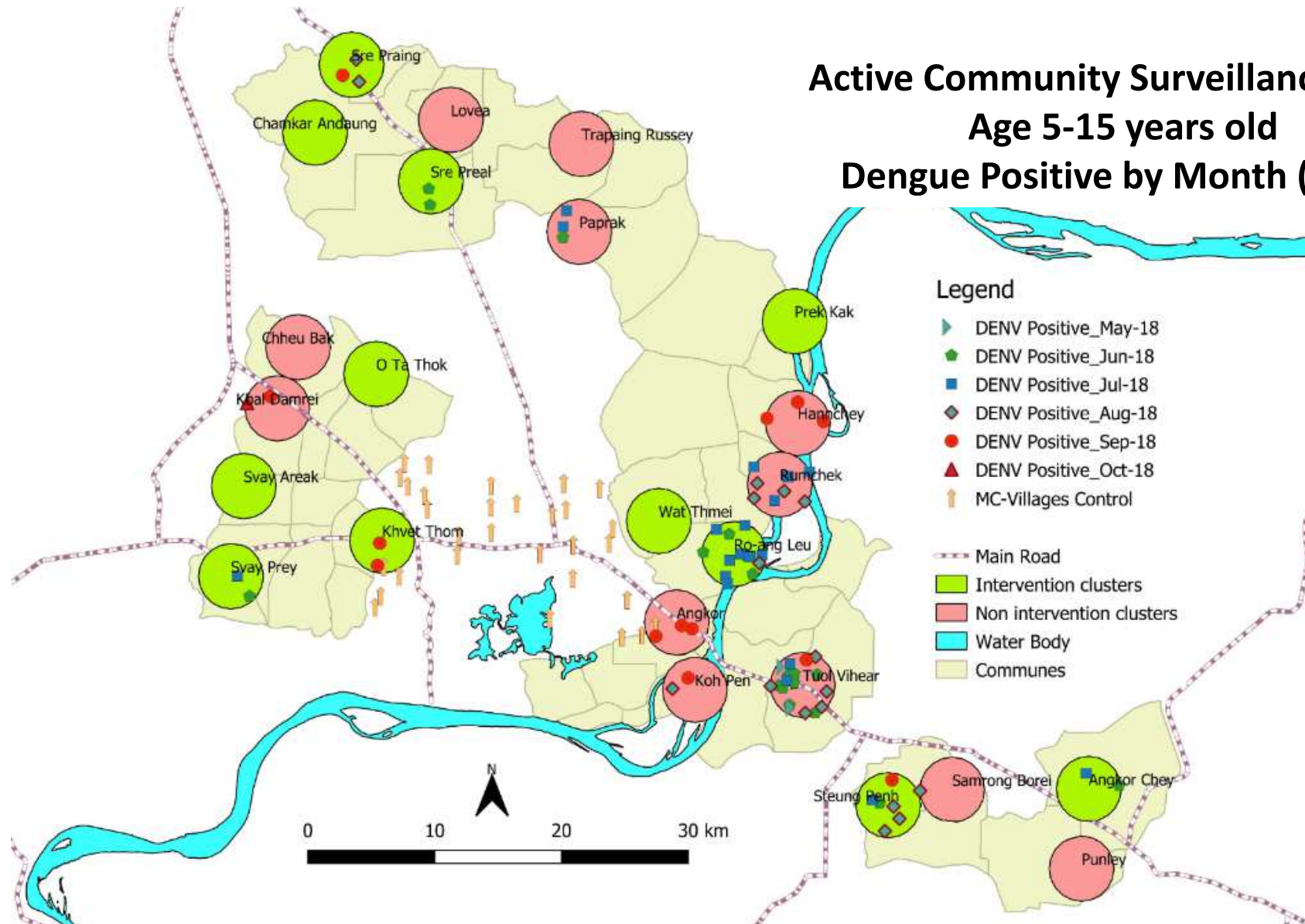
Dengue Positive by Month (n=12)



Active Community Surveillance, 2018

Age 5-15 years old

Dengue Positive by Month (n=70)



Active Surveillance of Dengue-like Illness in Community May 2017 – October 2018

- **Arbovirus diagnostic**
 - **PCR: 807 cases of DLI tested (4 pending)**
 - **82 positive (10.1%)**

Dengue serotype	2017 (n=12)	2018 (n=70)	Total (n=82)
DENV-1	0	23 (32.9%)	23 (28.0%)
DENV-2	10 (83.3%)	36 (51.4%)	46 (56.1%)
DENV-3	0	0	0
DENV-4	2 (16.7%)	11 (15.7%)	13 (15.9%)

Preliminary Results Saliva Testing for Dengue in School Children

Age 5-15 years old





Saliva Testing in School Children

Saliva collection	Nb of saliva	Date of collection
Survey 1	3003	23 -26 May & 13-23 June 2018
S2	2973 (99.0% of S1)	10-20 July 2018
S3	2801 (93.3% of S1)	22-31 August 2018
S4	2556 (85.1% of S1)	12-18 November 2018
S5	ongoing	14-21 January 2019



Collecting children's saliva





Dengue Serology Testing in Saliva - IgG ELISA result

Survey	Tested	IgG Positive	IgG Negative	Equivocal
S1	3003	92 (3.1%)	2902 (96.6%)	9 (0.3%)
S2	2973	110 (3.7%)	2856 (96.1%)	7 (0.2%)
S3	2801	108 (3.9%)	2687 (95.9%)	6 (0.2%)
S4	2556	Testing ongoing		
S5	Saliva collection ongoing			

Seroconversion

S1 (Negative) → S2 (positive): **84 (2.9%)**

S1 (Negative) → S2 (Negative) → S3 (positive): **76 (2.8%)**

Analyze by cluster: ongoing



Conclusion

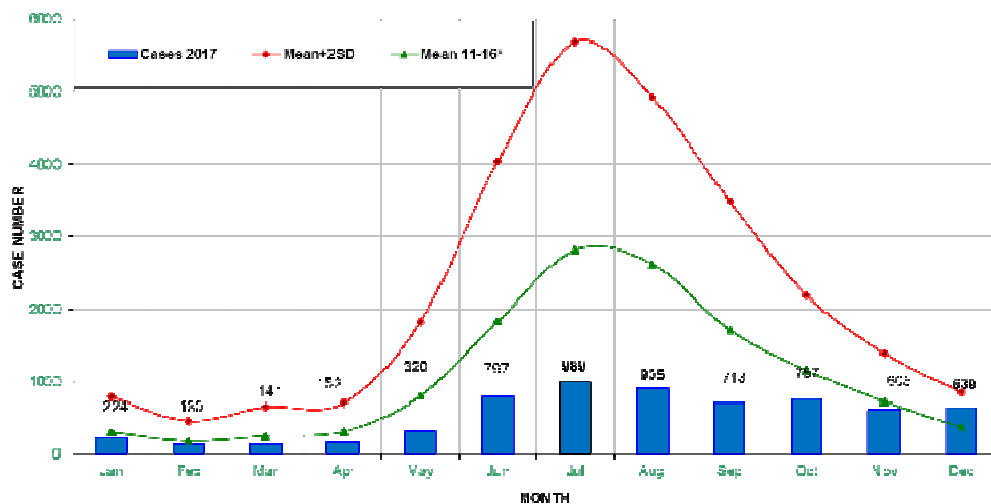
- Active surveillance of DLI was finished by end of October 2018
- More detection of Dengue-like illness and dengue positive cases in 2018 compared to 2017
- Overall excellent participation of children in community and in schools
- Two additional saliva collection in school children (4th and 5th sessions)
 - 5th sessions ongoing
- Lost of follow-up in saliva collection: flooding in August 2018 and change school grade above primary school
- Laboratory testing is still ongoing
 - Serological testing on saliva and blood samples
 - Virological characterization of DENV
- Continue with data consolidation and in-depth statistical analysis to assess the effect of intervention between the 2 study arms



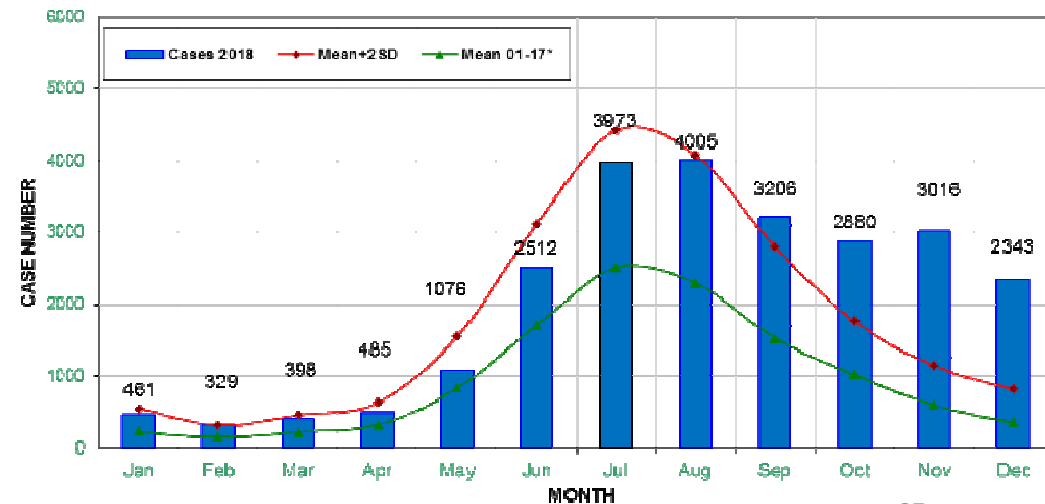
Syndromic Hospital Surveillance, National Dengue Control Program, Cambodia, 2017-2018

- Low circulation of Dengue in 2017

CUMULATIVE CASES OF DENGUE-REPORTED BY MONTH, 2017
COMPARED WITH BASELINE OF 2011-2016 (* excluding 2012), CAMBODIA



CUMULATIVE CASES OF DENGUE-REPORTED BY MONTH COMPARE WITH BASELINE OF 2001-2017(* Excluded 2007 and 2012), CAMBODIA, 2018



Conclusion



Milestonename / Short description	1 st SC	2 nd SC
Senior entomologist PhD deployment		
Study sites identification & selection		
Achievement of field visits to present the project to community and health authorities		
Design of the Cluster Randomized Trial Study		
Initial inventory of breeding sites in schools and destruction with participation of scholar		
Result of insecticide sensitivity and selection of products for the control of vectors		
Implementation of adult mosquitoes control		
Installation of auto-dissemination system around schools		
Kits for COMBI ready to be distributed		
Achievement of training of VHV involved in the active surveillance in villages		
Initial supply of saliva tests		
Collection and testing of saliva		
Data of active surveillance collected for statistical analysis		
Issue of recommendations for health authorities		

Acknowledgements

- Nurses from local health centers
- Village health volunteers (VHV)
- School teachers in saliva collection
- Field monitoring teams
- Laboratory team, Virology Unit, IPC
- Team at Epidemiology and Public Health Unit, IPC

- Parents of children participants



Saliva tubes



Field team



Preparing for survey



Meeting with VHV



Interview



Interview parents



Teachers collecting children's saliva

THANK YOU FOR YOUR ATTENTION !

