

A map of Malaysia with numerous red and purple markers indicating dengue hotspots, primarily concentrated in the central and southern regions. The text is overlaid on this map.

**HEALTHCARE INNOVATION 4.0 SUMMIT MALAYSIA**

**TECHNOLOGY PARTNERSHIP IN  
EFFECTIVE CONTROL OF DENGUE  
AND  
VECTOR BORNE DISEASE IN MALAYSIA**

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MINISTRY OF HEALTH MALAYSIA**

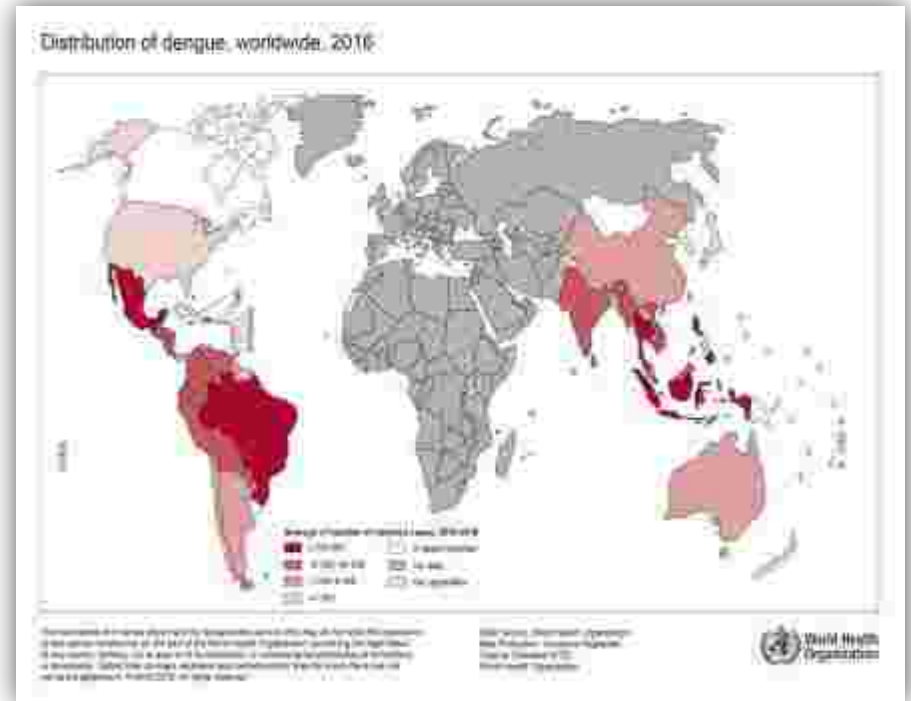
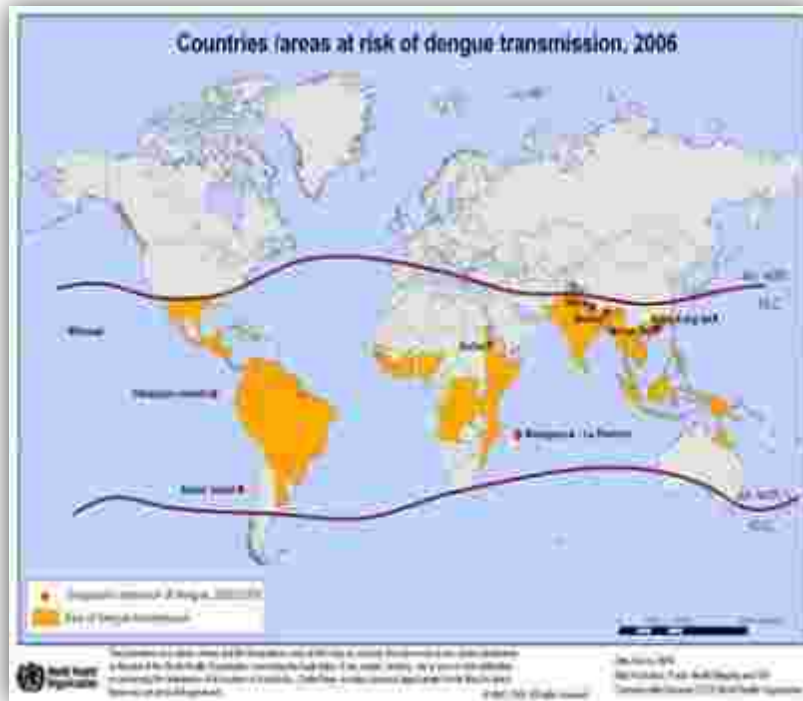
**KUALA LUMPUR  
23 OCTOBER 2018**

# OUTLINE OF PRESENTATION

- Dengue situation in other countries and in Malaysia
- Factors contributing to dengue incidence
- National Strategic Plan (NSP) for Dengue Prevention and Control
- Dengue digital surveillance system
- Results
- Conclusion



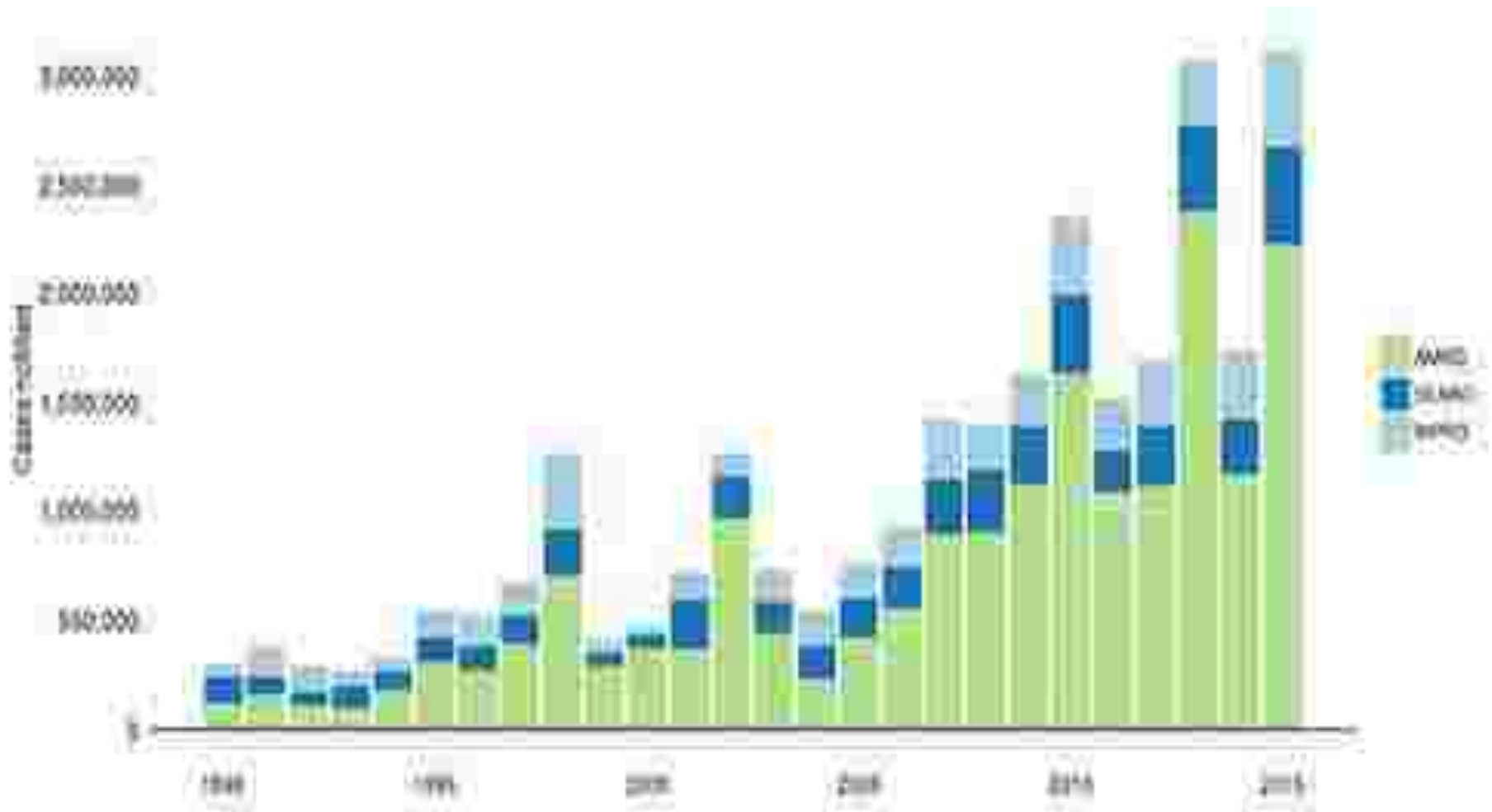
# DENGUE: SPREADING GLOBALLY



## WHO, Dengue and severe dengue, Fact sheet, Updated July 2016

**Before 1970, only 9 countries had experienced severe dengue epidemics.** The disease is **now endemic in more than 100 countries** in the WHO regions of Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific. The Americas, South-East Asia and Western Pacific regions are the most seriously affected.

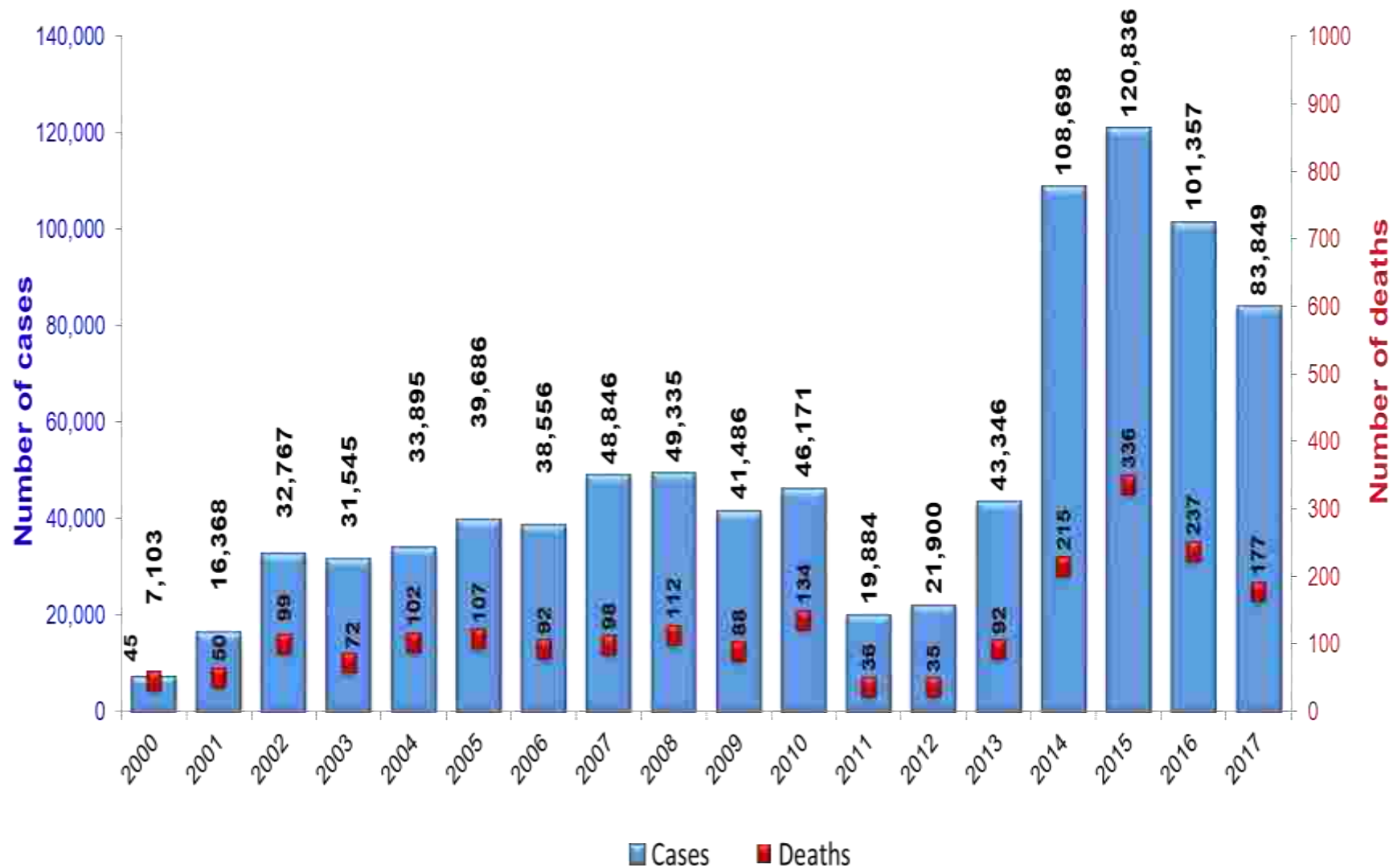
# GLOBAL SITUATION: NUMBER OF DENGUE CASES (SUSPECTED OR LABORATORY CONFIRMED) NOTIFIED TO WHO SINCE 1990.



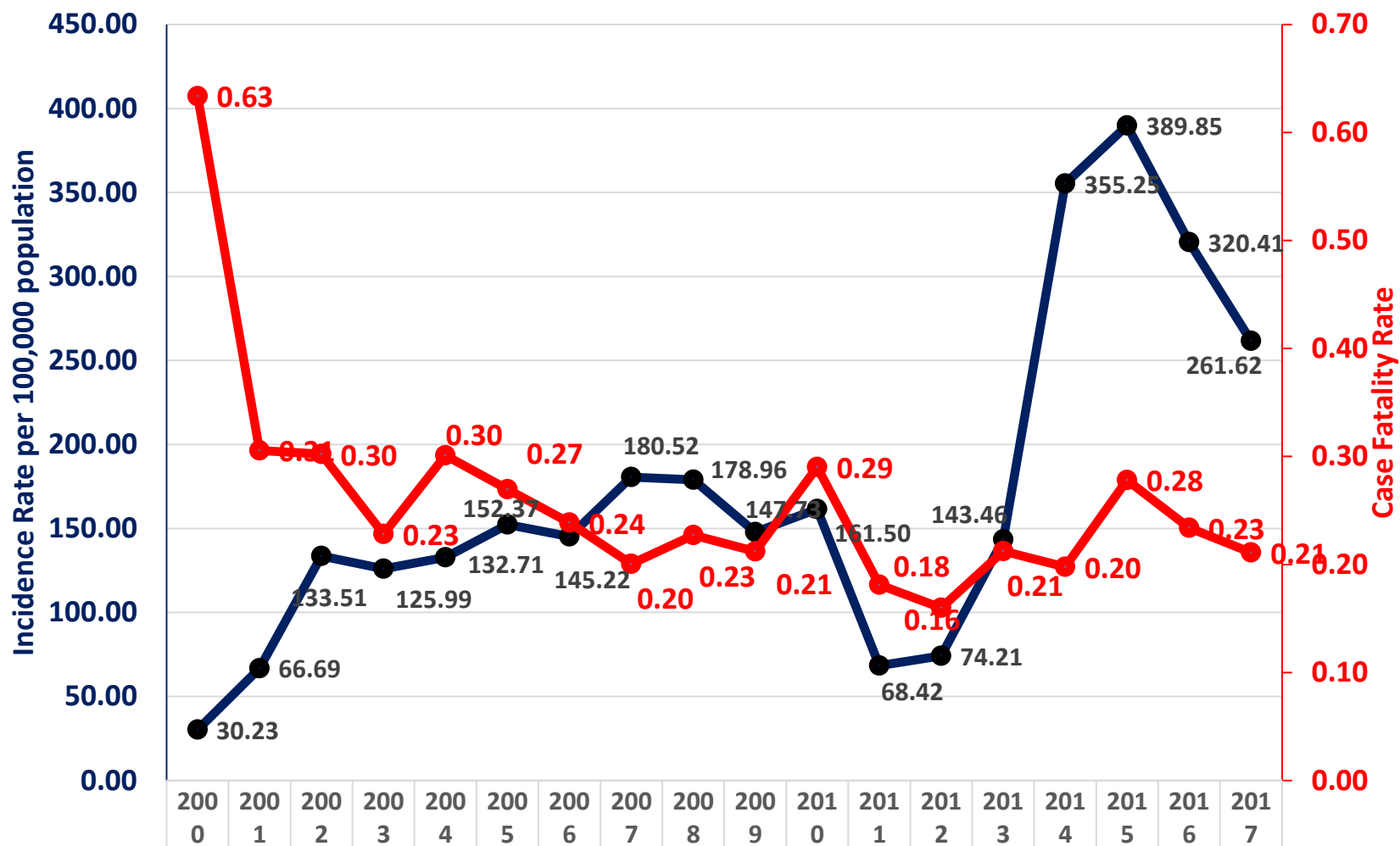
Member States in three WHO regions regularly report the annual number of cases to the WHO – AMRO, SEARO, WPRO

*Source: WHO, Geneva*

## Dengue cases and deaths in Malaysia (2000 – 2017)

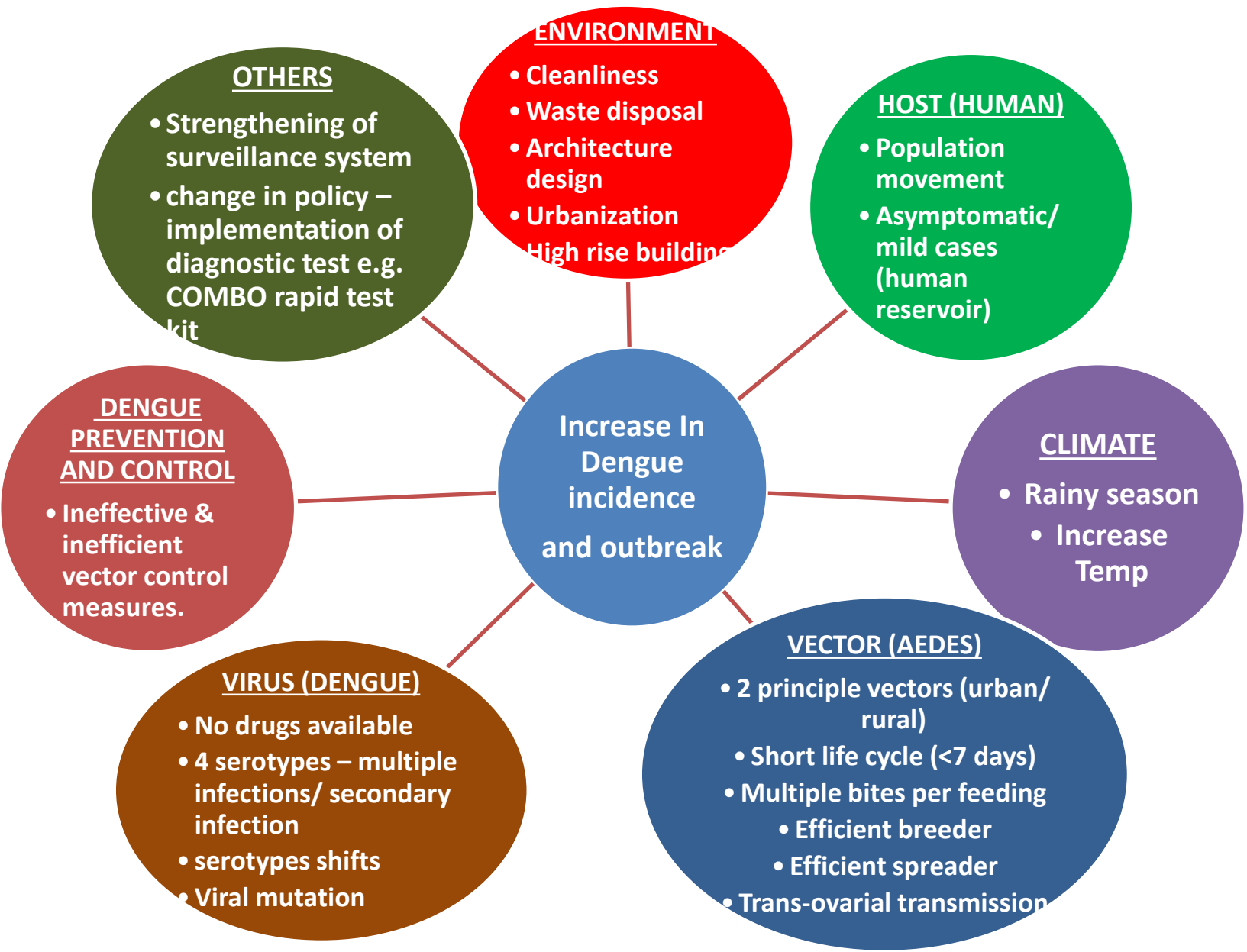


## Dengue incidence and case fatality rate in Malaysia (2000 – 2017)

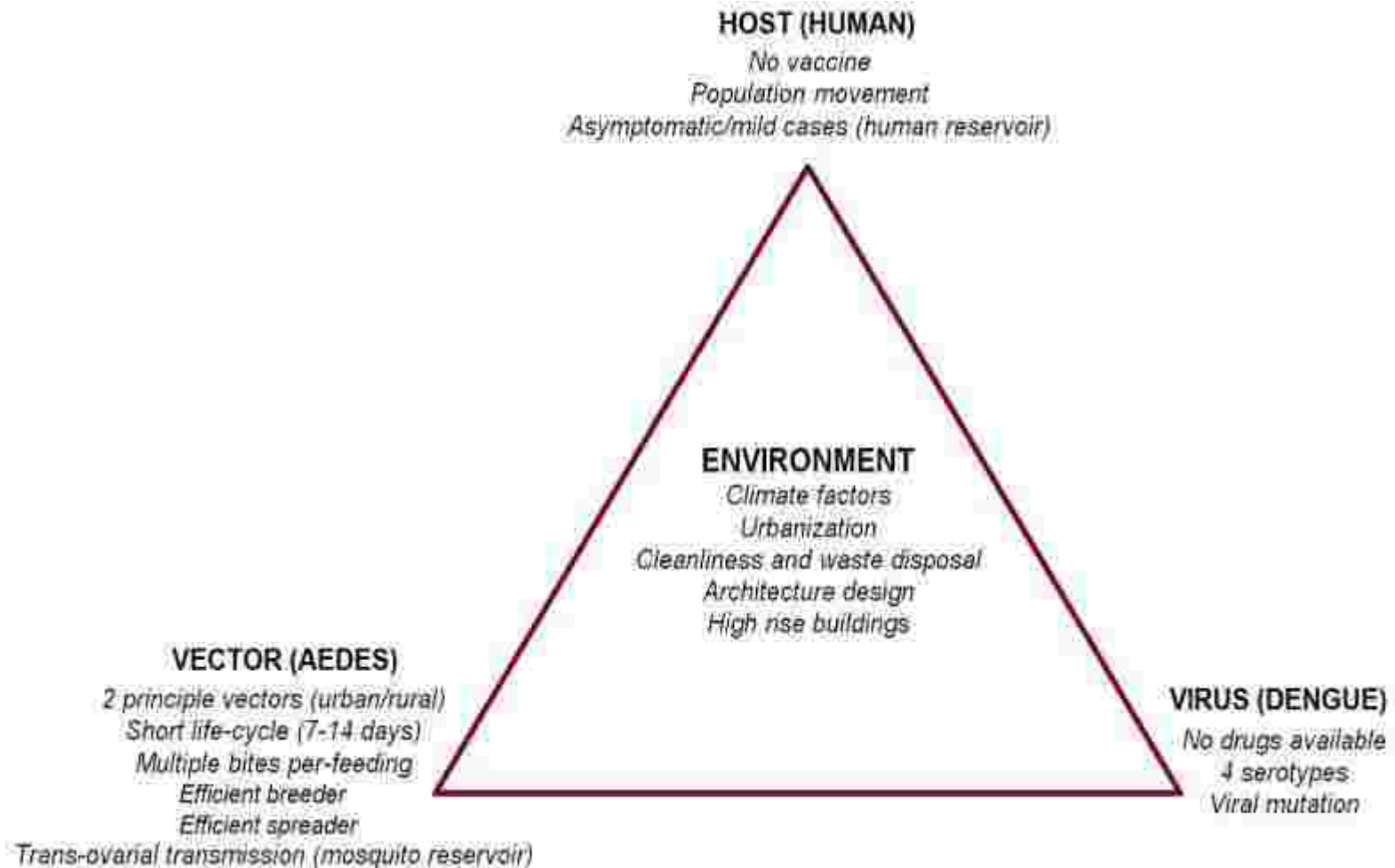


● Incidence Rate (IR)	30.2	66.6	133.	125.	132.	152.	145.	180.	178.	147.	161.	68.4	74.2	143.	355.	389.	320.	261.
● Case Fatality Rate (CFR)	0.63	0.31	0.30	0.23	0.30	0.27	0.24	0.20	0.23	0.21	0.29	0.18	0.16	0.21	0.20	0.28	0.23	0.21

# FACTORS CONTRIBUTING TO DENGUE INCIDENCE



# EPIDEMIOLOGY OF DENGUE TRANSMISSION





# NATIONAL STRATEGIC PLAN FOR DENGUE (NSPD)

1. Implemented in April 2009
2. Strengthening on the Dengue prevention and control through seven strategies:
3. In 2014 and 2018 - NSPD Reviewed and realigned with new strategies and policy



# **Digital Surveillance**

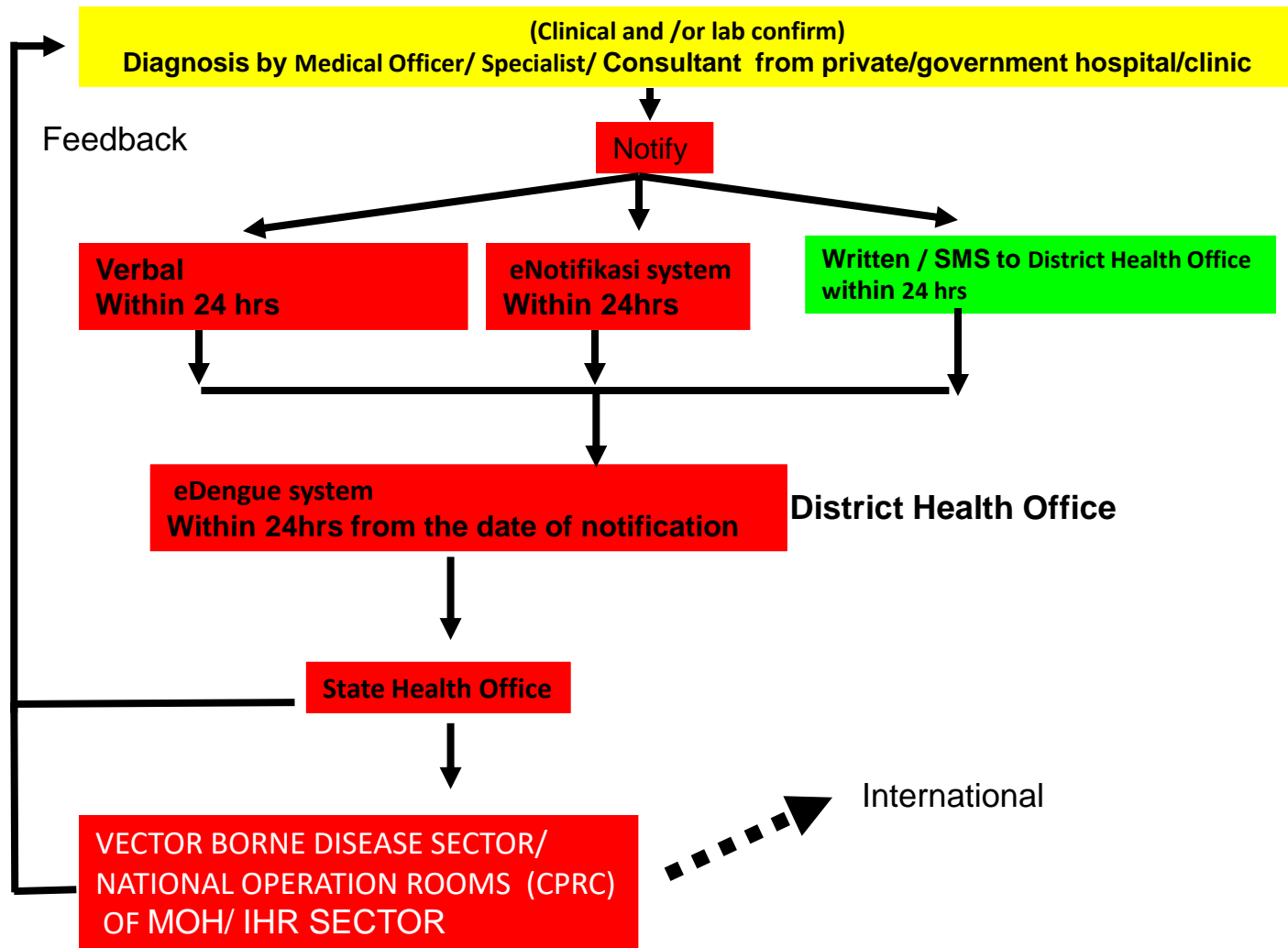
# DENGUE SURVEILLANCE IN MALAYSIA

## I. Effective Case Surveillance:

- ✓ **Prevention And Control of Infectious Disease Act 1988:**
  - Dengue is a **NOTIFIABLE** disease & must be reported within 24 hours
  - Failure to report: Medical officer can be compounded (Sect 25)
- ✓ To notify - **case fulfill clinical criteria for dengue** (by WHO- fever with 2 other symptoms), with or without laboratory blood results.
- ✓ **Policy changes in 2014**
  - **In 2014 – Only laboratory confirmed cases registered** into surveillance system (eDengue) **within 24 hours**

## II. Early Warning System

- ✓ **Daily monitoring of cases, deaths, outbreak and vector index** the outbreak localities at district, state and national level.



# Digital Dengue Surveillance System (Dengue notification, control and response)

Suspected or  
confirmed cases

**e-Notification**



Medical Officer  
(Health clinics/ Hospital/  
Districts Health Office)

Confirmed cases

**eDengue V2**



Health Officer/Medical  
officer (districts/ provincial  
/ National level)

Confirmed cases

**SPWD**



Health Officer/Medical  
officer (districts/ provincial  
/ National level)

**Real time web-  
based surveillance**

Confirmed cases

**i dengue**



**Community**

# Notification (e-notifikasi)

## Real-time web based data surveillance system:

- ✓ Data input from district through web base system
- ✓ Accessible at all level (district, state and national level) at real time
- ✓ Comprehensive - data based for cases, laboratory result,



# eVEKPRO



- Case registry
- Outbreak registry
- Vector Control
- Death Registry

# eDengueV2

## real-time web based data surveillance system:

- ✓ Data input from district through web base system
- ✓ Accessible at all level (district, state and national level) at real time
- ✓ Smart system – “alert” outbreak, automated calculation of the effectiveness of control activities
- ✓ Comprehensive - data based for cases, deaths, laboratory result, control activities, vector index, outbreak localities, health education activities, enforcement activities and GIS





# eDengue V2

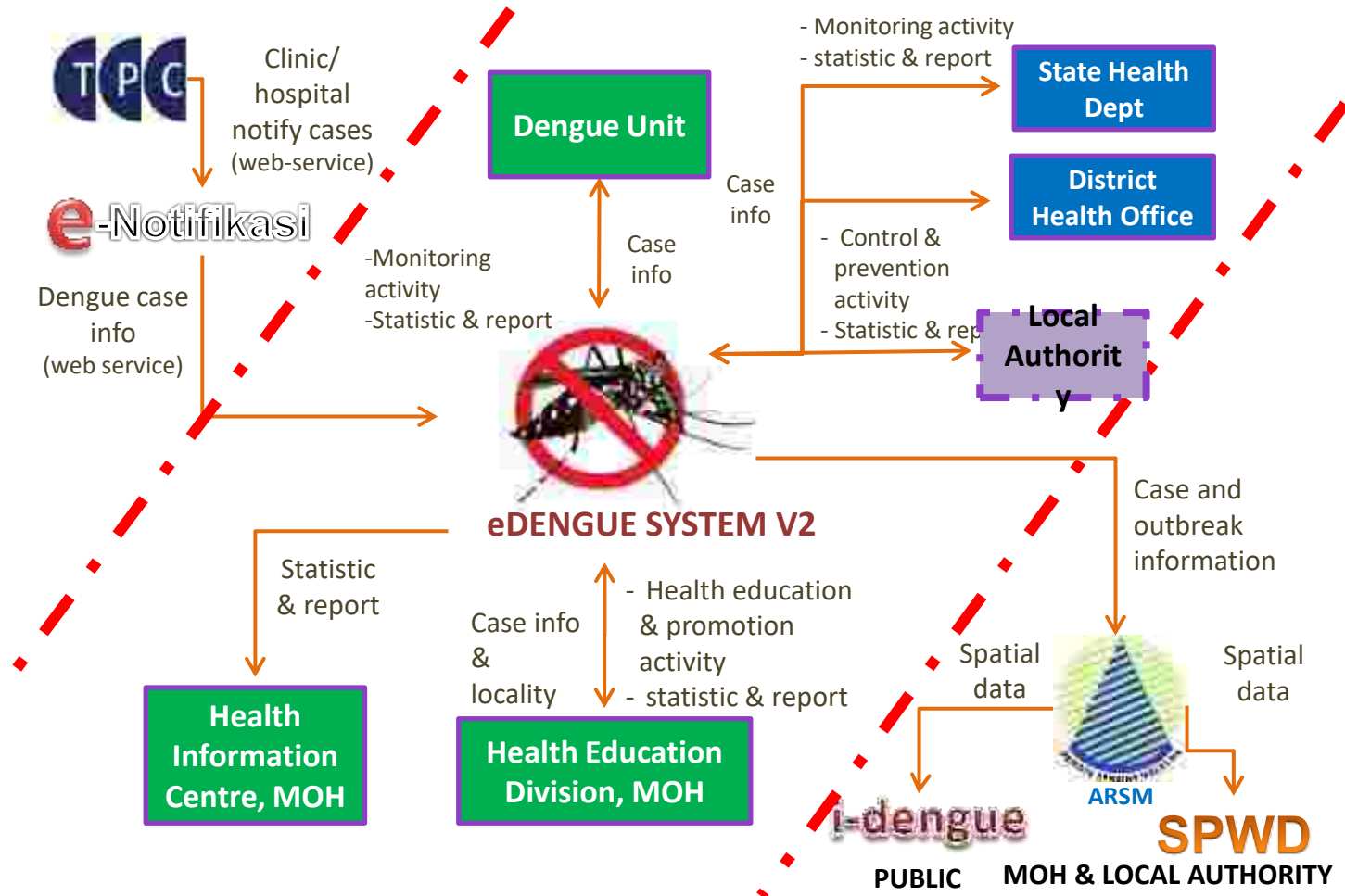
**Real time  
web based  
system**



## OTHER SURVEILLANCE

1. **Laboratory surveillance** by National Public Health Lab and Institute of Medical Research – serology, virology and genotype for cases , deaths and outbreak area
2. **Sentinel surveillance** – blood samples from 44 clinics and hospitals nationwide for serology and virology
3. **Vector surveillance** – adult mosquito e.g.BG trap
4. **Insecticide resistant surveillance**
5. Monitoring from the operation room of **Crisis Preparedness Response Centre (CPRC)** daily for 365 days.

# eDENGUE



# eDengueV2

- Developed as a web based
- Real time data
- Able to produce reports
- Accessible from various levels e.g district/ states/ HQ
- Accessible anywhere with internet capabilities
- No operational cost – handled in house

# eDengueV2

- User centric
  - ✓ information related to certain user only
- Enhanced Business Rules
  - ✓ auto-compute calculations and outcomes
- Active monitoring and alerts
  - ✓ For reminder and follow up activities

## Ministry of Health Subject Matter Expert



**Environmental Health  
Disease Control  
Supervision and Enforcement**

## Remote Sensing Agency Technology Provider



**Remote Sensing Technology  
Geographic Information System (GIS)  
Global Positioning System (GPS)  
Application System Development**

## DENGUE OUTBREAK MANAGEMENT SYSTEM

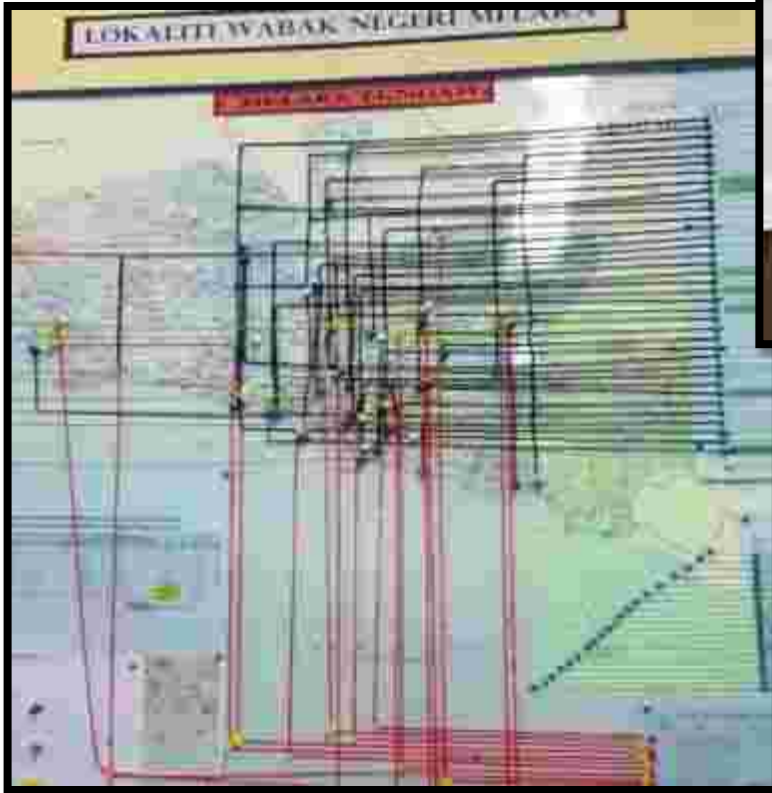
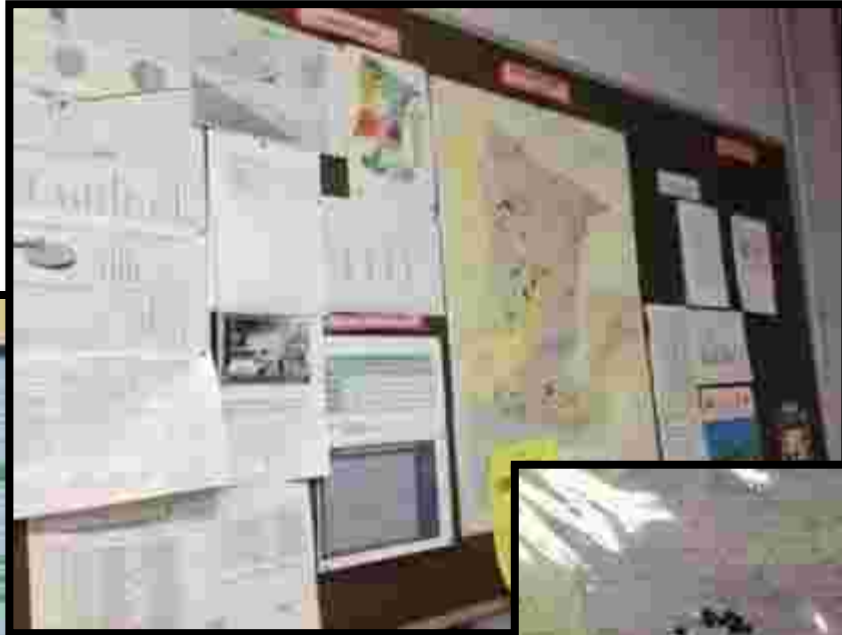
*SPWD*



<http://spwd.remotesensing.gov.my>



# CONVENTIONAL METHODS BEFORE SPWD



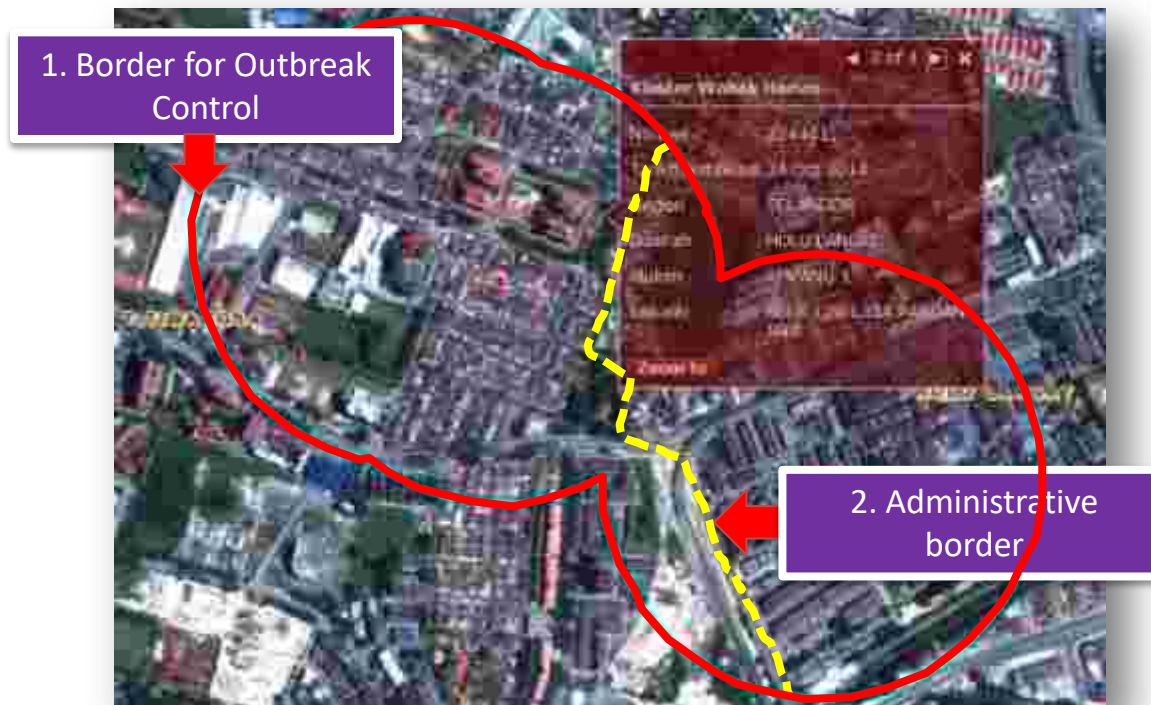


REAL-TIME supervision through monitoring of cases and outbreaks distribution daily



## Improving efficacy of control activity

Accurately identifying borders through high resolution satellite



Effective planning of resources such as manpower, monetary, vehicle, equipment and fuel





## Planning of prevention activities for decision makers

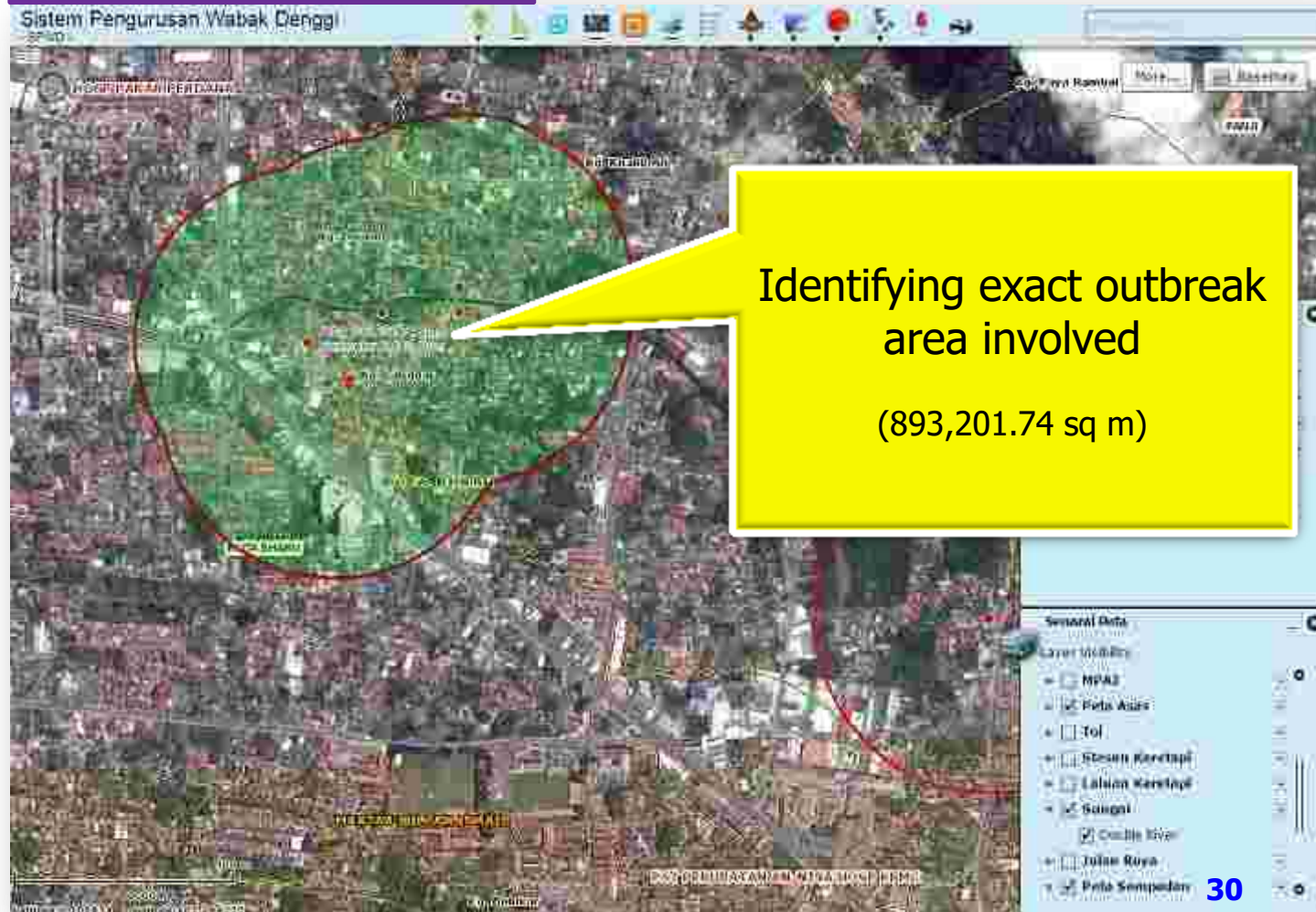




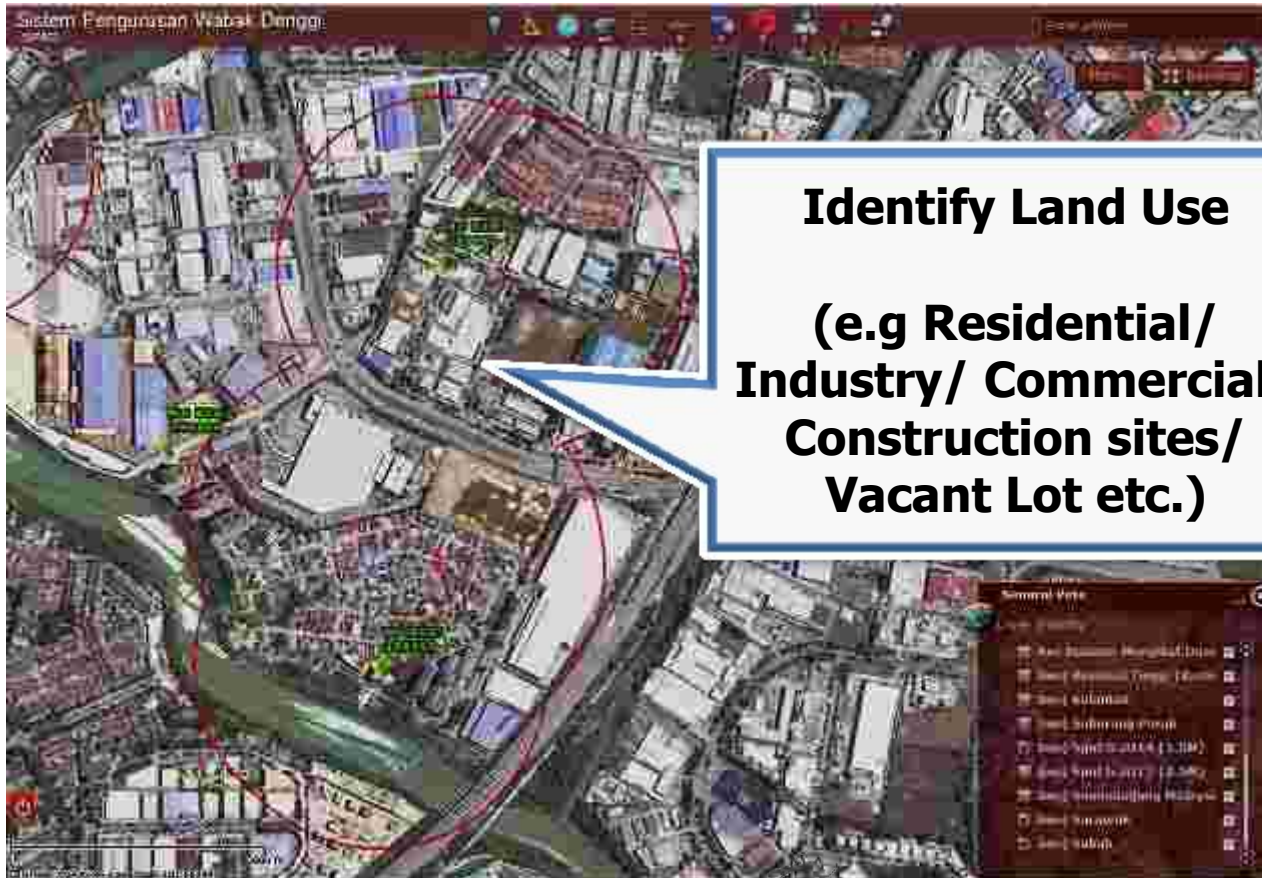
## OUTPUT – Distribution of Cases



## OUTPUT – OUTBREAK CONTROL

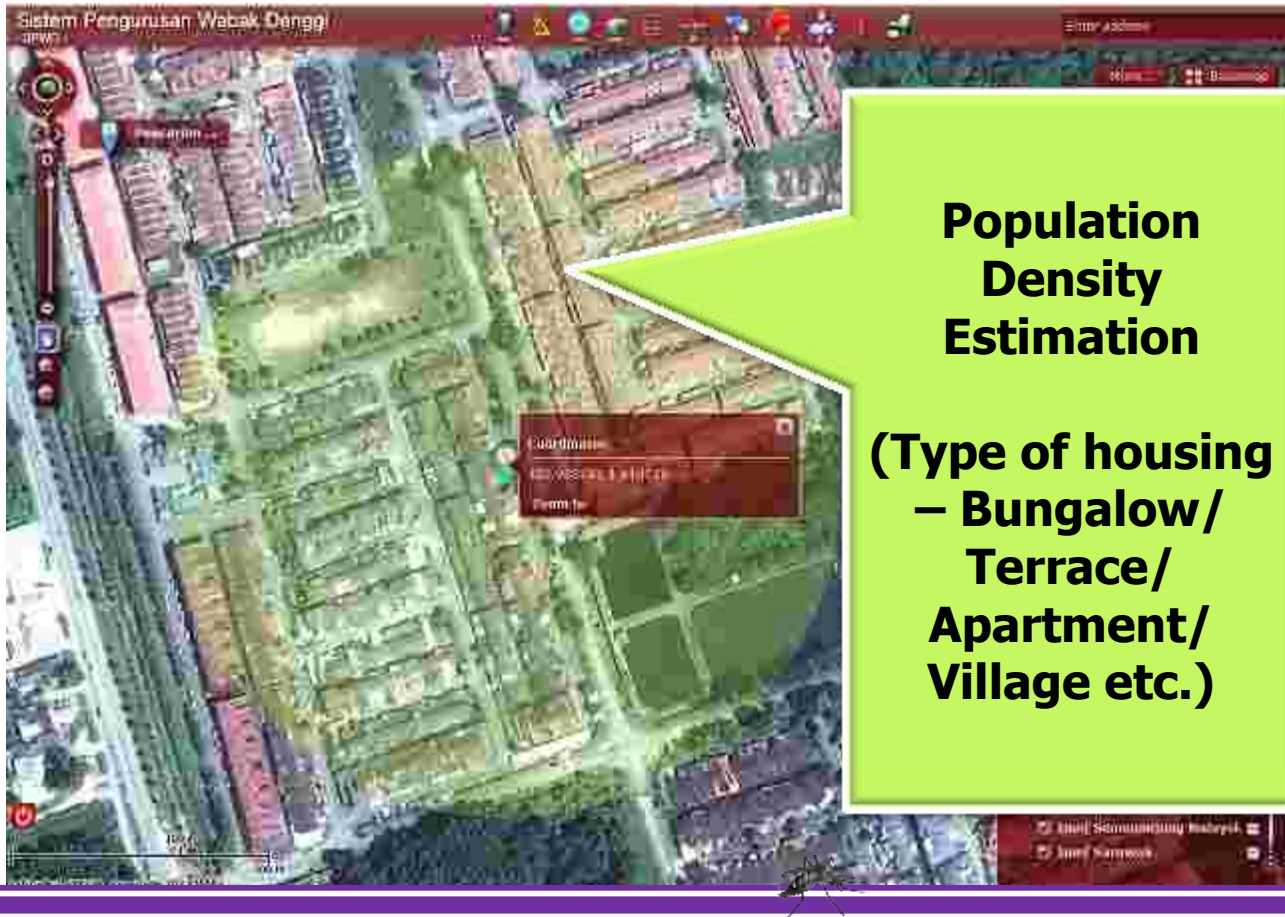


## OUTPUT – OUTBREAK CONTROL





## OUTPUT – OUTBREAK CONTROL





## – OUTPUT – OUTBREAK CONTROL



- 1) Determining work force
- 2) Identifying available resources
- 3) Estimation time for coverage
- 4) Identifying route for vehicle (ULV)
- 5) Fuel estimation
- 6) Insecticide usage estimation
- 7) Estimate operational costs



# **EMPOWERING THE COMMUNITY**

# Sistem **iDengue** *untuk komuniti*



<http://idengue.remotesensing.gov.my>



## CONTENT FOR USERS



# **BENEFITS OF DIGITAL SURVEILLANCE**

- Timely (real time)
- Accessibility at all levels and anywhere(web based)
- Effective tool for planning and decision making
- Reduces under reporting
- Customisable
- Integration potential
- Public interaction

# Feasibility

- Everyone carry a mobile device
- Smart partnership
- Resource sharing

# Notification (e-notifikasi)

## Real-time web based data surveillance system:

- ✓ Data input from district through web base system
- ✓ Accessible at all level (district, state and national level) at real time
- ✓ Comprehensive - data based for cases, laboratory result,



# NEW APPROACH IN MALAYSIA MOH, 2014

- **Integrated Management with multiple Ministries and agencies** starting July 2014
- **DENGUE CRISIS: Special Task Force for Dengue**
- Formation of special Task Force involving 7 Ministries
  - Ministry of Health
  - Ministry of Housing and Local Government
  - Ministry of Human Resource
  - Ministry of Education
  - Ministry of Internal Affairs
  - Ministry of Defence
  - Ministry of Works
  - All states government and
  - other Ministry e.g. Ministry of Communication and Multimedia



## ACTIVITIES OF NATIONAL DENGUE SPECIAL TASK FORCE

1. **National Dengue Task Force** – dengue meeting chaired by **Deputy Prime Minister** , ( 3 times between 2014-2015)
2. **Dengue Special Team** – **weekly** technical meeting chaired by **Director General of Health (July 2014 – Jan 2016)** and meeting conducted every **2 weekly** till present.
3. **Dengue Special Team at state level** - **weekly** meeting at state level (states with outbreak), District Outbreak Committee –weekly meeting with various agencies
4. Implementation of **Integrated management for dengue prevention and control** with inter-sectorial collaboration esp. for Klang Valley
5. **Regular field visit** to the dengue hotspots area by Minister, Deputy Minister, Director General and Deputy DG
6. **Special additional allocation for dengue control** (e.g. additional RM 27.6 mil. or USD 7.7 mil in 2014 and RM 10 mil or USD 2.4 mil in 2015)
7. Reemployment of temporary workers (more than 1000 workers).
8. Procurement of additional vector controls equipment's
9. **Intensify of Health Promotion & Advocacy** (additional RM 3 mil for **COMBI** annually)

# NATIONAL DENGUE SPECIAL TASK FORCE PLAN OF ACTION

## A. CASE MANAGEMENT

- Dengue Clerking Sheet
- Home Based Card
- COMBO Rapid Test Kit
- Extended Working Hours in Clinics
- Special Dengue Clinic in Primary Care

•Ministry of Health

## B. ENVIRONMENTAL MANAGEMENT & CLEANLINESS

- Source reduction
- Outsourcing of Solid Waste Management
- Inspection of Construction site
- Dengue Free Program in School and University/collage

•Ministry of Housing & Local Government  
•Ministry of Human Resource  
•Ministry of Education  
•Ministry of Defence

## INTEGRATED MANAGEMENT

## C. VECTOR CONTROL

- Fogging
- Temephos EC spray
- Source Reduction of Aedes Breeding Places
- Outdoor Residual Spray for hotspots area

•Ministry of Communication & Multi media  
•Ministry of Housing & Local Government  
•Ministry of Human Resource  
•Ministry of Education

## D. HEALTH PROMOTION & ADVOCACY

- Advertisement in Mass Media
- National Cleanliness Campaign Program
- Program COMBI
- Intervention Kiosk for Health Promotion

# ACTIVITIES OF NATIONAL DENGUE SPECIAL TASK FORCE

No.	Ministry/Agency	Activities
1	Ministry of Health	<ul style="list-style-type: none"> <li>• As lead ministry and coordinator</li> <li>• Dengue case management</li> <li>• Vector control and prevention</li> <li>• Surveillance</li> <li>• Enforcement of Destruction of Disease Bearing Insects Act 1975</li> <li>• COMBI</li> </ul>
2.	Ministry of Urban Wellbeing, Housing and Local Government	<ul style="list-style-type: none"> <li>• Rubbish collection</li> <li>• Vector control and prevention of areas under jurisdiction</li> <li>• Anti-litter programs</li> <li>• Enforcement &amp; cleaning up vacant lands</li> <li>• COMBI &amp; Local Agenda 21</li> </ul>
3.	Ministry of Works	<ul style="list-style-type: none"> <li>• To ensure construction sites and building structures are Aedes free</li> </ul>
4.	Ministry of Communications and Multimedia	<ul style="list-style-type: none"> <li>• Providing periodical media slots in radio &amp; TV</li> <li>• Increase community awareness on Dengue prevention and campaigns</li> </ul>
5.	Ministry of Education	<ul style="list-style-type: none"> <li>• To include cleanliness program in school's co-curriculum</li> <li>• To make sure school are free from Aedes breeding</li> </ul>
6.	Ministry of Home Affairs	<ul style="list-style-type: none"> <li>• Assist in Dengue prevention programs by mobilizing uniform bodies</li> </ul>
7.	Ministry of Human Resources (DOSH)	<ul style="list-style-type: none"> <li>• Enforcement activities at construction sites</li> </ul>
8.	State Governments	<ul style="list-style-type: none"> <li>• Ensuring prevention and control activities are done at state level</li> </ul>

# ENGAGEMENT OF IPTA/IPTS, PRIVATE SECTOR AND NGO

- IPTA and IPTS – conducted prevention activities in the university and community e.g USM, UITM
- Sanofi Pasteur initiate Dengue Patrol program, more than 100 schools involved
- IM4U – conduct dengue prevention activity in the community
- Allied Against Dengue by GSK
- Dengue Free movement by Country Heights

# PARADIGM SHIFT

## : INTEGRATED MANAGEMENT IN DENGUE PREVENTION



Children learn about dengue prevention

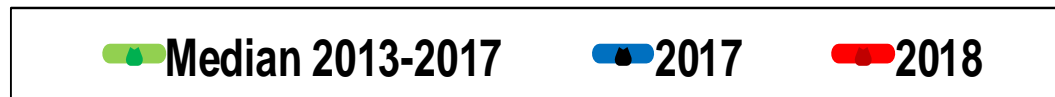
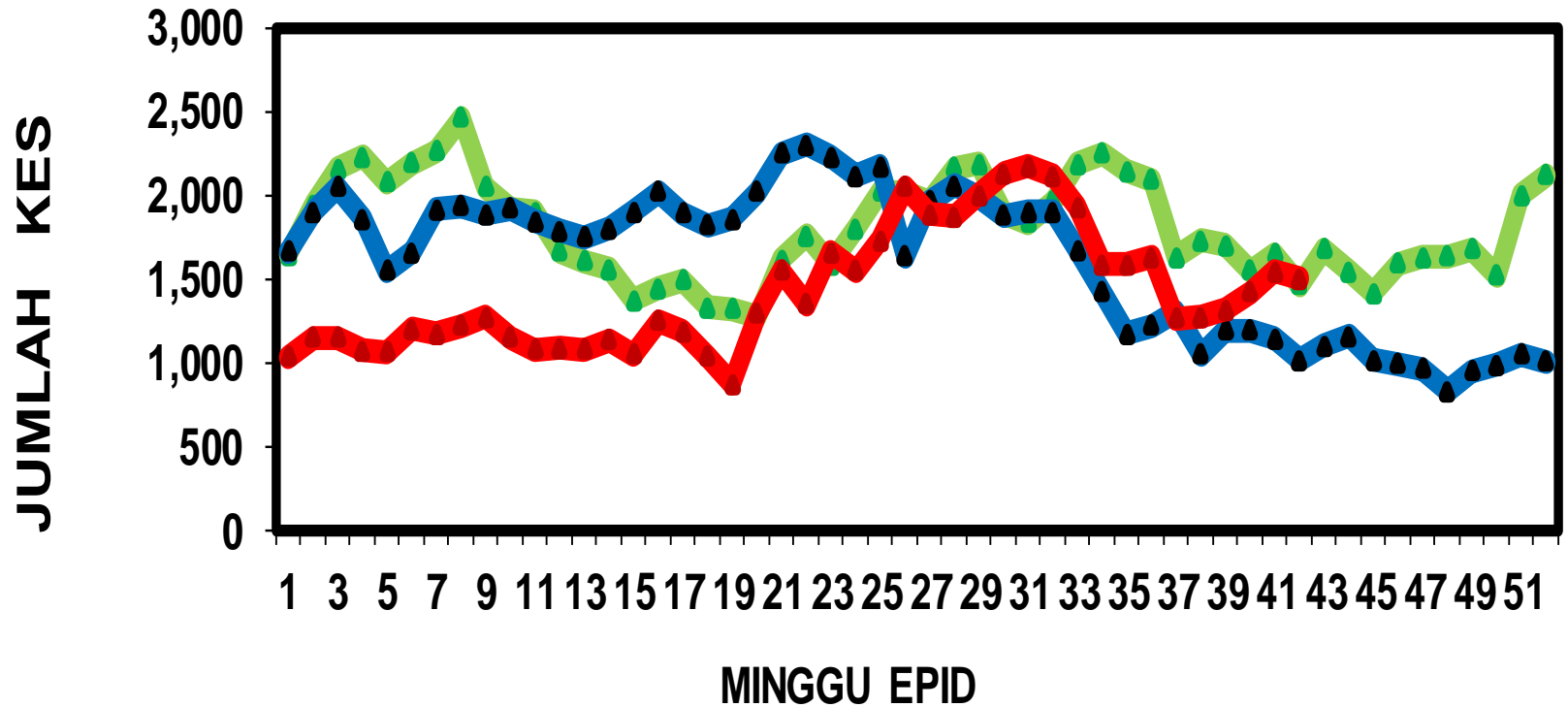


# RESULTS

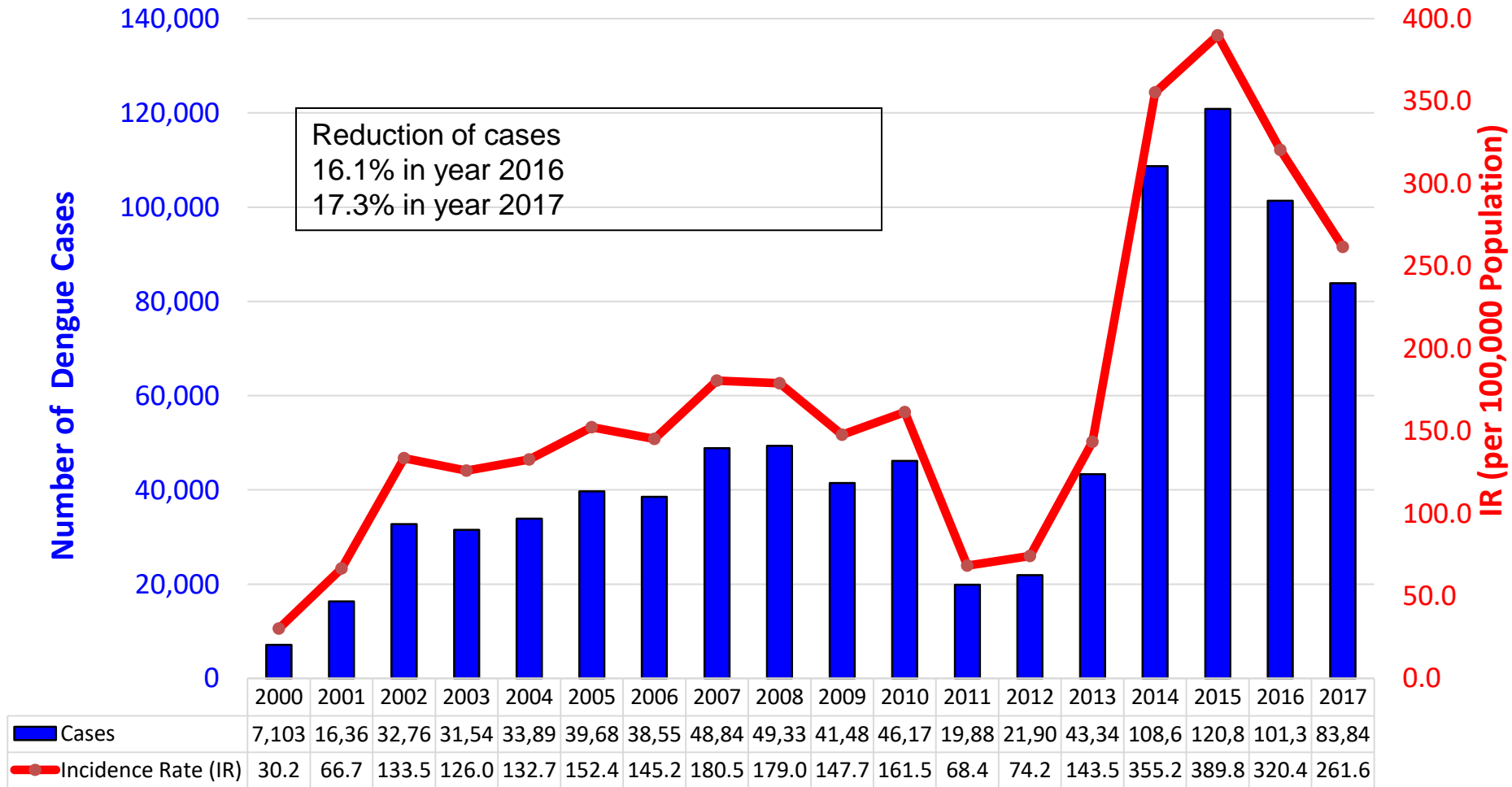


# MALAYSIA

## WEEKLY DENGUE CASES 2017, 2018 (TILL 20 OCT.) AND MEDIAN 2013-2017



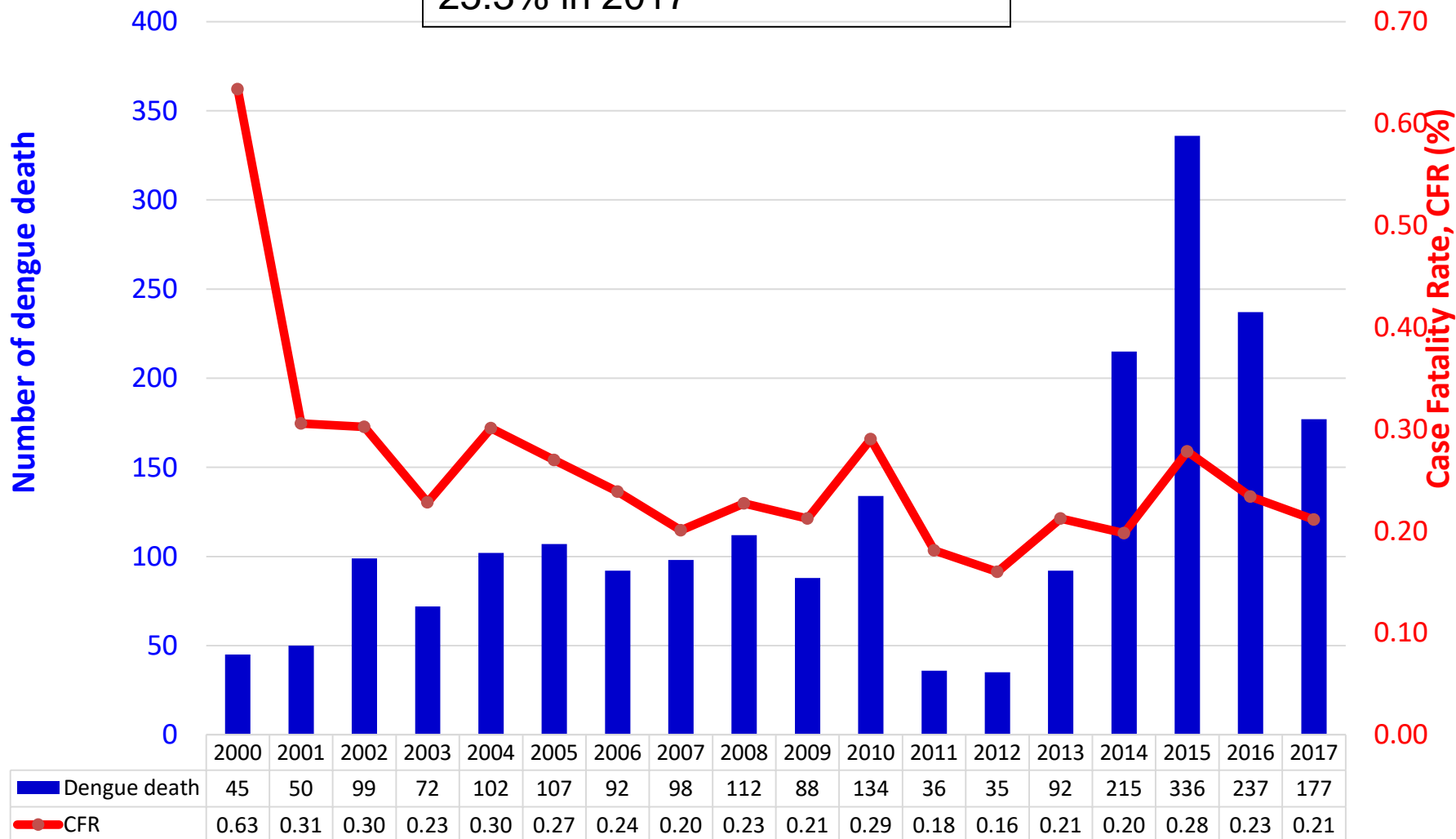
# Dengue cases and incidence rate in Malaysia (2000 – 2017)





# Dengue deaths and case fatality rate in Malaysia (2000 – 2017)

Reduction of deaths  
29.5% in 2016  
25.3% in 2017



# INNOVATION AND NEW METHOD IN DENGUE PREVENTION AND CONTROL

- GM mosquito – under IMR project
- Wolbachia – under IMR project
- Sterile Insect Technic using gamma irradiation – under IMR project
- Dengue Vaccine – Sanofi Pasteur

# Malaysia: World Recognition



Ladies and gentlemen,

The region is often described as the world capital of dengue. Your countries continue to be battered by epidemic cycles associated with rapid economic growth, unplanned urbanization, the mass movement of people and goods, and possibly also climate change.

In recent years, the incidence of dengue has increased dramatically, though mortality has gone down, thanks to improved case management.

Your action plan for dengue prevention and control proposes an important shift away from a focus on attempting to contain outbreaks, to an approach that aims to reduce the impact of dengue on communities. All countries can learn from [Malaysia's](#) national environmental cleanliness campaign, which engages communities to remove mosquito breeding sites.

# CONCLUSION

- New technologies and tools e.g. digital surveillance system, ICT system, usage of AI will strengthened the vector prevention and control program.
- The **shared responsibility** between the **individual, community, agency from the public and private sector** in dengue prevention activities is essential to determine the success of controlling dengue.



INTEGRATED WITH PHYSICAL ACTIVITY AND ANTI DENGUE  
CAMPAIGN



# INVOLVEMENT OF MINISTRY OF DEFENCE IN ENVIRONMENTAL CLEANLINESS ACTIVITY





# MINISTRY OF EDUCATION: INVOLVEMENT OF SCHOOL CHILDREN IN DENGUE PREVENTION ACTIVITY





# COMMUNITY PARTICIPATION IN DENGUE PREVENTION ACTIVITY



# THANK YOU TERIMA KASIH



## For more Dengue information:

- iDengue mobile apps – download *Play Store* and *App Store*
- <http://idengue.remotesensing.gov.my> - website for dengue hotspots, cases and etc.
- CPRC Kementerian Kesihatan facebook