



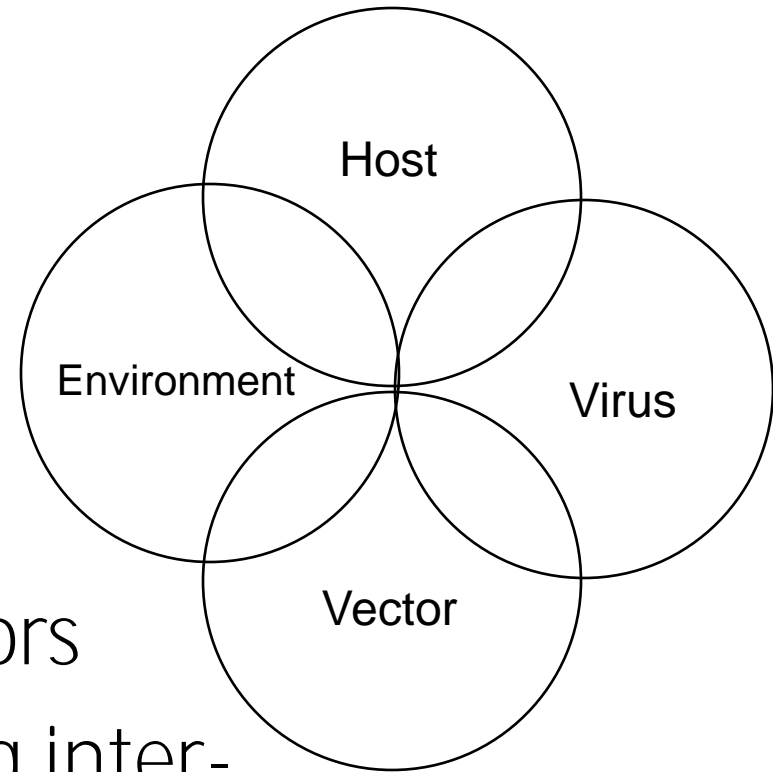
# Dengue: a complex disease

Effective control needs

Good understanding of

- entomological
- human
- virological
- and environmental factors

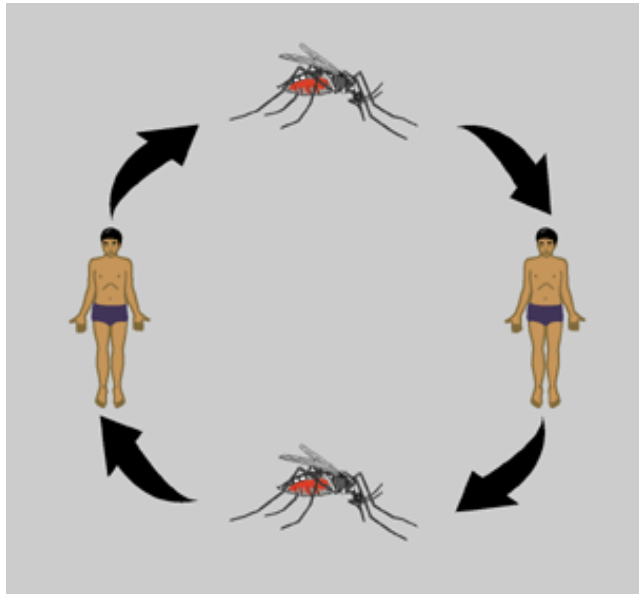
Surveillance and control during inter-epidemic period



- High morbidity, relatively low mortality disease
- **Dengue Fever** - sudden onset, high fever of 3-5 days, intense headache, myalgia, retro-orbital pain, anorexia, Gastro-Intestinal disturbances and rash – *self limiting*
- **Dengue Haemorrhagic Fever** - increased vascular permeability, hypovolaemia and abnormal blood clotting mechanisms – *death could follow if not supported*
- Wide spectrum of infection outcomes  
Asymptomatic infection      Death

# Vector

- *A. aegypti* – wide spread and well established in urban areas
- *A. albopictus* – becoming more important vector in rural settings (?)



# Environmental Factors

- Seasonality – temperature, humidity, \_\_\_\_\_

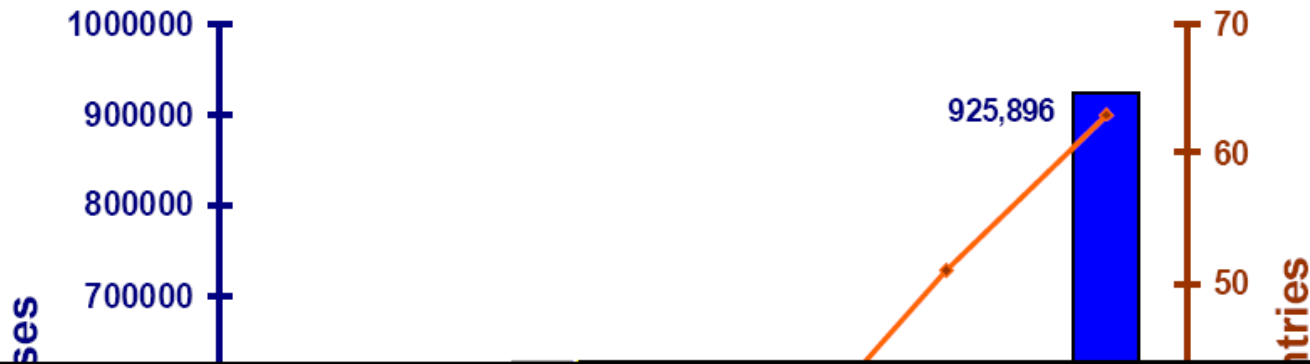
## Sri Lanka:

- South-western monsoons rains – first seasonal epidemic period
- North-eastern monsoon rains – second seasonal epidemic period

## Countries /areas at risk of dengue transmission, 2006



# Global increase in cases and in number of countries affected



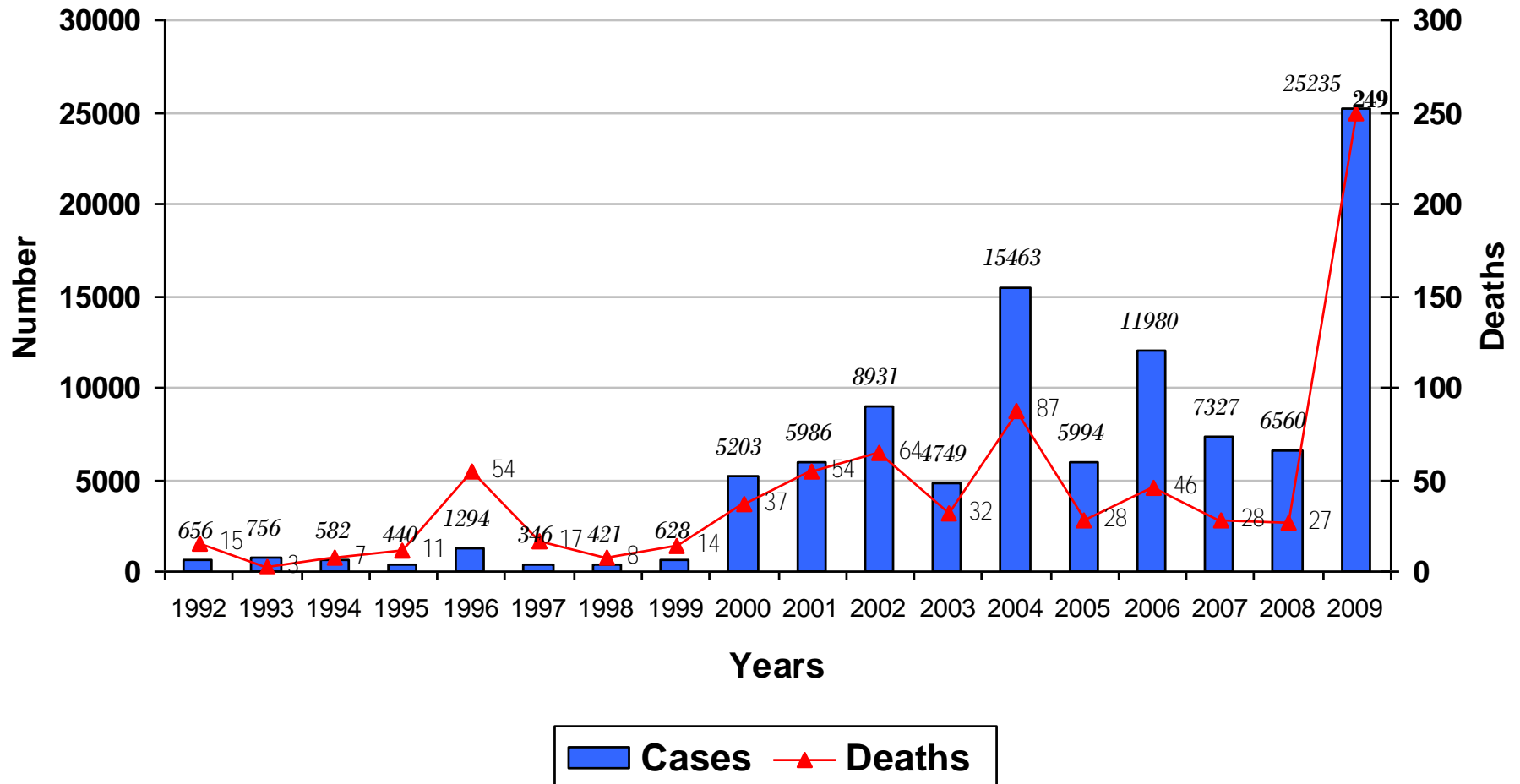
# Global update - Sept 7, 2009

- Brazil – cases have tripled in 2009 compared to same period in 2008
- Puerto Rico – 150 new cases in past week; total for 2009 3256
- Pakistan (Karachi) – 500 suspected cases in 2009
- Thailand – shift in age distribution of dengue cases - decrease in birth and death rates

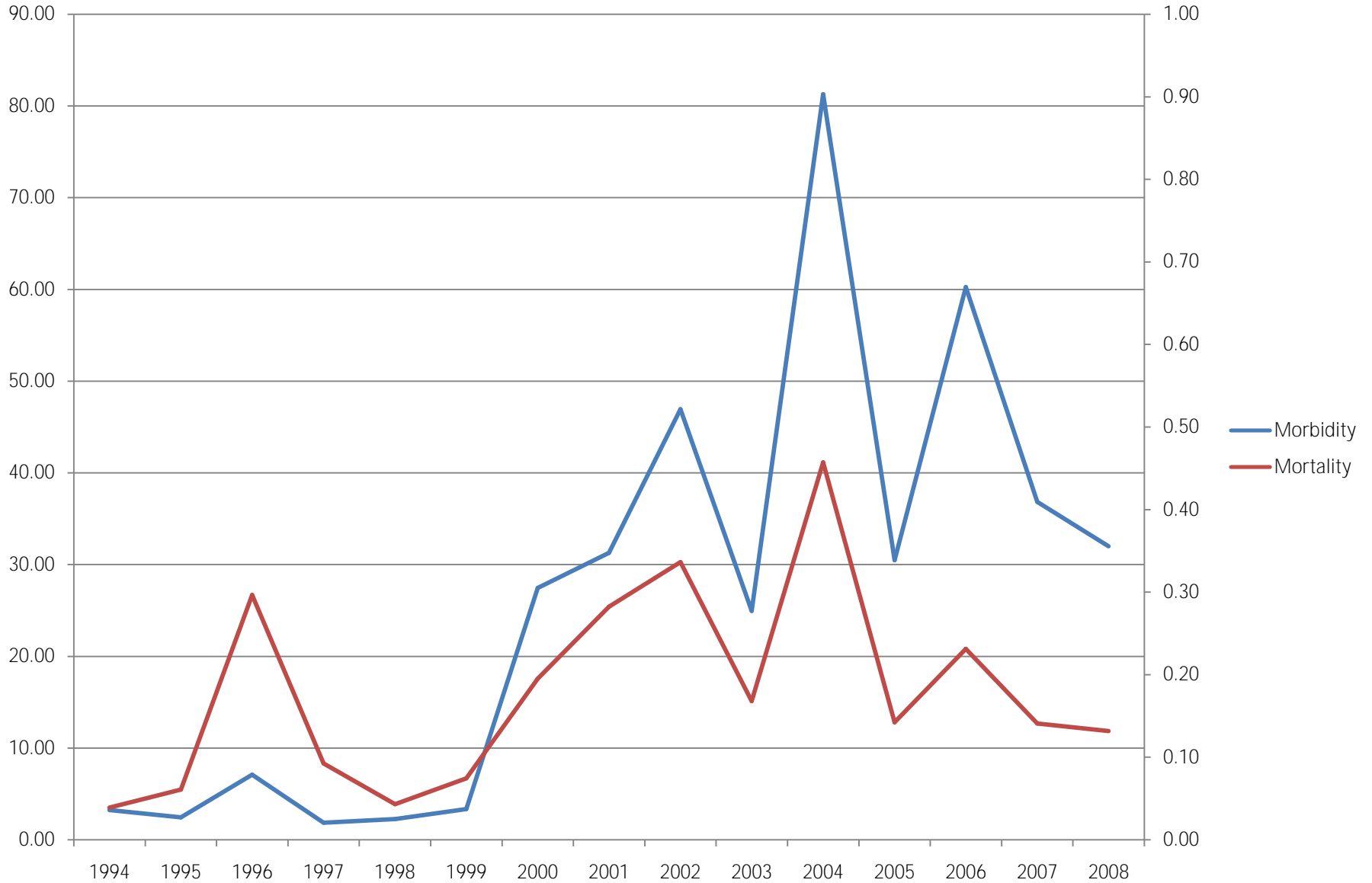


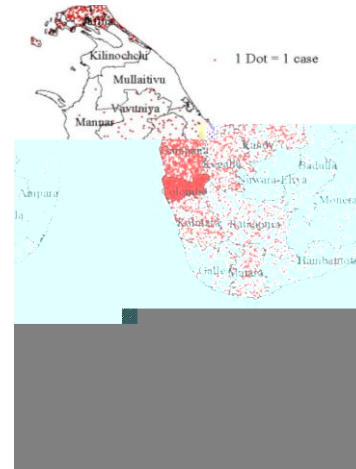
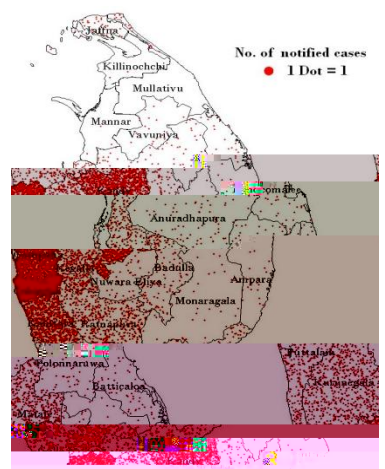
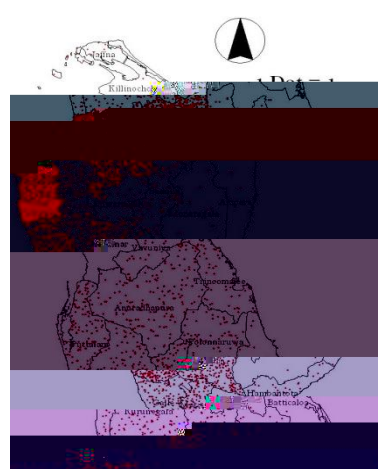
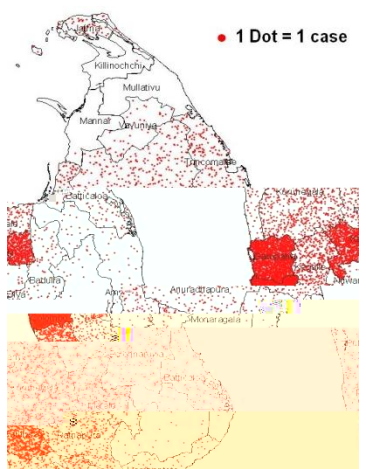
- Serologically confirmed 1962; first outbreak 1965
- First major epidemic reported in 1989
- Endemic since 1989 with DHF involvement
- Became notifiable disease in 1996
- Since year 2000 approx. 5,000 cases reported annually
- Cyclical epidemics – 2002, 2004, 2006, 2009...

# Dengue Trends in Sri Lanka

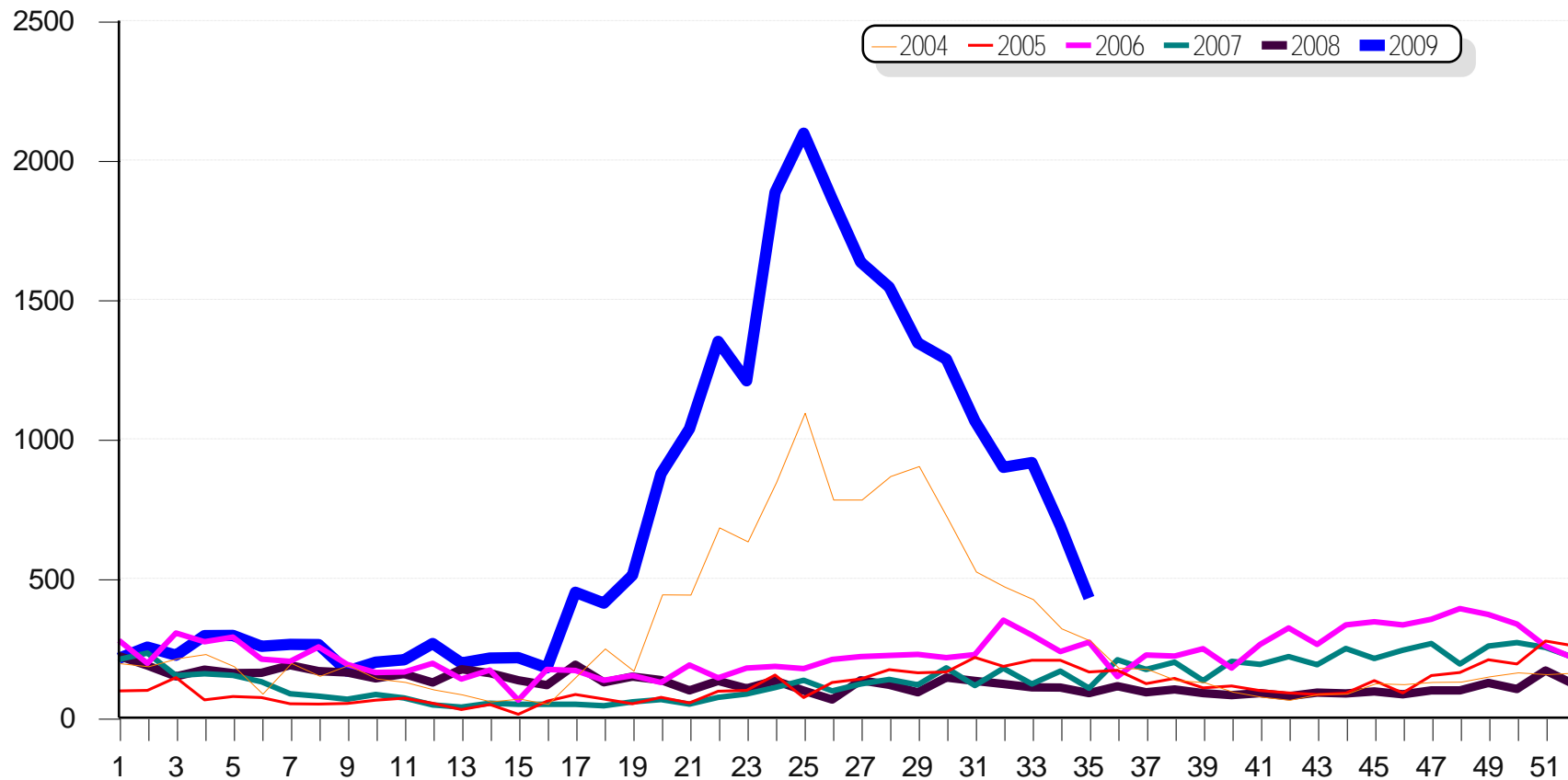


# Morbidity & Mortality Rates, 1994 - 2008 (per '000 pop)





No. of cases



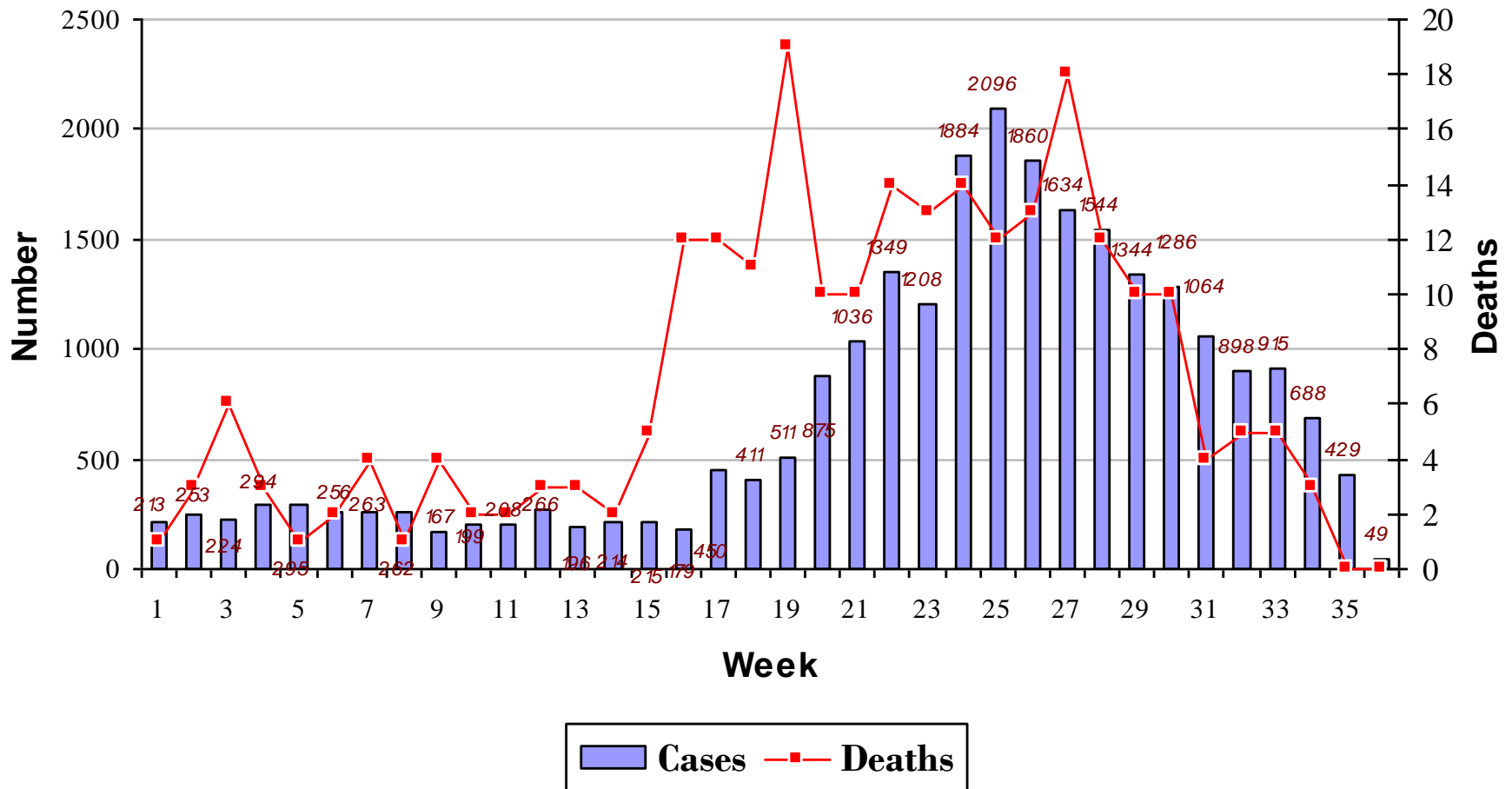
Week

Total cases: Year 2005= 5994  
Year 2006= 11980  
Year 2007= 7314  
Year 2008= 6555  
Year 2009= 25235

Source: Epidemiological Unit, Sri Lanka

Update date : 07/09/2009

# Distribution of cases by weeks – 2009



District	Cases	%	Deaths
<b>Colombo</b>	<b>3292</b>	<b>13.0</b>	<b>30</b>
<b>Gampaha</b>	<b>3147</b>	<b>12.5</b>	<b>47</b>
Kalutara	1270	5.0	12
<b>Kandy</b>	<b>3448</b>	<b>13.7</b>	<b>36</b>
Matale	1373	5.4	11
Nuwara-Eliya	212	0.8	3
Galle	467	1.9	5
Hambantota	767	3.0	16
Matara	965	3.8	6
Jaffna	12	0.0	0
Kilinochchi	0	0.0	0
Mannar	5	0.0	0
Vavuniya	19	0.1	1
Mullaitivu	0	0.0	0
Batticaloa	497	2.0	16
Ampara	207	0.8	0
Trincomalee	319	1.3	4
<b>Kurunegala</b>	<b>2391</b>	<b>9.5</b>	<b>17</b>
Puttalam	525	2.1	5
Anuradhapura	497	2.0	3
Polonnaruwa	138	0.5	0
Badulla	254	1.0	0
Moneragala	137	0.5	1
Ratnapura	1799	7.1	11
<b>Kegalle</b>	<b>3333</b>	<b>13.2</b>	<b>22</b>
Kalmunai	161	0.6	3
<b>Total</b>	<b>25235</b>	<b>100.0</b>	<b>249</b>

Five Key Districts - 62%

# Rural spread

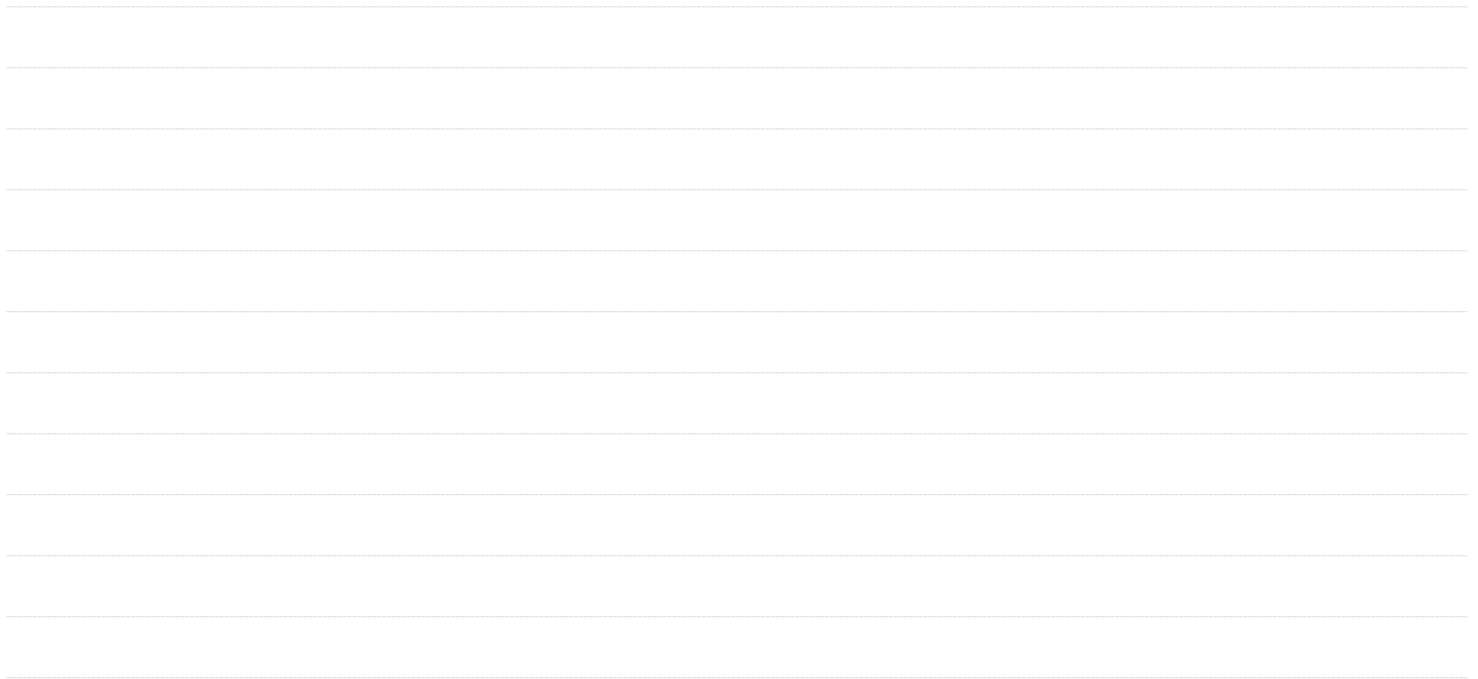
- Dengue: an urban disease?

## Geographic spread

- Bulathkohupitiya in Kegalle district
- Ibbagamuwa in Kurunegala district
- Angunukolapellessa in Hambantota district



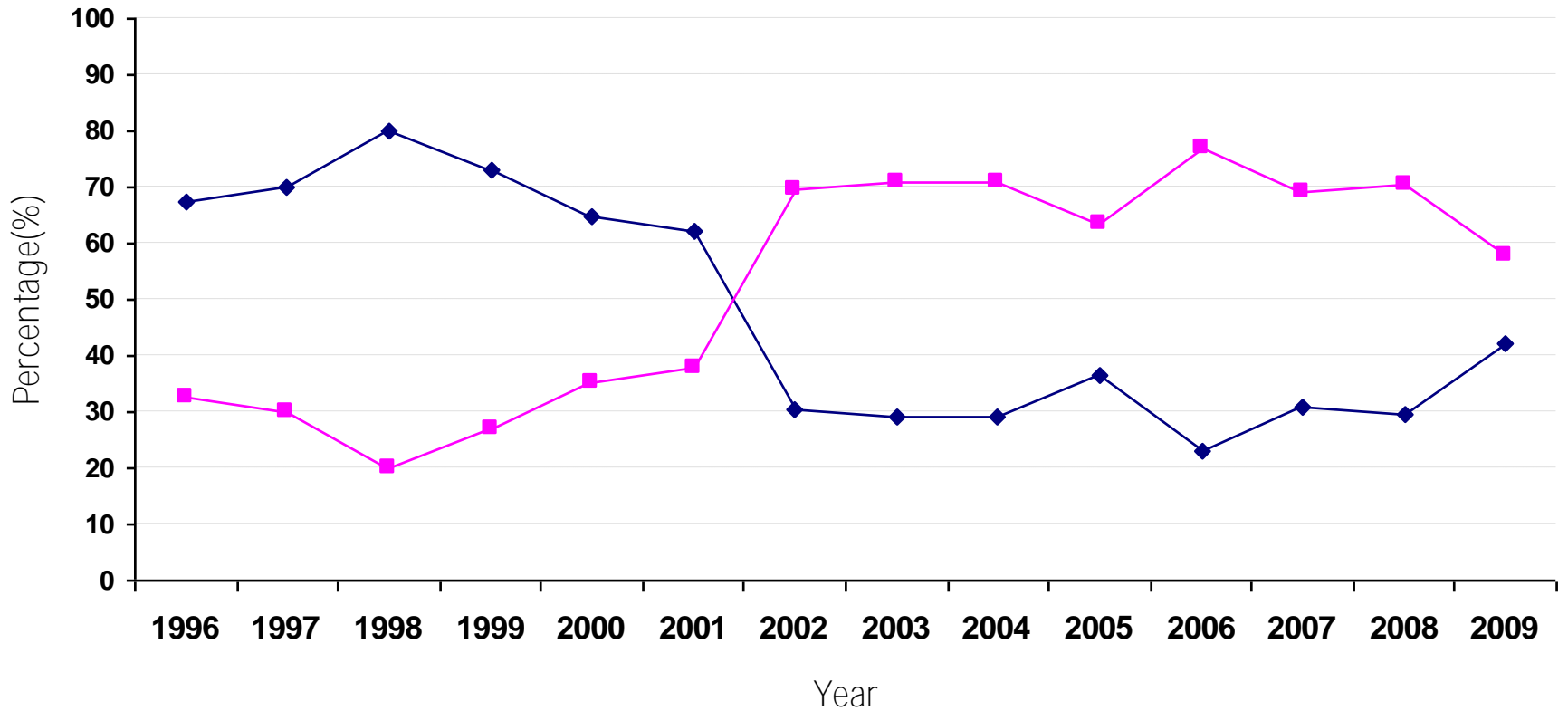
# Incidence rate of reported dengue cases by province, 2004-2009 (per 100,000 population)



<b>DISTRICT</b>	<b>HIGH RISK MOH AREAS</b>
<b>Colombo</b>	MC Colombo, Maharagama, Homagama, Kolonnawa, Dehiwala, Nugegoda, Piliyandala, Moratuwa, Kaduwela
<b>Kandy</b>	Akurana, Gangawatakorale, Harispattuwa, Kundasale, MC Kandy, Udunuwara, Wattegama, Yatinuwara, Gampola
<b>Kalutara</b>	Panadura, Horana, Bandaragama, Matugama
<b>Gampaha</b>	Kelaniya, Gampaha, Ja-Ela, Mahara, Wattala, MC-Negambo, Ragama, Attanagalle
<b>Batticaloa</b>	Batticaloa, Kattankudy, Eravur
<b>Matara</b>	MC Matara, Devinuwara, Dikwella
<b>Trincomalee</b>	Trincomalee, Kantale, Kinniya
<b>Kurunegala</b>	Kurunegala MC, Narammala, Polgahawela, Ibbagamuwa
<b>Hambantota</b>	Thangalle, Beliatta, Katuwana, Ambalantota, Walasmulla
<b>Matale</b>	Matale, MC Matale, Ukuwela, Galewela
<b>Ratnapura</b>	Embilipitiya, Eheliyagoda, Kuruwita, Pelmadulla, Ratnapura
<b>Kegalle</b>	Kegalle, Mawanella, Aranayake, Yatiyantota, Warakapola

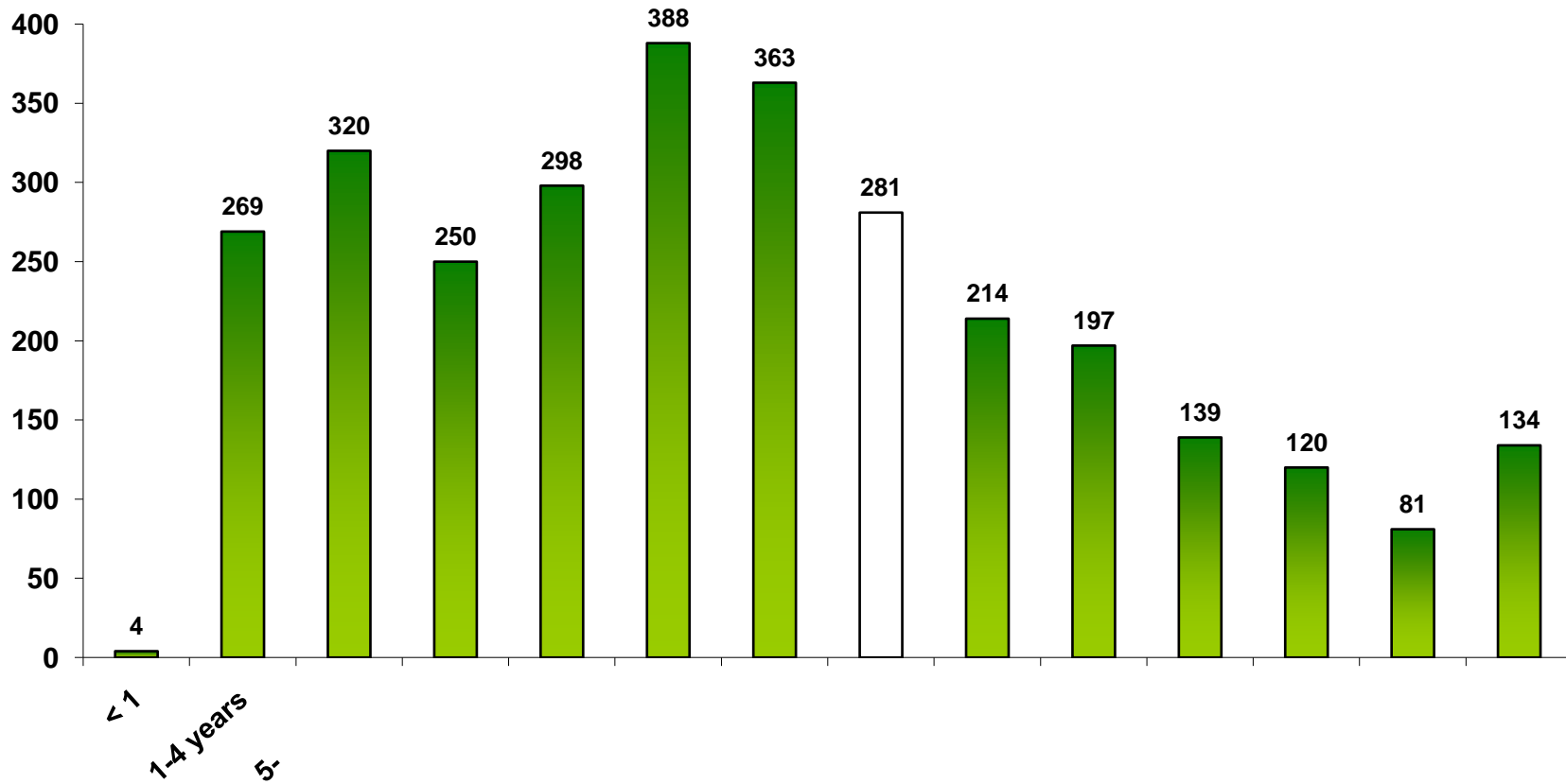
# Human cases

- Dengue: a childhood disease?
- Increasing age of infected persons



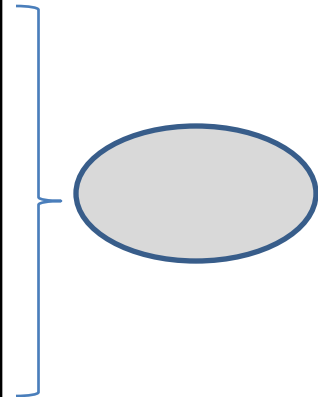
◆ Under 15    ■ 15+

Epidemiology Unit –  
provisional data 2009



# Age distribution of deaths -2009

	18(62.07)	11(37.93)	0	29	11.65
	37(57.81)	25(39.06)	2	64	25.70
	16(61.54)	10(38.46)	0	26	
	40(51.28)	37(47.44)	1	78	
	31(67.39)	15(32.61)	0	46	
N/A	3(50.00)	1(16.67)	2	6	2.41
				249	



# Virus\*

Year	Total Tested	Total Positive	D1 (%)	D2 (%)	D3 (%)	D4 (%)	Negative	ND
2006	1795	287	20 (7)	121 (43)	126 (45)	14 (5)	02	04
2007	461	56	01 (2)	26 (55)	20 (43)	00	08	01
2008	305	33	00	16 (64)	09 (36)	00	02	06
2009	521	73	19 (28)	21 (31)	26 (38)	02 (3)	03	02

\* Published in Weekly Epidemiological Report – pooled data

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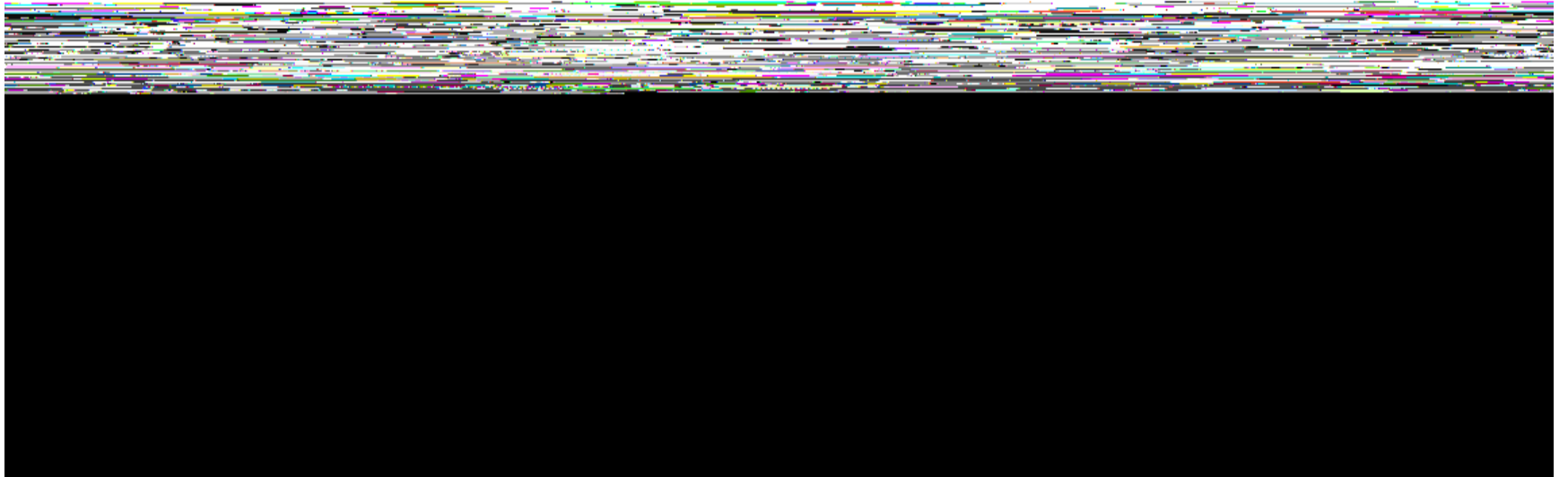
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# Challenges

- Northeast monsoon – possibility of further transmission during next 4 months
- Reducing fatalities due to more severe dengue infection – early healthcare seeking, early diagnosis, good patient management
- Risk communication – helps outbreak control through social mobilisation, minimize social turbulence, maintain public confidence in outbreak response efforts

# Weekly update on dengue situation



[www.epid.gov.lk](http://www.epid.gov.lk)