Re-emerging of Dengue Haemorrhagic Fever in Sri Lanka

Dr. LakKumar Fernando – MD, DCH, FRCP(Lond), MRCPCH(UK)
Consultant Paediatrician General Hospital – Gampaha Sri Lanka
History

• Old disease > 200 years
• Virus isolation – 1943 Hotta & Kimura
  1944 Sabin & Schhlessinger
• 1st epidemic – 1953/54 Philippines
• 2nd epidemic – 1956 Philippines
• 3rd epidemic – 1958 BKK Thailand
• 1960-70, epidemics 3-5 yrly in SEA
• 1970- South pacific islands
• 1980- Caribbean Basin
• 1980-1990 Americas
• NOW in OVER 100 COUNTRIES!!!
Global situation

- An estimated 2.5 billion people (40% of world’s population) live in over 100 endemic countries and areas where dengue viruses can be transmitted.
- Up to 50 million infections occur annually
  - DHF 500,000
  - Deaths 22,000

Distribution of DF/ DHF

Sri Lanka

- Tropical Island
- Area 65,610 km²
- Population: 21 million
Sri Lanka

- Life expectancy: M 71.4 y, F 76.4 y
- Infant mortality rate: 11.17/ 1,000 live births
- Under 5 y mortality: 13.39/1,000 live births
- Maternal mortality rate: 14.3 / 100,000 live births
- Adult literacy rate: M 92.2%, F 89.2%
DENGUE IN SRI LANKA
Dengue can be controlled
Young more dengue prone

About 72 percent below 20 years

Dengue claims 186 upto August 13

Dengue’s human cost
What is the State’s responsibility?

War against dengue
Decision by the Health Ministry prioritize dengue control

Borne diseases, most of them mosquito-borne, affecting the island is not unknown. Foremost among them was Malaria transmit by Plasmodium falciparum, which ravaged the dry zone of the island, leading to thousands of deaths. Then wonder insecticide Dichloro Diethyl Trichloroethane (DDT) was introduced in 1946, after initial trials in Anuradhapura district.

Deaths reported from Gampaha district is 2. The number of dengue cases reported from Gampaha district during this period is 3,015. Sixteen dengue deaths and 2,570 cases reported from Jaffna was encountered but it was much worse than on any other occasion reported. The same year, around 192 people had died from dengue fever in the island.

RASIKA SANJEEWA WEERAWICKRAMA
Attorney at Law
Around 192 people had died from dengue fever in the island.

Dengue mosquitoes lay eggs in stagnant water. Only five to 10 ml of water is enough and it is said the eggs are quite robust.
Dengue Virus in Sri Lanka

- **All 4** serotypes are found in Sri Lanka
- **Epidemics** of DHF has been associated with DEN2 and DEN3.
- 2009 epidemic: Mainly DEN2 & 3 but also DEN1 (New virus strain)
DENV1

Asia (genotype I)- Includes SL isolates from 2009 / 2010 sequenced at Duke NUS & Genetech

South Pacific (Genotype III)- SL isolates from early 1980s belong to this group

Thailand (genotype II)

Africa/ America (Genotype IV) - SL isolates from 1990s and early 2000s belong to this group

Sylvatic strain

Courtesy of Dr. Hasitha Tissera/ Epidemiology unit Sri Lanka
DENV1

• 4 genotypes:
  – South Pacific,
  – Asia,
  – Thailand,
  – Africa/America

• 1983-84 : South Pacific genotype
• 1990s and early 2000: African/ american genotype replaced the South Pacific genotype
• 2009: Asian Genotype + (unpublished data)
DENV2

• 4 genotypes:
  – Malaysian/Indian subcontinent,
  – Southeast Asian,
  – American,
  – West African

• In Sri Lanka: **Malaysian/ Indian subcontinent genotype**

• No evidence of recent introduction of DENV2 strain from outside the island
DENV3

• 4 genotypes:
  – Southeast Asian/South Pacific (I)
  – Thailand (II)
  – Indian subcontinent (III)
  – American (IV)
• In Sri Lanka all DENV-3 belonged to genotype III
• In 1989 and again in 2000, the dominant clade of DENV-3 genotype III was replaced by a new clade of genotype III
• In 1989, the lineage replacement was most likely caused by the introduction of DENV-3 from outside Sri Lanka.
• In 2000, the dominant lineage of DENV-3 was replaced by a previously rare lineage from Sri Lanka.
DENV4
DENV4

• 2 genotypes: Southeast Asian (I) and Indonesian (II)

• In Sri Lanka: The oldest (1978) and most recent isolates of DENV-4 belong to the Southeast Asian genotype
Incidence of DF/ DHF

- Clinically dengue like illness since the beginning of 20th century
- 1962: First serologically confirmed case
- 1965-1968: First epidemic of dengue
- 1989: First major epidemic
  - 203 cases, 20 deaths, CFR 9.8%
  - In Thailand in 1989: 74,391 cases, 290 deaths, CFR 0.39%
- Since 1989: Dengue Haemorrhagic fever endemic

Dengue Spread in Sri Lanka

No of patients: 1294

1996

Courtesy of Dr. Hasitha Tissera/ Epidemiology Unit, Sri Lanka
Dengue Spread in Sri Lanka

No of patients: 11980

2006

Courtesy of Dr. Hasitha Tissera/ Epidemiology Unit, Sri Lanka
Dengue Spread in Sri Lanka

No of patients: 35010

2009

Courtesy of Dr. Hasitha Tissera/ Epidemiology Unit, Sri Lanka
Dengue Trends in Sri Lanka

Source: Epidemiology Unit – updated April 20, 2009
Dengue Trends- Sri Lanka 1984-2010

Source: WHO / Epidemiology Unit Sri Lanka
### Seasonality

- **South-western monsoon peak:** May – July
- **North-eastern monsoon peak:** Oct - Jan

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of cases</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>15463</td>
<td>88</td>
</tr>
<tr>
<td>2005</td>
<td>5994</td>
<td>28</td>
</tr>
<tr>
<td>2006</td>
<td>11980</td>
<td>48</td>
</tr>
<tr>
<td>2007</td>
<td>7332</td>
<td>28</td>
</tr>
<tr>
<td>2008</td>
<td>6607</td>
<td>28</td>
</tr>
<tr>
<td>2009</td>
<td>35008</td>
<td>346</td>
</tr>
<tr>
<td>2010</td>
<td>33021</td>
<td>230</td>
</tr>
</tbody>
</table>

Source: Epidemiology Unit, Sri Lanka
DF/DHF cases by age groups Sri Lanka - 1996 and 2006

Reported mean age changed from 10-15yrs to 20-25yrs between 1996 & 2006
Dengue Surveillance in Colombo, Sri Lanka: Baseline seroprevalence among children

Figure 1: Age stratified seroprevalence among children 0 - 12 in the study cohort
DF vs DHF 2006 - 2009

2006

DF: 4116 (74%)
DHF: 1401 (26%)
Total: 5565

2009

DF: 8034 (65%)
DHF: 4321 (35%)
Total: 12422

Source: Special Surveillance Data, Epidemiology Unit, Ministry of Health Sri Lanka
Case Fatality Rate in South East Asian Region 2000-2010

Source: WHO
Case Fatality Rate in South East Asian Region 2000-2010
Case Fatality Rate in South East Asian Region 2000-2010
Case Fatality Rate in South East Asian Region 2000-2010
Case Fatality Rate in South East Asian Region 2000-2010

Source - WHO
2009 Dengue Epidemic in Sri Lanka

- 35007 reported cases
- 346 deaths
- CFR $\rightarrow$ 1%
- Gampaha district – 64 deaths (CFR 2.3%)
# External Review of causes leading to Death 2009 (n=50)

<table>
<thead>
<tr>
<th></th>
<th>Children</th>
<th>Adult</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Number</td>
<td>22</td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>Age range (yrs)</td>
<td>0.5 - 13</td>
<td></td>
<td>16 - 76</td>
</tr>
<tr>
<td>Prolonged shock</td>
<td>10</td>
<td>45.5</td>
<td>15</td>
</tr>
<tr>
<td>Fluid overload</td>
<td>12</td>
<td>54.6</td>
<td>13</td>
</tr>
</tbody>
</table>

Report by Prof Siripen Kalyanrooj Thailand - 2009

Source: Epidemiology Unit Sri Lanka
Classifying dengue: a review of the difficulties in using the WHO case classification for dengue haemorrhagic fever

Shibani Bandyopadhyay, Linda W. K. Chan, and Helen S.的最后一行

personal view

Lancet Inf Dis 2006; 6: 297-302

Severe dengue: the need for new case definitions

José G. Rigu-Pérez

viewpoint

Lancet 2006; 368: 170-173

The WHO dengue classification and case definitions: time for a reassessment

Jacqueline L. Deen, Eva Harris, Bridget Willis, Angel Balmaseda, Samantha Nadia Hammond, Crisanta Rocha, Nguyen Minh Dung, Nguyen Thanh Hung, Tran Tinh Hien, Jeremy J. Farrar
Symptomatic Dengue Infection

- Viral Syndrome
- Dengue Fever
- DHF
- Unusual Dengue
**Revised Dengue Classification (WHO-2009)**

- **Dengue ± Warning Signs**
  - Without Warning Signs
  - With Warning Signs

**Probable Dengue**
- Live in / travel to dengue endemic area, fever and 2 of the following criteria
  - Nausea, vomiting
  - Rash
  - Aches and pains
  - TT test +ve
  - Leucopenia
  - Any warning signs

**Warning signs***
- Requiring strict observation and intervention
  - Abdominal pain/tenderness
  - Persistent vomiting
  - Clinical fluid accumulation
  - Mucosal bleeding
  - Lethargy/restlessness
  - Liver > 2 cm
  - Lab: increased Hct, concurrent with rapid decrease in plt count

**Lab confirmed dengue**
- Important when no signs of plasma leakage
  - NS1 Ag. (? Sensitivity 40-50% Neg)

**Severe Dengue**
1. Severe plasma leakage leading to
   - Shock
   - Fluid accumulation with respiratory distress
2. Severe bleeding as evaluated by clinician
3. Severe organ impairment
   - Liver: AST or ALT >1000
   - CNS: impaired consciousness
   - Heart and other organs
WHO classification

- DF
- DHF: Grade I, II
- DSS: Grade III, IV
- Dengue with unusual manifestations (Expanded dengue syndrome)
  - Encephalopathy
  - Hepatic failure
  - Renal failure
  - Myocarditis
Dengue trends in Sri Lanka 
\(\rightarrow\) Mid 2010

- 2009 – 35,007 cases 346 deaths (Gampaha 64 Colombo 42)
- CFR \(\rightarrow\) 1%

- 2010 1\textsuperscript{st} 6months 132 deaths
- Thailand’s CFR <0.1% if we had a comparable situation \(\rightarrow\) 13 deaths (lost 119 more lives !)
DF or DHF?

DF vs DHF

- **Important to differentiate**
- **Two different clinical conditions** from the beginning of the illness; Though they look very similar on the first 2 days
- **DHF is NOT badly managed DF**
Difference between DF & DHF

• Dengue Fever (DF)
  – No plasma leakage
  – Plt may be decreased to <100,000 in about 50% of patients
  – Leucopenia (<5000) also present
  – Headache, muscle/ joint/ bone pain, haemorrhagic manifestations seen in both DF and DHF
  – MP rash seen more in DF than DHF
DF has Hemorrhagic Manifestations ....

- Skin hemorrhages: petechiae, purpura, ecchymoses
- Gingival bleeding
- Nasal bleeding
- Gastrointestinal bleeding: hematemesis, melena, hematochezia
- Hematuria

Haemorrhagic Manifestations not enough to call it DHF
Dengue Haemorrhagic Fever (DHF)

- Key feature is PLASMA LEAK
- Clinical
  - Initially like DF
  - Haemorrhagic manifestations
  - (hepatomegaly- more in DHF)
  - (Shock)
- Lab
  - Plt < 100,000 in all DHF (around 100,000)
  - Plasma leakage: Rising Hct > or towards 20%,
  - pleural effusion, ascitis,
  - albumin <3.5 g/dl, cholesterol < 100mg/dl
Natural Course of DHF

Febrile phase: High fever for 2 – 7 days

Critical phase: Plasma leakage
Lasts 24- 48 h
Usually on D5/ D6, but earliest on D3

Convalescent phase: 2-5 days
Longer in adults
Natural Course of DF

Febrile phase: High fever for 2 – 7 days

DF has no leaking phase

Convalescent phase:
2-5 days
Longer in adults
Dengue Management
Flow Chart-Triage

Acute Onset high fever + Body aches
Retro-orbital pain
Flushing etc...

Viral Fever
Dengue Fever
Dengue Haemorrhagic fever

Adequate rest
Adequate oral fluids (juices and electrolyte solutions eg. Jeewani)

Observe for warning signs
Clinical deterioration when fever subsides
Bleeding
Severe vomiting/abdominal pain
Very thirsty
Drowsy, sleeping all the time
Refuse to eat or drink
Shock / impending shock
Cold, clammy skin and extremities.
Decrease urine output or no urine for 4-6 hours.
Behavior changes e.g. confusion,

FBC after D2

White cell count < 5,000

Platelet count < 100,000

DF or DHF

Hospital Admission

Possible Dengue fever or Dengue Haemorrhagic fever

Repeat FBC on a daily basis

Platelet count > 100,000 but dropping

Get medical opinion to decide on hospital admission
**Dengue Management Flow Chart**

- **Acute Onset high fever +Body aches**
  - Retro-orbital pain
  - Flushing etc...

- **Viral Fever**
  - Dengue Fever
  - Dengue Haemorrhagic fever

- **Adequate rest**
  - Adequate oral fluids (juices and electrolyte solutions eg. Jeewani)

- **Observe for warning signs**
  - Clinical deterioration when fever subsides
  - Bleeding
  - Severe vomiting/abdominal pain
  - Very thirsty
  - Drowsy, sleeping all the time
  - Refuse to eat or drink
  - Shock / impending shock
    - Cold, clammy skin and extremities.
  - Decrease urine output or no urine for 4-6 hours
  - Behavior changes e.g. confusion, restless

- **FBC after D2**
  - White cell count < 5,000

- **Possible Dengue fever or Dengue Haemorrhagic fever**

- **Repeat FBC on a daily basis**
  - Platelet count < 100,000

- **Get medical opinion to decide on hospital admission**
  - Platelet count > 100,000 but dropping

- **Hospital Admission**
  - Dengue Fever
  - DHF

- **Hospital Admission**

**Possible Dengue fever or Dengue Haemorrhagic fever**

- **Hospital Admission**

**Get medical opinion to decide on hospital admission**

**Dengue Fever**

**DHF**

**Hospital Admission**
Hospital Admission

Look for leaking (up to about day 8)
- Rising Hct (check Hct twice a day)
- Pleural effusions/ Ascites (by chest x-ray or ultrasound scan)
- Low albumin/ low cholesterol

No evidence of leaking

Evidence of leaking

Critical Phase (lasts 24 – 48 hours)

Needs some fluid restriction (both oral / IV)
Give only a calculated volume of fluid
Continuous monitoring of pulse rate, blood pressure, Haematocrit, Urine output

DHF not started leaking yet

DF

Unusual Dengue
Management Leaking phase DHF

- Detect pt entering in to critical phase/leaking phase through proper monitoring..
  - When platelets drops < 100,000 (around 100,000)
  - HCT rising towards 20% from baseline
    - Monitor HCT; *when not rising* → ?bleeding
  - When evidence of leaking ....
    - Pleural or peritoneal effusions USS /CXR
    - Haemodynaemic state
Patient is in critical phase and confirmed to be DHF if ...

- Fever D 3 or beyond
- Platelet < 100,000 (WBC < 5,000)
- Evidence of plasma leak
  - Effusions: pleura/ peritoneum (CXR/ USS)
  - Hct rise of 20% from baseline
  - Low albumin/ low cholesterol
- Hemorrhagic manifestations
  - (not essential if objective evidence of plasma leak+)

Laboratory confirmation of dengue infection NOT essential
Fluid Management in Dengue...

- Once patient is in the critical phase (24-48hrs)

⇒ TIME THE ONSET OF LEAKING PHASE AND PREDICT THE END OF LEAKING PHASE

TOTAL FLUIDS = MAINTENANCE + 5% DEFICIT

OVER THE ENTIRE CRITICAL PHASE (USUALLY 48 HRS)
While in critical phase...

• Do proper /frequent monitoring (NO shortcuts)
  – BP, PULSE, UOP, HCT

• Proper Fluid regimen to avoid both shock and fluid overload ➔ Use crystalloids and colloids correctly depending on clinical parameters & available fluid quota

• Prolonged shock causes both bleeding and organ failure
## Dengue Situation by month

### 2009

<table>
<thead>
<tr>
<th>Month</th>
<th>Cases</th>
<th>Deaths</th>
<th>CFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1279</td>
<td>14</td>
<td>1.09%</td>
</tr>
<tr>
<td>February</td>
<td>948</td>
<td>11</td>
<td>1.16%</td>
</tr>
<tr>
<td>March</td>
<td>869</td>
<td>10</td>
<td>1.15%</td>
</tr>
<tr>
<td>April</td>
<td>1058</td>
<td>31</td>
<td>2.93%</td>
</tr>
<tr>
<td>May</td>
<td>4182</td>
<td>65</td>
<td>1.55%</td>
</tr>
<tr>
<td>June</td>
<td>7048</td>
<td>53</td>
<td>0.75%</td>
</tr>
<tr>
<td>July</td>
<td>6872</td>
<td>55</td>
<td>0.80%</td>
</tr>
<tr>
<td>August</td>
<td>3035</td>
<td>15</td>
<td>0.49%</td>
</tr>
<tr>
<td>September</td>
<td>1710</td>
<td>11</td>
<td>0.64%</td>
</tr>
<tr>
<td>October</td>
<td>2206</td>
<td>15</td>
<td>0.68%</td>
</tr>
<tr>
<td>November (3rd W)</td>
<td>1348</td>
<td>9</td>
<td>0.67%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>30555</td>
<td><strong>289</strong></td>
<td><strong>0.95%</strong></td>
</tr>
<tr>
<td><strong>2009 Total</strong></td>
<td><strong>35007</strong></td>
<td><strong>346</strong></td>
<td><strong>0.99%</strong></td>
</tr>
</tbody>
</table>

### 2010

<table>
<thead>
<tr>
<th>Month</th>
<th>Cases</th>
<th>Deaths</th>
<th>CFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>4764</td>
<td>50</td>
<td>1.05%</td>
</tr>
<tr>
<td>February</td>
<td>4709</td>
<td>18</td>
<td>0.38%</td>
</tr>
<tr>
<td>March</td>
<td>2518</td>
<td>20</td>
<td>0.79%</td>
</tr>
<tr>
<td>April</td>
<td>2002</td>
<td>10</td>
<td>0.50%</td>
</tr>
<tr>
<td>May</td>
<td>1948</td>
<td>22</td>
<td>1.13%</td>
</tr>
<tr>
<td>June</td>
<td>3434</td>
<td>38</td>
<td>1.11%</td>
</tr>
<tr>
<td>July</td>
<td>6108</td>
<td>39</td>
<td>0.64%</td>
</tr>
<tr>
<td>August</td>
<td>4167</td>
<td>25</td>
<td>0.60%</td>
</tr>
<tr>
<td>September</td>
<td>1860</td>
<td>7</td>
<td>0.38%</td>
</tr>
<tr>
<td>October</td>
<td>1114</td>
<td>1</td>
<td>0.09%</td>
</tr>
<tr>
<td>November (3rd W)</td>
<td>352</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>32976</td>
<td><strong>230</strong></td>
<td><strong>0.70%</strong></td>
</tr>
<tr>
<td><strong>2010 Total</strong></td>
<td><strong>32976</strong></td>
<td><strong>230</strong></td>
<td><strong>0.70%</strong></td>
</tr>
</tbody>
</table>
Dengue Deaths/ CFR 2009-2010

WHO-TDR Guideline
Dengue Deaths/ CFR 2009-2010

WHO existing classification+ proper fluid therapy

WHO-TDR Guideline
Daily update on dengue situation

WEEKLY EPIDEMIOLOGICAL REPORT
A publication of the Epidemiological Unit,
Ministry of Healthcare & Nutrition
231, de Saram Place, Colombo 01000, Sri Lanka.
Tele:(+94-011)2695112, 681548, 4740490, 4740492, 2677600 Fax: 2696583
Epidemiologist:(+94-011) 4740491, E-mail:chepid@slt.net.lk, epidunit@slt.net.lk
Web: www.epid.gov.lk

Vol. 35 No. 29  12th – 18th July 2008

www.epid.gov.lk
Unusual dengue

• Reported from different parts of the world and mostly in adults

• They are **UNCOMMON** – (?
  - NEURO- encephalopathy; ICH; SD Effusions; transverse myelitis
  - GI- Hepatic failure; pancreatitis;cholecystitis
  - RENAL- ARF;HUS
  - CARDIAC- myocarditis; pericarditis; arrhythmias
  - Other systems

When present → NEED DIFFERENT TREATMENT
Unusual Dengue- other claims..

• “Many severe DSS cases do not have platelets<100,000/mm3”
• “Tourniquet test negative in majority of DF/DHF” — not done repeatedly
• “Massive fatal bleeding in DF pts (with no associated leaking)”
• “Myocarditis - not uncommon cause of death in dengue”
• “Severe organ failure with no evidence of fluid leak or prolonged shock”
• “Shock due to fluid leak occurring on Day 1 of fever”
Some questions about *Unusual dengue*..

- How big is the problem?

  Unusual dengue exists but..,

    - An “extreme minority?” Or “not so uncommon” situation?
    - *Is part of it a complication of profound or prolonged shock?*
    - A very careful and detailed analysis of case histories, fluid regimens, associated co-morbidities are needed to understand this disease entity.
Transferred to ICU GHG on **THURSDAY NIGHT** for ventilation
SATURDAY afternoon

Deeply unconscious
Investigations (10/10/2009)

- WBC 16,800 (N70)
- Hb 8.8
- Plt 107,000
- PCV 25.9%
- Na 143 K 3.6
- Ca 6.1
- BU 79
- SGOT 7320
- SGPT 1820
- Albumin 2.7
• On **03/10/2009**.
  
  WBC 5.4 \times 10^3 
  
  Pl. 237 \times 10^3 
  
  PCV 36%

**On 06/10/2009**

- WBC 2900
- Hb 12.5
- PCV 43%
- Plt 57,000

Has had both prolonged shock and fluid overload
Kalana...

• Management of Complications
  – Given 3x PRC transfusions
  – Correction of Hypocalcaemia
  – Correction of acidosis
  – Liver failure regimen
  – Repeated doses of furosimide
Dengue Antibody ➔ positive
In Sri Lanka

- www.epid.lk
- Each dengue death is now evaluated in detail at a death review meeting and two independent consultants are also going through all details of case notes etc.
Conclusions

• In an emerging diseases- knowledge will also evolve over years.

• When new regions are challenged with old disease one of the best ways to handle it is by learning from those who have better experience

• More than 50 years after it’s first recognition DHF still exist as a distinct entity and identifying and managing the leaking phase of DHF is still the most important measure that bring down dengue deaths.

• Outcome of some diseases can be dramatically changed by applying simple principles
Conclusions cont..

• Any classification or guideline should aim at reducing deaths due to dengue one of its key objectives.
• Finding out what a classification or a guideline ultimately do to the case fatality rate is a better way of judging its usefulness.
• There is evidence that the existing WHO classification which evolved over the years has helped to gradually bring down the case fatality rate in countries where DHF is more prevalent.
References


• WHO Dengue Fact sheet: Available at http://www.who.int/mediacentre/factsheets/fs117/en/


• Tissera HA et al. Dengue Surveillance in Colombo, Sri Lanka: emergence of a new dengue virus type 1 genotype (Unpublished)

• Epidemiology Unit, Sri Lanka (www.epid.gov.lk)

Acknowledgements

• Ministry of Health- Sri Lanka
• Epidemiology Unit, Sri Lanka
• Dr. Hasitha Tissera, Consultant Epidemiologist
• Dr. Prasad Chathuranga – GH Gampaha, Sri Lanka
• Staff of Paediatric Unit, General Hospital Gampaha
Thank you