AIIMS Public Lecture

21st August 2014

We welcome you all

एम्स पब्लिक लेक्चर

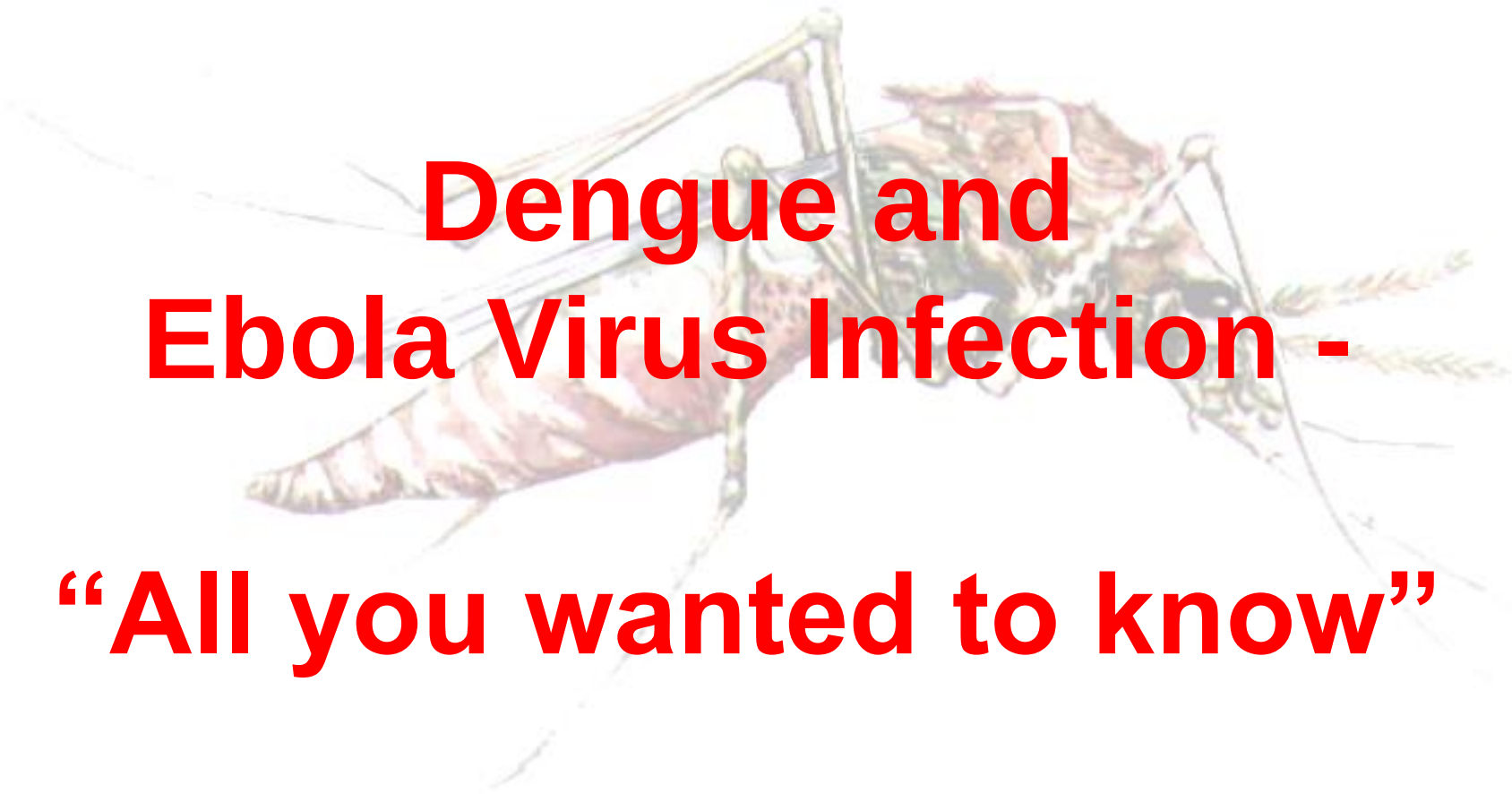
21st अगस्त 2014

कार्यक्रम के उपलक्ष में

आप सब का स्वागत है।

AIIMS Public Lecture

21st August 2014



Dengue and Ebola Virus Infection -

"All you wanted to know"

एम्स पब्लिक लेक्चर

21.04.2014

डेंगू व इबोला वायरस संक्रमण

–

‘‘आपकी जानकारी के लिए’’

हिंगLISH

Speakers

Dr. Randeep Guleria

Professor & Head, Deptt. of Pulmonary Medicine & Sleep Disorder

Dr. Sanjay K. Rai

Addl. Professor, Centre for Community Medicine

Dr. Ashutosh Biswas

Professor, Deptt. of Medicine

Dr. Anil K. Goswami

Asstt. Professor of Community Medicine

Panelist

Dr. Chandrakant S. Pandav

Professor & Head, Centre for Community Medicine

Dr. Praveen K. Aggarwal

Professor & Head, Deptt. of Emergency Medicine

Dr. Lalit Dar

Professor, Deptt. of Microbiology

Dr. S. K. Kabra

Professor, Deptt. of Paediatrics

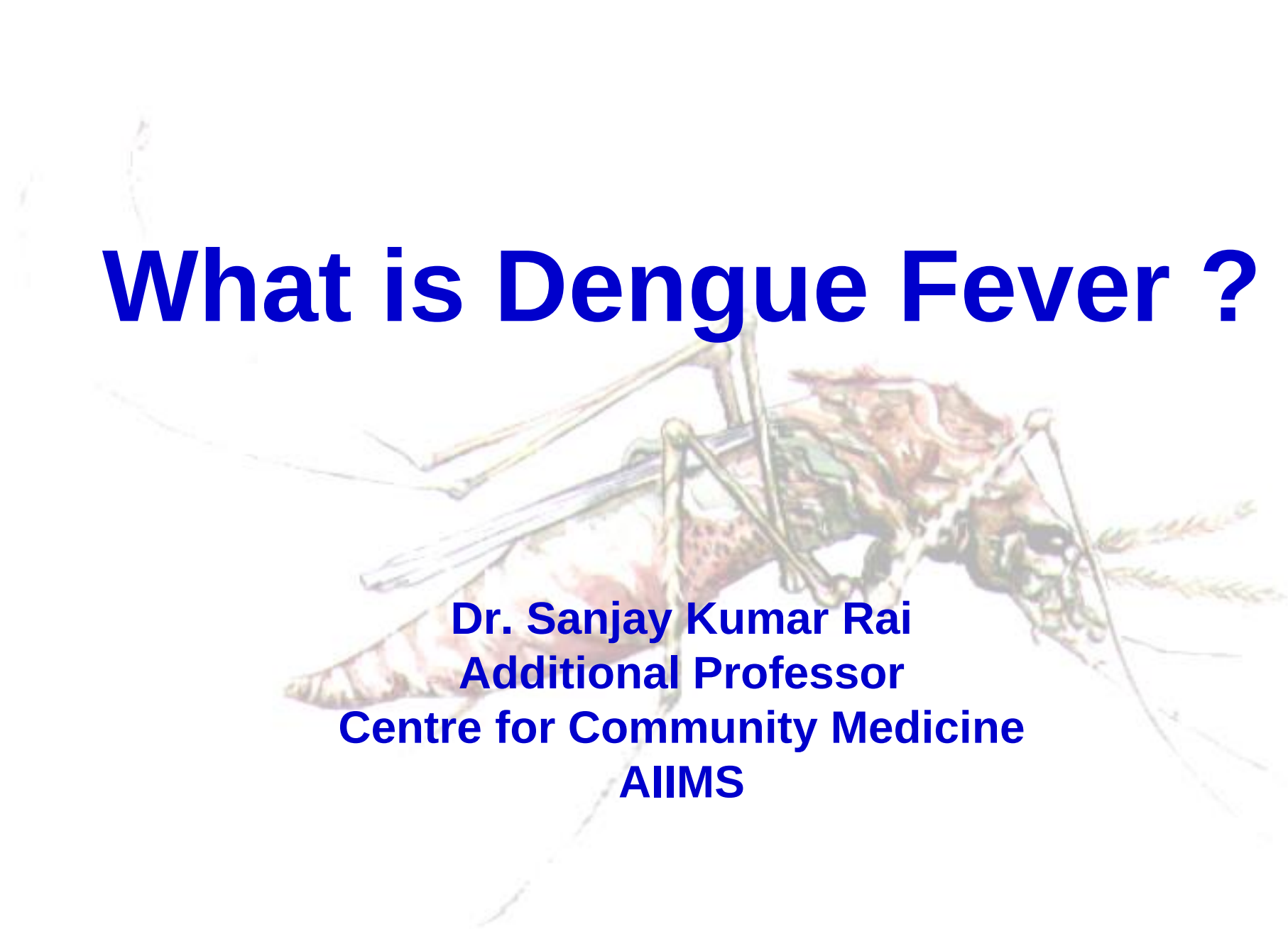
Dr. R.S. Aggarwal

Director, Charak Palika Hospital, NDMC

Dr. Pravas Mishra

Addl. Professor, Deptt. of Haematology

What is Dengue Fever ?



Dr. Sanjay Kumar Rai
Additional Professor
Centre for Community Medicine
AIIMS

What is Dengue?

- **Dengue is a mosquito-borne, viral infection.**
- **The infection causes flu-like illness, and occasionally develops into a potentially lethal complication called severe dengue.**
- **Common name of the disease is 'break-bone fever' (*Haddi Tod Bukhar* (हडी तोड बुखार)**

HISTORY

- **Epidemics of an illness resembling dengue occurred in 1779, 1780 in three continents- Asia, Africa and North America.**

- **First epidemic of DHF occurred in Manila, Philippines 1950.**

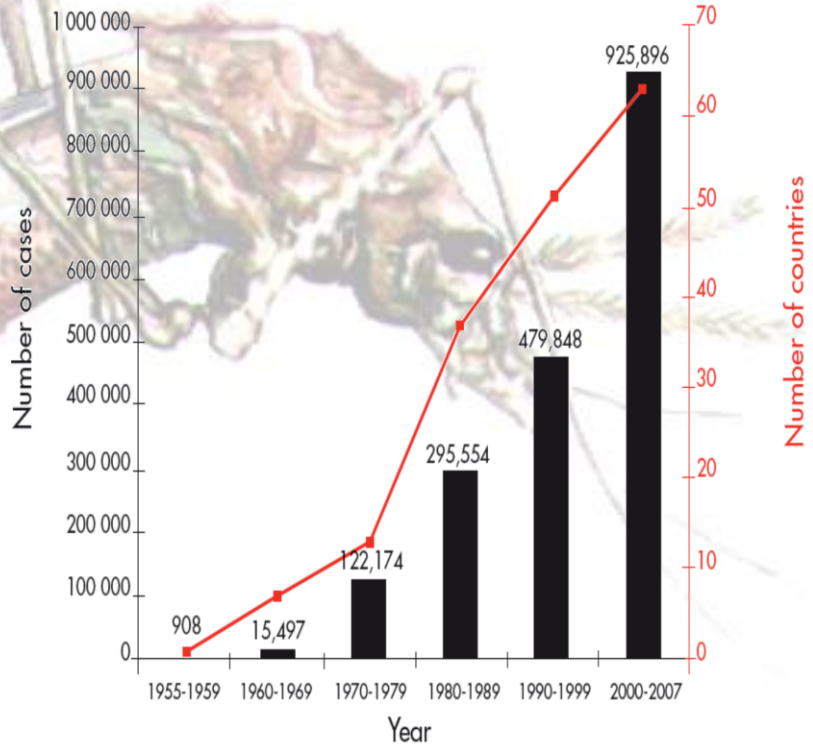
- **In India dengue virus was first isolated in Calcutta in 1945.**

- **Epidemic of DHF first occurred in Calcutta in 1963.**

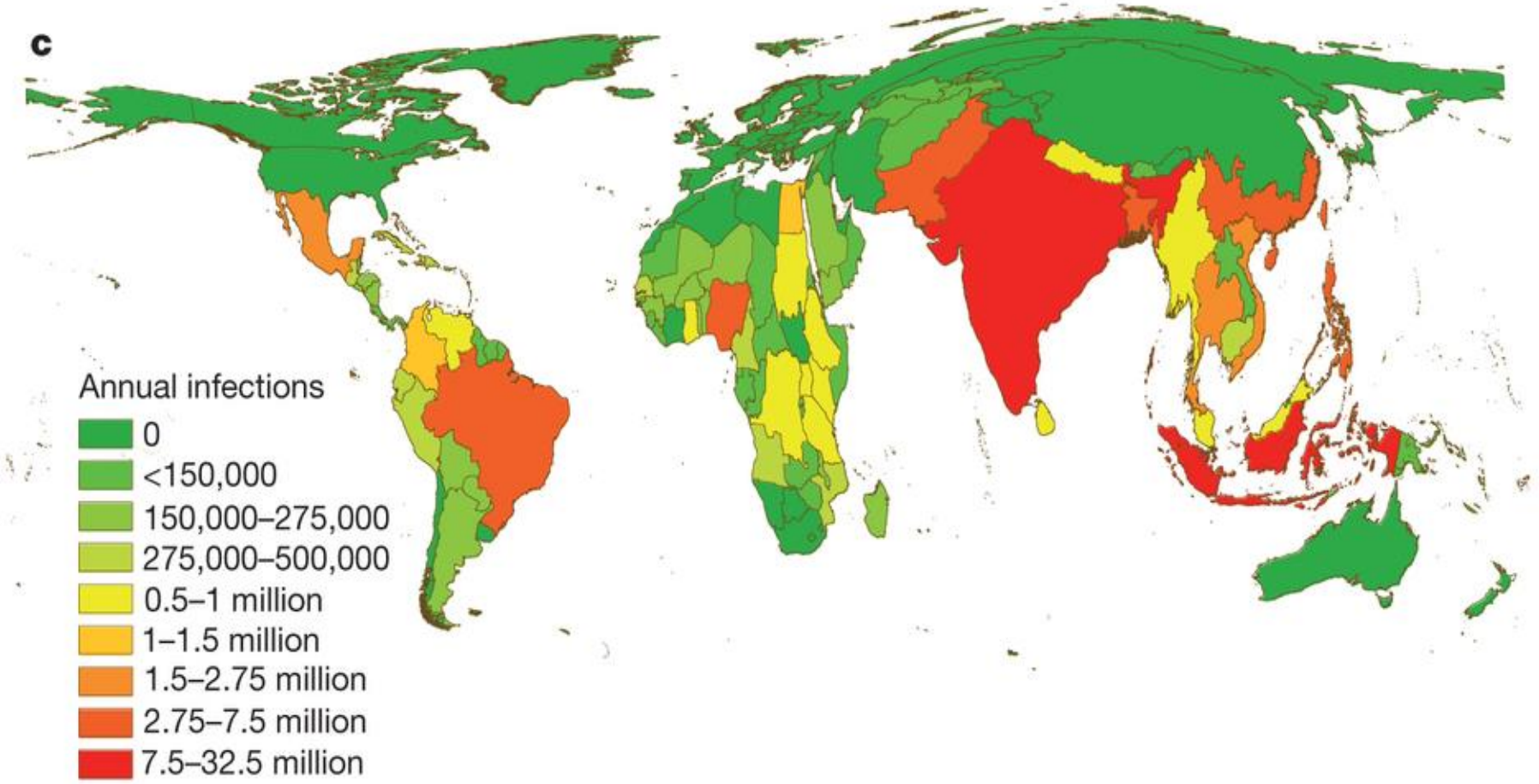
HISTORY

- **The global incidence of dengue has grown dramatically in recent decades.**
  - **The incidence of dengue has increased 30-fold over the last 50 years.**
  - **Up to 50-100 million infections are now estimated to occur annually in over 100 (only 9 counties in 1955) endemic countries.**
  - **Almost half of the world's population at risk.**

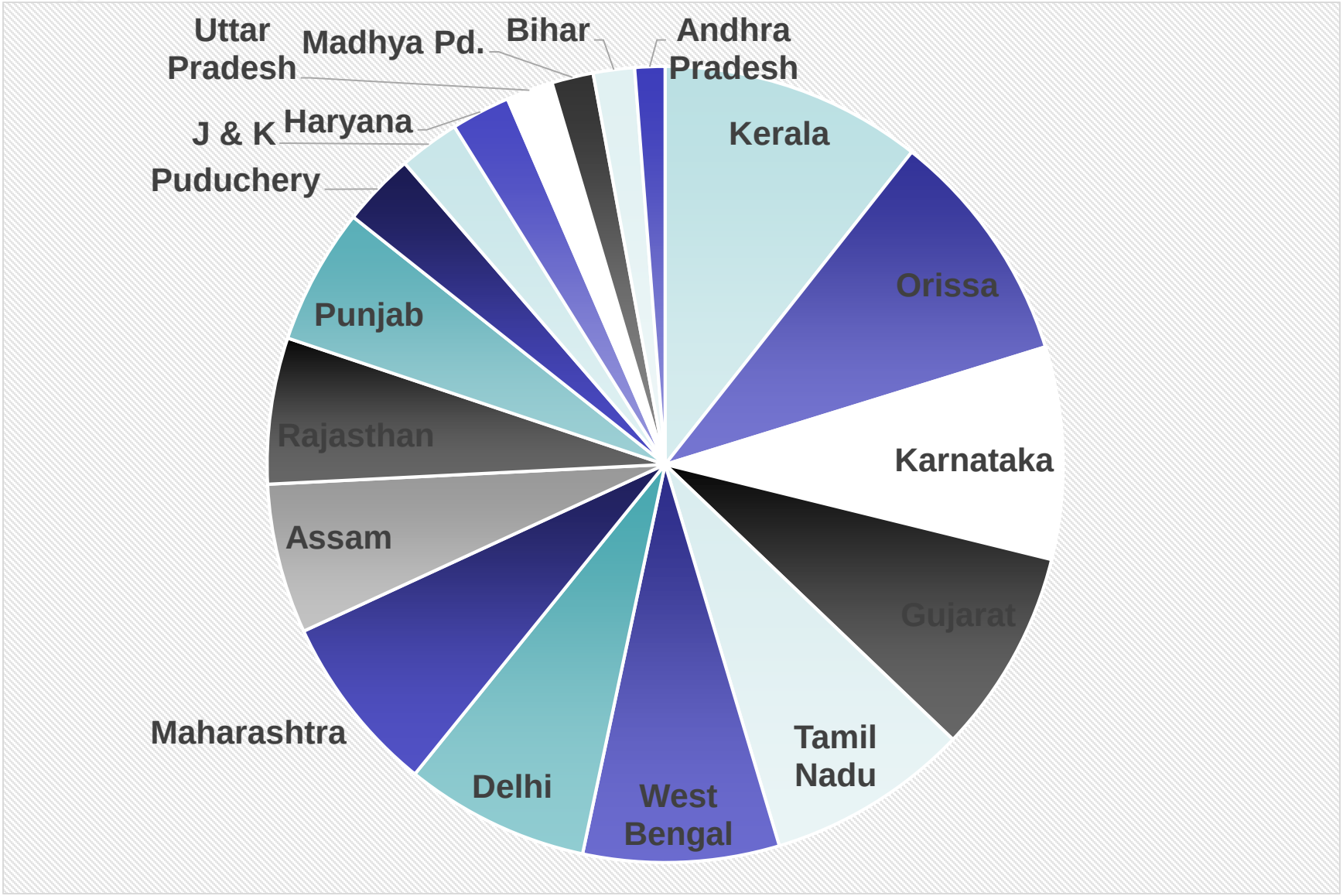
Average annual number of DF, and DHF cases reported to WHO 1955-2007



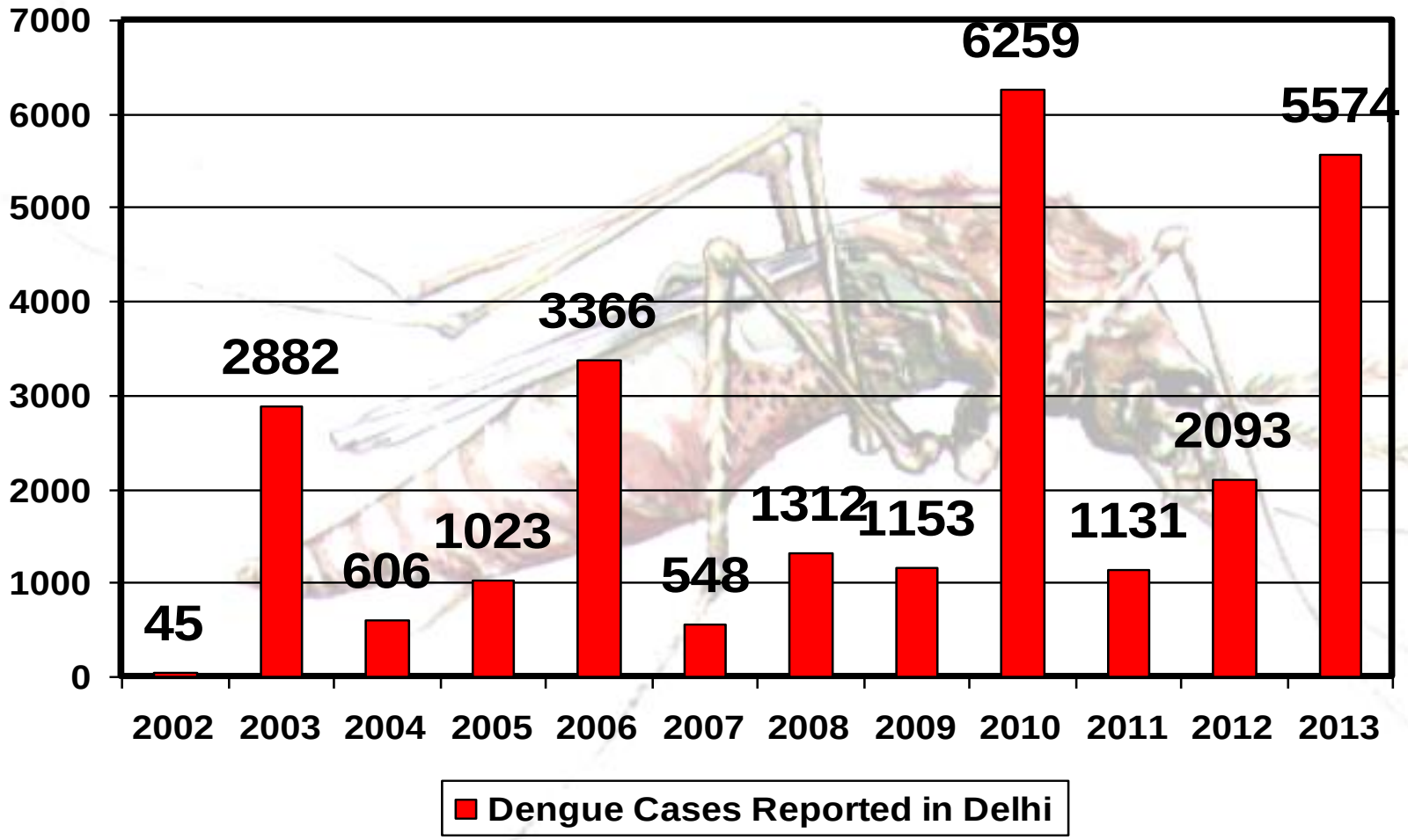
World wide distribution



Distribution in India



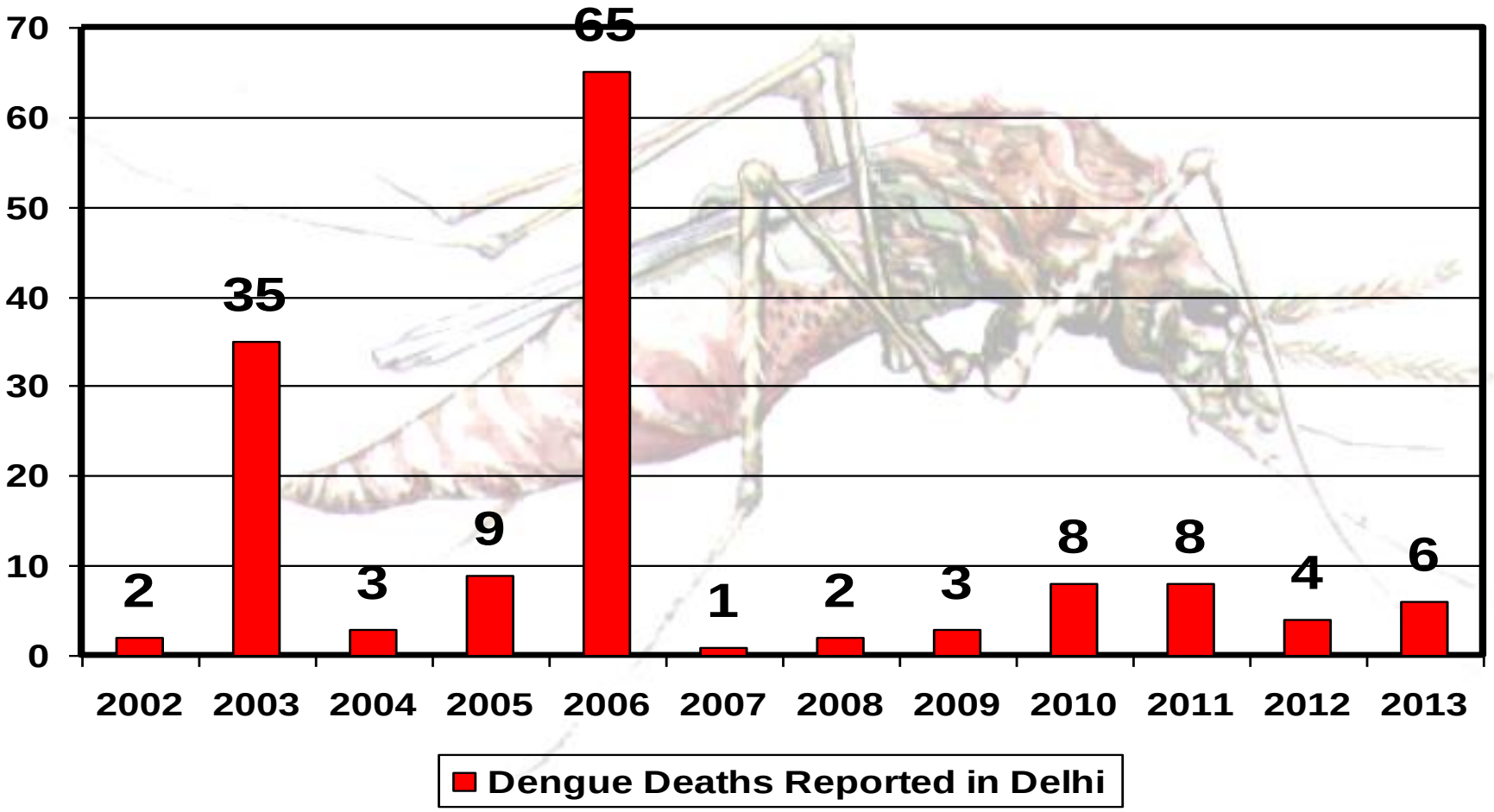
Dengue Cases in Delhi (2002 – 2013)



Endemic

Epidemic & Outbreaks Delhi -1996, 2003, 2006 , 2010, 2013

Deaths due to Dengue in Delhi (2002-2013)



What cause Dengue ?

- VIRUS -- cause
- MOSQUITO --- transmitter of disease
- ENVIRONMENT ----- Helps transmission

It is caused by a virus (Dengue Virus)

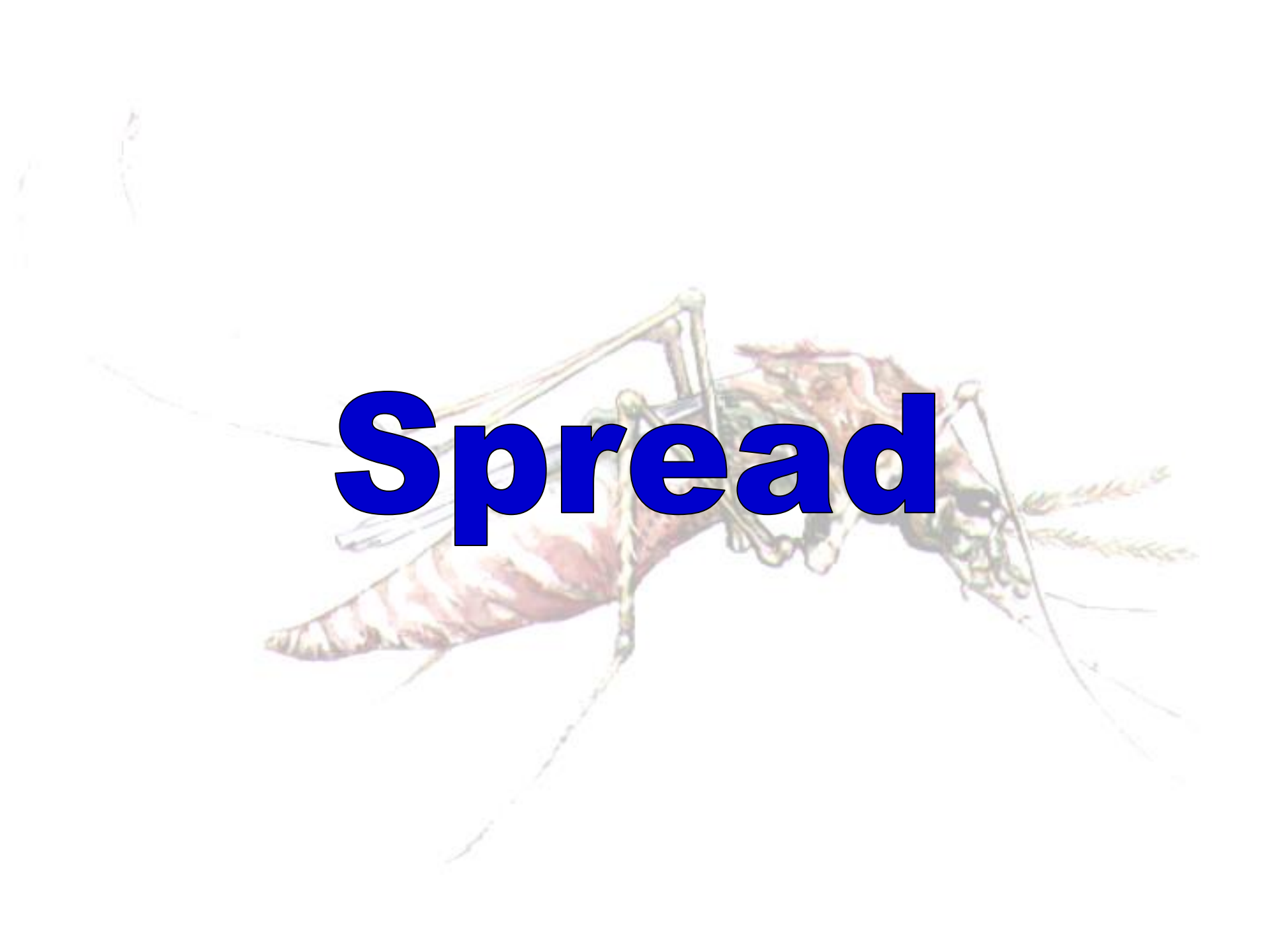
Four different types (Type 1,2,3,4).

- **Infection with one type provides Life long Immunity against that type, but not against other type**

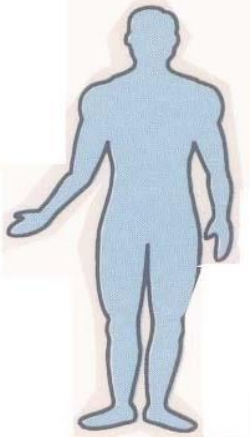
- **Theoretically, one person can suffer from Dengue 4 times in life.**

AGE & SEX GROUPS AFFECTED

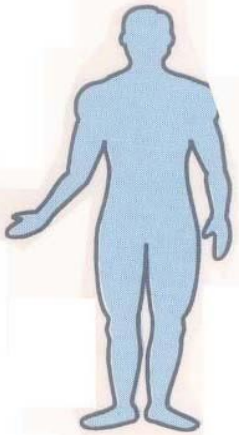
- All age groups & both sexes are affected
- Children > Adults
- Female > Male (severe)
- Deaths are more in children during DHF outbreak
- Immune status


Spread

TRANSMISSION CYCLE OF DENGUE



Man-Mosquito-Man



Infected Person → **Other persons**

Know Your Enemy !!

“Aedes” mosquitoes

“TIGER Mosquitoes”

: Breeds Inside and around the House

Feeding Habits

- **Day biter**
- **Mainly feeds on human beings in domestic and peridomestic situations**
- **Bites repeatedly**

BREEDING HABITS

- ***Typically container habitat species***

- **Mosquito breeds in any type of man made containers or storage containers having even a small quantity of water.**
- **Eggs of *Aedes aegypti* can live without water for more then one year.**

Life Cycle of a Mosquito

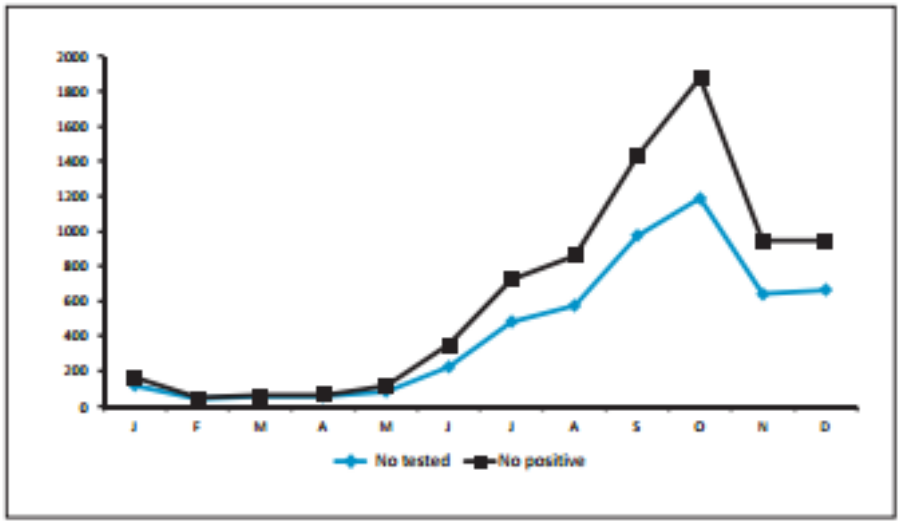
- **Egg** → **Larva**

Pupa

Adult Mosquito

= 7-12 Days

Disease occurs more frequently in the rainy season and immediately afterwards (July to October) in India.




Thank you...

Management of Dengue Fever

Dr Ashutosh Biswas
Professor of Medicine
AIIMS

Frequently asked questions

- How will one know Dengue Fever
- What are the specific symptoms and signs of DF
- What are DHF and DSS
- What are the Danger signs of Dengue Fever
- What one should do when suspected DF
- Is there any blood test to confirm early DF
- Is there any blood test to confirm late DF
- Is there any treatment for DF
- Is there any vaccine for DF

Manifestation Of Dengue Virus Infections

ASYMPTOMATIC

SYMPTOMATIC

- Undifferentiated Fever
- Dengue Fever
  - Without haemorrhage
  - With unusual haemorrhage
- Dengue Haemorrhagic Fever
  - No shock
  - DSS

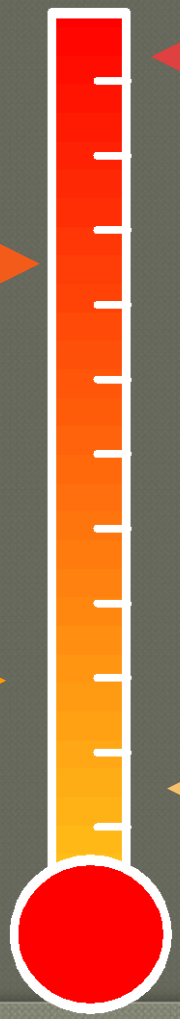
Warning Signs for Dengue Fever

Four Criteria for DHF:

- Fever
- Hemorrhagic manifestations
- Excessive capillary permeability
- ≤ 100,000/mm^3 platelets

Alarm Signals:

- Severe abdominal pain
- Prolonged vomiting
- Abrupt change from fever to hypothermia
- Change in level of consciousness (irritability or somnolence)



Initial Warning Signals:

- Disappearance of fever
- Drop in platelets
- Increase in hematocrit

When Patients Develop DSS:

- 3 to 6 days after onset of symptoms

Dengue Fever - Symptoms

- **Fever: continuous for 3 to 7 days**
- **Severe headache**
- **Joint pain, muscle pain, pain behind eyeballs**
- **Nausea, vomiting, and rash**
- **In very rare cases, the condition may worsen into dengue haemorrhagic fever, leading to internal bleeding, shock, or even death.**

Hemorrhagic Manifestations of Dengue

- Skin hemorrhages: petechiae, purpura, ecchymoses
- Gingival bleeding
- Nasal bleeding
- Gastro-intestinal bleeding: hematemesis, melena, hematochezia
- Hematuria
- Increased menstrual flow

Bleeding in Dengue fever

- Coagulopathy: decrease prothrombin complex due to alteration of liver functions.
- **Low platelets:**
  - Destruction by antibody
  - Destruction by liver and spleen
  - Platelet dysfunction (bleeding with normal plt. count)
  - Bonemarrow suppression (leucopenia, thrombocytopenia)
  - DIC
  - Endothelial Platelet aggregation

Danger Signs in Dengue Hemorrhagic Fever

- Abdominal pain - intense and sustained
- Persistent vomiting
- Abrupt change from fever to hypothermia, with sweating and prostration
- Restlessness or somnolence

Risk Factors for DHF

- Pre-existing anti-dengue antibody
  - previous infection
  - maternal antibodies in infants
- Virus strain (genotype)
  - Epidemic potential: viremia level, infectivity
- Virus serotype
  - DHF risk is greatest for DEN-2, followed by DEN-3, DEN-4 and DEN-1
- Host genetics
- Age

Pathophysiology

Capillary Leak Syndrome:

- Transient increased capillary permeability due to endothelial cell dysfunction
- Widening of tight junctions
- Cytokine release and complement activation
- **Leukopenia,** Thrombocytopenia and Hemorrhagic diathesis:
- Direct viral bone marrow suppression
- Platelet destruction in DHF
- Molecular mimicry between viral protein and coagulation factors

Severe Dengue Fever

- Encephalopathy
- Hepatic damage
- Cardiomyopathy
- Severe gastrointestinal hemorrhage

Clinical Evaluation in Dengue Fever

- Blood pressure
- Evidence of bleeding in skin or other sites
- Hydration status
- Evidence of increased vascular permeability-- pleural effusions, ascites
- Tourniquet test

Laboratory Tests

- Clinical laboratory tests
  - CBC--WBC, platelets, hematocrit
  - Albumin
  - Liver function tests
  - Urine--check for microscopic hematuria
- Dengue-specific tests
  - Virus isolation
  - Serology
    - Antigen : NS1
    - Antibody: IgM,IgG

Management of DF

Epidemic Management

- **Space mobilization**
- **Staff mobilization**
- **Augmentation of Lab. Services**
  - **Diagnosis not required in all cases**
- **Augmentation of blood bank services**
  - **increase of blood and blood component**

Case management

- **Individual case management**
  - **Diagnosis**
  - **Severity assessment**
  - **Specific management**

Dengue Fever - Treatment

- At present, no specific drug that can treat dengue fever effectively.
- Patient should be isolated in a mosquito-free environment to prevent the spread of disease

Treatment of Dengue Fever & DHF I & II

- Fluids
- Rest
- Antipyretics (avoid aspirin and non-steroidal anti-inflammatory drugs)
- Monitor blood pressure, hematocrit, platelet count,
  level of consciousness

Treatment of DHF III & IV

All above treatment +

– In case of severe bleeding, give fresh whole blood 20 ml/kg as a bolus

– Give platelet rich plasma transfusion exceptionally when platelet counts are below 5,000–10,000/ mm3 .

– After blood transfusion, continue fluid therapy at 10 ml/kg/h and reduce it stepwise to bring it down to 3 ml/kg/h and maintain it for 24-48 hrs

Indications for Hospital Discharge

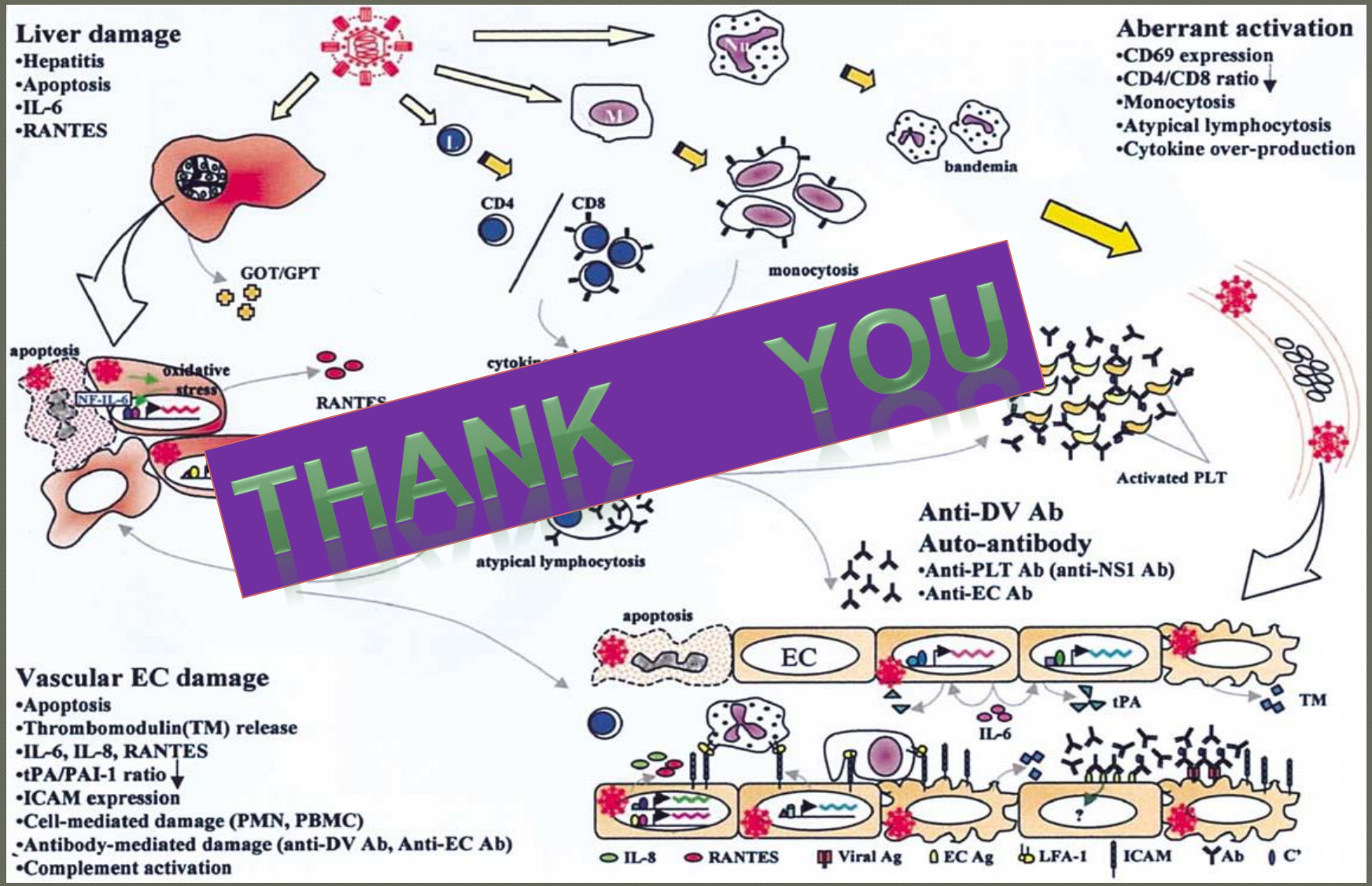
- Absence of fever for 24 hours (without anti-fever therapy) and return of appetite
- Visible improvement in clinical picture
- Stable hematocrit
- 3 days after recovery from shock
- Platelets $\geq 50{,}000/mm^3$
- No respiratory distress from pleural effusions/ascites

Patient Follow-Up

- **Patients treated at home**
  - Instruction regarding danger signs
  - Consider repeat clinical evaluation
- **Patients with bleeding manifestations**
  - Serial hematocrits and platelets at least daily until temperature normal for 1 to 2 days
- **All patients**
  - If blood sample taken within first 5 days after onset of fever, need convalescent sample between days 6 - 30
  - All hospitalized patients need samples on admission and at discharge or death

Dengue Vaccine?

- No licensed vaccine at present
- Recently Tetravalent Dengue Vaccine phase 3 trial completed in Asia.


Liver damage
•Hepatitis
•Apoptosis
•IL-6
•RANTES
GOT/GPT
apoptosis
oxidative stress
NF-IL-6
RANTES
CD4
CD8
monocytosis
bandemia
Aberrant activation
•CD69 expression
•CD4/CD8 ratio
•Monocytosis
•Atypical lymphocytosis
•Cytokine over-production
THANK YOU
Activated PLT
atypical lymphocytosis
Anti-DV Ab
Auto-antibody
•Anti-PLT Ab (anti-NS1 Ab)
•Anti-EC Ab
apoptosis
EC
tPA
TM
IL-6
?
Vascular EC damage
•Apoptosis
•Thrombomodulin(TM) release
•IL-6, IL-8, RANTES
•tPA/PAI-1 ratio
•ICAM expression
•Cell-mediated damage (PMN, PBMC)
•Antibody-mediated damage (anti-DV Ab, Anti-EC Ab)
•Complement activation
IL-8
RANTES
Viral Ag
EC Ag
LFA-1
ICAM
Ab
C'

Prevention of Dengue

(also applicable for Malaria & Chikungunya Fever)

Dr. Anil Kumar Goswami
Assistant Professor
Centre for Community Medicine
AIIMS

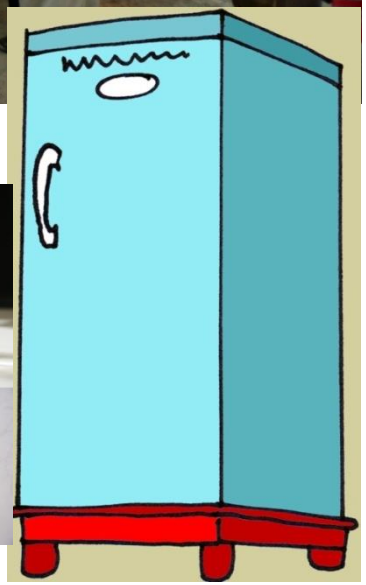
Prevention

For protection against mosquitoes

- Prevent Mosquito breeding
- Prevent Mosquito bites

Anti-larval measures- Environmental Control...1

- **Don't allow water to remain stagnant in and around your house. Fill the ditches.**
- **Clean the blocked drains.**
- **Empty the room air coolers and flower vases completely at least once in seven days and then refill them.**
- **Tray below the fridge also to be cleaned.**



Anti-larval measures- Environmental Control...2

- **Dispose off old containers tins and tyres etc. Properly.**

- **Keep the water tanks and water containers tightly covered so that the mosquitoes can not enter them and start breeding.**

Anti-larval measures- Environmental Control...3

- **Keep the surroundings of your house clean.**
- **Don’t litter garbage.**
- **Don’t allow wild herbs etc. to grow around your house.**

Do inform and take help from your local health centre, panchayat or municipality in case you notice abnormal density of mosquitoes or too many cases of fever are occurring in your area.

Anti-larval measures-chemical control...1

- TEMEPHOS an insecticide can be used to kill larva in water.

or

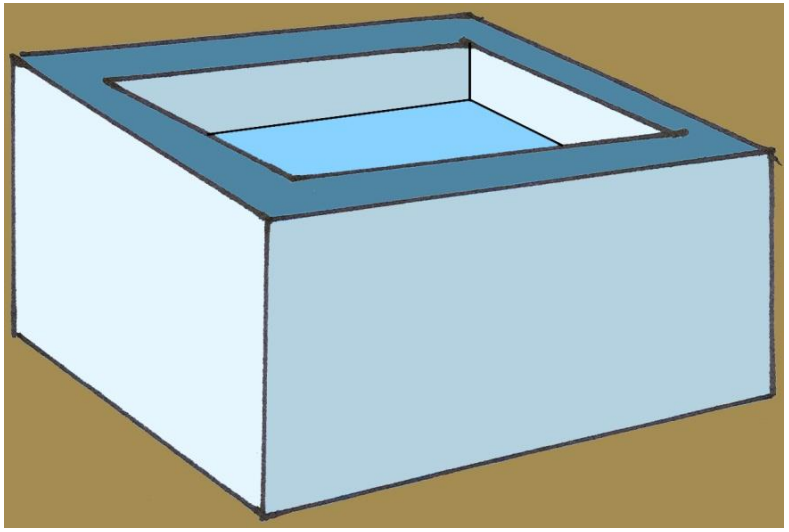
- Putabout two tablespoons (30 ml) of petrol or kerosene oil into 100 litres of water.

Where it is difficult to change water

Anti-larval measures-Biological control...1

- **Some types of small fish (Gambusia, Lebister) which eat mosquito larva, can be obtained from local administrative bodies.**

- **These fish can be used in burrow pits, sewage oxidation pounds, ornamental pounds, cisterns and farm ponds.**



ANTI-ADULT MEASURES-
Residual spray & Space spray…1

- **Don’t forget to spray behind the photo- frames, curtains, calendars, corners of house and stores.**

- **Use insecticidal sprays in all areas within the house at-least once a week.**

ANTI-ADULT MEASURES-
Residual spray & Space spray…2

Don’t turn away spray workers whenever they come to spray your house.

Protection Against Mosquito Bites…1

- **Wear clothes which cover the body as much as possible.**

- **Use Wire mesh on windows and doors.**

- **Use mosquito repellent sprays, creams, coils, mats or liquids to drive away/ kill the mosquitoes..**

Protection Against Mosquito Bites…2

- It is advisable to always keep the patient of Dengue fever under a **mosquito net** in the first 5-6 days of the illness so that mosquitoes don't have an access to him/her.

Dengue Fever can be **Easily Prevented!**

It is

Your, Mine and …

***Our* RESPONSIBILITY**

Need more Information???

AIIMS Help Lines

Telephone Helpline

011-26589712

Helpline operated by DPORC & CCM, AIIMS

Thank You

For your kind attention

21.08.2014

03:05