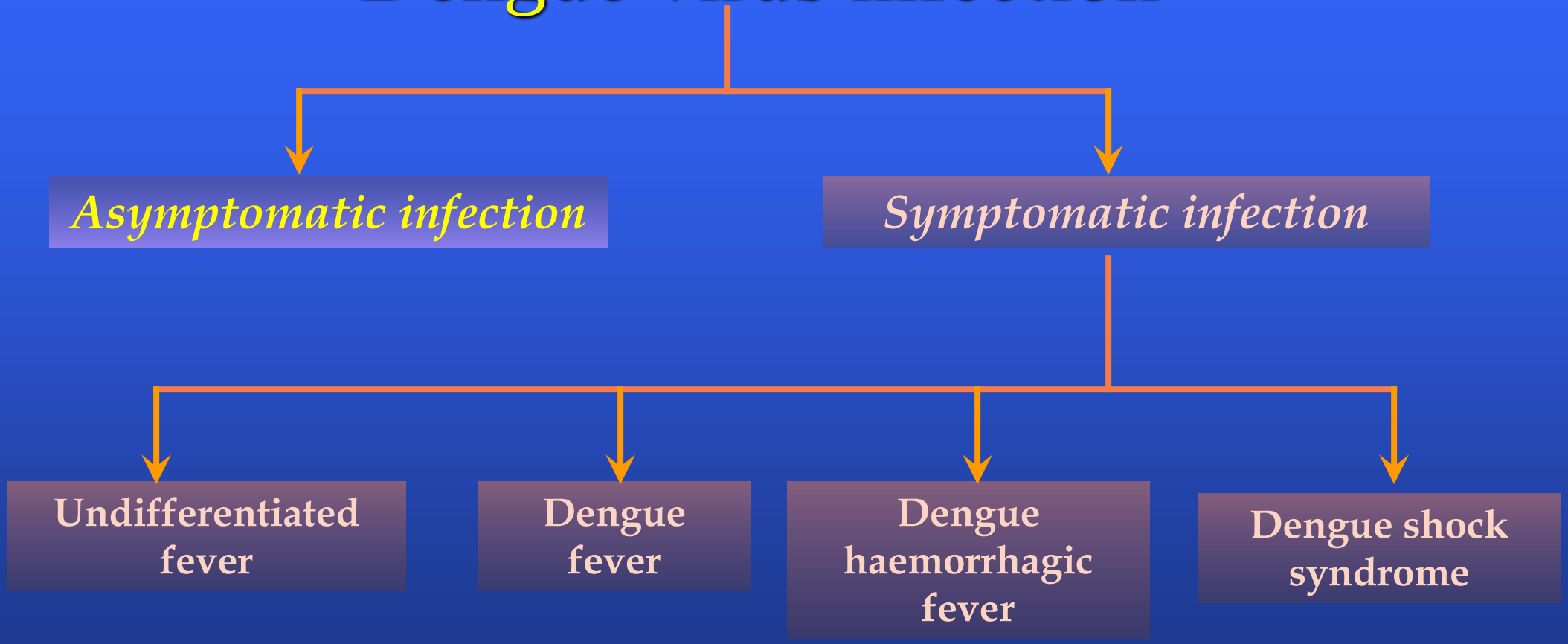
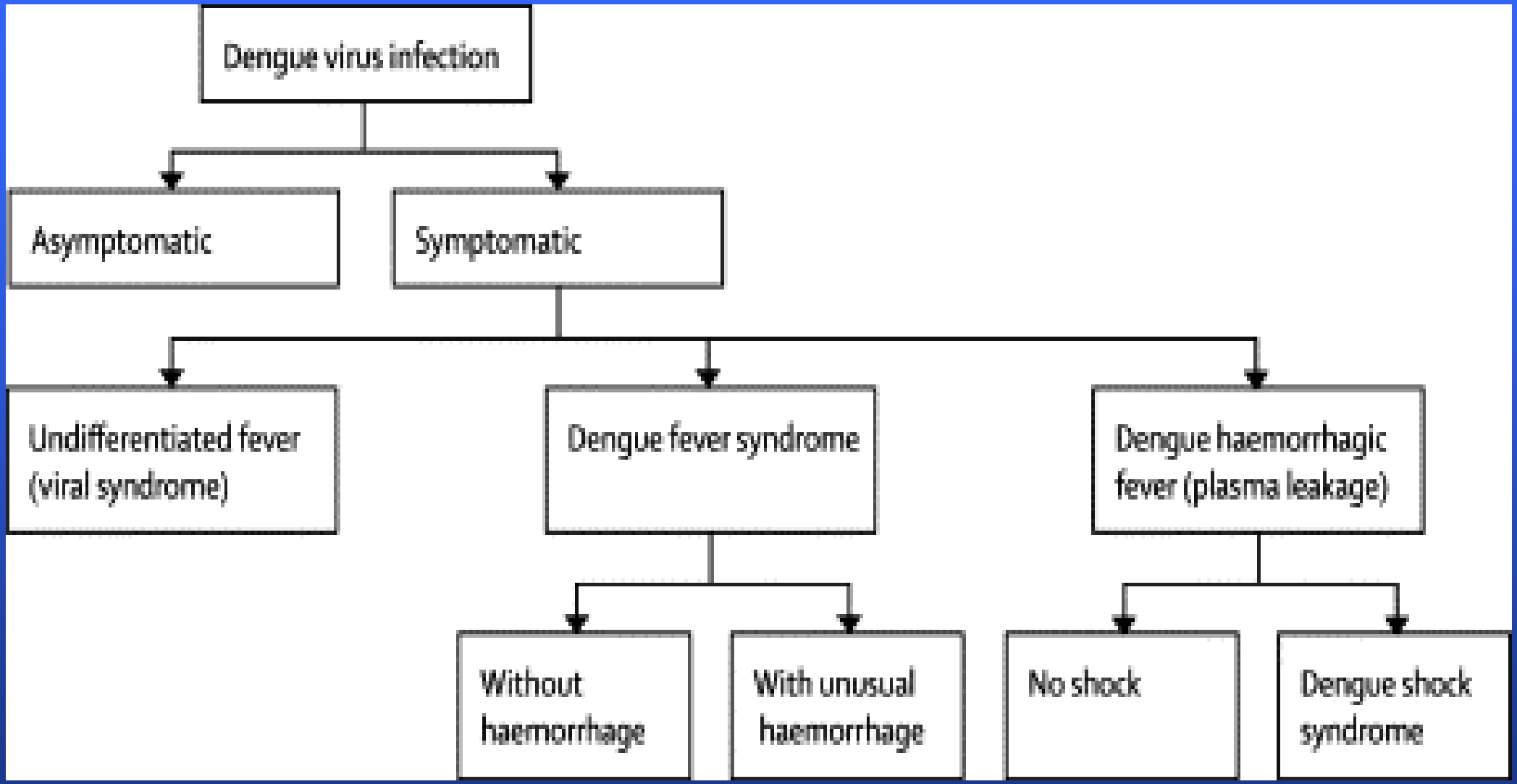


Clinical Aspects of Dengue

Clinical Manifestations of Dengue and Dengue Hemorrhagic Fever

Dengue virus infection



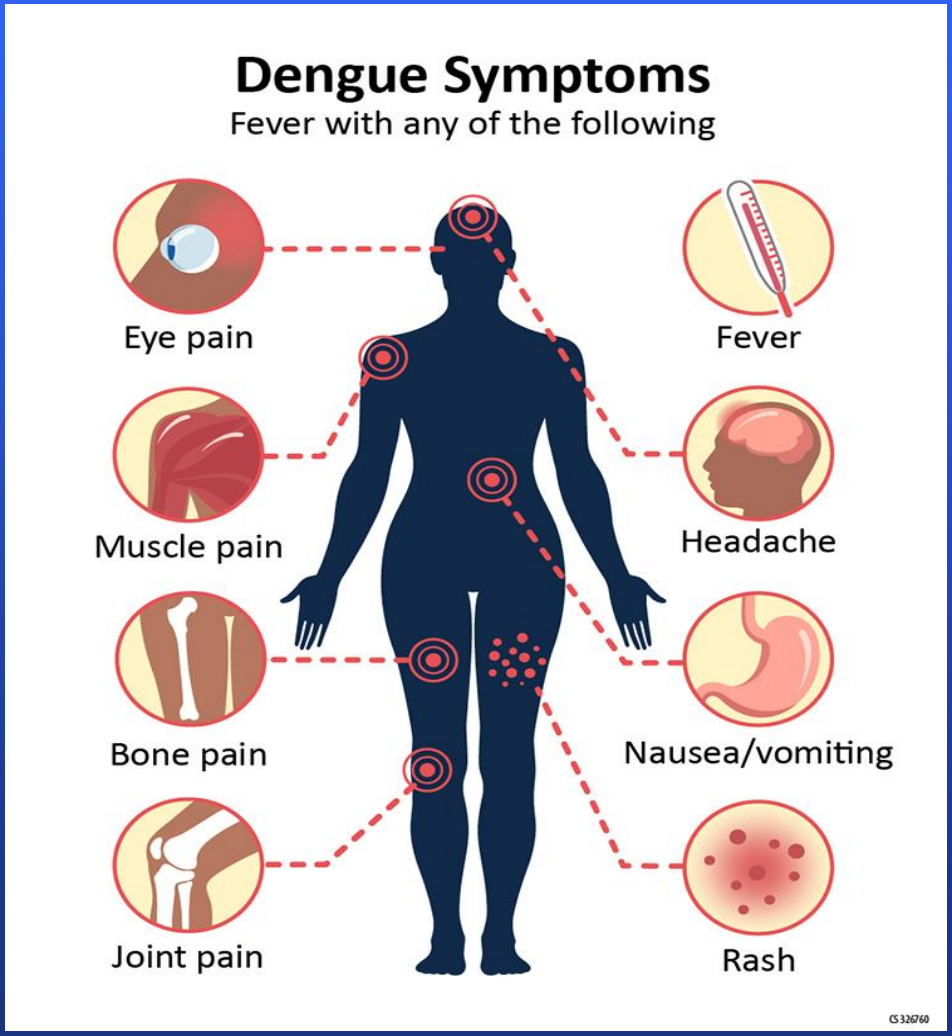

Dengue virus infection
Asymptomatic
Symptomatic
Undifferentiated fever (viral syndrome)
Dengue fever syndrome
Dengue haemorrhagic fever (plasma leakage)
Without haemorrhage
With unusual haemorrhage
No shock
Dengue shock syndrome

Undifferentiated Fever

- May be the most common manifestation of dengue.
- Prospective study found that 87% of students infected were either asymptomatic or only mildly symptomatic.
- Other prospective studies including all age-groups also demonstrate silent transmission.

Clinical Characteristics of Dengue Fever

- Fever
- Headache
- Muscle and joint pain
- Nausea/vomiting
- Rash
- Anorexia
- Retro orbital pain
- Facial flushing



Fever

- Sudden onset
- High fever (39-40C)
- Also called
  - -saddle back fever
  - - 7 days fever
  - - break bone fever



Saddleback fever refers to biphasic fever with an initial peak that remits and appears again.

Rash

- Pin point ,fleeting type
- Maculo-papular rash

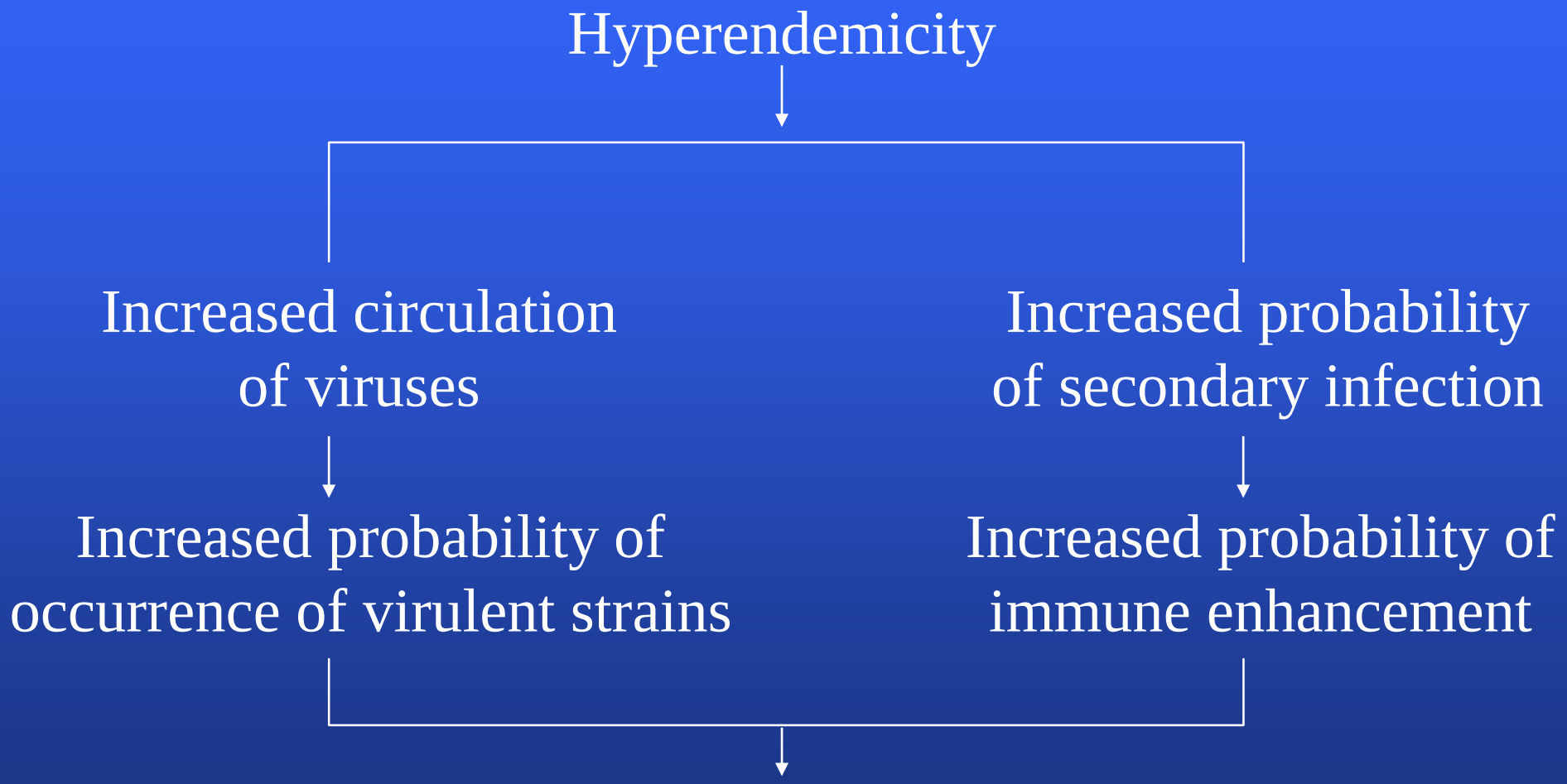


Risk Factors Reported for DHF

- Virus strain
- Pre-existing anti-dengue antibody
  - previous infection
  - maternal antibodies in infants
- Age
- Higher risk in locations with two or more serotypes circulating simultaneously at high levels (hyper endemic transmission).

Hyperendemic refers to persistent, high levels of disease occurrence.

Increased Probability of DHF



Gubler & Trent, 1994

Hypothesis on Pathogenesis of DHF (Part 1)

- Persons who have experienced a dengue infection develop serum antibodies that can neutralize the dengue virus of that same (homologous) serotype.

Hypothesis on Pathogenesis of DHF (Part 2)

- In a subsequent infection, the pre-existing heterologous antibodies form complexes with the new infecting virus serotype, but do not neutralize the new virus.

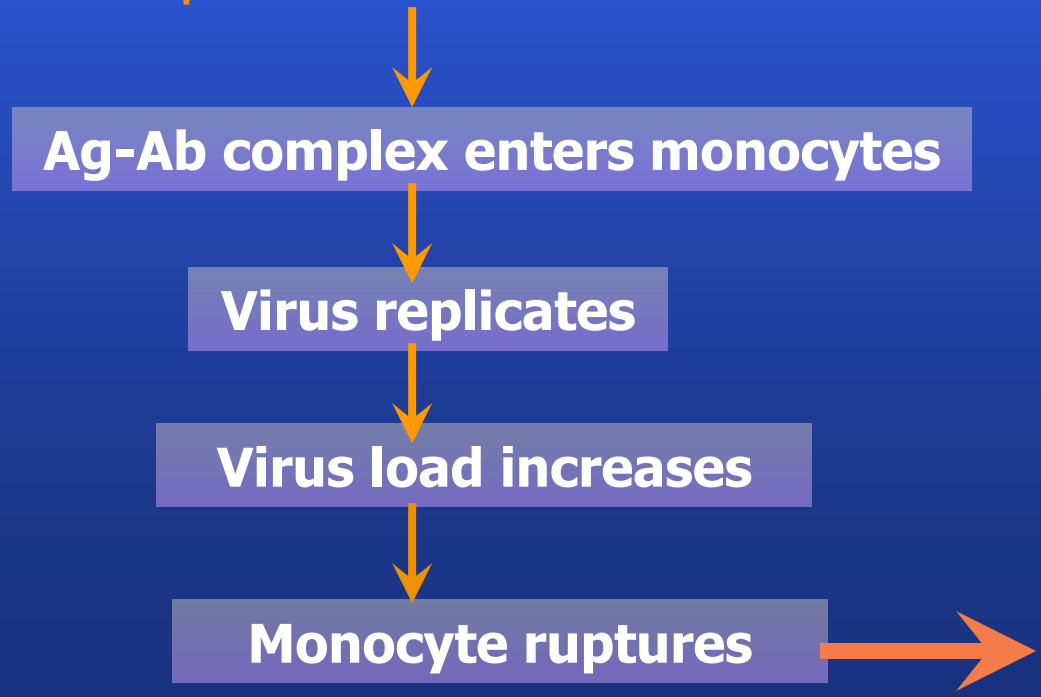
Pathophysiology of Dengue Haemorrhagic Fever

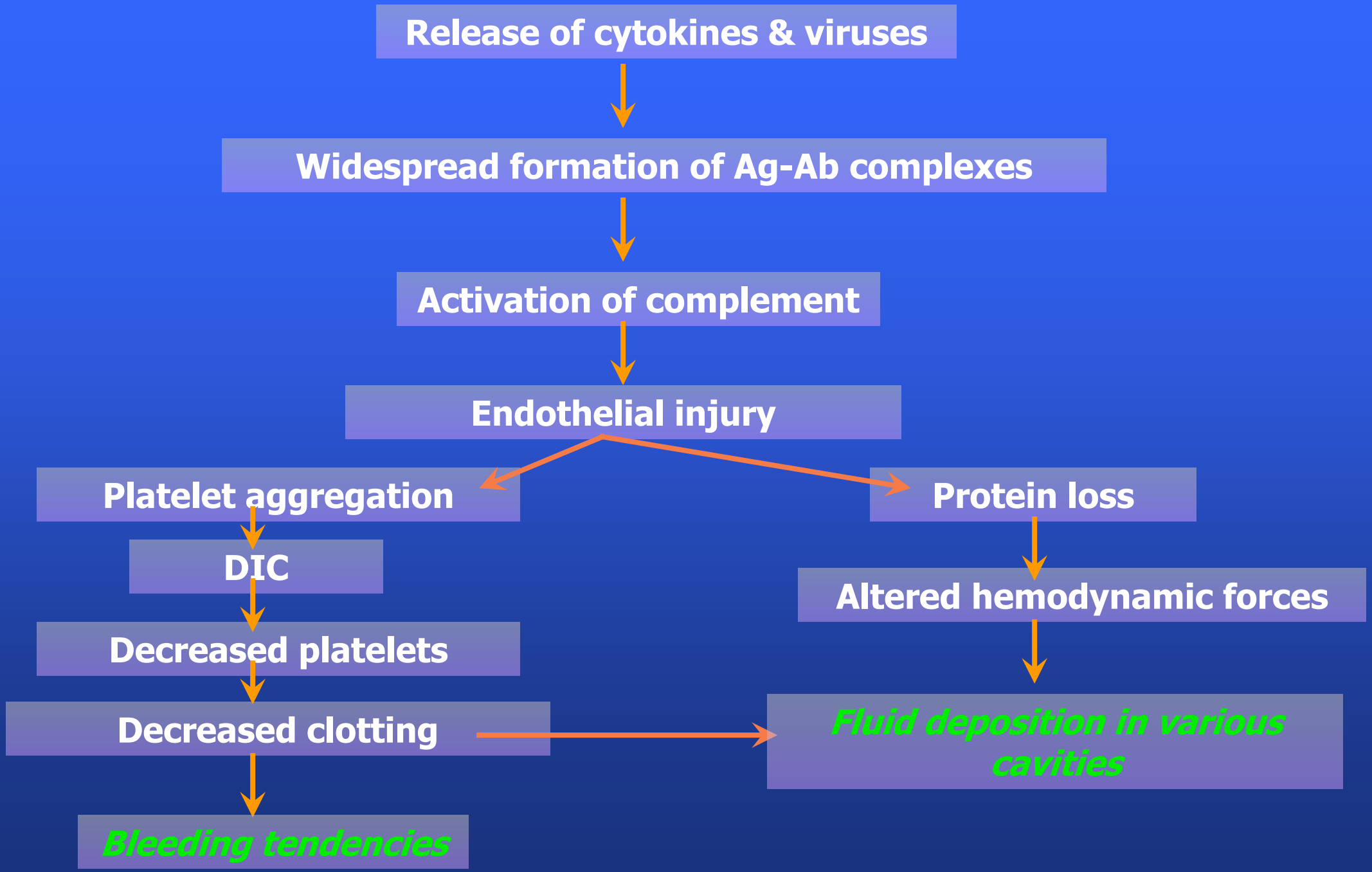
Sec. infection by same serotype

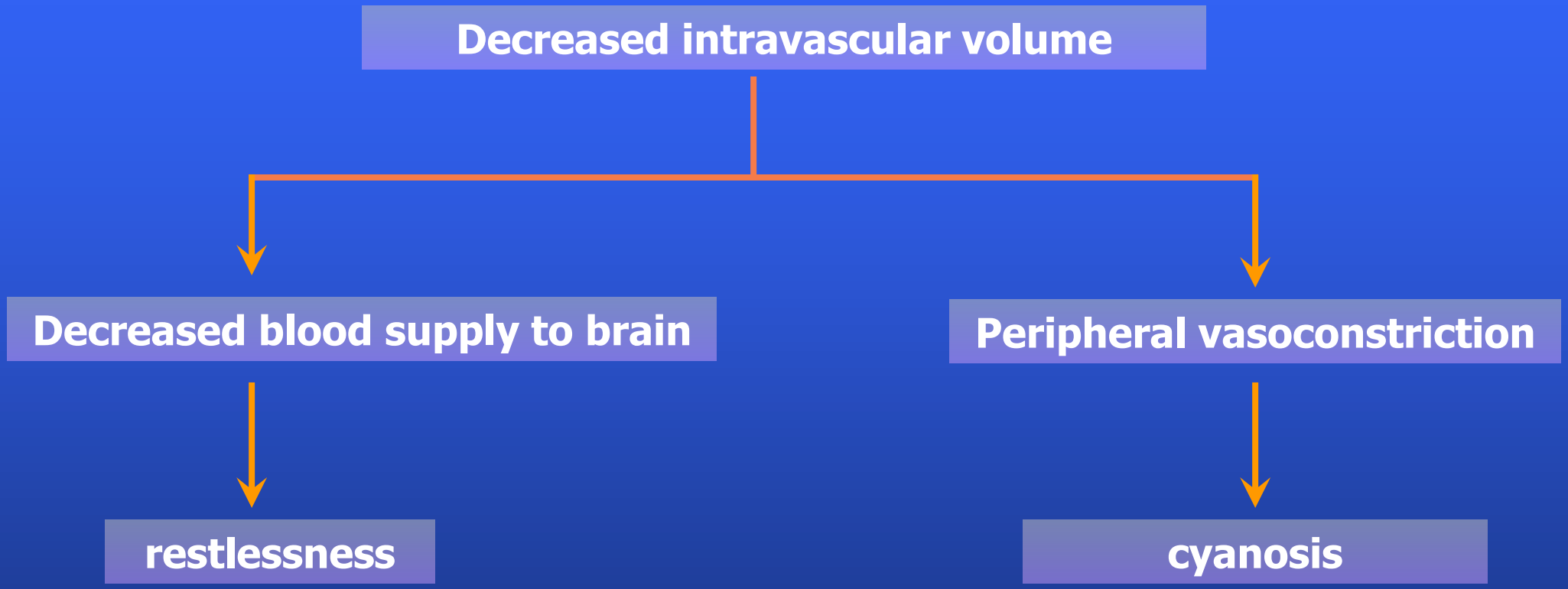
Ab neutralizes

Sec. infection by other serotypes

Ab complexes but can't neutralize




Release of cytokines & viruses
Widespread formation of Ag-Ab complexes
Activation of complement
Endothelial injury
Platelet aggregation
DIC
Decreased platelets
Decreased clotting
Bleeding tendencies
Protein loss
Altered hemodynamic forces
Fluid deposition in various cavities

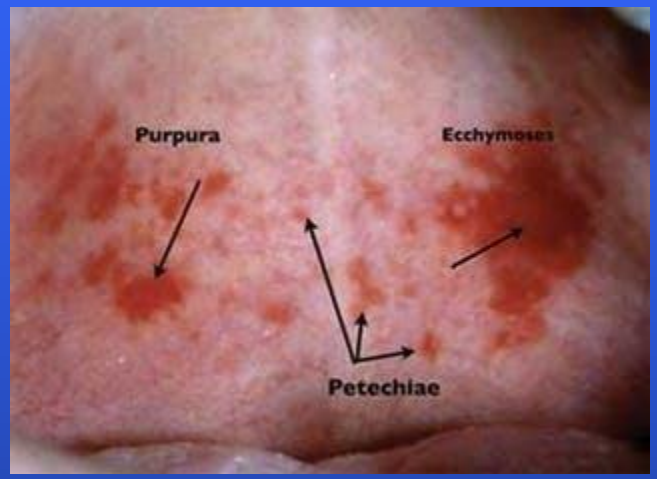

Decreased intravascular volume
Decreased blood supply to brain
Peripheral vasoconstriction
restlessness
cyanosis

Clinical features of DHF

- IP: 4-6 days
- High fever
- Head ache
- Anorexia
- Facial flushing
- Maculopapular rash
- Haemorrhagic manifestations

Hemorrhagic Manifestations of Dengue

- Skin hemorrhages:
  - Petechiae
  - Purpura
  - Ecchymoses
- Gingival bleeding
- Nasal bleeding
- Gastro-intestinal bleeding: hematemesis, melena, hematochezia
- Hematuria
- Increased menstrual flow



Clinical Case Definition for Dengue Hemorrhagic Fever

4 Necessary Criteria:

DHF patients must fulfill all four of the following criteria.

1. Acute onset of fever lasting for 2 to 7 days
2. Haemorrhagic manifestations evidenced by at least one of the following; a positive tourniquet test, petechiae, purpura, ecchymoses, bleeding from mucosa, puncture sites, gastrointestinal tract or any other bleeding
3. Platelet count <100,000/l
4. Haemoconcentration as evidenced by rising packed cell volume >20% or other evidence of plasma leakage (e.g. ascites, pleural effusions, low level of serum protein/albumin)

Clinical manifestations of Dengue Shock Syndrome

- Restlessness
- Lethargy
- Cyanosis
- Hepatomegaly
- Pleural effusion
- Ascites
- GI bleeding

Clinical Case Definition for Dengue Shock Syndrome

- 4 criteria for DHF
- Evidence of circulatory failure manifested indirectly by all of the following:
  - Rapid and weak pulse
  - Narrow pulse pressure (≤ 20 mm Hg) **OR** hypotension for age
  - Cold, clammy skin and altered mental status
  - Low or decreased Urine output
- Frank shock is direct evidence of circulatory failure.

Four Grades of DHF

- **Grade 1**
  - Fever and nonspecific constitutional symptoms
  - Positive tourniquet test is only hemorrhagic manifestation
- **Grade 2**
  - Grade 1 manifestations + spontaneous bleeding
- **Grade 3**
  - Signs of circulatory failure
    - » (rapid/weak pulse, narrow pulse pressure, hypotension, cold/clammy skin)
- **Grade 4**
  - Profound shock (undetectable pulse and BP)

Positive Tourniquet Test







- There is no bleeding manifestation

How to do a Tourniquet Test

1. Take the patient's blood pressure and record it, for example, 100/70.
2. Inflate the cuff to a point midway between SBP and DBP and maintain for minutes. (100 + 70) ÷ 2 = 85 mm Hg
3. Reduce and wait 2 minutes.
4. Count petechiae below antecubital fossa. See image at right.
5. A positive test is 10 or more petechiae per 1 square inch.

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.

Unusual Presentations of Severe Dengue Fever

- Encephalopathy
- Hepatic damage
- Cardiomyopathy
- Severe gastrointestinal hemorrhage

Diagnosis

Differential Diagnosis of Dengue

- Influenza
- Measles
- Rubella
- Malaria
- Typhoid fever
- Leptospirosis
- Meningococcemia
- Rickettsial infections
- Bacterial sepsis
- Other viral hemorrhagic fevers

Laboratory Tests in Dengue Fever

Nucleic acid amplification tests (NAATs)

- For patients with suspected dengue virus disease, NAATs are the preferred method of laboratory diagnosis.
  - NAATs should be performed on serum specimens collected 7 days or less after symptom onset.

- Clinical laboratory tests
  - CBC--WBC, platelets, hematocrit
  - Albumin
  - Liver function tests
  - Urine--check for microscopic hematuria
- Dengue-specific tests
  - Virus isolation – serotype detection
  - Serology
    - » IgM antibody testing can identify additional infections and is an important diagnostic test.

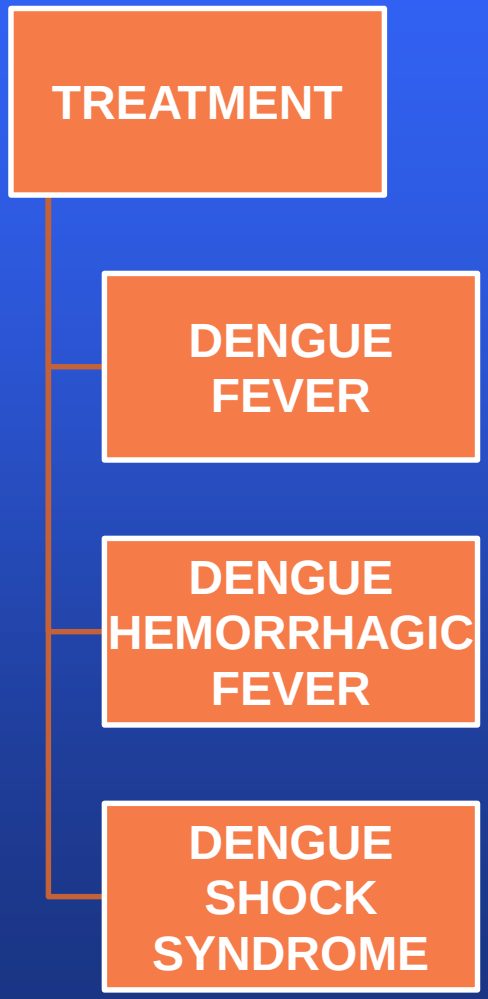
Collection and Processing of Samples for Laboratory Diagnosis

Type of Specimen	Time of Collection	Type of Analysis
Acute-phase blood (0-5 days after onset)	When patient presents; collect second sample during convalescence	Virus isolation and/or serology
Convalescent-phase blood (≥ 6 days after onset)	Between days 6 and 21 after onset	Serology



TREATMENT, PREVENTION & CONTROL OF DENGUE

DENGUE FEVER



TREATMENT OF DENGUE FEVER

- Bed rest
- Antipyretics/Sponging

ASPIRIN is contraindicated

-BLEEDING

-GASTRITIS

-ACIDOSIS

- Oral fluids & electrolyte therapy if

↑sweating

vomiting

diarrhoea

DENGUE HEMORRHAGIC FEVER



- **IV fluids if ↑ HEMATOCRIT (plasma loss)**
- **FLUIDS**
  - **-5%D in RL**
  - **-5%D in ½ NS**
  - **-5%D in NS**
  - **-40%dextran & plasma**
- **Recording of vitals & hematocrit to avoid excess administration.**

DENGUE SHOCK SYNDROME



- **EMERGENCY (electrolyte & acid-base disturbance)**
- **PATIENT may go to DIC.**
- **5%D in NS at 10-20ml/kg/hr.**
  - **-If shock persists – blood transfusion.**
- **Treated till hematocrit reaches 40 & vitals are stable, good urine flow.**
- **Fluid is given up to 48hrs.only as reabsorption of extravasated plasma takes 1-2 days thereafter**

  -hypervolemia

  -heart failure

  -pulmonary edema.

PREVENTION & CONTROL

- **Dengue is next to diarrhoea & ARI as a leading cause of hospitalization & deaths & it is re-emerging worldwide causing frequent epidemics. Hence there is a need to prevent it.**
- **Causes for re-emergence-**
  1. **Absence of effective mosquito control measures**
  2. **Deterioration of health systems – CRISIS MENTALITY has supervened giving importance to emergency control methods rather than developing programs to prevent epidemic transmission.**
     - **Only passive surveillance is being adopted. System to detect increased transmission relies on reports by local.**



Physicians who do not consider dengue fever in their DD.Therefore an epidemic reaches its peak level before it is recognized.

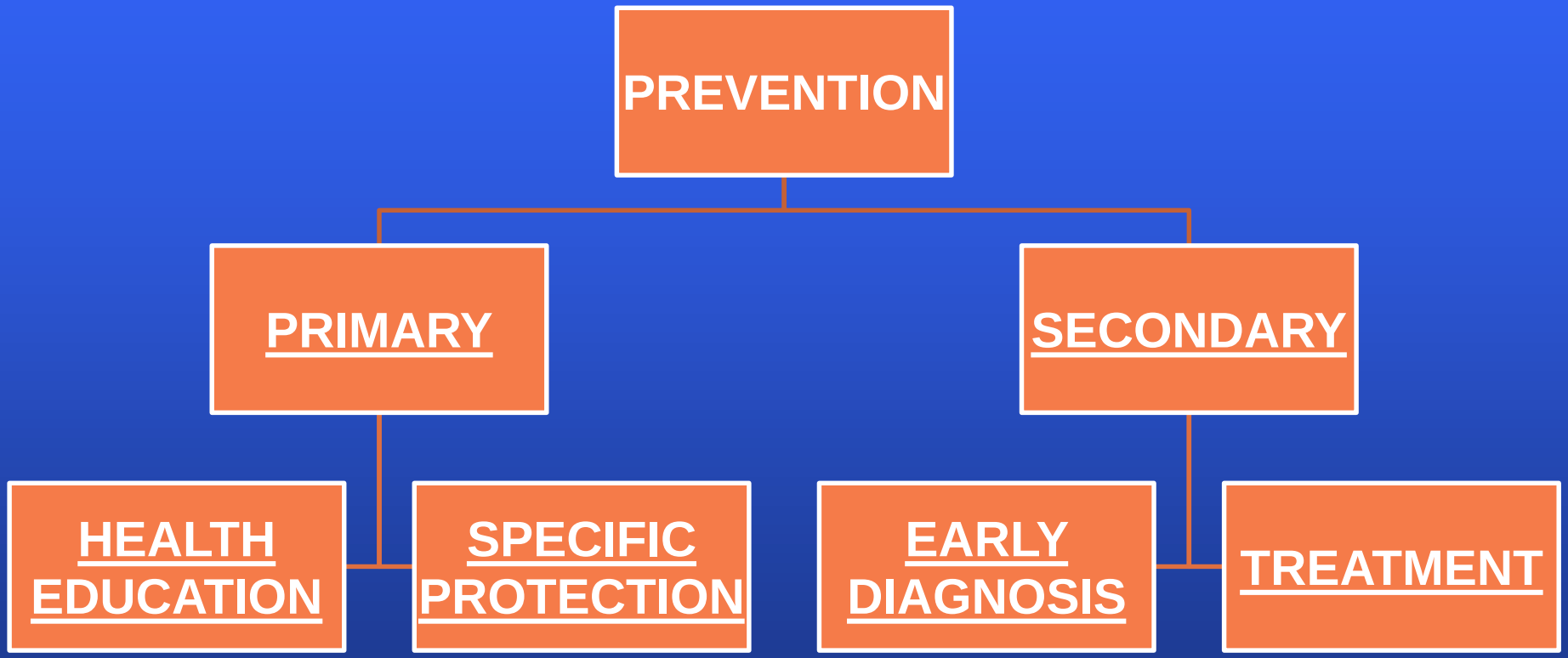
3)Rapid growth of population---over crowding

---urban decay

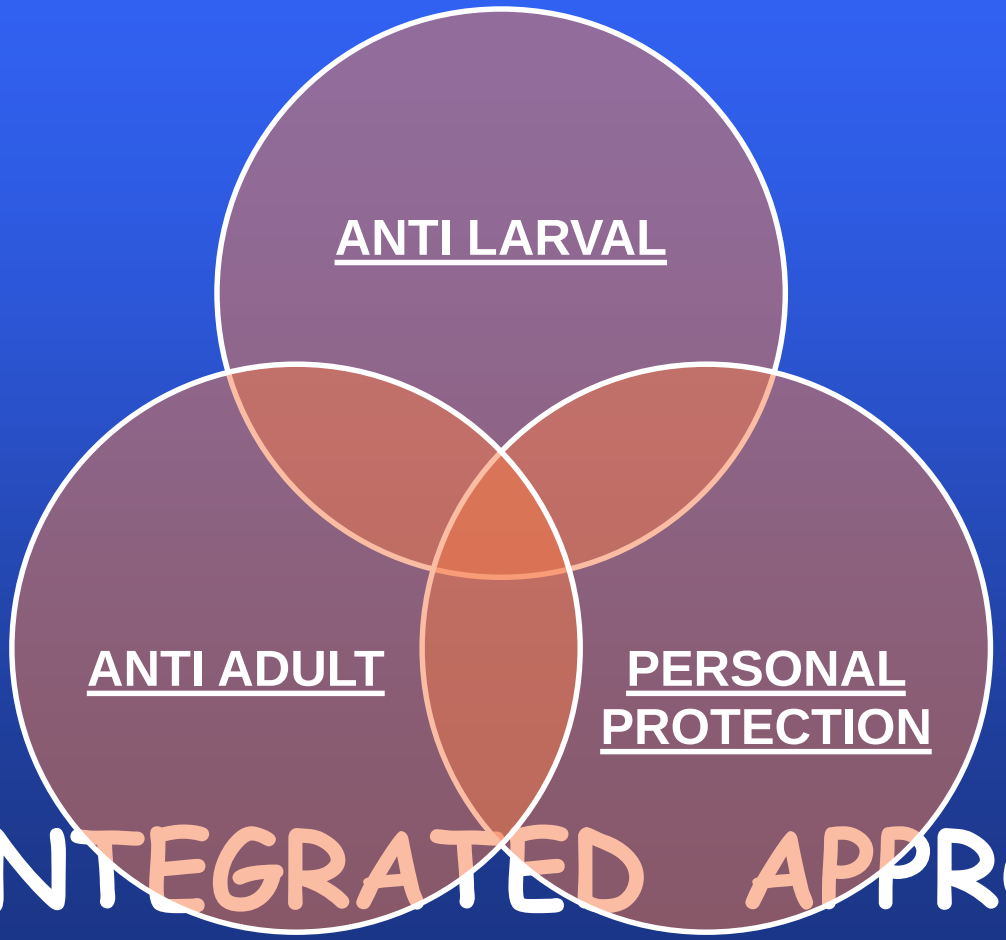
---sub standard sanitation

---inadequate water.

- **4)↑ use of non bio-degradable plastics (BREEDING PLACE)**
- **5)↑ air travel.**
- **THEY SHOULD BE KEPT AWAY FROM MOSQUITOES FOR PROTECTION OF OTHERS. Therefore to decrease the incidence these 5 points should be strengthened.**


PREVENTION
PRIMARY
SECONDARY
HEALTH EDUCATION
SPECIFIC PROTECTION
EARLY DIAGNOSIS
TREATMENT

MOSQUITO CONTROL MEASURES



INTEGRATED APPROACH

Adulto



Huevo



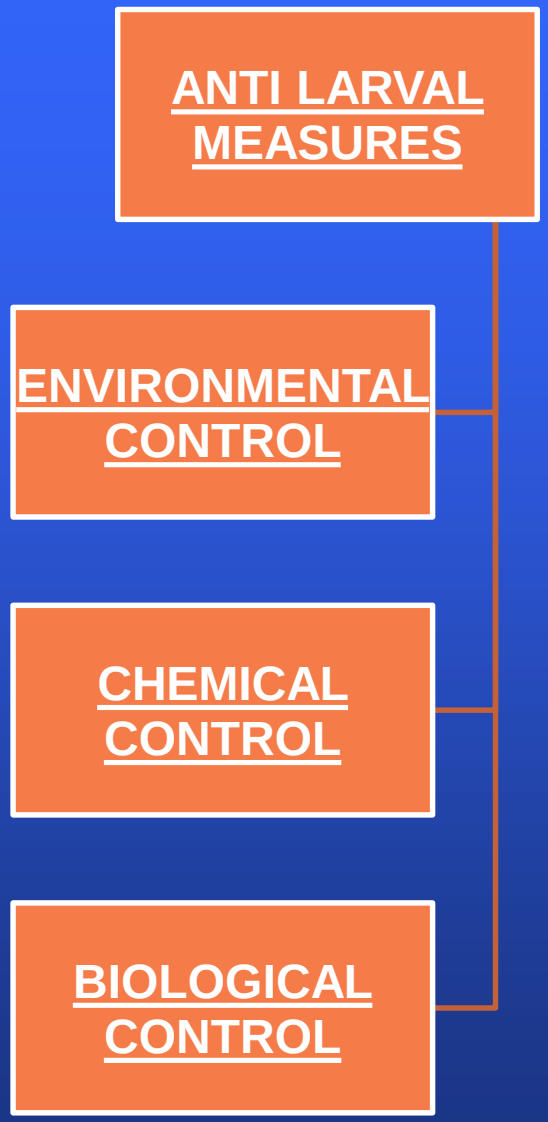
Pupa



Larva





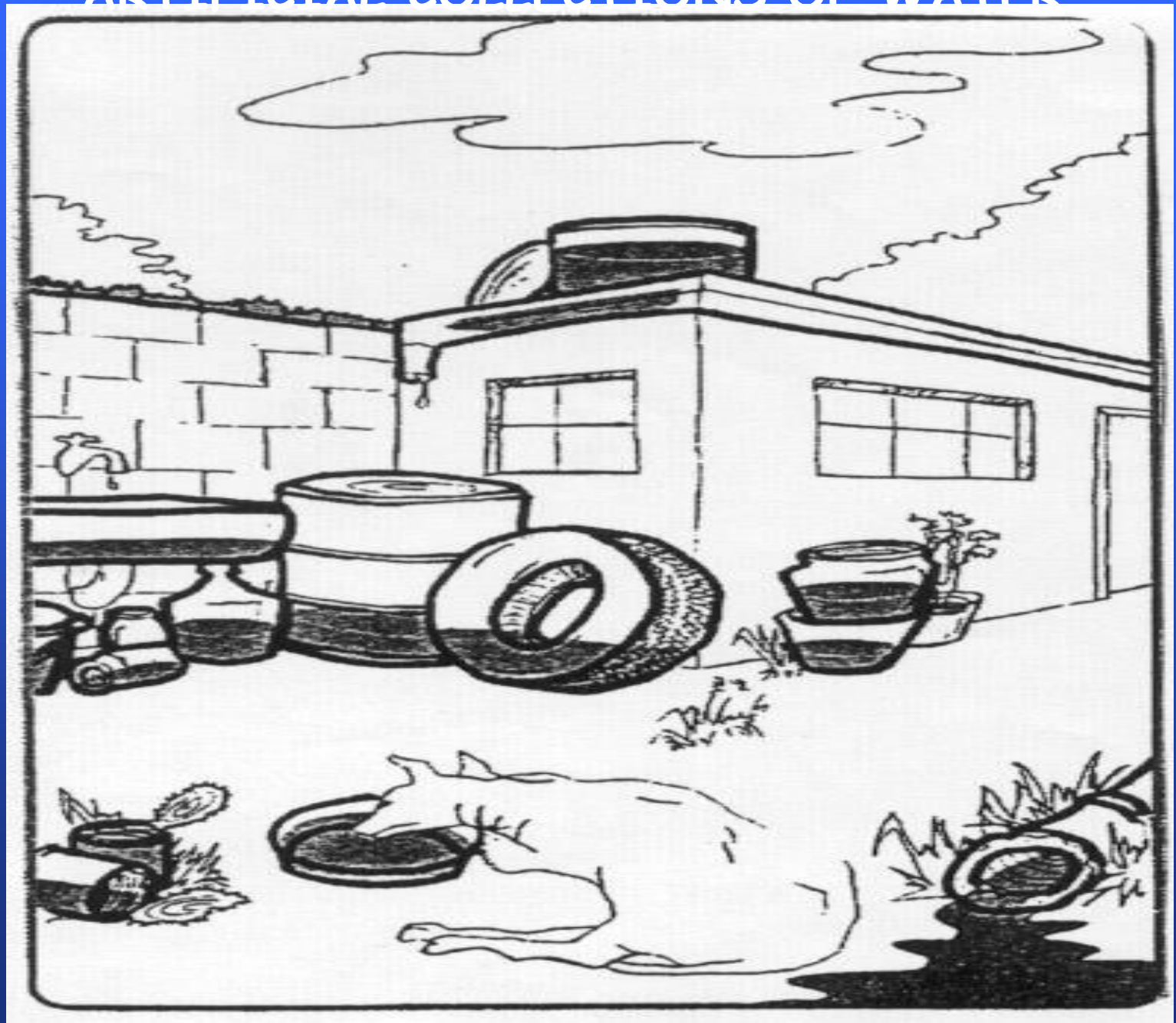

ANTI LARVAL MEASURES
ENVIRONMENTAL CONTROL
CHEMICAL CONTROL
BIOLOGICAL CONTROL

ENVIRONMENTAL CONTROL

By,
-Source reduction
-filling
-leveling
-draining of breeding places
-water management

DISAD-require knowledge of breeding habits.

ARTIFICIAL COLLECTIONS OF WATER



CHEMICAL CONTROL

1) Mineral oil on water (once a week as life cycle of vector is 8 days)

MOA-cuts oxygen.

ADV -oil is applied just once a week-so it saves time.

DISAD-water becomes unfit for drinking.

2) PARIS GREEN / COPPER ACETOARSENITE (2% dust. Dose is 1kg/hectare of water)

MOA -stomach poison

DISAD-kills mostly surface feeders

3) SYNTHETIC INSECTICIDES (Fenthion, Abate-1ppm at 56-112gm/hectare of water.)

MOA-larvicide.



- BIOLOGICAL METHOD.

  GAMBUSIA & LEBISTER RETICULATUS.

  ADV-easy & cost effective

  DISAD-effective only in conjunction with other methods.

  Recently BIOCIDES like BACILLUS THURINGIENSIS being used.



ANTI ADULT MEASURES



RESIDUAL SPRAYING



- **By DDT(Dichloro diphenyl trichloroethane)**

  1-2gm/sq.mt. sprayed to walls 1-3 times a year.

  If resistant-Malathion, Lindane

  Disad - Periodic tests are required to test if mosquitoes have become resistant.



SPACE SPRAYS

- **Insecticidal formulation is sprayed into atmosphere like mist.eg.PYRETHRUM-1 oz/1000cubic ft. of space.**

MOA - Nerve poison

Disad - No residual action





GENETIC METHODS

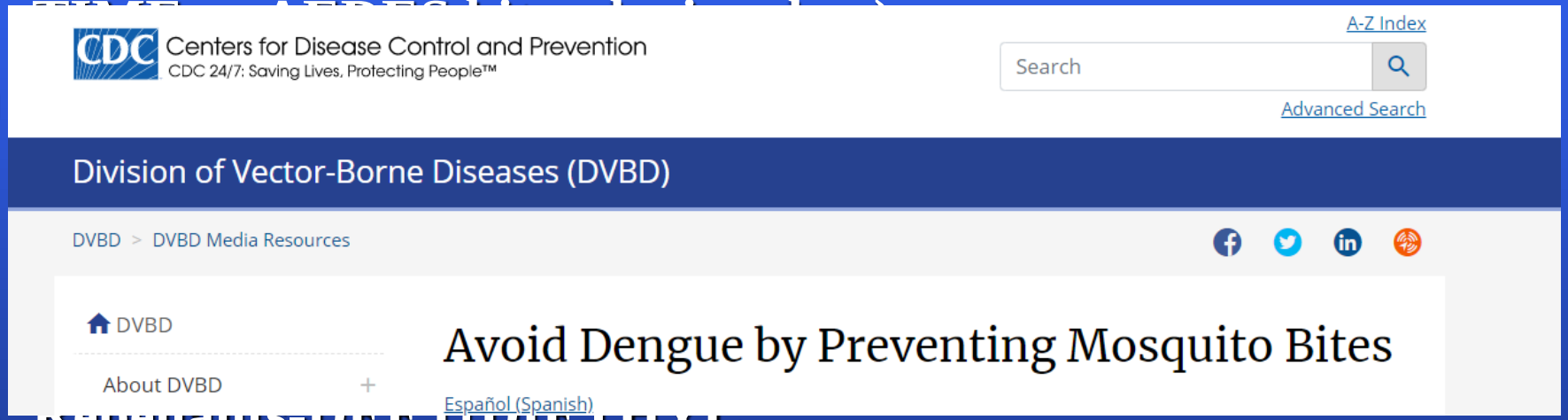
- Sterile male techniques
- Chromosomal translocation
- Sex distortion.

--Still in RESEARCH PHASE.

Adv-Cheap, No chance of vector resistance.

PERSONAL PROTECTION

- **Nets & mosquito coils (For DAY**
- **Repellants-DEET(DIETHYL TOLUAMIDE).**



DVBD

About DVBD

National Framework

DVBD Stories

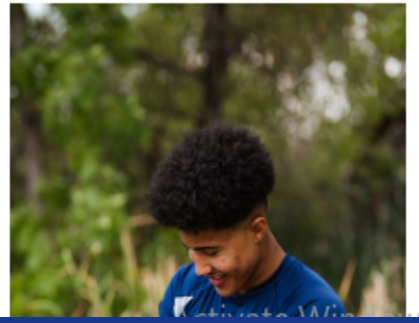
A-Z Index of DVBD Topics

What We Do & How We

Avoid Dengue by Preventing Mosquito Bites

Español (Spanish)

Use insect repellent, wear long-sleeved shirts and long pants, and control mosquitoes inside and outside your home.



Each year, an estimated 400 million people are infected with dengue virus through the bites of infected mosquitoes. About 100 million get sick. Outbreaks have occurred in Southeast Asia, the Western Pacific, the Eastern Mediterranean, the Americas, the

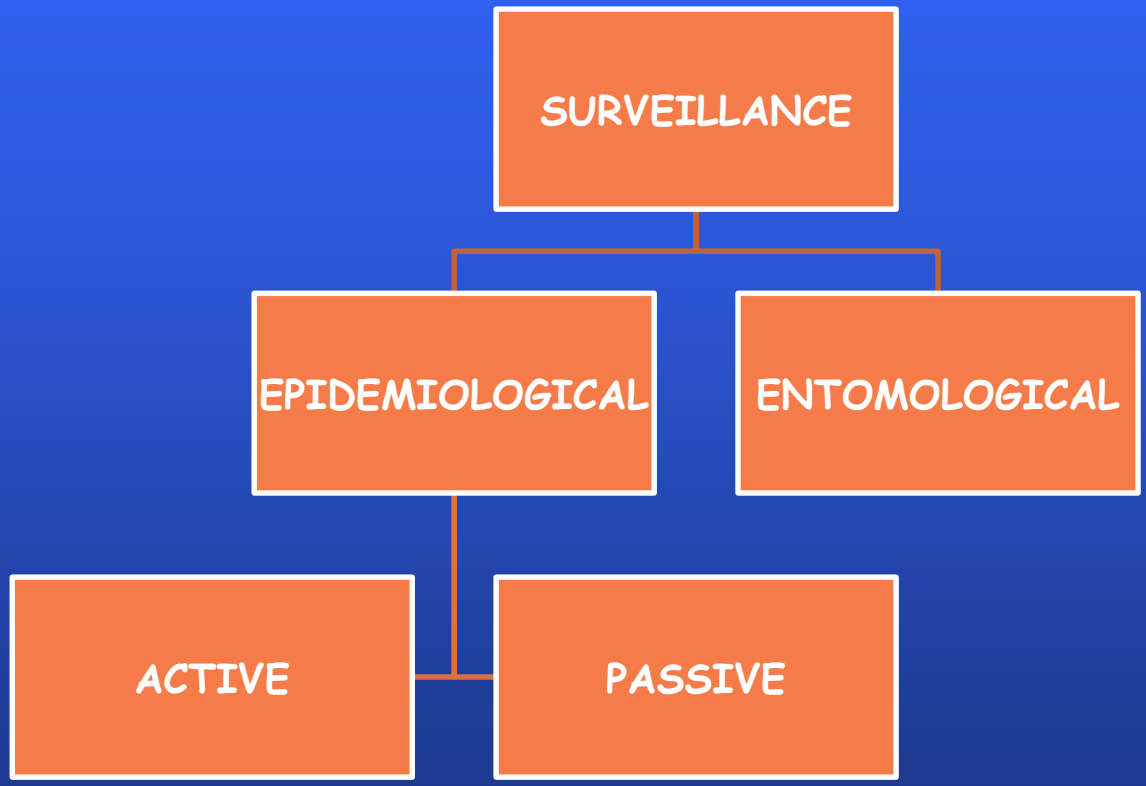
VACCINATION

Is very difficult as any 4 different virus can cause disease & b'coz prevention against only 1 or 2 virus could increase the RISK of more serious disease.

- **THERE IS NO LEGALISED VACCINE AT PRESENT.**

New serotypes & strains will continue to be introduced. Therefore we must develop improved,proactive,lab.based surveillance system that can provide early warning of an impending dengue epidemic.

SURVEILLANCE



- **ACTIVE SURVEILLACE**

  Is a lab. based surveillance to provide information about virus serotype & disease severity.

- **PASSIVE SURVEILLANCE**

  Reporting of all cases by hospitals.

- **ENTOMOLOGICAL SURVEILLANCE**

  Used to find changes in geographical distribution of vectors, get data & measure the population to implement control measures.

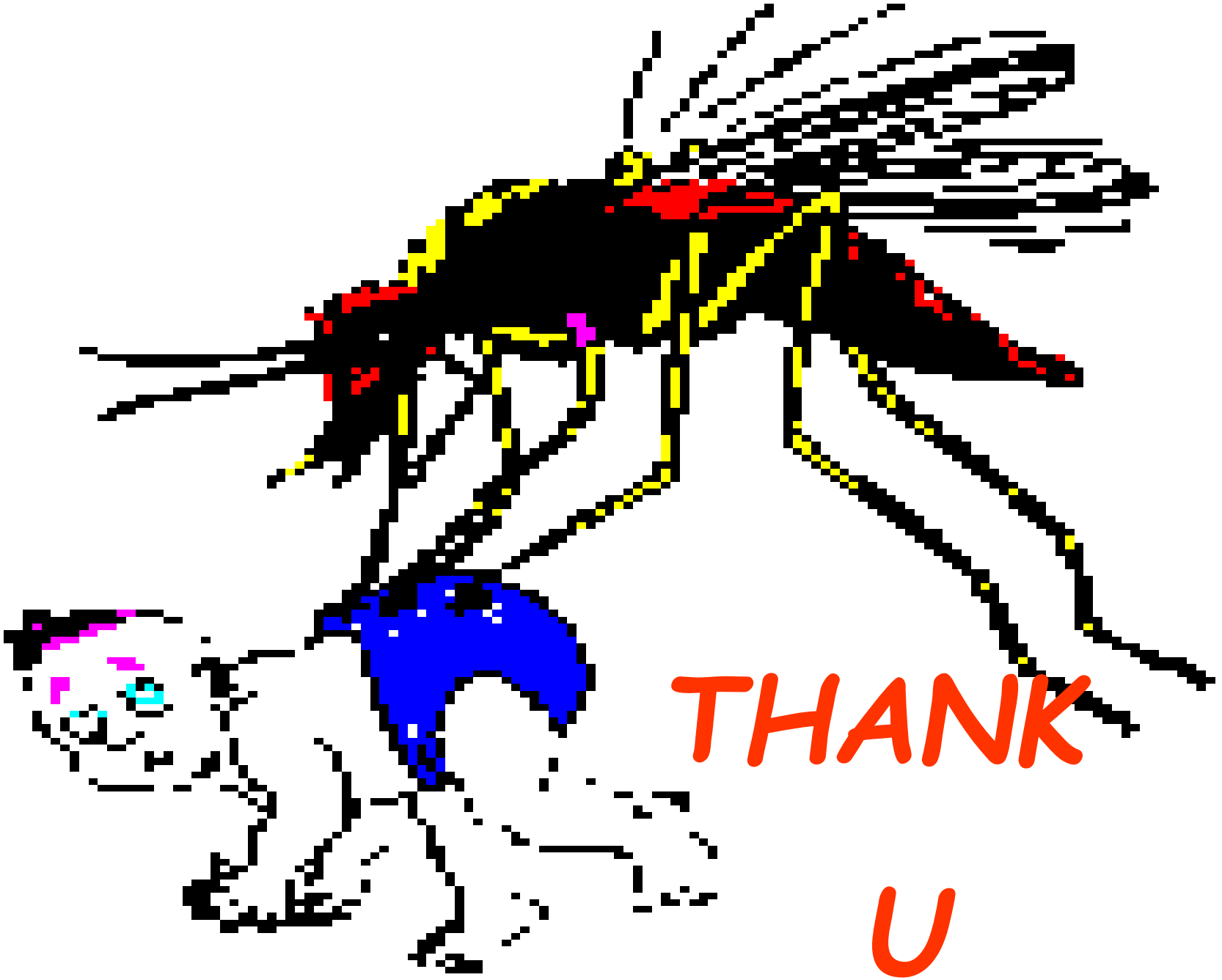
NOTE-DENGUE IS A NOTIFIABLE DISEASE IN INDONESIA,MYANMAR,SRI LANKA & THAILAND IN SEAR.

DENGUE PROGRAMMES

1)MOZZIE BUSTER FOR CADET SCOUTS & BROWNIES(IN SINGAPORE)

-NEA hopes to use this program to empower primary school boys & girls aged 9-12yrs. with knowledge on mosquitoes breeding & their prevention.

- **-They have to attend a ½ day course & they have to convey their messages to the school & community through projects.**
- **On completion they are awarded a "MOZZIE BUSTER CERTIFICATE" & an "EMBROIDERED BADGE"**
- **OBJ-TO DECREASE BREEDING PLACES IN HOMES FROM 30/1000 TO 10/1000.**


THANK
U