



ARTHROPOD BORNE DISEASES

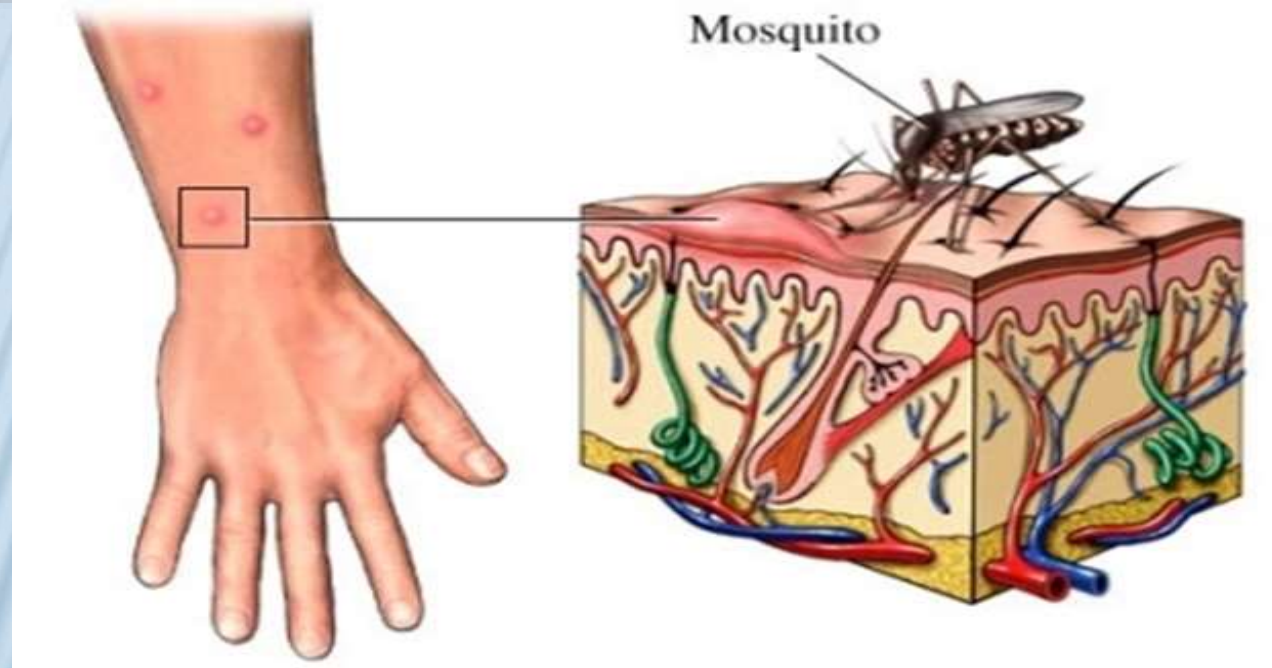


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<http://www.slideshare.net/daliaelshafei>

Arthropods form a major group of disease vectors with mosquitoes, flies, sand flies, lice, fleas, ticks and mites transmitting a huge number of diseases.



Many such vectors are haematophagous, which feed on blood at some or all stages of their lives.

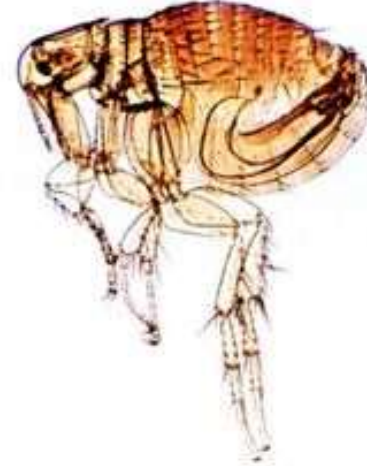
Arthropod Vectors



(a)



(b)



(c)



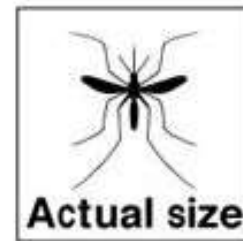
(d)



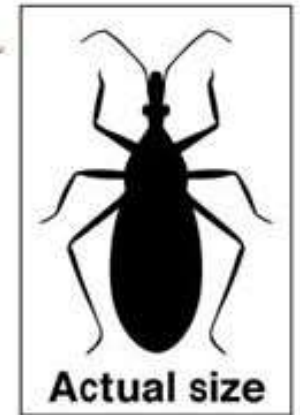
(e)



(f)



(g)



Viral

Yellow fever

Encephalitis

Dengue fever

Rift valley fever

Zika

Bacterial

Plague

Parasitic

Malaria

Filariasis

Leishmaniasis

Rickettsial

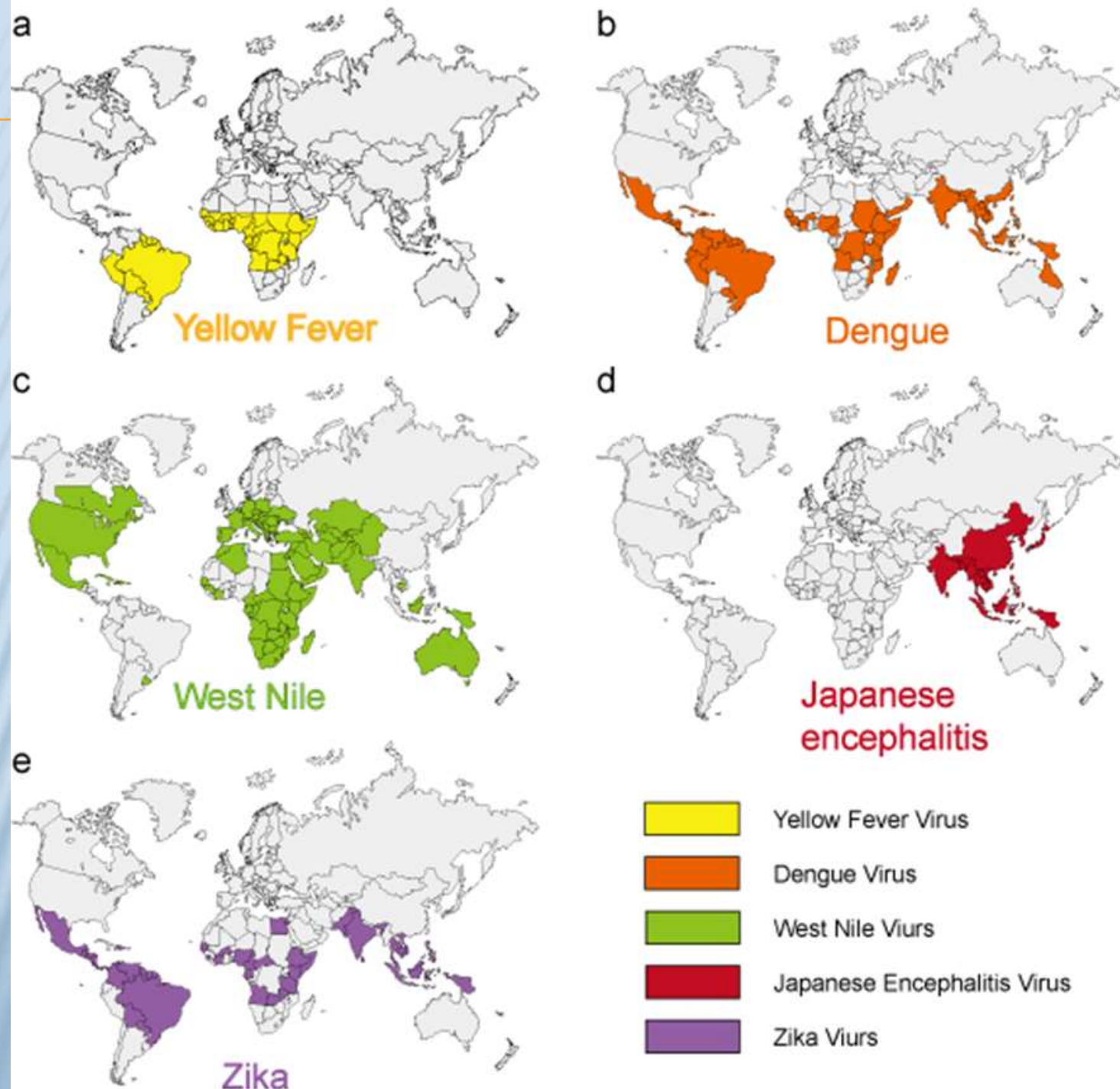
Typhus

Q fever

Spirochetal

Relapsing fever

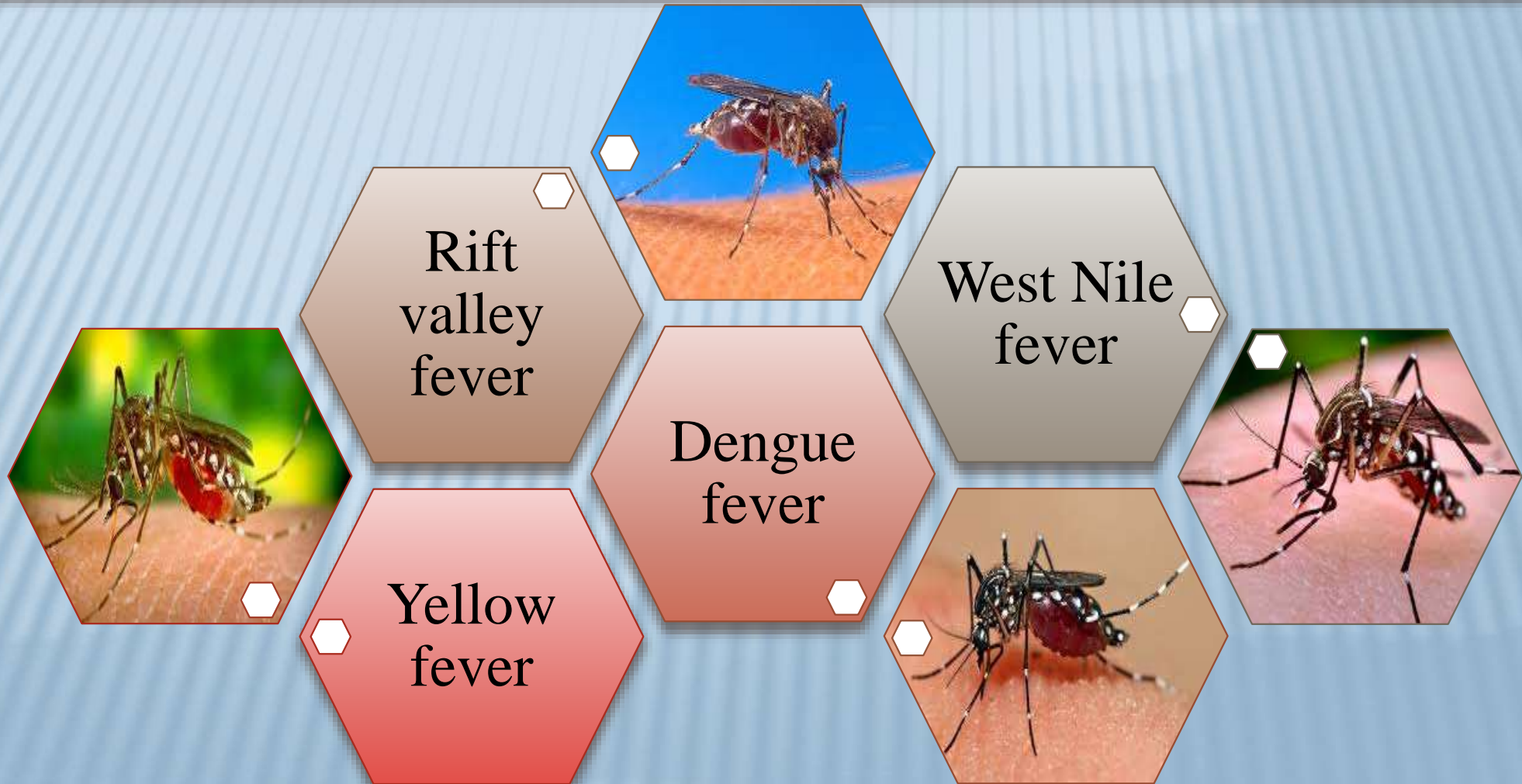
Epidemic area of Flavivirus



ARTHROPOD-BORNE VIRAL HEMORRHAGIC DISEASES



Acute febrile diseases with extensive external & internal hge, usually serious & may be associated with shock & liver damage with high case fatality.



YELLOW FEVER



A communicable arthropod-borne viral hemorrhagic **quarantinable** acute disease of short duration & varying severity.

Causative agent: Yellow fever virus.



Yellow fever

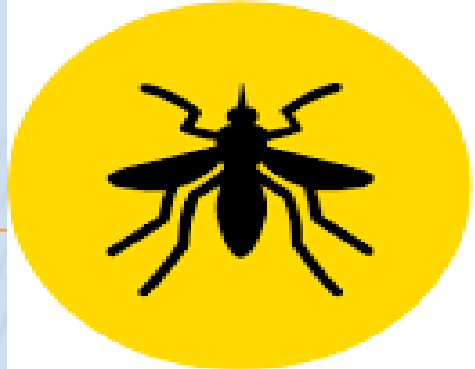
is a disease caused by a virus that is spread to
people by the

**bite of an
infected mosquito.**

The "yellow" in the name is explained by the jaundice
(yellow discoloration of the eyes and skin)
that affects some patients

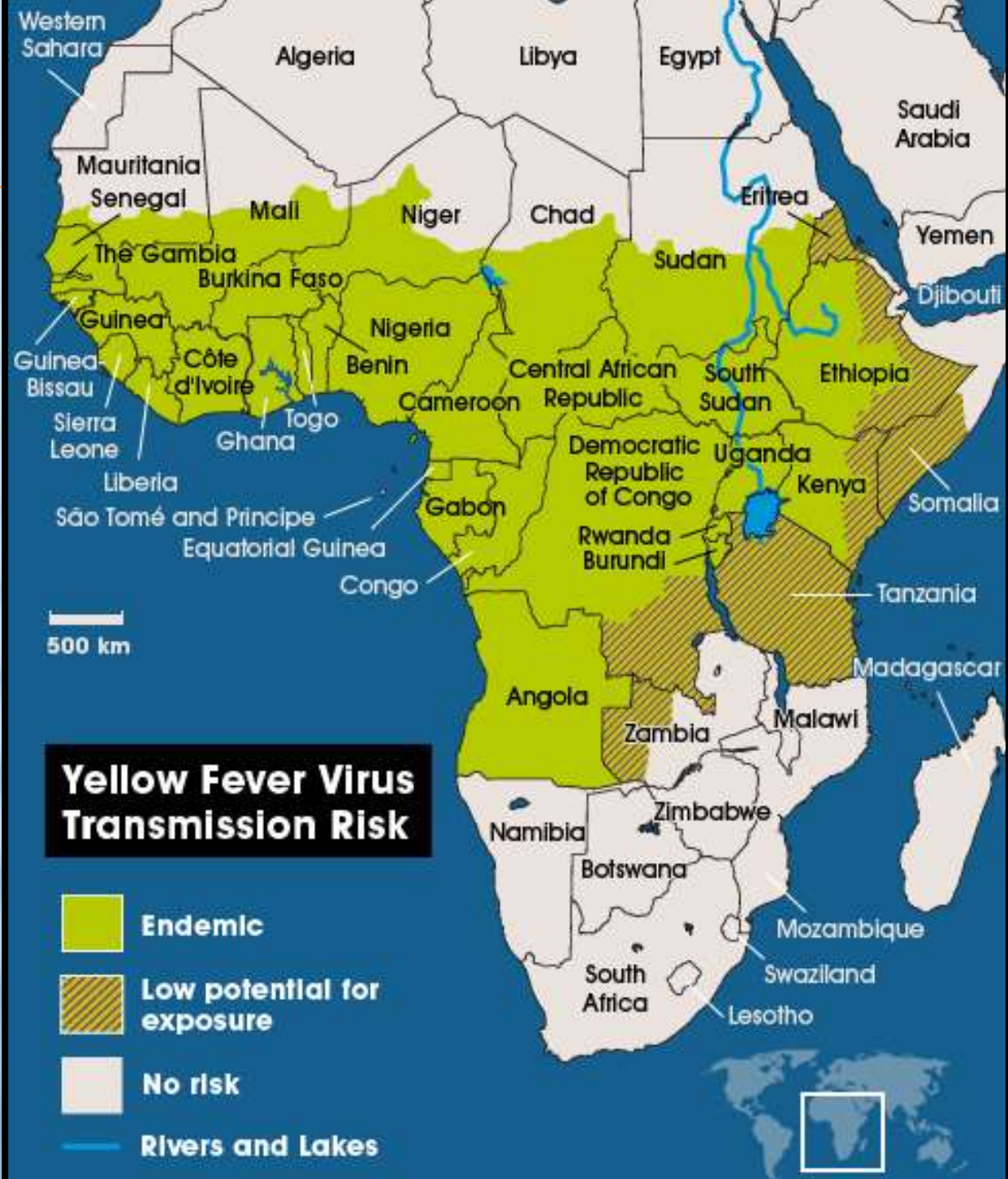


Endemic in Africa & South America in zone between 15° north & 100° south latitude of equator
(Yellow fever belt).



YELLOW FEVER ZONE





RESERVOIR:



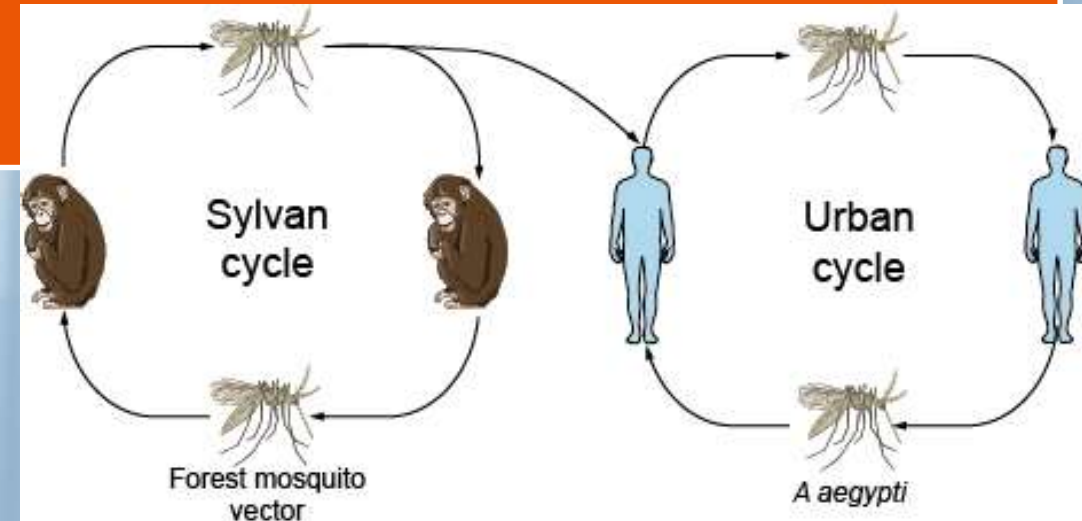
Sylvatic or Jungle yellow fever

- Main reservoir in forest area is vertebrates other than human mainly monkeys
- **Vector** is forest mosquitoes (haemagogus species).
- Human has no essential role in transmission.



Urban yellow fever

- Reservoir is human
- **Vector** is *Aedes aegypti* mosquitoes.





Aedes aegypti



HOW EGYPT IS PROTECTED FROM YELLOW FEVER:

Absence of yellow fever in Egypt & its rarity in other areas such as Eastern Africa despite wide spread of vector **aedes Egypti** may be due to **cross immunity from other flavi virus** (e.g. Dengue, West Nile, Japanese encephalitis) in population which may be providing an (**ecological barrier**).





PERIOD OF COMMUNICABILITY:

No man-to-man transmission.

Blood of man is infective to mosquito shortly during late IP & during first 3-5 days of disease.

In mosquitoes after biting an infected person there is 9-12 days extrinsic IP, then the mosquito becomes infective all over its life.

There is also trans-ovarian transmission which may contribute to maintenance of infection.

Mode of transmission



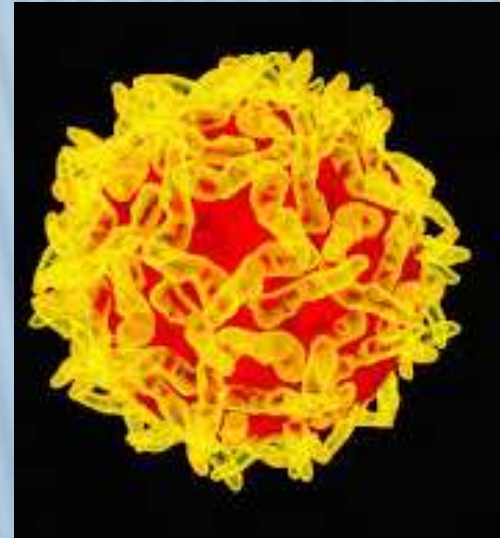
Aedes spp.
(Africa)

Urban YF: bite of infective female *Aedes aegypti* mosquitoes.

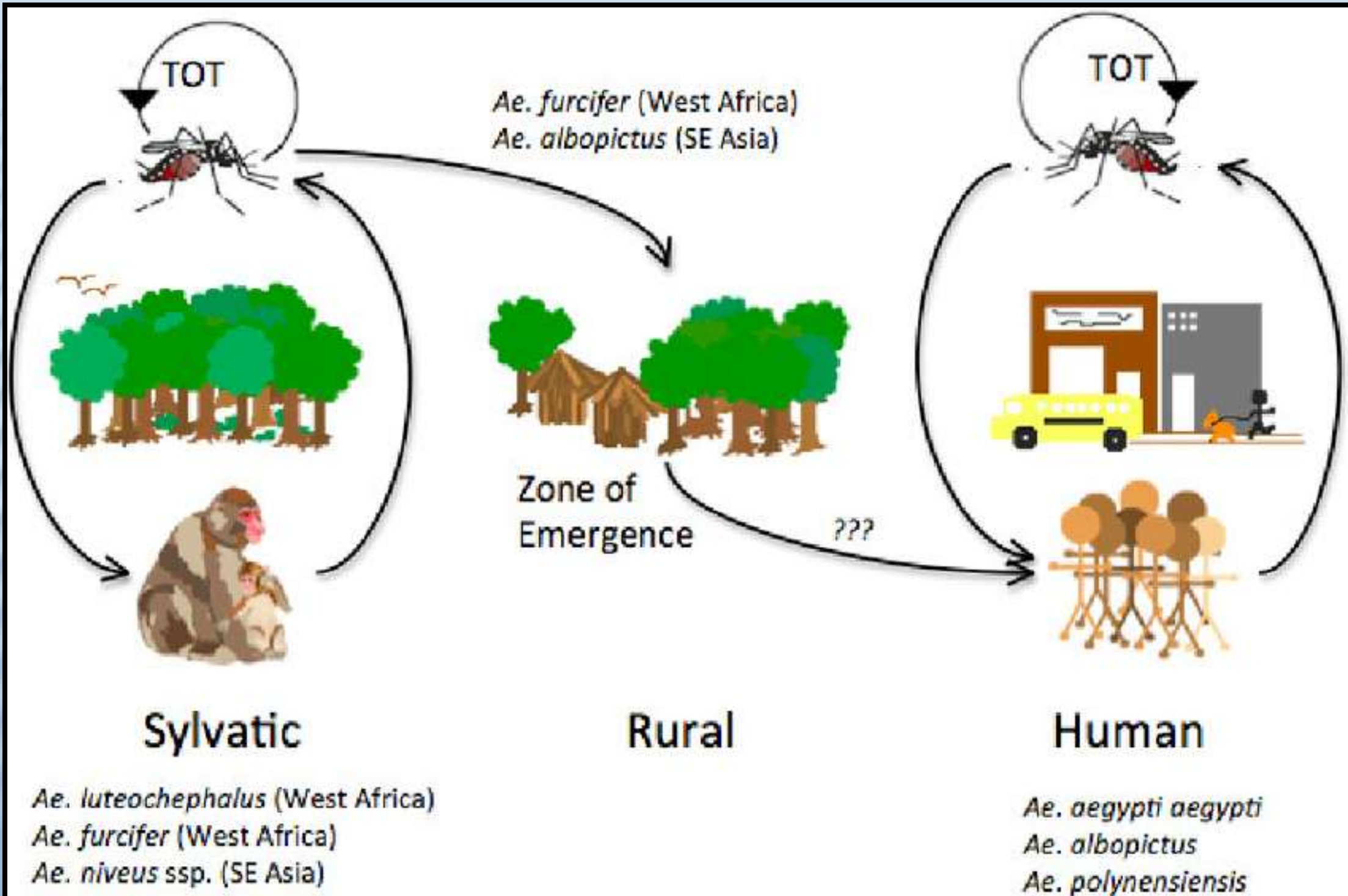


Haemagogus spp.
(Americas)

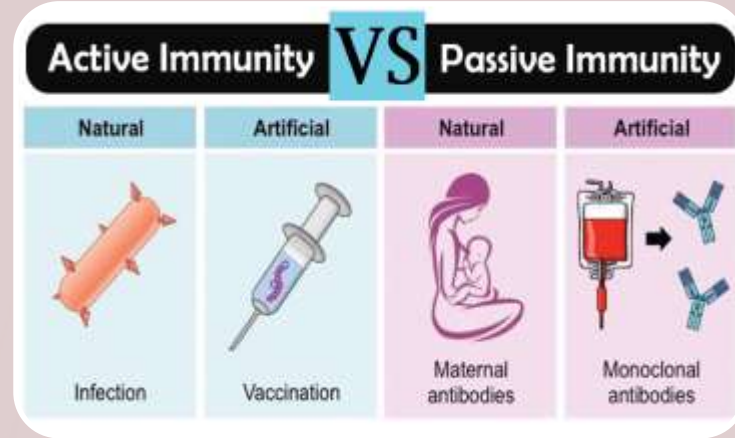
Sylvatic or jungle YF: bite of several species of genus *Haemagogus*.



IP: 3-10 days (**6 days** in international health regulation).



SUSCEPTIBILITY & RESISTANCE:



Age & Sex

- All ages & both sexes are susceptible.

Immunity

- Infection is followed by absolute immunity
- 2nd attacks are unknown.
- Transient passive immunity to inborn infant of immune mother occurs for up to 6 ms.

Occupation

- Woodcutter
- Hunter.

CLINICAL FEATURES

Mild form

- Sudden onset, FHMA, chills, muscle pain, nausea & vomiting.
- Faget sign: slow pulse out of proportion of elevated temperature.
- Jaundice is moderate early in disease & intensified later.
- Albuminuria or anuria may occur, leucopenia.
- Most of the manifestations resolve after 5-7 days.

Sever form

- After a brief remission of hours to a day some cases progress to severe form
- Hemorrhagic symptoms: epistaxis, gingival bleeding, haematemesis (coffee ground or black), melena.

Complications:

Liver & Renal failure

Fatality rate of jaundiced cases may reach 20-50%.

Early symptoms of yellow fever include



Sudden onset of fever



Chills



Severe headache



Back pain



General body aches



Fatigue and Weakness



Nausea and Vomiting

Severe cases include



High Fever



Bleeding and Shock



Yellow discoloration of the skin and the whites of the eyes.

DIAGNOSIS

C/P

Travel history

Lab investigations

- **Isolation of virus from blood** by inoculation of suckling mice, mosquito or cell culture.
- **ELISA** “viral antigen in blood”.
- **PCR** “viral genome in blood & liver tissue”.
- **Serologic diagnosis** “specific IgM in early sera or rise in titre of specific antibodies”.

PREVENTION:

General measures:

Environmental sanitation:

- A) Eradication or control of *Aedes Aegypti*:
- i. Anti-larval & anti-pupal measures
- ii. Anti-adult measures
- iii. Jungle mosquitoes “impractical”.
- B) Human protection against mosquitoes: e.g. protective clothing, bed nets, repellents.



Health education:

- Modes of transmission.

Specific measures:

1) Immunization:

a) Active Immunization: “most effective preventive measure”

17 D vaccine

- Live attenuated vaccine “stored at -25°C ”.
- Single dose, 0.5ml, S.C. injection.
- 99% immunity: International health regulation considered vaccine effectiveness to start after 10 days & persists for 10 years & then re-immunization is required.
- No or minimal reaction “1st 4ms of life...vaccine associated encephalitis”.

Dakar vaccine

- Live attenuated neurotropic virus.
- Administered by cutaneous scarification.
- Not approved by WHO for international use as it leads to encephalitis.



17 D VACCINE

Recommended

- International travelers coming from or going to endemic countries.
- Since 1989 WHO has recommended that at risk countries in Africa that fall in the endemic belt should incorporate it into their routine childhood immunization program after 6 month.

NOT recommended

- Allergy to a vaccine component
- Age <6 months
- Symptomatic HIV infection
- Thymus disorder associated with abnormal immune function
- 1ry immunodeficiencies
- Malignant neoplasms
- Transplantation
- Immunosuppressive & immunomodulatory therapies

Cautiously after medical advice

- Age 6 to 8 months
- Age \geq 60 years
- Asymptomatic HIV infection
- Pregnancy
- Breastfeeding

6815



Yellow Fever Vaccine – YF-VAX®

DO NOT FREEZE. Store at 2° to 8°C (35° to 46°F).

Reconstitute only with 0.6 mL diluent provided. Sterilize and discard within one hour after reconstitution. **SWIRL VACCINE WELL (AVOID VIGOROUS SHAKING).**

Dosage: 0.5 mL subcutaneously. For indications and directions see package insert. Prepared from avian leukosis-free chicken embryos infected with 17D virus. No preservative added.

277 3105116



US Govt License #1725
Manufactured by:
Sanofi Pasteur Inc.
Swiftwater, PA 18870 USA

CPT® Code: 90717
CPT is a registered trademark of the American Medical Association.

NDC 49281-915-01

YF

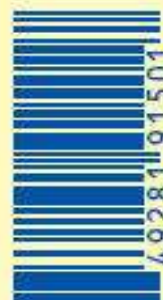
Yellow Fever Vaccine YF-VAX®

(live 17D virus, freeze-dried, avian leukosis-free, sorbitol-gelatin stabilized)

Rx only

5 VIALS
1 Dose
each

sanofi pasteur



3 49281 91501 7

5189

Yellow Fever Risk Assessment

the risks of a serious side effect due to vaccination

<1 to 20 – 40 / 1 000 000
(age dependent)

The risk of death caused by Yellow Fever in endemic area

20 to 1600 / 1 000 000
per month

INTERNATIONAL MEASURES:



Following measures should be done to prevent introduction of yellow fever from endemic area (Yellow Fever belt) into receptive area (areas free of yellow fever, but the vector is present & population is susceptible e.g. in Egypt):



World Health Organization

Notification within 24 hs to WHO.



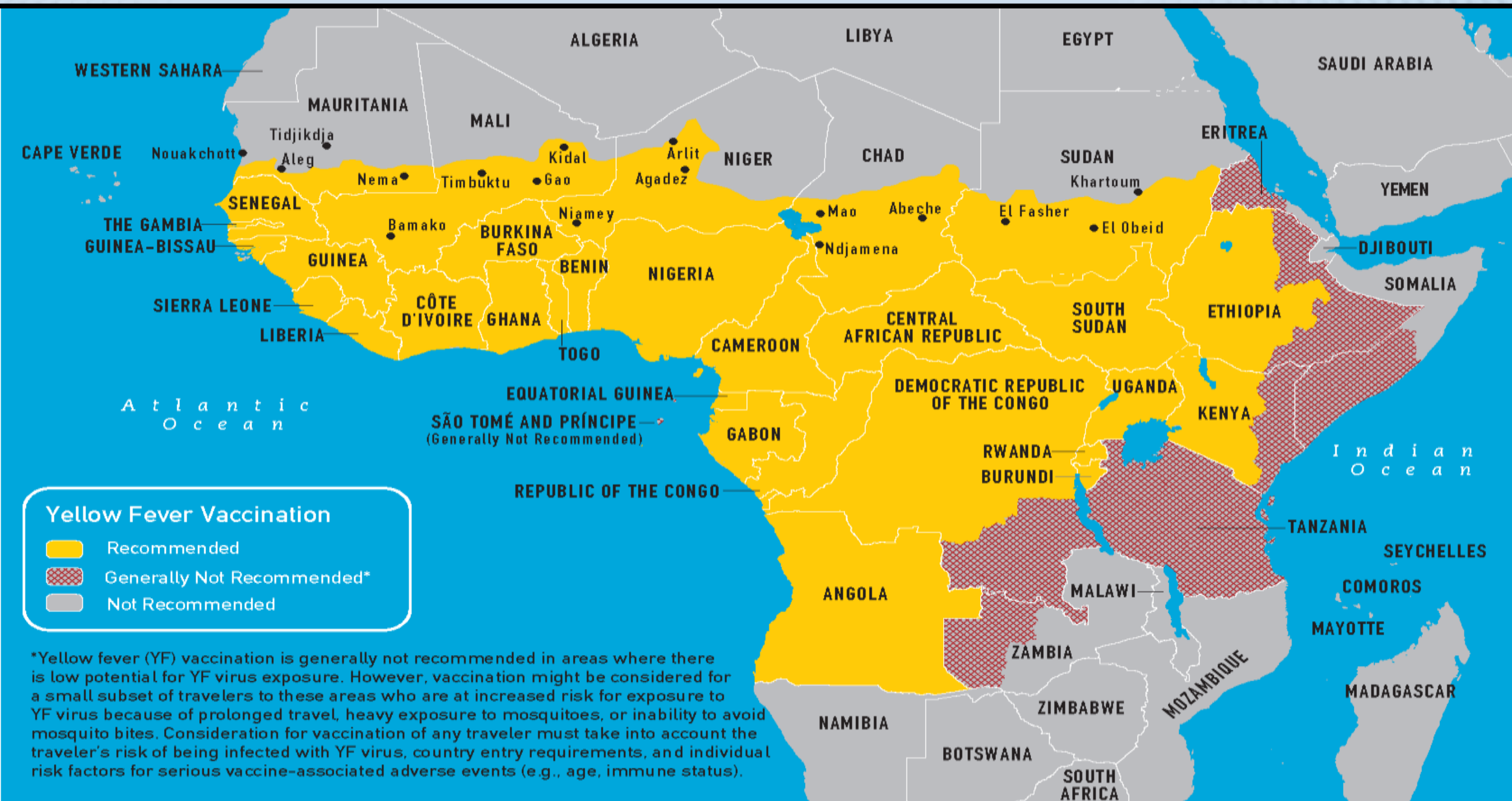
Valid vaccination certificate



Disinfection of any aircraft leaving an endemic area for receptive area, by aerosol spray of suitable insecticide, shortly before departure and also on arrival.



Quarantine of imported monkeys.



WESTERN SAHARA

CAPE VERDE

THE GAMBIA

GUINEA-BISSAU

SIERRA LEONE

LIBERIA

Atlantic Ocean

Yellow Fever Vaccination

- Recommended
- Generally Not Recommended*
- Not Recommended

*Yellow fever (YF) vaccination is generally not recommended in areas where there is low potential for YF virus exposure. However, vaccination might be considered for a small subset of travelers to these areas who are at increased risk for exposure to YF virus because of prolonged travel, heavy exposure to mosquitoes, or inability to avoid mosquito bites. Consideration for vaccination of any traveler must take into account the traveler's risk of being infected with YF virus, country entry requirements, and individual risk factors for serious vaccine-associated adverse events (e.g., age, immune status).

ALGERIA

LIBYA

EGYPT

SAUDI ARABIA

MAURITANIA

MALI

NIGER

CHAD

SUDAN

ERITREA

YEMEN

DJIBOUTI

SOMALIA

SENEGAL

GUINEA

BURKINA FASO

BENIN

NIGERIA

CAMEROON

CENTRAL AFRICAN REPUBLIC

SOUTH SUDAN

ETHIOPIA

Bamako

Niamey

Mao

Abeche

El Fasher

El Obeid

Ndjamena

EQUATORIAL GUINEA

SÃO TOMÉ AND PRÍNCIPE
(Generally Not Recommended)

GABON

DEMOCRATIC REPUBLIC OF THE CONGO

UGANDA

KENYA

Indian Ocean

RWANDA

BURUNDI

REPUBLIC OF THE CONGO

TANZANIA

SEYCHELLES

COMOROS

MAYOTTE

MADAGASCAR

ANGOLA

MALAWI

ZAMBIA

ZIMBABWE

MOZAMBIQUE

NAMIBIA

BOTSWANA

SOUTH AFRICA

VALID VACCINATION CERTIFICATE:

- a.** All international travelers including children coming from or going to endemic areas "Yellow Fever belt".
- b.** Validity starts 10 days after primo-vaccination & lasts for 10 ys.
- c.** Validity starts on same day after re-vaccination & lasts for 10 ys.
- d.** If no certificate is available: traveler is isolated for 6 days from date of leaving endemic area.
- e.** If traveler arrives before 10 days of vaccination, i.e. certificate is not valid yet: traveler is isolated until certificate becomes valid or until end of international IP calculated from day of leaving last endemic area.
- f.** Traveler is quarantined in mosquito-proof accommodation in airport.
- g.** This certificate is required by many countries including Egypt.

YF vaccination certificate

INTERNATIONAL CERTIFICATE OF VACCINATION OR PROPHYLAXIS
Certificat international de vaccination ou de prophylaxie

This certificate that (1) Jane Mary Doe (2) 22 March 1940 (3) F United States
 National identification number, if applicable: _____ Date of issue: _____
 [passport number] _____ Name (signature) of holder: Jane Mary Doe

On the date indicated below a course of _____ (4) Yellow Fever _____
 a full course of _____ was prophylactic or a full course _____

Vaccine or prophylactic used by agent (product name)	Date	Signature and professional status of supervising physician	Manufacturer and batch or lot number or other production number as on certificate	Certificate valid from to (month and year)
(4) <u>Yellow Fever</u>	(5) <u>15 June 2022</u>	(6) <u>John M. Smith, MD</u>	[<u>Batch (or lot) #</u>]	(3) <u>25 June 2022</u> <u>29 June 2022</u>

شهادة دولية للتطعيم
 أو إعادة التطعيم ضد مرض الحمى الصفراء

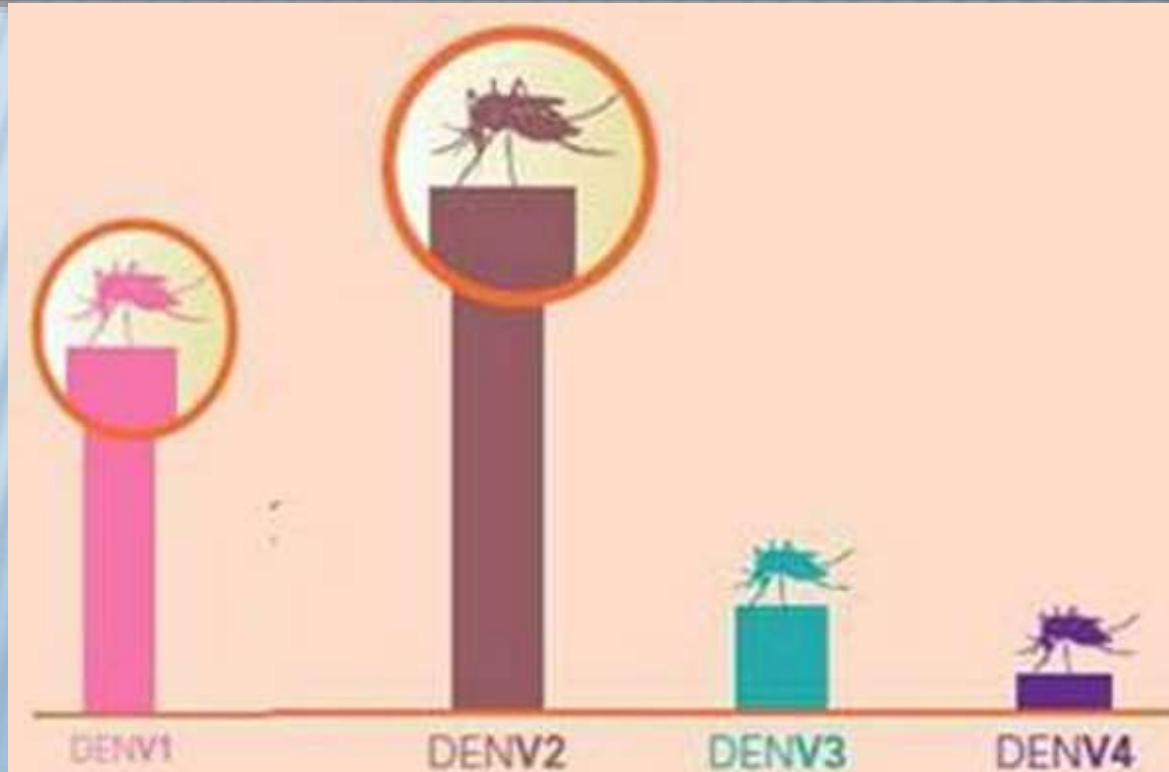
INTERNATIONAL CERTIFICATE OF VACCINATION
 OR REVACCINATION AGAINST YELLOW FEVER
 CERTIFICAT INTERNTIONAL DE VACCINATION OU
 DE REVACCINATION CONTRE LA FIÈVRE JAUNE

DENGUE FEVER (BREAK BONE FEVER)

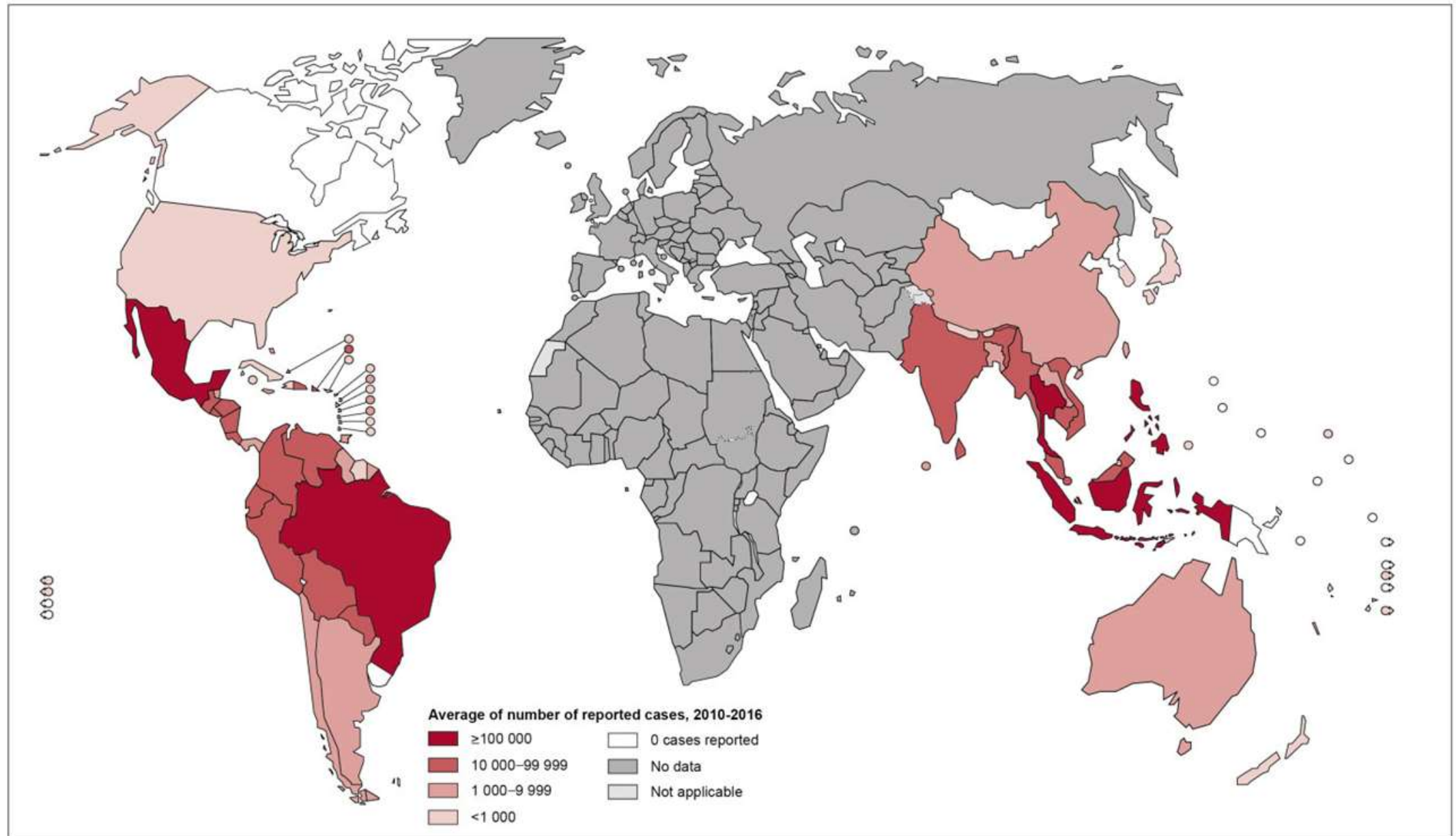


Causative agent: viruses of dengue fever: 1, 2, 3 & 4 types.

- It is endemic in south Asia.
- Dengue 1, 2, 3, 4 are now endemic in Africa.
- In recent years outbreaks of dengue fever has occurred on east coast of Africa from Mozambique to Ethiopia to Saudi Arabia.



Distribution of dengue, worldwide, 2016



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2016. All rights reserved

Data Source: World Health Organization
Map Production: Control of Neglected
Tropical Diseases (NTD)
World Health Organization

Dengue, countries or areas at risk, 2013



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Health Statistics and
Information Systems (HSI)
World Health Organization

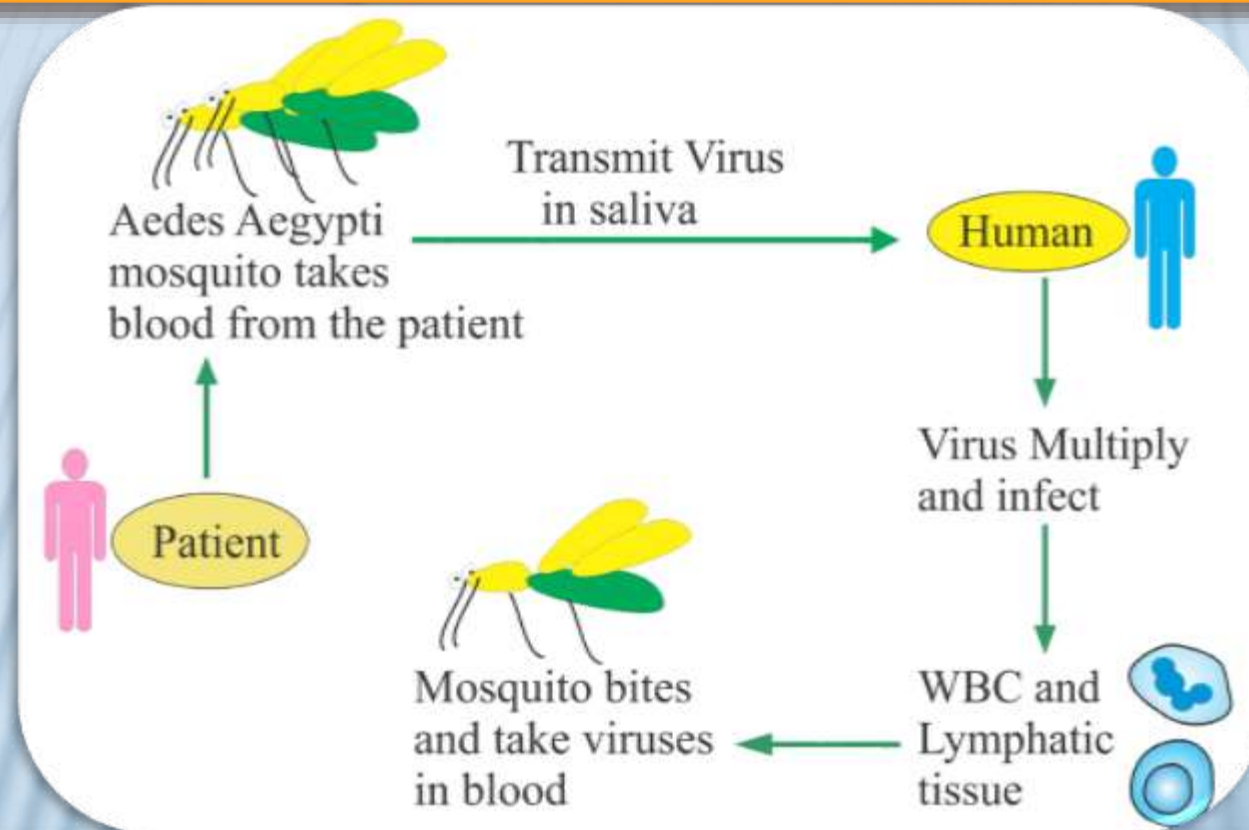


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Reservoir:

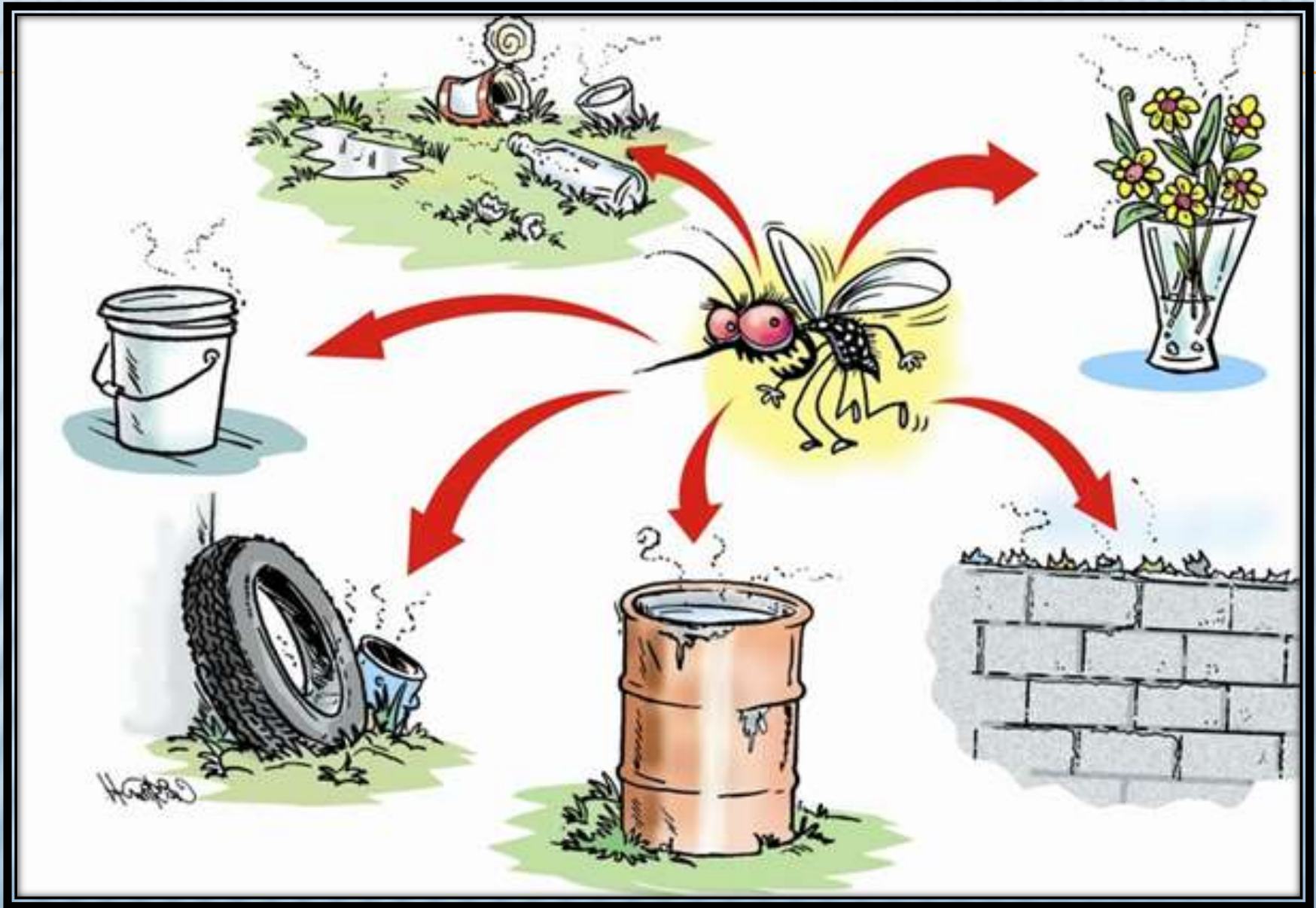
Man-mosquito cycle in tropical urban centers.

A monkey-mosquito cycle may serve as a reservoir in south Asia & West Africa.



Mode of transmission: bite of infective *Aedes aegypti* mosquito.

No man-to-man transmission



Life cycle of the *Aedes* Mosquito

1-2 days



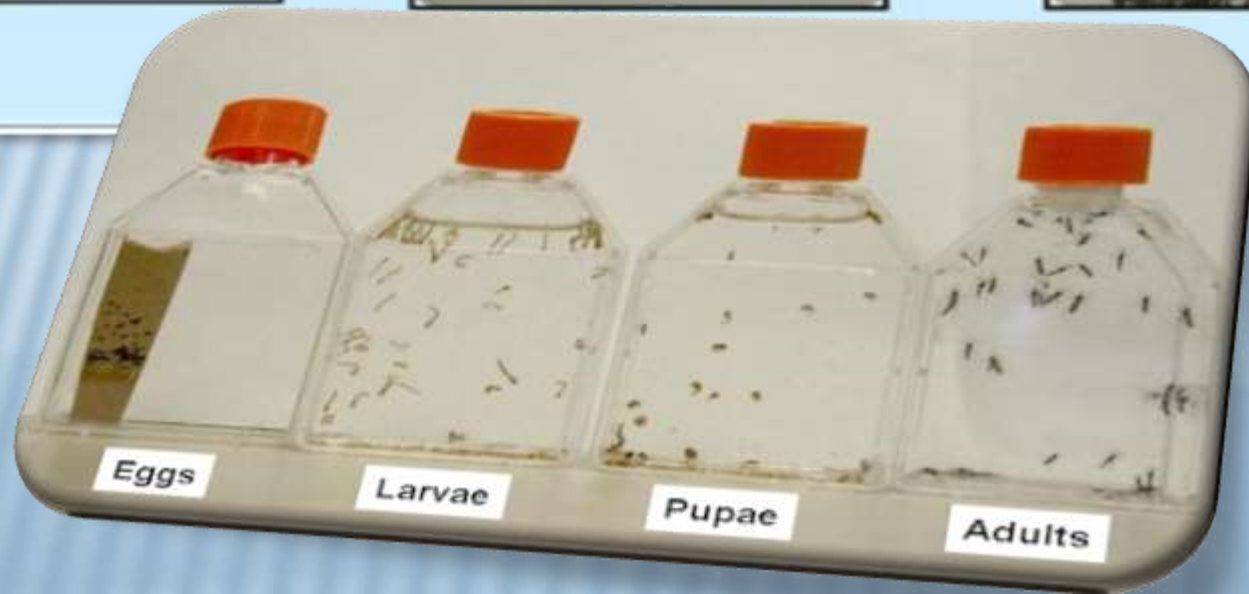
Pupae



Larvae

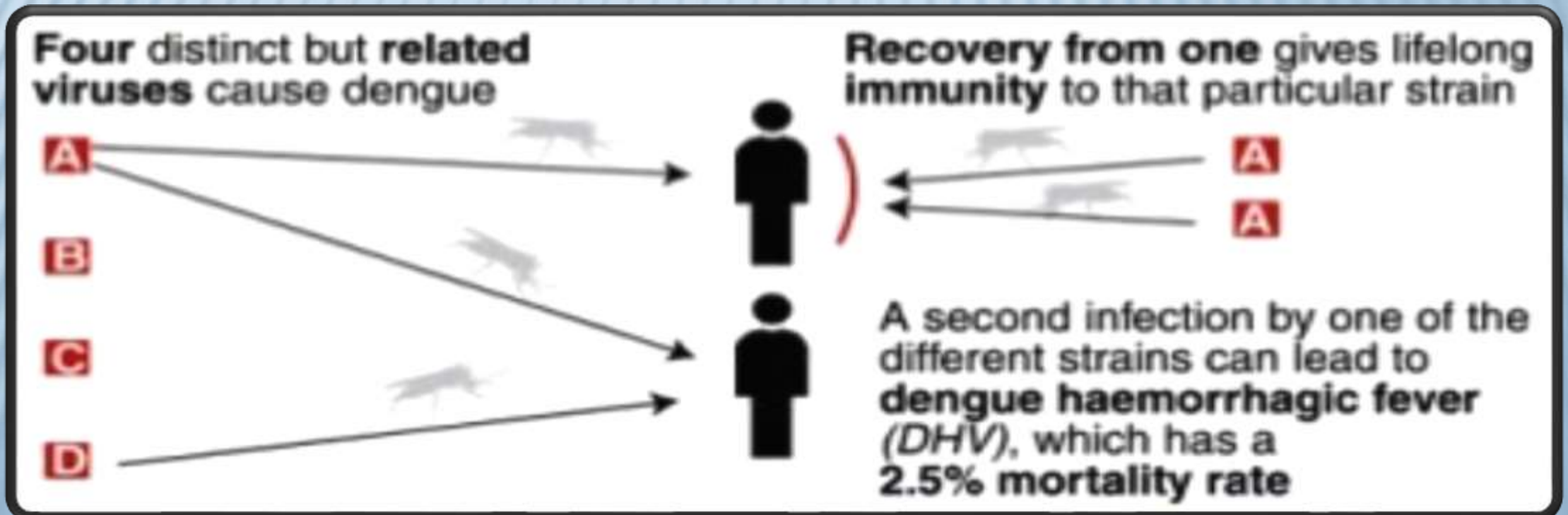


Eggs



SUSCEPTIBILITY & RESISTANCE

Once infection by one of dengue viruses, immunity will develop to that virus but infection by the other 3 viruses can still occur.



CLINICAL PICTURE:

IP: 4-7 days



High fever.



Headache



Muscle and joint pain



Pain behind eyes



**Generalized erythema
& Maculopapular rash**

Skin rashes.



Vomiting



Bleeding from mouth and nose

Complications:

Generalized bleeding & lymphadenopathy

Symptoms experienced by patients suffering from dengue

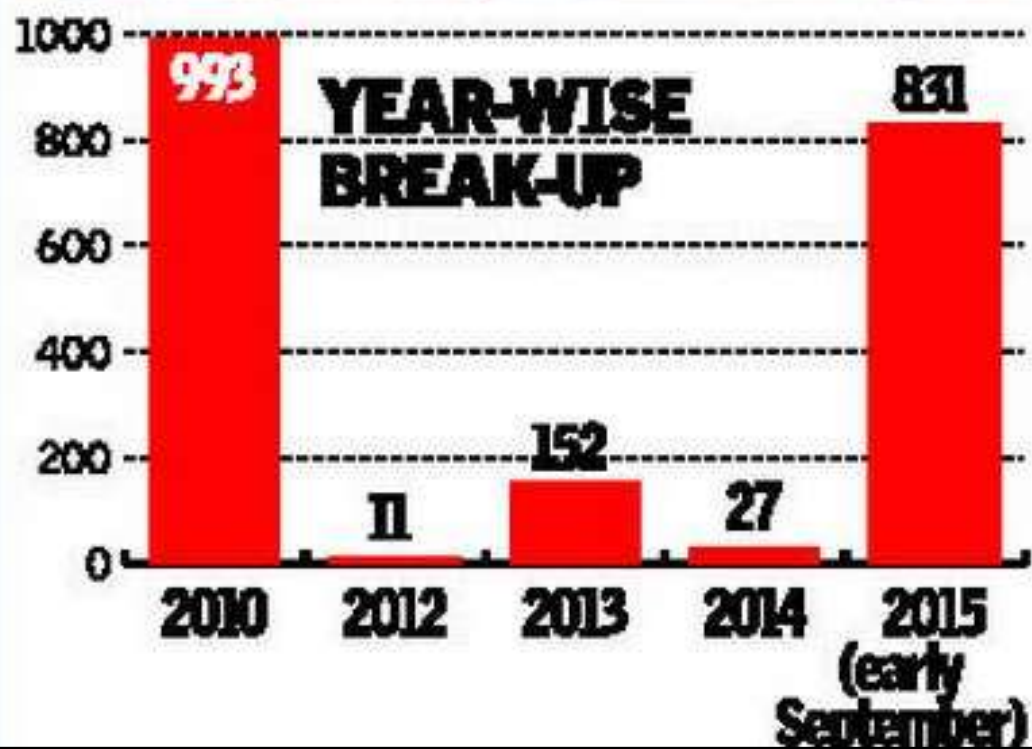
➔ Fever in **90% cases**

➔ Headache, eye pain, body pain and joint pain in **80% cases**

➔ Rashes in **50% cases**

➔ Nausea or vomiting in **50%** and diarrhoea in **30% cases**

➔ Cough, sore throat, and nasal congestion in **33% cases**



DIAGNOSIS

C/P

Travel history

Lab investigations

- **Serologic diagnosis** “specific IgM in early sera or rise in titre of specific antibodies”.

PREVENTION:



General measures:

Environmental sanitation:

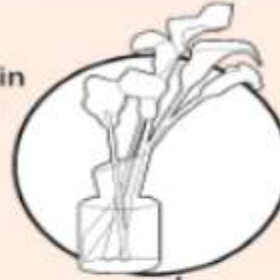
- A) Eradication or control of *Aedes Aegypti*:
- i. Anti-larval & anti-pupal measures
- ii. Anti-adult measures
- iii. Jungle mosquitoes “impractical”.
- B) Human protection against mosquitoes: e.g. protective clothing, bed nets, repellents.



Health education:

- Modes of transmission.

Vases
Change water in
vessels/ bowls
every other
day.



In clean, standing water
This type of mosquito always stays within 150m
from residences.
Eggs can withstand desiccation more than a
year.
Theoretically, lab test has shown that the infected
mosquito can infect her own eggs with the virus.

Tree hole

Roof gutters



Fallen leaves

Plant axils



Clear blockages

Canvas sheets

Flower pot

Flower pot plates
Remove water from
flower pot plates
every other day.

Air-con tray

Depression on
concrete slab



Turn over
all storage
containers

Discarded
receptacles



Collar of the
toilet bowl

Gully
Trap

Ground
Depression



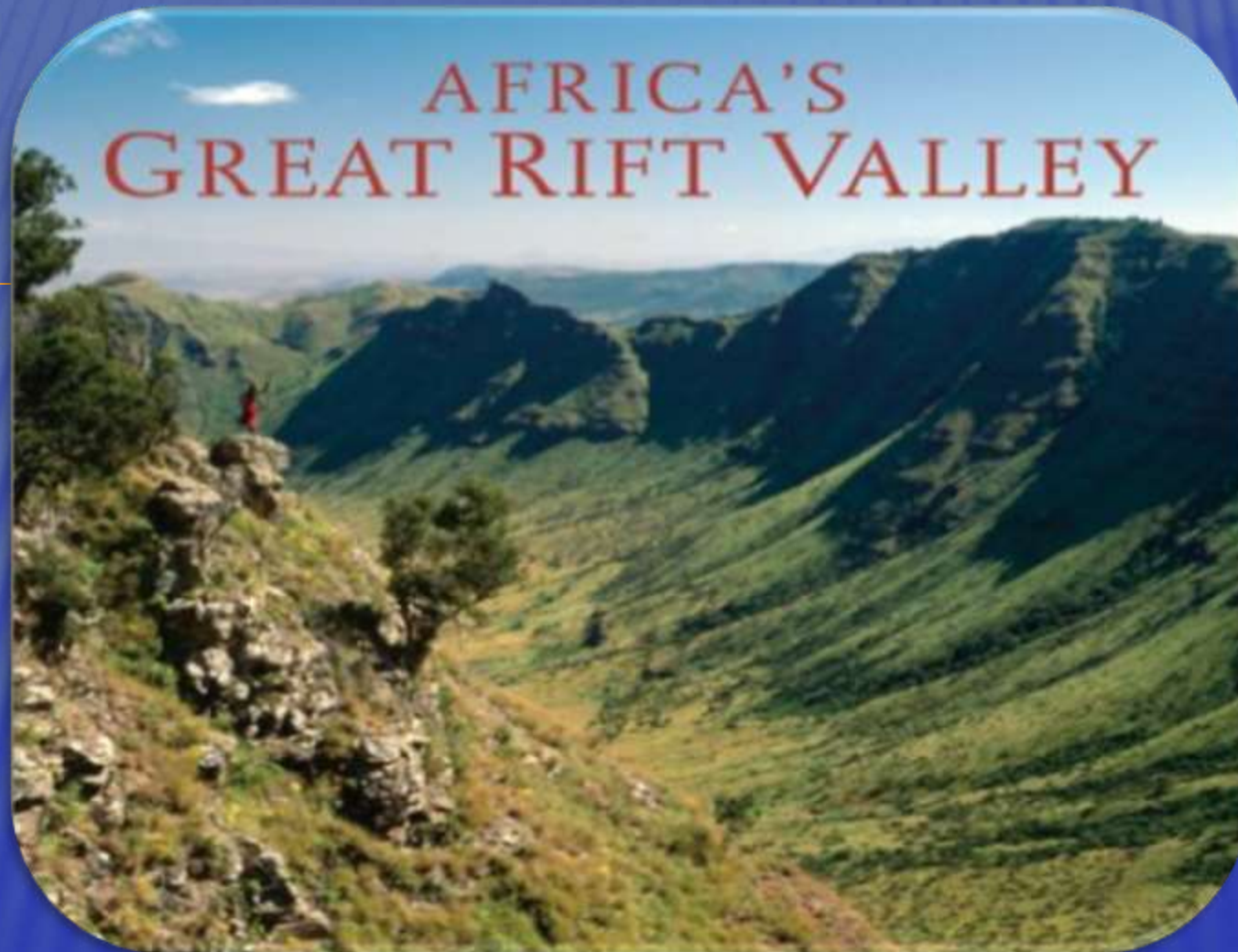
Control mosquito
breeding in water
storage containers by
using small fish

What is Dengvaxia?



Dengvaxia is a live recombinant tetravalent dengue vaccine developed by Sanofi Pasteur, given as a 3-dose series on a 0/6/12 month schedule. It is the first dengue vaccine to be licensed and has now been approved by 19 regulatory authorities for use in endemic areas in persons typically ranging from 9-45 (in some countries 9-60) years of age. It has been introduced in two sub-national programs in the Philippines and Brazil targeting about one million individuals.

RIFT VALLEY FEVER



AFRICA
CONTINENT

NEW
CONTINENT

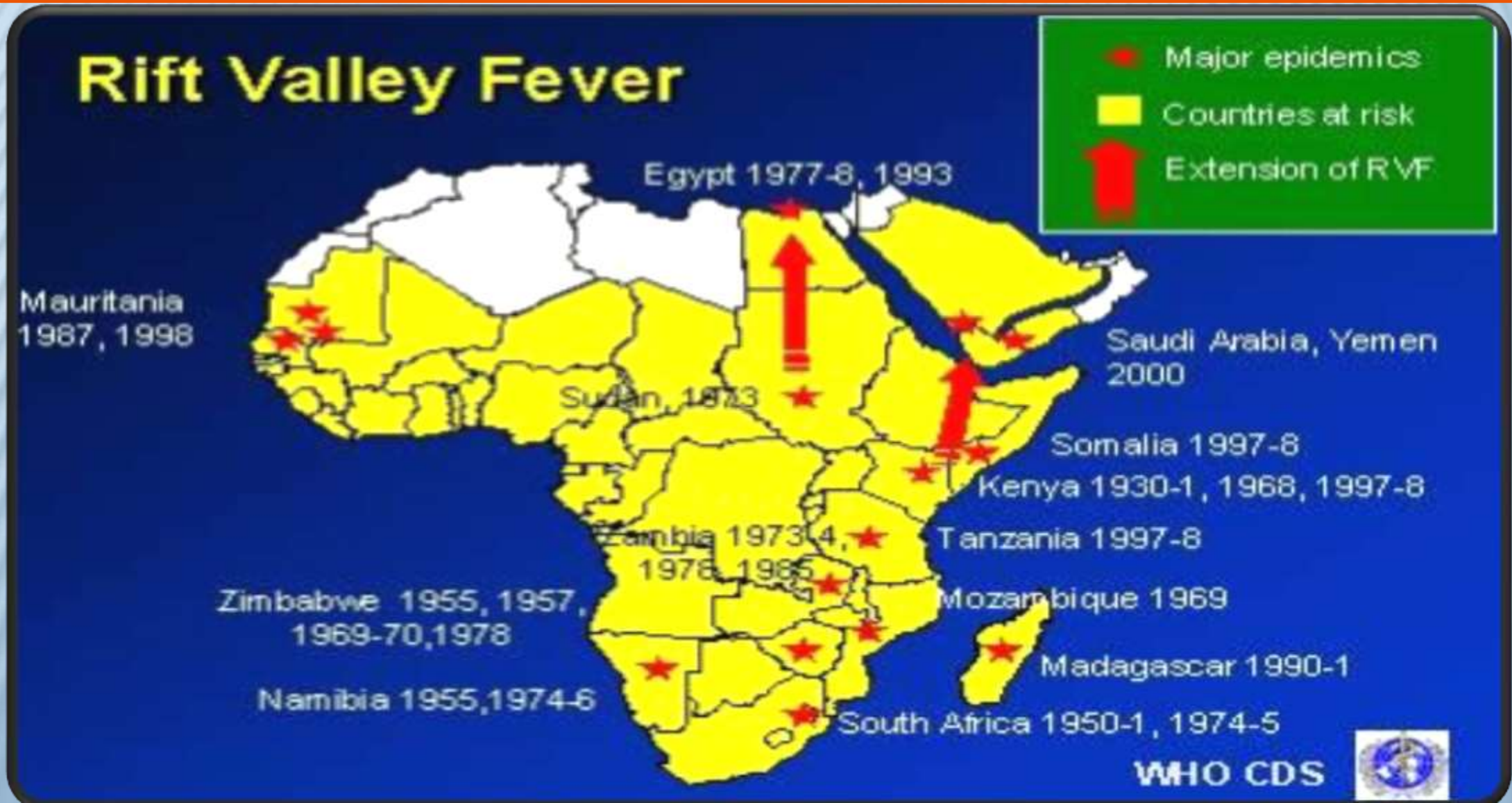
NEW
OCEAN



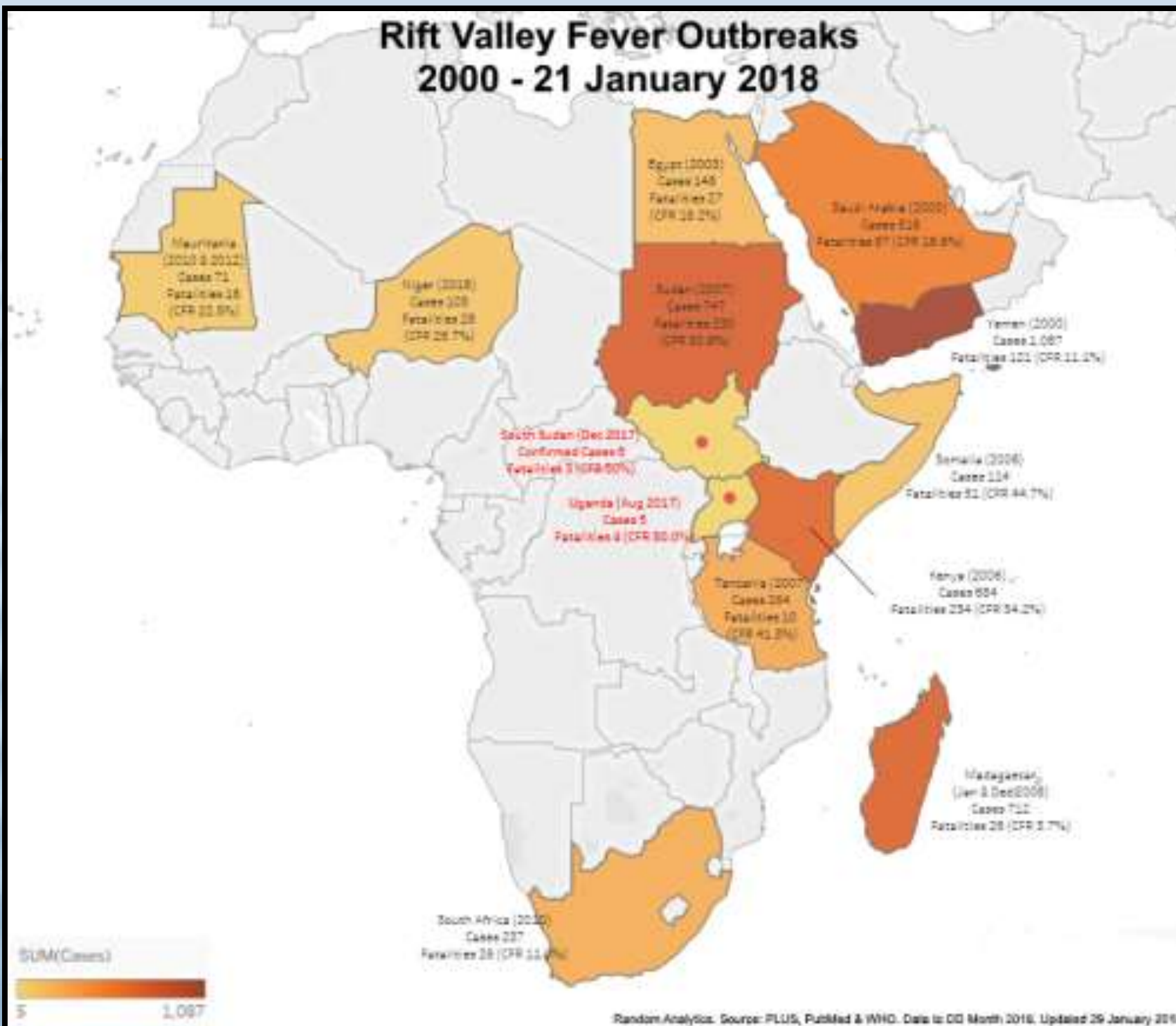
The Great Rift Valley, that runs through Eastern Africa is to split from Africa to form a new continent

Communicable arthropod-borne viral zoonotic disease.

It was introduced to Egypt from East & South Africa in 1977, causing outbreak in animals, that was transmitted to man.



Rift Valley Fever Outbreaks 2000 - 21 January 2018



Causes of Rift Valley Fever



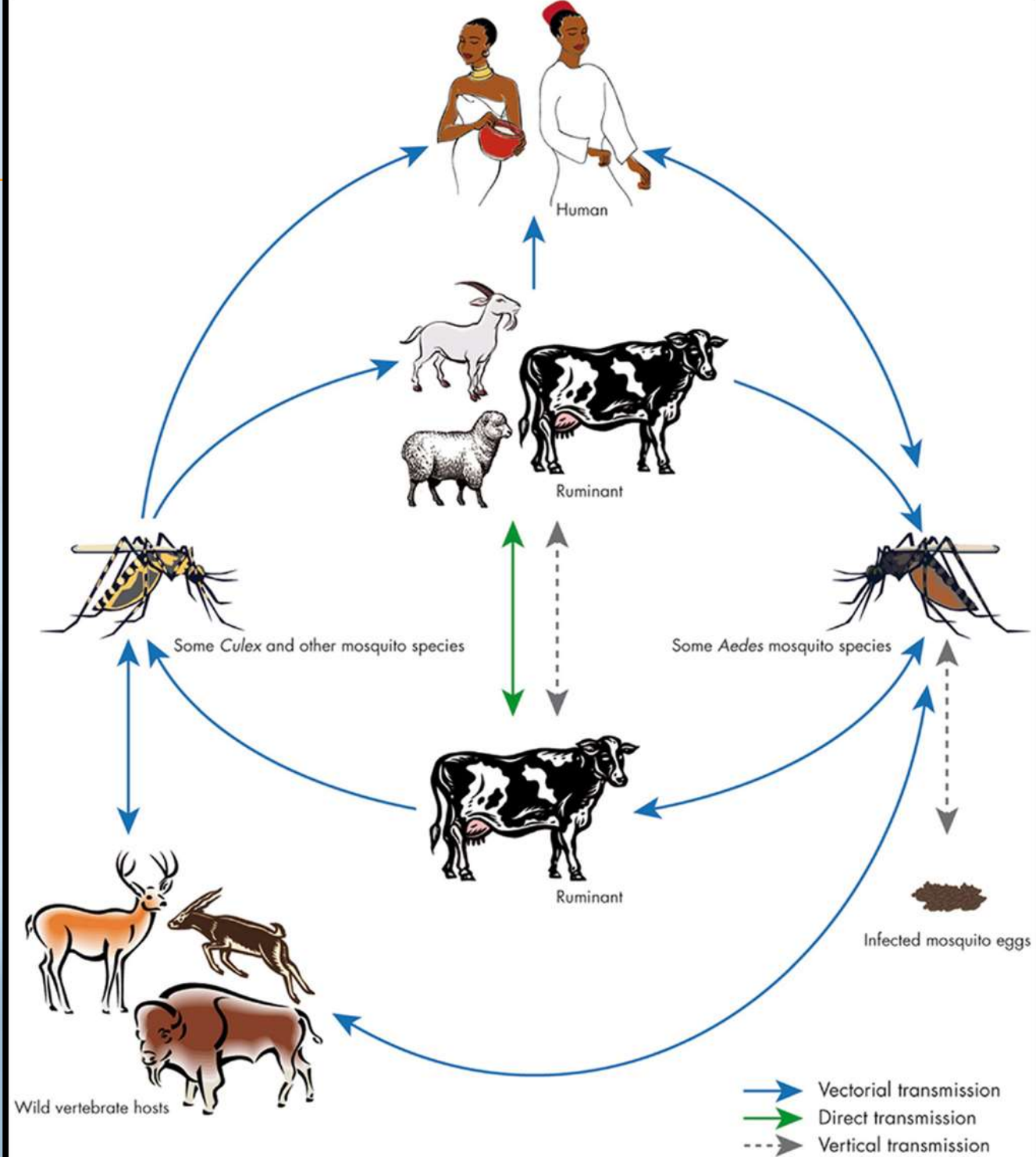
Rift valley fever is caused by RFVF or RFV virus which is prevalent in animals such as camels, goats, sheep, and cattle etc... the rift valley virus spreads to humans via infected mosquitoes.

Mode of transmission:

- Bite of some infective *Aedes* & *Culex* species.
- Handling diseased animals & their tissues, blood, body fluids.
- **No man-to-man transmission**



Aborted animals from infected cow with RVF



AT RISK PEOPLE:

Animal
herdsmen



Abattoir
workers



Veterinarians



International
travelers to
RVF-
endemic
locations



CLINICAL PICTURE:

What are the Symptoms of Rift Valley Fever

For Information,
Visit: www.epainassist.com



Mild form

- Fever
- Influenza like picture
- Recovery

Severe form (8%)

- Hemorrhagic fever
- Liver necrosis.
- Damage of retina
- Blurred & decreased vision “1-3 weeks after initial infection”

Complications:

50% of sever cases will have permanent vision loss.

Encephalitis

DIAGNOSIS

C/P

Animal contact history.

Lab investigations

- **Serologic diagnosis** “specific IgM in early sera or rise in titre of specific antibodies”.

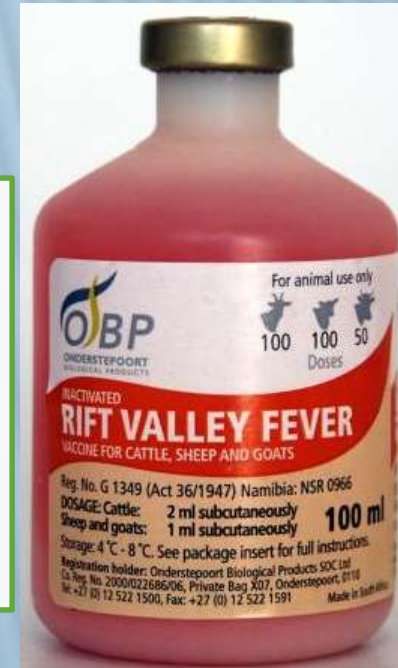
PREVENTION & CONTROL



Measures for animal reservoir

- Prevention & control of disease in animals, including vaccination
- Quarantine of imported animals from endemic areas.

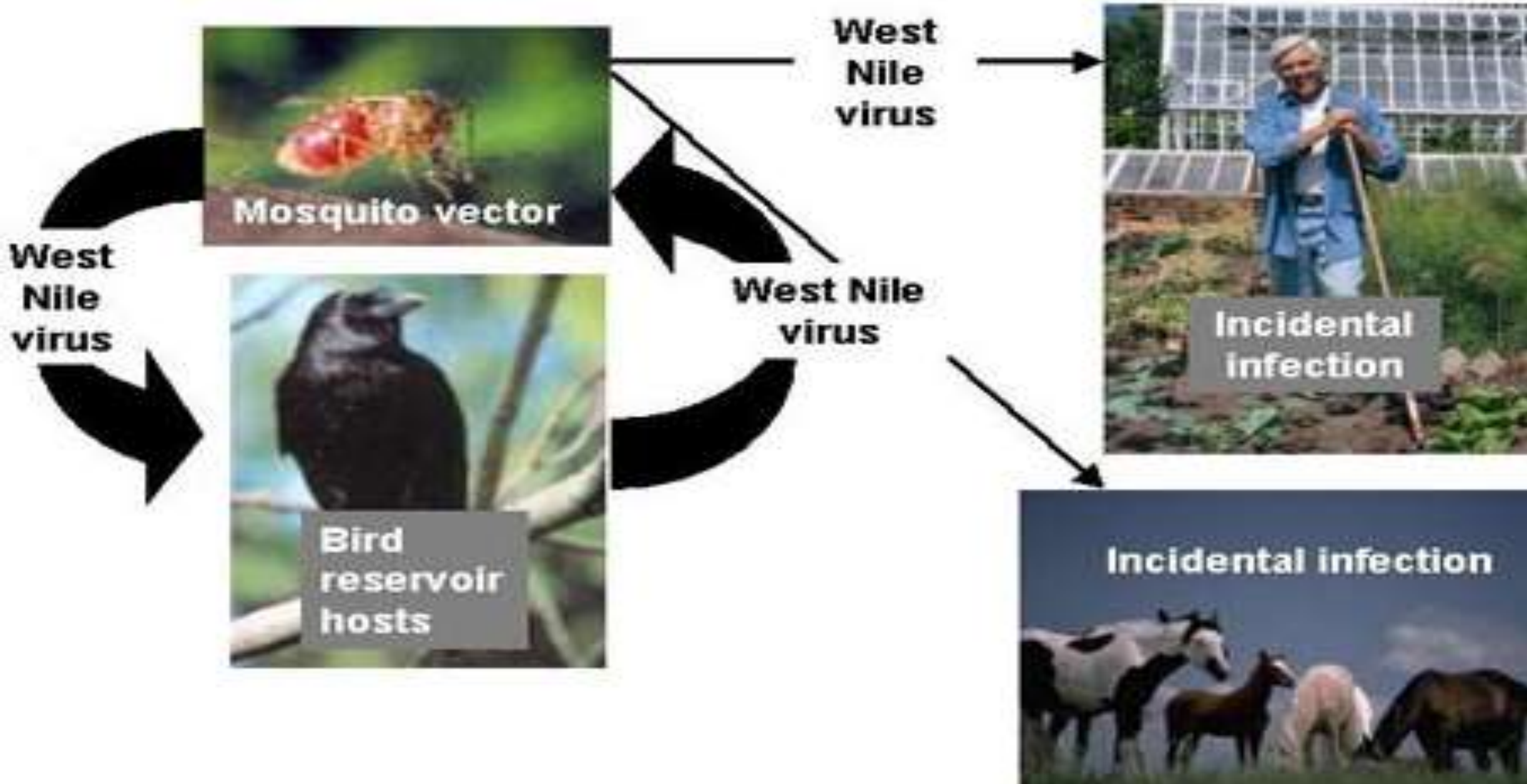
General measures for vector & man protection



VIRAL ENCEPHALITIS

	West Nile encephalitis	Eastern equine encephalitis	Western equine encephalitis	Japanese B encephalitis
Causative organism	specific arbovirus			
Occurrence	Africa & Middle East	East U.S.A	West U.S.A	Japan, Korea, India Philippines
Reservoir	Birds and some wild and domestic animals			
Vector	Mosquitoes & some by ticks. In Egypt, West Nile virus is transmitted by culex.			
C/P	Usually mild Serious outbreaks: with involvement of the brain, spinal cord and meninges.			
Prevention	<ul style="list-style-type: none"> - Eradication or control of vector. - Protection of man from vector - Quarantine measures for imported birds and animals 			

West Nile Virus Transmission Cycle



ZIKA VIRUS



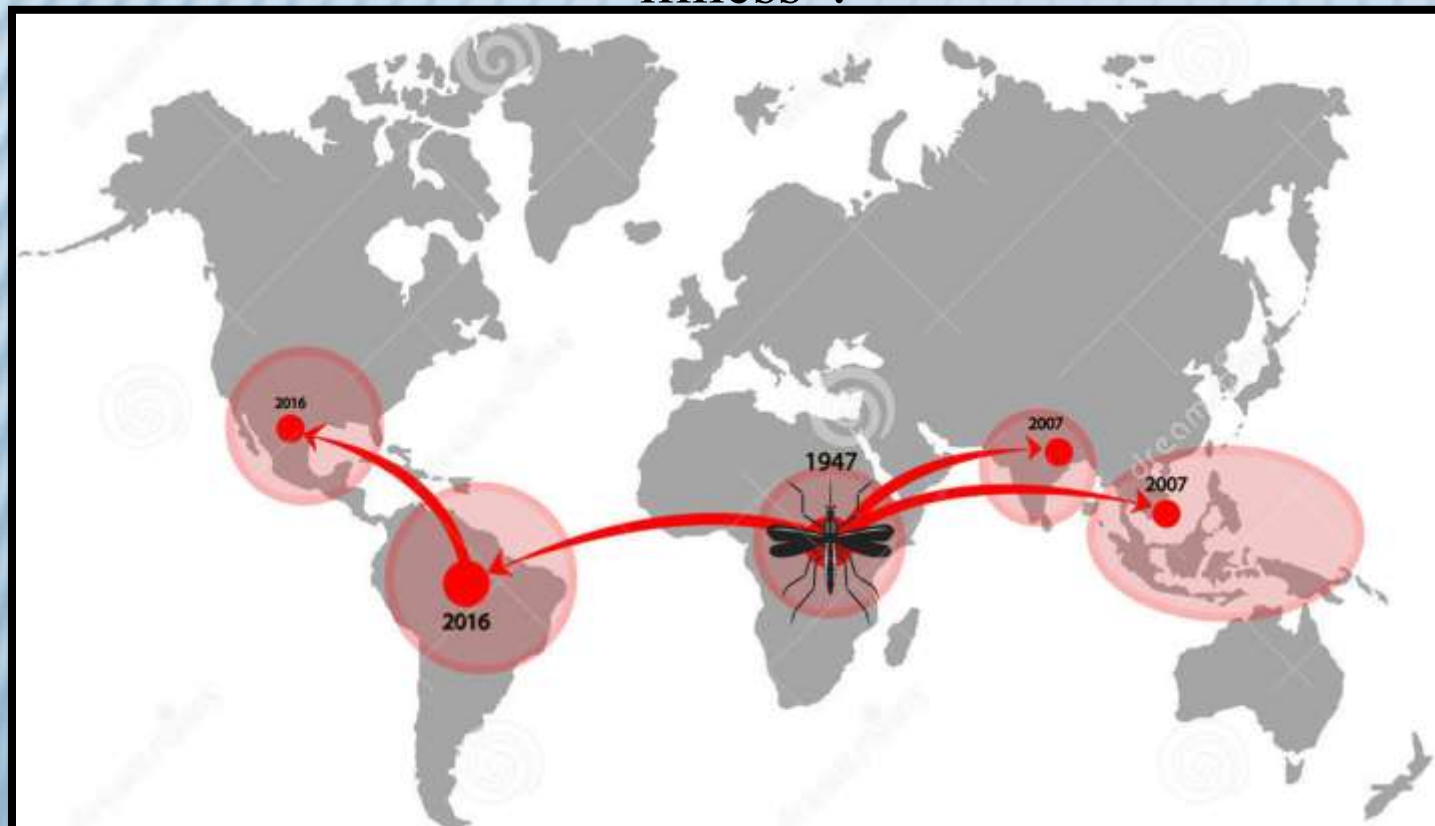
1947: 1st identified in Uganda in monkeys.

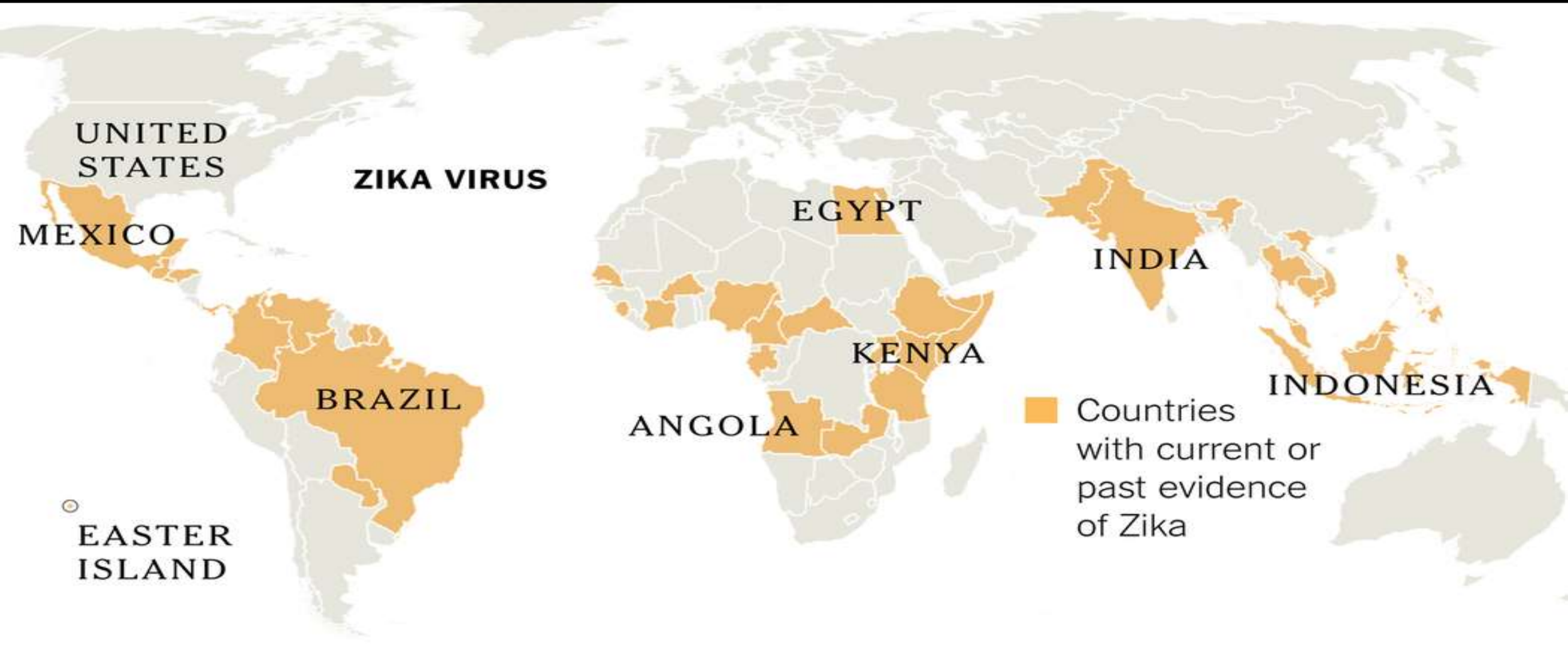
1952: Identified in humans in Uganda & Tanzania.

1960s-1980s: Outbreaks in Africa, the Americas, Asia and the Pacific “mild illness”.

2007: 1st large outbreak.

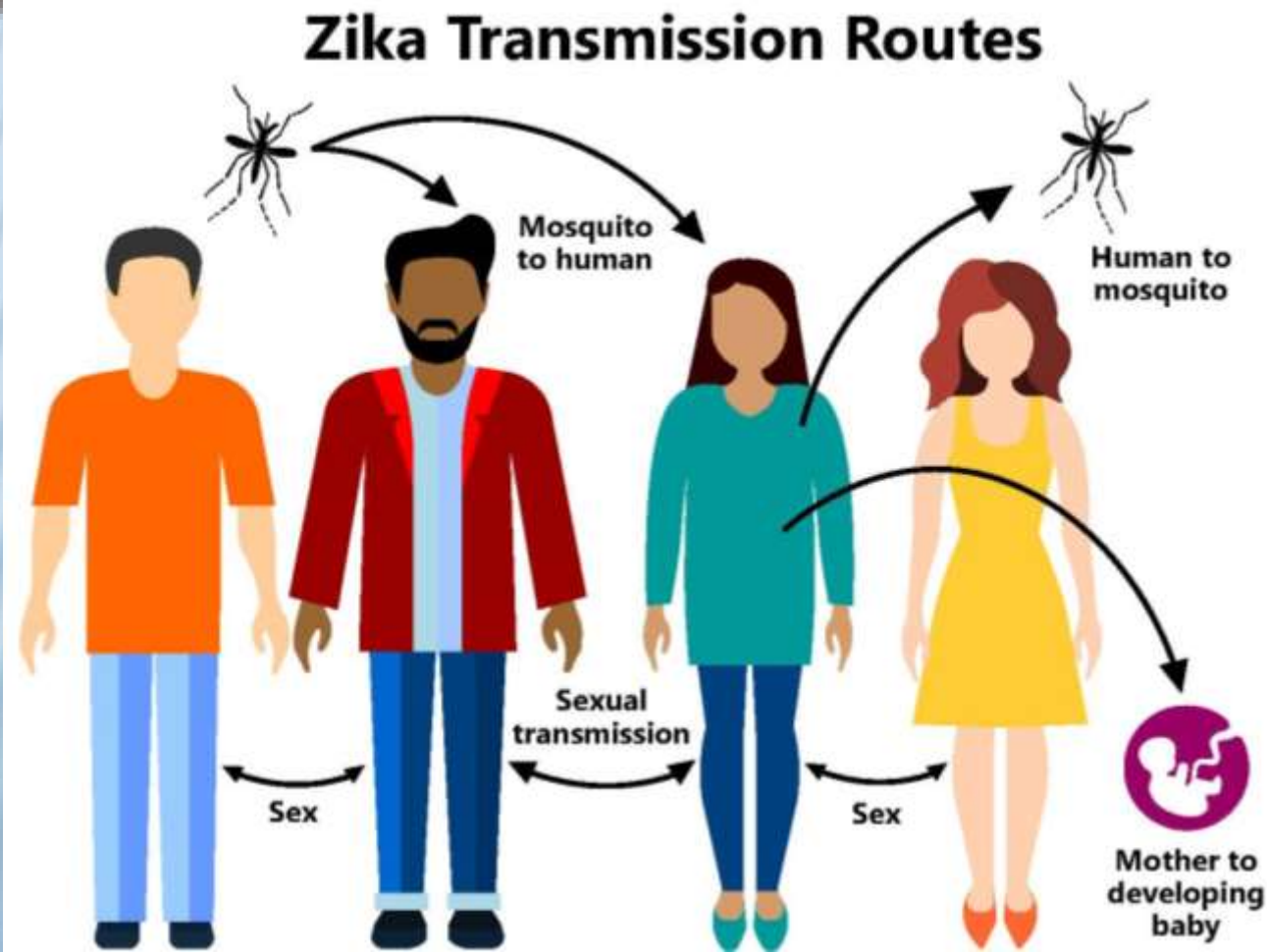
2015: Brazil reported an association with Guillain-Barré syndrome & Microcephaly.



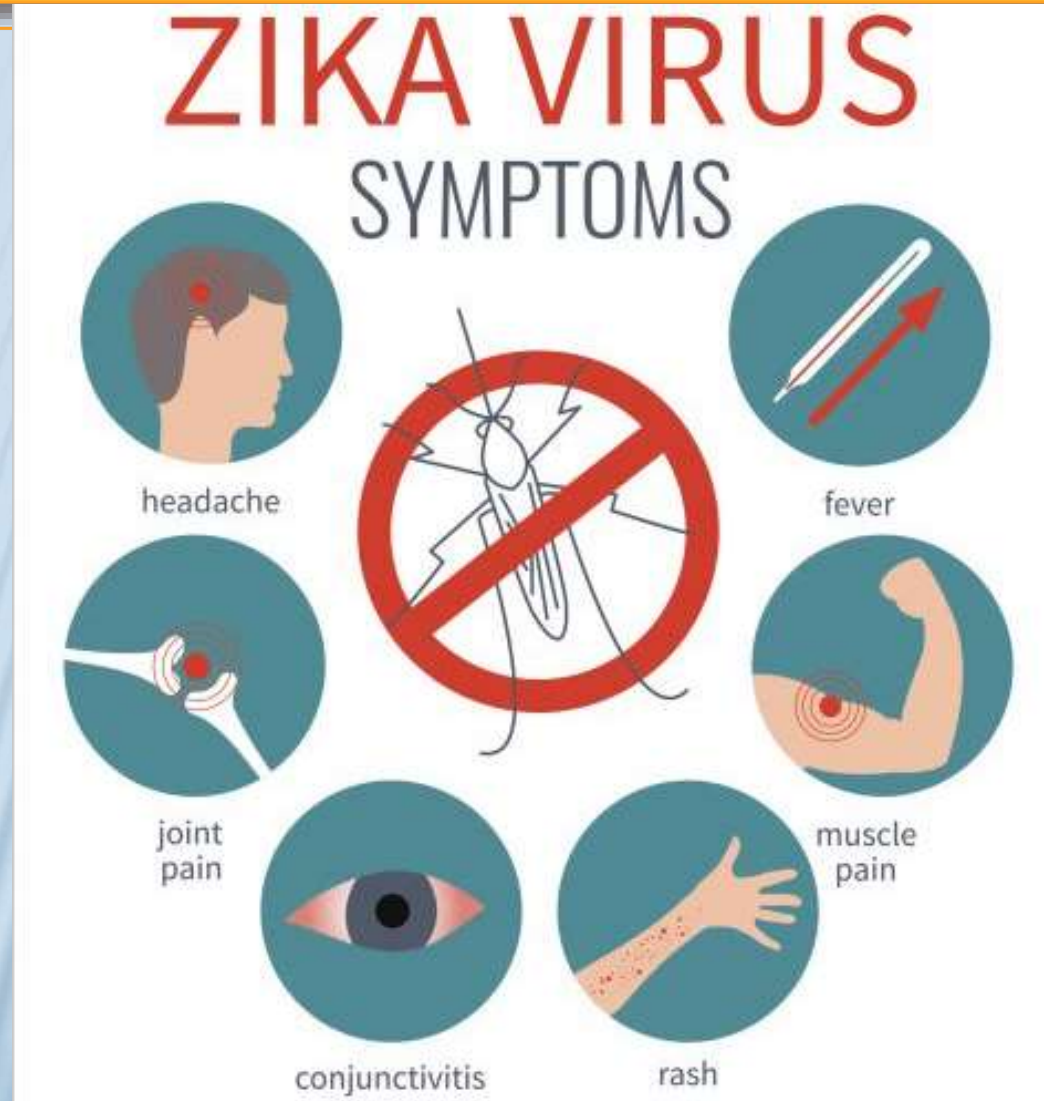


TRANSMISSION

Aedes aegypti in tropical regions “usually bite during the day, peaking during early morning & late afternoon/evening”.

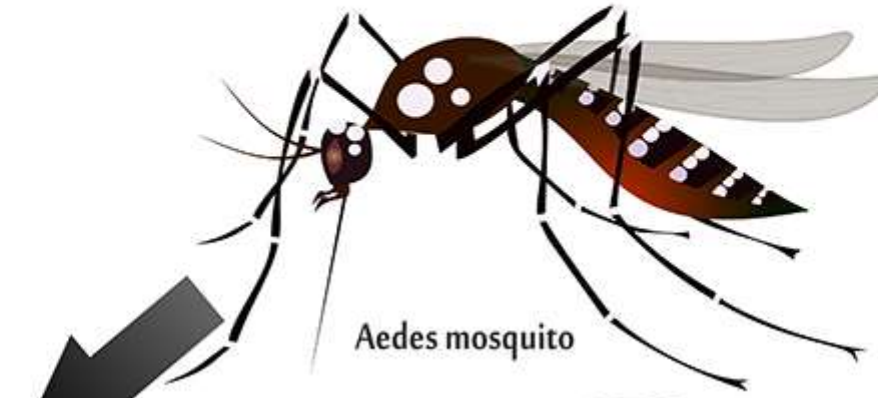


IP: not clear, but is likely to be a few days.



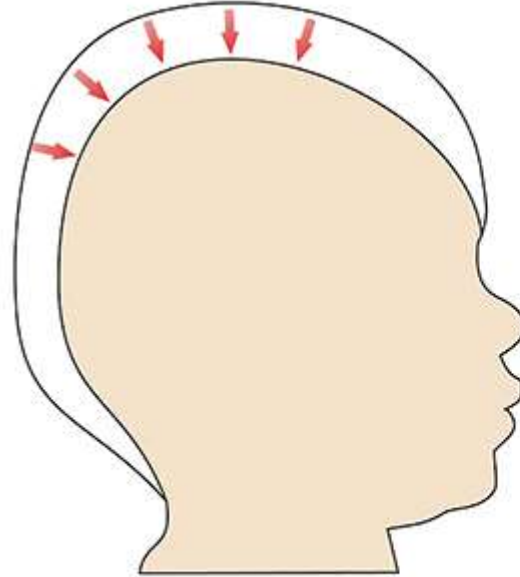
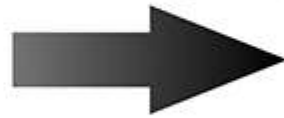
Usually mild & last for 2-7 days.

ZIKA VIRUS



Aedes mosquito

Microcephaly



Microcephaly

Symptoms include below-average head size

Often caused by failure of brain to grow at normal rate

Head circumference measuring less than 31-32cm

Zika Virus Disease

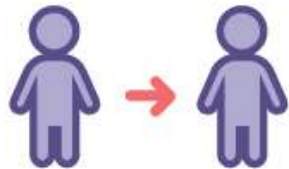
Transmission



By mosquito bite



From mother to fetus

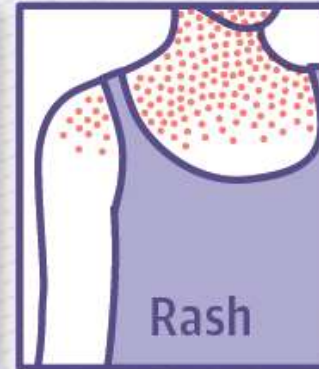


Sexually transmitted

Symptoms



Fever



Rash



Joint pain



Red eyes

Mosquito Bite Prevention in Zika Areas



Wear long-sleeved shirts and long pants



Stay indoors and use bed nets



Use insect repellent

COMPLICATIONS



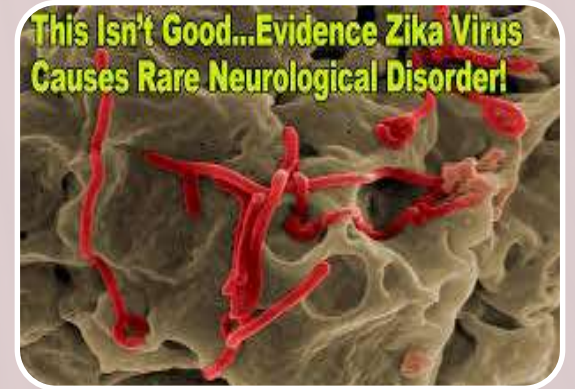
Congenital brain abnormalities, including microcephaly.



Trigger of Guillain-Barré syndrome.



Miscarriage, stillbirth, and other birth defects.



Neurological disorders “under research”.

DIAGNOSIS

C/P

Recent history of travel

Lab tests: blood or other
body fluids “urine, saliva
or semen”.

WHO RESPONSE

Zika: Strategic Response Framework & Joint Operations Plan (WHO)

Objectives

Surveillance

- Establish a global system approach to understand the ZIKV threat (distribution, spread, nature of infection and outcome trends)
- Enhance laboratory and diagnostic requirements, facilitate collaboration
- Facilitate national response methods

Response

- Disseminate systematically updated information
- Combat false or misleading information
- Engage community involvement
- Train and equip health care workers
- Rigorously pursue vector control and prevention efforts
- Establish clinical guidance and protocols
- Facilitate and enhance patient care

Research

- Investigate increase in microcephaly and neurologic syndromes and possible associations to ZIKV
- Fast-track research and developments

Viral

Yellow fever

Encephalitis

Dengue fever

Rift valley fever

Zika

Bacterial

Plague

Parasitic

Malaria

Filariasis

Leishmaniasis

Rickettsial

Typhus

Q fever

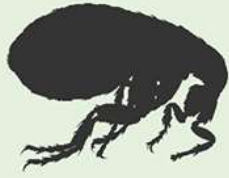
Spirochetal

Relapsing fever



FACTS ABOUT plague

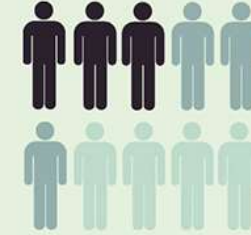
Plague is an infectious disease that can become severe if left untreated. If diagnosed early, plague can be cured with antibiotics and supportive care.



Plague is **caused by a bacteria** usually found in small mammals and their fleas



People infected with plague usually have "flu-like" **symptoms** within 1-7 days of contact



Early **diagnosis and treatment** are essential - the fatality rate is 30-100% if left untreated

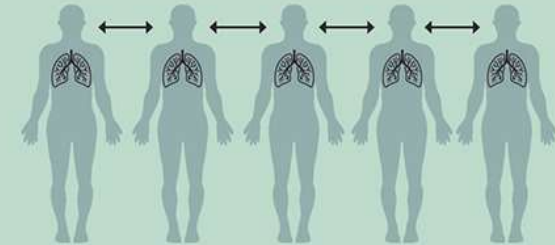


Bubonic



The most common type of plague affects the lymph nodes. It can be severe, but there is no human to human transmission.

Pneumonic



The deadliest and most rapid form of plague occurs when it reaches the lungs. It can be transmitted person to person via droplets in the air.



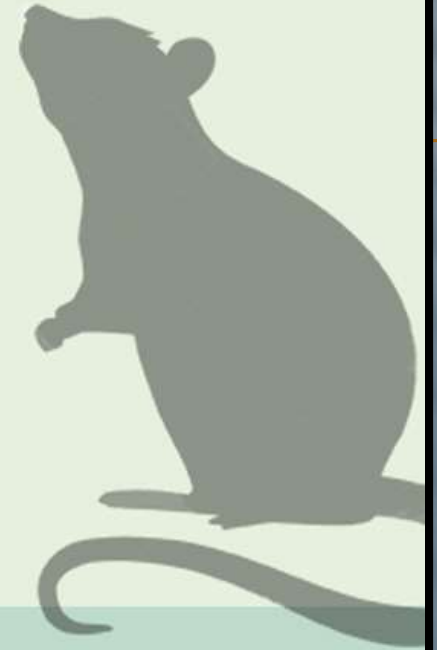
Middle ages ▶▶▶▶▶

Plague, known as the "Black Death" in 1400s, caused an estimated...

50 million deaths in Europe

Modern era ▶▶▶▶▶

Between 2010 - 2015, 3248 people were infected with plague worldwide... **584 died**



Plague is most common in

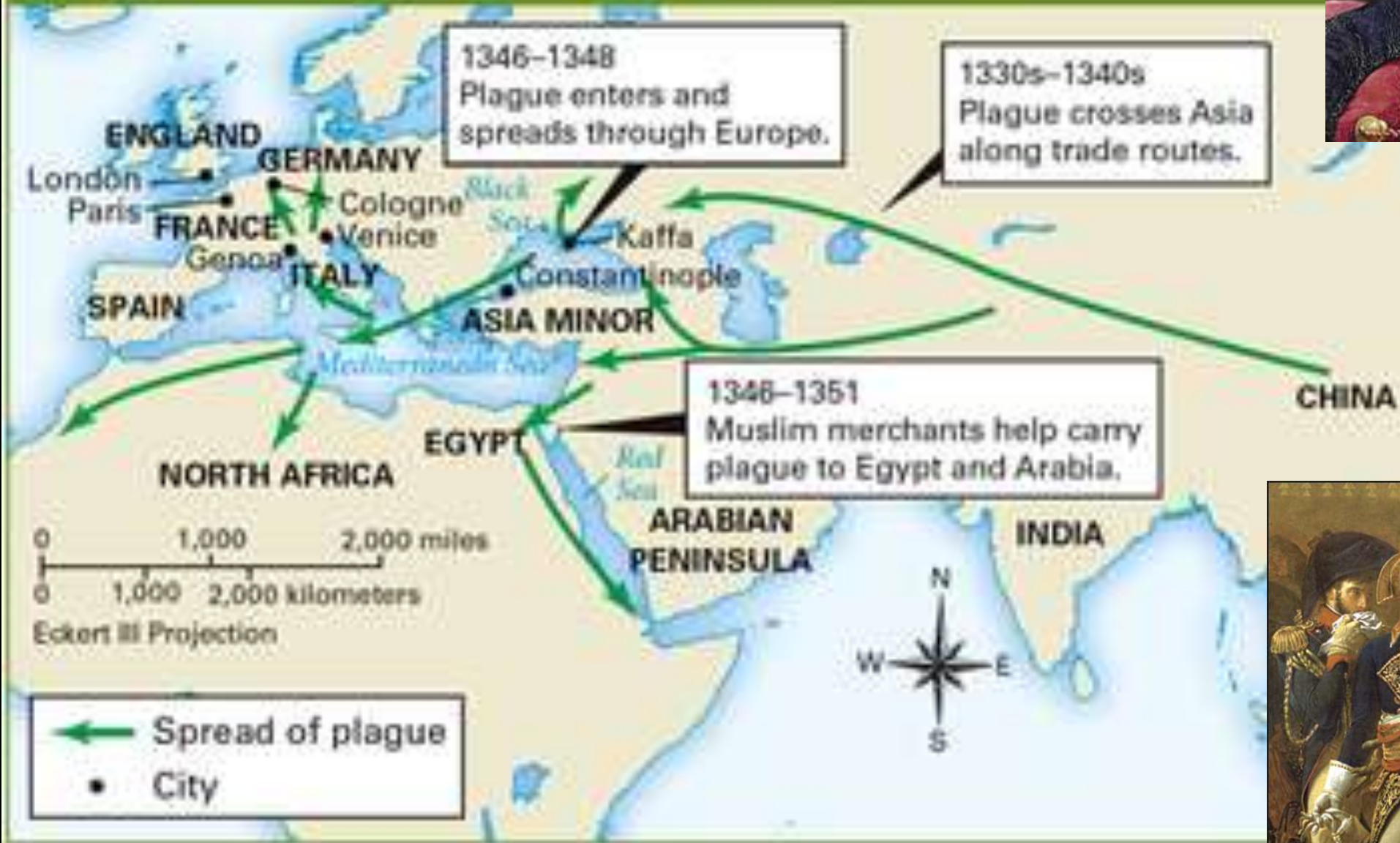
Madagascar, Democratic Republic of the Congo and Peru. However, the potential plague natural foci are distributed worldwide.



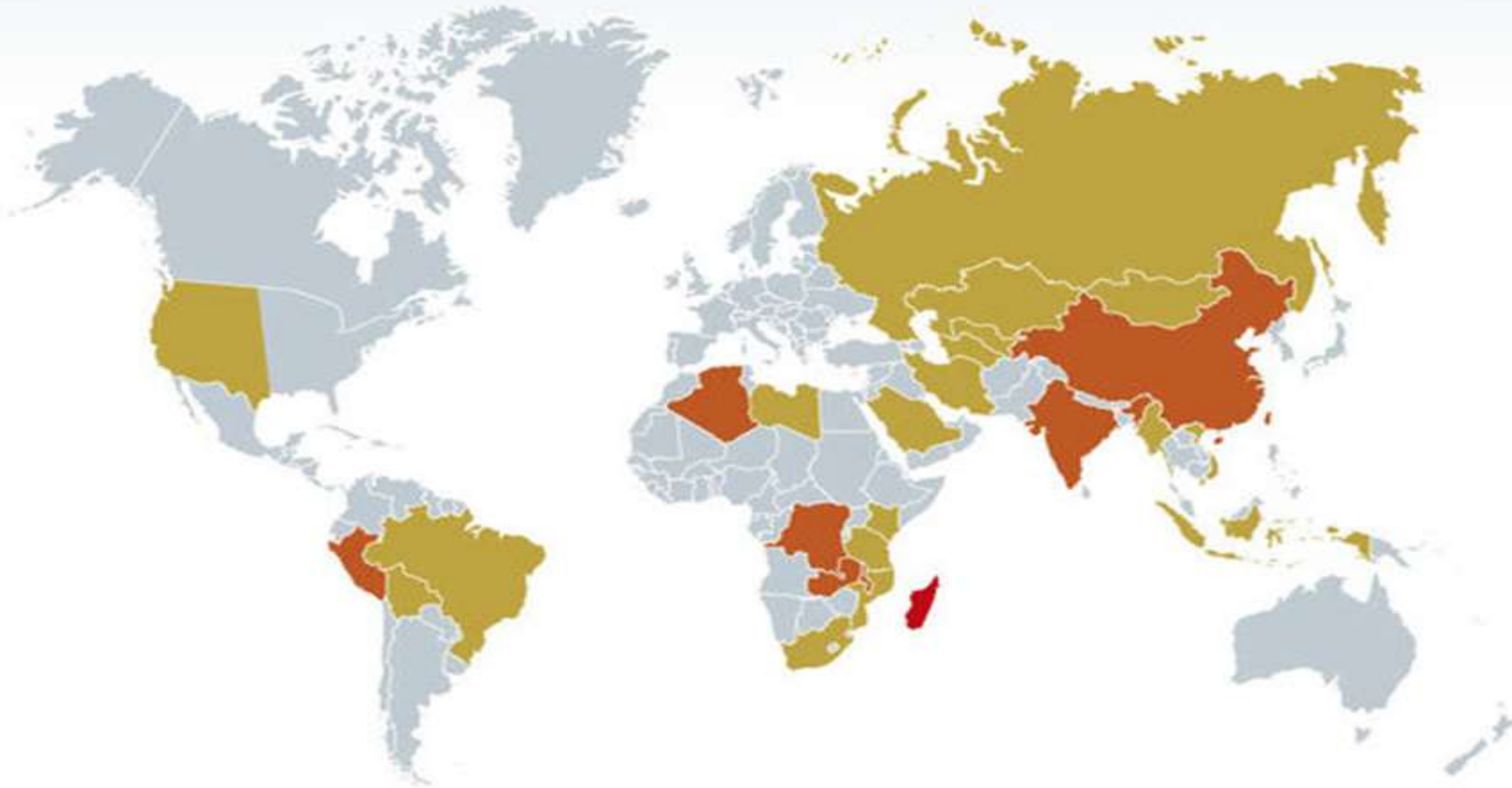
World Health Organization

October 2017

The Spread of the Plague in the 14th Century



BLACK DEATH: COUNTRIES THAT **STILL** HAVE THE PLAGUE



■ *Outbreaks in 2017*

Madagascar

■ *Outbreaks in the 21st century*

Peru
China
Congo
Algeria
Malawi
India
Zambia

■ *Where plague exists as an animal disease*

Western USA
Bolivia
Brazil
Lybia
Saudi Arabia
Kenya
Tanzania
Mozambique
South Africa
Iran

Russia
Kazakhstan
Uzbekistan
Turkmenistan
Mongolia
Burma
Vietnam
China
Indonesia

Plague Transmission

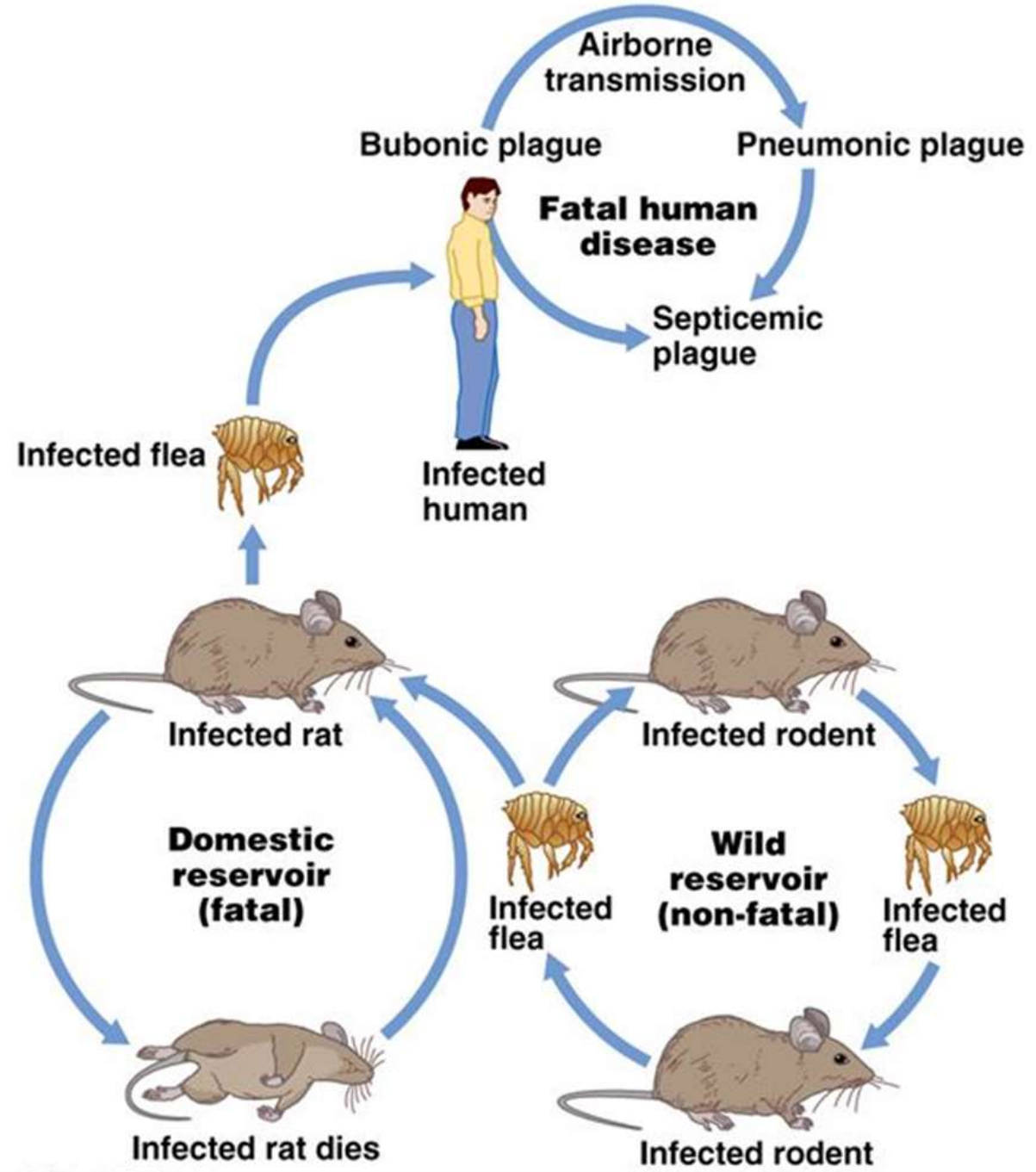
Plague in rodents shows:

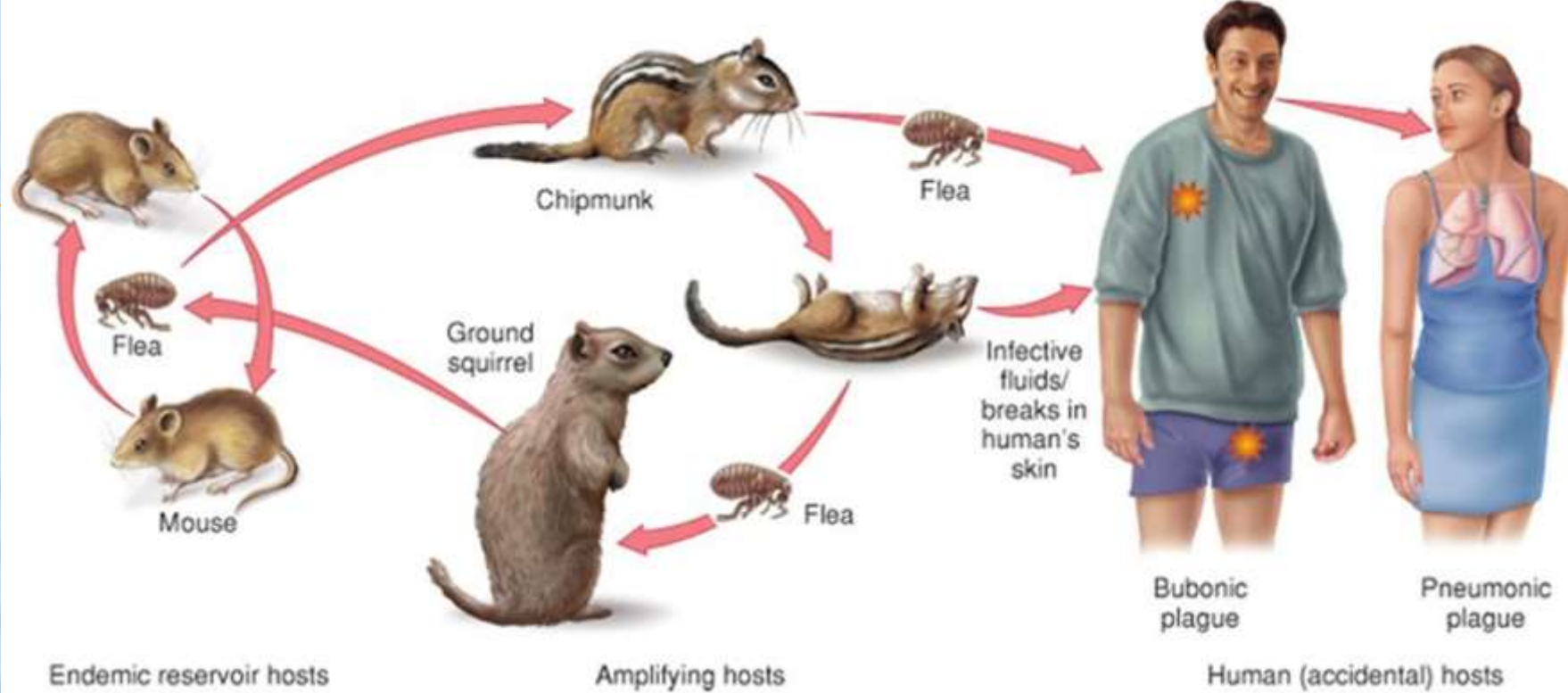
Enzootic spread

- Rat-flea-rat infection.

Epizootic spread

- High mortality.
- ↑Flea index (average no. of fleas per rat) so fleas leave rats & attack man to start plague epidemic.





- Bacteria: *Yersinia pestis* (*Pasteurella pestis*).

Causative agent



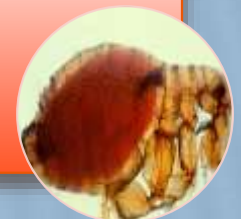
- Man, rats & other rodents.
- Rabbits & hares, wild carnivores & domestic cats and dogs “may be”.

Reservoir



- Organisms are found in blood of infected animal.

Exit



MODE OF TRANSMISSION

Vector-borne

- Bite of infected rat flea especially "blocked flea". Such flea is unable to obtain a blood meal, and tries to do more effort and bites more and more. During the bite, regurgitating blood full of bacilli will be inoculated in the skin bite causing infection.
- Human flea *Pulex irritans* can cause man-to-man infection, in some localities where this flea is abundant in homes or on domestic animals.
- Flea bite exposure may result in primary bubonic plague or septicemic plague.

Handling tissues of infected animals

- Most commonly results in bubonic plague or septicemic plague.

Airborne droplets

- Human patients or cats with plague pharyngitis or pneumonia.
- Careless manipulation of laboratory cultures.
- May result in pneumonic plague.

CLINICAL PICTURE:

IP: 2-10 days. International period is 6 days.

Untreated cases pass through 3 main forms of disease

The Most Common Forms of the Plague



Bubonic Plague

- Sudden, high fever
- Headache
- Chills
- Body Aches
- Swollen, painful lymph nodes at the groin and armpits (buboes)



Pneumonic Plague

- Sudden pneumonia
- Bloody, watery mucus
- Respiratory failure



Septicemic Plague

- Fever
- Chills
- Body Aches
- Severe abdominal pain
- Shock
- Blackened skin at the extremities

Bubonic plague

- Buboes are enlarged lymph nodes draining site of flea bites (usually inguinal), where the bacilli cause lymphadenitis.
- **C/P:** FHMA, enlarged softened painful lymph nodes. **Squeal** is either:
 - a) Recovery.
 - b) 2ry infection & suppuration of buboes.
 - c) Septicemia.

Septicemia plague

- Septicemia follows either severe bubonic cases, or heavy infection without buboes.
- **C/P:** fever, chills, severe weakness, shock, possibly bleeding, skin may turn black & die of toes, fingers and nose.
- **Squeal** is either:
 - Recovery of treated cases.
 - High fatality
 - Localization of bacilli in the lungs causing pneumonia.

Pneumonic plague

- **C/P:** FHMA, rapidly developing pneumonia with shortness of breath, chest pain, cough & sometimes bloody or watery mucous.
- May develop from inhaling infectious droplets or untreated bubonic or septicemic plague after the bacteria spread to the lungs.
- May cause respiratory failure & shock.
- Most serious form
- Only form that can be spread from person to person (droplets).



DIAGNOSIS



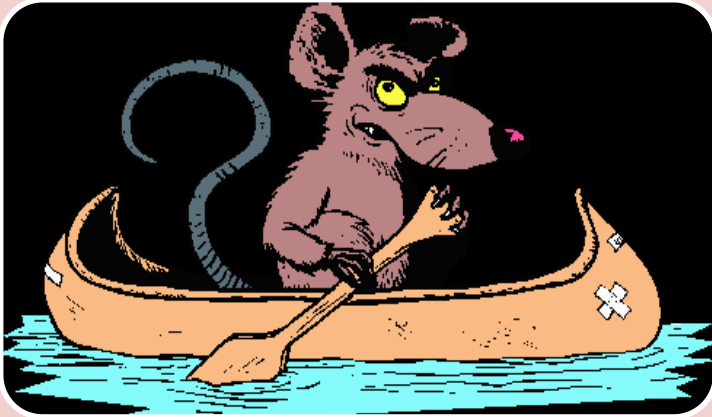
Recent history of travelling

C/P “ soft tender buboes”

Lab investigations



GENERAL PREVENTION:



Environmental sanitation

- Control of fleas.
- Control of rats.
- Dogs & cats

Health education

Maintain surveillance of natural plague foci

- Bacteriological testing: sick or dead wild rodents
- Serological studies of wild carnivores, dogs and cats.
- Collecting and testing of fleas

SPECIFIC PREVENTION

Active Immunization

- **Oten's vaccine:** live attenuated “single dose of 1.0 ml, S.C.”- Protective for around 6 months- To At-risk groups
- **Killed vaccine:** 3 doses. Booster injection is necessary every 6months if high risk exposure continuous. - Some protection against bubonic plague, but not lry pneumonic plague. Should not be relied upon as the sole preventive measure. -To At-risk groups.

Chemoprophylaxis

- Tetracycline or Chloramphenicol
- Close contacts of confirmed or suspected plague pneumonia cases

- Plague vaccines were widely used before the antibiotics era.
- The current vaccines have not been shown to be very effective against pneumonic plague & are not recommended by WHO out of for high-risk groups (e.g. lab personnel).
- Plague may be successfully managed with antibiotics as Streptomycin & tetracycline, ↓ mortality from 60% to <15%.



CONTROL:

Cases

- **Notification:** within 24 hours to WHO.
- **Isolation:** Rid patients of fleas, using insecticide; hospitalize if practical. Pneumonic plague, strict isolation.
- **Disinfection:** Concurrent disinfection of sputum & purulent discharges. Terminal cleaning of bodies & carcasses.
- **Specific ttt:** Streptomycin.

Contacts

- **Contacts of bubonic plague:** disinfested from fleas with insecticide.
- **Contacts of pneumonic plague:** put in strict isolation with careful surveillance for 7 days.
- **Chemoprophylaxis.**

International measures “quarantinable disease”

- **Notification** within 24 hours to WHO.
- **Deratting of cargo ships** “fumigation with SO₂ gas or HCN gas”. “Deratting certificate” valid for 6 months.
- **Rat-proof buildings** at seaports & airports; rodenticides.

Epidemic measures

- **Investigate** all suspected plague deaths.
- **Case finding**
- **Immediate case reporting.**
- **Health education.**
- **Intensive flea control.**
- **Rodent control.**
- **Measures for contacts.**

Viral

Yellow fever

Encephalitis

Dengue fever

Rift valley fever

Bacterial

Plague

Parasitic

Malaria

Filariasis

Leishmaniasis

Rickettsial

Typhus

Q fever

Spirochet

Relapsing fever

A doctor in a white lab coat and blue stethoscope is holding a white sign with the word "Typhus" written in blue. The doctor is wearing a blue patterned tie and a blue pocket square. The background is a solid blue color.

Typhus

several similar diseases caused by bacteria in the genus Rickettsia, acquired through the bite of an infected arthropod



Typhus: The name comes from the Greek tûphos (τύφος) meaning hazy, describing the state of mind of those infected. While "typhoid" means "typhus-like"



Figura 2. Worldwide distribution of *R. typhi* in the XXI century



THE TYPHUS EPIDEMIC 1847

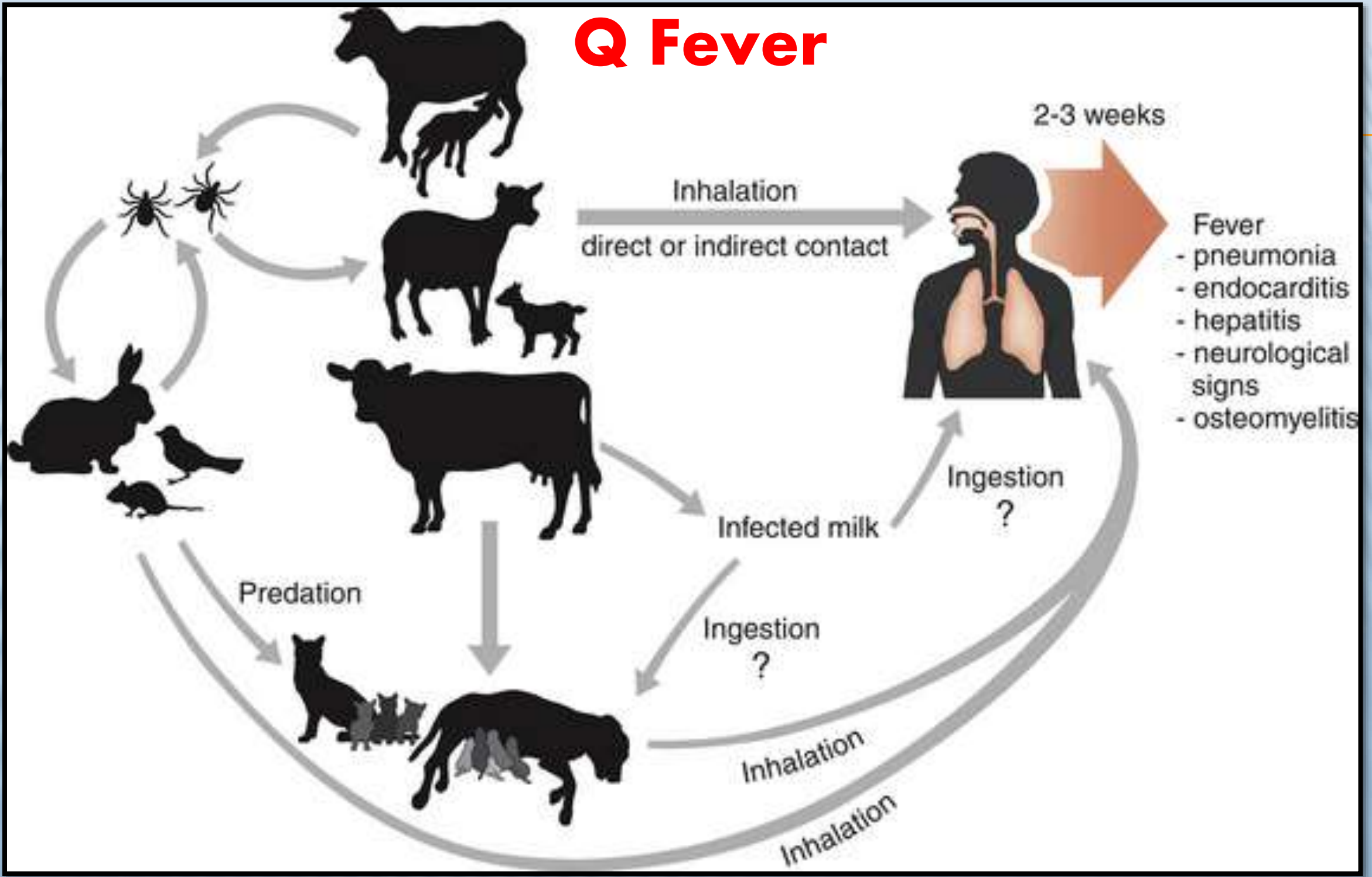
Though typhus had been epidemic periodically in Canada since the 1650's, the worst outbreak occurred in the summer of 1847. In that year some 90,000 emigrants embarked for Canada, most of them refugees from the potato famine then ravaging Ireland. Nearly 16,000 died of typhus, either at sea or after their arrival in Canada. Those stricken while passing through Kingston found shelter in makeshift "immigrant sheds" erected near the waterfront. Despite the efforts of local religious and charitable organizations, notably the Sisters of the Religious Hospitallers of St. Joseph and the ladies of the Female Benevolent Society, some 1,400 immigrants died. Buried near the present general hospital, their remains were re-interred here in 1966.

Archaeological and Historic Sites Board of Ontario.

	Epidemic typhus	Endemic typhus	Q fever
Causative organism	Coxiella Burnetti “Camp, Jail, War” fever	R. mooseri	Rickettsia prowazeki
Reservoir	Man: cases in febrile stage.	Rat	Small wild mammals, cattle, sheep, goats, birds and man.
Vector	Louse, "pediculus humanus"	Rat flea	Ticks, human body lice
Modes of transmission	<ul style="list-style-type: none"> - Skin contamination with faeces of infected louse. - Inhalation of dried faeces of infected louse. 	Skin contamination with faeces of the infective fleas.	<ul style="list-style-type: none"> - Air borne: dust contaminated by placental tissues, birth fluids & excreta of infected animals. - Ingestion of raw milk
IP	2 weeks	1-2 week	2-3 weeks



Q Fever



	Epidemic typhus	Endemic typhus	Q fever
C/P	<ul style="list-style-type: none"> - High fever, rigors, body aches. - Face flushing then cyanosis - Meningoencephalitis: Dullness & confusion. - Skin rash: on the 5th day on folds of axilla, anterior part of forearms then trunk and back. 		<ul style="list-style-type: none"> -Sudden chills, FHMA, weakness & severe sweats. -Pneumonitis or hepatitis.
Complications	<p>Untreated cases are often fatal</p> <p>Broncho-pneumonia, thrombotic changes, gangrenes of fingers, toes & genitalia.</p>	Rare	Miscarriage, stillbirth, pre-term delivery or low birth weight.
Diagnosis	Lab: Weil-Felix reaction (agglutination test)		<ul style="list-style-type: none"> - Serological tests with a rising titre. - Weil-Felix reaction (-ve).



Prevention	Epidemic typhus	Endemic typhus	Q fever
General	<ul style="list-style-type: none"> - Health education. -Delousing by washing facilities & dusting with a suitable insecticide. 	<ul style="list-style-type: none"> - Eradication & control of rats. - Control of fleas. 	<ul style="list-style-type: none"> -Control in domestic animals: vaccination or antibiotics. -Milk pasteurized at high temp.. -Health education.
Specific	<p>Madrid E typhus vaccine (live attenuated), a single IM dose, giving immunity for 5 years.</p>	<p>No specific prevention.</p>	<p>Inactivated vaccine Q 34, 1ml dose as 3 weekly SC. For high risk workers: lab workers & veterinarians, meat processing, sheep & dairy workers & farmers</p>



Control	Epidemic typhus	Endemic typhus	Q fever
Cases	<ul style="list-style-type: none"> - Notification to LHO. - Isolation in hospital after dusting. - Terminal disinfection by dusting (to kill any lice) & steam disinfection for clothes & bedding (to kill rickettsia). - ttt: tetracycline 500 mg / 6hs for 7 days. - Release after clinical recovery. 	<ul style="list-style-type: none"> - LHO - Treatment - Disinfection 	<ul style="list-style-type: none"> - LHO - ttt: Tetracycline or Chloramphenicol. - Disinfection: Concurrent of sputum, blood and articles
Contacts	<ul style="list-style-type: none"> - Delousing by bathing & dusting. - Surveillance for 2 weeks. 	No special measures, Search for cases.	
Epidemic measures	<ul style="list-style-type: none"> - Delousing of confined groups & underdeveloped communities by washing facilities & dusting. - Vaccination of high risk groups. - Searching for source of infection. 		



Viral

Yellow fever

Encephalitis

Dengue fever

Rift valley fever

Bacterial

Plague

Parasitic

Malaria

Filariasis

Leishmaniasis

Rickettsial

Typhus

Q fever

Spirochetal

Relapsing fever

RELAPSING FEVERS



RELAPSING FEVER

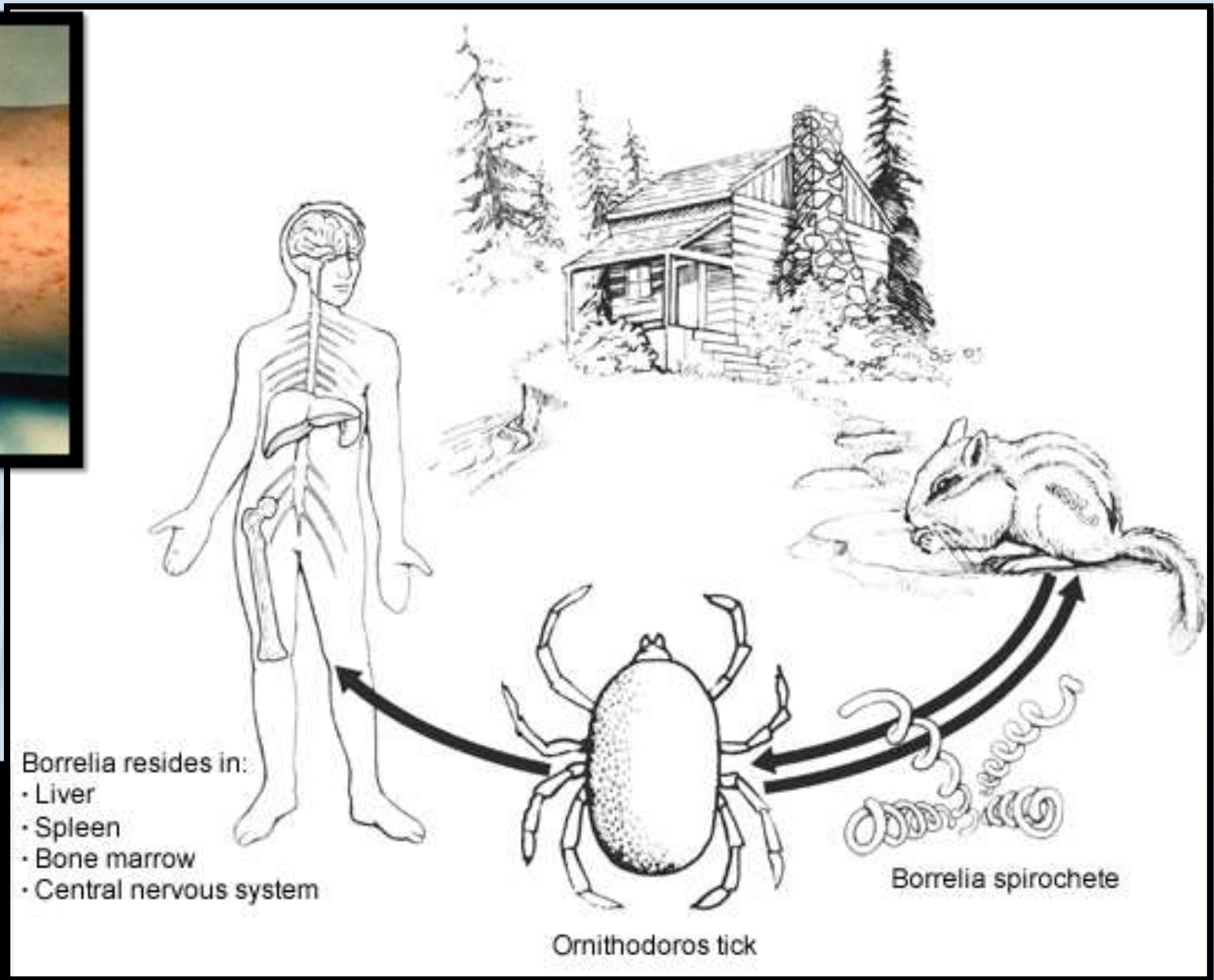
Relapsing Fever is a Vector-Borne Bacterial Infection which is caused by *Borrelia Spirochetes*

	TICK- BORNE “TBRF”	LOUSE- BORNE “LBRF”
Causative organism	Borrelia duttoni (Spirochete) “Endemic”	Borrelia recurrentis “Epidemic”
Reservoir	Rodents & accidentally man	Man
Vector	Tick	Human louse
Modes of transmission	Bite (through the saliva) or coxal fluid of an infected tick	Contamination of the wound with the louse's body fluid, following crushing of the louse on the skin.
IP	2-10 days	
C/P	<p>FHMA: Fever attacks alternating by a febrile period. Each febrile period terminates by crisis. No. of relapses varies from 1 to >10.</p> <p>Transitory petechial rashes are common. skeletal & abdominal tenderness with palpable liver & spleen, jaundice & purpura. the disease lasts for >16 days.</p>	
Complications	Hyperpyrexia, Bronchitis, nerve palsies, hepato-splenomegaly, renal failure, hypotension and cardiac failure	



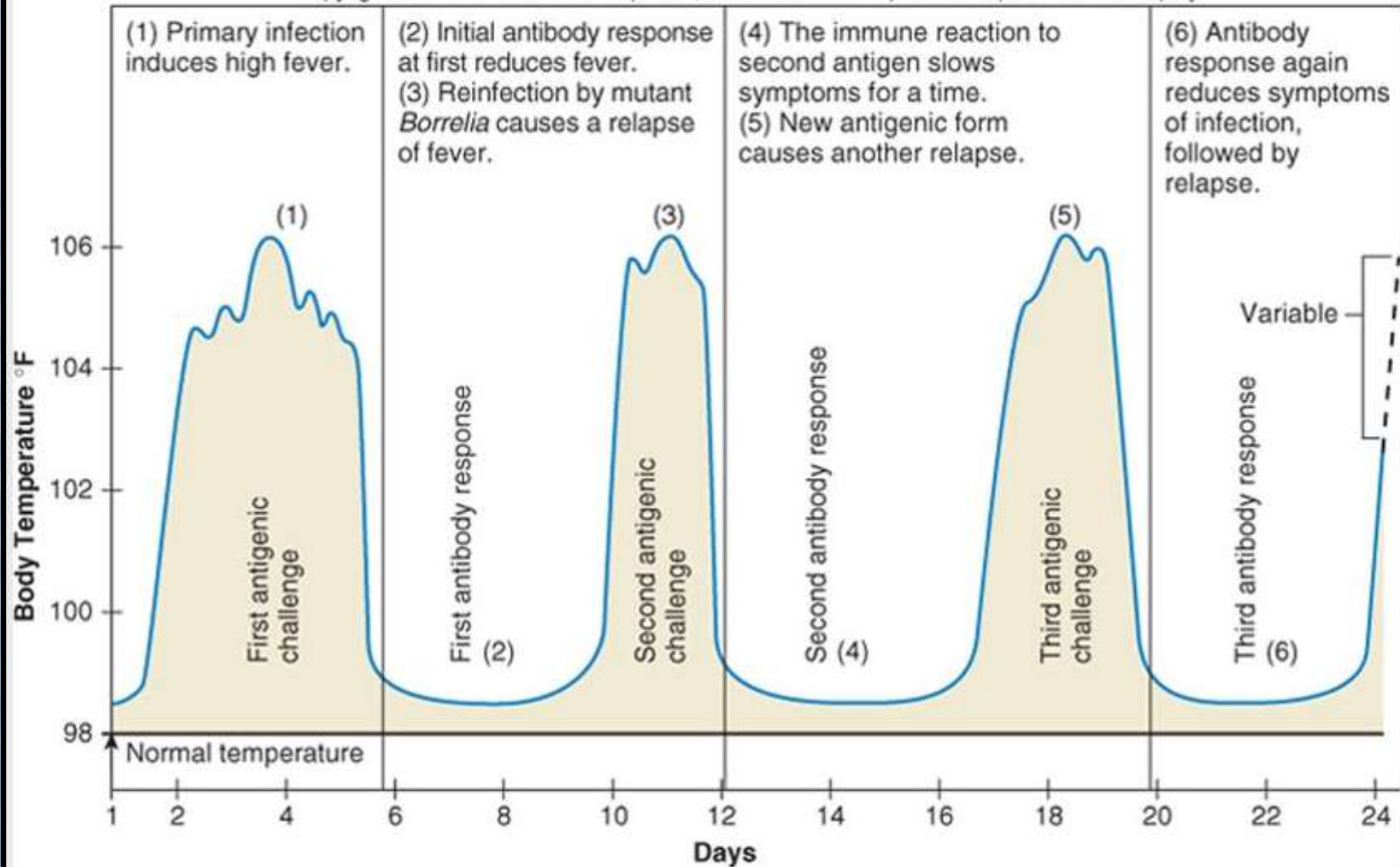
Before feeding

After feeding






Pattern in relapsing fever

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Tick bite



-  Incubation period
-  Symptomatic periods / Relapsing episodes (~ 3)
-  Afebrile (no fever) periods

SYMPTOMS OF RELAPSING FEVER



FEVER



HEADACHE



JOINT PAIN



LOSS OF APPETITE



NAUSEA & VOMITING

TICK- BORNE

LOUSE- BORNE

Diagnosis

Blood films (during the febrile attack): the circulating *Borrelia duttoni*.
 Intraperitoneal inoculation or culture in lab animals.

Prevention

General

1) Control of ticks & rodents: benzene hexachloride or dieldrin.
 2) Personal protection measure: repellents & protective clothes.

1) Delousing.
 2) Protection of susceptible: use of repellents & protective clothes.

Specific

Chemoprophylaxis with tetracycline after exposure

Control

Cases

Notification: to LHO
 Isolation: precautions with blood & body fluids.
 Treatment: tetracycline

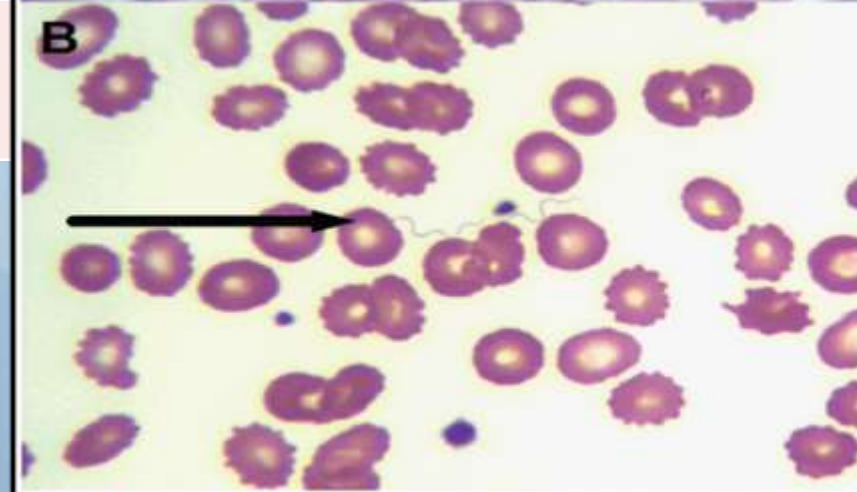
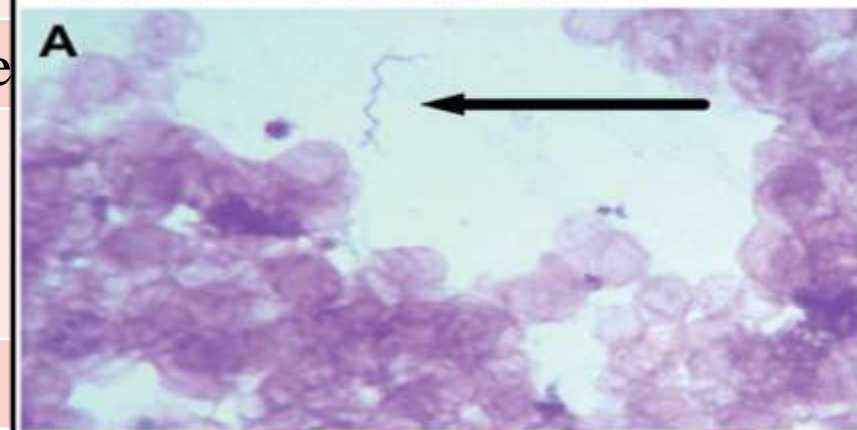
Contacts

Case findings.

Epidemic measures

Apply insecticides to clothes & houses.

Microscopic detection of spirochetes in blood, louse-borne relapsing fever case, Switzerland, August 2015



Viral

Bacterial

Parasitic

Rickettsial

Spirochetal

Yellow fever

Encephalitis

Dengue fever

Rift valley fever

Plague

Malaria

Filariasis

Leishmaniasis

Typhus

Q fever

Relapsing fever



The 2015 Nobel Prize in Physiology or Medicine awards discoveries regarding novel therapies for some of the most devastating parasitic diseases: River Blindness, Lymphatic Filariasis (Elephantiasis) and Malaria. The distribution of these diseases is quite similar and is collectively shown in blue on the world map.

Filariasis



Neglected Tropical Diseases (NTDs)

More than 1 billion people, one-sixth of the world's population, are affected by NTDs, which cause malnutrition, disfigurement, and social discrimination.

1 billion people
children and adults



INTESTINAL WORMS

Infections are caused by exposure to contaminated soil through ingestion or contact with the skin.



+ **270 million** preschool-age children
+ **600 million** school-age children
are at risk of infection



ONCHOCERCIASIS, the world's second leading infectious cause of blindness, is caused by frequent bites by infected black flies.



Onchocerciasis is currently present in 36 countries and **99%** of the **37 million** people infected live in Africa.

Approximately **770,000** people are blinded or severely visually impaired by onchocerciasis.



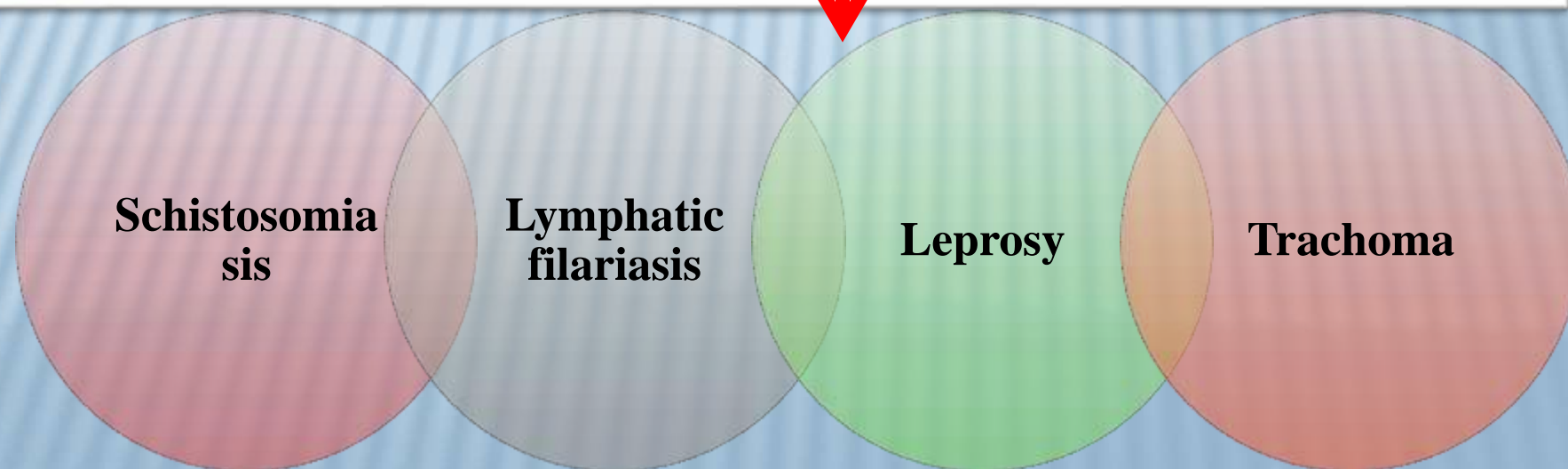
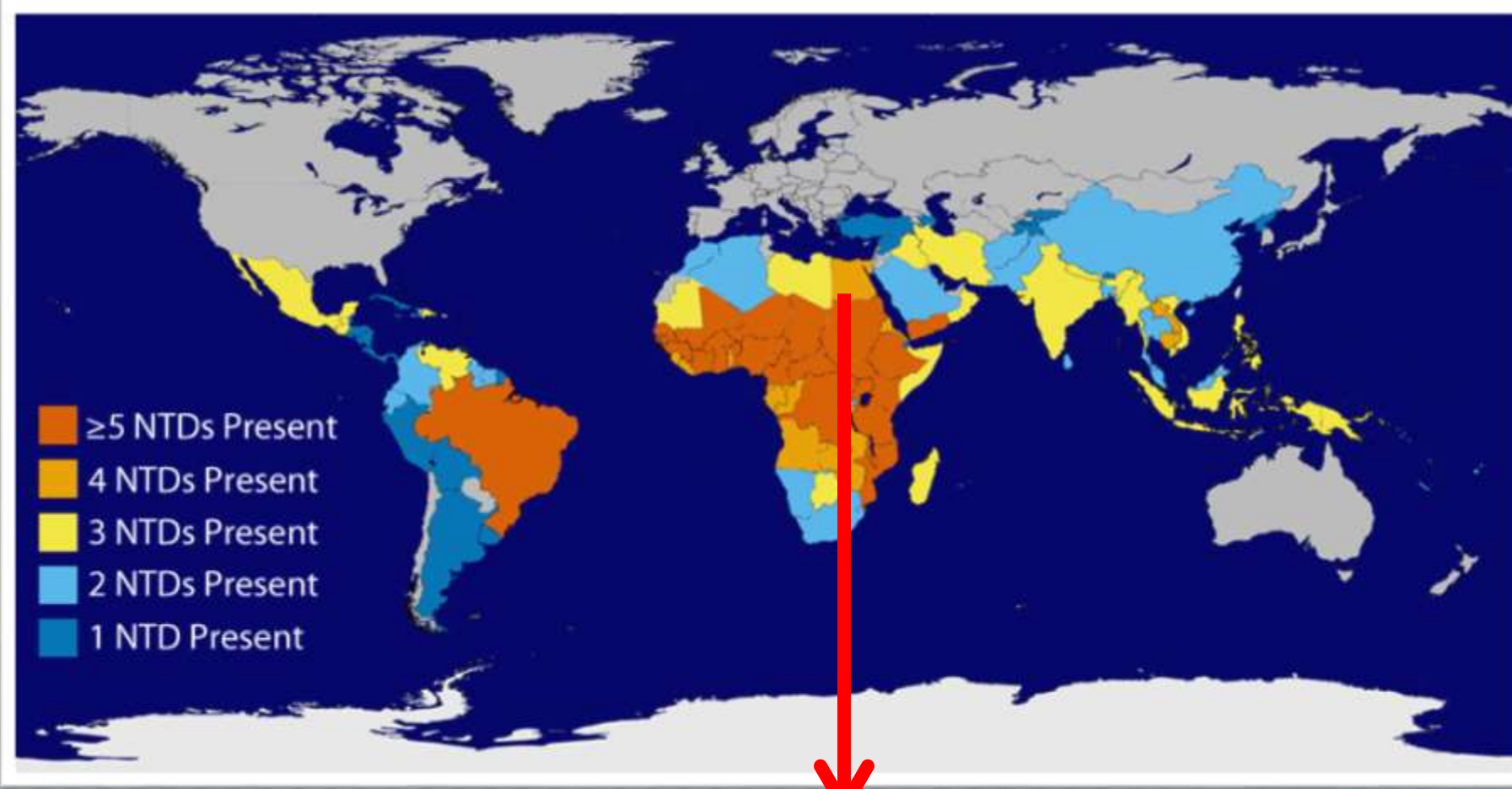
LYMPHATIC FILARIASIS (LF)

is a mosquito-borne worm disease that leads to elephantiasis, which can cause body parts to painfully swell.

Approximately **120 million** people have lymphatic filariasis, with about **40 million** disfigured and incapacitated by the disease.



120 million
people with LF



Sustainable Development Goals by 2030

GOAL 3:

Ensure Healthy lives and promote wellbeing for all at all ages



Reduce global maternal mortality ratio

End preventable deaths of newborns and children under 5 years of age

End the epidemics of AIDS, tuberculosis, malaria, neglected tropical diseases; combat hepatitis, water-borne diseases, other communicable diseases

Ensure universal access to sexual and reproductive health-care services

Reduce premature mortality from non-communicable diseases

Strengthen prevention and treatment of substance abuse

Halve global deaths and injuries from road traffic accidents

Achieve universal health coverage

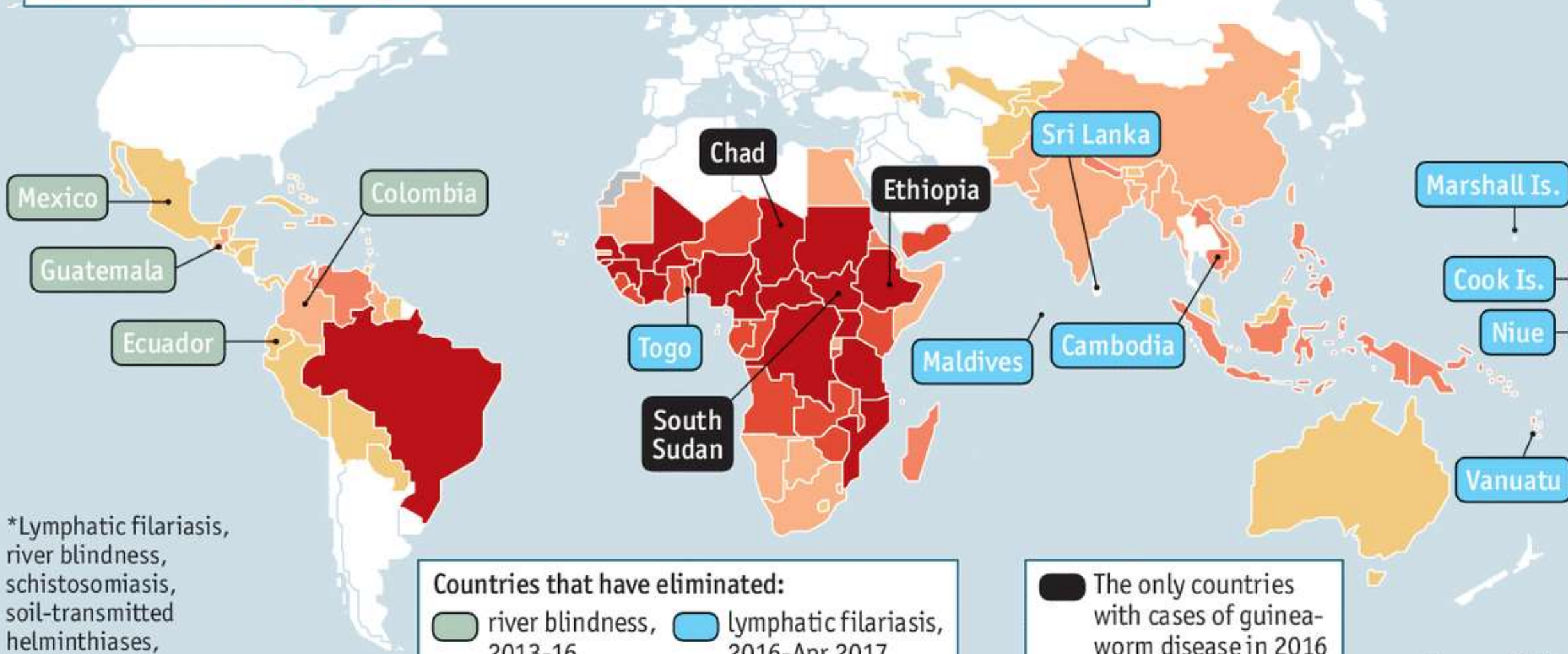
Substantially reduce number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Countries dispensing preventive drugs for a selection of neglected tropical diseases*

By number of diseases, 2015



□ No drugs required ■ No data



*Lymphatic filariasis, river blindness, schistosomiasis, soil-transmitted helminthiases, trachoma

Countries that have eliminated:
 ■ river blindness, 2013-16 ■ lymphatic filariasis, 2016-Apr 2017

■ The only countries with cases of guinea-worm disease in 2016

Source: WHO

Endemic in Egypt.

Nile Delta

Qalyobia
(Sandanhour)

Menoufia (Kafr al
Hemma & Shenawaii)

Sharkia (El-Korain
village)

Dakahlia

Kafr el sheikh

Gharbia

Upper Egypt

Giza (Badrashin) &
Assuit

**Elimination program started
in 2002.**



UnitingtoCombatNTDs

@CombatNTDs

Follow



It's official! #Egypt is the first country in the Eastern Mediterranean region to eliminate lymphatic filariasis. Congratulations 🇪🇬 #beatNTDs @WHOEMRO



Learn more from @WHO:
who.int/neglected_dise ...

Congratulations Egypt
for eliminating
lymphatic filariasis as a
public health problem



6:54 AM - 12 Mar 2018

Causative agent

- Nematode: *Wuchereria bancrofti*

Reservoir of infection

- Human with microfilaria in their blood.
- Man is definitive host
- Mosquito is intermediate host.

Period of communicability

- Human can infect mosquito when microfilaria is present in peripheral blood.
- They can persist for 5-10 yrs or longer after infection, mosquito becomes infective after about 2 weeks

Mode of transmission

- Bite of infective mosquito “*Culex*, *Anopheles* & *Aedes*”
- Egypt: female *Culex pipiens*,.



Aedes



Culex pipiens



Anopheles

Mosquito stages

Wuchereria Bancrofti: Life cycle

Human stages

1. L3 enters human skin as mosquito takes blood meal



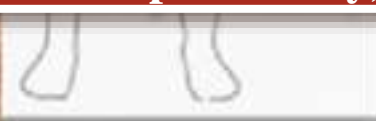
2. Adult in lymphatics

3. Microfilariae: migrates to lymph and blood vessels



4. Microfilariae ingested by Mosquito

5. Microfilariae penetrates mosquito's midgut and migrates to thoracic muscles



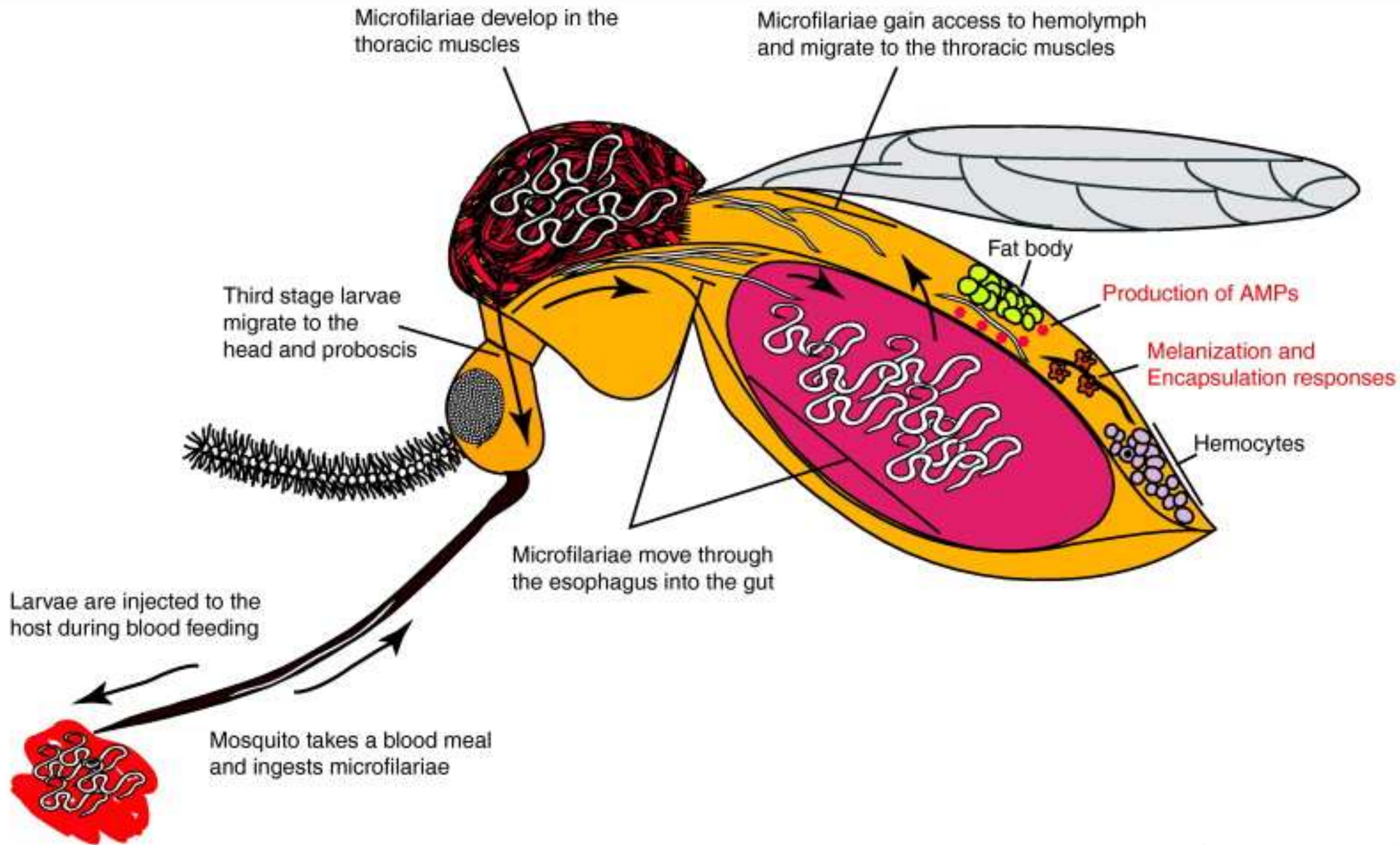
8. L3 migrates to head and mosquito's proboscis

7. Develops to L3 larvae

6. Develops to L1 larvae

Microfilaria appears in large no. during night with max. density in blood between 10 p.m - 2 a.m (Nocturnal periodicity)





SUSCEPTIBILITY & RESISTANCE:

General susceptibility

- Filariasis appears only in small % of infected persons. Many mosquito bites over several months to years are needed.
- Living for a long time in tropical or sub-tropical areas is the greatest risk.
- Short-term tourists have a very low risk.

Immunity

- Man may develop resistance only after many years of exposure to infection.

Environment:

- Unsanitary planning with inadequate sewage disposal, where breeding places of culex & collection of water for other species.

***Culex quinquefasciatus* breeding sites**
Dirty water in blocked drains, cess pits etc.



CLINICAL FEATURE:

Asymptomatic

Acute form

- Fever, Lymphangitis & Lymphadenitis

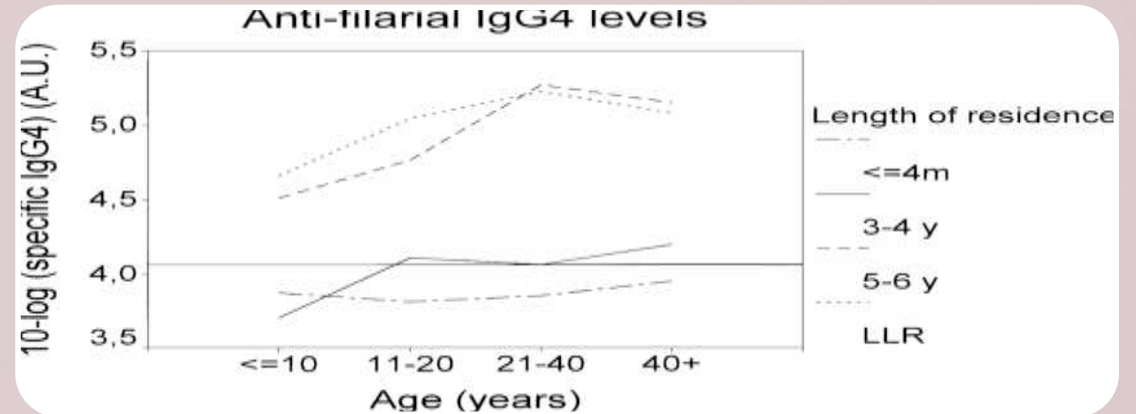
Chronic obstructive form

- Fibrosis & obstruction of lymphatics after repeated attacks “10 ys”.
- Swelling of limbs, breast & genitalia “hydrocele” & severe eosinophilia.
- Swelling + ↓ function of the lymph system → ↑bacterial infections in skin & lymph system → Skin hardening & thickening “**Elephantiasis**”



DIAGNOSIS:

Because lymphedema may develop many years after infection, lab tests are most likely to be –ve.



Blood smears

- Microfilariae by microscopic exam. during max. presence (nocturnal)
- Thick smear & stained with Giemsa

Antifilarial IgG4

- ↑ with active filarial infection

PREVENTION

Environmental sanitation

- Eradication or control of mosquito vector
- Human protection against mosquitoes: e.g. protective clothing, bed nets, repellents.

Health education

- Modes of transmission & Protection against mosquito bites.

Mass drug administration “WHO”

- MDA as an annual single dose, of combinations of diethylcarbamazine citrate (DEC) 6mg/kg body weight + 400 mg of albendazole for 4-6 years, or the regular use of DEC-medicated cooking salt for 1-2 years.
- 2 fold purpose of preventing future cases of lymphatic filariasis & helping those people who are already suffering from the disease.

Treat all persons in endemic areas with **Diethylcabamazine [DEC] + albendazole** annually

) DEC-medicated salt-
Common salt is medicated with **1-4g of DEC per kg.**



CONTROL OF CASES:

Notification

- LHO.

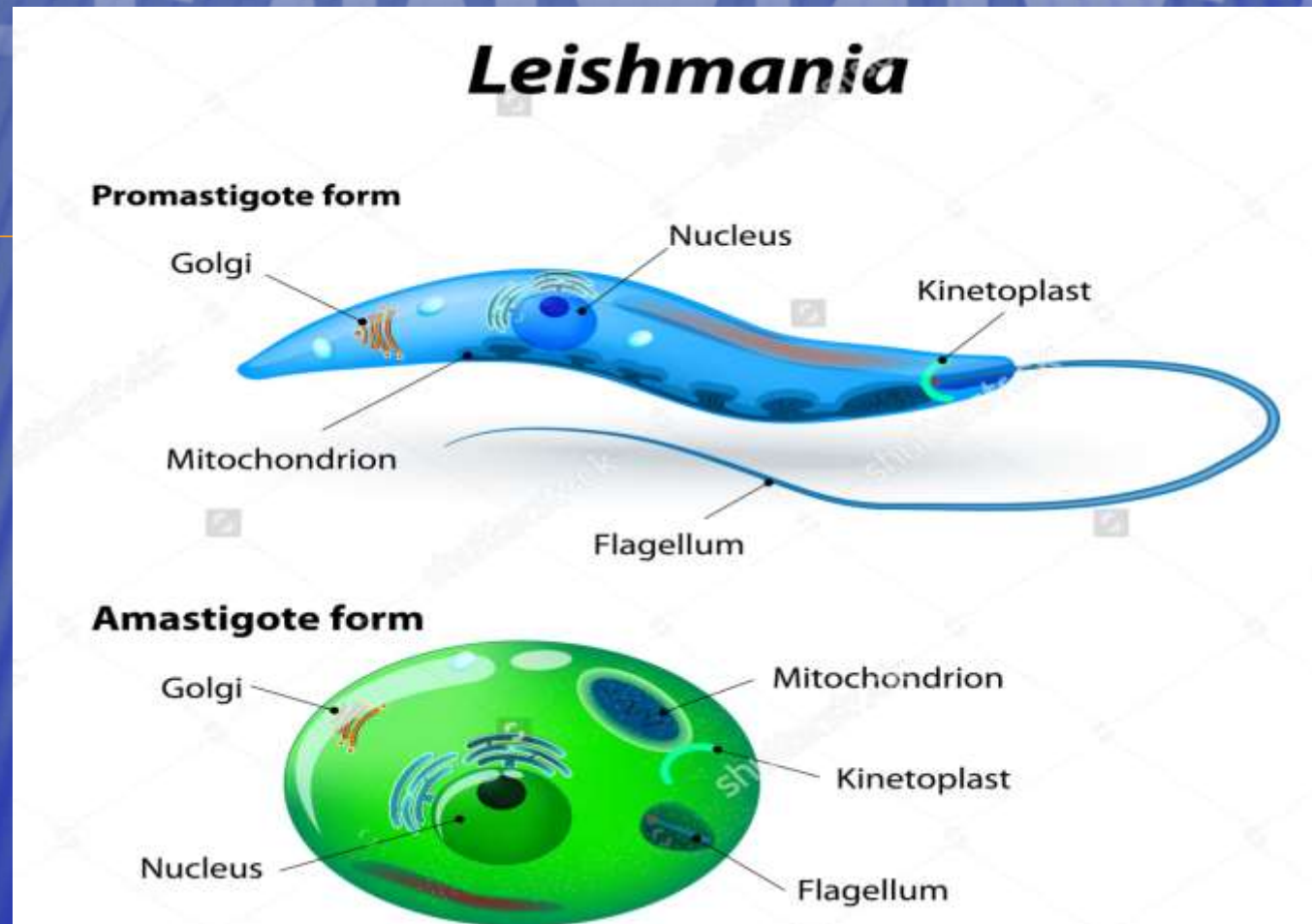
Isolation

- Not practical.

Specific treatment

- **DEC (Banocid, Hetrazan)** → rapid suppression of most or all microfilaria + some adult worms. Low level of microfilaria may reappear. So, ttt repeated yearly + lab follow up.
- **Ivermectin** kills only microfilariae, but not the adult worm; the adult worm is responsible for the pathology of lymphedema & hydrocele. Some studies have shown adult worm killing with ttt with Doxycycline (200mg/day for 4–6 weeks).
- **Lymphedema & Elephantiasis:** DEC not indicated “No active infection”.
- **Hydrocele:** Surgery.

LEISHMANIASIS



Definition

Group of diseases due to infection with Leishmania which is transmitted by sandflies.



Reservoir

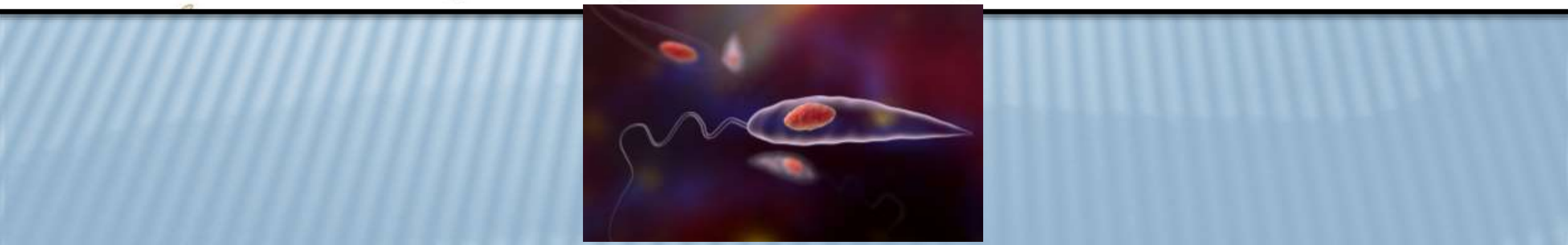
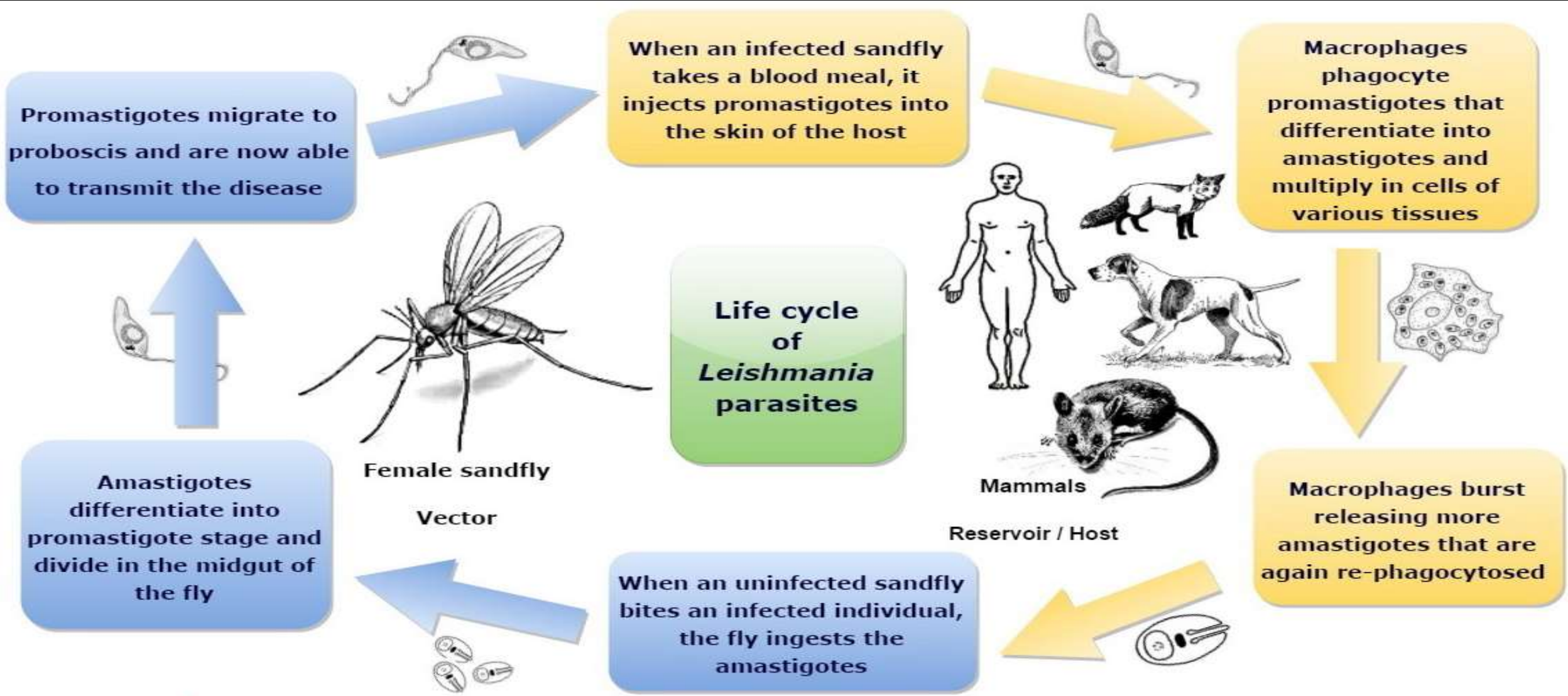
Man, dogs, wild rodents & foxes.



Vector

Several species of sandflies.





Leishmania Parasites and Diseases

SPECIES	Disease
<i>Leishmania tropica</i> <i>Leishmania major</i> <i>Leishmania aethiopica</i> <i>Leishmania mexicana</i>	Cutaneous leishmaniasis (CL)
<i>Leishmania braziliensis</i>	Mucocutaneous leishmaniasis (MCL)
<i>Leishmania donovani</i> <i>Leishmania infantum</i> <i>Leishmania chagasi</i>	Visceral leishmaniasis (VL)



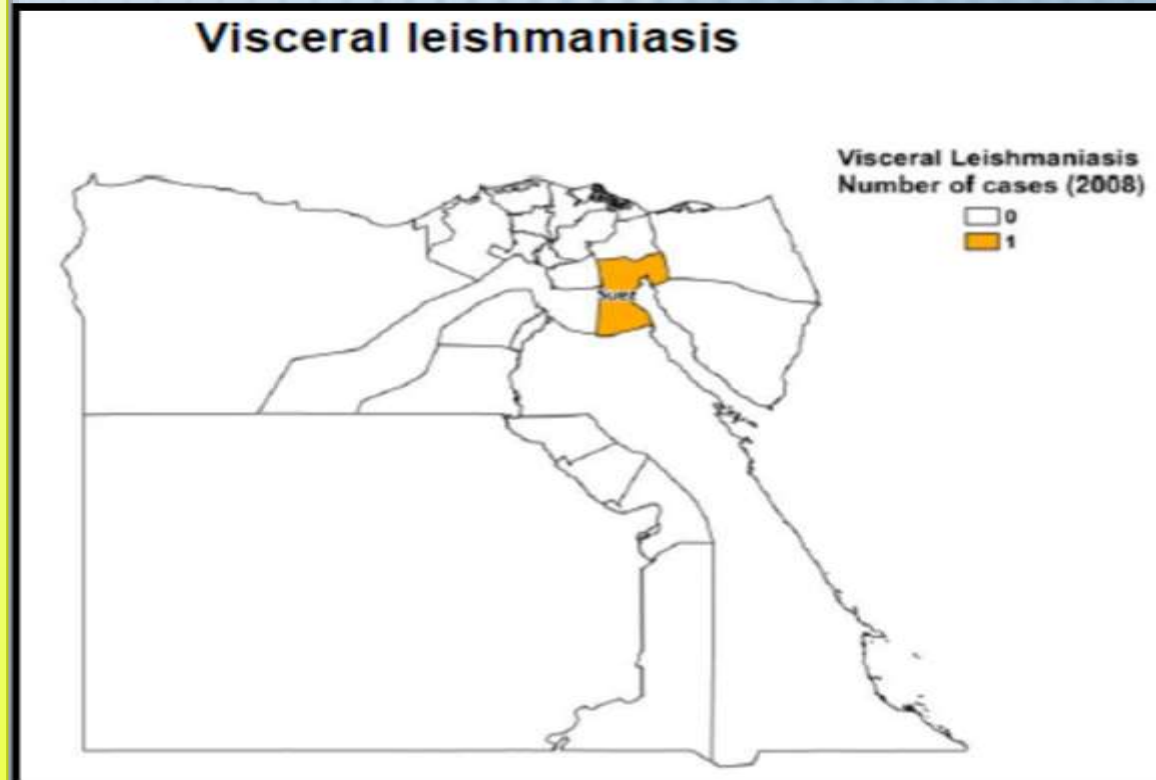
LEISHMANIASIS IN EGYPT

A focus of **visceral leishmaniasis** was discovered in El Agamy, in 1982. Last case there was reported in 2005.

Only one more case of visceral leishmaniasis was reported, in the Suez region in 2008.

However, due to a lack of awareness among medical practitioners, visceral leishmaniasis is suspected to be underreported.

Import of cases from Libya & Sudan may occur regularly & go unnoticed.



Cutaneous leishmaniasis has been an increasing problem in Egypt.

Known foci are among nomads in North Sinai.

Reported no. of cases is estimated to be 4-5 times lower than the real no.

People at risk are soldiers, laborers, & immuno-compromised adults.

Cutaneous leishmaniasis



Situation in countries affected by crisis in Syria

In the context of the Syrian crisis the cutaneous leishmaniasis form caused by *L. tropica* is the most important in terms of risk of being introduced in neighbouring countries. It also presents more treatment failures (up to 20% of cases may become chronic).

- Egypt: *L. major* in North Sinai. 864 cases reported in 2011 and 1260 in 2012.
- Iraq: *L. major*. 2978 cases reported in 2011 and 2486 in 2012.
- Jordan: Zoonotic forms are endemic. There is low risk of *L. tropica* causing outbreaks. In 2011, 136 cases caused by *L. major* were reported and in 2012, 103 cases.
- Lebanon: Very few cases caused by *L. infantum* are reported. In 2011, 5 cases were reported and in 2012, 2 cases. There is very low risk of *L. tropica* being introduced.
- Syria: Both *L. tropica* and *L. major* are endemic and transmission will continue.
- Turkey: *L. tropica* is endemic in southern Turkey and transmission will continue. The area is at risk of outbreaks.

CLINICAL FORMS

Cutaneous leishmaniasis



Mucocutaneous leishmaniasis



- Visceral Leishmaniasis.



CUTANEOUS LEISHMANIASIS (ORIENTAL SORE)

Types

- New world cutaneous Leishmaniasis: *L. mexicana*.
- Old world cutaneous Leishmaniasis: *L. tropica*, *L. major* & *L. aethiopica*.

Modes of transmission

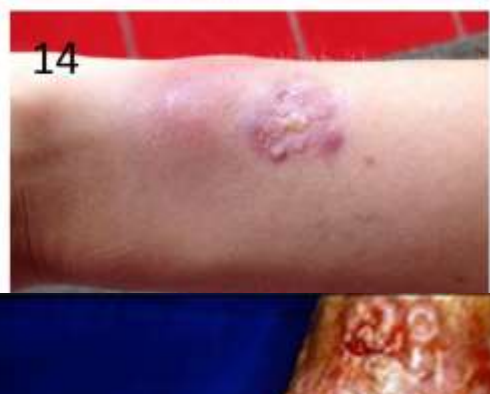
- Bites of infective sandfly.
- Contact with skin lesions of case.

Occurrence

- *L. Mexicana*: Mexico & Peru.
- *L. tropica*: Central Asia, India & West Africa. “Egypt: Alexandria”
- *L. major*: Mediterranean & Southwest Asia.
- *L. aethiopica*: Ethiopia & Kenya

C/P

- Starts with a papule & enlarges to become an indolent ulcer on the exposed parts of body which either heals or lasts for many years



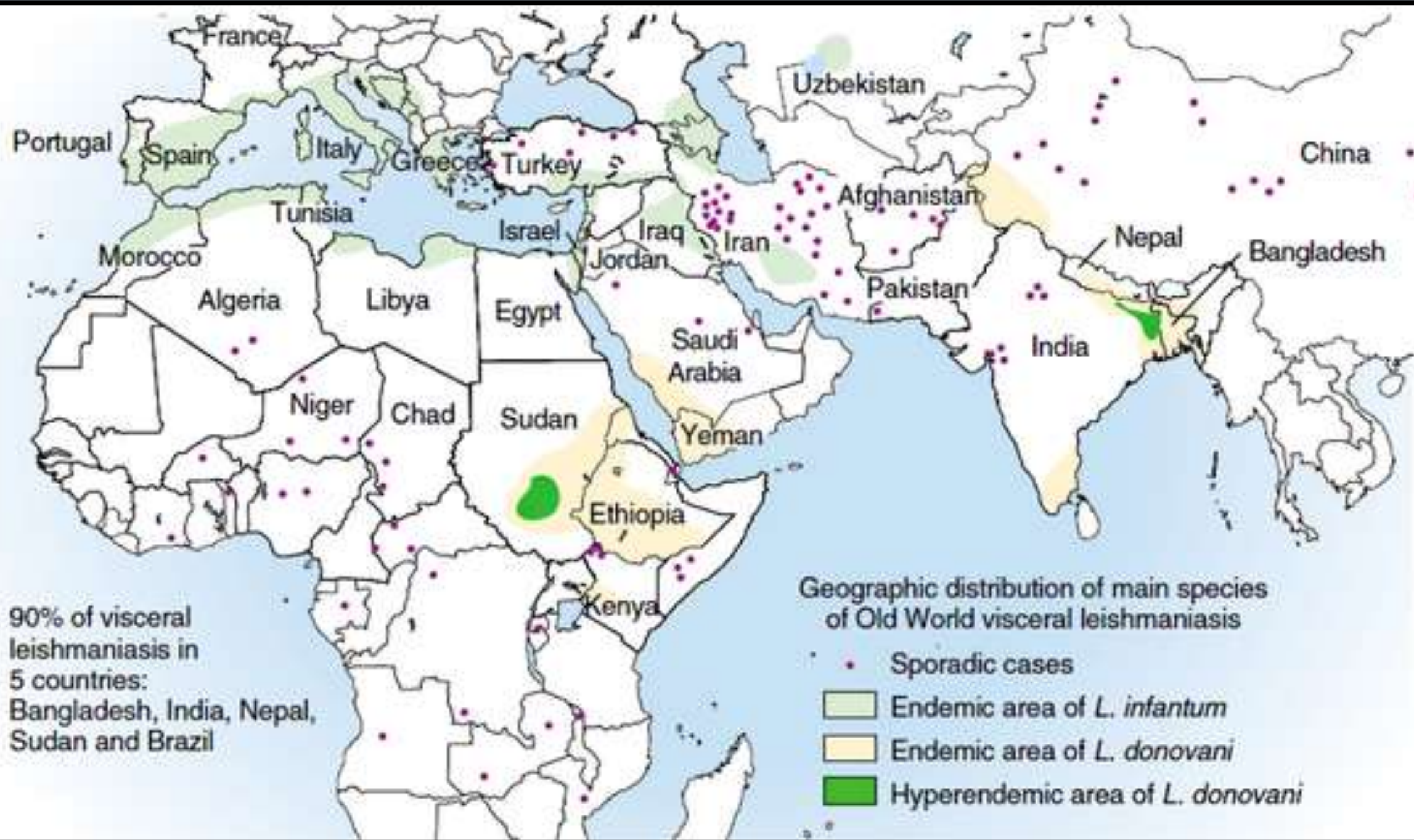


MUCOCUTANEOUS LEISHMANIASIS

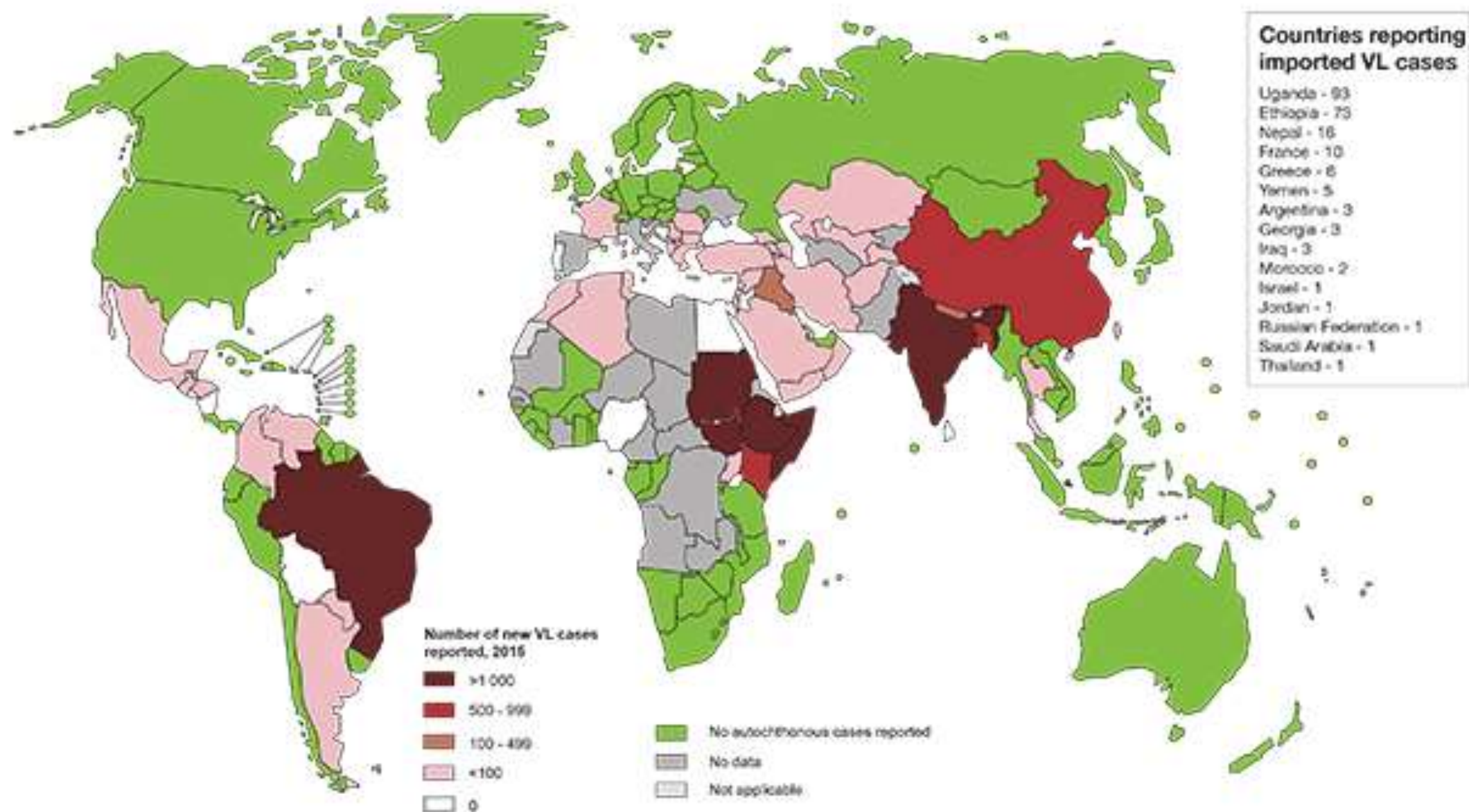
- *L. Braziliensis*
- Central & south America
- C/P: Nasopharyngeal destruction & deformities.

VISCERAL LEISHMANIASIS (Kala Azar)

- *L. donovani*
- C/P: chronic infection with fever, hepato-splenomegaly, lymphadenopathy & anemia. Progressive emaciation & weakness
- Fatal: if not treated.



Status of endemicity of visceral leishmaniasis worldwide, 2015



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. ©WHO 2017. All rights reserved.

Data Source: World Health Organization
Map Production: Control of Neglected
Tropical Diseases (NTD)
World Health Organization

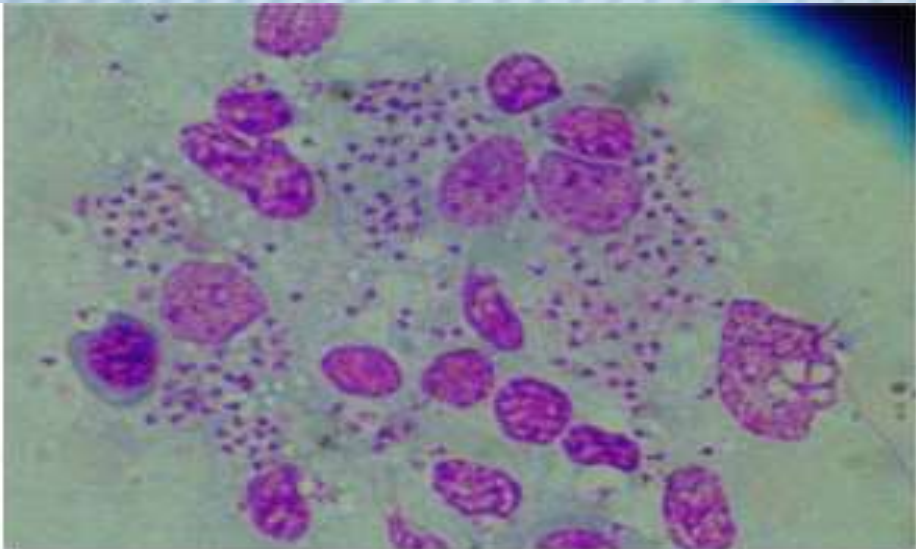
People with visceral Leishmaniasis usually become sick within several months of being bitten. Rarely, it may take years to develop the symptoms.



DIAGNOSIS OF LEISHMANIASIS:

Demonstration of Leishmania bodies in stained smear of ulcer, organ or blood.

Culture if necessary.



Amastigotes forms of *Leishmania spp* by Giemsa stain.



Leishmaniasis-Bone Marrow Macrophage



General Prevention

- Vector control e.g. by insecticides.
- Protection of man from sandflies: e.g. repellents, protective clothes.
- Proper control of domestic animals especially dogs
- Rodent control
- Health education.



Specific Prevention

- Active immunization: Live attenuated vaccine “↓severity of disease in endemic areas”.
- International measures: non



CSIR

CSIR-IICB, DNA Vaccine for Leishmaniasis or Kala-Azar
Provides lifeline to 350 million people globally

CONTROL

Cases

Early case finding & ttt.

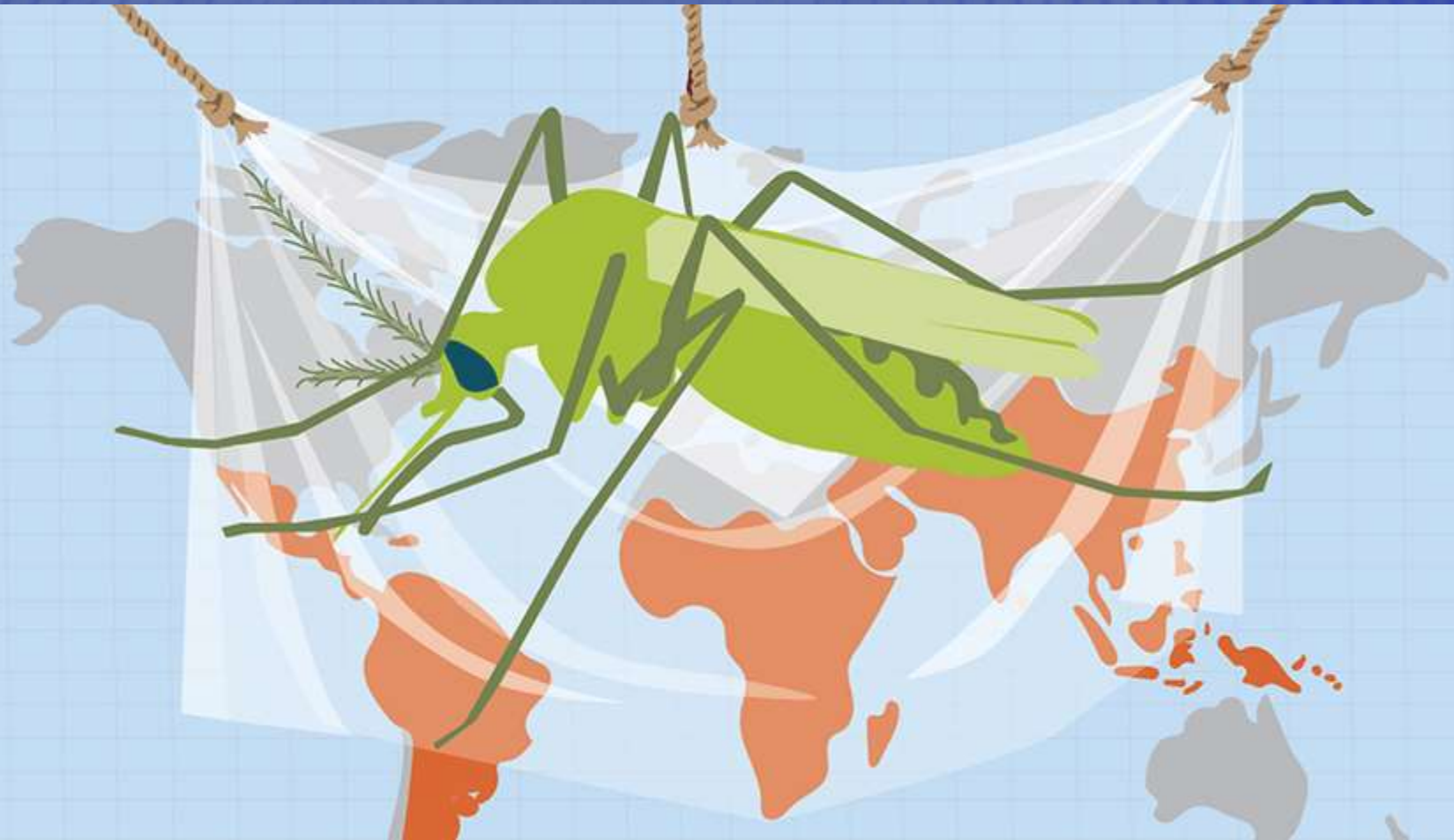
Skin lesions: covered to avoid infection of vector & contact infection of exposed individuals.

Contacts

Health education.

Examination.

MALARIA



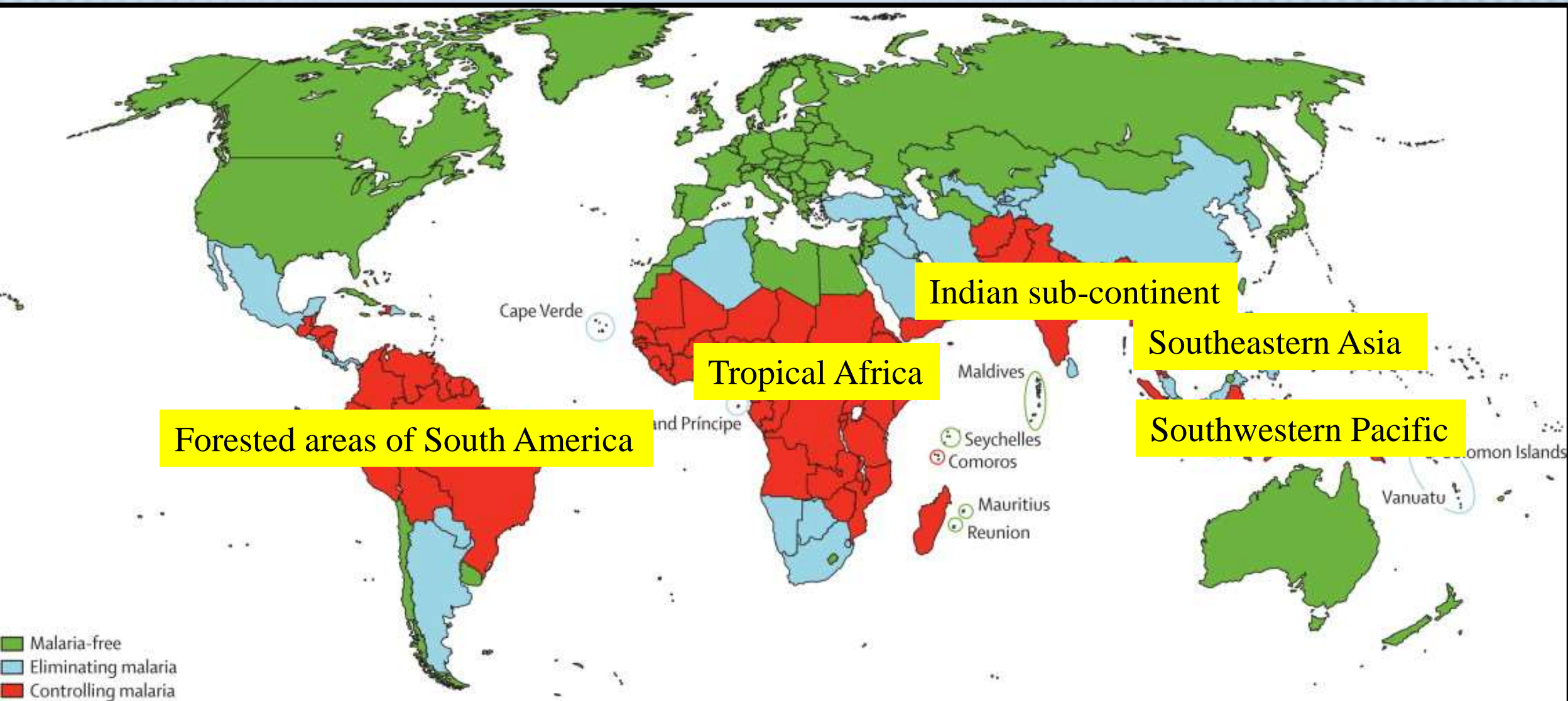
A parasitic **re-emerging** disease
1 million deaths/year in world
“Mostly young African children”

Still a major health problem in
Tropical & subtropical areas.

Recently multiple foci of **drug resistant** malaria are encountered in different areas.



50%
of the world's
population is at
risk of malaria





د. علاء عيد

حافظت مصر علي عدم تسجيل أية حالات مؤكدة من الملاريا ومن المتوقع اعلانها خالية من الملاريا بنهاية العام الجاري.

Causative agent

- Protozoan parasites with asexual & sexual phase
- Plasmodium vivax, P. falciparum, P. ovale & P. malaria.
- Mixed infections: Not infrequent in endemic areas.

Reservoir

- Humans: only important reservoir of human malaria.
- Case may have several plasmodia species at same time.
- Infective stage to vector is gametocytes which have to be: mature, both sexes, sufficient density & viable.
- Antimalarial drugs lose viability of gametocytes.
- Female anopheline mosquito is definitive host
- Infective stage to man is sporozoite.



PERIOD OF COMMUNICABILITY:

As long as infective macro gametes are present in blood of patients.

Varies with parasite species.

In untreated cases it may reach up to 3 years

Antimalarial drugs shorten the period greatly.

Transfusion transmission occur as long as asexual forms remain in circulating blood

Stored blood can remain infective for at least a month.

Life Cycle of the Malarial Parasite



Sporozoite release

Blood Vessel

Mosquito bite and Sporozoite release into a capillary.



Mosquito Gut Stage

Mosquito sucks blood, ingesting gametocytes. Final development leads to formation of Sporozoites.



Human Liver Stage

Liver infected and Hepatic cells rupture to release large number of merozoites.

Gametocyte

Ring Trophozoite

Merozoites

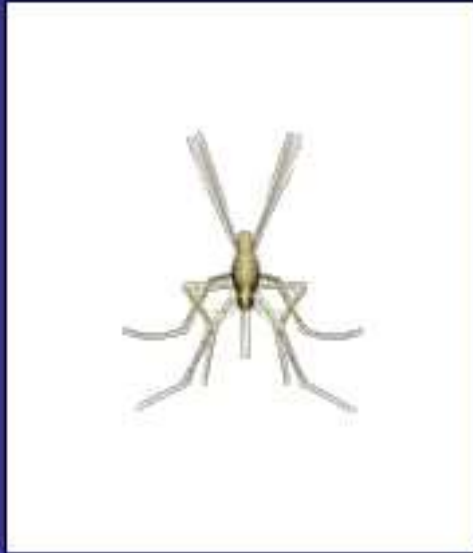
Gametocyte Stage

Male and female gametocyte produced in RBCs.

Human Blood Stage

Merozoites infect and destroys RBCs producing more number of merozoites.

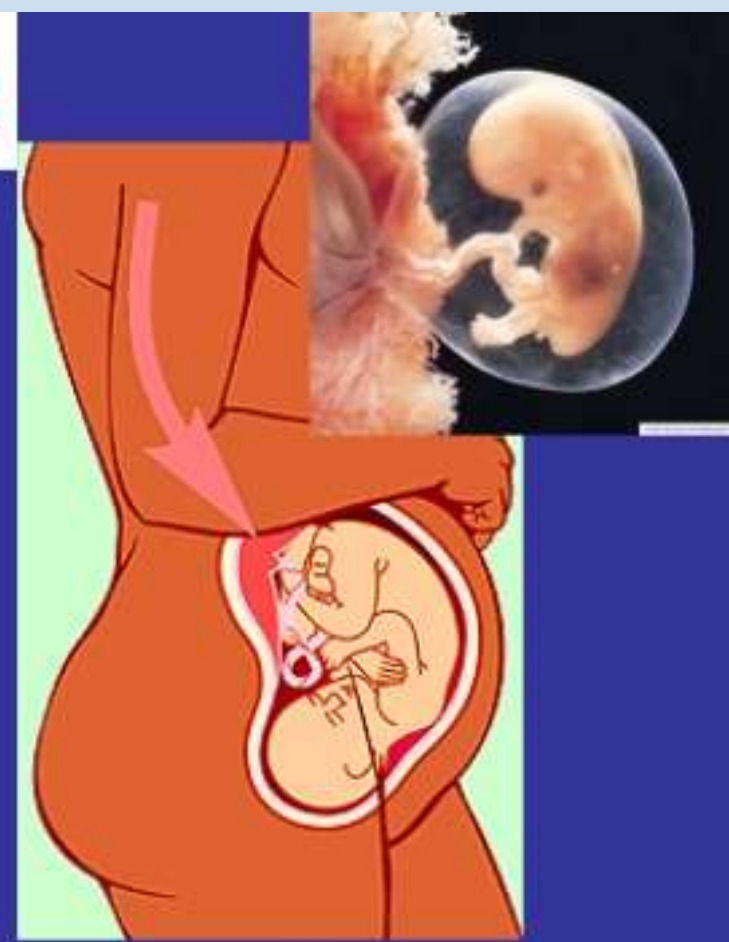
Transmission of Malaria



*Female
Anopheline
mosquito*



*Blood transfusion
(rare)*



*Mother to child
(rare)*

MODE OF TRANSMISSION:

Bite of infective female anophiline mosquito

Sporozoite in salivary glands. Most species feed at night; some important vectors also bite at dusk or in the early morning.



Blood-borne pathogen

Infection or transfusion of infected blood or use of contaminated needles & syringes.



Congenital transmission

Rare. However, pregnant women are vulnerable than others to falciparum malaria (and possibly other plasmodium species).

INCUBATION PERIOD:



Time between infective bite & appearance of clinical symptoms is 9-40 days according to type of malaria species.

With infection through blood transfusion, IP depend on the no. of parasites infused & are usually short, but may range up to about 2 months.

SUSCEPTIBILITY:

Age

- All ages are affected.
- Tolerance among adults in highly endemic areas “exposure to infective anopheline is continuous over many years”.

Sex

- ↑ Males “outdoor life”.

Immunity

- No natural immunity.
- Infection induces species specific immunity.
- Some sort of active immunity develops in endemic areas.

Genetic

- African population: natural resistance to *P. vivax* “absence of Duffy factor on RBCs”.
- Sickle cell trait (heterozygotes): Relatively protected.
- Sickle cell “homozygotes”: ↑ risk of severe falciparum malaria especially anemia.

HIV infection

- ↑ Risk of symptomatic falciparum malaria.

Sociocultural & environmental factors

- Low socioeconomic standard, outdoor sleeping, agricultural societies & vitiated air.
- Suitable environment for mosquito breeding “hot+humid+rainfall”



SYMPTOMS OF **Malaria**



Headache



Fever



Fatigue



Muscel Pain



Back Pain



Chills



Sweating



Dry Cough



Enlarge-ment



Neusea



Vomiting



Malarial Paroxysm

cold stage

- feeling of intense cold
- vigorous shivering
- lasts 15-60 minutes

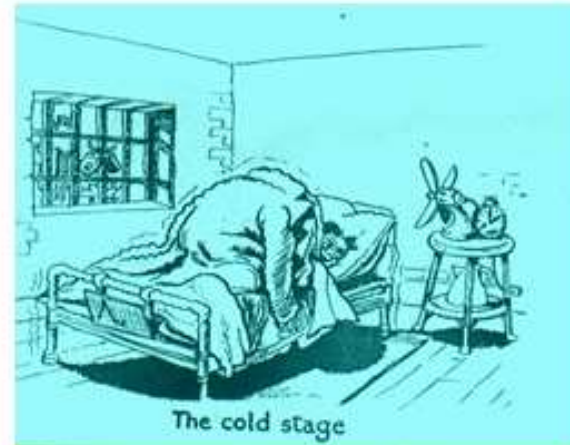
hot stage

- intense heat
- dry burning skin
- throbbing headache
- lasts 2-6 hours

sweating stage

- profuse sweating
- declining temperature
- exhausted and weak → sleep
- lasts 2-4 hours

The attack is repeated at 3rd days (tertian malaria) or at 4th day (quartan malaria).



COMPLICATIONS:



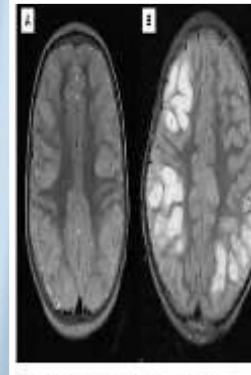
Anemia.



Splenomegaly.



Abortion & fetal infection.



Falciparum malaria

- Respiratory distress, pulmonary edema
- Jaundice, liver failure,
- Encephalopathy, cerebral edema, coma & death.

Relapses may occur after a period of cure without parasitaemia at irregular interval up to 5 years.

DIAGNOSIS:

Common methods

- Malaria parasites in thick blood film.
- Repeated microscopic exam.: every 12-24 hs to cover all parasite species.



complete
blood count



microscopic
exam



PCR test

New methods

- Rapid diagnostic tests: plasmodial antigens in blood.
- PCR: most sensitive method.
- Demonstrating antibodies which appear after 1st week of infection but may persist for years denoting past malaria infection.



Preventing malaria

Mind before Madness

YOUR
ABCD
AGAINST
MALARIA

A

Awareness:



**RECOGNIZING
MALARIA!**

B

**Bite
prevention:**



**CONTROLLING
MOSQUITOES!**

C

**Chemo-
prophylaxis:**



**USE PREVENTIVE
MEDICATION!**

D

Diagnosis:



**EARLY
RECOGNITION!**



General Prevention

- Eradication of larval stages by spraying crude oil & larvicides on water surface.
- Destruction of adult mosquitoes by using suitable insecticides (liquid aerosol, pyrethrum).
- Avoid taking blood from any individual giving history of malaria or a history of travel to, or residence in, a malarious area.

Specific Prevention

- Chemoprophylaxis for international travelers to endemic areas.
- Chloroquine or hydroxy chloroquine 5 mg /kg/week or chloroquine phosphate (500 mg for average adult). Continued for 4-6 weeks after leaving.
- Areas with chloroquine-resistant *P. falciparum*, Mefloquine (5mg/kg/week) for adults, 1-2 week before travel, during stay & 4 weeks after leaving.



CONTROL



Cases

- **Early case finding:** Survey + Campaigns.
- **ttt:** Antimalarial drugs “chloroquine or mefloquine”.

Contacts

- Investigation for early case findings.
- Investigation for source of infection or exposure.

MALARIA SURVEY

Field study in endemic areas to find out magnitude of problem, ecological factors & to plan for prevention & control.

Planning

- **Mapping area:** water channels, collections, cultivated lands, houses & climatic conditions.
- **Study population characteristics** e.g age, sex, occupation, habits etc.
- **Study vector;** types of mosquitoes, density, species, life span, breeding places, resistance to insecticides.
- **Choose suitable representative sample.**
- **Preparation of:** Team of work + Equipment+ Transportation facilities.

Investigation

- Clinical & Lab examination.

Statistical analysis

- Malarionetric indices.

HUMAN "MALARIOMETRIC" INDICES

Splenic

Non-specific: % of children between 2-6yrs showing splenomegaly "excluding other causes".

Interpretation: <10% low endemicity, 10-25% moderate endemicity, 25-50% hyperendemic.

Parasitic

Specific: % of infants <1 y. showing malaria parasites in their blood

Most sensitive index of recent infection.

Gametocytic index; is % of those having gametocytes in their blood.

Vector "Oocytic"

% of oocytes or ookinetes in stomach wall of female anopheles.

Sporozoite

% of female anopheles having sporozoites in salivary glands.

MALARIA ERADICATION

Eradication is the highest level of disease control.

Aiming at elimination of reservoir of infection, complete cure of cases & prevention of disease transmission by destruction of vectors.

To eradicate malaria in certain area **4 phases** have to be done:

Preparatory phase

Preparation, Survey planning: study vector & magnitude of problem.

Attack phase

Complete coverage of area by insecticides. D.D.T. is applied twice a year during period of malaria transmission.

Surveillance system

Early case finding & ttt with chloroquine of any case with fever & completion of ttt in +ve blood film cases.

Consolidation phase

Insecticides are stopped & continue with presumptive & radical ttt.



WORLD

MALARIA DAY

APRIL 25, 2018

READY TO BEAT MALARIA

“Thank You”

