

Vector-Borne Diseases



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For public health awareness and importance



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Preface



Vector borne diseases have been a major source of problem across India and also among the major diseases which heavily impact the economy and lead to loss of work days.

Recognizing what are the symptoms and methods to prevent the same will go a long way in helping reduce the burden of the disease.

This booklet is brought out to help the general public on what can be done to prevent the diseases, how to engage in source reduction and preventable means for the same and to live better and healthy.

Best Wishes,

Dr. Edmond Fernandes, MD
Chief Executive Officer, CHD Group



Vector-borne Diseases

- Viral, bacterial and parasitic infections spread by mosquitoes, ticks, lice etc.
- Among the most complex infectious diseases to predict, prevent or control.
- Constitute a major portion of communicable diseases in India.
- Identifying the habits and habitats of vectors are extremely challenging.
- Vectors often develop resistance to insecticides.

700,000

die of vector-borne diseases every year.

400,000

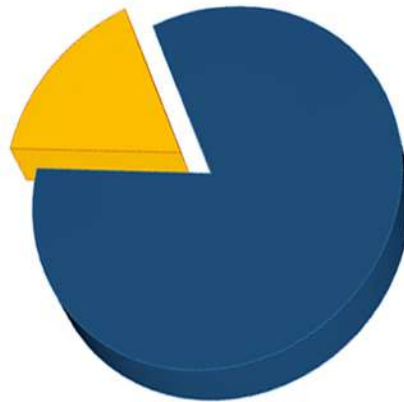
deaths by Malaria alone

61%

are children below 5 years

17%

of all infectious diseases



3.9 billion

at risk of contracting dengue globally

96 million

cases estimated per year





One Bite. Deadly Diseases.



Anopheles

Malaria



Aedes

Chikungunya
Dengue fever
Lymphatic filariasis
Yellow fever
Zika



Culex

Japanese encephalitis
Lymphatic filariasis

- *Anopheles* mosquito mostly bites between dusk and dawn.
- Female *Aedes aegypti* bites most frequently during daytime.
- Eggs of *Aedes aegypti* can live without water for more than a year.
- Only female mosquitoes require a blood meal and bite animals.
- Mosquito vectors breed in stagnant water.

Where do mosquitoes breed?



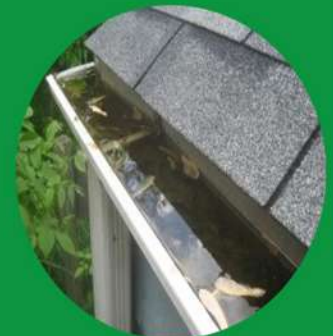
Containers



Plant pots



Tyres



Gutters

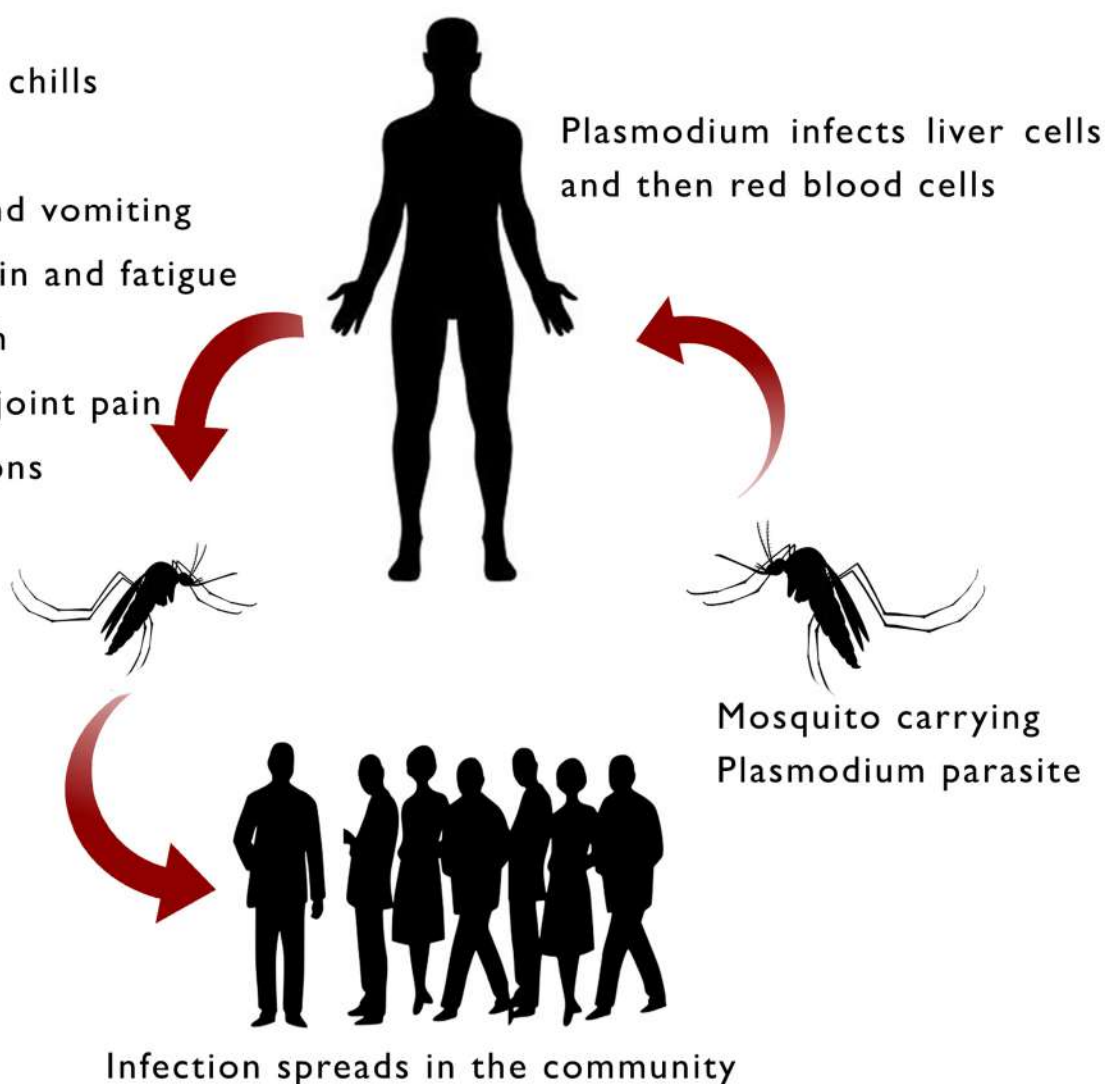


MALARIA

- Life-threatening infection that is preventable and curable.
- Caused by plasmodium parasite which is transmitted to humans by the bite of female *Anopheles* mosquito.
- *Plasmodium vivax* and *Plasmodium falciparum* are most commonly reported in India. *P. falciparum* causes the most severe malaria infection.

Symptoms develop after 10-14 days of bite

- Headache
- Fever and chills
- Sweating
- Nausea and vomiting
- Muscle pain and fatigue
- Dry cough
- Back and joint pain
- Convulsions





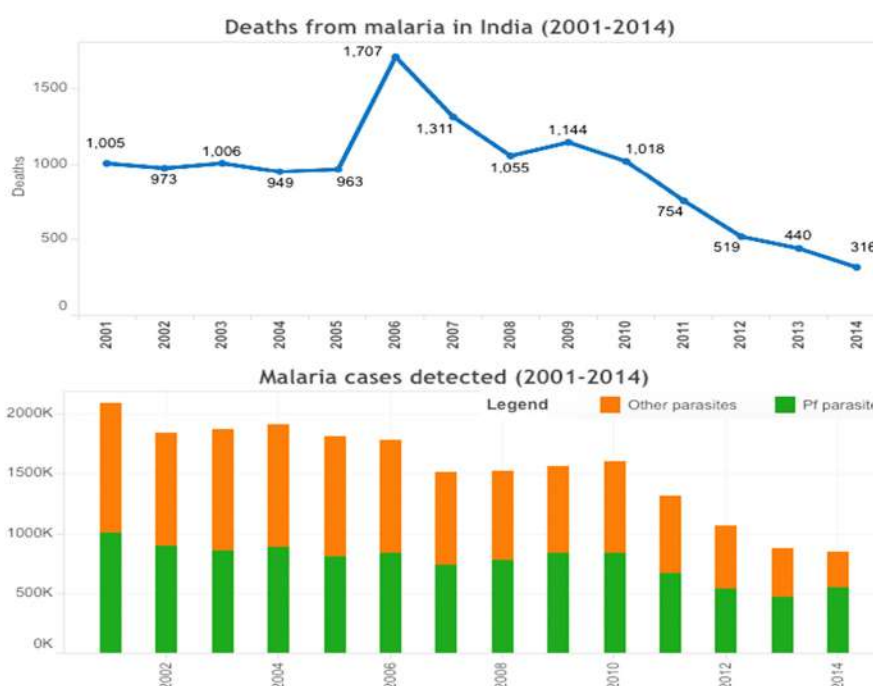
WORLD MALARIA DAY

25th
April

219 million malaria cases were reported in 2017, of which 92% of cases and 93% of deaths were reported in Africa alone.

- Malaria is generally a disease of the poor as it causes poverty and majorly affects marginalized, poorer, mostly rural/tribal sections with limited access to quality healthcare.

- Majority of malaria cases in India are reported from Odisha, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Tripura, Meghalaya and Mizoram.



- In India, malaria cases have consistently declined from 2.1 million in 2001 to about 4 lakhs in 2018. The prevalence with respect to public health expenditure from 2009 to 2017 has significantly decreased.

- However, making sustained efforts is vital, considering the growing threat of multi-drug resistance from the neighbouring countries, coupled with the shortage of new and effective antimalarial drugs. Therefore, country should shift the focus from malaria control to malaria elimination



DENGUE

- Dengue is a viral disease that is transmitted by the mosquito, *Aedes aegypti*.
- Man develops disease after 5-10 days of an infective mosquito bite.
- It occurs in two forms:

Dengue Fever

- abrupt onset of high fever
- severe frontal headache
- pain behind the eyes which worsens with eye movement
- Muscle and joint pains
- Loss of sense of taste and appetite
- Measles-like rash over chest and upper limbs in DHF
- Nausea and vomiting

Dengue Haemorrhagic Fever

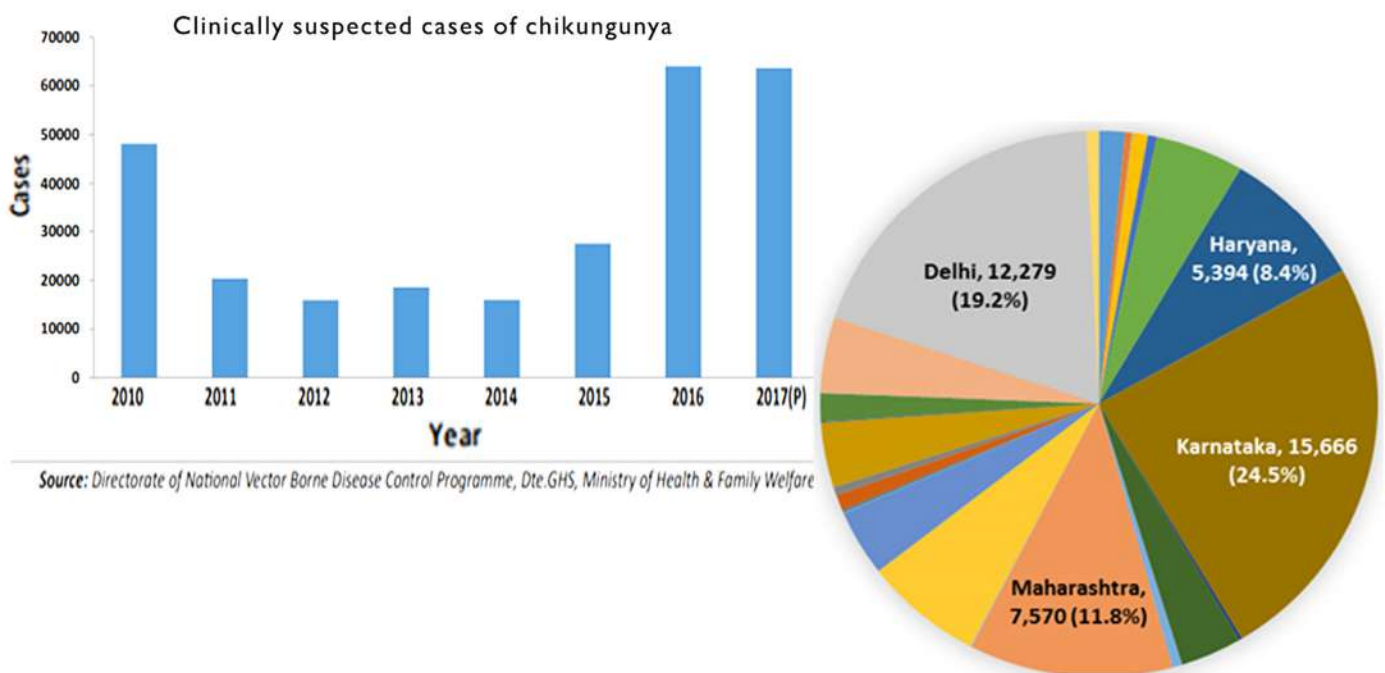
- more severe and often fatal:
- pale and cold skin
- bleeding from nose, mouth & gums
- skin rashes
- vomiting with or without blood
- restlessness
- dehydration
- rapid and weak pulse
- difficulty in breathing.

- The global incidence of dengue has grown dramatically in the recent decades. A vast majority of cases are asymptomatic and hence the actual number of cases are underreported and often misclassified.
- A limited-use live attenuated dengue vaccine Dengvaxia, has been licensed and developed in 2015 and is now undergoing phase-3 clinical trials.
- National Dengue Day is observed in India on May 16th to create awareness, intensify preventive measures and preparedness for the control of dengue in the country before transmission season starts.





- Serological diagnosis requires a larger amount of blood than the other methods, and uses an ELISA assay to measure chikungunya-specific IgM levels in the blood serum.
- There is no specific treatment for chikungunya.
- The first recorded chikungunya outbreak was in Kolkata in 1963.
- The virus re-emerged in 2006 after a gap of 32 years and caused an explosive outbreak affecting 13 states including Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Tamil Nadu, Gujarat and Kerala.



- In 2010, Delhi witnessed an outbreak following which the infection was in a decline until 2016, when another massive outbreak affected the country.
- What catches attention is the huge increase in the number of cases in Karnataka. from 24.5% in 2016 to a staggering 50.5% in 2017 due to the drastic variation in the rainfall pattern in the state in 2017 which led to increased breeding of mosquitos.

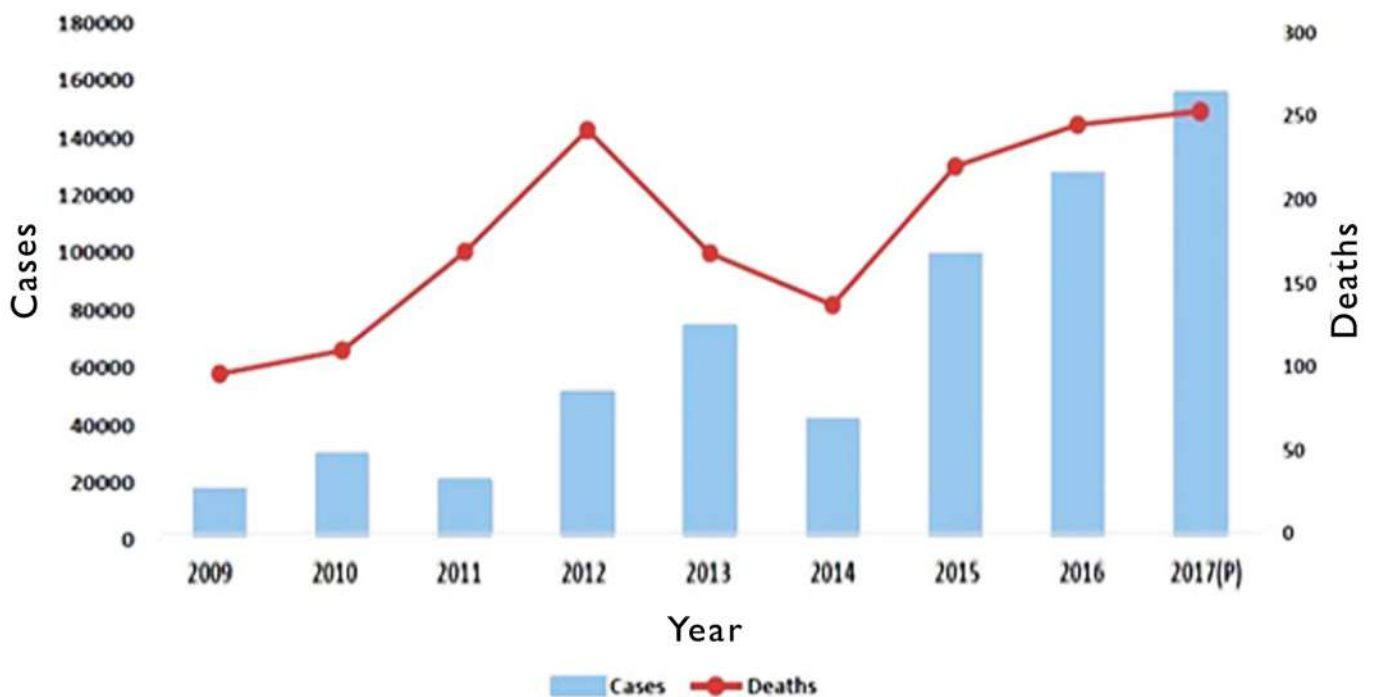


JAPANESE ENCEPHALITIS

- Japanese Encephalitis (JE) is a viral disease that is transmitted by infective bites of female mosquitoes mainly *Culex tritaeniorhynchus*, *Culex vishnui* and *Culex pseudovishnui*.
- JE virus commonly affects animals in its natural cycle and man is an accidental host. Mosquitoes do not get infection from JE patient.
- JE virus primarily affects central nervous system.
- In acute encephalitic stage, symptoms include:
 - convulsions
 - alteration of sensorium and behavioural changes
 - fever
 - motor or generalized paralysis
 - headache
 - disorientation and coma
 - tremors
 - loss of coordination
- Amongst patients who survive, some lead to full recovery through steady improvement and some suffer with stabilization of neurological deficit.
- Recovery phase is prolonged and vary from a few weeks to several months.
- There is no specific treatment for the disease. Treatment is focused on relieving severe clinical signs and symptomatic management.
- Central Research Institute, Kasauli, has developed Japanese encephalitis vaccine indigenously. Two doses are administered subcutaneously within a gap of 7-14 days followed by third dose any time after one month and before one year of the second dose. A booster is required after 3 years.



Cases and Deaths due to dengue in India



Source: Directorate of National Vector Borne Disease Control Programme, Dte.GHS, Ministry of Health & Family Welfare

CHIKUNGUNYA

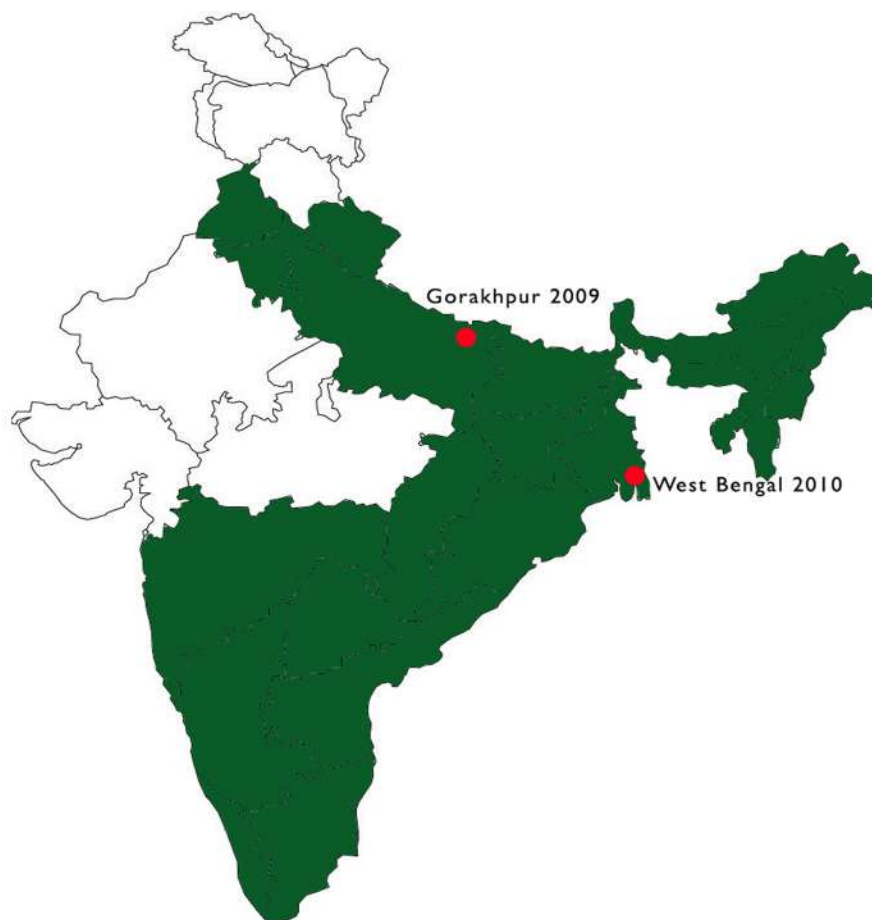
- Chikungunya is a viral illness that is spread by the bite of infected Aedes mosquito. The disease resembles dengue fever, and is characterized by severe, sometimes persistent, joint pain, fever and rash. It is rarely life-threatening.
- Chikungunya occurs in Africa, India and Southeast Asia. It is primarily found in urban /peri-urban areas.
- The mosquito usually transmits the disease by biting an infected person and then biting someone else. An infected person cannot spread the infection directly to others (i.e. not a contagious disease).

Chikungunya usually has a sudden onset with:

- Fever & chills
- Headache, nausea & vomiting
- Joint and muscle pain
- Rash/Itching



- It is manageable and preventable. Not all cases result in severe illness.
- In India, the first human case was reported from in Tamil Nadu in 1955.
- Until 1973, the disease was confined to southern parts of India, with low prevalence, subsequently the disease spread to various other parts of India.
- Now, the virus is found almost in every part of India and outbreaks have been reported regularly.
- The most affected states comprise of Andhra Pradesh, Assam, Bihar, Haryana, Karnataka, Kerala, Maharashtra, Manipur, Tamil Nadu, Odisha, Uttar Pradesh and West Bengal and union territories of Goa and Puducherry.





Personal protective and preventive measures

- Use of mosquito repellent creams, liquids, coils, mats etc.
- Wearing clothes (preferably light-coloured) that cover as much of the body as possible.
- Using physical barriers such as window screens and doors with wire mesh.
- Sleeping under mosquito nets pre-treated with insecticides even during day time.
- Patients infected with vector-borne diseases and people around them must follow personal preventive measures.

Environment management

- Eliminating mosquito breeding grounds.
 - Covering all water containers to prevent fresh egg laying by the vector.
 - Emptying and drying of water tanks, containers, coolers, plant pots at least once a week.
 - Periodically scrubbing the inside of water containers to destroy eggs.
 - Removing discarded items wherein water can accumulate specially during rainy season in open spaces.
- Regularly checking for clogged drains and roofs with poor drainage system

Biological control

- Using larvivorous fishes (*Gambusia/Guppy*) in ornamental water tanks, fountains and garden.
- Using bacteria, *Bacillus thuringiensis* (Bt H-14) as a biological larvicide. It poses no threat to the humans or the environment.



Chemical control

- Chemical larvicides (such as temephos) are used in long term water storage containers.
- Aerosol space spray during daytime, pyrethrum spray or malathion fogging during outbreaks or ultra-low volume (ULV) spray for the control of adult mosquitoes.
- Indoor residual spraying with insecticides to control malaria.

Community awareness and participation

- Detecting mosquito breeding places and their elimination.
- Swachh Bharat Mission aims to promote cleanliness and thus eliminates breeding places for mosquitoes.
- Educating common people regarding the disease and vector through various media sources like T.V., radio, newspapers, social media etc.
- Sensitizing and involving the community for detection of *Aedes* breeding places and their elimination.

Simple measures to prevent vector-borne diseases



Wear light-coloured long-sleeved clothes



Use mosquito repellants



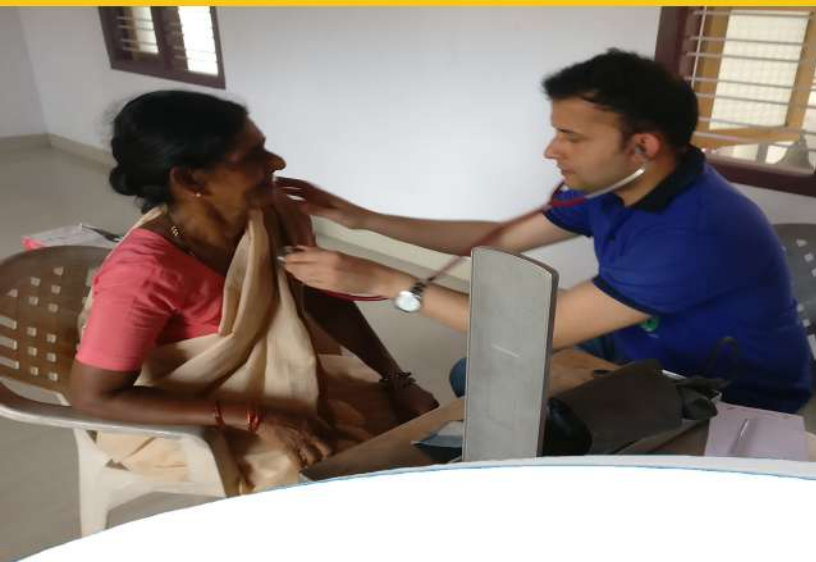
Install window screens



Sleep under an insecticide-treated bednet



Get rid of sources of stagnant water such as flower pots and used tyres



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