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# Vector-borne diseases

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## Key facts

- **Vector-borne diseases account for more than 17% of all infectious diseases, causing more than 700 000 deaths annually.**
  - **More than 3.9 billion people in over 128 countries are at risk of contracting dengue, with 96 million cases estimated per year.**
  - **Malaria causes more than 400 000 deaths every year globally, most of them children under 5 years of age.**
  - **Other diseases such as Chagas disease, leishmaniasis and schistosomiasis affect hundreds of millions of people worldwide.**
  - **Many of these diseases are preventable through informed protective measures.**
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## Main vectors and diseases they transmit

Vectors are living organisms that can transmit infectious diseases between humans or from

animals to humans. Many of these vectors are bloodsucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later inject it into a new host during their subsequent blood meal.

Mosquitoes are the best known disease vector. Others include ticks, flies, sandflies, fleas, triatomine bugs and some freshwater aquatic snails.

## Mosquitoes

- **Aedes**

- Chikungunya
- Dengue fever
- Lymphatic filariasis
- Rift Valley fever
- Yellow fever
- Zika

- **Anopheles**

- Malaria
- Lymphatic filariasis

- **Culex**

- Japanese encephalitis
- Lymphatic filariasis
- West Nile fever

## Sandflies

- Leishmaniasis
- Sandfly fever (phlebotomus fever)

## Ticks

- Crimean-Congo haemorrhagic fever

- Lyme disease
- Relapsing fever (borreliosis)
- Rickettsial diseases (spotted fever and Q fever)
- Tick-borne encephalitis
- Tularaemia

## Triatomine bugs

- Chagas disease (American trypanosomiasis)

## Tsetse flies

- Sleeping sickness (African trypanosomiasis)

## Fleas

- Plague (transmitted by fleas from rats to humans)
- Rickettsiosis

## Black flies

- Onchocerciasis (river blindness)

## Aquatic snails

- Schistosomiasis (bilharziasis)

## Lice

- Typhus and louse-borne relapsing fever

## Vector-borne diseases

Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by mosquitoes, sandflies, triatomine bugs, blackflies, ticks, tsetse flies,

mites, snails and lice. Every year there are more than 700 000 deaths from diseases such as malaria, dengue, schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and onchocerciasis, globally.

The major vector-borne diseases, together, account for around 17% of all infectious diseases. The burden of these diseases is highest in tropical and subtropical areas and they disproportionately affect the poorest populations. Since 2014, major outbreaks of dengue, malaria, chikungunya yellow fever and Zika have afflicted populations, claimed lives and overwhelmed health systems in many countries.

Distribution of vector-borne diseases is determined by complex demographic, environmental and social factors. Global travel and trade, unplanned urbanization and environmental challenges such as climate change can impact on pathogen transmission, making transmission season longer or more intense or causing diseases to emerge in countries where they were previously unknown.

Changes in agricultural practices due to variation in temperature and rainfall can affect the transmission of vector-borne diseases. The growth of urban slums, lacking reliable piped water or adequate solid waste management, can render large populations in towns and cities at risk of viral diseases spread by mosquitoes. Together, such factors influence the reach of vector populations and the transmission patterns of disease-causing pathogens.

## WHO response

The *Global vector control response (GVCR) 2017–2030* approved by the World Health Assembly (2017) provides strategic guidance to countries and development partners for urgent strengthening of vector control as a fundamental approach to preventing disease and responding to outbreaks. To achieve this a re-alignment of vector control programmes is required, supported by increased technical capacity, improved infrastructure, strengthened monitoring and surveillance systems, and greater community mobilization. Ultimately, this will support implementation of a comprehensive approach to vector control that will enable the achievement of disease-specific national and global goals and contribute to achievement of the Sustainable Development Goals and Universal Health Coverage.

WHO Secretariat provides strategic, normative and technical guidance to countries and development partners for strengthening vector control as a fundamental approach based on GVCR to preventing disease and responding to outbreaks. Specifically WHO responds to vector-borne diseases by:

- providing evidence-based guidance for controlling vectors and protecting people against infection;
- providing technical support to countries so that they can effectively manage cases and outbreaks;
- supporting countries to improve their reporting systems and capture the true burden of the disease;

- providing training (capacity building) on clinical management, diagnosis and vector control with some of its collaborating centres throughout the world; and
- supporting the development and evaluation of new tools, technologies and approaches for vector borne diseases, include vector control and disease management technologies.

A crucial element in vector-borne diseases is behavioural change. WHO works with partners to provide education and improve awareness so that people know how to protect themselves and their communities from mosquitoes, ticks, bugs, flies and other vectors.

For many diseases such as Chagas disease, malaria, schistosomiasis and leishmaniasis, WHO has initiated control programmes using donated or subsidized medicines.

Access to water and sanitation is a very important factor in disease control and elimination. WHO works together with many different government sectors to control these diseases.