

# VECTOR *Control*

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## Philippine Context PERSPECTIVE REVIEW

- Read [https://www.thelancet.com/journals/lanwpc/article/PIIS2666-6065\(22\)00120-1/fulltext](https://www.thelancet.com/journals/lanwpc/article/PIIS2666-6065(22)00120-1/fulltext)
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9197058/>
- How has the National Dengue Prevention and Control Program struggled?
- What complex factors drive larval development?


### 1. Vectors

- living organisms that can **transmit infectious pathogens** between humans, or from animals to humans (WHO, 2020)
- **Vermin and Vermin Control**
  - A group of **insects or small animals** such as flies, mosquitoes, cockroaches, fleas, lice, bedbugs, mice, and rats which are **vectors of diseases** (PD 856 Code on Sanitation of the Philippines)

### 2. Vectors: Mosquitoes


Anopheles	Aedes	Culex
Aedes	Chikungunya Dengue Lymphatic filariasis Rift Valley fever Yellow Fever Zika	Virus Virus Parasite Virus Virus Virus
Anopheles	Lymphatic filariasis Malaria	Parasite Parasite
Culex	Japanese encephalitis Lymphatic filariasis West Nile fever	Virus Parasite Virus

### Aedes



**Aedes aegypti**

- live in tropical, subtropical, and some temperate climates
- prefer to feed on people
- presence of **white/silver scale patches** on legs & other parts




**Aedes albopictus**

- live in tropical, subtropical, and temperate climates, [broader temperature range and at cooler temperatures]

- lay eggs on inner walls of containers with water, above waterline
- only need **small amount of water** to lay eggs: bowls, cups, fountains, tires, barrels, vases
- **Adult females bite. Blood is needed to produce eggs.**
- After feeding, females look for water sources to lay eggs.


cdc.gov/mosquitoes  
ecdc.europa.eu/en/disease-vectors




### Kilalanin natin ang Aedes Mosquito



Female Aedes aegypti

- May puti at itim na guhit sa kanilang katawan
- Kadalasang nangangagat sa pagitan ng 6:00-8:00 ng umaga at 4:00-8:00 ng gabi
- Tanging ang babaeng lamok lang ang nangangagat
- Nangingitlog sa malinis at hindi dumadaloy na tubig.
- Maaari ring magpakalat ng Zika, Chikungunya, at iba pang sakit.



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- mosquito becomes **infected when it takes blood** of person infected with the virus
- After about one week, it can then **transmit the virus while biting a healthy person**
- **daytime feeder**
  - peak biting periods: early in the morning and in the evening before dusk

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- flies about **400 feet** from its breeding ground
  - **can't fly very high but can cover much ground**
  - doesn't fly far from breeding ground and stays close to it
- can complete entire life cycle once a **small vessel with some water** is located (relatively clean water, stagnant)
  - **any container with enough water**, where they can survive for a year

earthclipse.com

#### SOURCE REDUCTION

- best preventive measure to eliminate egg laying sites

##### Indoor

- Ant traps
- Flower vases and saucers
- Water storage tank (drinking water, bathroom)
- Plastic containers
- Bottles

##### Outdoor

- Discarded bottles and tins
- Discarded tires
- Artificial containers
- Tree holes, potholes, construction sites
- Drums for collecting rainwater
- Shells, husks, pods from trees
- Leaf axils of various plants
- Boats, equipment

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## Anopheles

- spread **malaria**
- lay eggs in **marshy areas** or near banks of **shallow creeks and streams**
- Adult females bite usually **late in evening or at night**. Blood is needed to produce eggs.
- Adult females prefer to feed on people or animals, such as cattle
- attracted to **dark, sheltered areas for resting during daytime**



cdc.gov/mosquitoes

## Culex

- lay eggs on **surface of fresh or stagnant water** [barrels, ornamental ponds, unmaintained swimming pools, creeks, marshy areas]
- adult females bite people and animals; after blood feeding, these look for **water sources to lay eggs**
- don't fly long distances but fly up to 3.2 km
- live outdoors or near homes

cdc.gov/mosquitoes



## Flies

- Females can lay between 75 to 150 eggs at a time
- **HOUSE FLY: Musca domestica**
  - typically gray and have four black stripes on thorax
  - use sponging mouthparts to liquefy solid foods through spitting or regurgitation
  - capable of transferring more than 100 different pathogens, including **salmonellosis, typhoid, tuberculosis**
  - can contaminate food surfaces by spreading disease organisms picked up on their **legs and mouths** when feeding on **trash, feces, and other decaying substances**

pestworld.org



- **FRUIT FLY**

- appear to be **brown or tan**; usually have red eyes; have a **tan thorax** with **black and grey abdomen**
- eat **rotting food matter**, especially fruits and vegetables, and any **fermenting liquids**, like beer, liquor, and wine
- breed in **dark, moist, and unsanitary environments** like drains, garbage disposals, and trash bins



pestworld.org

## Cockroaches

- search for **dark, moist environment** while scavenging for plants and animals
- **American cockroaches**
  - varies from **red to almost brown**, with yellow band that outlines area behind heads and long, slender antennae
  - prefer **warm and humid environments** (sewers and sinks)



familyhandyman.com  
webmd.com  
thepestinformer.com

- **German cockroaches**

- **bronze**, half-inch (slightly smaller than American), with **two black stripes** on back of head
- most often found in relation to **humans and homes**



webmd.com  
thepestinformer.com

## Rats

- **NORWAY RATS (*Rattus norvegicus*)**
  - **Brown** with scattered black hairs; gray to white underside
  - **street or sewer rat**
  - have **fairly poor vision** and are **colorblind**
  - cause **damage** to properties and structures through their **gnawing**
  - building **shelters close** to one another
  - tend to live in fields, farmlands, and structures
  - often nest in basements, piles of debris or undisturbed materials; ground floor, lower floors of buildings, sewers



pestworld.org

- **ROOF RATS (*Rattus rattus*)**

- Brown with black intermixed; gray, white or black underside
- **black rats** or **ship rats**
- long and thin; have large eyes and ears, pointed nose and scaly tail
- tendency to find shelter in the upper parts of buildings
- not only **damage** materials by gnawing but also **contaminate** stored food and serve as vectors of dangerous diseases
- primarily **nocturnal** and thrive in **cool weather**
- only live up to one year, but have the ability to produce as many as **40 new offspring** during their lifetime



pestworld.org

- **HOUSE MICE (*Mus domesticus*)**

- **Dusty gray** with cream belly
- **breed rapidly**, can adapt quickly to changing conditions
  - female can give birth to half dozen babies every three weeks and can produce up to 35 young per year
- organize themselves in social hierarchies with one male dominating lower-ranking males and large number of females in a given territory
- implicated in **spread of salmonella through their feces**
- also bring fleas, mites, ticks, and lice into homes



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Primary Care Provider

## Mahal, pakonsulta ka na!

Maaaring lumaba ang dengue fever kapag hindi naapain agad. Bartayan ang pasyente, at tumakbo agad sa clinic o ospital kung mayroong mga sintomas tulad ng:

- Mababang pananakit ng friyan
- Patalay-tuloy na pagpauukla
- Mababa na paglilipag
- Dumudugong gitlad o lorig
- Pagkapagod
- Pagkabalisang
- Panamaga ng atay
- Dugo sa suka o dem

Agad kumonsulta sa pinakamalapit na health facility kung may mataas na lagnat o nakaramdam ng alinman sa mga sumusunod. Maaaring lumala ang dengue sa loob lamang ng ilang oras.

Sa kasulukuyan, walang specific na gamot para sa Dengue. Makatutulong ang paginom ng maraming tubig at pagpapahinga habang nagpapagalang.

**Iwasan ang pag-inom ng Aspirin at Ibuprofen para sa lagnat at sakit ng katawan. Kung linom ng herbal o alternative medicine para sa dengue, ito ay ikonsulta muna sa doctor.**

### Paano maiwasan ang dengue?

**IWASAN ANG WILD**

- Itaob ang mga lalagyan na maaaring pang-ibon ng tubig at pangliligan ng mga lamok. Takpan ang iba pang imbak.
- Recycle o itapon ang mga botle at iba pang labagan
- Magsuot ng long pants at long sleeves sa damit
- Panatilihin malinis ang katawan at kapaligiran
- Sumamit ng mosquito repellent araw-araw
- Makita at suportahan ang mga habang sa inyong lokal na komunidad at mga proyekto ng gobyerno upang labanan ang mga sakit tulad ng dengue.

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- Suyurin at sirain ang mga pinamumugaran ng mga lamok
- Sarili ay protektahan laban sa lamok
- Sumangguni agad sa pinakamalapit na pagamutan
- Sumuporta sa pagpapausok kapag may banta ng outbreak
- Sikapin at ugaliing uminom ng maraming tubig

## 6. Leptospirosis

Talwas sa kaalaman ng nakarami, hindi lamang sa ihi ng daga nagmamula ang bakterya na nagdudulot ng Leptospirosis.

**IWASAN ANG WILD**

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### Ano ang Leptospirosis?

Sakit na dulot ng *Leptospira* bacteria na nakukuha mula sa ihi ng mga infected na hayop na maaaring makakontamina ang lupa at tubig.

### Paano nalipag ang Leptospirosis?

Hayop na Infected

Paglalak ng kontaminadong tubig/hi sa mata, ibong, at bibo

Pagkain at paginom ng maduming pagkain at tubig

Paglusong sa maruming tubig habang may bukas na lusak

Bacteria: *Leptospira* sp.

Kontaminadong tubig o lupa

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### Anu-ano ang mga sintomas ng Leptospirosis?

Lagnat      Pananakit ng kalamnan ng guya      Panginginginig      Pananakit ng ulo at katawan

Pagtatae      Panamantal      Paninilaw ng balat      Pamumula ng mata

⚠️ Masariling makapinsala sa bato, utak, at atay kapag hindi naagapan. Agad kumonsulta sa pinakamalapit na health facility kung may lagnat na tumagal ng dalawang araw.

📱 @dohphilippines    🌐 www.doh.gov.ph

### Paano maiiwasan ang Leptospirosis?

**Iwasan ang maglangoy o kumansang sa maduming tubig o baha**

**Gumamit ng boots at gloves kung ang trabaho ay hindi makakalwas sa maduming tubig**

**Siguraduhin na malinis ang inuming tubig**

**Ugaliin ang tamang pagtapon ng basura**

**Panatilihin ang kalitiran ng bahay at kapaligiran**

**Maghugas ng malinis na tubig at sabon pagkatapos mababad sa kontaminadong tubig**

**Ingat!**

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## WILD DISEASES

Micro-organisms      Influenza-like illness

Leptospirosis      Typhoid

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### Maiiwasan ang mga WILD diseases sa pamamagitan ng sumusunod:

1. Magpahakuna upang maiwasan ang mga nakakahawang sakit tuwing taag-ulan katulad ng influenza at hepatitis.
2. Gumamit ng payong, kapote, at bola upang hindi mabasa ng ulan.
3. Iwasan ang mga lugar na masikip, walang masyadong pumapocok na hangin o mga lugar na walang magandang bentilasyon.
4. Iwasan ang malapit na pakikipag-ugnayan sa mga taong may sakit, may lagnat at ubo.

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### Maiiwasan ang mga WILD diseases sa pamamagitan ng sumusunod:

5. Uminom ng malinis na tubig. Pakuluhan ang tubig kung hindi siguradong malinis at ligtas inumin.
6. Iwasan bumili ang mga pagkain mula sa mga sidewalk vendor upang maiwasan ang mga sakit na dala ng pagkain.
7. Itak ang mga masaring ipunan ng tubig katulad ng mga tiram, timba, mga lumang gulang at bote na masaring pangitugan ng mga lamok.
8. Tigaking malinis at hindi barado ang mga gutters at alulod ng bubong na dinadaluhan ng tubig.

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### Maiiwasan ang mga WILD diseases sa pamamagitan ng sumusunod:

9. Iwasan lumangoy o lumangoy sa tubig baha upang maiwasan ang leptospirosis.
10. Ugaliin maging malinis hindi lamang sa katawan, kundi pati na rin sa kapaligiran sa lahat ng oras.
11. Ugaliin ang masuci at medales na paghuhugas ng mga kamay gamit ang sabon at tubig lalo na bago maghanda, magluto, kumain, at pagkagaling sa palikuran.
12. Iwasan ding hanakan ang mga mata, ilong at mga bagay sa kapaligiran kung marumi ang mga kamay.
13. Linitin ng mabuti ang mga kagamitan / Disinfection of surfaces in the home

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## 7. Programs

- **Aedes Borne Viral Diseases Prevention and Control Program**
  - to reduce disease burden of Dengue
  - to prevent transmission of Chikungunya and Zika
- **National Malaria Control and Elimination Program**
  - to ensure **universal access** to reliable diagnosis, highly effective and appropriate treatment and preventive measures
  - to strengthen **governance and human resources** capacity at all levels to manage and implement malaria interventions
  - to secure government and non-government **financing** to sustain malaria control and elimination efforts at all levels
  - to ensure quality malaria services, timely detection of infection and immediate response, and information and evidence to guide malaria elimination (**Health Information and Regulation**)

## 8. Laws / Policies

- **PD 856 Code on Sanitation of the Philippines**
  - Spaces where **food and drinks** are stored, prepared and served shall be so constructed and maintained as to **exclude vermin**.
  - All opening which connects spaces to the outer air shall be effectively **protected with screen** of non-corrosive wire 16-mesh or finer. Door screens shall be **tight-fitting**.
  - A **vermin abatement program** shall be maintained in the establishments by their owners, operators, or administrators. If they fail, neglect or refuse to maintain a vermin abatement programs, the local health agency will undertake the work at their expense.

- During deratting or disinfecting operations, all foodstuffs, utensils, food preparation and cleaning equipment shall be **covered to protect them from toxic chemical substances**.
- Vermin control in public places shall be the **responsibility of the provincial, city or municipal governments** which have jurisdiction over them.
- The procedure and frequency of vermin abatement program shall be determined and approved by the **local health authority**.

- Sec 64.
  - Hotels, motels, apartments, lodging, boarding, tenement houses, condominiums: **Periodic insect and vermin control measures** shall be undertaken to **eradicate vectors of diseases**.
- Sec 66.
  - Port, airport, vessel, aircraft: Every port of entry and the area within the perimeter of an airport of entry shall be **kept free from mosquito vectors** of yellow fever, malaria and other diseases of epidemiological significance.

## 9. Measures

- **PHYSICAL**
  - use of mechanical or physical forces
- **CHEMICAL**
  - use of pesticides
- **BIOLOGICAL**
  - limit growth and reproduction
- **ENVIRONMENTAL**
  - good housekeeping
- **EDUCATION**
  - health education and information

## 10. Implications to Nurses' Care of Families

- **Cover or properly discard** items that collect rainwater or are used to store water.
- **Empty** remaining essential containers; **clean and scrub** (to remove eggs) at least once a week.
- Use **long-sleeved clothing and mosquito repellents**, as well as window and door screens, mosquito nets, insecticides, aerosols, mosquito coils or other insecticide vaporizers.
- **Community participation** is key.

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### VECTOR-BORNE DISEASES

**VECTORS MAY BE A THREAT TO YOU, AT HOME AND WHEN TRAVELLING**

**VECTORS ARE SMALL ORGANISMS** that feed on blood and can spread diseases.

**WITH JUST 1 BITE** they can transmit diseases such as:

- Malaria
- Dengue
- Zika
- Lyme disease
- Japanese encephalitis
- Chikungunya
- West Nile virus

**TAKE SIMPLE MEASURES TO PROTECT YOURSELF AND YOUR FAMILY**

- Get vaccinated against yellow fever and Japanese encephalitis.
- Use insect repellent.
- Wash your hands regularly.
- Wear light-colored, long-sleeved shirts and trousers.
- Sleep under an insecticide-treated bed net.
- Use treated mosquito coils.
- Get rid of stagnant water from places where mosquitoes breed, such as in old containers, flower pots and used tyres.

For more information, contact your health-care professional.

[caro.doh.gov.ph](http://caro.doh.gov.ph)