**Alpha University**

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**Arthropod-Borne Infections**

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**1. Introduction to Arthropod-Borne Infections**

Arthropod-borne infections, often referred to as vector-borne diseases, are illnesses transmitted

to humans and animals by blood-feeding arthropods such as mosquitoes, ticks, lice, fleas, mites, and sandflies. These infections are a major public health concern, particularly in developing countries with warm climates where vectors thrive. The pathogens can be viruses, bacteria, protozoa, or helminths, and transmission typically occurs through the bite of an infected vector during blood meals. Some of these diseases are zoonotic, meaning they can be transmitted from animals to humans.

2. Types of Arthropod-Borne Infections

Arthropod-borne infections are classified based on the type of causative agent:

A. Viral Infections (Arboviruses):

 Dengue Fever – Aedes mosquito.  Zika Virus – Aedes mosquito.

 Yellow Fever – Aedes mosquito.

 Chikungunya Virus – Aedes mosquito.  West Nile Virus – Culex mosquito.

 Japanese Encephalitis – Culex mosquito.

B. Bacterial Infections:

 Lyme Disease – Ixodes tick (Borrelia burgdorferi).

 Plague – Flea (Yersinia pestis).

 Typhus – Lice/fleas (Rickettsia spp.)

 Relapsing Fever – Tick/louse (Borrelia species)

**C. Parasitic Infections:**

 **Malaria** – Anopheles mosquito (Plasmodium spp.).

 **Leishmaniasis** – Sandflies (Leishmania spp.).

 **Trypanosomiasis** (African Sleeping Sickness) – Tsetse fly (Trypanosoma brucei).  **Chagas Disease** – Kissing bug (Trypanosoma cruzi).

 **Filariasis** – Mosquitoes (Wuchereria bancrofti).

**3. Signs and Symptoms**

Symptoms vary widely depending on the pathogen but may include:

 **General symptoms**: Fever, headache, fatigue, muscle aches.

 **Neurological**: Encephalitis, confusion, seizures (e.g., Japanese encephalitis, West Nile).  **Dermatological**: Rashes, ulcers (e.g., Lyme disease, Leishmaniasis).

 **Gastrointestinal**: Nausea, vomiting, diarrhea.

 **Hemorrhagic**: Bleeding, low platelet count (e.g., Dengue hemorrhagic fever).

 **Organ-specific**: Liver enlargement (yellow fever), spleen involvement (malaria).

**4. Common Arthropod-Borne Infections**

**A. Malaria**

 Caused by Plasmodium spp.

 Transmitted by Anopheles mosquitoes.

 Symptoms: Cyclical fever, chills, sweating, anemia, organ failure in severe cases.

**B. Dengue Fever**

 Caused by Dengue virus.

 Spread by Aedes mosquitoes.

 Symptoms: High fever, severe headache, retro-orbital pain, joint and muscle pain (“breakbone fever”), rash, possible hemorrhage.

**C. Zika Virus**

 Mild fever, rash, conjunctivitis; dangerous in pregnancy due to risk of microcephaly in newborns.

**D. Leishmaniasis**

 Cutaneous or visceral forms.

 Symptoms: Skin ulcers (cutaneous), fever, weight loss, enlarged liver/spleen (visceral).

**E. Lyme Disease**

 Caused by Borrelia burgdorferi.

 Characterized by a "bullseye" rash (erythema migrans), fever, joint pain, and in later stages, neurological and cardiac symptoms.

**5. Prevention and Control Measures**

**A. Vector Control:**

 Eliminate breeding sites (e.g., stagnant water for mosquitoes).

 Use of insecticides and larvicides.  Environmental sanitation.

**B. Personal Protective Measures:**

 Wearing long-sleeved clothing.

 Using mosquito repellents (DEET, picaridin).  Sleeping under insecticide-treated bed nets.

 Avoiding outdoor activities during peak vector activity (dawn/dusk).

**C. Vaccination (where available):**

 Yellow Fever vaccine.

 Japanese Encephalitis vaccine.

 Dengue vaccine (limited use based on serostatus).

**D. Community-Based Strategies:**

 Public education campaigns.  Vector surveillance programs.

 Collaboration with health authorities.

**6. Diagnosis**

**Clinical Diagnosis:**

 Based on signs, symptoms, exposure history, and travel to endemic areas.

**Laboratory Diagnosis:**

 **Microscopy**: Blood smears for malaria.

 **Serology**: ELISA for Dengue, Zika, Chikungunya.  **PCR**: Detection of viral/bacterial DNA or RNA.

 **Culture**: For bacteria like Yersinia pestis.

 **Rapid Diagnostic Tests (RDTs)**: For malaria and some arboviruses.

**7. Treatment**

**A. Viral Infections:**

 Mostly supportive (hydration, fever reducers).

 No specific antiviral drugs for most arboviruses.

 Ribavirin in some cases (e.g., viral hemorrhagic fevers).

**B. Bacterial Infections:**

 **Antibiotics** such as:

o Doxycycline for Rickettsial infections and Lyme disease. o Streptomycin or gentamicin for plague.

**C. Parasitic Infections:**

 **Antimalarial drugs** (e.g., artemisinin, chloroquine).

 **Antiprotozoals** for leishmaniasis and trypanosomiasis.

**D. Supportive Care:**

 IV fluids for dehydration.

 Blood transfusions for severe anemia (e.g., in malaria).  Intensive care in severe or complicated cases.

**Conclusion**

Arthropod-borne infections are a significant burden on global health, particularly in regions with

poor infrastructure and warm climates. With increasing globalization, climate change, and urbanization, these diseases are spreading into new areas. Integrated efforts involving vector control, vaccination, public education, and research are essential to manage and eventually eliminate these infections.