A Brief overview of Vector-Borne Illness

N5290 The Science of Nursing in the Community

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Vector-borne diseases of relevance to agricultural development and agricultural practices

- malaria
- lymphatic filariasis
- dengue and dengue haemorrhagic fever
- yellow fever
- Japanese encephalitis
- schistosomiasis
- onchocerciasis
- African trypanosomiasis
- visceral leishmaniasis
- cutaneous leishmaniasis

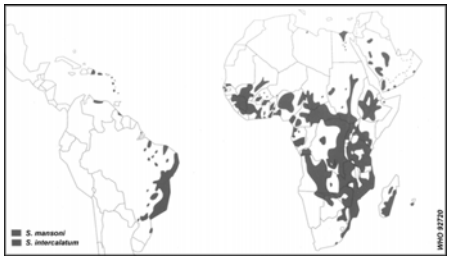
Global status of major vector-borne diseases

Malaria	Population at risk (millions)	Prevalence of infection (millions)	Present distribution
Malaria	2100	270	tropics/subtropics
	900	90.2	tropics/subtropics
Leishmaniases	350	12 million infected + 400,000 new cases/year	Asia/S. Europe/ Africa/S. America
Onchocerciasis	90	17.8	Africa/L. America
Dracunculiasis	63	1	tropical Africa and Asia
African trypanosomiasis	50	(25,000 new cases/year)	tropical Africa
Schistosomiasis	600	200	tropics/subtropics
Dengue	?	?	tropics/subtropics
Yellow fever	?	?	Africa/L. America
Japanese encephalitis	?	?	E./S.E Asia
Other arboviral diseases	?	?	

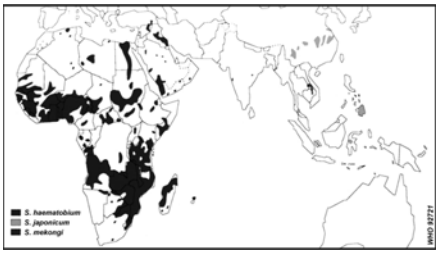
? : no estimates available

Source: WHO (1990)

Global Distribution of Schistosomiasis in Africa and the Americas: *S. mansoni, S. intercalatum*



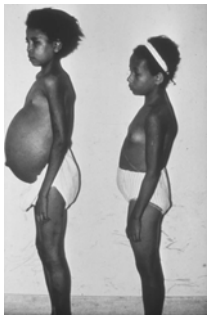
Global Distribution of Schistosomiasis in Africa and Asia: *S. haematobium, S. japonicum, S. mekongi*



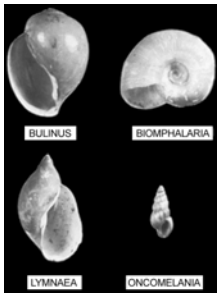
Clinical manifestations of Shistosomiasis

- Severe enlargement of liver and spleen
- Intestinal involvement
  - Abdominal pain
  - Bloody diarrhoea
  - fatigue

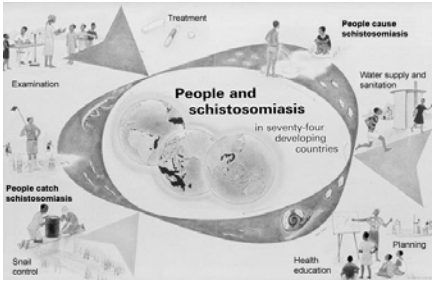
Child infected with Shistosomiasis



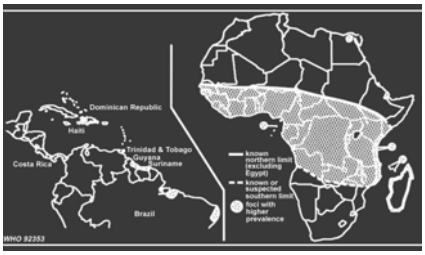
Shells of various snail intermediate hosts of schistosomiasis



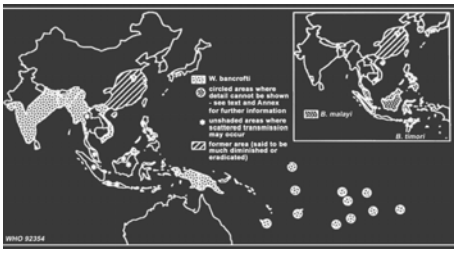
The life cycle of schistosome parasites



Distribution of lymphatic filariasis in Africa and the Americas



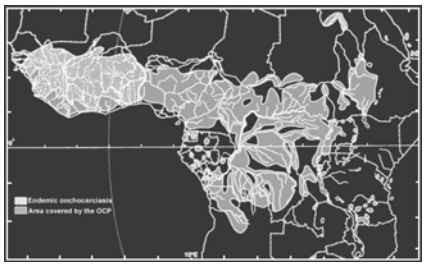
Distribution of lymphatic filariasis in Asia



Clinical Manifestations of Lymphatic Filariasis

- Elephantiasis- hyprtrophy, edema and fibrosis esp. in lower extremeties
- Vector breeds in organically polluted water

Distribution of onchocerciasis in Africa

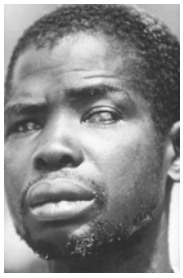


Distribution of onchocerciasis in the Americas

Clinical Manifestations of onchocerciasis (River Blindness)

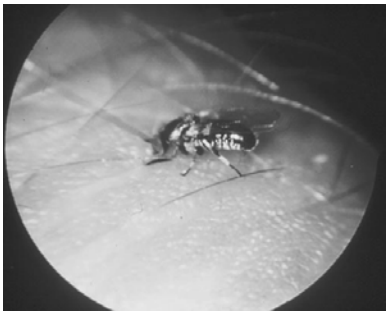
- Long term exposure to infected black fly bites causes blindness
- Affects river valley communities

A victim of river blindness (onchocerciasis)



Aerial view of an abandoned village in an area affected by onchocerciasis in West Africa

Blackfly, feeding



Distribution of old world and new world visceral leishmaniasis

Visceral leishmaniases: Kalazar

- Parasite affects the internal organs and the disease is likely to be fatal
- Arid, warm environment
- Zoonosis: human disease with animal reservior, sandflies become infected by rodents and dogs.

Distribution of cutaneous and muco-cutaneous leishmaniasis In the New World

Distribution of cutaneous leishmaniasis due to *L. tropica and L.aethiopica* in the Old World

Oriental sore (cutaneous leishmaniasis in the Eastern Mediterranean)

Cutaneous and mucocutaneous leishmaniasis

- Oriental sore, Aleppo button, Baghdad boil, Delhi sore, espundia, papalmoyo, pian bois
- Lesions frequently on face
- Zoonosis: human disease with animal reservior, sandflies become infected by rodents, dogs, monkeys.

A case of cutaneous Leishmaniasis

A case of cutaneous leishmaniasis

Oriental sore (cutaneous leishmaniasis in the Eastern Mediterranean)

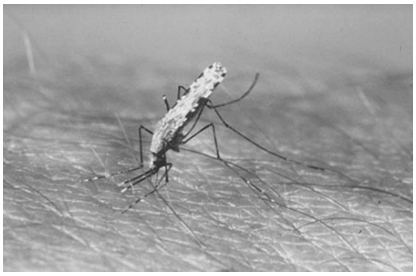
Sandfly, feeding

Mosquitoes

Distribution of mosquito-borne diseases

Mosquito	Disease	Distribution
Subfamily: Anophelinae Genus: *Anopheles*	malaria Bancroftian filariasis Brugian filariasis O'nyong nyong virus	throughout tropics and subtropics Asia and Africa Asia Africa
Subfamily: Culicinae Genus: *Culex*	Bancroftian filariasis encephalitis	throughout tropics Asia, Americas, Europe, Africa
Subfamily: Culicinae Genus: *Mansonia*	Brugian filariasis other arboviruses	Asia Africa, Americas
Subfamily: Culicinae Genus: *Aedes*	yellow fever dengue dengue haemorrhagic fever other arboviruses Bancroftian filariasis	Africa, Americas Asia, Americas, Africa Asia, Americas Asia, Americas, Africa Pacific

Anopheles gambiae, feeding



Global distribution of Malaria

Number of cases of Malaria reported by WHO

Number of malaria cases reported by WHO region (in thousands), 1981 - 1988

(The information provided does not cover the total population at risk in some instances)

WHO Region	1981	1982	1983	1984	1985	1986	1987	1988*
Africa **	6 754	6 042	2 736	4 420	3 373	3 046	3 309	3 285
Americas	638	718	831	931	911	951	1 019	1 100
Southeast Asia	3 566	2 964	2 731	3 004	2 521	2 689	2 823	2 645
Europe	60	66	71	60	32	45	27	8
Eastern Mediterranean	207	308	305	335	391	610	564	602
Western Pacific	3 464	2 487	1 839	1 361	1 066	786	758	704
Total (excl. Africa)	7 935	6 543	5 777	5 691	4 921	5 081	5 191	5 059

* Incomplete figures. ** Mainly clinically diagnosed cases

Source: *WHO Weekly Epidemiological Record, No 25, 22 June, 1990.*

Clinical Manifestations of Malaria

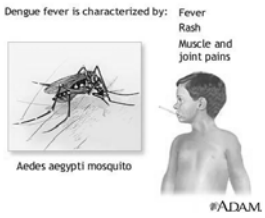
- Fever
- Headache
- Liver and spleen enlargement
- Anemia
- Cerebral malaria can be fatal in 24 hours

Girl suffering from malaria in Gambia

Distribution of yellow fever in Africa

Distribution of Yellow Fever in the Americas

Dengue Fever



Dengue is a mild viral illness transmitted by mosquitos. Treatment includes rehydration and recovery is expected. A second exposure to the virus can result in Dengue hemorrhagic fever, a life-threatening illness

Dengue Hemorrhagic Fever

- Severe, potentially fatal infection that occurs when someone with immunity to one type of Dengue virus is infected by a different type. It is spread by certain mosquitoes (*Aedes aegypti*) that bite primarily during the day.
- Worldwide, more than 100 million cases of dengue fever occur every year. A small percent of these develop into Dengue hemorrhagic fever. Most cases in the U.S. are brought in from other countries.
- Risk factors for Dengue hemorrhagic fever include having antibodies to dengue virus from prior infection and being younger than 12, female, or Caucasian.

Dengue Hemorrhagic Fever

- Early symptoms of Dengue hemorrhagic fever are similar to those of Dengue fever.
- After several days the patient becomes irritable, restless, and sweaty. These symptoms are followed by a shock-like state.
- Bleeding may appear as petechiae and ecchymoses.
- Shock may cause death. If the patient survives, recovery begins after a one-day crisis period.

Dengue Treatment

- Because Dengue hemorrhagic fever is caused by a virus for which there is no known cure or vaccine, the only treatment is to treat the symptoms.
- Rehydration with intravenous (IV) fluids is often necessary to treat dehydration.
- IV fluids and electrolytes are also used to correct electrolyte imbalances.
- A transfusion of fresh blood or platelets can correct bleeding problems.
- Oxygen therapy may be needed to treat abnormally low blood oxygen.

Chagas Disease

- insect-transmitted parasitic disease common in South and Central America
- Spread by reduvid bugs
- One of the major health problems in South America, where 20 million people are infected. Due to immigration, approximately 500,000 people in the United States are believed to be infected.

Chagas Disease

- Acute Phase
  - swelling and reddening at the site of infection
  - fever, malaise, and generalized swelling of the lymph nodes.
  - The liver and spleen may become enlarged
- Chronic Phase
  - cardiac disease (cardiomyopathy)
  - digestive abnormalities.
  - Patients may develop congestive heart failure.

Chagas Disease Treatment

- The acute phase should be treated. Benznidazole has been shown to be effective. Experimental treatment may include nifurtimox.
- Treating the chronic phase with antibiotics is not helpful. Instead, the symptoms of heart and intestinal disease should be treated.

Chagas Disease

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