The module vectors--mechanical and biological, is of Unit 1.

This includes the following points
 definition of vectors.

Basis of classification of vectors,

biological vectors,

description and examples,

mechanical vectors, description and examples.

At the end of this module,

the learner defines vectors,

understands the basis of classifying a

vector as a biological or mechanical vector.

Describes the various examples of mechanical

vectors and biological vectors .

Vectors in parasitology.

The vector transfers the

parasite to the next host,

so vectors can be defined as any agent

that carries and transmits parasites.

Based on whether the parasite undergoes any

developmental stage or not within the vector,

the vectors can be classified

as mechanical or biological.

Mechanical vectors are living organisms

that carry the parasite from one host

to another without being infected itself

or without any kind of development

of the parasite in the vector.

Usually the parasites in this case are

transmitted via some body part like legs,

wings, body hair, etc.

Now this mode is sort of accidental.

It is a kind of passive transmission.

Some examples of mechanical vectors

include the house fly and cockroach.

Fly or cockroach sits on some pathogen laden

material which sticks to its legs

and when it lands on some food item,

these pathogens get transferred to it.

Most are arthropods,

however, birds, rats and other animals

can also be mechanical vectors.

A biological vector is an organism

in which the parasite or the pathogen

undergoes some development before

being transmitted to the next host.

Arthropod vectors transmit

parasites by biting the host.

The parasite may go through part

of its reproductive cycle in the gut or

the salivary glands of the Arthropod,

in order to help its transmission

through it’s bite.

In this case,

the transmission is more active.

The biological vector is an essential

part of the life cycle of the parasite.

We have few examples of biological vectors.

The first is anopheline mosquitoes.

They transmit the plasmodium parasite,

causing malaria in man.

The life cycle of the malarial

parasite comprises two stages,

an asexual phase occurring in the humans

and a sexual phase offering in the mosquito.

When a female mosquito

bites an infected person,

it ingests parasitized erythrocytes

along with its blood meal.

The gametocytes are released

in the midgut of the Mosquito.

They fertilioze and form a zygote.

This zygote then turns into an ookinete which penetrates the

epithelial lining of the midgut.

The ookinete turns into an oocyst with many sporozoites within.

The oocyst bursts and sporozoites are released

into the body cavity of the mosquito.

From here,

the sporozoites move to the salivary glands.

Now when this infected

mosquito bites a human,

the sporozoites are injected

to initiate human infection.

The second example is sand fly.

Now Leishmania parasite is transmitted

from one mammalian host to another by this sand fly,or more specifically,the female sand fly ---Phlebotomus vector.

During development,the parasite passes through two stages,

an amastigote and promastigote.

The amastigote form occurs in humans and other mammal hosts.

And promastigote form occurs in the arthropod vector.

Now when this vector sand fly feeds

on an infected person the amastigotes

from the peripheral blood enter

the insect along with its blood meal.

In the midgut of the fly it

develops into promastigote, multiplies

and then migrates to the pharynx.

When the sand fly bites to take

its next meal, the parasites from the pharynx get dislodged and

they get deposited in the puncture wound,

caused by its proboscis.

And this is how it gets in.

The third example is--

Human lice Pediculus humanus humanus.

It is a vector of Rickettsia prowazekii-- that causes typhus disease in humans.

Now lice are also vectors of Bartonella quintana.This causes trench fever.

The fourth example is ticks,

specially the hardbodied ones-they are vectors of the

spirochete bacteria that

causes Lyme disease in humans,

this is characterized by a very specific,

expanding red rash called as erythema migrans

The fifth example is mites - Leptotrombidium species.

These are known to be vectors for a bacterium

Orientia that causes scrub typhus in man.

Now these mites feed on infected rodent hosts

and then they transmit the parasite to other

rodents and more importantly to humans.

The sixth example is that of

flea or Xenopsylla cheopis.

This Oriental rat flea is a vector that

transmits the plague causing bacteria-Yersinia pestis from the

rats to humans by their bite.

The seventh example is the

Blackfly or Simulium species.

In this, the female needs to obtain

nourishment by feeding on the blood

of mammals, including humans.

It acts as a vector that transmits

Onchocerca volvulus parasite that

causes River blindness in humans.

These are certain references

that you may go through.

Thank you.