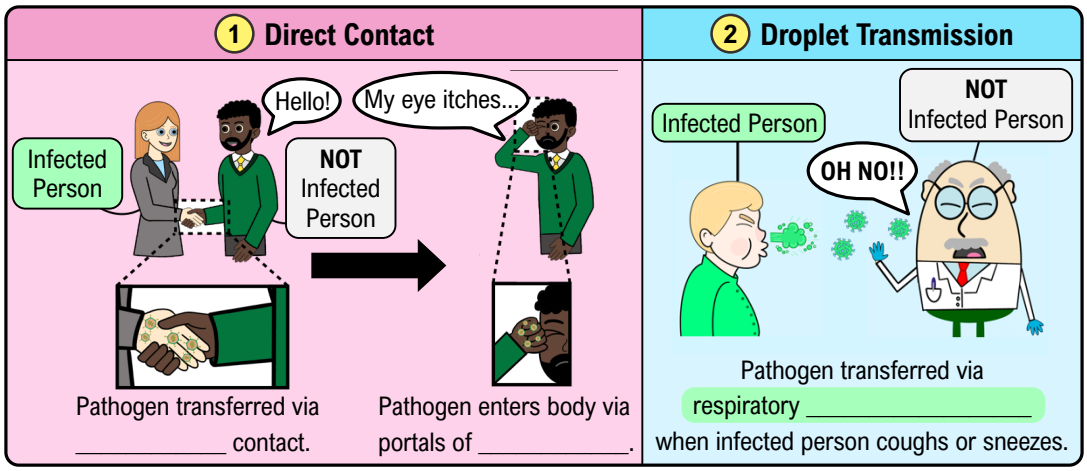
TOPIC: HORIZONTAL DISEASE TRANSMISSION

Direct Transmission

◆ **Direct Transmission:** *immediate* (_____) transfer of a pathogen to a portal of entry. Occurs in one of 2 ways:

1. **Direct Contact:** physical contact with the reservoir (e.g. _____, shaking hands).
   - Risk reduced by thorough *handwashing* to physically _____ or destroy microbes.
2. **Droplet Transmission:** *respiratory* _____ ejected if infected people sneeze, cough, talk etc.
   - **Respiratory Droplets:** _____ pathogen-containing droplets that don't remain airborne (fall to ground).



PRACTICE

The single most important measure to prevent the spread of disease via direct contact is:

a) Hand washing.

b) Pasteurization.

c) Preserving food.

d) Wearing a mask when in crowded public spaces.

PRACTICE

Which form of direct disease transmission does not require physical touch between an infected individual and a non-infected individual?

a) All forms of vertical transmission.

b) All forms of horizontal transmission.

c) Droplet transmission.

d) All the above require physical contact between an infected individual & a non-infected individual.

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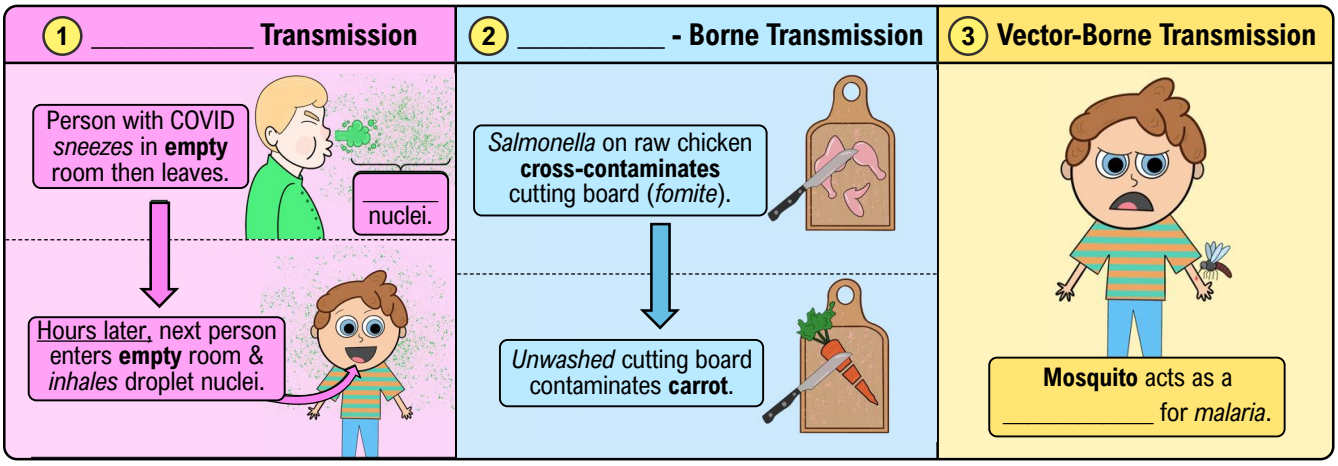
Indirect Transmission

◆ **Indirect Transmission:** _____ transfer of a pathogen, after a significant *delay* or via an *intermediary*.

1. **Airborne Transmission:** indirect/delayed transmission through microscopic *droplet* _____.
   - **Droplet Nuclei:** *small* droplets that remain _____ & can infect someone *indirectly*.
2. **Vehicle-Borne Transmission:** *indirect* transmission through _____*-living* objects (food, water, or *fomites*).
   - _____**:** *any contaminated* inanimate object/surface that can infect a healthy person.
     - _____**-Contamination:** accidental *transfer* of pathogens from one surface/object to another.
3. **Vector-Borne Transmission:** *indirect* transmission through _____ (*living* organisms).



EXAMPLE

Label the following examples as either airborne transmission (Air), vehicle-borne transmission (Veh), or vector-borne transmission (Vec):

A doctor leaves their used gloves out, & a cleaner picks them up & becomes infected with a disease.	
A kid sneezes in an elevator then leaves. A while later, a woman gets on the elevator & gets infected.	
A man is bitten on the leg by a tick, causing him to become infected with Lyme disease.	
A person drinks water from a contaminated well and becomes ill.	

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PRACTICE

Which of the following statements about airborne transmission is true?

a) Airborne transmission requires an infected individual to be within 1 meter of a non-infected individual.

b) Airborne transmission can occur through flying vectors such as mosquitos.

c) Airborne transmission can only occur after an infected person sneezes in a crowded space.

d) Droplet nuclei can remain airborne for hours, allowing indirect transmission to occur.

PRACTICE

When a disease is transferred from person to person through physical touch (kissing, hugging, shaking hands), what type of disease transmission is this?

a) Vector-borne transmission.

b) Vehicle-borne transmission.

c) Indirect contact transmission.

d) Direct contact transmission.

PRACTICE

A surgical instrument is accidentally contaminated with bacteria and is then used on a patient. This is an example of which mode of transmission?

a) Direct contact transmission.

b) Vehicle-borne transmission.

c) Airborne transmission.

d) Vector-borne transmission.

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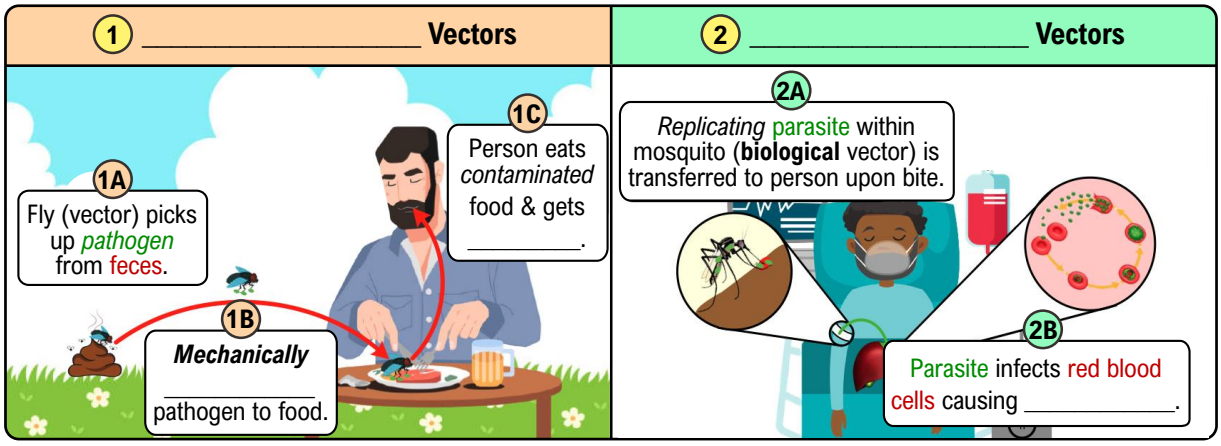
Mechanical vs. Biological Vectors

◆ There are ____ types of *vectors* (living organisms, usually arthropods):

(1) **Mechanical Vector:** *passively* transports pathogen _____ the pathogen replicating within vector.

(2) **Biological Vector:** *actively* transports pathogen, allowing pathogen to _____ inside the vector.



EXAMPLE

Which of the following is an example of a mechanical vector?

a) A horsefly that ingests a bacterium from feces, which replicated within the horsefly before it is injected into a horse while the horsefly extracts blood.

b) A fly lands on some raw chicken, then later on lands on a cooked plate of food, transferring the salmonella bacteria to the person eating it.

c) A mosquito bite causes someone to become infected with malaria.

d) A raccoon bites someone's hand, causing the person to be infected with rabies.

PRACTICE

Which of the following is not an example of a biological vector of disease?

a) A housefly carries *Escherichia coli* bacteria on its legs & lands on food which is later consumed by a human.

b) A tick is infected with *Borrelia burgdorferi* bacteria which is transferred to humans when the tick bites them.

c) A mosquito infected with a plasmodium parasite bites a human & transfers the pathogen.

d) A flea feeds on a rat infected with the plague. Some time later, once the plague-causing bacteria has replicated within the flea, it bites & infects a human with the disease.

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Zoonoses vs. Vector-Borne Transmission

- **Zoonosis** = "*Where the disease initially comes from.*" (origin is an animal reservoir).
- **Vector-borne** = "*How the disease gets from the reservoir to you.*" (spreads via vectors: mosquito, tick, flea, etc.).

Zoonosis Only	Rabies	 **Dog** (Reservoir) →  **Human** (Susceptible Host)
Zoonosis & Vector-Borne	Lyme Disease	 **Mouse** (Reservoir) →  **Tick** (Vector) →  **Human** (Susceptible Host)
Vector-Borne Only	Malaria	 **Human** (Reservoir) →  **Mosquito** (Vector) →  **Human** (Susceptible Host)

PRACTICE

Which of the following statements is true?

a) All zoonoses come from mammals & birds, but all vector-borne diseases come from arthropods.

b) All diseases transmitted between animals & humans are considered vector-borne diseases.

c) A disease can be both zoonotic & vector-borne if it is transferred from an animal population to a human population via an intermediate (a vector).

d) All of the above are true.