A cause that can be transmitted

Core syllabus statement: infectious diseases are caused by pathogens and are transmissible. Keep the cause of a disease separate from the way it spreads.

1. TWO PARTS OF THE CORE IDEA

Pathogen

Disease-causing organism or agent.

Cause

Transmission

Passage of the pathogen to a new host.

Spread

2. A HOST IS THE ORGANISM INVOLVED

A host is an organism in or on which a pathogen lives or multiplies. A human can be a host, but hosts are not always humans. A reservoir is a place or population in which a pathogen normally persists; it may be a host or part of the environment.

3. PATHOGEN DOES NOT MEAN EVERY MICROBE

Pathogens include some bacteria, viruses, fungi and protoctists. Many microorganisms are harmless or beneficial. Viruses are non-cellular agents, so "organism or agent" is a useful definition that includes them. Do not use "bacterium" as a synonym for every pathogen.

Transmissible does not mean spread by ordinary touch. A pathogen may reach a host from another host, through the environment, or through a vector. Transmission route and ease of spread depend on the pathogen.

Pathogens and disease terminology: OpenStax Microbiology, section 15.1.
Sources, transmission and hosts: CDC, Infection Control Basics.

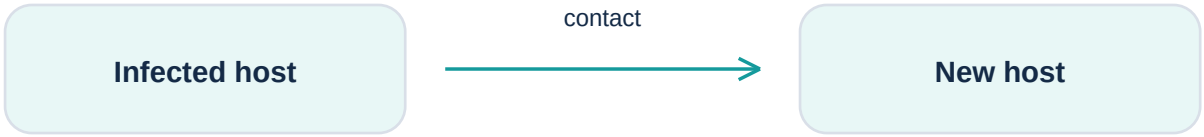
Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 1, p. 30.

Trace the route to a new host

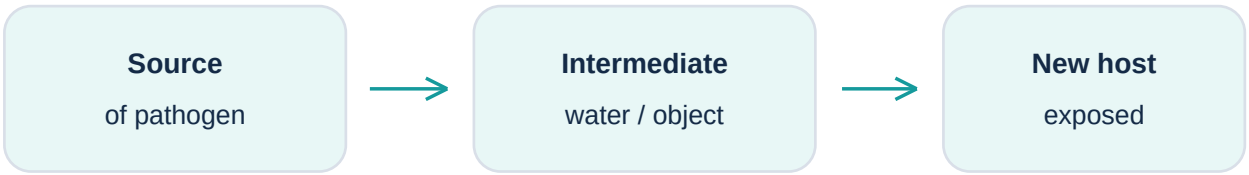
Transmission describes movement of the pathogen, not movement of the symptoms. Direct and indirect routes can both lead to infection.

1. DIRECT OR INDIRECT?

A. DIRECT CONTACT



B. INDIRECT ROUTE



2. IDENTIFY THE ACTUAL PATHWAY

Examples include direct physical contact, contaminated food or water, contaminated objects, and vector bites. Respiratory pathogens may also spread in droplets or fine airborne particles. Name the relevant route rather than assuming every infection spreads in the same way.

3. EXPOSURE IS NOT THE SAME AS DISEASE

Contamination means an agent is present on or in something. Infection requires the agent to establish itself in a host. Exposure does not guarantee infection, and an infected person may have no obvious symptoms. A person can sometimes transmit an agent without appearing ill.

Direct contact, environmental routes and vectors: OpenStax Microbiology, section 16.3.
Contamination, infection and symptom-free carriage: CDC, Infection Control Basics.

Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 1, p. 30.

Separate the agent from its carrier

A disease, its pathogen, its host and its vector are different things. Accurate names make explanations of transmission much clearer.

1. MALARIA: ONE EXAMPLE, FOUR ROLES

Disease	Malaria
Pathogen	Plasmodium parasites (protoctists)
Human host	Person infected by the parasite
Vector	An infected female Anopheles mosquito

2. THE MOSQUITO IS NOT THE MALARIA PATHOGEN

The mosquito transmits the parasite through a bite. It is the vector; Plasmodium is the disease-causing agent. A biological vector can also be a host in which a pathogen develops or reproduces. Malaria is not normally passed by casual person-to-person contact.

3. MATCH CONTROL TO THE ROUTE

If contaminated water carries a pathogen, safe water and sanitation interrupt the pathway. If mosquito bites transmit it, mosquito control and protection from bites address the route. These are introductory examples; detailed prevention and named pathogens follow in later lessons.

Recall check: state both "caused by a pathogen" and "transmissible". Then identify the agent, the host and the route. Similar symptoms alone do not establish that two people have the same pathogen.

Malaria agent, vector and prevention: WHO, Malaria fact sheet.
Transmission pathways and environmental spread: OpenStax Microbiology, section 16.3.

Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 1, p. 30.