Break the transmission route

Prevention reduces new infections; control also limits illness and spread. Match each action to the route, then consider whether people can actually use it.

1. CHOLERA: KEEP FAECES OUT OF FOOD AND WATER

Route: *Vibrio cholerae* is swallowed in contaminated food or water.

Interrupt spread	Safe water treatment and storage, sewage disposal, handwashing and food hygiene reduce faecal contamination.
Add protection	Oral cholera vaccines support outbreak control. They complement clean water and sanitation, not replace them.
Limit harm	Rapid detection and rehydration save lives. Severe cases may need intravenous fluids and antibiotics; rehydration does not remove the environmental source.

2. MALARIA: TARGET THE VECTOR AND PARASITE

Route: infected female *Anopheles* mosquitoes transmit *Plasmodium*.

Prevent bites	Insecticide-treated nets form a barrier and kill mosquitoes; indoor residual spraying targets mosquitoes resting indoors.
Reduce disease	Prompt diagnosis and antimalarial treatment reduce illness and can reduce onward transmission. Preventive medicines protect selected at-risk groups.
Use a combination	Childhood vaccines against *P. falciparum* malaria add protection in endemic settings. Nets and other measures remain necessary.

Different targets: water systems interrupt a vehicle; mosquito measures interrupt a vector. One disease's main control is not automatically useful for another.

Control measures, treatment and vaccination: WHO, Cholera.
Vector control, prevention and treatment: WHO, Malaria.

Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 4, p. 30.

Reduce exposure and infectivity

Treatment can protect both the affected person and others. Its effect depends on the pathogen, the treatment used and sustained access to care.

1. TB: FIND CASES AND REDUCE AIRBORNE EXPOSURE

Route: infectious pulmonary TB releases bacteria into shared air.

Reduce exposure	Ventilation, appropriate masks or respirators and infection-control precautions lower exposure to infectious airborne particles.
Detect and treat	Early diagnosis, contact screening and a completed course of appropriate combination antibiotics reduce disease and spread. Support treatment completion.
Protect at risk	BCG vaccination mainly protects young children against severe TB. Preventive treatment can reduce progression from infection to active disease.

2. HIV: BLOCK EXPOSURE AND SUPPRESS THE VIRUS

Route: specific body fluids reach susceptible tissue or the bloodstream.

Block exposure	Condoms reduce sexual exposure; sterile injection equipment and screened blood reduce blood-borne transmission. Testing links people to care.
Suppress HIV	Antiretroviral therapy (ART) suppresses replication but does not cure HIV. A sustained undetectable viral load prevents sexual transmission (U=U).
Add prevention	ART during pregnancy and breastfeeding reduces parent-to-child transmission. PrEP before exposure and PEP after exposure are clinician-guided prevention options.

Keep the distinction: antibiotics act against bacteria such as TB pathogens; HIV requires antiretroviral medicines. A treatment is not necessarily a cure.

Diagnosis, prevention, treatment and BCG: WHO, Tuberculosis.
Combined prevention, ART and U=U: WHO, HIV and AIDS.

Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 4, p. 30.

Why effective methods can fail

A control programme needs a biological mechanism, community participation and reliable resources. These factors interact rather than operate in isolation.

1. BIOLOGICAL

Will the method work?

Mosquito insecticide resistance can weaken malaria vector control. Drug resistance can undermine antimalarials or TB antibiotics. Diagnosis and surveillance help programmes adapt.

2. SOCIAL

Can people use and trust it?

Stigma can delay HIV or TB testing. Crowded housing increases shared-air exposure. Education must be paired with confidential services and practical support, not blame.

3. ECONOMIC

Can access be sustained?

Water infrastructure, tests, medicines and trained staff require funding. Travel costs or lost wages can prevent clinic visits even when medicines are free.

4. LINK THE BARRIER TO A PRACTICAL RESPONSE

Cost of travel
missed visits
→
Local care + support
easier access
→
More complete treatment
better control

Biological constraints: WHO, Malaria; see also the TB reference on page 2.
Infrastructure and community participation: WHO, Cholera.

Scope: Cambridge Biology 9700 syllabus, section 10.1, outcome 4, p. 30.