Pestes des Petits Ruminants

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Key facts

To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on Key concepts in epidemiology.

Importance

Peste des petits ruminants is caused by a virus of the family *Paramyxoviridae,* genus Morbillivirus. Until recently, this virus was named simply Peste des petits ruminants virus (PPRV); the official name of this virus was changed in 2016 to Small ruminant morbillivirus (SRM). It is antigenically similar to rinderpest virus, measles virus and canine distemper virus. Peste des petits ruminants (PPR) represents one of the most economically important animal diseases in areas that rely on small ruminants as a way of making a living. Outbreaks tend to be associated with contact of susceptible animals with animals from endemic areas.

In addition to occurring in extensive migratory populations, PPR can occur in village and urban settings though the number of animals is usually too small to maintain the virus in these situations. Morbidity rate in susceptible populations can reach 90–100% and mortality rates vary among susceptible animals but can reach 50–100% in more severe instances. Both morbidity and mortality rates are lower in endemic areas and in adult animals when compared to young.

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Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables public health officials to classify and count cases consistently.

The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community-based surveillance, ***volunteers*** *should use broad (simplified) case definitions (referred to as community case definitions) to recognize most or all possible cases, provide relevant risk communication and appropriate actions and encourage them to seek care. Other actors such as* ***healthcare workers or investigators*** *studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

Case definition

No case definition was specified

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Alert / epidemic threshold

An **alert threshold** is the pre-defined number of alerts that suggest the beginning of a possible disease outbreak and therefore warrant immediate notification.
Epidemic thresholds are the minimum number of cases indicating the beginning of a particular disease's outbreak.

Single case

Risk factors

- Animal movement or migration from one place to another (for example during trade and nomadic livestock farming practices)
- Proximity to infected areas
- Inadequate biosecurity
- Proximity to wildlife reservoirs
- Sharing farm resources
- Contaminated feed or water
- Human movement
- Importation of infected animals or contaminated animal products

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Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

Attack rates will vary from one outbreak to another. In case of an outbreak, consult the latest information provided by health authorities.

- PPR has a high attack rate, especially in susceptible populations of cloven-hoofed animals, often reaching over 90% in unvaccinated herds. The attack rate also varies depending on factors such as the species affected, virus strain, and environmental conditions

Groups at increased risk of severe illness (most vulnerable)

- All sheep and goats
- Young animals between 4 months to 2 years.

- Unvaccinated herds

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Infectious agent

Infectious agents are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

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Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

> Competent reservoirs/hosts of PPR virus are goats and sheep. Different species of wild and domestic mammals, including cattle, pigs, gazelles, buffaloes, and deer also get infected but do not appear to transmit the virus.

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How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key concepts to serve as guidance to better understand the diseases included in this website.

> Peste des Petits Ruminants (PPR) is primarily transmitted through aerosols or direct contact between animals living in close proximity. This mode of transmission is common in densely populated herds, where the virus spreads easily from one animal to another. Additionally, fomites, such as contaminated bedding, feed, pasture, and water troughs, can facilitate the spread of the infection. There is no known carrier state for PPR, meaning animals either clear the virus or succumb to the disease.
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> Outbreaks of PPR also show seasonal variation, with more frequent occurrences during the rainy season or the dry, cold season. This is likely due to increased animal movement and trade during these periods.

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Incubation period

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

The incubation period is typically 4–6 days but may range from 3–10 days. In most cases, clinical signs appear in 3-6 days.

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Period of infectiousness

Period of infectiousness is the time interval during which an infected person can transmit the infection to other susceptible persons.

Humans are not infected

Clinical signs and symptoms

The disease begins with a sudden rise in body temperature, reaching 40–41°C. This fever is accompanied by significant changes in the animal's overall condition, leading to depression, restlessness, weight loss and the development of a dry muzzle and dull coat. This is followed by nasal discharge which can persist for up to two weeks.

Around four days after the onset of fever, lesions appear in the gums with excessive salivation and an unpleasant odor, reddening and discharges from the eye. As the disease progresses, severe, watery, and often blood-stained diarrhea becomes a common feature, especially in later stages, followed by coughing, abnormal breath sounds (rales), and abdominal breathing. In some cases, animals may abort. Dehydration, emaciation, and respiratory distress (dyspnoea) often set in, and if the animal does not recover, hypothermia and death typically occur within 5 to 10 days. Those that survive the acute phase undergo a prolonged convalescence. Sometimes, especially in goats, these might occur more rapidly with sudden onset of high fever, rapid depression, and sudden death, often with high mortality rates.

https://www.woah.org/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Disease_cards/PESTE_DES_PETITS_RUMINANTS.pdf

Other diseases with similar clinical signs and symptoms

Contagious caprine pleuropneumonia, Bluetongue, Pasteurellosis (also may occur as secondary infection to PPR), Contagious ecthyma, Foot and mouth disease, Heartwater, Coccidiosis, Nairobi sheep disease, Mineral poisoning.

Diagnosis

- Identification of the agent
  - Nucleic acid detection and identification
  - Immunocapture enzyme-linked immunosorbent assay
  - Culture and isolation methods
  - Agar gel immunodiffusion
  - Counter immunoelectrophoresis
- Serological tests
  - Virus neutralisation
  - Competitive enzyme-linked immunosorbent assay

Vaccine or treatment

Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of a treatment or vaccine should be conducted by a health professional.

- There is no specific treatment. However, supportive care and treatment of bacterial and parasitic coinfections may decrease mortality
- Antibiotics may prevent secondary pulmonary infections
- Several homologous PPR and attenuated PPRV vaccines are commercially available

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Immunity

There are two types of immunity:
- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.

- Vaccines gives strong immunity

Which interventions are most effective for prevention and control?

The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately. Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).
- Community education and engagement activities to encourage the adoption of protective behaviours including:
  - Exposed or infected animals should be slaughtered and the carcases should be burned with deep burial
  - Endemic outbreak situations: when the virus is continually circulating
    - The most commonly employed control mechanism is vaccination

      1. Support and assist in organising vaccination drives for PPR by coordinating with animal health authorities and farmers to ensure all animals are vaccinated on time.

      2. Sheep and goats vaccinated with an attenuated strain of PPR, or that recover from PPR, develop an active life-long immunity against the disease.

    - Promote use of appropriate biosecurity measures

      1. Encourage the setting up of biosecurity checkpoints at farm entrances to ensure visitors are aware of and follow necessary hygiene measures, such as wearing protective clothing and disinfecting boot

      2. Support the recording of animal movements and visitors on farms, which can help trace the source of infection if an outbreak occurs.

    - Monitoring of wild and captive animals; especially avoiding contact with sheep and goats
- Epidemic outbreak situations: when the disease appears in previously PPR-free zones or countries
  - Humane slaughter and disposal of affected animals and their contacts; carcasses burned or buried
  - Strict quarantine and control of animal movements
  - Effective cleaning and disinfection of contaminated areas of all premises and disinfectants as described above; includes physical perimeters, equipment and clothing
  - Careful consideration to use of vaccine; strategic ring vaccination and/or vaccination of high-risk populations
  - Monitoring of wild and captive animals
- Social mobilization to support vaccination efforts in endemic areas, where possible. This includes extensive Information, Education and Communication (IEC) activities on the benefits of the vaccines, vaccination schedules and where/when to get the vaccines.

Epidemic characteristics and RCRC indicators and targets

The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red

Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

Epidemic characteristics and progression
Suspected cases per week (disaggregate by age, sex)
Confirmed cases per week (disaggregate by age, sex)
Case fatality rate

Indicators for Red Cross Red Crescent activities
Number of volunteers trained on a specific topic (e.g. Epidemic Control for Volunteers (ECV); Community-based surveillance (CBS); WASH training; CBHFA training, etc.) ***Numerator*:** Number of volunteers trained Source of information: Training attendance sheets
Suspect cases detected by volunteers who were encouraged to seek healthcare and who arrived at a health facility ***Numerator:*** PPR suspect cases detected by volunteers in a determined period preceding this survey (e.g. two weeks) for whom advice or treatment was sought from an animal health facility ***Denominator:*** Total number of people who are PPR suspect cases in the same period preceding the survey Source of information: Survey
Percentage of people recognizing at least one transmission route and at least one measure for preventing it ***Numerator*:** Total number of people who recognized at least one transmission route and at least one measure for preventing it during the survey ***Denominator*:** Total number of people surveyed Source of information: Survey
Percentage of people who know the cause, symptoms, treatment or preventive measures ***Numerator*:** Number of people who cite the cause, symptoms, treatment or preventive measures ***Denominator*:** Number of people surveyed

See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions,

please refer to: IFRC CEA toolkit (Tool 7.1: Template CEA logframe, activities and indicators). Available at: https://www.ifrc.org/document/cea-toolkit

- For community-based surveillance guidance please see: IFRC, Norwegian Red Cross, Croix-Rouge de Belgique (2022), Community Based Surveillance Resources. Available at: www.cbsrc.org/resources.

Impact on other sectors

Sector	Link to the disease
WASH	Routine sanitation, clearing vegetation and maintaining cleanliness around livestock areas can reduce exposure.
Food security	The disease can lead to death of animals and cause the scarcity of meat and milk in affected communities.
Nutrition	Absence of adequate numbers of meat and milk in the market could lead to poor nutrition and malnutrition in affected communities
Shelter and settlements (including household items)	PPR may have an indirect impact on household items due to the financial strain that could be imposed on families who rely on livestock.
Psychosocial support and Mental health	PPR can have several negative impacts on psychological, social and emotional aspects of a livestock farmer's life, particularly in the long-term.
Sex and Gender	Both women and men play essential -but often distinct- roles in the care and management of small ruminants. Women are closely involved in daily tasks such as feeding, cleaning, and milking, while men often take part in herding, trading, and making key decisions. However, women are frequently excluded from access- to training, and veterinary services, and vaccination campaigns for their animals. Studies suggest that households where both women and men are engaged in livestock management tend to be more resilient to disease impacts. For PPR control efforts to succeed, hence it is essential to ensure that both women and men have equal access to information, vaccines, and decision-making spaces.
Education	Importantly, schools and other facilities dedicated to children and youth can offer an important space for them to engage, mobilize and raise awareness around health education issues. With support, trust and appropriate capacity-building, young people can be effective advocates for the adoption of preventive measures during an epidemic and are those best placed to mobilize their peers.

Sector	Link to the disease
Livelihoods	Livelihoods based on sheep and cattlle breeding or dairy products can be significantly affected during outbreaks (quarantine of herds, slaughtering of livestock). Another impact on livelihoods is the reduction in work activity and to the diversion of resources to seek medical treatment for sick animals, particularly for animals with severe forms of PPR

Resources :

- Food and Agriculture Organization of the United Nations; Peste des Petits Ruminants (n.d.)
- World Organisation for Animal Health (WOAH); Pestes des Petits Ruminants. (2020)
- World Organisation for Animal Health (WOAH); Pestes des Petits Ruminants (n.d.)