

# Health Management and Disease Control in Small Ruminants

**Dr. Mukesh Kumar Swami<sup>1\*</sup>, Dr. Dharam Navadiya<sup>1</sup>, Dr. Ashishkumar Patel<sup>2</sup>,  
Dr. Dhrumilkumar Panchal<sup>2</sup>, Dr. Nayan Raval<sup>2</sup> and Dr. M. M. Islam<sup>3</sup>**

<sup>1</sup>M.V.Sc. Scholar, Department of Livestock Production Management,  
College of Veterinary Science & A. H., Kamdhenu University, Anand, Gujarat, India

<sup>2</sup>M.V.Sc. Scholar, Department of Animal Nutrition,  
College of Veterinary Science & A. H., Kamdhenu University, Anand, Gujarat, India

<sup>3</sup>Associate Research Scientist and Head, Pashupalan Sanshodhan Kendra,  
VASREU, Kamdhenu University, Ramna Muvada, Gujarat, India

## Corresponding Author

Dr. Mukesh Kumar Swami

Email: drmmukeshswami@gmail.com



**OPEN ACCESS**

## Keywords

Diseases, Health, Small ruminants, Immunization, Biosecurity

## How to cite this article:

Swami, M. K., Navadiya, D., Patel, As., Panchal, D., Raval, N. and Islam, M. M., 2024. Health Management and Disease Control in Small Ruminants. *Vigyan Varta* 5(11): 58-66.

## ABSTRACT

Small ruminants viz. sheep and goats, play an important role in rural economics around the world by producing crucial items such as meat, milk, fibre, and hides. However, their production and health are frequently jeopardised by a variety of viral and non-infectious disorders. This page discusses common diseases affecting small ruminants, such as Peste des Petits Ruminants (PPR), Foot and Mouth Disease (FMD), and Contagious Caprine Pleuropneumonia (CCPP). It emphasises the importance of comprehensive health management plans to prevent and control these disorders. Some of the tactics highlighted include biosecurity measures, immunisation programs, nutritional control, and regular health monitoring. By combining these approaches, the study provides a solid framework for protecting the health of small ruminants, assuring their long-term viability and profitability. The essay also emphasises the significance of emergency response plans and continuing surveillance in detecting and responding to disease outbreaks quickly. Overall, this holistic

approach is critical for preserving the health and production of small ruminants, which in turn helps rural communities' economic stability.

## INTRODUCTION

Small ruminants, specifically sheep and goats, are an important source of income for millions of people around the world. They provide meat, milk, fibre, and hide, and their management is often critical to the economic stability of families in rural areas. However, these animals are susceptible to many kinds of diseases, which can have a significant impact on their productivity and health. Effective health management and disease control measures are critical for preventing and controlling outbreaks and preserving the viability of small ruminant farming. According to Salisi *et al.* (2012), the herd health program aims to prevent disease and promote herd health. In the 1990s, Noordhuizen & Wentink devised a farm management program that combines herd health, animal welfare, public health, and farm production. This method has led to improved animal welfare on farms (Sol & Renkema, 1984; Hogeveen & Dykhuizen, 1992). This article explores the most prevalent diseases that affect sheep and goats, as well as detailed health management methods for their prevention and control. The solutions mentioned will include vaccinations, biosecurity measures, nutritional control, and other preventive procedures.

### Common diseases that affect to sheep and goat

Sheep and goats are affected by various types of diseases, which are categorised as infectious and non-infectious. Infectious diseases are viral, bacterial, parasitic, etc., but non-infectious diseases are considered metabolic diseases, mineral and vitamin deficiency diseases, etc. Some common diseases that are found in small ruminants' causative agents and

symptoms are listed here. Visna and Maedi, Louping, Capri Pox. Orf, Caprine arthritis, encephalitis, ovine rotavirus diarrhoea, scrapie, border disease, etc. diseases can also affect small ruminants.

#### 1. Peste des petits ruminant

- **Synonym:** Pseudo rinderpest
- **Causative agent:** PPRV (*Morbilli virus*)
- **Transmission:** Direct contact, secretions and contaminated feed and water
- **Symptoms:** Characterised by high fever, oral necrosis, stomatitis, catarrhal, nasal discharge, diarrhoea, and death. kids are more susceptible than adult animals
- **Prevention & control:** Use secondary infection-preventing medicine, Slaughter of affected animals and immunisation
- **Remark:** Mainly goats are affected

#### 2. Foot and mouth disease

- **Synonym:** Sheep pox / Apathous fever / Epizootic stomatitis
- **Causative agent:** FMDV (*Picornia*)
- **Transmission:** Infected animals, contaminated material with discharge from lesions
- **Symptoms:** Salivation, Sores on feet, tongue and inside the mouth, lameness, off-feed, agalactia
- **Prevention & control:** Segregation and other sanitary measures pre-season vaccination with polyvalent vaccine

### 3. Contagious Caprine Pleuropneumonia (CCPP)

- **Causative agent:** *Mycoplasma mycoides*
- **Transmission:** Through inhalation
- **Symptoms:** A contagious disease characterised by pyrexia ( $\geq 41^{\circ}\text{C}$ ) severe respiratory distress high morbidity mortality and post-mortem Lesion of Fibrinous Pleuropneumonia with pronounced hepatisation and pleural adhesions
- **Prevention & control:** Good herd hygiene, quarantine, movement controls, slaughter of infected and exposed animals and treat by arsenicals, antibiotics and immunisation
- **Remark:** Mainly goats are affected

### 4. Bluetongue

- **Synonym:** Catarrhal fever
- **Causative agent:** *Orbi virus*
- **Transmission:** Blood-sucking midges, mosquito
- **Symptoms:** Fever, depression, lack of appetite, inflammation and ulceration of mucus membrane. Tongue swollen and bluish-coloured.
- **Prevention & control:** Control of biting of insects and vaccination
- **Remark:** Mainly sheep are affected

### 5. Contagious ecthyma

- **Causative agent:** *Parapox virus*
- **Symptoms:** Contagious and highly infectious, pustular and scabby lesion on muzzle and lips. If the lesion extends to the respiratory tract death may be possible

- **Prevention & control:** Maintain hygiene, isolation and give treatment to affected animals, immunization/ vaccination

- **Remark:** Mainly goats are affected

### 6. Rinderpest

- **Causative agent:** *Morbilli virus*
- **Transmission:** Spread by contaminated feed, water, milk, faeces, urine, infected animal, attendant and contaminated utensils
- **Symptoms:** Lesion on buccal mucus membrane, Ulcer inside the lips, gums and foetid smelly diarrhoea at a later, skin lesion also seen
- **Prevention & control:** Isolation of affected animal, Animal movement control, Vaccination

- **Remark:** Mainly sheep are affected

### 7. Anthrax

- **Synonym:** Charbon / Splenic fever
- **Causative agent:** *Bacillus anthracis*
- **Transmission:** Water and food contaminated with blood and excretions by wound infection
- **Symptoms:** History of sudden deaths in the herd, high temperature, rapid breathing, swelling over the body, especially around the neck, tar-coloured dark bloody discharge from natural opening of body and sudden death.
- **Prevention & control:** Animals properly dispose of dead animal manure and other material used for affected animals by cremation or deep burial method. Annual vaccination before the rainy season.
- **Remark:** Sheep are most susceptible

## 8. Enterotoxaemia

- **Synonym:** Overeating pulpy / kidney disease
- **Causative agent:** *Clostridium perfringens* type C & D
- **Symptoms:** The course of illness in kids is short and may develop during the night, consequently may find dead kids during the morning. Respiration is very rapid, saliva drips from the mouth and rises in body temperature. The animal may manifest abdominal pain.
- **Prevention & control:** Herd hygiene, quarantine, and immunisation
- **Remark:** Mainly goats are affected

## 9. Johne's disease

- **Synonym:** Paratuberculosis / vah / dast
- **Causative agent:** *Mycobacterium paratuberculosis*
- **Transmission:** Direct contact with infected animal or via contaminated feed water and pasture
- **Symptoms:** Intermittent diarrhoea and constipation, foul diarrhoea being more prevalent animal losses of flesh.
- **Prevention & control:** Segregation of healthy animals from infected animals strict quarantine of new animals, hygiene
- **Remark:** Mainly sheep are affected

## 10. Mastitis

- **Causative agent:** *Streptococci*, *Staphylococci*, *Corynebacterium tuberculosis*
- **Transmission:** Bacteria from the dirty floors, milker's hands, animals body etc

enter into the udder through injuries on the udder and teats.

- **Symptoms:** Uneasiness at the time of milking, udder swollen, hot and painful in acute cases, milk whey-like with milk clots or sometimes blood clots, temperature of animal body rises
- **Prevention & control:** Proper clean & dry Hand milk in Washing and wiping of udder and teats with mild antiseptic before and after milking clean barns and sheds to reduce overcrowding in sheds

## 11. Brucellosis

- **Synonym:** Bang's disease / Malta fever / Undulant fever
- **Causative agent:** *Brucella melitensis*
- **Transmission:** Contaminated food, water, infected foetus, and may be possible through flies, ticks, rat etc.
- **Symptoms:** Abortion about the 4<sup>th</sup> month of pregnancy, arthritis, orchitis
- **Prevention & control:** good herd hygiene, slaughter, and protective vaccination/immunisation
- **Remark:** Sheep are less susceptible than goat

## 12. Haemorrhagic septicaemia

- **Synonym:** Shipping fever / Gulghotu
- **Causative agent:** *Pasteurella multocida* type I
- **Transmission:** Through contaminated food, water and pasture with infected animals, organisms usually present in the respiratory tract of apparently healthy animals and cause disease when the animal resistance is lower

- **Symptoms:** Sudden attack, high fever, early death, painful, hot swelling on throat, neck and may involve fore-legs and shoulders, swollen tongue, laboured breathing
- **Prevention & control:** Segregation, avoidance of infected pasture, feed and water and pre-monsoon vaccine

### 13. Pneumonia

- **Transmission:** Generally, pneumonia occurs when animals are exposed to unfavourable weather conditions and when their resistance is lowered
- **Symptoms:** Initially chill followed by high temperature, breathing becomes faster and laboured coughing is dry and painful in the beginning but becomes soft and moist as the disease advances watery or mucus-like discharge from nostrils.
- **Prevention & control:** Avoid exposure to sudden cold or rain avoid overcrowding of animals keep animals in neat clean and dry houses.

### 14. Tuberculosis

- **Causative agent:** *Mycobacterium tuberculosis*
- **Transmission:** Infection occurs either directly or indirectly from infected animals their secretion or excretion bacteria enter systems by ingestion or inhalation.
- **Symptoms:** Usually, lungs and lymph glands are affected often infected animals show no outward symptoms, loss in weight, swelling of joints chronic cough, laboured breathing, fever, and depression.
- **Prevention & control:** Tuberculin test and BCG vaccine
- **Remark:** Mainly sheep are affected

### 15. Babesiosis

- **Synonym:** Texas fever
- **Causative agent:** *Babesia bigemina*
- **Transmission:** Transmitted by blood-sucking ticks
- **Symptoms:** High-temperature rapid breathing red to dark brown urine yellowish mucus membrane
- **Prevention & control:** Control of ticks dipping during tick season
- **Remark:** Mainly sheep are affected

### 16. Coccidiosis

- **Causative agent:** *Eimeria arloingi*, *E. peravea*
- **Transmission:** Animals frequently harbour coccidia but disease only follows massive infections such as may occur when animals are kept in unclean and over-crowd conditions
- **Symptoms:** The faces are thin, foetid mixed with mucus and blood clots are passed in or after faces, there is marked straining tenesmus and progressive emaciation, disease less severe in sheep and goat
- **Prevention & control:** Hygiene management practice segregation of affected animals keeps animals in a sunny dry place, coccidiostat drugs may be used
- **Remark:** Mainly sheep are affected

### 17. Theileriosis

- **Causative agent:** *Theileria hirci*
- **Transmission:** By blood sucking ticks

- **Symptoms:** Haemoglobinuria- red to dark brown coloured urine
- **Prevention & control:** Control of ticks by dipping during tick season
- **Remark:** Mainly sheep are affected

### 18. Roundworm

- **Causative agent:** *Hoemonchus contortus*, *Oesophagostomes*, *Strongyles*
- **Symptoms:** Unthriftiness, loss of weight, diarrhoea, anaemia, pale mucous membrane of eye and mouth, potbelly and swelling under the jaw.
- **Prevention & control:** Pasture rotation Proper stoking rate, use of phenothiazine, copper sulphate, nicotine sulphate.

### 19. Tape worms

- **Synonym:** Gid in sheep
- **Causative agent:** *Tenia saginata*, *Coenurus cerebralis*
- **Symptoms:** Lambs most adversely affected, larval stage called Bladder worm *Cysticercus ovis* affected mutton giving it a spotted or measly appearance
- **Prevention & control:** Control is difficult due to the various species involved, pasture rotation and sanitation
- **Remark:** Mainly sheep are affected

### 20. Liver flukes

- **Causative agent:** *Fasciola hepatica*
- **Symptoms:** Sheep are highly susceptible, death is rapid in case of heavy infestation, diarrhoea, anaemia, watery swelling on the dependent part of the body

- **Prevention & control:** Control of intermediate host Snail, treatment with Thiabendazole, Tetrachloromethane and Tetrachloroethane is recommended

- **Remark:** Mainly sheep are affected

### Comprehensive Health Management Plans to Prevent and Control Outbreaks

Comprehensive health management plans (CHMPs) are critical instruments in veterinary medicine for preventing and controlling outbreaks, particularly among livestock and companion animals. These plans include a number of guidelines and methods for managing and mitigating risks associated with infectious diseases. A comprehensive plan should contain the shelter's infectious illness policy, outbreak management plan, and disease-specific practices. The infectious illness policy specifies which disease or conditions the shelters will treat and under what conditions. The initiative tries to improve herd performance and productivity by addressing nutrition, breeding, parasite control, vaccines, biosecurity, and environmental issues.

### Key features of comprehensive health management plans

#### Biosecurity Measures

Biosecurity refers to any practices, policies, or procedures used on a farm to prevent as well as control disease from entering or moving around the farm. It can include simple practices related to animal husbandry, such as daily cleaning of holding units, sanitation, Isolation and Quarantine, disposal of dead animals, and feeding regimes, as well as farm policies and procedures concerning visitor admission, animal introductions onto the site, and equipment disinfection (Delabbio *et al.*, 2006).



Biosecurity can be defined as a prevention plan to control disease on the farm or spread around the farm by implementing specific practices or procedures.

### Deworming / Vaccination Programs

A comprehensive herd health program should address common parasite threats to goats. A successful parasite management policy must emphasise prevention over treatment. Treating goats with high parasite burdens has a lower impact on decreasing future environmental pollution. Besides that, goats tend to release worm eggs back into the environment even after treatment. Adult goats should be dewormed every two to three months, regardless of whether they graze intensively. Children should be dewormed at weaning, and this should be done again after 21 days. For effective management of parasites, a periodic screening program is necessary. This involves collecting faecal samples from goats every three months and performing faecal flotation tests, which are the most popular diagnostic tests for parasites.

Faecal egg counts, or FECs, should be done on ewes and lambs before they head out to pasture. Deworming needs to be done based on the FEC outcome. FEC should be given again every 4-6 weeks, particularly to lambs. If diarrhoea is evident, samples should be taken from lambs with solid faeces but inadequate body condition rather than those with diarrhoea. It is recommended to sample lambs, gimmers, and ewes individually and conduct independent investigations on the FEC of a mixed sample of each group. Maintain a pristine pasture for your ewes and lambs. It is also important to follow the guidelines for sustained parasite management.

Vaccination programs are essential for the health of herds. It can keep goats safe from several kinds of diseases. Vaccination can minimise pathogen spread, but in naive

populations, there is often insufficient time for vaccine production and administration, resulting in a lack of protection. Vaccination during an outbreak is also extremely resource-intensive and may divert limited resources away from other high-priority duties, including tracing and observation. The immunization program aims to cure a number of infectious diseases, including foot and mouth disease, pneumonia, and caseous lymphadenitis (CLA). Goats, particularly young ones, are susceptible to pneumonia, a respiratory condition. Vaccination boosts the animal's immune system development early in life.

### Deworming schedule

Roundworms	1-6 months of age – once in a month 6-12 months of age – once in two months After one year of age thrice in a year
Liver flukes	Twice in a year
Tapeworms	Twice in a year

### Vaccination schedule

Vaccine	Primary (1 <sup>st</sup> dose)	Booster (2 <sup>nd</sup> dose)	Revaccination	Dose & Route
Peste des petits ruminants (PPR)	≥ 3 months	—	After every 3 years	1 ml S/C
FMD	≥ 3 months	2-4 weeks after 1 <sup>st</sup> dose	Twice in a year	1 ml S/C, I/M
Enterotox aemia	≥ 3 months if Dam vaccinated At 1 week if dam unvaccinated	15 days after 1 <sup>st</sup> dose	Annually (Prior to monsoon)	2 ml S/C
Haemorrhagic septicaemia	≥ 3 months	—	Annually	----
Sheep pox/ Goat pox	≥ 3 months	—	Annually	1 ml S/C
Tetanus	3-4 months	6 months of age	Annually	500 IU S/C
Blue tongue	4 months	4 weeks	Annually	2 ml S/C

		after 1 <sup>st</sup> dose		
Anthrax	≥ 3 months	-----	Annually	
CCPP	≥ 3 months	-----	Annually	0.2 ml S/C, I/M

### Surveillance and Monitoring

As fewer veterinarians participate in livestock production and producers have less interaction with individual animals, surveillance programs are becoming increasingly vital. Routine inspections of health are the foundation of effective herd management. Regular clinical examinations, faecal collection for parasite load, and behaviour observation should all be part of these assessments to detect any signs of disease or suffering early. Individual animal health statuses, treatment histories, and outcomes should all be documented in great detail.

Throughout the grazing season, the flock or each member of the flock needs to be under daily supervision. The flock, or every component of the flock, needs to be under daily management during the grazing season. At a minimum, one must trim one's feet annually.

It should be possible to take foot baths. Sheep raised for wool must be shorn once a year at minimum. The shearers' clothing should be clean (just laundered), and their shoes should be clean and sanitized. Before being given to the flock, all shearing equipment that the shearers introduce should be thoroughly cleaned and sanitized. If ectoparasites appear, appropriate care needs to be given. Chewing lice cannot be removed by systemic macrocyclic lactones; instead, use pyrethroids or other contact pesticides if they appear.

### Nutritional Management

A well-balanced diet is critical to small ruminant health and output. Nutrition should

be tailored to the herd's specific needs, considering characteristics including age, reproductive state, and production goals. Grazing management is also crucial; excessive grazing can cause nutritional deficits and raise the danger of parasite infections. Mineral and vitamin supplements should be administered as needed, and water quality should be examined on a regular basis to avoid waterborne infections.

### Emergency Response Plans

A successful outcome requires enough resources from the entire government, the implementation of tested programs, and previous education of all stakeholders. Minimizing the social, environmental, welfare, and financial costs associated with an emergency animal disease depends on immediate detection, mobilization of resources for assistance in movement control, data collection and collation, assistance with vaccination, and the "over-commitment" of initial resources.

### CONCLUSION

Small ruminant farming requires effective health management and disease control to ensure its long-term viability. Comprehensive health management strategies, which include vaccination, biosecurity, nutritional management, and regular health monitoring, can greatly lower the occurrence of illnesses such as PPR, FMD, and CCPP in sheep and goat populations. These tactics not only increase animal health and productivity but also boost the financial viability of small-scale farming businesses. Regular surveillance and emergency action plans are critical for the early detection and management of disease outbreaks, thereby reducing their impact. Furthermore, continuous education and training for farmers is required to ensure the successful implementation of these health management strategies. Small ruminant



producers may preserve their herds, enhance productivity, and contribute to rural economies' overall resilience by putting disease prevention and management first. This comprehensive approach to health care is critical to maintaining the long-term success and sustainability of small ruminant farming.

## REFERENCE

- Banerjee, G. C. (2018). *A textbook of animal husbandry* (8th ed.). Oxford & IBH Publishing.
- Delabbio, J. (2006). How farm workers learn to use and practice biosecurity. *Journal of extension*, 44(6), 6FEA1.
- Hogeveen, H., Dykhuizen, A. A., & Sol, J. (1992). Short- and long-term effects of a 2-year dairy herd health and management programme. *Preventive Veterinary Medicine*, 13(1), 53–58.
- Noordhuizen, J. P. T. M., & Wentink, G. H. (2001). Epidemiology: Developments in veterinary herd health programmes on dairy farms: A review. *Veterinary Quarterly*, 23(4), 162–169. <https://doi.org/10.1080/01652176.2001.9695106>
- Salisi, M. S., Saad, M. Z., & Kasim, A. (2012). Implementation of herd health program to improve survival of Boer goats in Malaysia. *Tropical animal health and production*, 44, 207-211.
- Sastry, N. S. R., & Thomas C. K. (2015). Health management. In *Livestock Production Management*. 5ed. (pp. 354-399). Kalyani Publishers, New Delhi.
- Sol, J., & Renkema, J. A. (1984). A three-year herd health and management program on thirty Dutch dairy farms: I. Objectives, methods, and main results. *Veterinary Quarterly*, 6(3), 141-148.