



RASHTRIYA  
KRISHI VIKAS  
YOJNA (RKVY)

ISBN: 978-93-5473-823-4

# Awareness Guide on Dairy Farm Biosecurity



**Edited by**

Dr. Pankaj Dhaka

Dr. J.S. Bedi

Dr. Deepthi Vijay

Dr. Simranpreet Kaur

Dr. B.B.S. Dhaliwal

Dr. R.S. Aulakh

**Centre for One Health**

**College of Veterinary Science**

**Guru Angad Dev Veterinary and Animal Sciences University,  
Ludhiana, Punjab, India -141004**



# Preface

'Animal Farm Biosecurity' refers to the herd management practices that reduce the chances of entry and spread of infectious diseases onto the farm by animals or people. Broadly, the farm biosecurity can be divided into external biosecurity and internal biosecurity. The management system that reduces the risk of introducing infectious diseases to a herd is known as external biosecurity, whereas, internal biosecurity includes those management practices affecting animal contacts within the farms which affect disease spread between the animals.

The benefits of implementation of biosecurity at farm level include increase in productivity, decrease in healthcare cost, good animal welfare, good quality animal products, increase in overall farm profit margin, and awareness on zoonoses and other infectious diseases to farmers and public. The simple preventive measures of biosecurity, if appropriately applied at farm level, could drastically improve the human, animal and environment health in a synergetic way. In many regions, there is lack of awareness not only among the farmers but also among the veterinary professionals about the benefits and practical applicability of the biosecurity measures.

The relevant information on the biosecurity measures in readily accessible form is scarce, and also the farmers are not adequately trained for setting-up the biosecurity framework at their farms. Therefore, awareness on the practical utility and benefits of biosecurity measures need to be spread among veterinary professionals and farmers. In this context, the present booklet aims to provide a comprehensive overview on 'dairy farm biosecurity' by summarizing relevant literature for awareness purposes for farmers students and veterinary professionals.



**Dr. Sarvpreet Singh Ghuman**  
(Dean, CoVS, Ludhiana)



**Dr. J.P.S Gill**  
(Director Research)

# Why Animal Health is Important?

“Healthy animals secure better livelihoods, ensure food safety, and maintain equal access to food for all”



- To improve the farm productivity
- To obtain farm stability
- To improve quality and safety of farm products
- To reduce the risk of zoonotic infections
- To improve animal welfare
- To reduce antimicrobial usage and resistance

**Animal husbandry is considered as the growth engine of the nation**

- Contribute 4.11% of GDP
- Livelihood source for rural population
- Source of nutritious food as milk to the families



## Preventing animal diseases protect public health

**Zoonoses:** Zoonoses are the ‘diseases and infections that are naturally transmitted between vertebrate animals and man’.

- 61% of existing human diseases are zoonoses
- 75% of emerging infectious diseases of humans are zoonoses

**Foodborne Disease:** ~ 250 foodborne diseases affect humans, in which foods of animal origin remain a major source

# What causes infectious diseases in animals?

## VIRUSES

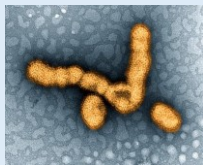


Image of H1N1 influenza virus under transmission electron microscope. (Image credit: National Institute of Allergies and Infectious Diseases)

Viruses are smallest of all the microbes. Viruses are unique because they are only alive and able to multiply inside the cells of other living beings. A virus is made up of a core of genetic material, either DNA or RNA, surrounded by a protective coat called a capsid which is made up of protein. Sometimes the capsid is surrounded by envelope. Some of the viruses can cause highly infectious diseases in animals and humans.

Bacteria are single celled microscopic organisms not visible with naked eye. The bacteria don't have nucleus or membrane bound organelles.

Most bacteria in the body are harmless, and some are even beneficial. A relatively small number of species can cause diseases in humans and animals.

## BACTERIA



Scanning electron microscope image of Gram-negative *Escherichia coli* O157:H7 (Image: Centers for Disease Control and Prevention)

## FUNGI

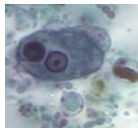


Microscopic image of *Aspergillus fumigatus* (Image: Centers for Disease Control and Prevention)

Fungi can be single celled or complex multicellular organisms. They are found in all habitat and mostly live on soil or on plant. Some are parasites of plants, animals and humans causing diseases. In humans these include skin diseases such as athletes' foot, ringworm and thrush.

A parasite is an organism that lives on or in a host organism and gets its food from or at the expense of its host. There are 03 main classes of parasites that can cause disease in humans and animals: protozoa, helminths, and ectoparasites.

## PARASITES



Microscopic image of protozoa-*Entamoeba histolytica*



Adult *Ascaris lumbricoides* worm. They can range from 15- 35 cm.



Adult louse: actual size is as big as a sesame seed.

(Image: Centers for Disease Control and Prevention)

# Disease transmission pathways

## Routes

## Description and examples

### Respiratory route

- Infectious **aerosols** are created when the pathogens are dispersed in **particles  $< 5 \mu\text{m}$** , whereas the **particles  $> 5 \mu\text{m}$**  in size can be transmitted through **droplets or dust particles**
- Important route of transmission, where animal density are high with poor ventilation.
- E.g., Foot-and-mouth disease; Infectious bovine rhinotracheitis; Ephemeral fever etc.

### Oral route

- Oral route of transmission is common for **enteric pathogens**. The ingested organisms may be excreted in faeces of infected animals and start the **faecal-oral** transmission cycle.
- E.g., Rotaviruses, *Salmonella* spp., *Cryptosporidium parvum*, Enteroviruses etc.

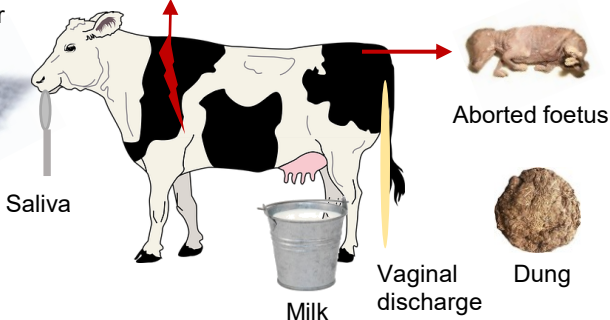
### Transmission through percutaneous, corneal and mucous membranes

- **Percutaneous infections** can be due to the **bites** by both vertebrates and arthropods (e.g., Rabies from dog bite, trypanosomiasis from tse-tse fly bite).
- Some microbes can transmit through skin *via*. **direct contact with infected animal** (e.g., ringworm and ectoparasitic infestations) or **fomites** (e.g., brucellosis).
- Some pathogens may gain access through **cornea** (e.g., bovine keratoconjunctivitis by *Moraxella bovis*)
- Some pathogens can be **transmitted sexually** through **mucous membranes** during coitus (e.g., *Brucella* spp.)

## Common routes of pathogen(s) excretion in animals

Aerosols through breathing or coughing

Wound



Aborted foetus

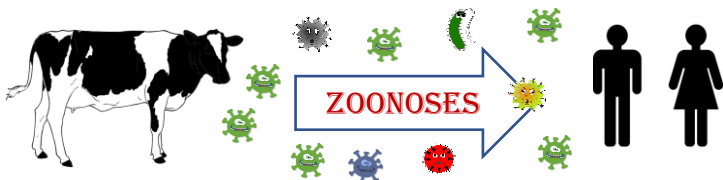
Milk

Vaginal discharge

Dung

# Can animals transmit disease(s) to humans?

Yes !!!



**Zoonoses** are the infectious diseases that can transmit from animals to humans. Zoonotic pathogens may be bacterial, viral or parasitic, which can spread to humans through direct contact with animals and vectors, or through food, water or the environment.

## List of Important Bovine-associated Zoonoses



### Bacterial Zoonoses

- **Anthrax** (*Bacillus anthracis*)
- **Brucellosis** (*Brucella abortus*, *B. melitensis*)
- **Coxiellosis/Q fever** (*Coxiella burnetii*)
- **Enterohemorrhagic *E. coli***
- **Leptospirosis** (*Leptospira* spp.)
- **Listeriosis** (*Listeria monocytogenes*)
- **Non-typhoidal Salmonellosis** (*Salmonella* Typhimurium)
- **Zoonotic tuberculosis** (*Mycobacterium bovis*)
- **Others:** *Campylobacter* spp., *Clostridium perfringens*, *E. coli*, *Staphylococcus aureus*



### Viral Zoonoses

- **Rift Valley Fever (RVF)**- (*Phlebovirus*; Bunyaviridae)
- **Crimean-Congo haemorrhagic fever (CCHF)**- (*Nairovirus*; Bunyaviridae)
- **Kyasanur Forest disease (KFD)**- (*Flavivirus*; Flaviviridae)
- **Others:** Cowpox virus, Parapox virus, Rabies virus, Vesicular stomatitis virus



### Parasitic Zoonoses

- **Taeniasis** (*Taenia saginata*)
- **Cryptosporidiosis** (*Cryptosporidium parvum*)
- **Others:** *Entamoeba histolytica*, *Fasciola* spp., *Giardia intestinalis*, *Toxoplasma gondii*, *Trypanosoma brucei*, *Sarcocystis*, *Schistosoma* spp.



### Fungal Zoonoses

- **Dermatophytosis** (*Dermatophilus congolensis*), *Microsporium* spp., *Trichophyton* spp.

# What do you mean by Animal Farm Biosecurity?

“Animal farm biosecurity comprises of set of measures that are designed to protect the farm from the entry and spread of infectious diseases”



## RESTRICTED ENTRY

Visitors are requested to comply with the **FARM BIOSECURITY**

CONTACT US BEFORE VISIT



Mobile No. \_\_\_\_\_

**Help to Keep Our Animal Healthy**

*Remember! Vehicles, people and equipment can carry pathogens*

“It is all about dealing with biohazards **to prevent the entry** of pathogens to the farms; and if entered, then **to prevent their transmission** from infected to susceptible animals or nearby farms”

**Remember:** # Healthy Animals → # Healthy Food → # Healthy Humans

## Animal Farm Biosecurity

Foundation of all disease control programs

Important tool of 'Herd Health Management'

## Components of Farm Biosecurity

### External Biosecurity (Bio-exclusion)

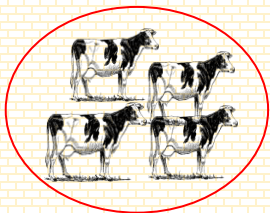
The prevention or reduction of the risk of introduction of infectious agents to the animal farms is termed as bio-exclusion

### Internal Biosecurity (Bio-containment)

To complement bio-exclusion, preventive measures should be taken to reduce the spread of infectious agent within the farm, termed as bio-containment



# Components of Animal Farm Biosecurity



**Import of animals with proper testing and Quarantine**



**Avoid contact with stray and other animals during grazing and cattle fairs**

**External Biosecurity**



**External Biosecurity**

**Farm visitors, equipment, feed and water can be the vehicles for pathogens**

**Vermin, wild animals or birds can spill over the pathogens to farm animals**



**Internal Biosecurity**

- **Feed and water quality**
- **Testing of animals**
- **Isolation of infected animals**
- **Safe disposal of animal wastes**
- **Vaccination and deworming**
- **Maintaining farm records**
- **Worker hygiene**

**“It should be remembered that the biosecurity chain remains as strong as the weakest link”**

# Farm Biosecurity: Its start from 'farm entrance'

Persons who have frequent exposure to animals like vets, para-vets and other visitors can pose risk to the farm by spreading the pathogens; therefore, proper hygiene is essential while allowing their entry to farm premises.



Proper fencing of the farm entrance and boundaries to prevent any contact of stray or wild animals to the farm animals



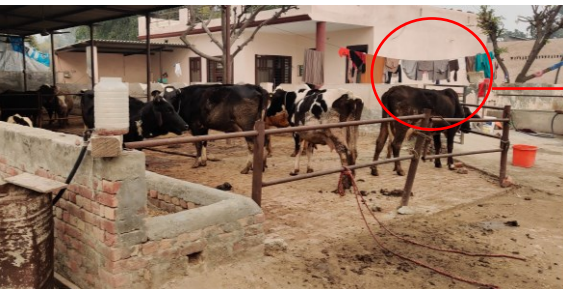
Proper record of farm visitors with required PPE (e.g., shoe cover)

Proper disinfectant footbaths for entering vehicles

**Visitors Pay Attention!**

Entry Restricted beyond this point

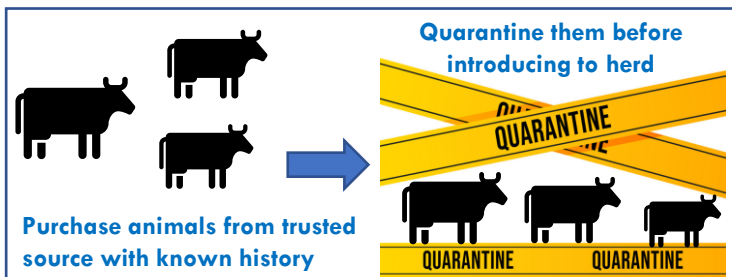
Park your vehicle here and follow biosecurity norms



Remember that the farms must have appropriate distance from the residence

# Quarantine and Isolation facilities: A shield against infectious diseases

- It is nearly impossible to keep completely closed-herd
- Most likely way for disease to arrive on farm is through the arrival of new animals
- Disease status of new stock should be considered carefully
- Ask questions about animal health status, vaccination, and treatment history



Protect your farm animals against disease(s) by separating them from the newly arriving animals until your vet is sure that they are disease-free. This is referred to as **'Quarantine'**

The **'length of quarantine'** must cover **'incubation periods'** of most acute infectious diseases, so may be **6 weeks or longer**, or the time for test results to be received



Isolation of cow with subclinical mastitis

- Disease may occur within your stock, so separate sick animals to protect the healthy animals. This is referred as **'isolation'**
- Isolation allows sick animals to rest and recover, which prevents spreading of disease to others

**Designate specific areas for quarantine or isolation.** These should:

- Be completely separate buildings with proper fencing
- Be as far as possible from other healthy animals
- Use of separate feeding, watering and equipment facilities

# Feed and Water Hygiene

Contaminated feed & water facilities can be the point source of infection for animals. Proper monitoring and testing of feed & water supplies remain a crucial component of farm biosecurity

## Feed Sources



- Feed sources must be from trusted and known suppliers
- Keep feed transport vehicles and equipment clean and disinfected
- Don't feed catering waste and kitchen scraps to animals
- Remove the uneaten feed promptly & carefully dispose it

## Water Sources



- Use good quality water and keep water supplies clean
- Locate water troughs carefully to avoid contamination
- Faeces and body fluids from animals may contaminate feed and water troughs
- Vermin/stray/wild animals can also contaminate feed stores

## Feed storage



- Keep feed stores clean and spillage-free
- The improper storage may contaminate the feed with microbes as well as mycotoxins
- Follow standard procedures while preparing silage



**Store the feed in clean and dry place**

# Management of animal waste & dead animals



## Dispose animal wastes properly to prevent spread of diseases and environment pollution

**Slurry and manure** can be the source of pathogens on farm. Some important points to be considered are:

- Remove the dung and slurry as soon as possible from the shed
- Avoid aerosols when collecting & spreading slurry
- Dispose slurry and manure far away from the farm
- Wear protective clothing and boots which can be cleaned and disinfected when handling slurry or manure



### Keep your animals and farm premises clean

Farm hygiene is very crucial to prevent many infectious diseases including mastitis

**Dead animals:** Animals died of infectious diseases might pose a risk to other farm animals. In case of zoonoses, this can pose risk to animal handlers also

Proper disposal of carcass is crucial. Buried animals must be covered with at least 2 feet of soil



- Remove placenta and dead stock from farm as soon as possible with proper disposal measures
- Consult your vet to enquire about the need of post-mortem examination of dead animal (s)



# Protect your farm from stray animals/rodents/vectors

No farm can be completely proof from biological hazards, but the level of risk can be minimized by following biosecurity protocols

**Stray animals** can pose a great threat of the health of farm animals.

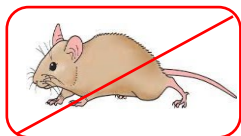
Stray dogs can be the source of as deadly disease as rabies. Wild and migratory bird can be the source of exotic pathogens

Keep check on **stray animal** population in your areas and be vigilant of their contact with farm animals. Appropriate fencing should be done according to the presence of type of **stray and wild animal** species in surrounding areas.



**Rodents** can harbour many pathogens. Implementation of rodent control program and monitoring of its effectiveness is crucial

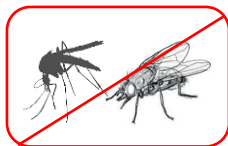
**Rodents** are mostly attracted to feed; so, store feed in closed containers or sheds, and clean the feed spillage regularly. Repair holes in the farm building to block the vermin entry points.



**Flies and mosquitoes** are among the most difficult pests to control.

These can be the vectors for many pathogens and can cause potential losses to your animal's productivity

Sanitation and hygiene is the most important factor in any **fly control** plan. Manure and other fly breeding material should be regularly removed from the farm and nearby premises.



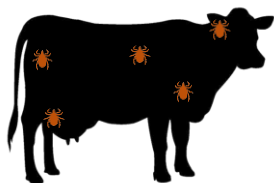
**Ticks** can be the important vector for many pathogens; therefore, farm level and environmental tick control program should be placed in biosecurity protocols.

**Ticks** can have impact on animal's weight gain, milk production and can also transmit the pathogens. The integrated tick control strategies with appropriate acaricides remain a major component of farm biosecurity.



# Tick control at Farm

## Why tick control is important?



Cattle should be examined regularly for presence of ticks. Tick infestation can cause irritation, lesions, damage to hide and udders, toxicosis, and production losses. Moreover, ticks can serve as vectors for many pathogens.

## Tick control Strategies



## Use of acaricides

Ask your Vet for appropriate products. Pyrethroids, including fipronil, permethrin, and their combination, are effective ectoparasiticides.

Acaricides can be used as dipping, hand spray, foot-bath, pour-on, impregnated ear-tags, self-applicators etc.



Rotation of pastures or pasture spelling can control ticks. Keep pastures short by grazing or mowing to minimize vegetation where ticks could live.

**Avoid tick prone pastures !!!!**

**Protect yourself and your animals**

Eliminate cracks in walls, which provide shelter to free-living stages of ticks



Some of the emerging novel methods include use of anti-tick vaccines, pheromones, sterile male/hybrid mating technique.

# Fly control at Farm

- Flies involved in transmission of >100 pathogens to humans, including typhoid, dysentery, cholera etc.
- Flies are responsible for significant reduction in animal production and spoilage of dairy products



**Intensive livestock farming often provide an ideal breeding environment for flies, making their control a major challenge**

## Do you know?

A house fly can lay up to **1000 eggs** during its **30 days life cycle**. These eggs are deposited on moist manure or decaying organic matter.



## Sanitation is the KEY!

**Eliminate the flies' breeding source:** A systematic sanitation program is must to control flies in and around farm. No insecticide can be expected to control flies under poor sanitary conditions.

## Sanitary tips:

- Remove all manure from livestock pens as frequently as possible
- Spread manure thinly to outdoors so that fly eggs & larvae will be killed by drying, or stack the waste and cover with plastic tarp
- Eliminate silage seepage areas, wet litter, manure stacks, old wet hay or straw bales, and other organic matter accumulations that may attract flies anywhere on the farm
- Provide proper drainage in barnyards
- Keep water troughs leak-free

## Integrated Pest Management:

In case of high fly menace, farmers can combine routine sanitation with a variety of pesticide applications, such as baits, residual sprays, space sprays, and larvicides. Consult your vet for appropriate selection of pesticide (e.g., permethrin, dichlorvos, deltamethrin, pyrethrins, methomyl, diflubenzuron etc.)

**Remember: Don't** allow food-producing animals to have access to treated areas. **Don't** allow contamination of feed or drinking water.

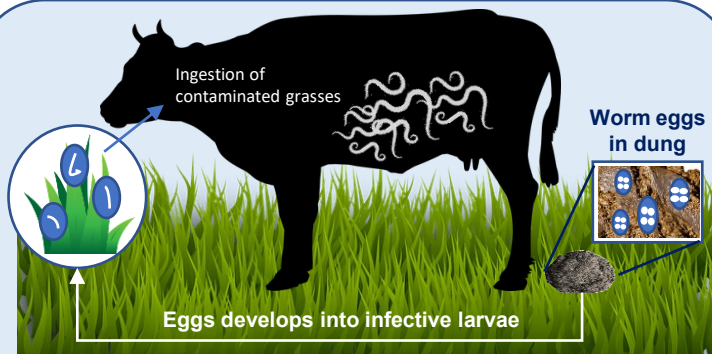


# Parasite control in animals

Parasites are the freeloaders in farm animals that harms the hosts by taking up their valuable nutrients, energy and affects general well-being. These parasites can reduce weight gain, suppress appetite, reduce milk production and weaken immune response.

## Advantages of deworming

- Better animal health
- Boost of immunity
- Increase growth and production
- Increase in reproductive performance



An illustration of internal parasitic life cycle in cattle

Animal owners should consult their veterinarian(s) to choose the relevant parasitic drug and its interval for the internal parasite control program of the farm

## The 5 "C's" of Parasite Control

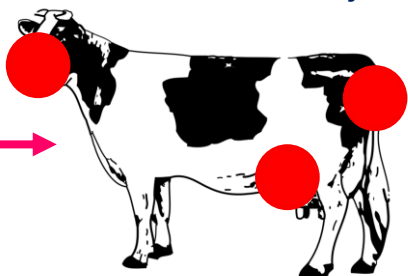
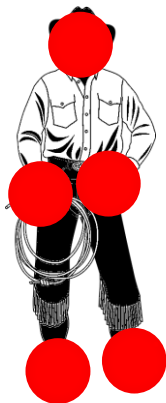
- Use the **correct** product
- Apply to **correct** species of animal
- Apply at the **correct** time
- Use the **correct** dose
- **Check** for efficacy

In places where heavy endo-parasite infestations are found (hot-humid regions), it is advisable to deworm heifers twice a year up to two years of age.

# Farm workers' hygiene

**Remember:  
Germs moves  
both ways!**

**Protect Yourself !  
Protect Your Cows !  
Protect Your Family !**



**You can bring in  
germs from outside  
the farm that may  
make cows sick**

**You can take germs  
home from work  
that can make your  
family sick**

## **When to wash hands**

- At the start and end of work day
- Before and after eating
- Before and after milking
- After removing gloves
- After herd health activities or working with manure



**Wash hands with soap and water for 20 seconds,  
dry with clean towel**

**Pay extra attention to hand washing and  
hygiene when returning to the farm after**

- Contact with animals on other farms
- Contact with pets or wildlife
- Spending any time in a hospital



# Staying safe at work on farm!

Ensure that new workers are appropriately trained and familiar with the temperament of farm animals

## Wear work-specific clothing and footwear

It is advisable to provide a separate farm usage clothing for employee with on-farm laundry facilities

High-risk farm operations (e.g., handling parturition) should be conducted with appropriate personal protective equipment(s)

Avoid touching your mouth, eyes, or food with contaminated hands

Eat your meals in an area away from cattle and their housing



Set routine farm work from low-risk (e.g., feeding healthy calves) to high-risk flow (e.g., handling sick animals)

Animals whose milk is unfit for human consumption should be milked last or with a separate bucket or system. Do not use milk from sick animals for human consumption. Also, never consume raw milk.

Take extra precaution when you are ill and, when possible, limit close contact with coworkers and cattle.

Keep **records of health status** of farm workers. Remember to keep your immunizations up-to-date for vaccine-preventable diseases.

# Disease threat from visitors

Farm visitors and their vehicles can be a potential threat to farm biosecurity. Visitors such as farmers, veterinarians, para-vets, dead-stock collectors etc., who have frequent contact with animals are considered as high-risk groups

## Keep Our Farm Healthy and Our Farm Secure

Measures that can help to reduce the bio-risks from visitors are:

- Keep **single farm entry point** in order to restrict unauthorized entry
- Designate **separate office area** for meeting with visitors
- Keep **visitors to minimum** and maintain a record of visitors
- **Footbath for both people and vehicles** at the farm entrance
- **Proper display of biosecurity signs to visitors**, like signs for designating areas permitted access for visitors and which don't
- **Personal protective clothing and footwear** for visitors
- **Hand washing** points with soaps and disinfectant should be available at least at entry and exit point of farm
- **Stock the dead animals** in **designated area** outside the farm and avoid bringing dead-stock collector vehicles into the farm.

### Do not Enter

**Animal Housing Area without permission**

If granted permission to enter, you must:

- **Wear clean protective clothing**
- **Sanitize boots or wear sterile shoe covers**
- **DO NOT touch animals/pets**
- **DO NOT feed animals**

### Reduce your risk

**Wash your hands before and after touching the animals and their environments**



**No hand to mouth contacts, such as eating, smoking etc. Use special cautions, if you are pregnant, elderly or have children under 05 years**

# Calf Management

**Remember: Colostrum should be the first thing that goes in calf's mouth**

- New-born calves are mainly reliant on colostrum until their immune system develops in the first months of life
- Colostrum provides antibodies crucial for protection against disease conditions such as scour, pneumonia etc.

## Do you know?

Colostrum quality decreases by 3.7% every hour after birth and a calf's ability to absorb antibodies directly into its bloodstream only lasts a few hours. So, colostrum must be harvested quickly, and **must be fed within four hours of birth**



## Take a note !

- Provide first colostrum feed of four litres (or 10-12% of bw) within first 08 hrs of birth, followed by 02 litres within 12 hrs of birth.
- A calf requires approx. 20 minutes of continuous suckling to consume enough colostrum.
- If a calf is not receiving adequate colostrum, try feeding the calf using a nipple feeder/stomach tube
- Good quality colostrum contains at least 50 g/L of IgG antibodies

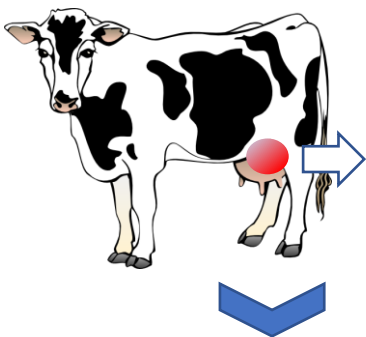
**Good calf management is the key for farm productivity and economics**



**Keep calves in clean and hygienic housing conditions**

# Mastitis: Management issue at farm

Mastitis is a complex, multifactorial disease, where the pathogens, cows and the farm management all play a role



**Bovine mastitis is an inflammation of the mammary gland.**

There are several causes of mastitis, including bacteria such as *Streptococcus agalactiae*, *Staphylococcus aureus*, *Mycoplasma*, *Streptococcus* spp., *Staphylococcus* spp. and coliforms

Decrease in milk production

Extra treatment cost of animals

Risk to spread to other animals

Food safety concerns

More use of antibiotics

Environmental contamination

**“Mastitis remains a major issue in dairy production and economics. It reduces milk yields, increases the cost of production and makes milk less valuable for consumption and by-product manufacture”**

**Clinical mastitis** is the condition in which abnormality of the udder or secretions can be observed. It can be mild, moderate or severe

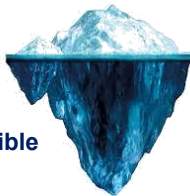
**Subclinical mastitis** is a form of mastitis in which the udder is normal and the milk appears normal. However, microorganisms can usually be cultured from the milk and inflammatory changes in the milk can be detected by measuring the somatic cell count (SCC)

**Tip of iceberg phenomenon**

Detection of clinical form of mastitis in a farm

Indicates

Many possible cases of subclinical mastitis in the farm



# Mastitis: Prevention and Control

The incidences of mastitis can be reduced by adopting good management practices of dairy farm

**Farm hygiene:** Keep the shed dry and comfortable. Also, renew the bedding materials frequently and ensure about fly control. Animals need to be milked in a stress-free environment. Adopt proper milking technique to prevent teat injury & invasion of pathogens to teat canal.

**Udder hygiene:**

- Trimming of long udder hair
- Use of disposable paper towels for cleaning the teats
- Routine use of germicidal teat dip applied after milking
- Use of milkers' gloves, and back-flushing the milk cluster after milking a cow with (sub)clinical mastitis or milking them last

**Keep cows standing following milking:** The teat end remain open shortly after milking, so keeping cow standing reduces the chances of contamination of teat ends with manure.

**Keep infected cows segregated** and use separate milking equipment to prevent transmission throughout the herd.

- Cows with chronic mastitis must be separated from herd and use antibiotic 'dry cow therapy' according to label specifications

**Culture milk samples** from cows with high somatic cell counts to determine the causative agent and its antibiotic resistance pattern.

**Keep proper recording** of animal health and production.



Teat dip



Proper wipe



Testing of animals

**"It is futile to treat infected cows with antibiotics if you do not take management steps to decrease the rate of transmission of contagious mastitis pathogens among the cattle. Otherwise, the cattle you treat today will be reinfected tomorrow"**

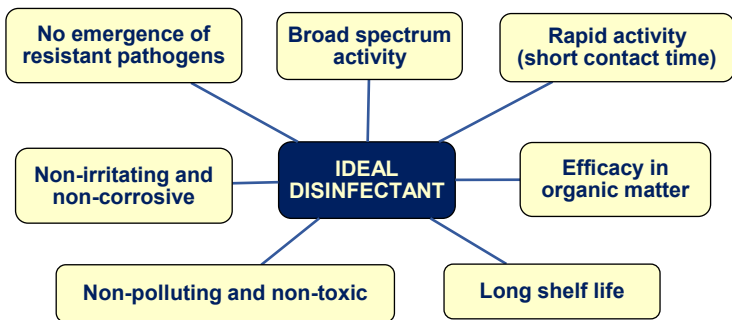
**Remember that treating cows with antibiotics should be a small part of your mastitis control program. Limiting antibiotic use will help in preventing antibiotic resistance and thereby preserve the usefulness of antibiotics for the future.**

# Cleaning and Disinfection

Cleaning and disinfection is imperative for well being and health of farm animals. Proper cleaning and disinfection eliminate or decreases the pathogen level and thereby, prevents or breaks the infection cycle.

Equipment, vehicles, protective clothing and footwear should be cleaned and disinfected before and after contact with farm animals

## Characteristics of an ideal disinfectant



## Commonly used farm disinfectants

- Phenol (0.5-5%)
- Calcium hydroxide (slaked lime)
- Potassium permanganate (1-2mg/lit)
- Glutaraldehyde (2-4%)
- Sodium carbonate (2.5-4%)
- Sodium hydroxide (1-5%)
- Bleaching powder (calcium hypochlorite)
- Boric acid (4-6%)
- Formaldehyde solution (5-10%)
- Copper sulfate (5mg/lit)
- Quaternary ammonium compounds

A single disinfectant can't meet all the requirements of the ideal disinfectant.

Thereby, synergy is required by selecting the appropriate disinfectant as per the need.



## Points to consider before selecting a disinfectant

- Against which germs are you disinfecting?
- Which surfaces have to be disinfected?: The disinfectant should be adapted to the material and to the level of organic matter
- How and how often should you disinfect?



# Vaccinate your animals

Vaccinations are a primary component of herd health program. Vaccines contain antigens of disease-causing agents, and are used to stimulate animal's immune systems and create an immune response before significant natural exposure to disease-causing agents



## Vaccination Schedule for Cattle and Buffaloes

Sl.	Name of Disease	Age at first dose	Booster dose	Subsequent dose
1	Foot and Mouth Disease (FMD)	4 months and above	1 month after first dose	Six monthly
2	Haemorrhagic Septicaemia (HS)	6 months and above	-	Annually in endemic areas
3	Black Quarter (BQ)	6 months and above	-	Annually in endemic areas.
4	Brucellosis	4-8 months (only female calves)	-	Once in a lifetime
5	Theileriosis	3 months of age and above	-	Once in a lifetime. Mainly for crossbred and exotic cattle
6	Anthrax	4 months and above	-	Annually in endemic areas
7	Infectious bovine rhinotracheitis (IBR)	3 months and above	1 month after first dose	Six monthly (presently not produced in India)
8	Rabies (post bite therapy only)	Immediately after suspected bite	4th day	7, 14, 28 and 90 (optional) days after first dose

Source: National Dairy Development Board (NDDB) <https://www.nddb.coop/farmer/animal-health/vaccination/schedules>

### Points to consider:

- Follow the label directions
- Give boosters, if necessary
- Transport and store vaccines at the right temperature
- Observe the withdrawal times
- Don't mix 2 vaccines in 1 syringe
- Use separate needle and syringe for each animal

### Did you know?

**Vaccines ensure animal welfare**, improve the **sustainability** of farming practices, and the **safety of our food**.

**Vaccines decrease AMR** by preventing infections and reducing the use/misuse of antibiotics.

# Farm Biosecurity in combating Antimicrobial Resistance

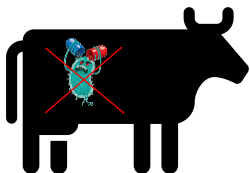
**Responsible use of antibiotics** is an integral part of good farm management practices

Maintaining good **Biosecurity** standards on the farm will curtail the entry and spread of disease and protects animal health, which helps reduce the need to use antibiotics.

- Farm and animal hygiene
- Good housing and ventilation
- Balanced nutrition
- Monitoring health and animal welfare
- Vaccination and deworming



**Reduction in therapeutic usage of Antibiotics**



**Antibiotics:** “As little as possible;  
**AS MUCH AS NECESSARY”**

# Points to Remember

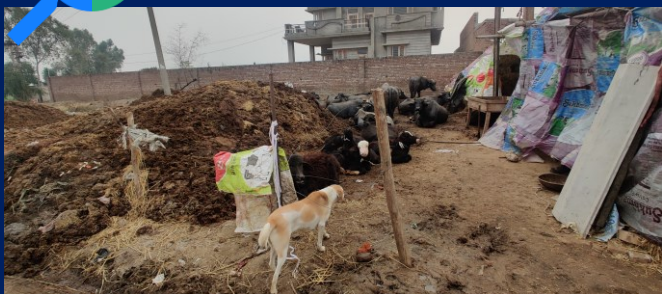
- **When you buy a cattle, never underestimate the buying of disease with it**, especially when you don't know the status of source farm'- so know the disease/treatment/vaccination history of animal and implement proper quarantine measures
- **At birth, the most important for immunity is good quality colostrum**: Maternal antibodies may interfere with some vaccines. So, avoid injectables during first 5 days of life.
- **Animal feed quality and storage conditions matters !!** Contaminated feed can be the source of pathogens as well as toxins. Improper feed storage conditions are associated with mycotoxin contamination and invites rodents and other pests.
- The **farm water quality** should be wholesome. Remember that compromising the water quality can serve as point source contamination to the whole farm.
- **To boost immunity among the animals**, there should be a great balance between good biosecurity, colostrum management, mineral supplementation, nutrition, sanitation, deworming, vaccinations, and comfortable housing.
- **Line of work**: During farm operation, employees should move from the youngest animals to older animals, working from healthy animals to sick animals. This movement pattern reduces the risk to healthy animals.
- **Discard animal and farm wastes appropriately**, as these can pose the health safety concerns not only to the farm premises but also to nearby environment.
- **Use the antibiotic judiciously** for animals under the supervision of veterinary doctor. When the ongoing treatment schedule is showing inefficacy, prefer to conduct antimicrobial sensitivity testing.
- Develop **integrated pest management (IPM) program** for your farm by combinations of cultural, biological, and chemical control practices to maximize the effectiveness of pest control actions while conserving beneficial insects and minimizing pesticide use.

# Check you Farm Biosecurity level

Sl.	EXTERNAL BIOSECURITY (Bio-exclusion)	Y/N
1	Provision of quarantine facilities of animals when introducing into farm (at least 4 weeks)	
2	Proper farm fencing with regular inspection and adequate maintenance to prevent the livestock from mingling or straying	
3	Separate provision for the parking of farm or visitor's vehicles away from the main operational farm area	
4	Disinfection of all vehicles before entering the farm premises	
5	Provision of cleaning and disinfection facilities for hands and shoes of farm workers and visitors at entering points of farm compartments	
6	Cleaning or disinfection of materials and equipment directly used for animals when carried into hygiene control area	
7	No contact with animals of other farms (including any contact during animal fair or pasture contact during grazing)	
8	Provision of testing of animals for endemic diseases (e.g., brucellosis, tuberculosis, hemoprotozoan infections) during purchase	
9	Testing of milk sample of newly introduced cows for mastitis	
10	Screening of bull's semen for sexually transmitted diseases where natural insemination is practiced	
11	Restrict the access of animals to natural water bodies (e.g. ponds) of unknown hygienic status	
12	Avoid manure from other farms being spread on farmlands within a 500-meters radius of your farm and pastures	
13	Placing of sign boards to inform visitors about the biosecurity requirements and protocols to be adhered on arrival to the farm	
14	Hygiene lock (designated clothing & footwear changing room for workers and visitors) available before entering the animal shed	
15	Segregation of hygiene control area (e.g., milking and feed storage area) from the other areas with proper signboard	
16	Prevention of birds (including wild birds) or animal feces (including stray animals) entering to feeding and water facilities of the farm	
17	Instalment of systematic plan for rodent control	
18	Instalment of systematic plan for control of ectoparasites (e.g., ticks)	
19	Instalment of systematic plan for control of insect (e.g., mosquitoes and flies)	

Sl.	INTERNAL BIOSECURITY (Bio-management)	Y/N
1	Strict working lines (starting with the healthy animals and handling sick animals at last) are used during farm operations	
2	Provision of isolation pen for sick animals with the facilities of separate equipment (e.g. buckets, utensils etc.)	
3	Separate milking of diseased animals (including mastitis) after the healthy animals	
4	Animals of different age groups are strictly separated in different compartments	
6	Proper disposal or disinfection of materials to which body fluid of animals (especially sick animals) got attached	
7	Cleaning and disinfection of manger and waterer on regular basis	
8	Availability of separate & dedicated parturition box (or exclusive calving area)	
9	Rearing animals with suitable density [optimal floor space allocation (open and close space)]	
10	In case of mixed species farming, adequate facilities of separate housing of different animal species	
11	No pets (e.g., dogs and cats) should be allowed in the animal shed	
12	All used equipment should be shed specific	
13	If borrowed or lend, equipment to be cleaned and disinfect before and after use	
14	Stockfeed inspection on delivery to ensure its quality (e.g., free from pest damage, mycotoxin contamination and visual contaminants)	
15	Proper storage of feed to prevent contamination by mycotoxins, vermin, livestock, wildlife and feral animals	
16	Use sperate utensils for feed and farm waste (i.e., there's no double use of same utensil for feed and waste handling)	
17	Provision of clean drinking water for animals	
18	Cleaning & disinfection of cow's hindquarters (including udder) before each calving	
19	Testing of cattle after abortion for possible infectious causes	
20	Chemical and microbiological analysis of drinking water (at the source and the end of the drinking line) at least once a year	
21	Provision of separate space (with concrete flooring) to place the dead animal in farm & proper disposal of dead animal at designated location away from the farm	
22	Proper handling of carcass with gloves, and disinfect all the materials used for manipulation of carcasses	
23	Facilities for proper effluent dispersal to minimize pathogen spread in environment	
24	Proper containment of household-garbage areas to prevent access by vermin, livestock, feral animals and wildlife	
25	The farm employees should not be allowed to work on other farms	
26	Collecting up-to-date information on prevention of animal infectious diseases	
27	Daily health check of animals (basic physiological parameters)	
28	Immediate report of specific symptoms to the veterinary officer and restriction of animal movement	
29	Proper transport facilities to minimize potential welfare issues, disease and/or contamination spread	
30	Periodic training on farm hygiene, including use of protective clothing & cleanliness	
31	Written protocols/SOPs for farm hygiene procedures	
32	Record keeping (including, movement of visitors and vehicles) for early identification of source of infection	
33	Written protocols for vaccination, deworming and disease treatment records	
34	Maintenance of health record of workers including vaccination	
35	Contact details of local vet & government animal health officer(s), and what to do in the event of a suspected emergency animal disease should be available in farm	

Find the breaches in biosecurity measures



A



B



C



D



Find

the breaches in biosecurity measures



E



F



G



H

## Find out the breaches in biosecurity measures

**A**

- Improper disposal of animal waste (dung)
- Improper contact of farm animals with pet dog
- Improper animal housing. Location of farm is near to residential area
- No proper fencing

**E**

- Milk containers shouldn't be placed near animals
- High stocking density
- Improper disposal of biomedical and other farm wastes
- Poorly maintained sewage facilities

**B**

- No provision of sewage
- Improper disposal of animal waste (drug)
- No farm equipment hygiene
- High stocking density and improper housing
- No proper fencing

**F**

- No provision of separate storage of animal feed. It may pose high risk of contamination
- Poor calf management and housing
- High stocking density of animals

**C**

- No provision of separate placement of farm equipment in hygienic manner
- No proper fencing and poor farm ventilation
- No sperate place for farm vehicle

**G**

- No provision of hygienic placement of farm utensils (feeding and watering)
- The location of farm in not proper (near to residential area)
- Farm bedding is unhygienic

**D**

- No provision of fodder storage. Improper feed storage may be the source of microbes as well as toxins
- No provision of separate placement of farm equipment
- No provision of proper sewage

**H**

- Improper location of water facility (the animal waste can contaminate the water)
- No provision of separate placement of feeding and watering utensils
- No provision of proper sewage facilities



## References

1. FAO and IDF. 2011. Guide to good dairy farming practice. Animal Production and Health Guidelines. No. 8. Rome. (Weblink: <http://www.fao.org/3/ba0027e/ba0027e00.pdf>)
2. Dewulf, J. and Van Immerseel, F. eds., 2019. *Biosecurity in animal production and veterinary medicine*. CABI. ePDF 9781789245691
3. Thukral, H., Dhaka, P., Bedi, J.S. and Aulakh, R.S. 2020. Biosecurity: A Frontline Defence for Infectious Diseases on Dairy Farms. *International Animal Health Journal*, 7(3):50-54 (Weblink: <https://www.animalhealthmedia.com/biosecurity-a-frontline-defence-for-infectious-diseases-on-dairy-farms/>)
4. Scotland's Healthy Animal (Weblink: <https://www.scotlandshealthyanimals.scot/disease-avoidance/farmers-livestock-keepers/>)
5. Farm Biosecurity (Weblink: <https://www.farmbiosecurity.com.au/industry/dairy-cattle/>)
6. Implementing Biosecurity on Dairy Farms. (Weblink: <https://nwnyteam.cce.cornell.edu/submission.php?id=6>)
7. Ohio Dairy Industry Resources Center. Ohio State University Extension. (Weblink: <https://dairy.osu.edu/>)

### **Images & illustration sources:**

Pixabay (Weblink: <https://pixabay.com/>) and Google Images

## Acknowledgement

- The compilation of literature has been carried out for the awareness activities under RKVY project entitled *“Development of Strategies for Biosecurity Measures to Curtail Important Zoonotic diseases in Punjab, India”*
- The financial assistance is granted under the project of ‘Strengthening and Development of Higher Agricultural Education in India, ICAR’
- We thank the dairy farmers of Punjab for allowing the use of farm photos for the educational and awareness purposes

**For suggestions or queries, contact:**

Centre for One Health, GADVASU

## Notes

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

# About the Authors



**Dr. Pankaj Dhaka**  
**Assistant Professor**  
Centre for One Health,  
GADVASU, Ludhiana, Punjab  
Email: [pankaj.dhaka2@gmail.com](mailto:pankaj.dhaka2@gmail.com)



**Dr. Jasbir Singh Bedi**  
**Professor & Director**  
Centre for One Health,  
GADVASU, Ludhiana, Punjab  
Email: [bedijasbir78@gmail.com](mailto:bedijasbir78@gmail.com)



**Dr. Deepthi Vijay**  
**Assistant Professor**  
Dept. of Veterinary Public Health,  
COVAS, Mannuthy, Kerala  
Email: [deepschinnus@gmail.com](mailto:deepschinnus@gmail.com)



**Dr. Simranpreet Kaur**  
**Associate Professor**  
Centre for One Health,  
GADVASU, Ludhiana, Punjab  
Email: [simranthind18@gmail.com](mailto:simranthind18@gmail.com)



**Dr. B.B.S. Dhaliwal**  
**Professor**  
Centre for One Health,  
GADVASU, Ludhiana, Punjab  
Email: [bsdhaliwal@gmail.com](mailto:bsdhaliwal@gmail.com)



**Dr. R.S. Aulakh**  
**Professor**  
Centre for One Health,  
GADVASU, Ludhiana, Punjab  
Email: [rsaulakh@rediffmail.com](mailto:rsaulakh@rediffmail.com)

The cow is the foster mother of the human race: W.D. Hoard

Hygiene Fly control Stray animals  
Foodborne pathogens Disinfection  
Isolation Vaccines Personal  
Deworming Ticks Protective  
Zoonoses Farm Equipment  
Rodent control Biosecurity Clean milk  
Wild animals Aborted  
Water hygiene Colostrum animals  
Sanitary measures Farm hygiene Feed  
Mastitis Antibiotic resistance Hygiene  
Worker's hygiene Quarantine Wild birds

Our farmers work tirelessly to put food on our plates,  
so make sure you support them!



Centre for One Health  
College of Veterinary Science

Guru Angad Dev Veterinary and Animal Sciences University,  
Ludhiana, Punjab, India -141004

