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KOORIMP

BIOSECURE

CONTENTS

Takk til medarbeiderne i helsetjenestene for geit og storfe i Tine Rådgiving og medarbeiderne i helsetjenestene for fjørfe, sau og svin i Animalia for gode og kunnskapsrike bidrag til arbeidet med “Smittesikker”.

Oslo 20.06.2013, Nina Svendsby

Foto: Grethe Ringdal

01 INTRODUCTION

NORWEGIAN FARM ANIMALS are healthy. There are few serious, contagious animal diseases in Norway. There are also few infectious agents that pass from animals to humans. We want to keep this advantageous situation. And you can contribute! Your employer here in Norway wishes you to read this brochure and follow the biosecurity routines described here.

When you work with animals, you have a responsibility to carry out the tasks assigned to you by your employer. You also have a responsibility to carry out the job in such a way that the risk of spreading contagious diseases is reduced as much as possible.

Good animal health is important for:
- Good economy in farm animal production
- Good animal welfare
- Food safety
- A safe working environment

Farm animals can become sick for a variety of reasons, such as improper feeding or a disturbed hormone balance. But livestock often become sick because they have caught pathogens, such as viruses, bacteria or parasites.

This text is mostly about diseases caused by pathogens.

Usually we can't see pathogens. Sick animals can spread infection to healthy animals if they come into contact with each other. Then the microbes are often found in body fluids such as mucus or saliva. Coughing and sneezing can cause infections to spread through the air. Animal faeces may also contain large amounts of infectious agents. The animals do not always show signs that they carry pathogens. We call these animals "healthy carriers".

Germs can also be spread in other ways:

- with people, on their skin, clothing or boots
- with tools that we use in animal areas and elsewhere on the farm
- with animal feed
- with food leftovers

Some diseases can also be transmitted from animals to humans. These diseases are called zoonoses. Simple but effective biosecurity measures are important for you and your employer in order to avoid spreading infection from sick to healthy animals and from animals to humans.

Most infections caused by bacteria can be treated with antibiotics. However, some bacteria may have characteristics that make them resistant to antibiotics. The use of antibiotics contributes to more bacteria becoming resistant. Antibiotics don't have effect on diseases caused by resistant bacteria. Resistant bacteria can spread throughout the community. They can cause serious complications if they enter hospitals or other health institutions. Infections that usually can be treated can kill people if resistant bacteria cause the infection. On this background we want to keep the use of antibiotics in livestock to a minimum. To achieve this, we need to lay down continuous and systematic efforts to keep animals healthy.

Biosecurity

Biosecurity consists of various measures to prevent the spread of contagious diseases. In order for the biosecurity measures to be effective, we must know something about the infectious agents, how they spread between animals, humans and herds, and which measures are effective in preventing the spread of microbes. And we must use that knowledge every day in the work on the farm and with animals. Biosecurity is about doing the right things at the right time and place. If we only wash our hands and change our boots every second time we go in to the animals, we increase the risk of bringing disease in to them every time we fail to take precautions. This is also true for the other procedures: each time we take shortcuts or forget to implement hygiene practices, we increase the risk of spreading infection.

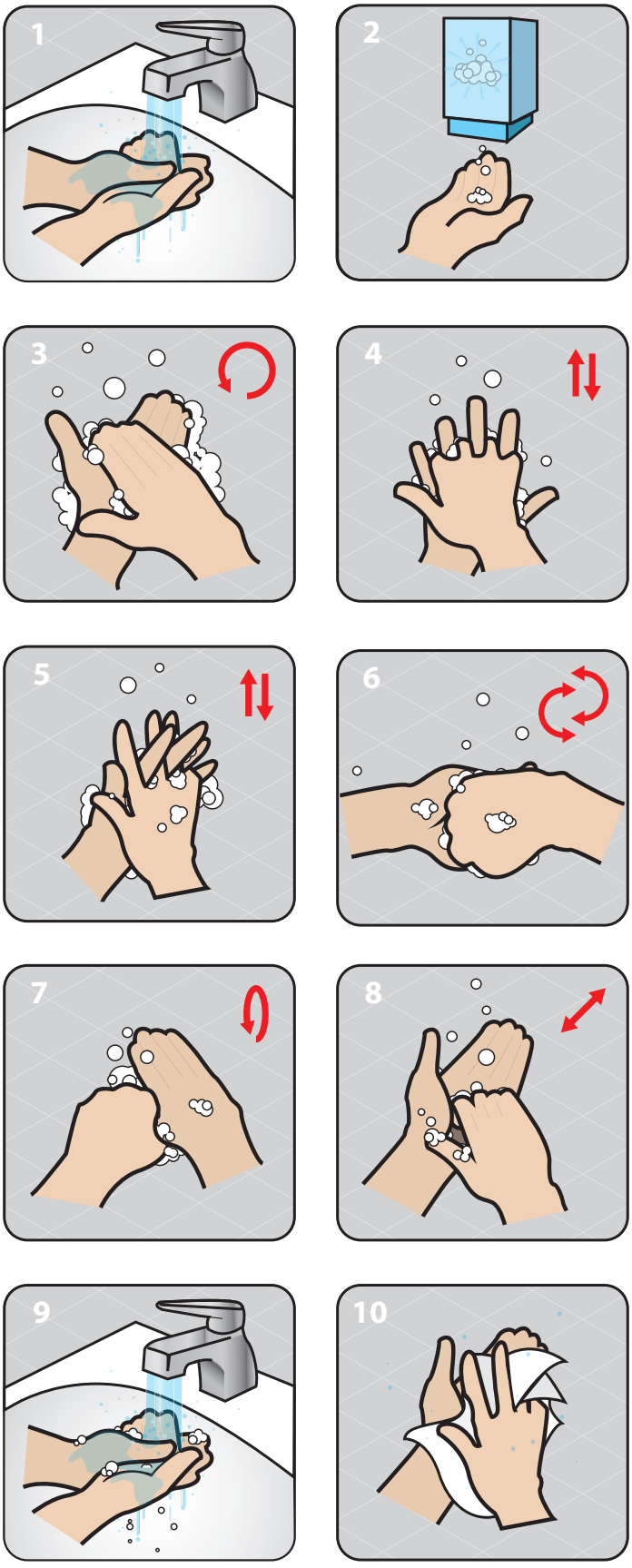
Hygiene is an important part of effective biosecurity measures. Proper cleaning can be decisive in preventing the spread of disease and keeping infection pressure low. Hygiene is also important when handling waste, manure and dead animals.

Your employer is responsible for the biosecurity on the farm. Your task is to learn the hygiene practices at the farm and to sort out with the people you work for how they want you to do your job. It is important that you ask and understand what the animal owner expects from you regarding the examination of animals showing signs of illness, treatment of disease and consulting the veterinarian.

The practical solutions for biosecurity may vary between different farms. Some solutions are related to the buildings and the design of entrances and animal housing. Others are related to routines such as changing clothes, the use of overalls, cleaning and the moving of animals in the herd. We present some examples, but the goal can be achieved in other ways. You must respect the solutions that your employer has chosen, even if they are different than the ones we present here.

WHAT TO DO?

- Wash your hands often, using soap. Hand disinfectant is a good alternative
- Always respect biosecurity barriers and routines
- Change your shoes when entering the herd
- Maintain good personal hygiene
- Change to clean working clothes frequently
- Wash your working clothes regularly at a minimum of 40°C
- Do not use the same clothes in different herds
- Shower and wash your hair after you finish the job
- Do not give food leftovers to farm animals!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02 EXTERNAL BIOSECURITY

A HERD is usually a relatively closed system. Routines that block possible infection routes are important to prevent new pathogens from entering a herd from outside. The important thing is how we think and act in order to avoid bringing infectious agents into the herd from the world outside. These measures are often called external biosecurity.

Risk factors for infection:

- Contact with animals from other herds, movement of livestock
- Traffic between farms - people, vehicles and tools
- Contact with non-commercial animal husbandry
- Contaminated drinking water and feed
- Wild animals and birds
- Dogs and cats

WHAT TO DO?

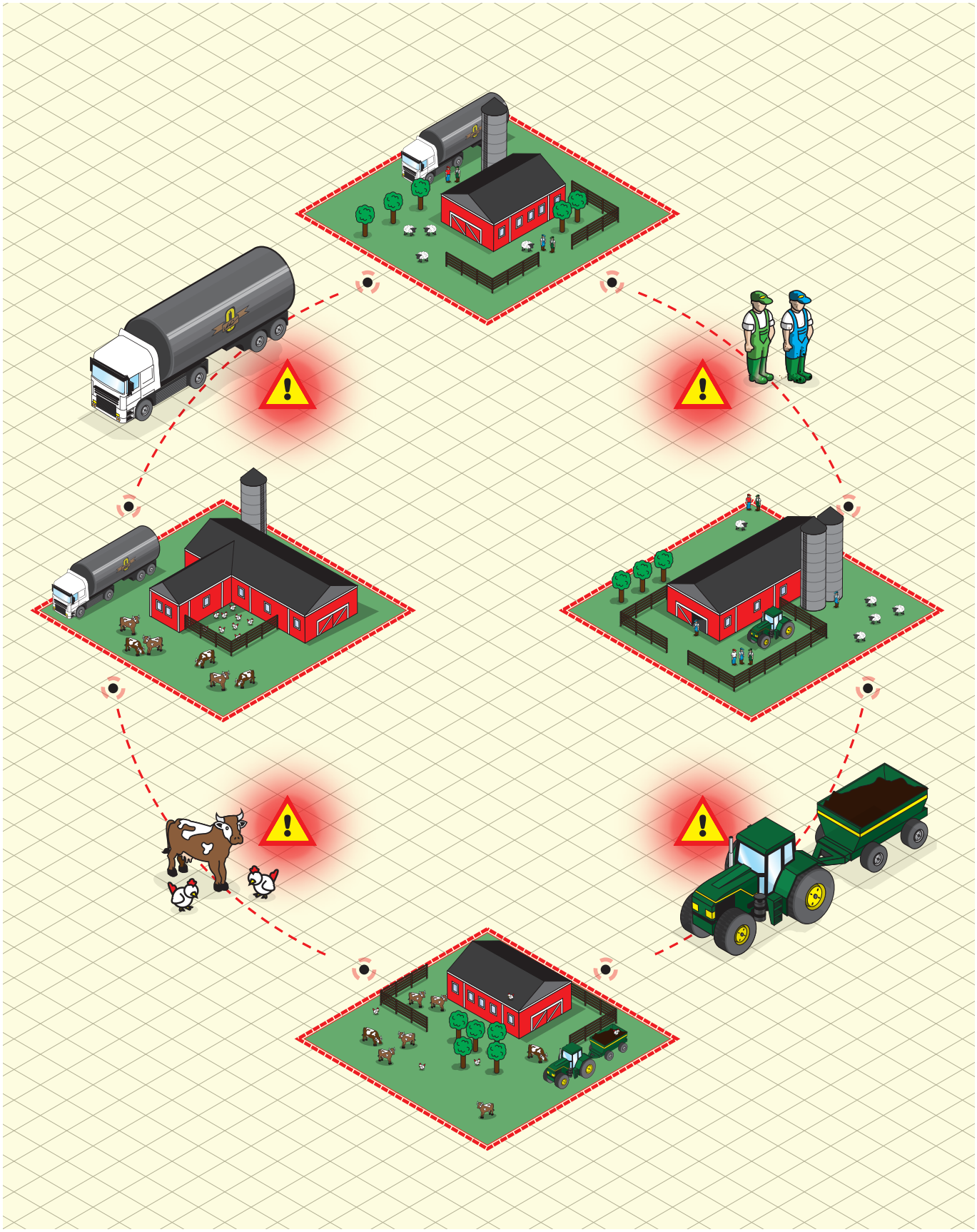
Monitor the newly purchased animals and animals that have recently returned from pasture. If they show signs of illness, they should be examined, and it may be necessary to call the vet

a) Contact with animals from other herds

Farm animals can come into contact with animals from other herds when livestock is purchased; when they are let out on common pastures, when breeding animals are used in several herds and at livestock exhibitions and other events where animals are exhibited.

Procedures for procurement of livestock are primarily the responsibility of your employer. Your most important task is to follow up the herd's procedures for receiving and handling purchased animals. Health certificates and quarantine days are examples of measures that can reduce the risk of introducing diseases when purchasing animals.

When animals have been grazing together with animals from other herds, it is particularly important to pay close attention when they come back home.



WHAT TO DO?

- Do not use the same clothes in different herds, wash your clothes often
- Personal hygiene is important. Shower and wash your hair when the working day is over
- Wash your hands often, and always:
  - before milking
  - when handling animals in birth, or who have recently given birth
  - before handling new-born animals
  - after contact with manure, blood, amniotic fluid and foetal membranes, sick and dead animals

b) Traffic between herds

People can bring infectious agents into a herd from the outside. Viruses and bacteria can be transported on skin, clothing or boots. Some people have work tasks in several herds. It is particularly important that these people consistently follow good hygiene practices. In addition to animal owners and animal staff on the farms, there may be veterinarians, advisors and other service people, such as animal transport drivers, tanker truck drivers and suppliers of feed, bedding and other products. Guests at the farm may also like to look at the animals.

Consistent routines are important for people who work with animals, including personal hygiene, washing of clothes and changing of clothing and boots.

For people working in agriculture who are occasionally with the herd, it is important to receive clear information about the hygiene procedures that apply. Those who work in several herds also have a greater risk of transporting an infection. As a general rule, it is important that they do not go further into the animal housing than necessary in order to get the job done. A tanker truck driver shall not go farther in than to the room where the milk tank is located. With good room planning, the animal truck driver will not need to go further than to the loading ramp, and ideally he can stay on the truck.

Examples of measures to reduce the risk of people bringing in infection are:

- Clear marking of entrances for the farm's own staff, other visitors, the milk tank room and the loading and unloading of animals
- Clear signs stating that those who wish to visit the herd must have the owner of the animals' permission
- Biosecurity barrier with instruction about routines
- Available overalls and boots or shoe covers for those entering
- Available basins with hot water, soap and paper towels

c) Wild animals and birds

Wild animals and birds can carry pathogens that can infect farm animals and humans. A certain amount of contact with wild animals can not be avoided, for example for animals that are let out in pasture to graze during summer. The fact that animals graze outside in the summer has many benefits for animal welfare, care of the cultivated landscape and the utilization of grass as feed. There is no great risk that wild animals will infect domesticated animals with diseases when they are on pasture. However, some species such as pigs and poultry are more vulnerable to infection from wild species. Poultry can be infected with viral diseases that can cause major losses in poultry production. Examples of measures to reduce the risk of infection from wild species are securing livestock buildings keep wild birds from entering and to have good control of pests such as rats and mice. It may also be necessary to remove bird nests to prevent birds nesting close to animal housing. Keeping the surroundings clean and tidy is good for disease control.

WHAT TO DO?

- Ensure that guests use the correct entrance, if there is a separate entrance for visitors
- Make sure guests change into the farm's own clothing, or disposable overalls and boots
- Remember that even veterinarians and animal transport drivers are guests and remind them about the procedures
- If you have been to other herds with vehicles and tools that have come into contact with manure, wash and disinfect the equipment before it is used again at home

WHAT TO DO?

- Follow the herd's procedures for the control of pests like rats and mice
- Assist in maintaining safety measures in animal housing, such as mesh in openings to prevent birds from entering

03 INTERNAL BIOSECURITY

WHAT TO DO?

- Keep it clean and tidy around you in your work, both with the animals and in the staff rooms
- Follow the procedures for daily cleaning
- Follow the procedures for periodical cleaning and disinfection, for example when introducing new animals or when moving groups of animals
- Follow the procedures for the control of pests
- Keep dogs out of the feed storage and animal housing, if the farmer requests it
- Help with cutting the grass and keep it tidy around the farm buildings

THERE IS ALWAYS a possibility that there are infectious agents that can be transmitted from animal to animal within the herd. Best practices and good cleaning routines can reduce the risk of spreading them. These routines are called internal biosecurity.

General cleaning and maintenance routines are important. And it is especially important to handle young animals, sick animals and manure properly.

a) Good practices and maintenance

A tidy farm with farm animal housing that is cleaned regularly has a better chance of preventing infections than farms that are messy. This is also important for the prevention of fire in animal housing. It is necessary to tidy and clean the area where the animals are housed, but also in the break room, locker rooms and other rooms for staff. Items that are broken and neglected will collect dust and dirt. Damaged equipment should be repaired or delivered to a waste disposal site. Control of pests is important. Many farmers do not want to allow dogs inside the animal housings.

b) Manure

Faeces from animals and humans always contain a lot of viruses and bacteria. Faeces that end up in the feed contaminate it and destroy the quality of the feed. Good animal housing is therefore designed so that feed and manure can be handled separately to the greatest possible extent. In older housing that may not be so well designed, good practices are even more important in order to avoid contaminating the feed.

WHAT TO DO?

- Handle feed at a good distance from animal manure
- Use different tools to handle feed and manure
- Store tools for handling manure, such as scrapers and shovels, in a different place than tools used to handle feed, such as rakes and brushes
- Keep tools used to handle feed clean and in good order
- Make sure the feed is not driven into the animals over manure areas
- Make sure the animals do not get into the feed tray
- Use the toilet yourself, not the manure storage facilities

c) Young animals

Young animals are vulnerable and need to have a warm and dry environment. Species differ slightly with regard to the care of young animals, but young animals generally require more frequent inspections and more care than adult animals. If there are new-born animals in the herd, it is a good general rule to check on them often and be aware of symptoms of illness, such as diarrhoea and wheezing or coughing.

WHAT TO DO?

- Always wash your hands before having direct contact with young animals
- Keep animal housing with new-born or young animals tidy and clean, including pens and boxes for stabling
- Check new-born and young animals frequently, be aware of whether they are taking food and whether they exhibit symptoms of disease

WHAT TO DO?

- Always wash your hands after coming into contact with sick animals
- Keep unused sick pens empty, clean and ready for use if the herd has sick pens
- Use sick pens for sick animals, or isolate the sick animals from healthy animals in the herd
- Pay special attention to hygiene routines where sick animals are housed
- Ensure that residues of feed and manure from sick animals do not end up with the healthy animals
- As a main rule handle sick animals after you have handled healthy animals
- Make arrangements with your employer about when the veterinarian should be called and who should do it
- Remove dead animals immediately
- Follow the herd's procedures for handling dead animals, like covering up or freezing

d) Sick and dead animals

Sick animals usually produce viruses or bacteria that can be transmitted to other animals. Animals that have died as a result of a disease may also contain pathogens. Body fluids such as mucus, saliva and milk can contain large amounts of microorganisms. Follow the herd's procedures for the care and treatment of sick animals. If there are separate sick pens, make sure that they are kept clean and ready for use when needed. Sick animals must often be isolated from other animals in the herd in order to reduce the risk of infection. Talk with the animal-owner about when to call the vet and how sick animals should be handled where you work.

04 AVOID INFECTIOUS AGENTS FROM OTHER COUNTRIES

PEOPLE WHO have been abroad pose a particular risk for the introduction of diseases that we do not have in Norway. Many other countries have diseases that we do not have here. There is always a certain risk that people will bring pathogens back to Norway after visiting other countries. This also applies in the case of a normal holiday trip. The risk increases in case of contact with livestock in the other country, or if you have been ill and admitted to hospital.

Some countries have outbreaks of serious contagious animal diseases, such as foot and mouth disease, swine fever and avian flu. We need to be especially aware of these diseases. Outbreaks of serious diseases are usually well known. Serious animal diseases are common in some countries outside Europe. Several of these countries are popular holiday destinations. Remember that it is illegal to bring food of animal origin from countries outside the EU/EEA into Norway or EU countries. And no matter where the food comes from, do not feed livestock with leftovers!

Routines for visits to herds in other countries

Before contact with the herd, you should wash your hands thoroughly with soap and water. Use disposable gloves and headgear, as well as a dust mask with a valve to reduce your risk of infection from the animals. After contact with the herd, you should remove your protective equipment and immediately wash your hands, as well as applying disinfectant. Take a shower as soon as possible after your visit to the herd.

WHAT TO DO?

- If you have been in contact with animals in other countries, you should wait 48 hours before going into a Norwegian herd. Count the hours from the time you return to Norway
- If you have had contact with farm animals in a country with known outbreaks of serious, contagious animal diseases, you should wait 72 hours before you go into a Norwegian herd. Count the hours from the time you return to Norway
- Make it a regular routine to shower and wash your hair after you have been in another country, before going into a Norwegian herd
- Wash clothing that has been in contact with animals in other countries at a temperature of at least 60°C, and clean and disinfect your footwear
- Footwear that has been used in other countries should not be used in Norwegian herds
- Remember that it is prohibited to bring products of animal origin from countries outside the EU into Norway and EU countries
- Do not give food scraps to animals - no matter where the products come from

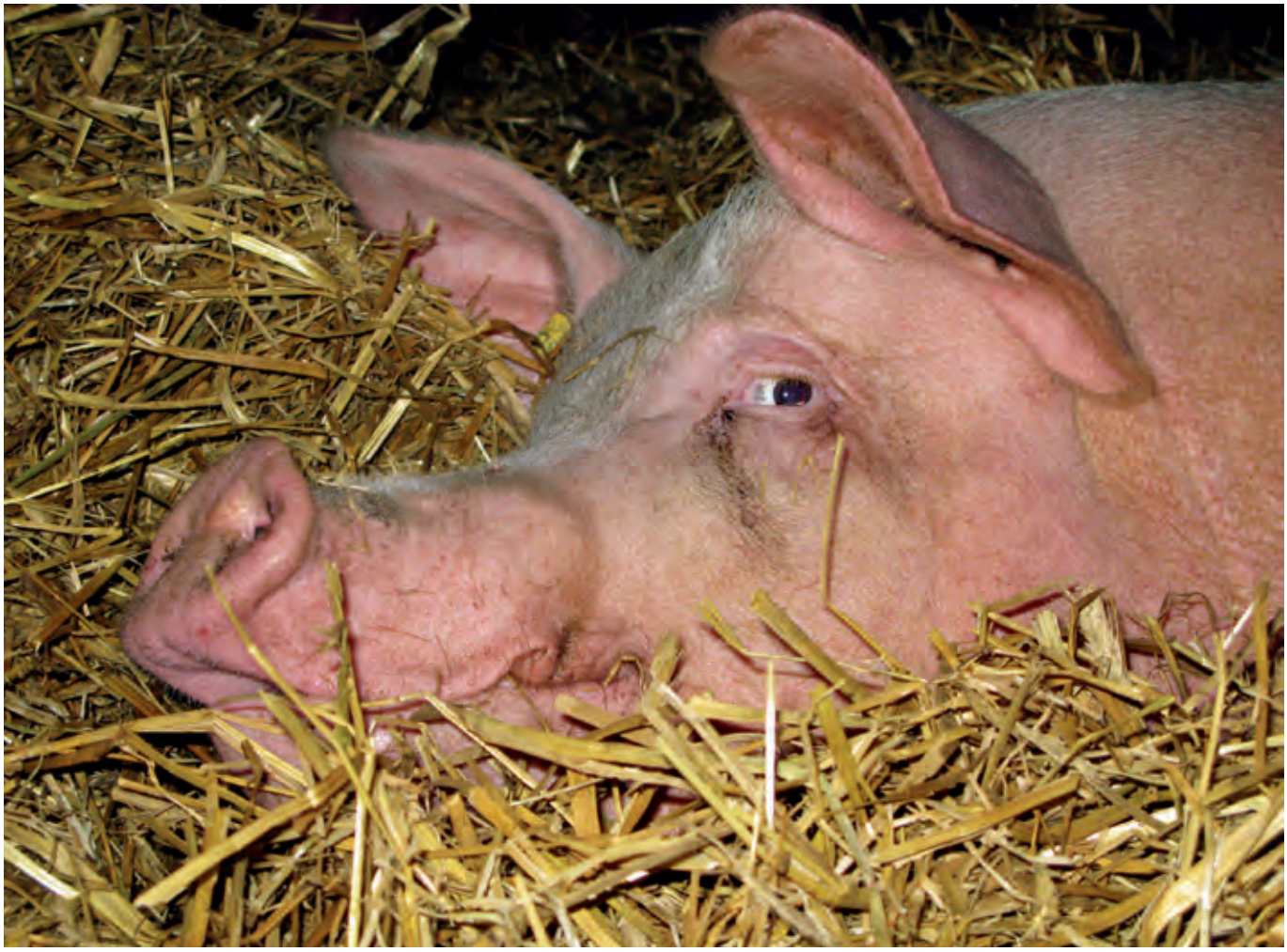
05 PREVENTION AND PREPAREDNESS

PREVENTION is about having regular routines to detect incidents before they develop into something serious. In practice, this means monitoring what is happening in the herd and on the farm, taking action if something undesirable is about to happen and alerting the animal owner if you notice anything unusual. In Norway it is normal to call a veterinarian when animals are obviously sick. If many animals exhibit symptoms simultaneously, the animal owner shall also notify the authorities (Norwegian Food Safety Authority). This is especially important if the animals have a fever, are not eating and have blisters or ulcers in the mouth and on the edge of their hoofs.

WHAT TO DO?

- Spend some time each day observing the animals and how they behave, and look for anything unusual in the herd
- Look for individual animals that stand out
- Listen for unusual sounds in the herd
- Talk to the animal owner if you notice anything unusual. Make sure the animal owner is informed if you see that animals are sick
- Talk to the animal owner if you think animals need veterinary attention
- Contact the animal owner immediately if several animals are sick at the same time, with fever, poor appetite and reduced production

06 ANIMAL WELFARE



ANIMAL WELFARE is important in Norwegian livestock production. Animals that have good welfare also have good health. To ensure good animal welfare, we must monitor their condition and take action if they are not well. Sometimes it is better to euthanize a sick or injured animal rather than let it live with its suffering. If you have a job where you sometimes have to stun and kill animals, make sure you know how to do it in a correct manner.

WHAT TO DO?

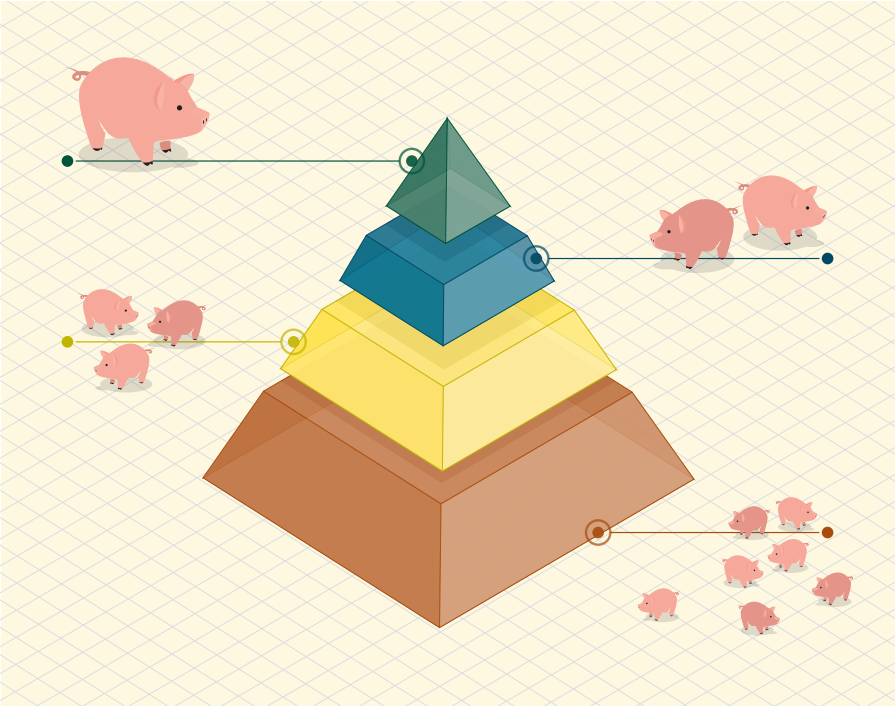
- Take care of the animals! Handle them gently
- Keep an eye on whether the animals you are working with appear to be well
- Talk to your employer or fix the furnishings or equipment if the animals are injured
- If the animals are sick or injured, make sure they receive appropriate treatment, or are stunned and killed in the correct manner
- Talk to your employer if you see signs of poor animal welfare

07 PIG FARMING IN NORWAY

IN NORWAY we have approximately 90,000 sows and about 1.5 million pigs are slaughtered every year. Norwegian herds are small compared to herd sizes in most other European countries. Norwegian pigs' health status is extremely good, since we don't have many of the diseases that exist elsewhere, such as porcine reproductive and respiratory syndrome virus (PRRS) and pneumonia caused by mycoplasma. It is very important for the Norwegian swine farmers that this advantageous situation is maintained.

The pedigree and health pyramid is central to Norwegian pig farming. It is important to know about this in order to understand the dynamics of the production and the principles for the movement of animals between herds. All movement of animals occurs downwards in the pyramid. The elite breeding herds are located at the top. There are approximately 40 closed herds that produce thoroughbred animals of the breeds Norwegian Landrace, Duroc and Hampshire. They have very good health status and get the best semen from the breeding organization Norsvin. These herds supply boars to the testing station and semen collection centre. They also supply Norwegian Landrace sows for the multiplying breeding herds. In the multiplying herds, the landrace sows are inseminated with Yorkshire semen, and hybrid sows are produced that are sold to the breeding herds. Some of them sell all their piglets (25-30 kg) to finisher herds. Some herds produce both piglets and finishers, they are called combined herds.

There is also a special form of production in Norway called sow pools. Here a nucleus herd and several satellite herds form one biosecurity entity. The nucleus herd is specialized in reproduction and delivers pregnant sows to the satellites about 3 weeks before the expected farrowing. After the piglets are weaned, the sows are transported back to the nucleus herd for new insemination. The satellites do not receive the same sows each time.



There is also some production of specific pathogen-free (SPF) pigs in Norway. There are herds where the pigs are free from certain specific infectious agents, including bacteria that give malignant lung disease (APP). These pigs therefore have particularly good health status, and often have very good growth. Pigs from SPF herds should not be mixed with pigs from conventional herds, as they have not developed immunity to the microbes they face there.

Avoid infection

Preventing the spread of infection is essential in Norwegian pig farming. This includes infection from abroad, infection between herds and infection between sections of the herd.

To prevent infection from abroad, remember to:

- Follow the recommendations about time limits after visits to other countries, remember 48 hours and 72 hours
- shower and change clothes and shoes after visiting other countries
- never give food scraps to the pigs

To avoid infection between herds, it is important that:

- biosecurity barriers and routines are respected
- the purchase of animals takes place through formal agreements between sellers and buyers, whether it concerns sows or piglets
- pigs with different health status are not mixed together

To prevent infection within the herd, it is important to have:

- sectioning of the herd, i.e. that a room only contains animals in a particular age group
- emptying and cleaning of the sections before new animals are introduced
- washing of boots between departments, and using different tools (scrapers) for each department

Animal welfare

In Norway we set high standards for animal welfare. For pigs, the requirements in some areas are more stringent than in the EU. This includes, among other things:

- Ban on restraining sows. This includes the suckling period. It is only allowed to restrain particularly upset sows from birth until 7 days after birth
- All animals should be able to lie on solid floors. Fully slatted flooring is prohibited
- It is not permitted to dock tails
- Castration must be performed by a veterinarian using both anaesthesia and analgesia
- It is not allowed to wean piglets until they are 28 days old
- The space requirements are greater for some groups
- All pigs are entitled to rooting material in order to be able to perform normal behaviour
- Forage like hay or silage is a requirement for sows, gilts and boars, but is recommended for all pigs

Animal welfare is about the individual animal thriving. It is therefore important that you take time to observe the animals thoroughly every day. If any animals have poor welfare, measures must be taken to address the situation. These measures could be taking extra care and placement in a special pen for sick pigs, veterinary treatment or euthanasia. It is important to clarify the procedures with your employer and that you discuss with him/her when you are in doubt.

08 SHEEP FARMING IN NORWAY

NORWAY HAS about 1 million adult ewes (winter-fed sheep). Meat and wool are the main products of sheep farming. The most common sheep breed is the Norwegian White Sheep, which is a meat sheep that produces a high number of lambs that have a good rate of growth. The ewes lamb in April-May and are generally on pasture from April/May to October. The use of mountain pastures is common during the summer months. Because of the climate in Norway, most adult animals are housed during the mating and gestation period (November-April), but there are geographical variations. We have breeding of sheep organized by the Norwegian Sheep and Goat Breeder Association (NSG). Locally, ram circles are the most important part in the organization of breeding. A ram circle is an association of interested sheep owners in a geographical area, who work together on progeny testing of rams.

Sheep farming in Norway experiences a low incidence of contagious diseases compared to many other countries. Diseases affecting suckling lambs, such as diarrhoea and joint and pulmonary infections are the greatest challenges. Mastitis and disease caused by internal and external parasites are also challenges. The major welfare challenges to sheep in Norway are probably predators on pastures and loss of lambs from birth to slaughter.

ENSURE

- Proper feeding and care of animals to ensure healthy and robust animals
- That sick animals are placed in separate pens with minimal contact with other animals. This also makes it easier to monitor sick animals
- That sick animals receive appropriate treatment
- To observe hygiene practices

Avoid contamination from sick to healthy animals in the herd

Since many of the diseases that we have in sheep farming are infectious, i.e. they are caused by bacteria, viruses or parasites, it is also important to prevent infections spreading within the herd.

Prevent new infections in the herd

The structure of sheep farming in Norway means that there are two main risk factors concerning introduction and spread of contagious diseases: livestock contact and infection through people and equipment.

Livestock contact: Measures are important both on the pasture, when purchasing livestock and in connection with breeding. In order to reduce the risk of infection from livestock, the state has banned the transfer of female animals between herds, and has prohibited the transfer of sheep from one county to another.

Infection through people and equipment: The risk of infection as a result of the movement of persons is highest during the period when the animals are inside. The reason is that the stocking density is often highest inside, and that the period spent inside is often a time with a great deal of human traffic. Visits to other countries represent a major risk of introducing an infection.

MAKE SURE

- That sheep that do not belong to the herd do not come into contact with the herd's animals. This means that the fences on the farm must be intact. If contact can't be avoided, such as the use of common pastures, it is important to have measures to reduce the level of contact as much as possible. Examples include separate transport, restricting the length of stays in collection pens and correct placement of salt lick stones, to name a few
- That purchased animals are quarantined before they come into contact with the herd's animals
- That biosecurity measures that have been implemented in the herd, in connection with the ram circle or common pastures are followed

MAKE SURE

- That every visitor uses overalls and changes their footwear
- That those visiting the herd can wash their hands, equipment etc. with hot water and soap before and after the visit
- That people who have been abroad comply with the recommended time limits, remember 48 hours and 72 hours
- That equipment that has been used in other herds is washed and disinfected

09 POULTRY FARMING IN NORWAY

Photo: Tone Beate Hansen, Animalia

NORWAY DOES not have a breeding programme for poultry. Grand parents or parent animals are imported to Norway from abroad. In separate hatcheries and breeding flocks, animals are bred for commercial production of eggs and poultry meat. The hatcheries have their own requirements for biosecurity and hygiene.

Health

We have few contagious diseases in commercial poultry in Norway. This is largely due to efficient biosecurity. We have favourable conditions for preventing pathogens from entering. The most important are:

- **"All in - all out".** The housing is emptied after each production cycle. Before new animals are introduced, the rooms and equipment must be cleaned, disinfected and dried. This is how we remove unwanted microorganisms and keep the overall infection pressure down.

- **Separate age groups.** There is usually only one age group on each farm, which prevents infection spreading from juvenile to adult animals, and vice versa. This is how infection routes on the farm are stopped.

- **Biosecurity barriers.** Poultry production has strict requirements concerning use of the biosecurity barriers. We know that infectious agents can be spread between farms by people and equipment. We also know that microorganisms are present in the outdoor environment around the barn. By always changing outer clothing and footwear in the biosecurity changing area and washing our hands, we leave the pathogens outside the bird housing.

  - When new animals are introduced, everyone entering the animal housing must respect the biosecurity changing routines. In addition, there must be a physical barrier installed between the outdoor and indoor environments. When using transport crates, these can be lifted from the outdoor environment to the indoor environment over a board in the gate. Trolleys on wheels can be moved from the vehicle's pallet and in onto cleaned and disinfected ramps. The farmer's instructions must be followed.
  - All equipment that shall enter the animal housing must be either new or cleaned and disinfected. The equipment should never stand directly on the ground or on the floor outside the biosecurity barrier.

- **Ban on back yard poultry flocks.** Back yard poultry in Norway, as elsewhere in Europe, are infection reservoirs for a variety of pathogens, including highly infectious and serious respiratory viruses. That is why it is not permitted to keep such animals on commercial poultry farms in Norway.

- **The 48 and 72-hour rules.** Anyone who has been in countries outside Norway must follow the 48 and 72-hour rules. If you have been in contact with any kind of birds in another country, you must notify your employer in Norway. After visiting another country, you must wait at least 48 hours before you go into poultry housing in Norway. If you come into contact with poultry or sick and dead birds in other countries you must wait a minimum of 72 hours.

Animal welfare

Generally, good animal welfare is concerned with ensuring that animals are healthy and that their needs for food and water of good quality are met. Moreover, the interiors of the housing must be functional, where the animals' natural needs are satisfied, such as the possibility of feather care (sprinkle bathing), laying (separate laying boxes) and roosting. The owner of the animals is responsible for this. Animal welfare is also about you being particularly aware of weak, sick and injured individual animals. These must be treated or else stunned and killed. The animal owner must teach you what to look for and how to treat or stun and kill such animals in a humanely acceptable manner.

10 CATTLE FARMING IN NORWAY

THERE ARE about 300,000 cows in Norway, most of which are dairy cows. Approximately 75,000 people are suckler cows. Norwegian cattle production has traditionally been based on the breed Norwegian Red (NRF), which has provided both milk and meat. The cattle herds in Norway are small by international standards. Many cattle are still kept in the traditional tie-barns. In recent years, many producers have built new barns, and an increasing number of cows are kept in modern free-range barns. From 2034, it is a requirement in the Norwegian legislation to keep cattle in free-range barns. It is also an official requirement to release the cows out to pasture or paddocks during the summer, regardless of the type of housing.

The breeding company Geno organizes the breeding and development of the NRF breed. Most cows are inseminated with frozen bull sperm that Geno distributes. Geno takes in bull calves for testing, where the best are selected to be breeding bulls.

In meat production based on suckler cows, it is also common to inseminate the cows, although farm bulls are more prevalent than in dairy herds. Most beef cattle are beef breeds such as Hereford or Charolais, or cross-breed animals.

The health situation is good for cattle in Norway. The viral disease Bovine Virus Diarrhoea (BVD) is eradicated. Cattle in Norway are also free of Infectious Bovine Rhinotracheitis (IBR) and leucosis. Diseases such as Johne's disease, salmonellosis and ringworm are widespread in many countries, but occur very rarely in Norwegian cattle. It is important to preserve this favourable situation, in the interests of both animal welfare and the economy in cattle farming.

The greatest risk of infection in cattle is through contact with live animals, especially other cattle. The purchase of animals, common pastures, exhibitions and transport with animals from other herds, are all likely routes of infection. There is also a risk of transferring infection passively, with clothing, boots and equipment moved between herds.

In order to reduce the risk of spreading infection with live animals, we recommend the following routines:

- When purchasing animals, a correctly completed health certificate shall be sent to the buyer of the animal in good time before the animal arrives at the farm.
- Newly purchased animals should be isolated from the other animals in the herd for at least 14 days.
- During those 14 days, any other animals should not be transferred to or from the herd.
- Animals from different seller herds should not be mixed on the transport vehicle if they are to be delivered to multiple buyers.
- If animals are released onto common pasture, the health status of the other herds that use the pasture should be known, and the number of herds restricted.

To reduce the risk of spreading infection with equipment, clothing and footwear, it is important to have a barrier between the farm's areas and "foreign" zones. To reduce risk, we recommend the following routines:

- Everyone who wishes to enter the herd shall change into the farm's own clothing and footwear, or use disposable overalls and boots.
- Only the farm's staff and the milk tanker driver are allowed access to the milk tank room. The milk tanker driver shall not enter the barn.
- When unloading animals for slaughter, the driver of the transport vehicle shall use the farm's own clothing and boots, or suitable disposable overalls.
- Remember the 48 hours and 72 hours restrictions after visits abroad.

11 GOAT FARMING IN NORWAY

THERE ARE approximately 65,000 goats in Norway, including kids and bucks. These are distributed over about 1,100 farms. About 350 of these farms produce goat milk. Norwegian Milk Goat is the predominant breed in goat milk production. Herds of suckler goats and hobby goats generally have few animals, and the majority of these are other races.

The Norwegian Sheep and Goat Association (NSG) organize the breeding and development of the goat breeds. The use of artificial insemination is established, but could advantageously be used more than today, both for advances in breeding and infection considerations. NSG is responsible for the intake and testing of semen bucks.

In 2001, a project called "Healthier goats" was initiated in order to eradicate the loss-causing chronic infectious diseases CAE, abscesses and Johne's disease (paratuberculosis) from the goat population in Norway. It was established that the Norwegian goat population was severely affected by these diseases, and it was considered to be of crucial importance for the future of Norwegian goat farming that extensive measures were implemented. Eradication work was established nationwide in 2004, and in 2010 the goal to eradicate the disease in the entire Norwegian goat population was adopted.

The diseases can also affect sheep and Johne's disease (paratuberculosis) is also a very harmful disease in cattle in many parts of the world. In Norway, we consider Johne's disease in cattle to be eradicated, although some isolated cases have been detected.

In herds with other goat breeds, the diseases covered by the eradication work is seldom found, but it is important to also document the health status on farms with such breeds. The industry has invested major efforts in the eradication work, and it has achieved good results.

A biosecurity package has been produced for goats, with relevant information for goat farmers and visitors. It can be ordered from orghk@tine.no

Going forward, the challenge is to avoid reinfection in the herds where the infection has been eradicated, and to continue working to keep the herd free of other contagious diseases. A good health status and a low level of infectious diseases are also important for the welfare of the animals.

In parallel with the eradication of infection in goats, major investments were made in upgrading animal housing and production equipment in a large proportion of the herds. At the same time, many of the animal owners have made great progress concerning correct feeding for better milk performance and the durability of the animals. This has also been an important contribution in achieving improved animal welfare.

12 TESTING FOR MRSA

What is MRSA?
MRSA is a type of bacteria that has developed resistance to certain antibiotics. It may be passed between humans and animals in either direction. Usually the bacteria live in the nose or throat, and it may be present on the skin. It can also be present in dust, or on surfaces that have been in contact with infected humans or animals.

Who must be tested?
Everyone who is going to work with livestock in Norway must be tested if they:
- Have been in contact with animals that are known to have a resistance to antibiotics
- Have visited or worked in livestock herds abroad
- Have been admitted to a health institution, received dental treatment or undergone medical examination abroad
- Have worked as a health worker abroad
- Have stayed in orphanages or refugee camps abroad
- Have stayed abroad for more than six weeks
- Have had permanent residence abroad

Why is testing important?
Keeping the level low in society: MRSA is not usually dangerous to healthy humans or animals. However, if the bacteria spreads to vulnerable people, for example those in hospitals, it can become difficult to treat. Therefore, it is important to minimise MRSA related infections as much as possible. To achieve this, it is necessary to test those people who meet one or more of the criteria listed above.

Avoid spreading to animals: People are the main source of MRSA infection in Norwegian livestock production, and MRSA is much more common among people than among domestic animals.

Avoid negative consequences: In Norway, the authorities (the Norwegian Food Safety Authority) regularly test pigs for MRSA. When it is detected, the Norwegian Food Safety Authority imposes measures to remove the infection. The animals are slaughtered and the pig shed must be washed and disinfected. When MRSA is detected in other species, the authorities act to remove the infection.

How is testing done?
Testing for MRSA should be done by a general physician at a Norwegian health care institution near where you live. The process is simple, quick and painless. The physician will take a nose and throat swab, and you will receive the results after approximately 1 week.

Until you receive the results, you must use appropriate biosecurity equipment:
- Disposable clothing or overalls
- Surgical mouth band and headgear
- Disposable gloves
- Wash and disinfect your hands every time you enter and leave the herd
- Shower and wash your hair thoroughly as soon as possible after you have been in the herd

About the use of antibiotics
Use of antibiotics in humans and animals can lead to the development of resistant bacteria. It is therefore extremely important to only use antibiotics prescribed by a physician and follow the guidance of the physician when prescribed antibiotics.

1 INFECTIOUS DISEASES

INFECTIOUS DISEASES are caused by infectious agents such as bacteria, viruses, fungi, parasites or prions. Bacteria, viruses and prions can't be seen with the naked eye, and are often called microorganisms. Fungi and parasites are also often so small that we can't see them, but some parasites, such as mites and some types of intestinal worms, can be seen when they are fully developed.

Microorganisms are found in animals and humans and in the environment around us all the time. Generally, we do not become sick from them, and many are vital to the physiological processes in the body. This applies for instance to microbes in the stomach and intestines of animals and humans. Some microorganisms cause diseases primarily in weakened animals, such as new-born animals and older individuals, or animals that are emaciated, stressed or have poor immune status. Other microorganisms are more aggressive and can cause disease, even in individuals who are healthy and in good physical condition. Both animals and people can carry infectious microorganisms without showing symptoms, i.e. they can be healthy carriers. The carriers can spread the infection to other animals and possibly humans during periods where they shed the pathogens. For most contagious diseases, however, the animals shed the largest amount of microbes when they show symptoms.

Infected individuals can shed infectious agents in body fluids such as urine, faeces, mucus, saliva, milk and semen. Some can be found in the air that humans and animals exhale. Different microorganisms have varying excretion pathways and varying ability to survive outside the host individual. These characteristics affect how infectious the microorganisms are. Some can survive outside the host organism for a very long time, sometimes for years if environmental conditions are optimal for the microbe. Other microorganisms survive outside the host for a short period of time. Infections can spread directly between animals and indirectly via the air, equipment, land, clothes and shoes, depending on the type of infectious agent. Microorganisms that are secreted and survive in animal products such as milk and meat can spread with these products.

Prions and viruses are the smallest infectious agents. They are not live organisms. They depend on infecting a host organism, such as animals or humans in order to reproduce. Bacteria, fungi, and parasites are unicellular or multicellular living organisms. Many of these persist in the environment and can reproduce outside a host organism.

Prions

Prions are infectious agents that consist solely of proteins. They can cause serious diseases such as mad cow disease in cattle (Bovine Spongiform Encephalopathy, BSE), Scrapie in sheep and Creutzfeldt - Jakob disease in humans. The prion diseases cause loss of nerve cells in the brain. In the brain, many small cavities are formed which appear sponge-like in the microscope. The diseases are always fatal. Mad cow disease occurred as an epidemic in the late 1980s. The reason was most likely that bone meal was mixed in the feed for ruminants, without adequate heat treatment. Mad cow disease has never been detected in Norway.

Scrapie is a prion disease in sheep. There have been cases of scrapie in Norway, but because of testing and slaughter of infected herds the disease is very rare here.

Most countries with modern food production have introduced strict rules for the use of bone meal in feed production. Dead animals have been examined for prion diseases and risk material such as brain and spinal cord are removed and

destroyed. Prion diseases are now only found occasionally. There are still strict government rules for the movement of animals between countries and across county boundaries in order to prevent the spread of scrapie.

Virus
Viruses are small organisms that rely on getting into the cells of other organisms in order to replicate. Generally, the host cell is destroyed by the virus. Some viruses are completely harmless, while others cause some of the most serious diseases we know of, such as foot and mouth disease (MKS). Many viruses spread easily. Millions of virus particles can be found in exhaled air and in the body fluids of sick animals. Some viruses can be spread over long distances by air and by attaching to other particles. An example is the foot and mouth disease virus. Because some viruses spread so easily, it is very important to know the symptoms they cause in animals. Recognizing symptoms early in the disease process makes it possible to take action quickly to prevent the spread of infection.

Some viruses, such as bluetongue and Schmallenberg, can be spread by insects, so-called vectors. Diseases that are spread by vectors can spread quickly and cover large areas in the summer when the density of insects is high. Mosquitoes, black flies as well as ticks can spread diseases

Bacteria
Bacteria are single-celled organisms that are found everywhere. They reproduce by cell division, and those who divide rapidly can multiply quickly and become a large number. Many bacteria are harmless, some are useful and some are very dangerous. Some bacteria cause very serious diseases. One example is anthrax. The anthrax bacteria can infect and kill animals and people very quickly. Many bacteria persist in the environment for a long time and keep their infectious properties. Animals and humans can be weakened by harmless viral infections that make them susceptible to bacterial infections.

It is common to treat bacterial infections with antibiotics. Mastitis in dairy cattle and joint infection in piglets are examples of infections that are commonly treated. The use of antibiotics must be safe and prudent to reduce the risk of bacteria developing resistance to antibiotics.

Parasites
Parasites can range from unicellular organisms to long worms. Various intestinal worms are common in farm animals. Some are transmitted between animals, some are transmitted via other species that act as intermediate hosts, and some are transmitted in the pasture. Symptoms of parasitic infection depend on the infecting parasite. Common symptoms of infection with intestinal parasites are diarrhoea and emaciation. If animals have parasites on their skin or fur, such as lice, you can see them scratching against fixtures. They may also suffer hair loss and skin wounds. An important effect of parasitic infections is that they weaken the animals, and thus make them more susceptible to other infections. Lack of growth and production is another consequence of parasite infections. Most producers use anti-parasite products to control and treat infections in their animals. Parasites can also develop resistance against anti-parasitic treatment; this is why it is necessary to have a plan for safe and prudent use of anti parasitic treatment.

2 REGULATION AND ORGANIZATION OF THE LIVESTOCK INDUSTRY

There is active farming throughout Norway, even in the far north of the country. Most farms are still family farms, small by international standards. It has become more common in recent years for several producers to own and manage larger herds together. Grains and grasses are produced in areas where the land is suitable for it. Norway is self-sufficient in eggs, poultry, pork and milk. There has been a shortfall in beef production in recent years. In order to meet demand, beef has been imported. Some feedstuffs are also imported for the production of animal feed.

Many of the larger companies in the Norwegian livestock industry are agricultural cooperatives. In cooperatives the producers also own the companies and they supply them with raw material i.e. slaughter animals, milk and eggs. This applies for example to TINE and Nortura. There are also large companies that are family businesses, such as Furuseth and Fatland slaughterhouses, or companies owned by foundations, such as the Q-dairies.

Here is a summary of the most important organizations in the Norwegian livestock industry:

NORTURA SA is Norway's largest brand for meat and egg products. The group obtains its raw materials from farmers throughout the country and has factories in several Norwegian municipalities. Nortura SA is a cooperative owned by about 18,800 farmers who supply raw materials for production. The aim is to process the owners' slaughter animal, eggs, livestock and wool in the best possible way. This is done through the efficient processing of raw material, marketing of products and advisory services to the producers. On the web: www.nortura.no

THE NORWEGIAN INDEPENDENT MEAT AND POULTRY ASSOCIATION (KJØTT- OG FJØRFEBRANSJENS LANDSFORBUND – KLF) organize and represent the privately-owned, independent sector of the meat, egg and poultry industry in Norway. The organization has 141 member enterprises spread over 149 plants. The companies are distributed throughout the country and have about 4,100 employees in total. The member companies range from small businesses with 2-3 employees to large slaughterhouses and meat processing enterprises with several hundred employees. On the web: www.kjottbransjen.no

TINE SA is the largest group in the dairy sector in Norway. TINE is owned by more than 15,000 cattle farmers. TINE collects raw milk from dairy farmers across the country. The group also has dairies and factories in many Norwegian municipalities. The milk is processed for many different products and marketed and sold to Norwegian consumers. TINE also has a counselling service for its producers. On the web: www.tine.no

THE Q-DAIRIES (Q-MEIERIENE) are owned by the Kavli Group. They have a dairy on Jæren in Rogaland, and in Gausdal just north of Lillehammer. The farms that supply milk to the Q-dairies are located in the areas around the two dairies. The Q-dairies process milk from approximately 530 farms and have approximately 150 employees. On the web: http://www.q-meieriene.no

NORSVIN SA is a breeding company engaged in the development, production and sale of pig genetics as its main tasks. Norsvin is also a cooperative, owned by the Norwegian pig producers. Norsvin's genetics is distributed to Norwegian and foreign customers through the sale of live animals or semen. Norsvin is also a trade organization for Norwegian pig producers, and is engaged politically to improve the economic framework for the pig industry. On the web: www.norsvin.no

GENO SA is a breeding company working with the breeding and development of the breed Norwegian Red (NRF). Geno is owned by Norwegian cattle farmers. Geno distributes bovine semen and performs insemination services throughout Norway. The main product is the semen from the best NRF bulls in the country, but Geno also delivers semen from other cattle breeds to its members and customers.
On the web: www.geno.no

NORWEGIAN BEEFBREEDERS ASSOCIATION (TYR) is a breeding and member organization for Norwegian suckler cow producers and other beef producers. TYR is responsible for the national breeding of beef cattle breeds and can provide genes with well-documented features. TYR has some 1,600 members across the country. TYR works to improve the economy in suckler cow production. On the web: www.tyr.no

THE NORWEGIAN SHEEP AND GOAT BREEDERS ASSOCIATION (NORSK SAU OG GEIT – NSG) is a professional membership organization for sheep and goat owners. The organization currently has 18 county branches, approximately 390 local branches and about 12,000 members. The activities include development work in the areas of sheep and goat breeding, membership communication, information and a number of projects. On the web: www.nsg.no

THE NORWEGIAN POULTRY ASSOCIATION (NORSK FJØRFELAG – NFL) is a national member organisation in the poultry sector, open to all producers, regardless of production (eggs for consumers, broilers, turkey, hatching eggs, live chickens) and the commercial level, both cooperative and private. The members are organized in 12 local branches. The NFL works to improve poultry farmers' livelihood. Favourable economic framework and optimization of production conditions, as well as good animal welfare and animal health, is essential to achieve this. On the web: http://www.nfl2.no

NORWEGIAN FARMERS ASSOCIATION (NORGES BONDELAG – NB) is the largest organisation for farmers in Norway, with 62,000 members, divided into 550 local associations and 18 county branches. The Norwegian Farmers Association works to improve conditions for agriculture and to show agriculture's significance in our society. The goal of the Norwegian Farmers Association is to gather everyone who is or feels connected to farming and to protect the farmers' economic, social and cultural interests. The NB negotiates each year with the Norwegian government regarding agriculture's economic framework. It receives no government funding. On the web: www.bondelaget.no

NORWEGIAN FARMERS' AND SMALLHOLDERS' UNION (NORSK BONDE- OG SMÅBRUKARLAG – NBS) is an organization for farmers with approximately 7,000 members in 260 local chapters and 18 county branches. NBS negotiates with the Norwegian government each year concerning farmer's economic framework. It works politically to improve the development prospects for the rural areas. Local food, environmentally friendly production, local processing, animal welfare and a thriving cultural landscape are important issues for the organization. On the web: www.smabrukarlaget.no

THE NORWEGIAN FOOD SAFETY AUTHORITY (MATTILSYNET) is an important authority for everyone who keeps animals in Norway. The Authority is a state agency that works with the public administration of all regulations relating to the keeping of animals and to food production. The Authority is responsible for safe food and safe drinking water. They also work for good animal health and the environmentally-friendly and ethically responsible keeping of animals. The Authority develops and administers regulations, provides information and maintains preparedness for contagious animal diseases.
On the web: www.mattilsynet.no

FARM ANIMAL HEALTH SERVICES (HELSETJENESTENE). The livestock industry itself organizes healthcare for the individual animal herds. The health services work with counselling on health, welfare, herd management and biosecurity. They supervise producers, veterinarians and others who work in agriculture. Important tasks for the health services are organized, preventive healthcare and systematic disease control. The health services offer information, courses and other training. The health services for poultry, sheep and pigs are organized in Animalia, while the health services for goats and cattle are organized by Tine Counselling. On the web: www.animalia.no and http://geithelse.tine.no and http://storfehelse.no

KOORIMP is the Norwegian Livestock Industry's Biosecurity Unit. The Norwegian livestock industry wants to impose strict requirements concerning testing and health documentation for animals entering Norway. On this background the livestock industry has established KOORIMP. KOORIMP works to ensure the quality of animals and breeding material imported to Norway. Biosecurity is an important task for KOORIMP. The goal of the work in KOORIMP is to reduce the risk of infectious animal diseases entering Norway, and to prevent the spreading of diseases we already have.
On the web: www.animalia.no/koorimp

KOORIMP

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