Chapter 4  Health and Disease Management

Healthy and unhealthy birds

It is extremely important for the farmer to learn how to detect an unhealthy or sick bird, so she immediately can initiate the right action. In fig. 4.1 you will find the main characteristics of healthy and unhealthy birds (See also Chapter 6). Healthy birds may be able to fight the diseases themselves, whereas unhealthy birds will have difficulties in fighting diseases. It is important to isolate unhealthy or sick birds from the healthy flock in order to ensure a minimum of loss.

![Healthy bird](image1.png) ![Unhealthy bird](image2.png)

**Healthy birds**

- Alert and on guard
- bright eyes and comb
- walk, run, stand, and scratch continuously
- eat and drink normally
- lay eggs normally
- smooth and neat feathers (according to race)
- soft compact droppings
- breathe quietly

**Unhealthy/Sick birds**

- Tired and lifeless
- dull eyes and comb
- sit or lie down
- eat and drink less
- lay less or stop laying eggs
- ruffled and loose feathers
- wet droppings with blood or worms, diarrhoea
- cough, sneeze and breathe noisily, and may have nasal discharges

*Fig. 4.1 Characteristics of healthy and unhealthy birds*

Health and disease management

Diseases are everywhere and will attack birds at all ages, but careful management can prevent many diseases.
Fig. 4.2 Good management = healthy birds

Figure 4.2 shows a poultry house, which is clean and nicely kept outside and inside. A woman is vaccinating a bird with the eye-drop method. One sick hen is isolated in a small shelter away from the others. Birds are well fed and characteristically healthy.
Figure 4.3 shows a poultry house with food and droppings lying around, with sick and dead birds among each other, dirty water in the pot and dirty feed in the feeder. Birds are characteristically sick and the farm badly managed. If you find an unhealthy or sick bird, isolate the animal and call for the veterinarian or health assistant for disease identification and further advice. If the bird dies, burn it or bury it. Due to the possible presence of Avian Influenza it is not advisable to eat dead chickens. You should rather remove dead birds, so the germs are not left on the ground to be passed on to other birds or to humans.

Do not buy chicks from unknown sources, and do not use eggs for hatching from hens that have been ill.

**Biosecurity**

What is biosecurity? Basically biosecurity is equal to disease management. Biosecurity is in practical terms a management practice which must be developed by the farmer in order to prevent the entry of any disease into the flock. It is an approach to animal husbandry that has a focus on maintaining or improving the health status of their animals and preventing the introduction of new disease pathogens by assessing all possible risks to animal health. Fig. 4.4 shows various ways of introducing disease(s) into a flock.
Biosecurity is – in any flock – improved by applying measures to avoid introducing disease into the flock such as limited access to the flock by others than the keeper, known origin of day-old chicks and other birds brought into the flock, improved hygiene, known origin of feed, litter and equipment. Rodents and insects are difficult to keep away from free-ranging birds. For the same reason biosecurity can never be optimal in a free-range flock.

Fig. 4.4 An overview of threats of introduction of diseases into a flock

Feeding
Supplementary feeding, in particular for small chicks, is one of the most important means of preventing diseases. Feeds should always be stored in a dry and clean place, as they may easily get contaminated and spread disease in the flock.

Clean Water
Clean water from a well, not a pond, is important to avoid the spread of waterborne diseases, such as Fowl Cholera, Newcastle Disease (ND), and Avian Influenza (AI). If a highly contagious strain of AI is present in the area, strict care should be taken to avoid contact with other birds – domesticated or wild. Water should be clean as it could be contaminated by droppings from wild birds.

Hygiene
Dry and clean housing is essential to avoid development and spread of disease. Every three to six months, houses and shelters should be disinfected with lime wash.
after cleaning (see Chapter 1 for detailed advice on proper management). A rule of thump is to apply new lime wash when the old has been worn of the walls.

Culling
A well managed flock includes regular culling of the birds. It is better to slaughter hens that are too thin, as they do not resist diseases well and can pass diseases to poultry in good health. Also birds not laying eggs due to age should be culled. Sick animals should be culled if a diagnosis can not be made.

Housing and chicken runs
Too many birds together may fight or even kill each other, as the stronger ones peck the weaker (see fig. 1.11). You should never keep local breeds in confinement without free access to outdoor areas. If you use outdoor runs, provide at least 5 square meters per adult animal. When space is limited, diseases are passed more easily from one bird to another. Other species of birds may carry diseases without showing any signs of being ill. For example, ducks, guinea fowls, and turkeys can pass on diseases to hens, or vice versa. The best way to avoid spreading diseases from one species to another is to keep them separate in different cages, baskets, or houses. Always keep domesticated birds as far away from wild birds as possible.

Disease control
Depending on the origin of the disease, it might be possible to cure it. Table 4.1 gives an overview of how to treat different types of diseases.
## Table 4.1 Types of diseases and possible treatments

<table>
<thead>
<tr>
<th>Disease type</th>
<th>Possibilities for control or cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus</td>
<td>Viral diseases cannot be cured, but may be prevented or controlled if the animals are vaccinated before the disease occurs in the flock. If the disease is present in the flock, vaccinations might increase the severity of the disease or even kill the birds.</td>
</tr>
<tr>
<td>Bacterial</td>
<td>Many bacterial diseases can be treated by use of antibiotics. It is important to diagnose the disease in order to choose the right antibiotic.</td>
</tr>
<tr>
<td>Parasites</td>
<td>Most parasites can be treated. You can use conventional veterinary medicine (anthelmintics), and some traditional methods have also proved efficient.</td>
</tr>
<tr>
<td>Fungus</td>
<td>Fungal diseases might be treated with antibiotics, but the most important is prevention by offering feed of good quality.</td>
</tr>
<tr>
<td>Nutritional diseases/disorders</td>
<td>Nutritional diseases or disorders are caused by wrong feed compositions. Depending on the disease, it can be prevented or cured at an early stage by mixing the right feed with minerals and vitamins, or giving access to a diversity of feedstuffs from the surroundings, e.g. green grass and fresh cow dung.</td>
</tr>
</tbody>
</table>

### Important diseases

Diseases are often characterised according to their biology, such as Virus, Bacteria, Parasites, Fungi, and their causes, e.g. nutritional disorders (Table 4.1). However, in the following the most important diseases in poultry are categorized at three levels according to their severity and importance in village based small–scale production systems. They are presented by distinct features such as their characteristics during outbreaks (symptoms) and possible treatments (prevention or control), as well as the time of occurrence. The importance of a disease is judged by mortality rates and effect on production, and will vary greatly from area to area and from season to season. High importance (▼▼▼) signifies a common disease with high mortality (more than 30 per cent of the flock), highly contagious and difficult treatment. Medium importance (▼▼) signifies a common disease with medium mortality (10–30 per cent of the flock) with easy to difficult treatments. Less importance (▼) signifies not common, lower mortality and/or easy treatment.
Combination of diseases
Some less important diseases may interact with other diseases to create a more severe effect on the birds. This is the case for the combination of E.coli infections, nutritional deficiencies, and internal parasites. Such diseases rarely kill the individual bird, but have a remarkable effect on the immune system of the birds, thus creating the basis for easy infection by other diseases. Often a treatment against parasites is sufficient.

Viral diseases

Newcastle Disease (ND) (Fig. 4.5)
The disease is very common and is often seen in young chicks, but also in adults. High flock mortality, often between 30 and 80 per cent of the birds die, when the disease occurs. The chickens lose appetite and have poor digestion. They may show heavy breathing, greenish droppings, and sometimes bloody diarrhoea. Nervous symptoms, paralysis, and sudden deaths are often seen, and several symptoms may occur at the same time. The disease is a virus, so there is no treatment, but it can be prevented through vaccination of all birds including chicks from two weeks of age. The symptoms of ND resemble those of avian influenza.

Avian Influenza (AI)
The disease is found naturally in ducks and other waterfowl, and may spread in a highly contagious and potentially dangerous form to chickens. High flock mortality, blue and swollen comb and wattles. AI infects through contact to other birds, contaminated feed and drinking water from ponds with wild birds. The disease is a virus, so there is no treatment. Best prevention is strict hygiene and slaughter of sick birds. AI can be prevented through vaccination of birds, but the vaccine is very difficult to find. All birds in the flock must be culled and burned, and chicken houses thoroughly cleaned and disinfected after a disease outbreak. Always call a veterinarian if you suspect an AI outbreak. Do not eat infected birds, and make sure that no persons or animals get near infected and dead birds or their droppings (clean the surroundings carefully).

Fowl pox (Fig. 4.6)
Fowl pox is often seen in young chicks, but also in adults, and shows as pocks (small lumps) on wattles, comb, and face. High body temperature, tiredness followed by sudden death. The disease is common during dry seasons, but may be found all year around. The disease is a virus, so there is no treatment. Vaccine is available and highly effective.

Gumboro (Fig 4.7) (Infectious Bursal Disease, IBD)
IBD is only seen in chicks younger than 6 weeks of age, and normally only in large flocks kept in confinement. The disease is not common in small-scale village based systems. Common symptom: Diarrhoea. The disease is a virus, so there is no treatment. Vaccine is available.

▼ Marek’s disease (Fig. 4.8)
Marek’s disease is only seen in birds older than 16 weeks. Initially the birds may show paralysis of one or both wings. Or one or both legs might be paralysed. The disease is a virus, so there is no treatment, but commercial vaccines are available.

Bacterial diseases
▼▼▼ Fowl cholera (pasteurellosis)
Fowl cholera may attack at any time in all age groups. Symptoms are severe. Diarrhoea, respiratory symptoms, loss of appetite, blue combs and wattles are common symptoms. May occur as a chronic disease or hit as sudden death. Infection occurs through contaminated feed and drinking water. There is no treatment. Best prevention is strict hygiene and vaccination. Kill and burn affected birds. Vaccine is usually available and effective.

▼▼ Pullorum disease (Baciillary white diarrhoea)
The disease is mostly seen in young chicks. Chicks walk with difficulty, show big bellies, and drag their wings. Faeces is liquid and turns white. There is no treatment. Prevention is strict hygiene. If illness occurs, isolate or kill and burn the birds. Disease is transmitted to chicks from the eggs of infected hens, which may not show signs of being ill.

▼▼ Fowl typhoid
Fowl typhoid is usually seen in rather old birds. Symptoms: high body temperature, tiredness, blue comb, sudden death. No treatment. Prevention is done through strict hygiene and culling of ill hens.
Infectious coryza
Coryza is seen at all ages. The symptoms are: Runny nose, swellings under the eyes, closed eyes, drop in egg production. Treatment may be given by adding antibiotics to the drinking water.

Chronic respiratory disease (Fig. 4.9) (Mycoplasmosis)
Symptoms: Runny or blocked nose, swollen face, closed eyes, drop in egg production, rare deaths. Treatment may be given by adding antibiotics to the drinking water.

E. coli infection
E. coli infections are common among newly hatched chicks, causing infection in the stomach region. In older birds the symptoms may be: Respiratory distress or infection in the egg organ with stop of egg production. The best prevention is improved hygiene of eggs for hatching and of the nests. Treatment of sick chicks might be possible with antibiotics but is difficult.

Parasites
Coccidiosis (internal parasites)
The disease may occur at any time at all ages, but can be prevented by regular and careful cleaning of troughs and poultry houses. Resistance develops after infection if the birds are treated. Symptoms: Sick, tired, head down, ruffled feathers, bloody diarrhoea. Death in young chicks. If the chicks survive, they will remain thin and be late in laying if they have not been treated. Treatment: Anticoccidiostatics in drinking water or feed. Prevention: Not too many birds together. Avoid different age groups of birds in the same house, as the disease may spread from adults to young chicks.
Roundworms and tapeworms (internal parasites) (Fig. 4.10 and 4.11)
Internal parasites are very common in all ages in the village based production systems. These parasites will cause poor health, weight loss, drop in egg production, and bloody diarrhea. The best treatment is adding anthelmintics in the drinking water once or twice a year, at best two weeks before vaccination against ND (See above). Careful hygiene may prevent heavy infections.

Fig. 4.11 Internal parasites as found in the faeces

External parasites (Fig. 4.12)
External parasites may attack birds at all ages at any time, but occurs most frequently in humid chicken houses with bad hygiene. Adult birds are clearly disturbed and spend a lot of time pecking and polishing feathers. Young chicks may die from anemia. If not treated, mites, lice, fleas, ticks will cause weight loss and possibly loss of feathers due to the parasites sucking blood and to skin irritation. Lice can be seen around eyes and nose. Fleas can be seen on the belly. Treatment: Spray or dust with pesticides, dry lime, ashes, and oil.
Ashes, dry lime, and sulphur powder may be used where the hens do dust bathing.
Nests may be protected by putting a few tobacco leaves mixed with ashes in the nests.
**Fig. 4.12 External parasites (behaviour and parasites)**

**▼▼ Scaly legs (Fig 4.13)**
Scaly legs are caused by an external parasite irritating the skin on the birds’ legs. Symptoms: Legs clearly have scales and wounds and may become crippled in their appearance. Treatment: Dip the legs daily in kerosene, oil, or in an insecticide until the scales disappear. Old birds with crippled legs should be culled.

**Fig. 4.13 Scaly legs in three stages**

**Fungal diseases**

**▼▼ Mycotoxicosis (fungal poisoning)**
Fungal diseases are common if the chickens are fed moulded feed. Symptoms: Weakness, pale combs. Treatment: Supplementary vitamins. Prevention: Proper storage of feed to prevent growth of the fungi that produce the mycotoxins, which cause the disease.
Nutritional diseases

Fig. 4.14 Nutritional diseases. Feather loss (a) and leg deformation (b)

▲Nutritional diseases (Fig. 4.14)
Nutritional diseases are commonly seen in poorly managed flocks. Symptoms: Bone deformation and feather loss. The birds walk with difficulty; they limp. Legs are deformed. Some deficiencies may cause feather loss. Treatment, if detected in time: Supplementary vitamins and calcium, fresh grass, and cow dung. Nutritional diseases may be avoided when the birds have access to normal vegetation and are therefore rare in scavenging chickens.

Treatment of diseases
Some diseases may be cured by drugs. Parasitic diseases, such as lice or worms may be cured by use of anti-parasitic drugs or by applying simple, local methods. Often these drugs are given mixed with feed. Some bacterial diseases causing diarrhoea, may be cured with antibiotics. Antibiotics may be given as injections or added to feed or drinking water depending on which antibiotics it is. For viral diseases there is no treatment. However, the viral diseases can often be prevented by vaccination.

Vaccination
All poultry should be vaccinated against the most common viral disease(s) in the area. Vaccination schemes at village level should minimum cover Newcastle Disease and Fowl Pox. Vaccination against Avian Influenza should depend on the veterinary authorities. Other viral diseases such as Gumboro and Marek’s disease may be covered by vaccination, but they are often less important at village level. A bacterial disease such as Fowl cholera may also be prevented by vaccination. Poultry should be vaccinated when they are very young, and before they have begun to lay eggs. Most young birds that have not been vaccinated do not resist diseases, and often die. Vaccines should only be given to healthy birds. If you vaccinate a sick bird you may kill the bird, see fig. 4.14. Anthelmintics against internal parasites should be given two weeks before vaccination, to improve the effect of the vaccine.
Vaccination methods

In several countries, village vaccinators have been trained to assist the veterinarians in carrying out vaccination programmes. In the following some simple instructions in relation to vaccination are given.

In principle, there are four fundamental ways of vaccinating birds (Fig.4.20):

1. Eye drops (easy)
2. Injections (difficult)
3. Skin piercing (easy)
4. Orally in feed or water (difficult)

For scavenging poultry, you should avoid mixing vaccines with drinking water or feed, as it is difficult to give the right dose. Research has shown that protection against e.g. Newcastle Disease is highly uncertain if vaccine is given through water or feed. Giving the right dose is essential for the vaccine to work properly. Overdosing of a live vaccine may kill a young chick, whereas too low a dose will not give adequate protection. If the mother hen has been vaccinated, an early vaccination of her chicks may also cause an overdose and kill the chicks. Thus, it is important to consult a veterinarian or auxiliary veterinarians (barefoot vets, village vaccinators) for further advice before performing vaccinations.
Fig. 4.16 Important vaccination tools

Tools for application normally include (Fig. 4.15) a clean apron (green or other dark colour if possible in order not to scare the birds) (A), vaccine vial (B) stored in a cool box (C), soap to clean hands (D), clean needles (E), clean syringe (G), and a clean box for needles and syringe (F). Needles and syringe should be boiled in water for 5 minutes and cooled before re-use (Fig. 4.17).

Fig. 4.17 Boiling water to disinfect needles and syringes before vaccination
It is important to treat the clean syringes and needles carefully. Do not touch the end of the needle after cleaning. Put the needle gently on the syringe, holding the needle with the sharp end upwards (Fig. 4.17A). Hold the vaccine vial upside-down and press the needle gently through the plastic seal of the vial cap. Pull the syringe handle gently down, while sucking the vaccine out of the vial until the syringe is full (Fig. 4.17B). Press the syringe handle back until you reach the right volume (Fig. 4.17C). Make sure that there is no air bubbles trapped in the syringe or the needle. Air bubbles will give the wrong dose to the chickens. Normally a full 1 ml syringe will match 10 doses, one for each of ten adult birds (Fig. 4.18). This however depends on the weight of the bird, the type of vaccine, and the application method. After vaccination of 10 birds, the needles should be changed or cleaned in boiling water.

Fig. 4.18 It is important to handle the syringe and needle correct

Fig. 4.19 One full 1 ml syringe is usually enough for ten adult birds
Fig. 4.20 The most common methods for vaccinating young chicks are eye drops (A), or by piercing the skin of the wing (C). For older or adult birds by injections in the breast or thigh muscles ©.

The most common vaccination methods for young chicks are eye drops and skin piercing (Fig. 4.19, A and B). When the birds grow older, injections are given in the breast muscles (Fig. 4.19, C). Depending on the vaccine type, eye drops may also be used for adult birds. Please consult the reference list in Appendix A for technical literature on how to vaccinate against Newcastle Disease and other diseases. Vaccines should be given either early morning, before letting the birds out of the chicken house or in the evening when the local birds are easy to catch resting in the trees. When vaccinating adult poultry for the first time, you should preferably be two persons, one holding the bird, the other one vaccinating (Fig. 4.20).
General precautions for vaccination with live vaccines

1. All vaccines should be stored in a refrigerator before use.
2. Some vaccines are so-called thermo-stable, which means that the vaccine will tolerate high temperatures. However, thermo-stable vaccines should also be stored in a cold place to keep them viable. You should always keep vaccines out of direct sunlight.
3. When using vaccines in the field, you should if possible transport them in a cool box with ice.
4. The syringe, needle and other equipment to be used for vaccination should not be cleaned by any chemical disinfectants, as these may destroy the vaccine. They should instead be disinfected in boiling water (Fig. 4.16) and be used after cooling.
5. The vaccines must be mixed or diluted in cold distilled water, and care must be taken to ensure that the vaccines are not exposed to direct sunlight.
6. It is best to vaccinate birds during the cool hours of the day, either in the morning or in evening.
7. Some mixed vaccines should be used within 30 minutes. Otherwise they will be useless and should be thrown away.
8. Always consult a veterinarian or an auxiliary veterinarian before conducting a vaccination campaign.

Disease prevention calendar

It is important to prevent and treat diseases according to the occurrence of diseases. Vaccination campaigns against Newcastle Disease (ND) or Fowl Pox should be implemented before the onset of the disease, as the vaccine may otherwise kill already sick birds. To plan vaccination and medication, it is advisable to use a so-called “disease prevention calendar”, where veterinarians, farmers, and extension workers together identify the periods where diseases should be prevented or treated. Figure 4.21 shows a “disease prevention calendar” indicating when birds at different ages are vaccinated against ND (a) and Fowl Pox (d) and treated against internal parasites (worms) (b) and external parasites (d), following the annual cropping cycle and festivals. The exact periods of treatment of course vary according to local conditions.
Fig. 4.21 Example of disease prevention calendar
Ten simple rules for disease prevention:
1. Give access to the right feed and clean water, in particular for small chicks;
2. Build shelters against wind and rain;
3. Clean houses weekly and apply lime wash on the floor and the walls every three to six months;
4. Provide clean and dry litter regularly;
5. Do not put too many birds together (5 hens per m² in the house);
6. Different species of poultry, for example hens, turkeys, pigeons, ducks, and guinea fowls should be kept separate;
7. Separate chicks from adult birds with exception of the mother hen;
8. Vaccinate chicks against the most important diseases and revaccinate if necessary;
9. Isolate and treat sick birds – if medication is not available then kill the sick birds;
10. Burn or bury killed birds.