Best Practice Guide Pigs

Best Practices for Good Animal Health



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1 Objectives and structure

What are the objectives of this Best Practice Guide?

The **Best Practice Guides (BPGs)** aim to improve animal welfare by giving recommendations and advice to all stakeholders that are involved in the production of fattening pigs and broiler chickens. They have been developed as part of the **aWISH project (Animal Welfare Indicators at the Slaughterhouse)** and contain numerous measures, the so-called "Best Practices", that can be implemented on farm, during transport and at the slaughterhouse to ameliorate the welfare of pigs and broilers throughout the whole production chain.

This BPG focuses on Best Practices regarding **good health during the rearing and fattening period of pigs**. Animal health and animal welfare are closely interconnected as freedom from disease is the basis for wellbeing in animals. This is also reflected in the Five Domains Model of Animal Welfare where animal health presents one of the domains assessed for animal welfare (Mellor et al., 2020). Health challenges such as infectious diseases, parasites and disorders of the musculoskeletal system can negatively impact the pigs' welfare and might also lead to economic losses due to reduced growth performance and downgrading at the slaughterhouse. Investing in good health is not only important but a prerequisite for responsible pig husbandry.

The Best Practices listed in this guide refer to ensuring animal health and welfare and are based on scientific literature, expert surveys, and experience gained in the EU project aWISH.

Who is this Best Practice Guide intended for?

This BPG is intended for farmers, advisors, veterinarians, scientific experts, policymakers, and anyone involved in improving animal health and welfare on farm.

How is this Best Practice Guide structured?

The recommendations provided in this BPG should lead to an increase in pig welfare that is reflected in the (automatic) welfare monitoring at farm and slaughterhouse level.

This BPG starts by outlining preventative measures followed by a description of acute interventions to maintain and improve pig health. For each section in the guide, potentially affected animal welfare domains are listed, referring to the five domains model (1 Nutrition, 2 Physical Environment, 3 Health, 4 Behavioural Interactions and 5 Mental State) (Mellor et al., 2020). In addition, the animal welfare indicators (AWI) studied in the aWISH project that are affected in that section are identified. Afterwards, a detailed description of Best Practices is provided that can improve animal welfare in this area.

2 Preventative measures

Factual background

Preventing disease is a crucial measure for good animal health and welfare. Furthermore, prevention of disease is also important for food safety and public health since zoonotic infections also pose risks to humans. The key concept of prevention is to avoid transmission of diseases, either between farms or within a farm, by implementing biosecurity measures (Alarcón et al., 2021). Effective preventative measures keep animals healthy and help ensure that medication can be avoided and, particularly regarding the use of antibiotics, reduced. Prevention should be based on herd specific measures and a close cooperation with the herd veterinarian rather than on a single general strategy (Raasch et al., 2020). Preventative measures may include selecting the right genetic lines of animals (for instance suited to specific housing conditions like outdoor or indoor housing), as well as maintaining good hygiene in the pigs' environment and ensuring that animals are properly vaccinated.
The Best Practices listed in this guide should be considered in every pig housing facility to prevent the development and spread of disease.

2.1 Genetics

Affected welfare domains[1]: Health, Behavioural Interactions

Affected AWI (related to the aWISH project): Tail/Ear lesions, Skin lesions

Genetics are important in pig farming and can also impact the occurrence of tail and ear lesions as well as skin lesions. Several studies report that **breeding strategies** such as breeding for resilience (Gorssen et al., 2024), and group selection where the performance of group/pen mates is included in the calculation of an individual animal's breeding value, leading to more „sociable swine"(Bijma, Muir, Ellen, et al., 2007; Bijma, Muir, & Van Arendonk, 2007; Rodenburg et al., 2010) can reduce aggressive behaviour in pigs. Certain breeds may also be more associated with tail and ear biting than others (Lange et al., 2023). In an aWISH survey, farmers as well as scientific experts listed genetics as one of the most important factors for reducing tail and ear lesions. Genetics can also play a role in disease resistance and survivability of pigs. For instance, selecting for a good immune response may be a way to improve the robustness of pigs. However, the studies conducted on this topic are inconsistent, and the heritabilities found were

[1] Referring to the Five Domains Model of Animal Welfare (Mellor et al., 2020), a science-based framework to assess animal welfare. The model includes 5 domains that are assessed: 1 – Nutrition, 2 – Physical environment, 3 – Health, 4 – Behavioural interactions, 5 – Mental state.



rather moderate. Generally, it is also difficult to measure disease resistance phenotypes over longer periods of time in order to incorporate them into routine genetic analysis. Nevertheless, there is evidence that genetic factors may influence the health of pigs (Bruns and Stalder, 2019).

Best Practices

- It is advisable to select the **genetic line that is best suited to the specific housing and management system**. There may be differences in requirements between outdoor and indoor housing, or in the requirements for maternal performance when sows are not kept in farrowing crates. **The breeding company or a specialised advisor** should be consulted regarding this matter.
- To prevent tail-biting, it may be helpful to draw on the experiences of those countries (or individual farms) where pigs are not tail docked. **Breeds that are less predisposed to tail biting** may be used there, even if they are not yet scientifically identified.
- It is advisable to stay up to date on new findings and the **current state of research** regarding the influence of genetics on animal health and behaviour. To this end, **expert advice** should be sought. One can also consult professional journals, attend conferences and workshops, or take advantage of similar opportunities.

2.2 Hygiene

Affected welfare domains:	Nutrition, Physical environment, Health
Affected AWI (related to the aWISH project):	Tail/Ear lesions, Lung lesions, Liver lesions, Bursitis

Animal hygiene is one of the most important ways to ensure animal health and avoid diseases. A clean and well-managed environment reduces the risk of infections. Good hygiene practices may also improve productivity and contribute to healthier herds. The reduction of pathogens can mainly be achieved through appropriate **biosecurity measures**. It is important to effectively prevent the entry of pathogens on farms and to control the spread of disease within the farm. To this end, several biosecurity measures can be implemented, including measures to protect the herd from contamination from outside as well as daily hygiene practices within the farm.

Best Practices

- A strict **hygiene lock** that separates the barn into a “clean” and a “dirty” area helps to reduce the introduction of pathogens into the barn. Only **farm-owned clothing** or clothing that does not leave the farm should be worn in the clean area. It is advisable to



disinfect the hands before entering the clean area, and a walk-through shower can further promote hygiene.

- The entrance to the barn should be **restricted** to a small number of people. Persons that pose a high biosecurity risk (e.g. due to contact with other pig farms) should only enter the barn when absolutely necessary and should adhere to additional hygiene measures.
- Measures need to be implemented to avoid the spread of diseases between batches and especially from older to younger animals: a **quarantine for new pigs (physically separated from the main pig barn)** as well as **separate tools and clothing per barn/compartment** minimise this risk. **Disinfectant footbaths** can be placed at the entrances to individual compartments to disinfect boots before entry.
- Pests such as rodents should be prevented from entering the barn. There should be no open cracks or gaps through which pests like mice and rats can enter. If pests are present, they must be effectively controlled. To do this, farmers should seek advice from a professional **pest control** expert.
- **No pets**, such as dogs or cats, are allowed in the piggery. They must be kept strictly out of the barns.
- **Equipment** brought into the barn (such as veterinary medical equipment, etc.) must always be **disinfected**.
- **Pigs from different batches should not be mixed and sick animals should be separated from healthy ones**.
- **Hospital pens** for injured as well as sick animals should be present in every barn.
- **Closed farms or a close cooperation between farrowing and finishing farms** further reduce the risk of spreading diseases.
- Animal transfer within farms should be reduced (avoidance of re-mixing pigs or having pens with heterogeneous pigs).
- Pigs kept outdoors have a higher risk of coming into contact with pathogens. Biosecurity measures such as **avoiding contact to wild boars** and preventing wildlife from entering the outdoor area are necessary. A double fence is recommended.
- Cleaning and disinfecting are also important parts of animal hygiene. An **all-in-all-out system** should be adopted. Once all pigs are moved out of the barn, all pens need to be **cleaned and, once completely dried, disinfected**.
- **Disinfectants** need to be **suitable and tested** and used according to the label instructions. It is essential to always follow the manufacturer's instructions regarding the required exposure time for the disinfectant, as well as any other specific instructions for use.
- Care must be taken to ensure that the entire barn (including corners, crevices, and feed and drinking troughs) is **disinfected**.
- If certain diseases caused by known pathogens have occurred in a barn, care must be taken to use a disinfectant that is effective against those pathogens. Disinfectants should further be **effective against worm eggs**, especially when pigs have access to an outdoor area.



- If necessary, pens can be cleaned during a batch. This is also important when trying to **avoid animals coming into contact with their own excreta**, for instance regarding the spreading of worm eggs.
- When pigs are kept on straw, **manure should be removed regularly**. For pigs kept outdoors, **rotating pastures** can minimise worm infestations.
- **Feeders and drinkers should be checked and cleaned daily** to ensure reliable function as well as hygienic conditions for the pigs.
- The **water and feed lines as well as storage silos** also need to be **cleaned regularly**, since stale feed and water left in the lines can turn mouldy. To avoid this, it can also help to **flush the water lines prior to the arrival of new pigs**. Water lines should be disinfected regularly.
- It is very important to **regularly check the feed hygiene on all production stages** (field to storage) in order to monitor potential entry ways for pathogens. Performing **regular water checks** is also recommended.
- **Animal carcasses should always be stored outside the pig barns**, preferably at the edge of the farm, where they can be accessed by collection vehicles without having to enter the farm.



2.3 Veterinary advice (medical treatments/vaccinations)

Affected welfare domains:	Health
Affected AWI (related to the aWISH project):	Tail/Ear Lesions, Lung lesions, Liver lesions, Bursitis

Proper medical treatment and vaccination programs are essential for preventing disease and maintaining pig health. If animals in the piggery already have diseases, the severity of the symptoms can be reduced, and other animals can be prevented from becoming infected. In any case, veterinarians should be consulted regarding preventative health measures such as vaccinations, as they can establish a medical program tailored specifically to the farm.

Best Practices

- A **veterinarian** should be consulted to **optimise health management**. This includes the development of a **vaccination plan, parasite prophylaxis** as well as other measures to maintain optimal pig health.
- Animals should be **vaccinated against Mesomycoplasma hyopneumoniae, PRRS and PCV2**, however other vaccinations may be mandatory or recommended depending on the health status of the herd and regional and national recommendations.
- The **vaccination status** of all pigs as well as the **Actinobacillus pleuropneumoniae status of the sow herd** should be communicated to the fattening farmer when pigs were delivered.
- An "**animal passport**" should be available that includes information on batch, vaccination status and genetics to improve traceability and provide basic information on all animals.
- **Parasite prophylaxis** is especially important for pigs kept outdoors or indoors with straw bedding. A **strategic deworming plan** should be discussed with the responsible veterinarian, and pigs should be treated with anthelmintics if necessary.
- It is very important to **treat sick and injured animals as soon as possible**. When pigs show signs of impaired health (see also section 2.5 "Behavioural observations and Precision Livestock monitoring"), a **veterinarian** should be consulted to determine causes and treat the pigs if necessary.



2.4 Feed quality and management

Affected welfare domains:	Nutrition, Health, Behavioural interactions, Mental state
Affected AWI (related to the aWISH project):	Tail/Ear lesions, Skin lesions

A good feed quality is one of the most important factors to keep pigs healthy and ensure sufficient growth. Farmers as well as scientific experts participating in surveys within the aWISH project have named good feed quality a top Best Practice in order to limit tail and ear biting outbreaks in pigs. A good feeding management, with sufficient feeding space and high-quality feed, also prevents competition for resources and improves the animals' welfare.

Best Practices

- The **feed composition** should be **analysed regularly** and **tested for mycotoxins**. This can be achieved by **consulting a veterinarian or feed adviser**. Parameters to look for are the **calcium to phosphorus ratio, crude fibre, amino acids (especially lysine) as well as vitamin and mineral concentrations**.
- Based on the feed analysis, corrective actions should be taken, e.g. changing the feed composition if necessary or **adjusting the crude fibre according to the age of the pigs**.
- To avoid stomach ulcers, it is important to **check the milling of the feed** and **consult the feed provider** to ensure an optimal particle size. Furthermore, **providing roughage** can help to avoid stomach ulcers.
- When using liquid feed, the **percentage of dry matter** should be monitored regularly and adjusted if necessary.
- **Sudden feed changes are to be avoided**, a slow transition including the mixing of former and new feed is better for gut health.
- Regarding management, **regular feeding times** should be implemented when feed is not available ad libitum. It is very important to check whether all animals have been properly fed and to **adjust the feed distribution** if errors occur.
- **Checking for blocked feed lines or bridging in hoppers** further ensures that all pigs are being fed.
- It is important to provide a **sufficient number of feeding spaces**. Preferably, there should be one feeding space per animal. When feeding ad libitum, several pigs may share a single feeding space (max. 4:1).

2.5 Behavioural observations and Precision Livestock monitoring

Affected welfare domains: Health, Behavioural interactions, Mental state

Affected AWI (related to the aWISH project): Tail/Ear lesions, Skin lesions

Monitoring the pigs presents one of the most important practices when it comes to ensuring pig health and welfare. Early signs of tail biting outbreaks and diseases, but also behavioural interactions can be observed and used to decide whether corrective actions are necessary.

aWISH project result:

An aWISH intervention study showed that **automatic weight detection systems** (such as the Weight Detect, developed in the aWISH project [Innotech Vision, Denmark]) can **support the early detection of growth stagnation due to respiratory diseases**. Through automated monitoring, the disease outbreak could be detected earlier and **timely intervention** was possible. Furthermore, treatment costs and workload were reduced, while profit margins were protected.

Automatic weight detection therefore has the potential to support farmers in day-to-day animal monitoring and the detection of health and welfare impairments.

Best Practices

- It is crucial to **take the time to monitor the animals daily**. This way, deviations can be detected quickly. The entire barn should be inspected once, or preferably twice, a day to check on the animals. During these inspections, the animals should be carefully observed. Animals located in areas of the pen that are poorly visible, such as under covers, in corners, etc., must also be checked.
- Pigs should be observed for **signs of health impairments** such as apathy, isolation from the group, panting, coughing, injuries, lameness, and more.
- One should look out for **signs of tail biting**. These include pigs that keep their tails between their legs, pigs manipulating pen mates as well as injured tails.
- To improve observations, it can help to **undergo training by competent advisors**. Self-assessment tools such as the PIGLOW mobile app can also support on-farm health and welfare assessments (Graat et al., 2024).



- Furthermore, **sensors** can be used as a **management tool for early detection** and decision making. These include but are not limited to camera and audio systems to monitor behaviour, barn climate sensors to monitor environmental parameters in the pens, and water and feed intake sensors to identify reduced consumption. A list of AWI that can be measured via sensors as well as corresponding technologies can be found in the **aWISH Animal Welfare Indicator Catalogue**.



3 Acute interventions

Factual background

When welfare issues such as tail biting or aggressive interactions resulting in injuries arise on a farm, immediate action is required. Aggressive interactions after mixing of pigs are usually associated with injuries which are mostly limited to superficial skin layers. However, depending on the intensity of fighting, deeper lesions with subsequent wound infections may also occur (Petherick and Blackshaw, 1987). Measures must be taken when aggressive behaviour among pigs leads to serious consequences. For example, severely injured animals must be removed from their pens and taken to hospital pens for treatment.

Keeping in mind the avoidance order (i. e. subordinate pigs actively retreat or move out of the way of dominant pigs to prevent physical conflict) as an important factor for the social hierarchy of pigs, the provision of visual protections or blinds in the pen can be recommended. Such pen divisions have not been found suitable to reduce the aggression level immediately after mixing (Olesen, 1996; Francis et al., 1996). However, it was reported that providing hiding places reduced aggressive behaviour throughout the entire period of group housing (Arey and Edwards, 1998) after the animals learned how to use them for protection (Marchant-Forde and Marchant-Forde, 2005).

Concerning tail biting, intervention protocols should be used on farms to ensure that farmers can act promptly at, or even before, the onset of an outbreak in order to increase the likelihood of successful control (Chou et al., 2019). The causes of tail biting are multifactorial and can vary from farm to farm. Therefore, it is not possible to recommend a general solution that applies to every farm (Sonoda et al., 2013). However, reducing acute and chronic stressors and reasons for frustration as much as possible, can be a broad recommendation. The Best Practices listed below are well established and may work in many cases.

Acute interventions also play an important role when diseases occur. When pigs show acute clinical symptoms, it is important to act immediately to treat the affected animals and prevent the further spread of infectious pathogens.

3.1 Managing welfare issues such as aggression and tail biting

Affected welfare domains:	Physical environment, Health, Behavioural interactions, Mental state
Affected AWI (related to the aWISH project):	Tail/Ear lesions, Skin lesions

When animal welfare issues such as tail and ear biting or skin lesions occur, it is crucial to intervene in order to keep the issue at bay.



Best Practices

- **Severely injured** pigs (e.g. with wounds that are bleeding) as well as **victims of tail biting** need to be **separated and treated with (pain) medication** if necessary to avoid infections.
- Regarding skin lesions, **good runt management** is essential since these pigs are often the target of fights. Runts should be kept in separate pens and treated with medication if necessary.
- When aggressive behaviour is often observed among pigs, **visual protections or hiding places** should be provided in the pens to protect subordinate pigs.
- It is necessary to try and **identify tail biters and separate them** from the group.
- **Offering distractions** such as emergency enrichment (organic manipulable material like straw or sisal ropes) when tail biting occurs can help to minimise the episode.
- A **lower stocking density** can further aid, since pigs gain more space to avoid each other.
- When tail biting occurs, **monitoring should be intensified** to several times a day.
- It is important to **identify causes of tail biting on a farm**. **Consulting a veterinarian and/or competent advisor** is strongly recommended to find causes and take appropriate measures.
- **Feed quality and hygiene as well as water access** should be checked and improved.
- **Barn climate** should be checked and improved to reduce tail biting. More information on how to improve barn climate can be found in the Best Practice Guide “Good Environment for Pigs”.

3.2 Managing diseases when they occur

Affected welfare domains:	Nutrition, Physical environment, Health, Behavioural interactions, Mental state
Affected AWI (related to the aWISH project):	Tail/Ear lesions, Skin lesions, Lung lesions, Liver lesions, Bursitis

When diseases such as respiratory infections, intestinal disorders or musculoskeletal diseases occur, it is crucial to restore the animals' health and prevent the spread of disease within the herd.



Best Practices

- If an illness is detected during daily monitoring of pigs, **rapid action** is required. Measures must be taken immediately.
- Pigs that are **clearly ill** and showing signs of overall discomfort must be **separated from the group**, housed in **hospital pens**, and given targeted **treatment**.
- If pigs show any signs of illness, a **veterinarian** should be consulted immediately.
- If dead animals are found in the barn, they must be removed immediately and stored at designated **carcass disposal sites** outside the barn.
- Medicinal treatments should only be administered in **consultation with and under the guidance of a veterinarian**. A veterinary diagnosis must be made before treatment begins.
- Hospital pens should have a **soft surface** for the pigs to lie on, as well as sufficient food and water. Food and water must be easily accessible to the animals (at an optimal height and a short distance from their resting area), as they may be physically weak. If there are several sick animals, it is preferable to house **at least two pigs in a single pen** to reduce the stress caused by separation from their conspecifics.
- If a contagious disease is present, the spread of the disease to other animals must be prevented. This includes **treating the underlying cause** of the disease (e.g. antibiotics for infections, antiparasitic drugs for parasitic infestations) as well as **adequate hygienic measure**s (changing clothes, disinfecting boots before entering areas with healthy animals) and, if necessary, **emergency vaccinations**.
- If a recovery is not possible, **emergency killing** must be performed immediately. Unnecessary suffering of irreversibly ill animals must be avoided. Emergency killing must be performed properly by trained personnel. Right before, the animal must be stunned (e.g. with a captive bolt pistol) and then bled out.
- **Euthanasia by medication must be performed by a veterinarian.**

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