



Ministry of Food, Agriculture  
and Fisheries of Denmark  
Danish Veterinary and  
Food Administration

# Animal Health in Denmark 2021



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# Contents

<b>Preface</b>	3
<b>1. Animal health surveillance and contingency planning</b>	5
<b>2. Livestock disease status</b>	18
2.1. Multiple species diseases	20
2.2. Cattle diseases	30
2.3. Sheep and goat diseases	39
2.4. Swine diseases	44
2.5. Poultry diseases	53
2.6. Equine diseases	66
2.7. Fur animal diseases	68
2.8. Fish diseases	71
2.9. Mollusc diseases	76
<b>3. Animal by-products</b>	78
<b>4. Livestock statistics</b>	80
<b>5. Index of diseases</b>	84
<b>6. Animal health contacts in Denmark</b>	88

# Preface

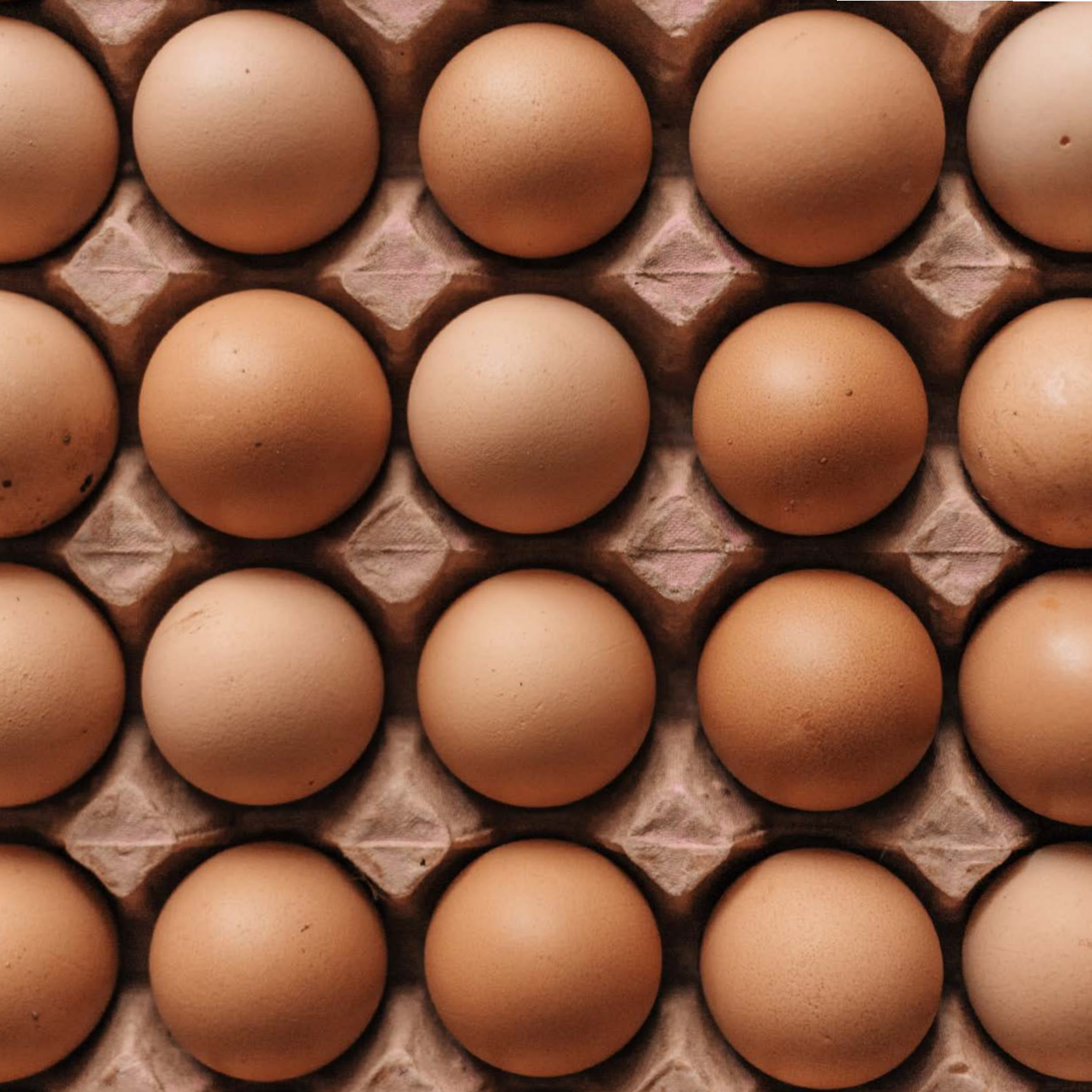
It is a pleasure for me to present the 2021 Annual Report on Animal Health in Denmark on behalf of the Danish Veterinary and Food Administration (DVFA). The Annual Report begins with a general presentation of the Danish animal health surveillance and contingency planning, including the essential preparedness measures introduced to prevent the introduction of contagious diseases into Danish livestock.

The report also reviews developments in 2021 in the field of animal health in Denmark. The focus is on WOA-listed diseases and the animal diseases that are notifiable in Denmark.

The report provides statistical information and an overview of surveillance that may be useful for reference purposes.

I hope that you will find the information in this Annual Report useful; however, please visit our website at [www.dvfa.dk](http://www.dvfa.dk) if you need further details. If you cannot find the information you are looking for, please do not hesitate to contact us.

**Camilla Brasch Andersen**  
Deputy Chief Veterinary Officer  
Head of the Animal Health Division



# 1. Animal health surveillance and contingency planning

## Monitoring and control of animal diseases

As the competent veterinary authority, the Danish Veterinary and Food Administration (DVFA) is responsible for the monitoring and control of animal diseases in Denmark.

Denmark has a long history of intensive production of food of animal origin and of trade in animals and animal products. Relative to its size and compared to other countries, the level of animal production in Denmark is quite high, and production has increased over the past decades. Information on livestock statistics is given in Chapter 4 of this report.

Concurrently with the increase in animal production, the implementation of disease surveillance and control programmes is essential to improve animal health and animal welfare and thereby support the production of safe foods.

Such programmes to control animal diseases, which are also intended to prevent human and animal infections and protect trade interests, are subject to legislation. The extensive trade in Danish animals and animal products is highly dependent on the good health status of Danish livestock. To keep livestock free from diseases, various initiatives are taken to limit the risk of disease introduction into Denmark. One example is that the number of imported cloven-hoofed animals has been kept as low as possible for many years (see Table 26 in Chapter 4). Disease status is paramount when it comes to the issuance of export certificates for Danish animals and products (see the description in Box 4).

Denmark is a member of the World Organisation for Animal Health (WOAH) and meets all transparency obligations in any animal disease situation, including the obligation to give notification of any occurrence of a listed disease. Furthermore, as a member of the EU, Denmark has adopted the harmonised EU legislation on animal health and animal production.



The extensive trade in Danish animals and animal products is highly dependent on the good health status of Danish livestock.

The DVFA is constantly focused on the national disease awareness, preparedness and control based on experiences, new EU legislation, changes in farming practices, disease risk assessments, development in the scientific field, etc. Additionally, operational capabilities are continuously improved to provide a prompt and effective response to every single suspected case or outbreak of a notifiable infectious disease in the Danish livestock population.

The main purposes of maintaining disease awareness and preparedness are:

- To reduce the likelihood of the introduction of new livestock diseases into Denmark.
- To curb the spread of disease among susceptible animal populations.

This is achieved by maintaining a constant focus on improving biosecurity measures, effective disease surveillance and early detection of diseases and by updating contingency plans for appropriate and effective control of disease outbreaks.

## Animal disease preparedness

### Obligation to notify suspicions

The EU Animal Health Law<sup>1</sup> and the Danish Animal Health Act<sup>2</sup> provide the legal basis for the requirement to notify the suspected and confirmed presence of notifiable animal diseases to the competent authority and for laying down a list of notifiable animal diseases in Denmark. Further-



more, the EU Animal Health Law and the Danish Animal Health Act provide legal powers to perform tasks such as carrying out diagnostic and epidemiological investigations, imposing movement restrictions, establishing restriction zones, performing movement control within such zones, sampling, culling infected, suspected and contact animals, compensating farmers, disposing of carcasses and potentially infectious materials, carrying out cleaning and disinfection and, if necessary, carrying out emergency vaccination.

<sup>1</sup> As from 21 April 2021, Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health (Animal Health Law).

<sup>2</sup> The statute in force as at the date of this publication is Animal Health (Consolidation) Act No. 9 of 6 January 2022. It is available at <https://www.retsinformation.dk/eli/Ita/2022/9> (In Danish).

## A description of all notifiable animal diseases in Denmark is available at [www.fvst.dk](http://www.fvst.dk)

Animal diseases notifiable in Denmark according to the EU Animal Health Law as well as animal diseases of interest to Danish society are listed in Executive Order No. 1191 of 24 August 2022<sup>3</sup>. The Executive Order has two lists: List 1 comprises diseases which must be notified to the DVFA immediately if there is a suspicion, and List 2 comprises diseases which must be notified to the DVFA at the time of confirmation. All animal diseases listed in the EU Animal Health Law are included in List 1. A description of all notifiable animal diseases in Denmark is available at [www.fvst.dk](http://www.fvst.dk) (in Danish).

Effective surveillance for clinical signs of transmissible animal diseases is required for early detection of disease outbreaks. According to the Animal Health Act, all farmers are obliged to notify a veterinarian in case they have a suspicion of a notifiable disease and in case there are abnormal mortalities or other signs of a severe disease. If the veterinarian has reason to suspect the presence of a notifiable disease included in List 1, the veterinarian must notify the relevant Veterinary Inspection Unit (VIU) of the DVFA of the suspicion. A veterinary officer from the VIU will inspect the herd or flock within five hours and report the suspected case to the Animal Health Division of the DVFA. If the veterinary officer cannot reject the suspicion

of a List 1 notifiable disease, official restrictions are imposed on the herd or flock, and test material is collected and dispatched to the national reference laboratory.

As a second line of defence, official veterinarians are responsible for inspecting animals intended for production, slaughter or export at assembly centres and animals intended for export directly from the farm. Furthermore, official veterinarians are responsible for controlling animal welfare at shows if there are more than one species present. Ante-mortem inspection and post-mortem examination at slaughterhouses are also important elements of the surveillance system.

The role of private veterinarians in animal health surveillance in Denmark is described in Box 1 in this chapter.

### Handling of suspicions of notifiable animal diseases

The DVFA ensures that all suspicions of a notifiable disease are handled in a uniform way. This is achieved for example by the application of 'action cards'. The action cards, which are available on the DVFA intranet, list all actions necessary to handle a suspicion of a notifiable animal disease.



All farmers are obliged to notify a veterinarian in case they have a suspicion of a notifiable disease and in case there are abnormal mortalities or other signs of a severe disease.

<sup>3</sup> The statute in force as at the date of this publication is Executive Order No. 1191 of 24 August 2022. It is available at <https://www.retsinformation.dk/eli/ta/2022/1191> (In Danish).



## BOX 1

# The role of private veterinarians in national contingency plans

Denmark maintains a high level of preparedness for notifiable diseases in animals involving the full range of stakeholders: authorities, private veterinarians and farmers. In 1995, the first veterinary advisory service contracts (VASCs) were signed with owners of herds of cattle and pigs. In 2010, it became mandatory for owners of large herds of cattle and pigs and for mink farm owners to sign a VASC. Small cattle and pig holdings may be registered for advisory services on a voluntary basis.

A central element of a VASC is frequent veterinary advisory visits to the farm, creating a one-on-one relationship between the farmer and the veterinarian. Further, a VASC provides the farmer with extended treatment possibilities.

The most important aims of VASCs are to maintain focus on advice and the prevention of diseases rather than treatment to ensure the prudent use of antimicrobials to minimise antimicrobial resistance (AMR) and hence improve animal welfare. More information on the Danish strategy for the reduction of AMR is given in Box 2 in this chapter.

Having signed a VASC, the farmer usually consults the same veterinarian, who can be temporarily replaced by a colleague from the same veterinary practice, if necessary. This gives the veterinarian a unique insight into the health of the herd and enables a faster reaction to disease outbreaks in the herd.

Private veterinarians are also part of the national contingency plans. If a farmer suspects a notifiable animal disease, the farmer is obliged to contact the veterinarian immediately. In such a situation, the private veterinarian is obliged to inspect the herd and the animals in question and to evaluate whether further action should be taken. Depending on the suspected disease, the private veterinarian then contacts the relevant Veterinary Inspection Unit (VIU) of the Danish Veterinary and Food Administration (DVFA). A veterinary officer from the VIU will then inspect the herd within five hours and report the suspected case to the DVFA. All suspected cases of a notifiable disease will immediately be registered in a database and announced on the website of the DVFA. Depending on the nature of the suspected disease, the international animal health organisations will also be notified. A national database and a web interface have been set up to increase the



awareness among farmers and veterinarians of the potential presence of certain notifiable diseases.

A VASC is a means to ensure that the farmer is advised by the veterinarian of ways to increase biosecurity that can contribute to the general health of the herd, while the veterinarian also acts as a first-line defence in the surveillance of notifiable animal diseases.

## The suspicion database is available at [www.fvst.dk](http://www.fvst.dk)

### **Transparency in dealing with the suspicion or confirmation of a notifiable animal disease**

All suspected cases of a notifiable disease will immediately be published on the official website of the DVFA, which displays information (in Danish) on each individual suspicion notified. This is done to increase the awareness among farmers and veterinarians of the potential risk of infection with the relevant notifiable disease.

If a suspected case is deemed to be of potential interest to the general public and/or export markets, a website notice will be followed up by a press release. Additionally, targeted information will be sent to the embassies of Denmark's main export markets. The database is publicly available at [dvfa.dk](http://dvfa.dk) (in Danish).

### **Compensation for losses caused by outbreaks of notifiable animal diseases**

The DVFA compensates animal owners who suffer a financial loss due to the outbreak of a notifiable disease<sup>4</sup>. The compensation scheme contributes significantly as an incentive for animal owners to comply with the obligation to notify listed diseases.

In case of an outbreak of a notifiable disease leading to a loss of animals and/or eggs and the destruction of contaminated feed, the DVFA compensates the value of the animals, eggs and

feed. In most outbreaks, this value is estimated by a valuation committee. The committee has three members: one appointed by the herd owner, one appointed by the DVFA and one being an employee of the DVFA. The premises are cleaned and disinfected according to a fixed plan, the cleaning and disinfection being paid by the DVFA. Furthermore, the DVFA pays 20% of the estimated income loss caused by the disease outbreak.

### **Pathogen-specific surveillance**

Denmark has several pathogen-specific surveillance programmes. These programmes have a two-fold purpose: to demonstrate the absence of diseases that usually cause mild or no clinical symptoms, to determine the occurrence, prevalence or distribution of diseases. The surveillance method used depends on the disease and the purpose of the programme, and usually a combination of different surveillance methods is applied. Several Danish surveillance programmes are mentioned in Chapter 2 of this report.

The DVFA focuses especially on infectious diseases with increasing incidence in other countries and an epidemic potential that raises the risk for introduction into Denmark in the near future. The DVFA has implemented a rapid and systematic risk assessment to qualitatively evaluate the risk of disease introduction in case of disease outbreaks in other

<sup>4</sup> Compensation is paid under the provisions of Executive Order No. 420 of 5 April 2022 on Compensation and Expenditure for the Control and Prevention of Domestic Animal Diseases (in Danish).

## BOX 2

# Danish strategy to reduce antimicrobial resistance (AMR)

Antimicrobial resistance (AMR) is of growing global concern, and it is foreseen that AMR in human pathogens will cause an increasing number of deaths as well as higher healthcare costs. Moreover, the use of antimicrobials in humans and animals may lead to selection for resistant pathogens.

From a One Health perspective, close connections between animals, food, people and the environment therefore necessitate action across sectors and a strong call for reduced and more prudent use of antimicrobials in both humans and animals to mitigate AMR.

Denmark has a long history of combatting AMR. Since 1995, Denmark has monitored antimicrobial consumption and resistance across humans, food and animals (DANMAP). DANMAP was developed in close collaboration between authorities, industry

and scientists, and stakeholders continuously discuss interventions to ensure a high level of compliance and maximum effect.

The Danish approach to AMR is based on certain fundamental principles according to which all veterinary antimicrobials are prescription-only, prophylactic use is not allowed, and Danish veterinarians are not allowed to make a profit from the sale of antimicrobials. Furthermore, laboratory examination of samples from cases of pneumonia and diarrhoea must be performed to identify the cause of the infection before group treatment of pigs is prescribed. These initiatives are supported by guidelines for

veterinary practitioners on the prudent use of antimicrobials in pigs and cattle.

The large Danish pig production accounts for the vast majority (80%) of antimicrobials used in animals in Denmark. Many initiatives to reduce AMR are therefore aimed at the pig sector. In 2010, the Yellow Card Initiative was introduced to reduce the use of antimicrobials in pig production. A 'yellow card' is given when the consumption of antimicrobials in a pig herd exceeds a fixed national threshold. The pig farmer is thereby ordered to make an action plan to reduce the use of antimicrobials to less than the threshold.

# 29.4%

The Yellow Card initiative has resulted in a 29.4% reduction in the total use of antimicrobials in pigs from 2009 to 2021.



In 2016, the Yellow Card Initiative was expanded to reduce the use of critically important antimicrobials, such as third-generation and fourth-generation cephalosporins, fluoroquinolones and colistin. Despite an increase in pig production, Denmark has achieved, through the Yellow Card Initiative commencing in 2010, a 29.4% reduction in the total use of antimicrobials in pigs from 2009 to 2021. Moreover, the use of critically important antimicrobials such as third-generation and fourth-generation cephalosporins, fluoroquinolones and colistin is now close to zero.

Denmark aims at a more prudent use of antimicrobials and has obtained good results from determining national targets for the reduction in the use of antimicrobials. A new advisory Committee on Veterinary Medicines was established in 2018 to provide evidence-based advice for the authorities on the use of veterinary medicines. In 2019, a new national target was determined for an 8% reduction in the use of antimicrobials in the pig sector by 2022.

Denmark's long history of AMR initiatives was also highlighted in a recent report published in collaboration with FAO in 2019 (**see** [www.fao.org](http://www.fao.org)).

EU Member States or certain third countries. For more information on this rapid risk assessment for disease introduction, see Box 3 in this chapter.

Examples of Danish surveillance programmes for emerging diseases are given below:

- Blood sample testing of outdoor poultry for West Nile fever. For more information on the surveillance scheme for West Nile virus in Denmark, see Box 6 in section 2.1 of this report.
- Cattle farmers are offered laboratory examination of material from abortions in the form of a post-mortem examination and subsequently microbiological and histological examinations. Such an examination also comprises an analysis for brucellosis, bovine virus diarrhoea and any new emerging infections causing abortion in cattle. For more information, see Box 7 in section 2.2 of this report.
- Swine carcass samples submitted by pig farmers to a diagnostic laboratory undergo a general post-mortem examination, and selected samples are examined for African swine fever and classical swine fever. For more information on the supplementary surveillance for African swine fever and classical swine fever, see Box 8 in section 2.4 of this report.

## The DVFA has designated Statens Serum Institut as the national reference laboratory for most diseases.

- The DVFA offers free testing for Aujeszky's disease, African swine fever, classical swine fever and *Trichinella* spp. of wild boars hunted in Denmark. For more information on the free testing, see section 2.4 of this report.
- In 2014, the DVFA initiated a special surveillance programme for porcine epidemic diarrhoea. In 2015, the Danish pig industry took over responsibility for the surveillance programme. For more information on the absence of porcine epidemic diarrhoea virus in Denmark, see Box 9 in section 2.4 of this report.

### Veterinary diagnostic laboratories in Denmark

The Danish veterinary diagnostic laboratories fall into three different categories: national reference laboratories (NRLs), official laboratories (OLs) and approved veterinary diagnostic laboratories (ALs). All Danish NRLs, OLs and ALs have obtained accreditation according to the European EN ISO 17025 standard or a corresponding standard.

#### National reference laboratories (NRLs)

As required by Regulation (EU) 2017/625, the DVFA has designated Statens Serum Institut (SSI) as the NRL for most diseases, Société Générale de Surveillance (SGS) Analytics Sweden AB as the NRL for bovine spongiform encephalopathy (BSE) and transmissible spongiform encephalopathy (TSEs), and DTU Aqua, the National Institute of Aquatic Resources at the Technical University of Denmark (DTU) as the NRL for diseases in aquatic animals.

#### Official laboratories (OLs)

In accordance with Regulation (EU) 2017/625, the DVFA has also designated five veterinary diagnostic laboratories as OLs: two university laboratories (one of which closed its operations in November 2021) and three privately owned laboratories.

#### Approved veterinary diagnostic laboratories (ALs)

ALs are laboratories approved by the DVFA under national legislation. Currently, two privately owned veterinary laboratories are ALs in Denmark.

As an NRL, the SSI collaborates closely with the OLs and the ALs. The collaboration includes the handling of samples from suspected cases of a notifiable disease, information sharing and standby availability in case a laboratory identifies problems with a particular analysis. Most OLs and ALs perform diagnostic analyses in close collaboration with the agricultural industry.

### Disease control Contingency plans

Being prepared is an important precautionary principle to enable a rapid and effective response to any outbreak of a notifiable disease. Almost every year, outbreaks of diseases occur in nearby countries with comparable intensive animal production systems.

### BOX 3

## Qualitative rapid risk assessment to determine the risk of introduction of new diseases into Denmark

The Danish Veterinary and Food Administration (DVFA) monitors animal disease outbreaks of high significance in the EU, the Nordic countries and countries neighbouring the EU.

Due to increased global mobility, the trade in live animals and animal products and the interaction with livestock production systems of other countries (including through transport vehicles), it is necessary to assess on a regular basis the risk that new infectious diseases may be introduced into Denmark.

The DVFA has implemented a structured, systematic, transparent and well-documented qualitative rapid risk assessment (RRA) concept to prevent the introduction of diseases into Denmark in case of certain animal disease outbreaks in other EU Member States or in certain countries outside the EU. RRAs are prepared in accordance with the guidelines given in the WOAAH Handbook on Import Risk Analysis for Animals and Animal Products, in particular the risk assessment steps. The risk assessment process is a well-documented step-by-step process. Hazard identification is the first step and is considered separately from the risk assessment process. The risk assessment

process itself is subdivided into four steps: (1) entry assessment, (2) exposure assessment, (3) consequence assessment and (4) risk estimation.

The overall risk estimation is made by integrating the entry, exposure and consequence assessments.

An RRA is reproduced in a document reporting on the estimated risk of introduction of epizootic or zoonotic diseases into Danish susceptible animal populations. It is intended to help risk managers prepare for possible health risks and to reduce the social and economic consequences of the relevant threat (the pathogen causing the disease).

In short, the aim of an RRA is to provide a well-documented report describing:

- The importance and purpose of the disease risk assessment (hazard identification).
- The current status of the relevant disease in the EU or in neighbouring countries.
- The estimated level of the risk that specific diseases will be introduced into Denmark through different risk pathways already identified.

- The significance of the consequences if a disease gains a stronghold in Denmark and spreads from the first infected population to other sensitive animal populations.

Results from such RRA are then used by the risk managers to determine risk-mitigating actions, such as the requirement of a more thorough inspection of vehicles for international transportation of animals, additional tests of recently imported live animals and, depending on the estimated risk level, the need for specific information to relevant groups of the public. If necessary, risk-mitigating measures are recommended to all stakeholders.

All qualitative RRA reports are published by the DVFA at [dvfa.dk](http://dvfa.dk) (in Danish with a summary in English) within three working days from the time when the official outbreak notification is received.

In 2021, specific RRA reports were drafted for highly pathogenic avian influenza and African swine fever due to outbreaks in the EU and countries neighbouring the EU.

## All contingency plans are regularly updated to be in line with the experience gained in other European countries.

Despite a history of few disease outbreaks in Denmark, the DVFA has made great efforts to prepare and revise its contingency plans. These plans include all necessary actions to handle infected herds, ensuring an efficient control of any disease outbreak.

### The general contingency plan and the disease-specific manuals

The Danish contingency plan for certain notifiable animal diseases consists of a general plan and disease-specific manuals. The Danish contingency plan comprises an overall eradication strategy, tools for eradication, crisis organisation and management and communication planning. The disease-specific manuals include operational instructions for those involved in managing the response to an outbreak. All contingency plans are publicly available at [dvfa.dk](http://dvfa.dk) (in Danish).

The following information is included in the disease-specific contingency plans: characteristics and epidemiology of the disease, sampling procedures, disease-specific cleaning and disinfection procedures, the establishment of restriction zones, instructions for handling animals and materials from infected herds and herds within the zones, instructions for screening and emergency vaccination.

All contingency plans are regularly updated to be in line with the experience gained in other European countries. Updates are also based on

experiences gained from simulation exercises and from handling actual outbreaks, changes in farming practices, revisions to EU legislation and the most recent scientific knowledge.

### Vaccination policy

The main methods for disease control described in the Danish contingency plans are the quarantining of farms with animals suspected of carrying a notifiable disease, the culling of infected animals, cleaning and disinfection, as well as the establishment of restriction zones.

In general, preventive vaccination against notifiable diseases is banned. However, the DVFA is authorised under the relevant EU legislation to use emergency vaccination to control any outbreaks following an epidemiological analysis of the disease situation.

### Disease control and eradication - 'the Danish model'

Denmark has a long tradition of eradicating animal diseases. As a prominent example, Denmark eradicated tuberculosis and brucellosis from domestic livestock by the mid-1900s. The eradication was achieved through close collaboration between the veterinary research laboratory, the veterinary administration authority and the industry, which commenced in the late 1800s. In those days, farmers created both dairy and slaughterhouse cooperatives, which were owned by the farmers. All farmers therefore had a common interest in producing high-quality products.

## BOX 4

# Certification of animal products

EU legislation lays down the general principles and requirements of food law. According to Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002, only products complying with EU law can be exported from Member States to third countries. Where a bilateral agreement has been concluded between the European Union or one of its Member States and a third country, it follows from the Regulation that products for export

for that country must comply with all provisions of the bilateral agreement. Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 governs official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products.

The issuance of certificates for products of animal origin is based on national legislation (Executive Order No. 729 of 29 May 2020) and Commission Implementing Regulation (EU) 2020/2235 of 16 December 2020. Certificates can be issued only following a thorough investigation of the background for the certification. Furthermore, the certifying officer must be impartial and independent from commercial interests. According to the rules, the certifying officer must be authorised by the competent authority on the basis of facts obtained from official regular on-site control visits and results of previous audits of the monitoring programmes as well as epidemiological surveillance programmes. The certifying officer cannot certify data of which s/he has no personal knowledge, or which cannot be ascertained. No blank or incomplete certificates can be issued, nor can certificates for products which are no longer available for inspection.

If a notifiable animal disease breaks out, the following steps will be carried out immediately:

- All certificates affected by the outbreak will be identified.
- Affected certificates will be blocked fully or partially on the official DVFA website.
- Export restrictions imposed as a result of the outbreak will be published on the official DVFA website.
- Information on the outbreak and blocked/partially blocked certificates will be circulated to all certifying officers.
- Information on the outbreak will be circulated to the European Commission and the Danish Embassies.
- Affected certificates already issued will be reviewed, and it will be decided whether any of the certificates must be cancelled or whether any consignments already shipped must be recalled.





On many occasions, the animal farming industry has launched voluntary initiatives to control the occurrence of infections. Those initiatives have always gained broad support from all farmers, and effective eradication measures have subsequently been supported by legislation.

Several animal diseases besides tuberculosis and brucellosis have been eradicated in Denmark because of the efficient 'Danish model', including enzootic bovine leukosis, Aujeszky's disease, infectious bovine rhinotracheitis, bluetongue and viral haemorrhagic septicaemia.

### The disease control organisation

The emergency preparedness and response of the competent authorities to an outbreak of a notifiable animal disease is facilitated by the legal powers of the competent authorities, the statutory provisions granting ample financial resources and the direct chain of command. Moreover, contingency plans are in place for the operation of the National

Disease Control Centre (NDCC) and the establishment of a Local Disease Control Centre (LDCC).

In the event of an outbreak, the NDCC is staffed by employees from the DVFA central office, and the LDCC by employees from the relevant Veterinary Inspection Unit(s) (VIU). The DVFA has three VIUs with local veterinary officers specifically trained in managing suspected cases and outbreaks of notifiable animal diseases.

### Training

The veterinarians from the DVFA, including veterinarians from the VIUs, organise and prepare practical training in the contingency plans. The field staff are trained at seminars and targeted courses and by participation in simulation exercises.

Veterinary officers from the DVFA maintain their expertise by participating in relevant courses and training activities, such as courses held under the auspices of the EU 'Better Training for Safer Food' (BTSF) programme and training organised by the FAO (the European Commission for the Control of Foot-and-Mouth Disease (EuFMD)).

### Simulation exercises

Simulation exercises constitute an important tool for testing contingency plans, but are also used for the training of DVFA staff and different stakeholders in handling emergency situations. Furthermore, exercises may be used for testing new equipment and procedures.

On many occasions, the animal farming industry has launched voluntary initiatives to control the occurrence of infections.



## Veterinarians from the DVFA organise and prepare practical training in the contingency plans.

The Danish exercise programme comprises a number of exercises each year. The number is not fixed in advance, but depends on the animal health situation, including the number of real cases. Lessons learned from all exercises throughout the year and from handling disease outbreaks are used to prepare the most beneficial exercise programme for the following years.

The following categories of exercises are applied in the Danish training programme:

- Procedure exercises: Training in disease-handling procedures.
- Dilemma exercises: Desktop exercises to simulate a specific dilemma or train the use of new software.
- Crisis management exercises: Exercises with a broader scope, such as the assessment of resources, setting up of crisis centres, actions to control outbreaks, communication and collaboration between national or international partners as either local training or full-scale national simulation training involving both regional and national units.
- Evaluation seminars: Each year, the lessons learned from all exercises are evaluated. The learning obtained is used for updating contingency plans and internal procedures and is incorporated into the exercises the following year to create a multiplier effect.



Simulation exercises are conducted at regional level, at national level and, due to the close cooperation among the Nordic and Baltic countries (the Nordic-Baltic Veterinary Contingency Group), also as cross-border exercises at international level. Simulation exercises are postponed in years with large-scale disease outbreaks.

Full-scale exercises are conducted at intervals of 3-5 years, and extensive contingency exercises are carried out regularly for all eight Nordic and Baltic countries.

The exercises may involve a number of stakeholders, such as the national reference laboratory, the Danish Emergency Management Agency, the National Police, agricultural organisations, slaughterhouses and rendering plants.

# 2. Livestock disease status

In general, a large number of WOAH-listed diseases are currently not present in Danish livestock, and only few diseases cause problems in the production of livestock.

Denmark is officially recognised by the WOAH as a country free from foot and mouth disease without vaccination, and Denmark also has the official status of a country free from classical swine fever, peste de petit ruminant and African horse sickness. Since 2011, Denmark has been recognised as a country with a negligible risk of bovine spongiform encephalopathy (BSE) by the WOAH. Comprehensive BSE testing has been conducted for more than two decades, and the last case of BSE in Denmark occurred in 2009 in a 14-year-old cow. No BSE cases have been born after the most recent tightening of the feed ban in January 2001.

Within the EU, Denmark is recognised as officially free from Aujeszky's disease, bluetongue, bovine brucellosis, infection with *Brucella melitensis*, infec-

tion with *Mycobacterium tuberculosis*-complex, infection with rabies virus, enzootic bovine leukosis, infectious bovine rhinotracheitis (IBR), infectious salmon anaemia (ISA) and viral haemorrhagic septicaemia (VHS)<sup>5</sup>.

As regards poultry and other captive birds, Denmark and the rest of Europe experienced a high prevalence of highly pathogenic avian influenza (HPAI) in 2021.

An overview of the animal health status in Denmark for WOAH-listed diseases is given at the end of each section for the relevant animal category.

Information on the Danish strategies for the monitoring and control of animal diseases is given in Chapter 1 of this report and on the website of the Danish Veterinary and Food Administration at [dvfa.dk](http://dvfa.dk)

<sup>5</sup> Since the year under review, Denmark has been approved by the EU as officially free from infection with bovine virus diarrhoea according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.



# 2.1 Multiple species diseases

For decades, Denmark has not experienced any outbreaks of Aujeszky's disease, brucellosis in bovine herds, Infection with *Mycobacterium tuberculosis*-complex, foot and mouth disease, sylvatic rabies or *Trichinella* infection in swine and horses. Brucellosis has not been detected in Danish pig herds since 1999. Furthermore, Denmark is free from disease caused by *Brucella melitensis*, which has never been recorded in Denmark, and Denmark has been recognised as free from bluetongue since 2011.

## Aujeszky's disease

According to Commission Decision 2008/185/EC<sup>6</sup>, Denmark is recognised as officially free from Aujeszky's disease by the European Commission. The last case of the disease occurred in Denmark in 1991.

**Table 1: Blood samples examined under the Danish Aujeszky's disease surveillance programme, 2019-2021**

<b>Year</b>	<b>Samples</b>
<b>2019</b>	39,977
<b>2020</b>	45,039
<b>2021</b>	37,600

Source: Statens Serum Institut (SSI), the Technical University of Denmark and other official laboratories in the EU, 2021.

Under the Danish Aujeszky's disease surveillance programme, blood samples from 2% of all sows with a live weight of more than 140 kg are tested at slaughter or before trade. The current surveillance programme was initiated in 2012. All boars at semen collection centres are regularly tested in accordance with the provisions of Council Directive 90/429/EEC<sup>7</sup>. Moreover, breeding pigs intended for export to certain countries outside the EU are tested for Aujeszky's disease. The number of blood samples examined for Aujeszky's disease in the period 2019-2021 is given in Table 1. Due to trade fluctuations, the number of samples tested varied during the three-year period.

Two suspected cases of Aujeszky's disease were notified to the Danish Veterinary and Food Administration (DVFA) in 2021. Both cases were notified because animals had tested positive in a

<sup>6</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

<sup>7</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.



serological test performed prior to export. Official restrictions were imposed on the herds under suspicion while confirmatory laboratory testing was conducted at the national reference laboratory. The suspected cases tested negative for Aujeszky's disease.

## Bluetongue

Since 1 January 2011, Denmark has been recognised as free from bluetongue according to Commission Regulation (EC) No 1266/2007<sup>8</sup>.

In 2007 and 2008, Denmark and most North and Central European countries experienced outbreaks of bluetongue caused by virus serotype 8 (BTV-8) in herds of sheep and cattle. The last outbreak of bluetongue (BTV-8) in Denmark occurred in November 2008.

In 2008, a vaccination campaign against BTV-8 was initiated both in Denmark and in several other EU Member States to control outbreaks of the disease. However, vaccination against bluetongue has been banned in Denmark since 1 January 2011.

A surveillance programme for bluetongue has been implemented in Denmark according to Commission Regulation (EC) No 1266/2007<sup>9</sup>. Serological tests were performed on blood samples collected from 60 cattle herds in 2021. In total, 600 blood samples were tested. All tested negative for bluetongue.



Vector surveillance activities have been carried out in Denmark since the first outbreak of bluetongue. For further details on vector surveillance, see Box 5 in this section.

Denmark is recognised as officially free from several multiple species diseases.

The DVFA was notified of three suspected cases of bluetongue in 2021, all in cows. Two cases were reported due to clinical symptoms. One of the cases was rejected by a Veterinary Inspection Unit (VIU) of the DVFA based on an evaluation of the clinical symptoms. Official restrictions were imposed on all herds under suspicion while laboratory testing was conducted. The virological tests of samples from all herds under suspicion proved negative.

<sup>8</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

<sup>9</sup> As from 21 April 2021, according to Commission Delegated Regulation (EU) 2020/689 of 17 December 2019.

**Table 2:** Blood samples examined under the Danish brucellosis surveillance programme, 2019-2021

Year	Cattle: Blood samples	Pigs: Blood samples	Sheep and goats: Blood samples
2019	1,019	33,356	2,314
2020	1,177	43,024	1,807
2021	2,119	27,151	1,703

Source: Statens Serum Institut (SSI), the Technical University of Denmark and other official laboratories in the EU, 2022.

## Brucellosis

Denmark has been recognised as officially free from brucellosis in bovine herds since 1979 (Commission Decision 2003/467/EC<sup>10</sup>). The official Danish eradication programme for brucellosis in bovine herds began in 1948, and all cattle herds were identified as free from brucellosis in 1959. Brucellosis has not occurred in cattle in Denmark since 1962. All bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC<sup>11</sup>. Cattle intended for export to certain countries outside the EU are also tested. In 2021, 35 aborted fetuses from cattle underwent laboratory testing for brucellosis. All tested negative. See Box 7 in section 2.2 for more information on the supplementary surveillance for brucellosis in cattle.

The latest case of brucellosis in pigs was in 1999, when *Brucella suis* biovar 2 was diagnosed in a herd of free-range pigs. The source of the infection was never found, but it is suspected that *B. suis* biovar 2 had been transmitted from European brown hares in the area. *B. suis* biovar 2 has not been detected in hares since 2002, when it was diagnosed in two wild hares found dead. All boars at semen collection centres are regularly tested in accordance with the provisions of Council Directive 90/429/EEC<sup>12</sup>. Breeding pigs intended for export to certain countries outside the EU are also tested for brucellosis. Due to trade fluctuations, the number of samples tested varied during the three-year period mentioned in Table 2.

<sup>10</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

<sup>11</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

<sup>12</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.



## BOX 5

# Suveillance for disease vectors in Denmark in 2021

Over the years, there has been an ever-increasing focus on insect vectors and the pathogens transmitted by those vectors. Organised monitoring of vector activity has been carried out in Denmark since 2007 when Denmark experienced the first outbreak of bluetongue. In the following years, the vector surveillance programme was expanded to include mosquitoes, horse flies and ticks.

Since 2012, the Danish Veterinary and Food Administration (DVFA) and the Technical University of Denmark (in 2019 replaced by the University of Copenha-



gen) have carried out systematic surveillance of mosquitoes and biting midge abundance during the warm season. Vectors are collected on a weekly basis through the use of octenol and CO<sub>2</sub>-baited suction traps in private gardens and light traps at cattle farms. National average abundance estimates are updated weekly at [www.myggetal.dk](http://www.myggetal.dk) (in Danish). Additional traps are operated permanently at Copenhagen Airport to monitor potential introductions of exotic mosquito species.

In 2017, the seasonal vector surveillance was expanded to include weekly surveillance of four groups of *Tabanidae* biting flies at a horse farm, a pig holding and a cattle holding. Since June 2017, the surveillance has also included larvae, nymphs and adults of *Ixodes ricinus* ticks at three forest sentinel sites.

The summer of 2021 was characterised by average weather conditions resulting in an average number of all five mosquito genera present in Denmark. The main biting West Nile vector *Culex modestus* returned in high numbers after having almost disappeared in 2020, probably because of a cold July. In addition, the abundance of *Culicoides* was on average for 2021. The abundance of ticks continues to appear stable between years, although

tick-borne encephalitis (TBE virus) is now emerging on Zealand. On the northern coast of the island, a transmission hotspot has been identified after human cases were reported. In the small hotspot, up to 10% of *I. ricinus* nymphs test positive for TBE virus. The hotspot has been continuously monitored since 2019 and remains geographically well-defined.

Relevant species of mosquitoes, *Culex pipiens/torrentium* and *C. modestus* collected under the surveillance programme were tested for West Nile virus (WNV). More than 400 *Culex* mosquitoes of relevant species were collected; all tested negative for both Usutu and West Nile virus (the WNV surveillance programme is described in Box 6). In July 2021, an exotic *Hyalomma* tick was removed from a Danish horse without prior travel history. This is the fourth *Hyalomma* tick reported in Denmark in recent times, the first three presumably having been introduced in the record warm summer of 2018. The finding of a fourth *Hyalomma* tick in 2021 suggests that the emergence of *Hyalomma* ticks in Northern Europe may not be driven solely by extreme warm weather. No other exotic vector species were found in 2021.

*Brucella melitensis* has never been reported in Denmark, and Denmark has been recognised as being officially free from *B. melitensis* since 1995 by the EU (Commission Decision 93/52/EC<sup>13</sup>). A serological surveillance programme for *B. melitensis* in sheep and goats is carried out by testing blood samples collected through the voluntary lentivirus control programme managed by SEGES, the Danish Agriculture and Food Council (see section 2.3 on sheep and goat diseases).

In 2021, six suspected cases of brucellosis were notified to the DVFA: four in pigs, one in a young bull and one in a ram. Three of the cases in pigs were notified because the animals had tested positive in a serological test. The three other cases were notified due to clinical symptoms in the animals. Official restrictions were imposed on all herds under suspicion while confirmatory laboratory testing was conducted. Samples of all suspected cases tested negative at the national reference laboratory.

The number of blood samples examined for brucellosis in the period 2019-2021 is given in Table 2.

### Foot and mouth disease

Denmark is recognised by the WOAHP as free from foot and mouth disease (FMD). Vaccination is prohibited, and FMD has not occurred in Denmark since 1983.

The main component of the Danish surveillance and early detection system for FMD is the animal disease notification system. The system for the notification of suspected cases of animal disease is described in Chapter 1 of this report.

In 2021, the DVFA was notified of one suspected case of FMD in cattle due to clinical symptoms. However, the case was rejected by a Veterinary Inspection Unit (VIU) based on a thorough evaluation of the clinical symptoms.

### Infection with *Mycobacterium tuberculosis*-complex

Denmark has been recognised as officially free from tuberculosis in bovine herds since 1980 (Commission Decision 2003/467/EC<sup>14</sup>).

The eradication of infection with *Mycobacterium tuberculosis*-complex (MTBC) in Denmark was initiated in 1893. In 1959, the eradication programme was replaced by a surveillance programme because only few outbreaks were diagnosed each year.

The last outbreak of tuberculosis in cattle occurred in 1988, the infection being of human origin. However, MTBC was also diagnosed in farmed deer in 1988. A surveillance programme for MTBC comprising all Danish herds of farmed deer was initiated in 1989. The last outbreak of tuberculosis in Danish farmed deer occurred in 1994.



The last case of foot and mouth disease in Denmark was registered in 1983.

<sup>13</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

<sup>14</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

The Danish surveillance programme demonstrating the absence of tuberculosis in cattle comprises post-mortem examination of all slaughtered animals as part of the meat inspection programme at the slaughterhouses. In 2021, approximately 454,000 slaughter animals were inspected. Furthermore, bulls at semen collection centres are regularly tuberculin-tested in accordance with the provisions of Council Directive 88/407/EEC<sup>15</sup>.

Cattle intended for export to certain countries outside the EU are also tested if required by the third country. In 2021, all tests performed at semen collection centres and in connection with the exportation of animals were negative for MTBC.

## Rabies

The rabies virus (classical rabies virus) has not been reported in domestic animals in Denmark since 1982. In wild animals, the last occurrence was in 1981. Since 2021, Denmark has been recognised as officially free from infection with rabies within the EU according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

Bat rabies, the European bat lyssavirus (EBLV), was diagnosed for the first time in Denmark in 1985. The occurrence of bat rabies has been monitored since then. The last case of bat rabies in Danish domestic animals was diagnosed in sheep in 2002 (EBLV-1), and the last cases of bat rabies in Danish bats were diagnosed in 2009 (EBLV-1) and 2015 (EBLV-2).



In 2021, all tests performed at semen collection centres and in connection with the exportation of animals were negative for MTBC.

The monitoring of rabies is based on the testing of animals suspected of being infected with rabies and of bats which have been in contact with other animals or humans as well as on active surveillance for rabies in bats. Twenty-five bats suspected of being infected were tested in 2021, and all tested negative. No other animals were tested.

In 2021, 17 bats were tested as part of the active surveillance, and additional saliva samples were collected from 28 bats living at different locations in Denmark. All bats and saliva samples tested negative for EBLV-1 and EBLV-2.

<sup>15</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

## Trichinellosis

Infections with *Trichinella* spp. have not been reported in domestic animals in Denmark since 1930.

For more than 80 years, targeted tests have been performed in Denmark without finding any *Trichinella* spp. in pork or horse meat. In 2007, Denmark was classified in the EU as a region with a negligible risk of trichinellosis in herds of domestic pigs (Commission Regulation (EC) No 2075/2005). Although the designations of status and categories were changed in 2014 due to an amendment to the EU legislation (Commission Regulation (EC) No 216/2014), Denmark was allowed to maintain its surveillance programme for infections with *Trichinella* spp.

The Danish surveillance programme for demonstrating the absence of *Trichinella* spp. infections distinguishes between pigs kept indoors and pigs having access to outdoor facilities, the latter being considered a high-risk subpopulation. Older pigs, such as breeding animals, are also considered a

high-risk subpopulation. However, sows and boars are still exempt from testing when kept under controlled housing conditions, as are also slaughtered fattening pigs reared under controlled conditions in integrated production systems.

Although comprehensive testing for *Trichinella* spp. is not required, the Danish pork meat industry has maintained a practice of testing all slaughtered fattening pigs, boars and sows as not all trading partners accept the above testing regime. Therefore, supplementary testing is performed, and this scheme is still under the control of the Danish competent authorities. All animals of susceptible species slaughtered at Danish slaughterhouses are examined in accordance with the methods prescribed in Commission Implementing Regulation (EC) 2015/1375.

The number of animals from each category of slaughtered animals examined under the Danish trichinellosis surveillance programme in the period 2019-2021 is shown in Table 3.



Infections with *Trichinella* spp. have not been reported in domestic animals in Denmark since 1930.

**Table 3:** Animals examined under the Danish trichinellosis surveillance programme, 2019-2021

Year	Pigs (incl. boars and sows)	Farmed wild boars*	Horses
2019	16,639,006	909	1,321
2020	17,312,459	637	918
2021	18,508,082	569	761

\* Privately hunted wild boars are included.

Source: Danish Veterinary and Food Administration Laboratory Division and other laboratories accredited to test for *Trichinella* spp., 2022.

**Table 4:** Last occurrence of WOAH-listed multiple species diseases in Denmark

<b>Anthrax</b>	1988
<b>Crimean Congo haemorrhagic fever<sup>1</sup></b>	Never reported
<b>Equine encephalomyelitis (Eastern)</b>	Never reported
<b>Heartwater<sup>1</sup></b>	Never reported
<b>Infection with Aujeszky's disease virus</b>	1991
<b>Infection with bluetongue virus</b>	2008
<b>Infection with <i>Brucella abortus</i>, <i>Brucella melitensis</i> and <i>Brucella suis</i></b>	Cattle: 1962 Pigs: 1999 Sheep and goats: Never reported
<b>Infection with <i>Echinococcus granulosus</i></b>	Not reported <sup>2</sup>
<b>Infection with <i>Echinococcus multilocularis</i></b>	2018 <sup>3</sup>
<b>Infection with epizootic haemorrhagic disease virus</b>	Never reported
<b>Infection with foot and mouth disease virus</b>	1983
<b>Infection with <i>Mycobacterium tuberculosis</i>-complex</b>	1994
<b>Infection with rabies virus</b>	1982 <sup>4</sup>
<b>Infection with Rift Valley fever virus</b>	Never reported
<b>Infection with rinderpest virus</b>	1782
<b>Infection with <i>Trichinella</i> spp.</b>	1930
<b>Japanese encephalitis</b>	Never reported
<b>New World screwworm (<i>Cochliomyia hominivorax</i>)<sup>1</sup></b>	Never reported
<b>Old World screwworm (<i>Chrysomya bezziana</i>)<sup>1</sup></b>	Never reported
<b>Paratuberculosis</b>	Disease present <sup>5</sup>
<b>Q fever</b>	Disease present <sup>6</sup>
<b>Surra (<i>Trypanosoma evansi</i>)</b>	Never reported
<b>Tularemia</b>	Disease present <sup>7</sup>
<b>West Nile fever</b>	Never reported

<sup>1</sup> The disease is not notifiable in Denmark.

<sup>2</sup> Year of last outbreak not known.

<sup>3</sup> Detected in wildlife (fox).

<sup>4</sup> Infection with classical rabies virus in domestic animals.

<sup>5</sup> The disease is not officially controlled in Denmark; however, the cattle industry runs a voluntary control programme.

<sup>6</sup> Detected in bulk milk sample.

<sup>7</sup> Detected in wildlife (hare).

## BOX 6

# Active surveillance for West Nile virus in Denmark in 2021

During the past few years, an increasing number of European countries have experienced outbreaks of infection with West Nile virus (WNV), and in 2021, outbreaks of WNV in horses and birds were continuously detected in Central and Northern Europe not far from Denmark. As WNV may spread further north with migratory birds from endemic areas, surveillance activities are highly relevant to monitor whether the infection has reached Danish territories.

In 2021, the Danish Veterinary and Food Administration (DVFA), Statens Serum Institut (SSI) and the Natural History Museum of Denmark (the University of Copenhagen) continued the ongoing surveillance for WNV in Denmark.

Various material (avian tissue, blood samples and mosquitoes) was collected for surveillance:

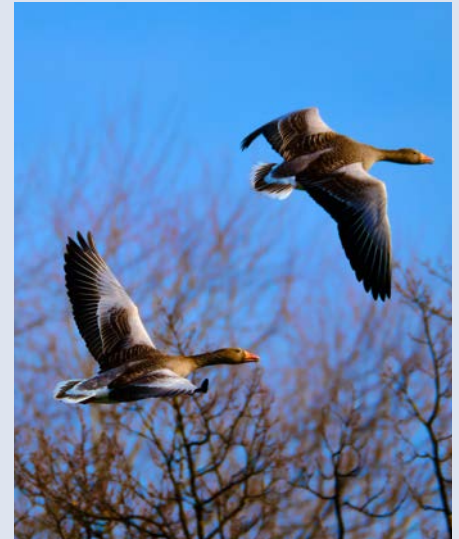
Serum from poultry held outdoors (560 individuals) and migratory birds (331 individuals) were included in the serological surveillance programme and tested for WNV-specific antibodies. Altogether, 981 samples were examined, and 14 of these samples were found positive for WNV antibodies (14 migratory birds). Like previous years, this suggests that a small

percentage of migratory birds that stayed in or passed through Denmark in 2021 had previously been exposed to WNV, probably during the annual winter stay in Africa.

As regards outdoor poultry, no detection of WNV-specific antibodies was made in 2021. In 2020, antibodies were detected in one organic layer hen.

Further, mosquitoes collected through the insect vector surveillance programme mentioned in Box 5 (44 pools, or a total of 412 mosquitoes) were used to carry out virological surveillance for WNV. Also, brain tissue from 150 wild birds found dead in nature was analysed for WNV. The testing of dead birds focused on species that are particularly sensitive to WNV. All samples tested negative. This means that no viral RNA was found in the material collected.

In conclusion, data from the 2021 surveillance programme indicate that infections with WNV may be expected in the Danish bird and mosquito populations. There is no doubt that migratory birds serve as a link between WNV-endemic areas and Denmark, and it is essential to maintain special focus on testing free-ranging Danish poultry and the mosquito population.



The material collected under this programme was tested in parallel for Usutu virus (USUV) and corresponding antibodies. All tests were negative.

# 2.2 Cattle diseases

*Denmark has a cattle population of approximately 1,480,000 animals. In terms of farms, there are 80% beef farms and 20% dairy farms. The trend towards fewer but larger dairy herds has been evident for many years. In 2021, Denmark had approximately 559,000 lactating cows.<sup>16</sup>*

*Bovine spongiform encephalopathy (BSE) has not been detected in Denmark since 2009, and Denmark is recognised by the WOAAH as a country having a 'negligible BSE risk'.*

*Denmark is recognised by the EU as officially free from enzootic bovine leukosis and infectious bovine rhinotracheitis (IBR).<sup>17</sup>*

## **Bovine spongiform encephalopathy (BSE)**

Denmark became recognised as a country with a 'negligible BSE risk' in 2011. Even before 2011, Denmark was generally considered a country with a low risk of BSE due to very few cases of the disease. The status as a country with a negligible risk was granted on the basis of a comprehensive application documenting Danish compliance with the WOAAH requirements. The essential elements are:

- Risk assessment identifying historical and existing risks and showing that appropriate measures have been taken to manage each identified risk.
- Ruminant-to-ruminant feed ban, which has been in place in Denmark since 1990.
- The most recent tightening of the feed ban in January 2001, when processed animal proteins were banned in feed for production animals.
- No BSE cases in cattle born after the most recent tightening of the feed ban in January 2001.
- The comprehensive Danish BSE testing programme with a little over 2.7 million tests performed since the beginning of 2001.
- The long period of more than 20 years since the birth of the youngest Danish case of BSE.

<sup>16</sup> Source: Danish Agriculture and Food Council.

<sup>17</sup> Since the year under review, Denmark has been approved by the EU as officially free from infection with bovine virus diarrhoea according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.





No cases of BSE have been found in Denmark since 2009, when BSE was found in a 14-year-old cow. During the period 2000-2009, a total of 18 cases of BSE were detected. The youngest Danish case of BSE was a cow born in 1999. No animals born after the implementation of the total feed ban in 2001 have tested positive for BSE. This fact highlights the importance and effectiveness of the total feed ban.

In 2021, no suspected cases of BSE were notified to the DVFA due to clinical symptoms.

### Surveillance for BSE

In 1990, a passive surveillance programme for BSE was introduced in Denmark, and at the same time BSE was made a notifiable disease.

As BSE is a notifiable disease, anyone discovering symptoms of BSE in an animal must notify a veterinary practitioner and, hence, the Danish Veterinary

and Food Administration (DVFA). BSE is suspected in animals showing clinical signs compatible with BSE or in case of a positive or inconclusive result of a rapid test performed under the surveillance programme. Confirmatory testing of material from the relevant animal is performed at the national reference laboratory. Meanwhile, the herd of origin is placed under movement restrictions, at least until the birth cohort of the suspected animal has been identified. Animals of the birth cohort are then placed under movement restrictions. This applies to both animals in the herd of origin and animals moved to other herds.

Additionally, if a rapid test of a slaughtered animal is positive, all parts of the animal are disposed of as specified risk material (SRM) irrespective of the result of the confirmatory test. At the slaughter line, the carcasses next to the test-positive animal are also disposed of as SRM (one carcass upstream - two carcasses downstream) if the final result is positive.

An overview of the amendments to the Danish BSE surveillance programme is provided in Table 5.

The results of the Danish BSE surveillance programme in the period 2019-2021 are shown in Table 6.

**Table 5:** Amendments to the Danish BSE surveillance programme as from 2001

<b>BSE testing in Denmark (periods)</b>	<b>Clinically suspected cases tested</b>	<b>Risk animals tested: emergency-slaughtered animals, fallen stock and AM animals</b>	<b>Healthy slaughter animals tested</b>
<b>1 July 2001 - 31 December 2008</b>	All (no age limit)	All > 24 months	All > 30 months
<b>1 January 2009 - 30 June 2011</b>		All > 48 months	All > 48 months
<b>1 July 2011 - 31 December 2012</b>			All > 72 months
<b>1 January 2013 - 3 July 2013</b>			Random samples > 72 months
<b>1 January 2013 - 4 July 2013</b>			No testing

**Table 6:** Results of the Danish BSE surveillance programme, 2019-2021

Category	2019		2020		2021	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
<b>Fallen stock</b>	22,872	0	22,450	0	21,534	0
<b>Emergency-slaughtered animals</b>	1,705	0	1,756	0	1,336	0
<b>AM animals</b>	0	0	0	0	0	0
<b>Healthy slaughter animals</b>	0	0	0	0	0	0
<b>Clinical suspects</b>	1	0	0	0	0	0
<b>Total</b>	<b>24,578</b>	<b>0</b>	<b>24,206</b>	<b>0</b>	<b>22,870</b>	<b>0</b>

Source: EFSA (the European Food Safety Authority), 2022.

The current Danish BSE surveillance programme implements the most recent European TSE legislation laid down in Commission Regulation (EC) No 999/2001 as amended and Commission Decision 2009/719/EC as amended.

Active surveillance was implemented in October 2000, and from 2001 to 2009 the surveillance programme generally comprised the testing of:

- All clinical suspects (no age limit).
- All fallen stock, emergency-slaughtered animals and animals older than 24 months in which observations had been made of accidents or functional or neurological problems at the ante-mortem inspection at slaughter (AM animals).
- All healthy slaughter animals older than 30 months at slaughter.

The surveillance programme has been revised a few times since 2009 due to amendments to EU legislation. The latest revision was made in July 2013, when the testing of healthy slaughter animals was discontinued.

As from 4 July 2013, the surveillance testing regime for animals born in Denmark has comprised:

- All clinical suspects (no age limit).
- All fallen stock older than 48 months, emergency-slaughtered animals older than 48 months and animals older than 48 months in which observations were made of accidents or functional or neurological problems at the ante-mortem inspection at slaughter (AM animals).

Moreover, a more stringent testing regime has been implemented for animals from other EU Member States whose monitoring programmes have not been revised or from countries outside the EU which have a controlled or undetermined risk of BSE.

An overview of the amendments to the Danish BSE surveillance programme is provided in Table 5.

The results of the Danish BSE surveillance programme in the period 2019-2021 are shown in Table 6.

## Bovine virus diarrhoea

No cattle herds newly infected with bovine virus diarrhoea (BVD) were detected in Denmark in 2021.<sup>18</sup>

Denmark initiated a systematic voluntary eradication programme of BVD in 1994. The voluntary programme was replaced by a compulsory surveillance programme in 1996, and BVD became notifiable in the entire country. The programme was carried out jointly by the DVFA and the Danish cattle industry. Legislation has been amended regularly to reflect the progress in the BVD eradication programme.

In 2006, the eradication programme had almost reached the end, and all herds except for a few were considered free from BVD. Movement restrictions were imposed on the remaining infected herds. Since 2006, BVD has only occurred sporadically. The last two infected herds, considered as a single epidemiological unit, were detected in 2019. The two herds were kept under official restrictions in 2020 and 2021.

The present Danish BVD surveillance programme includes the testing of bulk milk samples from dairy herds and blood samples from beef herds for antibodies against BVD. Bulk milk samples are collected from all dairy herds four times a year. Cattle from beef herds are sampled at slaughterhouses following a computer-based selection of herds for sampling. Furthermore, bulls at semen

**Table 7: Bulk milk samples and blood samples examined under the Danish bovine virus diarrhoea surveillance programme, 2019-2021**

Year	Bulk milk samples	Blood samples from beef herds
2019	12,927	20,918
2020	12,293	20,174
2021	10,867 <sup>1</sup>	19,547

<sup>1</sup> Samples were taken from 2,554 dairy herds in 2021.

Source: SEGES, 2022.

collection centres are regularly tested according to the test regime required by the provisions of Council Directive 88/407/EEC<sup>19</sup>.

In 2021, 33 suspected cases of BVD were notified to the DVFA due to positive serological tests. Official restrictions were imposed on all herds under suspicion while confirmatory laboratory testing was conducted at the national reference laboratory. All suspected herds tested free from BVD.

The number of bulk milk samples and the number of blood samples from beef herds examined for BVD in the period 2019-2021 are given in Table 7.

## Enzootic bovine leukosis

Enzootic bovine leukosis (EBL) has not occurred in Denmark since 1990, and Denmark was declared officially free from EBL in 1991 (Commission Decision 2003/467/EC<sup>20</sup>).

<sup>18</sup> Since the year under review, Denmark has been approved by the EU as officially free from infection with bovine virus diarrhoea according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

<sup>19</sup> As from 21 April 2021, by the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

<sup>20</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

EBL has been notifiable in Denmark since 1959, and a surveillance programme was initiated the same year. For several years, the absence of EBL was demonstrated by tests of bulk milk samples every three years and by regular tests of blood samples collected at slaughter.

Since 2011, the Danish surveillance programme demonstrating the absence of EBL in cattle has comprised post-mortem examination of all slaughtered animals as part of the meat inspection programme at slaughterhouses. In 2021, approximately 454,000 slaughtered animals were inspected. Furthermore, bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC<sup>21</sup>. Cattle intended for export to certain countries outside the EU are also tested. In 2021, 2,261 animals were tested at semen collecting centres and in connection with animal export.

In 2021, the DVFA was notified of one suspected case of EBL. Official restrictions were imposed on the herd of origin while laboratory testing was conducted at the national reference laboratory. The suspected case tested negative.

### Infectious bovine rhinotracheitis/ infectious pustular vulvovaginitis

Denmark was recognised as free from infectious bovine rhinotracheitis (IBR) in 1992 (Commission Decision 2004/558/EC<sup>22</sup>).

Isolated outbreaks of IBR have occasionally occurred in Denmark. However, the official disease-free status has not been lost. The most recent case of IBR in Denmark was diagnosed in 2005 in one animal.

The national serological surveillance programme intended to demonstrate the absence of IBR was implemented in April 1984. The surveillance programme includes testing for IBR antibodies in bulk milk samples from dairy herds and blood samples from beef herds. Bulk milk samples are collected from all dairy herds. Cattle from beef herds are sampled at slaughterhouses following a computer-based selection of herds for sampling. In order to detect any introduction of IBR into Denmark, samples are collected from all cattle herds on the basis of the estimated risk of IBR. Danish dairy herds were tested once in 2021.



Denmark is recognised as officially free from BVD, EBL and IBR.

**Table 8: Bulk milk samples and blood samples examined under the Danish infectious bovine rhinotracheitis surveillance programme, 2019-2021**

Year	Bulk milk samples	Blood samples from beef herds
2019	3,056	12,039
2020	2,783	11,681
2021	2,639 <sup>1</sup>	11,196

<sup>1</sup> Samples were taken from 2,505 dairy herds in 2021.

Source: SEGES, 2022.

<sup>21</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

<sup>22</sup> As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

**Table 9:** Last occurrence of WOAH-listed cattle diseases in Denmark

<b>Bovine anaplasmosis<sup>1</sup></b>	Never reported
<b>Bovine babesiosis<sup>1</sup></b>	Suspected, but not confirmed
<b>Bovine genital campylobacteriosis<sup>1</sup></b>	1995
<b>Bovine spongiform encephalopathy (BSE)</b>	2009
<b>Bovine virus diarrhoea</b>	2019
<b>Enzootic bovine leukosis</b>	1990
<b>Haemorrhagic septicaemia<sup>1</sup></b>	Never reported
<b>Infection with lumpy skin disease virus</b>	Never reported
<b>Infection with <i>Mycoplasma mycoides</i> subsp. <i>mycoides</i> SC (contagious bovine pleuropneumonia)</b>	1886
<b>Infectious bovine rhinotracheitis (IBR)/Infectious pustular vulvovaginitis (IPV)</b>	2005
<b>Theileriosis<sup>1</sup></b>	Never reported
<b>Trichomonosis<sup>1</sup></b>	1990
<b>Trypanosomosis<sup>1</sup></b>	Never reported

<sup>1</sup> The disease is not notifiable in Denmark.

Furthermore, bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC<sup>23</sup>. Cattle intended for export to certain countries outside the EU are also tested.

In 2021, the DVFA was notified of six suspected cases of IBR. Five cases were suspected due to positive serological tests and one case due to clinical symptoms. Official restrictions were imposed on all herds under suspicion while

laboratory testing was performed. Samples of all suspected cases tested negative for IBR at the national reference laboratory.

The number of bulk milk samples and the number of blood samples from beef herds examined for IBR in the period 2019-2021 are given in Table 8.

Information pertaining to the WOAH-listed cattle diseases is given in Table 9.

<sup>23</sup> As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

## BOX 7

### Supplementary surveillance for brucellosis in cattle



The Danish Veterinary and Food Administration (DVFA) collaborates with the national reference laboratory to offer laboratory examination of bovine abortion material (foetus, placenta and blood sample from the mother cow).

In the post-mortem examination and microbiological and histological examinations, the samples are examined for brucellosis, bovine virus diarrhoea

and any new emerging infections causing abortion in cattle. In 2021, 35 aborted foetuses from cattle underwent laboratory testing under this scheme.

The examination scheme is a supplement to the passive surveillance for bovine brucellosis, which provides additional documentation proving that Denmark is free from brucellosis in cattle.



# 2.3 Sheep and goat diseases

*Sheep and goats are kept under both intensive and extensive husbandry systems in Denmark, production being mainly for the domestic market.*

*Classical scrapie has never been reported in Denmark. Denmark only had one case of a sheep and goat disease listed by the WOAAH in 2021, namely Maedi-visna in sheep. Maedi-visna and caprine arthritis/encephalitis in goats are included in a voluntary control and surveillance programme for lentivirus.*

## **Caprine arthritis/encephalitis**

Caprine arthritis/encephalitis is an enzootic infection most often recorded on the basis of serological findings. The disease is suspected to occur in Danish goats, but no cases were confirmed in 2021.

A voluntary control programme for the lentivirus causing arthritis/encephalitis in goats was initiated in 1979 and is being managed by SEGES, the Danish Agriculture and Food Council. Herds included in this programme must be tested every three years to maintain the disease-free status. The disease status of a herd has implications for the sale of live animals from that herd. It is recommended to identify and slaughter

animals testing positive as well as their offspring, or to slaughter all animals of the herd if infection is diagnosed.

In 2021, 329 goats were tested in a serological test, and all tested negative (source: The Technical University of Denmark, 2021).

## **Maedi-visna**

The disease is present in Danish sheep. A voluntary programme for the lentivirus causing Maedi-visna in sheep was initiated in 1979 and is managed by SEGES. The control programme for Maedi-visna is similar to the programme for caprine arthritis/encephalitis.



## A major amendment to the TSE Regulation concerning imports was made in 2013 in order to approximate EU legislation and the WOHAT Terrestrial Animal Health Code.

In 2021, two of 2,294 sheep tested positive in a serological test (source: The Technical University of Denmark, 2021).

### Transmissible spongiform encephalopathy

Denmark has never reported any cases of classical scrapie despite the comprehensive Danish surveillance programme for transmissible spongiform encephalopathies (TSEs). Since 2002, more than 70,000 animals have been tested for TSEs, which is quite a large number considering that the Danish population of sheep and goats is rather small (for population data, see Chapter 4).

A passive surveillance programme was initiated in Denmark in 1988, and active surveillance began in 2002. From 1995 to 2002, a number of animals were tested in the voluntary scheme.

Atypical scrapie was first detected in Denmark in 2006. In 2021, no cases of atypical scrapie were reported. The last case of atypical scrapie was in 2020 when a 12-year-old goat was diagnosed. This case was detected after four years without any positive cases. However, cases of atypical scrapie are anticipated as this disease can appear spontaneously in old animals.

TSE is suspected in case of a clinically suspected animal or a positive/inconclusive result of a rapid test, and the national reference laboratory investi-



**Table 10:** Results of the Danish surveillance programme for TSEs in sheep, 2019-2021

Category	2019		2020		2021	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
<b>Animals not slaughtered for human consumption</b>	517	0	509	0	455	0
<b>Healthy slaughter animals</b>	0	0	0	0	0	0
<b>Cases of clinically suspected TSE</b>	0	0	0	0	0	0
<b>Total</b>	<b>517</b>	<b>0</b>	<b>509</b>	<b>0</b>	<b>455</b>	<b>0</b>

Source: The European Food Safety Authority (EFSA), 2022.

**Table 11:** Results of the Danish surveillance programme for TSEs in goats, 2019-2021

Category	2019		2020		2021	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
<b>Animals not slaughtered for human consumption</b>	110	0	91	0	107	0
<b>Healthy slaughter animals</b>	0	0	0	0	30	0
<b>Cases of clinically suspected TSE</b>	1	0	1	0	0	0
<b>Total</b>	<b>111</b>	<b>0</b>	<b>92</b>	<b>0</b>	<b>137</b>	<b>0</b>

Source: The European Food Safety Authority (EFSA), 2022.

## For countries like Denmark with a national control programme for classical scrapie, the most stringent EU rules on imports still apply.

gates the test material from the animal. Meanwhile, official restrictions are imposed on the herd of origin and/or other herds in which the animal may have been exposed to TSEs.

The Danish TSE surveillance programme implements the European TSE legislation as laid down in Commission Regulation (EC) No 999/2001. In 2003, Denmark initiated an extended national surveillance programme according to the EU rules at the time. According to the Danish programme,

all fallen sheep and goats older than 18 months were tested, and Denmark was therefore granted additional guarantees regarding stringent import rules. In 2012, Denmark revised the national programme to become a testing scheme under which only random samples of sheep and goats older than 18 months were tested. The reason was the substantial number of TSE tests performed during the preceding eight-year period which all tested negative for classical scrapie. The sample size depends on the size of the

The results of the surveillance programme for TSEs in sheep and goats in Denmark in the period 2019-2021 are shown in Tables 10 and 11.



population and the rules laid down in the TSE Regulation (Council Regulation (EC) No 999/2001) as amended (Annex III).

A major amendment to the TSE Regulation concerning imports was made in 2013 in order to approximate EU legislation and the WOAHP Terrestrial Animal Health Code. Denmark has maintained the status of a country with an extended surveillance programme, even though the TSE Regulation now refers to the programme as a national control programme for classical

scrapie. For countries like Denmark with a national control programme for classical scrapie, the most stringent EU rules on imports still apply.

The results of the surveillance programme for TSEs in sheep and goats in Denmark in the period 2019-2021 are shown in Tables 10 and 11.

Information pertaining to the WOAHP-listed diseases in sheep and goats is given in Table 12.

**Table 12:** Last occurrence of WOAHP-listed sheep and goat diseases in Denmark

<b>Caprine arthritis/encephalitis</b>	Disease suspected, but not confirmed
<b>Contagious agalactia<sup>1</sup></b>	Never reported
<b>Contagious caprine pleuropneumonia<sup>1</sup></b>	Never reported
<b>Infection with <i>Chlamydia abortus</i> (Enzootic abortion of ewes, ovine chlamydiosis)<sup>1</sup></b>	Never reported
<b>Infection with peste des petits ruminants virus</b>	Never reported
<b>Maedi-visna</b>	Disease present <sup>2</sup>
<b>Nairobi sheep disease<sup>1</sup></b>	Never reported
<b>Ovine epididymitis (<i>Brucella ovis</i>)<sup>1</sup></b>	Never reported
<b>Salmonellosis (<i>Salmonella abortusovis</i>)</b>	Never reported
<b>Scrapie (transmissible spongiform encephalopathy, classical scrapie)</b>	Never reported
<b>Sheep pox and goat pox</b>	1879

<sup>1</sup> The disease is not notifiable in Denmark.

<sup>2</sup> Two sheep from one holding tested positive in a serological test in 2021.

# 2.4 Swine diseases

*The Danish pig production is characterised by large intensive farms. Approximately 2,500 Danish pig farms (half of all pig farms, but approximately 80% of the breeding sow population) are run according to the pig industry's SPF programme.*

*Approximately 90% of Danish pig meat or meat products are exported, and approximately 45% of all piglets are exported as live animals.<sup>24</sup>*

*African swine fever has never been reported in Denmark, and classical swine fever has not been reported in Denmark since 1933.*

## **African swine fever**

African swine fever (ASF) has never been reported in Denmark.

In 2013, ASF was approaching the borders of the EU from the East, as two outbreaks were reported in Belarus in June. In July, the EU implemented new legislation with the aim of reducing the risk of ASF spreading to the EU by transport vehicles entering the EU after having delivered live pigs to ASF-infected farms in countries along the eastern borders of the EU. The risk mitigating measures include the washing and disinfection of transport vehicles when they enter EU territory.

ASF reached the eastern territories of the EU in 2014. To prevent the disease from spreading any further, risk mitigating measures were put in place in the affected countries.

In 2021, 381 samples were tested under a supplementary surveillance programme for ASF (and classical swine fever (CSF)) in Denmark. All tested free from ASF and CSF. See Box 8 for more information on the surveillance programme. Further, 36 samples from pigs were tested for ASF prior to export to certain countries outside the EU. All samples tested negative.

<sup>24</sup>Source: Danish Agriculture & Food Council.



## The public is encouraged to take part in the eradication of wild boars by reporting animals found to the DVFA.

If a pig shows clinical symptoms of ASF, CSF is also suspected. The Danish Veterinary and Food Administration (DVFA) was notified of seven suspected cases of ASF in 2021. Six cases were reported due to clinical symptoms found in animals either in a holding or at a slaughterhouse, and one case was reported due to illegal swill feeding. Official movement restrictions were imposed on the herds under suspicion while epidemiological investigation and laboratory testing were conducted. However, all samples tested free from ASF and CSF. Further details on the suspected cases are given under the heading of classical swine fever.

### Initiatives to prevent the introduction of African swine fever into Denmark

Denmark has closely monitored the development and spread of ASF since the outbreak of the disease in the Baltics in February 2014. Recent developments have therefore led to a more cautious and preventive approach as an attempt to curb the threat.

To mitigate the risk, Denmark has developed an action plan. The action plan consists of many measures, which are intended, in combination, to reduce the risk of introduction of ASF virus on Danish territory. The measures comprise veterinary actions and actions to eradicate wild boars in Denmark. The main elements are described below.

Veterinary actions:

- Further strengthening of the Danish veterinary disease control.
- Information initiatives on biosecurity, food litter and kitchen offal.
- Information signs at pull-outs from motorways giving instructions on risk mitigating measures and on the general prohibition of swill feeding.
- Large fines for illegal importation of food from third countries and for failure to properly clean transport vehicles returning from ASF-infected areas due to the risk of introduction of ASF.

Eradication of wild boars in Denmark:

- Intensive efforts to eradicate free-living wild boars in Denmark.
- License to hunt wild boars 24 hours a day.
- Construction of a wild boar fence along the Danish border to Germany to prevent the crossing of wild boars.
- Intensive ASF-surveillance in the wild boar population due to the programme of free testing of caught wild boars for *Trichinella* spp.
- Strengthening of the cooperation with the Danish Hunters' Association.

The public is encouraged to take part in the eradication of wild boars by reporting animals found to the DVFA. This can easily be done by using the smartphone app 'VildsvineTip' (in English: Wild Boar Tip-off). Sightings of both dead and live



<5

By the end of 2021, the estimated number of free-living wild boars was less than five.

animals are stored in the wild boar database. Each record comprises the date, condition of animal(s) (i.e. dead or alive), number of animals, geographical location and a photo of the animal(s) or traces of their presence.

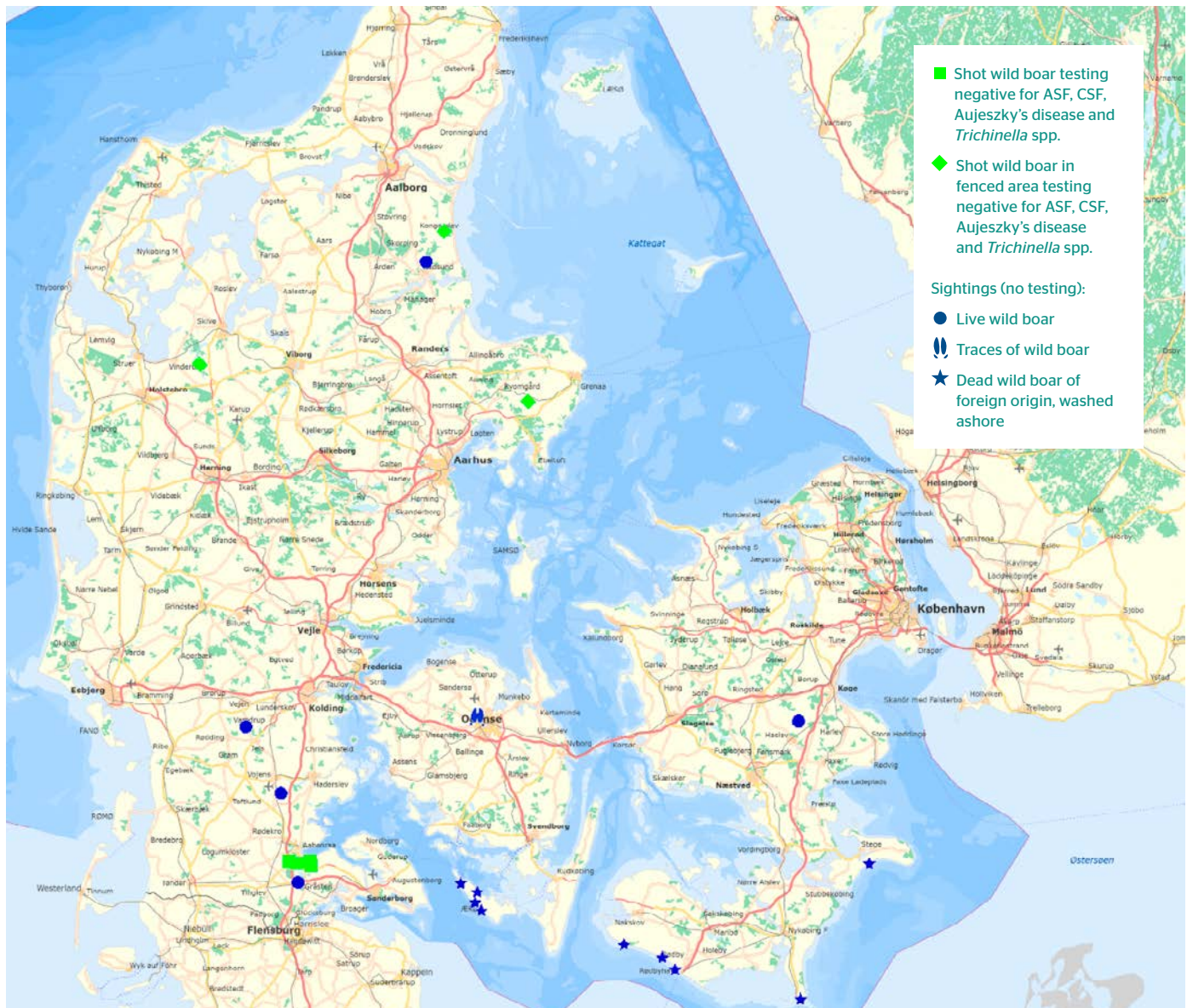
Information on live animals is forwarded to the Danish Nature Agency, which organises the hunting of wild boars and makes entries about animals killed in the database. The relevant Veterinary Inspection Unit (VIU) then collects samples from the dead wild boars (whether shot, road-killed and otherwise deceased) for the purpose of testing them for ASF, CSF and Aujeszky's disease, and the laboratory enters the test results into the

database. Hunters are offered free testing of hunter-killed wild boars for *Trichinella* spp., which boosts the surveillance for ASF, CSF and Aujeszky's disease as well. The person reporting the wild boar will also be notified of the test results through the app. Carcasses of dead wild boars are collected and disposed of. All results are publicly available at [www.vildsvin.fvst.dk](http://www.vildsvin.fvst.dk) (in Danish). Sightings of wild boars reported in 2021 are illustrated in Figure 1.

The measures to eradicate wild boars in Denmark have resulted in a sharp decline in the number of free-living wild boars. By the end of 2021, the estimated number of free-living wild boars was less than five.



**Figure 1.**  
Wild boars registered in 2021.



## Classical swine fever

The last outbreak of classical swine fever (CSF) in Denmark was in 1933.

A serological surveillance programme is applied to demonstrate the absence of CSF in the Danish pig population. The surveillance programme was revised in 2012 on the basis of a comprehensive risk assessment. Since the revision of the serological surveillance programme, the following three components have been included in the programme:

- Random sampling of a maximum of 2% of sows at slaughter.
- Targeted testing of boars at semen collection centres in accordance with Council Directive 90/429/EEC<sup>25</sup>.
- Sampling of animals intended for export to certain countries outside the EU.

As a supplement to the serological surveillance, pig carcasses submitted for post-mortem examination are tested for CSF and African swine fever (ASF). Further details are given in Box 8.

The number of samples examined in the period 2019-2021 is given in Table 13. Due to trade fluctuations, the number of samples tested for CSF varied significantly during the three-year period mentioned in Table 13.

<sup>25</sup> As from 21 April 2021, in accordance with Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

## BOX 8 Supplementary surveillance for African swine fever and classical swine fever

Samples from carcasses of swine submitted from pig farms for general post-mortem examination at a diagnostic laboratory are included in the surveillance programme for African swine fever (ASF) and classical swine fever (CSF) as a supplement to serological surveillance.

Carcasses are selected by laboratory staff on the basis of the anamnesis, and relevant organ material is collected for the testing for ASF and CSF. If a sample tests positive, the result is immediately reported to the Danish Veterinary and Food Administration (DVFA) as a suspected case of ASF or CSF.

On a weekly basis, samples from at least six pig herds are tested for ASF and CSF under this programme. In 2021, samples from 381 submissions were tested; all tested free from ASF and CSF.



If any animals in a herd show clinical symptoms which give rise to the suspicion of CSF, the herd will be placed under official restrictions while laboratory testing and epidemiological investigations are conducted. If a pig shows clinical symptoms of CSF, ASF is also suspected.

In 2021, the DVFA was notified of 13 suspected cases of CSF (in seven of those cases, there was a suspicion of both ASF and CSF). Three cases were suspected due to clinical signs in pigs at the ante-mortem inspection at a slaughterhouse, one case due to clinical symptoms observed in a general post-mortem examination at a diagnostic laboratory, two cases due to clinical symptoms in animals of a herd and one case because of illegal swill feeding. Six cases were notified because animals tested positive in a serological test performed prior to export. In all suspected cases, the herd of origin was subjected to thorough clinical examination and laboratory testing. The relevant VIU imposed official restrictions on the herds under suspicion while epidemiological investigation and laboratory testing were conducted. All samples tested free from CSF and ASF.

Information pertaining to the WOA-listed diseases in pigs is given in Table 14.

**Table 13:** Serum samples from pigs examined under the Danish classical swine fever surveillance programme, 2019-2021

<b>Year</b>	<b>Samples</b>
<b>2019</b>	31,940
<b>2020</b>	26,090
<b>2021</b>	30,080

Source: Statens Serum Institut (SSI) and other official laboratories in the EU, 2021.



**Table 14:** Last occurrence of WOA-listed swine diseases in Denmark

<b>Infection with African swine fever virus</b>	Never reported
<b>Infection with classical swine fever virus</b>	1933
<b>Infection with porcine reproductive and respiratory syndrome virus (PRRS)</b>	Disease present <sup>1</sup>
<b>Infection with <i>Taenia solium</i> (Porcine cysticercosis)</b>	Disease absent <sup>2</sup>
<b>Nipah virus encephalitis</b>	Never reported
<b>Transmissible gastroenteritis</b>	Never reported

<sup>1</sup> PRRS is endemic in Denmark.

<sup>2</sup> Year of last outbreak is not known

## BOX 9

# No porcine epidemic diarrhoea virus in Denmark

Porcine epidemic diarrhoea (PED) has never been recorded in Denmark despite the wide distribution of PED in Central and Southern Europe since the 1990s.

PED is a notifiable disease in Denmark. The symptoms are similar to those of transmissible gastroenteritis (TGE), which is also a notifiable disease that has never been reported in Denmark.

Due to the increased focus on PED in Northern America in 2013, a serological screening of blood samples from sows for PED was initiated by the Danish Veterinary and Food Administration (DVFA) in 2014, using samples collected under the surveillance programmes for Aujeszky's disease and classical swine fever.

From October to December 2014, approximately 2,000 blood samples were tested in a PED ELISA developed by the Technical University of Denmark. The ELISA was developed to detect both the original European and the Asian/American strains. All samples tested negative. The samples originated from 1,352 sow herds. In statistical terms, it was concluded with 92% certainty that the prevalence of the PED virus in Denmark was less than 1% at the end of 2014.



In 2015, the pig farming industry took over responsibility for the surveillance scheme. Material from carcasses of piglets with diarrhoea submitted for post-mortem examination is included in the PED surveillance scheme as a supplement to serological surveillance. In 2021, 164 samples were examined as part of the surveillance programme. All samples tested negative for PED.

# 164

In 2021, 164 samples were examined as part of the surveillance programme. All samples tested negative for PED.



# 2.5 Poultry diseases

*Poultry production in Denmark comprises two major categories: table egg production and meat production.*

*In 2021, two epidemics of highly pathogenic avian influenza (HPAI) occurred. The epidemic of HPAI H5N8 that started in the autumn of 2020 continued into 2021. But the epidemic was resolved during the summer of 2021. In the autumn of 2021, a HPAI H5N1 epidemic occurred.*

*A total of 300 dead wild birds were diagnosed with HPAI H5 in 2021. Furthermore, 14 outbreaks of HPAI H5N8 and five outbreaks of HPAI H5N1 were detected in poultry or other captive birds. Low pathogenic avian influenza (LPAI) was not detected at any holdings in 2021.*

*Only few other poultry diseases listed by the WOAHP occurred in Denmark in 2021.*

*The EU-coordinated surveillance programme for avian influenza (AI) in poultry as revised in 2015 continued in 2021.*

## **Avian influenza**

In the winter season of 2020/2021, Denmark and the rest of Europe experienced the worst epidemic of HPAI ever. The virus was brought to the continent by migratory birds from the East and spread rapidly to poultry holdings in many European countries. In the autumn of 2021, a new HPAI epidemic was once again introduced into Europe, most likely by migratory birds. Simultaneously there was also evidence of infections with viruses from the past HPAI season.

The HPAI epidemic that started in Denmark in the autumn of 2020 continued into 2021. At the beginning of 2021, HPAI H5N8 was detected in poultry, captive birds and wild birds. During the period from January to April, 12 cases of HPAI H5N8 were detected in poultry and other captive birds. The last outbreak of HPAI H5N8 in 2021 was detected on 5 July 2021, reaching a total of 13 HPAI H5N8 outbreaks in poultry or other captive birds in Denmark. Furthermore, one case of HPAI H5N5 was detected in captive birds in March 2021.



By the end of 2021, the HPAI epidemic in poultry, captive birds and wild birds was continuing.

In June 2021, Denmark regained its status as a country free from notifiable AI according to the WOAHP Terrestrial Animal Health Code. The status was maintained until July 2021, when an outbreak of HPAI H5N8 was detected at a commercial poultry farm. In August 2021, Denmark once again regained its status as a country free from notifiable AI. The new status was maintained until the beginning of November 2021.

On 1 November 2021, Denmark detected the first incidence of HPAI H5N1 in poultry in 2021. A total of five outbreaks of HPAI H5N1 in poultry and captive birds were detected in the last two months of 2021. HPAI H5N1 was also detected in living birds as a part of the active surveillance programme and in several dead wild birds as a part of the passive surveillance programme. By the end of 2021, the HPAI epidemic in poultry, captive birds and wild birds was continuing.

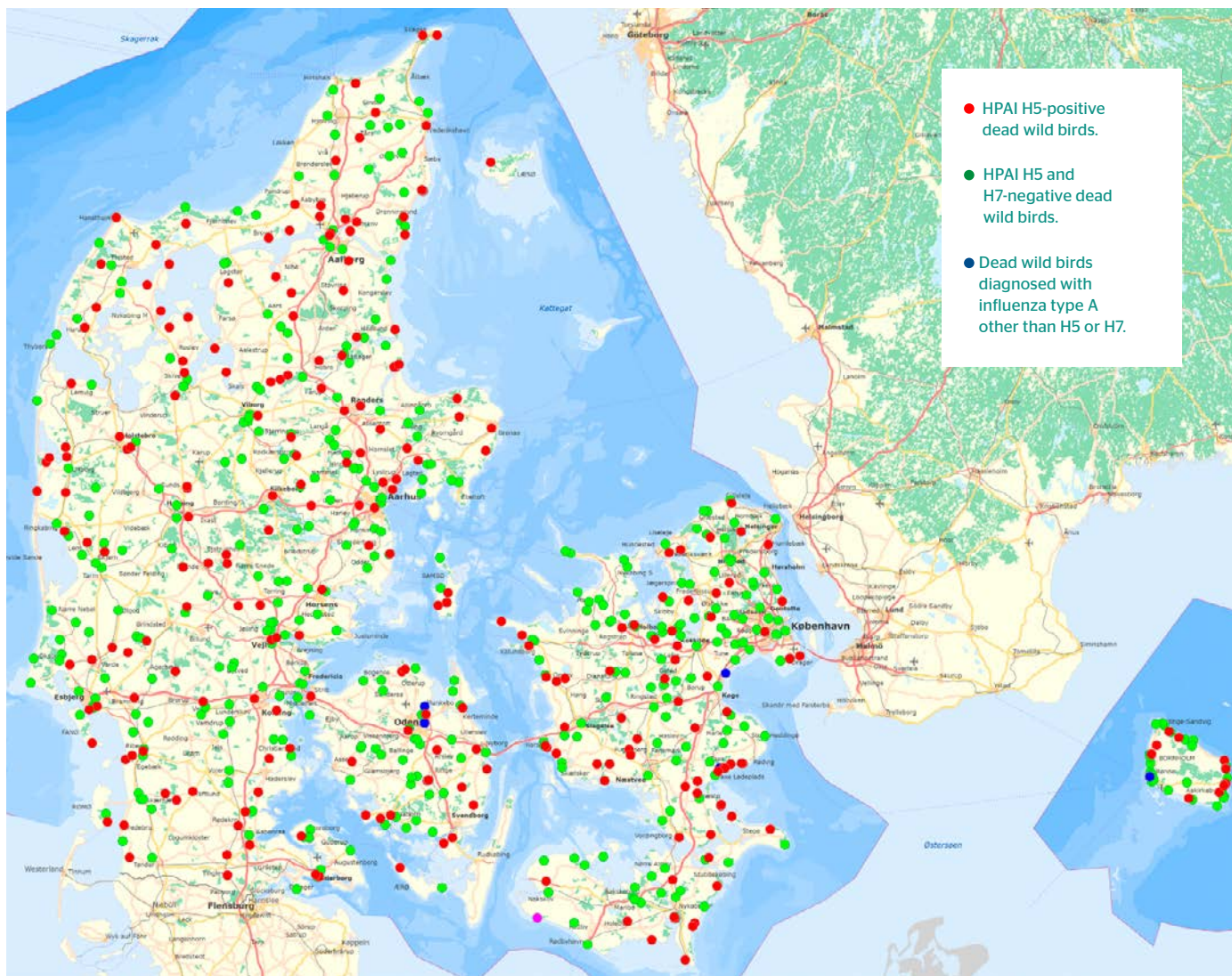
All outbreaks were reported to the WOAHP through the World Animal Health Information System (WAHIS).

AI H5/H7 is notifiable in Denmark according to national legislation. All farmers are obliged to notify a veterinarian in case of their suspicion of AI and in case of abnormal mortalities or other signs of a severe disease. If the veterinarian has any reason to suspect the presence of AI, the veterinarian must notify the relevant Veterinary Inspection Unit (VIU) of the DVFA of the suspicion.

If poultry show clinical signs of AI, official restrictions are imposed on the farm while an epidemiological investigation of the flock is carried out and laboratory testing is conducted.

In 2021, 47 suspected cases of AI were notified to the DVFA due to clinical symptoms. Two cases were rejected by the VIU based on a thorough evaluation of the clinical symptoms. Twenty-eight cases tested negative in the virological test. One case tested positive for HPAI H5N5. Nine cases tested positive for HPAI H5N8, including a clinical suspicion notified to the DVFA on 31 December 2020. Six cases tested positive for H5N1. Furthermore, a clinical suspicion on 31 December 2021 led

**Figure 2**  
Dead wild birds tested for avian influenza in 2021.



Note that dead birds found in close geographical and temporal proximity of each other are only represented on the map by one dot.



## **BOX 10**

# **Early warning scheme – a supplement to the surveillance of avian influenza**

EU surveillance programmes for avian influenza (AI) in poultry and wild birds have been in place in Denmark since 2003. As a supplement to these programmes, a special programme for early warnings of AI in commercial poultry and hobby poultry has been in place since 2005. All samples tested due to an early warning of AI are also tested for Newcastle disease (ND) as a differential diagnosis.

The AI early warning parameters requiring the owner of the animals to notify are:

- Drop in feed and water intake by more than 20% in 24 hours.
- Drop in egg production by more than 5% for more than two consecutive days.
- Mortality rate higher than 3% in any unit during a three-day period.

Early warnings are notified to the DVFA, and samples are collected from 10 birds of the flock for virological examination.

Six early warnings of AI were notified to the DVFA in 2021. One of the cases was rejected after a thorough assessment of the anamnesis. The remaining five cases tested free from AI and ND.

to the detection of positive for HPAI H5N1 on 1 January 2022 (not included in Table 15). See Table 15 for additional information on outbreaks of HPAI in 2021. All suspected cases with clinical symptoms were also tested for Newcastle disease (ND). All tested negative for ND.

One suspected case of AI was notified to the DVFA because birds had tested positive in a serological test performed under the Danish serological surveillance programme for AI. The bird tested positive for HPAI H5N8.

### **Strengthened biosecurity measures due to the HPAI epidemic**

The biosecurity measures implemented during the 2020 epidemic were continued for the first part of 2021. This meant that the compulsory housing order introduced on 6 November 2020, which required that all poultry and other captive birds must be housed indoors or confined under roof, net or wire to protect the poultry from contact with wild birds, was still in force. The housing order applied to the whole country and to all categories of poultry and other captive birds with certain exceptions for animal welfare reasons. In addition, fairs, markets, shows and other gatherings of poultry or other captive birds were prohibited across the country. The compulsory housing order was lifted on 29 May 2021 after the risk level had been reduced from high to low.

On 28 October 2021, the risk level was once again raised from low to high as a consequence of a rapid risk assessment performed after findings of HPAI in wild birds in Denmark and Northern Germany. Due to the higher risk, a new housing order for poultry and other captive birds came into

force on 1 November 2021. The risk level remained high for the remainder of 2021.

### Low pathogenic avian influenza

In 2021, no cases of LPAI were detected in poultry or other captive birds in Denmark. The last occurrence of LPAI in poultry or captive birds in Denmark was detected on 29 January 2020 through the Danish surveillance programme for AI in poultry and game birds.

### Highly pathogenic avian influenza in poultry

In 2021, 15 cases of HPAI were detected in poultry. See Table 15 for further details on the outbreaks.

When the DVFA was notified of a suspicion of HPAI in a holding, movement restrictions were immediately imposed on the holding by the relevant Veterinary Inspection Unit (VIU) of the DVFA. Samples were collected for testing at the national reference laboratory.

A 3 km protection zone and a 10 km surveillance zone around the infected holdings were established immediately after confirmation of the HPAI outbreak, and all necessary measures were implemented in accordance with Council Directive 2005/94/EC<sup>26</sup>, Commission Delegated Regulation (EU) 2020/687 of 17 December 2019<sup>27</sup> and national legislation. Epidemiological investigations were conducted to identify possible epidemiologically linked holdings. Possible epidemiological holdings were imposed movement restrictions and samples

were collected for testing at the national reference laboratory. Furthermore, additional surveillance was conducted in all the protection and surveillance zones in order to identify any further spread of HPAI.

The epidemiological investigation conducted in relation to the outbreak of HPAI on 6 March 2021 in a turkey holding (outbreak 6 in Table 15), resulted in three additional cases of HPAI (outbreaks 7, 9 and 11 in Table 15).

Epidemiological investigations revealed that the primary source of infection in most outbreaks was most likely direct or indirect contact with wild birds. In outbreak 9 (turkeys), airborne transmission from outbreak 8 (turkeys) was also suspected to have occurred due to the short distance (1.7 km) between the farms. Moreover, inadequate biosecurity was considered in outbreaks 9 (turkeys) and 11 (turkeys).

All poultry on the infected holdings were culled, and the DVFA approved the cleaning and disinfection of the facilities. Restrictions were lifted no earlier than 21 and 30 days, respectively, after approval of the preliminary cleaning and disinfection.



In 2021, 15 cases of HPAI were detected in poultry in Denmark

See Table 15 for further details on the outbreaks.

<sup>26</sup> Before 21 April 2021.

<sup>27</sup> As from 21 April 2021.

## In 2021, four cases of HPAI were detected in captive birds. See Table 15 for further details on the outbreaks.

### Highly pathogenic avian influenza in captive birds

In 2021, four cases of HPAI were detected in captive birds. See Table 15 for further details on the outbreaks. All the outbreaks were detected due to clinical suspicions.

When the DVFA was notified of a suspicion of HPAI, movement restrictions were immediately imposed on the holding by the relevant Veterinary Inspection Unit (VIU) of the DVFA. Samples were collected for testing at the national reference laboratory.

In two of the cases, a 3 km protection zone and a 10 km surveillance zone were declared around the infected holdings, and all necessary measures were implemented in accordance with Council Directive 2005/94/EC<sup>28</sup>, Commission Delegated Regulation (EU) 2020/687 of 17 December 2019<sup>29</sup> and national legislation. Epidemiological investigations were conducted to identify possible epidemiologically linked holdings. Movement restrictions were imposed on potential epidemiological holdings, and samples were collected for testing at the national reference laboratory. Furthermore, additional surveillance was conducted in all protection and surveillance zones to identify any further spread of HPAI. In two cases of infection

in holdings with captive birds, no protection and surveillance zones were declared as the risk assessment revealed that the risk of virus spread was negligible.

All birds of the affected holdings were culled, and the DVFA approved the cleaning and disinfection of the facilities.

The protection zones, surveillance zones, and implemented restrictions were lifted no earlier than 21 and 30 days, respectively, after approval of the preliminary cleaning and disinfection. For the outbreak on 23 November 2021, the restrictions were lifted earlier after a risk assessment in accordance with Commission Delegated Regulation (EU) 2020/687 of 17 December 2019.

The most likely infection route was direct or indirect contact with wild birds.

### The surveillance programme for avian influenza in poultry and game birds for restocking

The Danish surveillance programme for AI in poultry and game birds for restocking was established to detect AI virus of subtype H5 or H7 circulating in the poultry population. Consequently, when posi-



In 2021, four cases of HPAI were detected in captive birds.

See Table 15 for further details on the outbreaks.

<sup>28</sup> Before 21 April 2021.

<sup>29</sup> As from 21 April 2021.

tive serological findings are reported, the relevant holdings will be subjected to further testing to detect whether the virus is circulating. All birds of holdings in which AI H5/H7 virus is detected will be culled, and the infected premises/facilities will be cleaned and disinfected.

Surveillance for AI has been in place throughout the country since 2006. Initially, the surveillance programme comprised two levels: a standard level of testing all over the country and an intensified level of testing in an area extending 3 km inland from the coastline and from the shore of all large lakes.

The surveillance programme was revised in 2015 following a risk assessment. Subsequently, the surveillance level has been the same all over the country without any specific risk areas defined. All commercial holdings in the target group

having more than 100 animals are included in the programme. Breeder hens (central rearing flocks) and pullets are tested before release to egg production, outdoor layers four times a year and outdoor slaughter poultry (broilers, ducks and geese) before slaughter. In addition, fattening turkeys are tested before slaughter. Breeder ducks and geese are required to be tested once a year.

Farmed game birds for restocking (gallinaceous birds and waterfowl) are tested four times during the production season from February to August. Breeding animals undergo serological testing and their offspring virological testing.

When traded, poultry and game birds have to be accompanied by a certificate stating that the flock has been tested within the preceding three months in case of poultry, or two months in case of game birds.



When traded, poultry and game birds have to be accompanied by a certificate stating that the flock has been tested within the preceding three months in case of poultry, or two months in case of game birds.

The surveillance programme is mainly based on serology. PCR testing is used only for offspring from game birds. Additionally, PCR testing is used in case of a positive serological result to confirm whether the relevant flock is infected by the AI virus.

Birds in one holding tested positive for AI H5 under the Danish serological surveillance programme in 2021. However, PCR testing showed no circulation of virus in the poultry.

As a supplement to the surveillance of AI, a special early warning programme for AI is in place. For more information, see Box 10 in this chapter.

The results of the Danish surveillance programme for AI in poultry and game birds for restocking are shown in Table 16.

**Table 15: Outbreaks of avian influenza in poultry and other captive birds in Denmark, 2021**

<b>Outbreak number</b>	<b>Municipality</b>	<b>Confirmed (date)</b>	<b>Virus type</b>	<b>Susceptible birds</b>	<b>Category</b>	<b>Type of holding</b>	<b>Approval of preliminary cleaning and disinfection (date)</b>
1	Viborg	01/01/2021	HPAI H5N8	9,415	Poultry	Game birds (pheasants and mallards)	11/01/2021
2	Copenhagen	05/02/2021	HPAI H5N8	35	Captive	Other captive birds	07/02/2021
3	Bornholm	25/02/2021	HPAI H5N8	23	Poultry	Backyard: Laying hens	28/02/2021
4	Bornholm	03/03/2021	HPAI H5N8	10	Poultry	Backyard: Laying hens	05/03/2021
5	Ringsted	03/03/2021	HPAI H5N8	582	Poultry	Game birds (pheasants)	07/03/2021
6	Slagelse	06/03/2021	HPAI H5N8	37,000	Poultry	Fattening turkeys	15/03/2021
7	Slagelse	10/03/2021	HPAI H5N8	24,000	Poultry	Fattening turkeys	15/03/2021
8	Kalundborg	12/03/2021	HPAI H5N8	19	Poultry	Backyard: Laying hens	15/03/2021
9	Slagelse	16/03/2021	HPAI H5N8	5,700	Poultry	Fattening turkeys	23/03/2021
10	Langeland	17/03/2021	HPAI H5N8	2,200	Poultry	Game birds (mallards)	20/03/2021
11	Slagelse	17/03/2021	HPAI H5N8	27,600	Poultry	Fattening turkeys	23/03/2021
12	Lejre	21/03/2021	HPAI H5N5	4	Captive	Other captive birds	22/03/2021
13	Holstebro	20/04/2021	HPAI H5N8	19,000	Poultry	Fattening ducks and geese	25/04/2021
14	Sønderborg	05/07/2021	HPAI H5N8	40,470	Poultry	Broiler chicken	09/07/2021
15	Slagelse	01/11/2021	HPAI H5N1	27,000	Poultry	Fattening turkeys	06/11/2021
16	Slagelse	03/11/2021	HPAI H5N1	50	Captive	Other captive birds	05/11/2021
17	Slagelse	23/11/2021	HPAI H5N1	2	Captive	Other captive birds	25/11/2021
18	Viborg	19/12/2021	HPAI H5N1	6,000	Poultry	Game birds	23/12/2021
19	Vordingborg	31/12/2021	HPAI H5N1	42	Poultry	Backyard: Hens, ducks and geese	02/01/2022

## The surveillance programme for avian influenza in wild birds

In 2021, the DVFA continued the intensive surveillance programme for AI in wild birds.

Since January 2011, the surveillance programme for AI in wild birds has been divided into an EU-coordinated passive surveillance programme for HPAI in wild birds found dead or sick and active national surveillance for AI in live birds with an increased risk of exposure to AI and in hunted

game birds. Birds sourced from passive surveillance are tested individually, and birds sourced from active surveillance are tested by cloacal swabs in pools taken from up to five birds of the same species at the same time and location.

The DVFA encourages the public to report findings of dead wild birds. This can easily be done by using the smartphone app 'FugleinfluenzaTip' (in English: Bird Flu Tip-off).

The monitoring of dead wild birds covered the whole country, and the birds were tested at the national reference laboratory. The results are displayed in Figure 2 and in Tables 17 and 18.

**Table 16:** Results of the Danish surveillance programme for avian influenza in poultry and game birds for restocking, 2021

Poultry category	Holdings (h)/flocks (f) in Denmark <sup>1</sup>	Holdings (h)/flocks (f) tested <sup>2</sup>	Serologically positive holdings/flocks (H5, H7)			Virologically positive holdings/flocks	
			H5	H7	H5 and H7	H5	H7
<b>Chicken breeders</b>	191 (f)	90 (f)	0	0	0	-	-
<b>Free-range laying hens<sup>3</sup></b>	166 (f)	127 (f)	0	0	0	-	-
<b>Free-range broilers<sup>3</sup></b>	53 (h)	31 (h)	0	0	0	-	-
<b>Fattening turkeys</b>	37 (h)	15 (f)	0	0	0	-	-
<b>Fattening geese</b>	5 (h)	1 (h)	0	0	0	-	-
<b>Fattening ducks</b>	44 (h)	7 (h)	0	0	0	-	-
<b>Mallards bred for restocking of game birds</b>	16 (h)						
<b>- Breeding animals</b>		7 (h)	1	0	0	0	0
<b>- Offspring</b>		11 (h)	-	-	-	0	0
<b>Pheasants, partridges, rock partridges and red-legged partridges</b>	97 (h)						
<b>- Breeding animal</b>		45 (h)	0	0	0	-	-
<b>- Offspring</b>		68 (h)	-	-	-	0	0
<b>Total positives</b>			<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<sup>1</sup> All holdings/flocks with more than 100 animals are registered. The holdings/flocks do not necessarily have active production throughout the year.

<sup>2</sup> Some flocks/holdings are tested more than once a year; the figures only include one annual testing per flock/holding.

<sup>3</sup> Flocks/holdings with 'free-range' hens kept inside during the AI epidemic were not tested in that period as they had no access to outdoor areas.

Source: The Poultry Database of the Danish Agriculture & Food Council, 2022.

**Table 17:** HPAI in dead wild birds by species in 2021

<b>Species</b>	<b>Birds with H5 (unknown N type)</b>	<b>Birds with H5N1</b>	<b>Birds with H5N3</b>	<b>Birds with H5N5</b>	<b>Birds with H5N8</b>	<b>Positive birds per species</b>
<i>Accipiter gentilis</i>					4	4
<i>Accipiter nisus</i>					3	3
<i>Anas acuta</i>		1				1
<i>Anas crecca</i>		2				2
<i>Anas penelope</i>		6				5
<i>Anas platyrhynchos</i>		1				1
<i>Anser albifrons</i>					1	1
<i>Anser anser</i>		7			7	14
<i>Anser brachyrhynchus</i>		1			7	8
<i>Ardea cinerea</i>		1			6	7
<i>Branta bernicla</i>					1	1
<i>Branta leucopsis</i>		19			18	37
<i>Buteo buteo</i>	1	10		1	53	65
<i>Buteo lagopus</i>					3	3
<i>Calidris canutus</i>			2			2
<i>Corvus monedula</i>				1		1
<i>Cygnus cygnus</i>		2			59	61
<i>Cygnus olor</i>	1			1	31	33
<i>Falco peregrinus</i>				1	3	4
<i>Falco tinnunculus</i>			1		3	4
<i>Fulica atra</i>					1	1
<i>Larus argentatus</i>	1	5			9	15
<i>Larus marinus</i>		1			5	6
<i>Larus ridibundus</i>		1				1
<i>Mergus merganser</i>					1	1
<i>Milvus milvus</i>		1				1
<i>Phasianus colchicus</i>					15	15
<i>Rallus aquaticus</i>					1	1
<i>Scolopax rusticola</i>					1	1
<i>Turdus philomelos</i>					1	1
<b>Total number of positive birds</b>	<b>3</b>	<b>57</b>	<b>3</b>	<b>4</b>	<b>233</b>	<b>300</b>

**Table 18:** Results of the Danish surveillance programme for avian influenza in wild birds, 2021

<b>Species</b>	<b>Passive surveillance (dead or sick wild birds)</b>	<b>Active surveillance (live wild birds)</b>
<b>Birds sampled</b>	760	1,015
<b>Samples/pools</b>	1,520 samples	234 pools <sup>1</sup>
<b>Influenza A-positive birds</b>	300	62 pools <sup>2</sup>
<b>LP AI H5-positive birds</b>	1	1 pool <sup>2</sup>
<b>LP AI H7-positive birds</b>	0	0
<b>HP AI H5-positive birds</b>	291	9 individual birds and 1 pool of 10 droppings
<b>HP AI H7-positive birds</b>	0	0

<sup>1</sup> Pools of cloacal swabs taken from up to five birds of the same species at the same time and location, except for 30 samples, which were pools of 10 fresh droppings from birds of the same species taken at the same time and location.

<sup>2</sup> The actual number of positive birds is not known. If a pool is positive, at least one of the birds making up the pool is positive.

Source: Statens Serum Institut (SSI) and the University of Copenhagen, 2022.





In total, 760 dead wild birds were tested in 2021 in the passive surveillance, most of them in the first quarter of the year.

Under the active surveillance programme, 1,015 birds were sampled, and nine individual birds and one pool tested positive for HPAI H5. It is quite exceptional to detect that many positive HPAI samples under the active surveillance programme.

The monitoring of dead wild birds covered the whole country, and the birds were tested at the national reference laboratory. The results are displayed in Figure 2 and in Tables 17 and 18.



## Newcastle disease

The last outbreak of Newcastle disease (ND) in Denmark occurred in October 2005.

Prophylactic vaccination against ND is compulsory for hens and turkeys in both breeding and layer flocks. Vaccination is also compulsory for flocks of broilers kept free-range or slaughtered when older than 10 weeks and for turkeys for commercial production. Also, poultry brought to gatherings, exhibitions and markets and wintering game birds for breeding the following spring must be vaccinated against ND.

If poultry show clinical symptoms of AI, ND is also suspected, and official restrictions are imposed on the farm while an epidemiological investigation of the flock is carried out and laboratory testing is conducted. In practice, this means that all holdings suspected of an infection with AI due to clinical symptoms, or tested in the early warnings scheme, are tested for both ND and AI.

Due to the comprehensive vaccination programme against ND in Denmark, this disease is usually not the primary suspicion in case of clinical disease in poultry. However, as a precautionary measure, suspected cases are tested for ND to rule out the presence of the virus.

In 2021, no suspected cases of ND in poultry or other captive birds were reported to the DVFA.

Information pertaining to the WOA-listed poultry diseases is given in Tables 19 and 20.

Due to the comprehensive vaccination programme against ND in Denmark, this disease is usually not the primary suspicion in case of clinical disease in poultry.

**Table 19:** Outbreaks of poultry diseases listed by the WOAAH and notifiable in Denmark, 2019-2021

<b>Poultry disease</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Avian Chlamydiosis<sup>1</sup></b>	18	2	25
<b>Avian infectious laryngotracheitis</b>	4	6	8
<b>Avian mycoplasmosis (<i>Mycoplasma gallisepticum</i>)</b>	(1967)	(1967)	(1967)
<b>Fowl typhoid</b>	(2002)	(2002)	(2002)
<b>Infection with highly pathogenic avian influenza viruses (poultry)</b>	(2016)	1	15
<b>Infection with highly pathogenic avian influenza A virus (other captive birds)</b>	(2017)	1	4
<b>Infection with low pathogenic avian influenza viruses</b>	3	1	(2020)
<b>Infection with Newcastle disease virus</b>	(2005)	(2005)	(2005)
<b>Pullorum disease</b>	2	(2019)	(2019)

The year of the last occurrence is stated in brackets if there were no outbreaks of the disease in the relevant year.

<sup>1</sup> Occurrence mainly in ornamental, hobby and backyard birds.

**Table 20:** Last occurrence of other WOAAH-listed poultry diseases not notifiable in Denmark

<b>Avian infectious bronchitis</b>	Suspected, but not confirmed
<b>Avian mycoplasmosis (<i>Mycoplasma synoviae</i>)</b>	Disease absent <sup>1</sup>
<b>Duck virus hepatitis</b>	Suspected, but not confirmed
<b>Infectious bursal disease (Gumboro disease)</b>	Disease absent <sup>1</sup>
<b>Turkey rhinotracheitis</b>	2007

<sup>1</sup> Year of last outbreak is not known.

Source: The Poultry Database of the Danish Agriculture & Food Council, 2021.

# 2.6 Equine diseases

The keeping of horses in Denmark is based on more than 30 different breeds, which are used for driving, riding and other purposes. Riding horse breeding focuses on the breeding of horses suitable for competition at an international level.

One of the WOAH-listed equine diseases are known to be present in Denmark, namely contagious equine metritis, and several cases of were reported in 2020-2021. Equine viral arteritis is notifiable and suspected to be present in Denmark, but the infection has not been confirmed.

## Contagious equine metritis

Infection with *Taylorella equigenitalis*, which causes contagious equine metritis (CEM), was diagnosed in several horses in Denmark in 2021. Most of the cases were in horses of the Icelandic and Fjord breeds. Samples from those horses were collected for microbiological examination in connection with breeding, and official restrictions were imposed on infected stallions by the DVFA. The restrictions comprised a duty to treat infected stallions and a prohibition against the use of infected stallions for breeding until they had tested negative for *T. equigenitalis*. Further, all mares were traced, and the DVFA recommended the treatment of infected mares and the suspension of breeding activities until the horses had tested negative for *T. equigenitalis*.

Testing for CEM is also carried out in connection with international trade in horses and horse semen.

## Dourine

Dourine, which is caused by the protozoan parasite *Trypanosoma equiperdum*, has never been reported in Denmark. Serological examination is carried out in connection with international trade in horses and horse semen.

## Equine infectious anaemia

Equine infectious anaemia (EIA) has not been reported in Denmark since 1928. Serological examination is carried out in connection with international trade in horses and horse semen.

## Glanders

Glanders, which is caused by an infection with the *Burkholderia mallei* bacterium, has not been reported in Denmark since 1928. Serological examination is carried out in connection with international trade in horses and horse semen.

Information pertaining to equine diseases is given in Table 21.

Information pertaining to equine diseases is given in Table 21.



**Table 21:** Occurrence of WOAH-listed equine diseases in Denmark

<b>Contagious equine metritis</b>	Disease present
<b>Dourine</b>	Never reported
<b>Equine encephalomyelitis (Western)</b>	Never reported
<b>Equine infectious anaemia</b>	1928
<b>Equine influenza<sup>1</sup></b>	Suspected, but not confirmed <sup>2</sup>
<b>Equine piroplasmosis<sup>1</sup></b>	Disease absent <sup>3</sup>
<b>Infection with <i>Burkholderia mallei</i> (Glanders)</b>	1928
<b>Infection with African horse sickness virus</b>	Never reported
<b>Infection with equid herpesvirus-1 (EHV-1)<sup>1</sup></b>	Disease absent <sup>3</sup>
<b>Infection with equine arteritis virus</b>	Not reported
<b>Venezuelan equine encephalomyelitis</b>	Never reported

<sup>1</sup> The disease is not notifiable in Denmark.

<sup>2</sup> Due to widespread vaccination of competition horses and racehorses, incidents among those horses are rare and of a mild nature.

<sup>3</sup> Year of last outbreak is not known.

# 2.7 Fur animal diseases

For many years, Denmark was among the world's leading producers of animal fur. By midsummer 2020, 1,147 mink farms with a population of approximately 15 million minks were registered in Denmark.<sup>30</sup> During the remainder of 2020, the COVID-19 pandemic had a severe impact on the Danish mink production. All minks at farms were culled in 2020, and a temporary ban on mink farming was imposed in Denmark. The ban will remain in effect until the end of 2022.

In addition to the production of minks, Denmark also has a very small commercial production of chinchillas, ferrets and rabbits, although most rabbits in Denmark are held as pets. The populations of wild rabbits are assumed to be limited in number and to exist only in restricted areas.

In total, Denmark exported approximately 1,700 fur animals in 2021. The number is limited, and the animals are ferrets and chinchillas.

## Myxomatosis

Until 2007, myxomatosis in rabbits occurred sporadically in Denmark, both in wild and in pet rabbits. In wild rabbits, myxomatosis occurred only in the southern part of Jutland and on some isolated islands. In 2007, many outbreaks of myxomatosis occurred in Danish pet rabbits, most cases being on Zealand.

Vaccination against myxomatosis has been allowed in Denmark since 2008. In 2010, myxomatosis was de-listed and made a non-notifiable disease.

## Rabbit haemorrhagic disease

Rabbit haemorrhagic disease (RHD) in rabbits is a notifiable disease in Denmark.

In 2021, RHD was diagnosed on three commercial and five pet holdings of rabbits in which an increase in mortality had been observed. The wild population is considered a reservoir for the disease.

<sup>30</sup> Source: Copenhagen Fur (owned by the Danish Fur Breeders' Association).





# 2.8 Fish diseases

In 2021, 220 aquaculture production businesses (APBs) producing fish were registered in Denmark. The majority were freshwater fish farms, but 20 APBs were marine fish farms producing rainbow trout (*Oncorhynchus mykiss*) in net cages, and 10 APBs produced fish in saltwater tanks/raceways. The marine fish farms are located in the Belt Sea, south and west of Zealand, along the eastern coast of Jutland and near the island of Samsø.

## The Danish aquaculture surveillance programme

Since 1970, Denmark has had an official disease surveillance programme comprising all fish farms in the country. Common EU legislation on animal health conditions governing the placing on the market of aquaculture animals was introduced by Council Directive 2006/88/EC<sup>31</sup>. Since then, the surveillance programme has been conducted in accordance with the provisions laid down in this Directive<sup>32</sup>.

The aquatic animal health surveillance in Denmark consists of the following components: the obligation to notify suspicions of animal diseases and abnormal mortalities, routine inspections and laboratory examination of surveillance samples.

In 2021, the Danish Veterinary and Food Administration (DVFA) carried out 247 inspections of fish farms. The surveillance samples (including export samples) tested in 2021 are described in Table 22.

Each sample tested is a pooled sample of up to 10 fish. The most common species tested is rainbow trout (*Oncorhynchus mykiss*), which constitutes approximately 88% of the production of fish at Danish fish farms. Some saltwater and freshwater fish farms produce brown trout (*Salmo trutta*), salmon (*Salmo salar*) and brook trout (*Salvelinus fontinalis*). These species are also tested under the surveillance programme. Samples from wild salmon (*Salmo salar*) and wild brown trout (*Salmo trutta*) are also collected for testing under the surveillance programme. A few fish farms produce

# 247

In 2021, the DVFA carried out 247 inspections of fish farms.

<sup>31</sup> As from 21 April 2021, according to Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016.

<sup>32</sup> As from 21 April 2021, the surveillance programme has been conducted in accordance with the provisions of Commission Delegated Regulation (EU) 2020/689 of 17 December 2019.



other species such as zander (*Sander lucioperca*) and turbot (*Scophthalmus maximus*). Those species are also sampled and tested for viral haemorrhagic septicaemia (VHS) virus and infectious haematopoietic necrosis (IHN) virus. The types of tissue sampled and the testing methods are also specified in Table 22.

### Infectious haematopoietic necrosis

The first outbreak of infectious haematopoietic necrosis (IHN) was reported in Denmark in May 2021. The whole territory of Denmark remained approved as IHN-free by the European Union until December 2021, and Denmark handled outbreaks of IHN until December 2021 according to the EU Animal Health Law (2016/429) and Commission Delegated Regulation (EU) 2020/689 to maintain the IHN-free status. As a result, the DVFA imposed restrictions on infected farms and farms under suspicion. The restrictions included movement restrictions,

requirements of cleaning, disinfection and fallowing, and restriction zones covering the whole water catchment area around the infected farm.

The Danish fish farm industry bore the entire financial burden of infection controls to prevent the potential spread of IHN. The restrictions had major financial consequences to the industry, and consequently the industry asked the DVFA to abandon the Danish IHN-free status. The IHN-free status was withdrawn on 10 December 2021.

Before the IHN-free status was withdrawn, the DVFA declared 28 fish farms IHN-free compartments. These farms are considered IHN-free regardless of Denmark's IHN status.

In total, infection with IHN was found in eight fish farms and three put-and-take lakes.

**Table 22:** Number of surveillance samples (including export samples) tested under the Danish aquaculture surveillance programme in 2021

Disease	Type of tissue sampled <sup>1</sup>	Testing method <sup>2</sup>	Samples tested in 2021 <sup>3</sup>
<b>Infection with Epizootic haematopoietic necrosis virus</b>	1	A	615
<b>Infectious haematopoietic necrosis</b>	1	A+B	2,009
<b>Infection with infectious salmon anaemia virus</b>	2	B	359
<b>Infection with salmonid alphavirus</b>	1	B	241
<b>Spring viraemia of carp</b>	1	A	154
<b>Viral haemorrhagic septicaemia</b>	1	A+B	1,024

<sup>1</sup> 1: Kidney, spleen and heart (and in some cases brain).

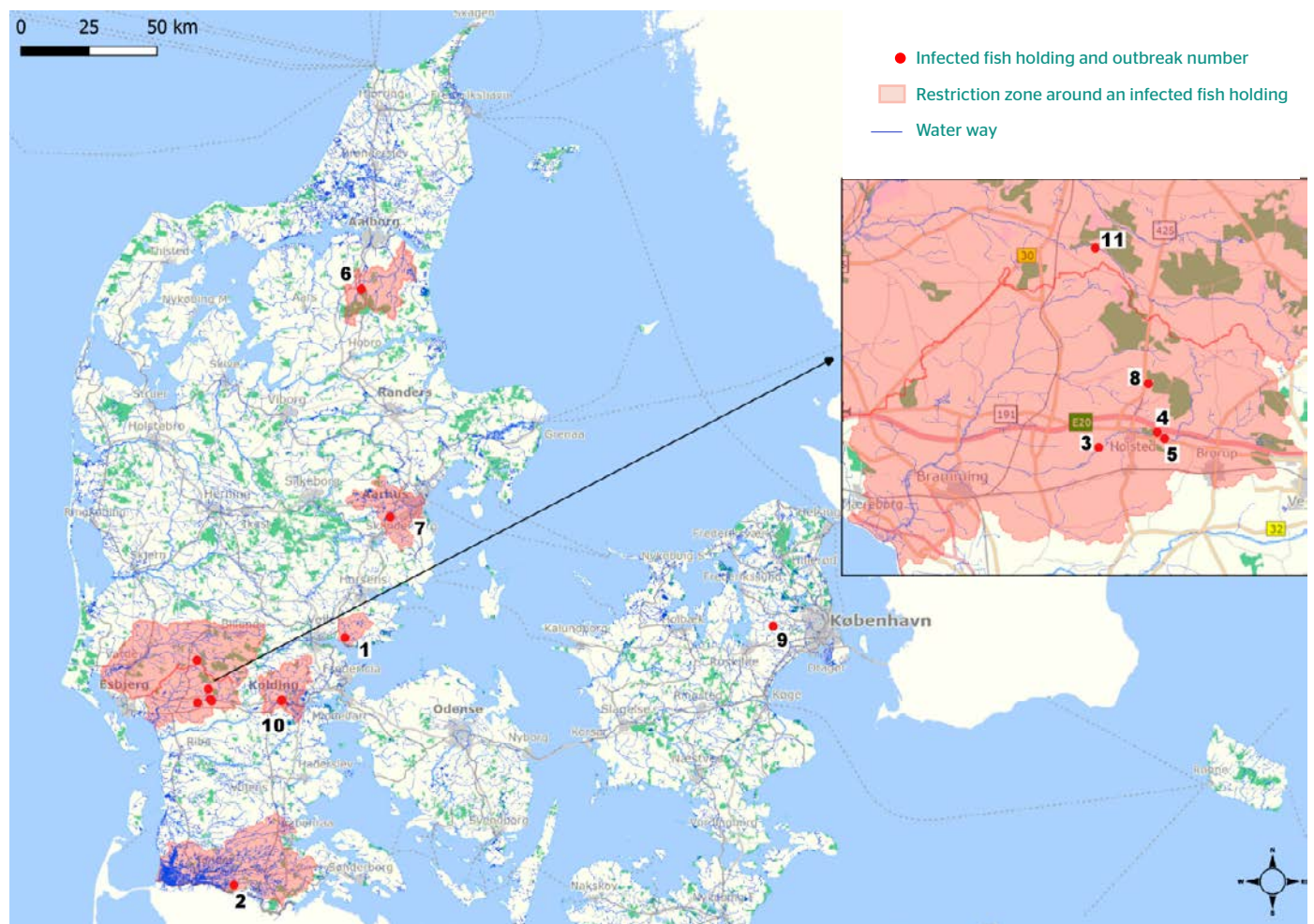
<sup>2</sup> 2: Same tissues as in sample type 1 + gills.

<sup>2</sup> A: Cultivation in cell culture followed by observation of cytopathic effect.

B: PCR test.

<sup>3</sup> Each sample tested is a pooled sample of up to 10 fish per sample.

**Figure 3**  
IHN-infected fish holdings and their restriction zones at 8 September 2021



**Table 23:** Occurrence of WOAH-listed fish diseases in Denmark

<b>Epizootic haematopoietic necrosis disease</b>	Never reported
<b>Infection with <i>Aphanomyces invadans</i> (epizootic ulcerative syndrome)</b>	Never reported
<b>Infection with <i>Gyrodactylus salaris</i><sup>1</sup></b>	Suspected, but not confirmed
<b>Infection with HPR-deleted infectious salmon anaemia virus</b>	Never reported
<b>Infection with HPRO infectious salmon anaemia virus</b>	2019 <sup>2</sup>
<b>Infection with salmonid alphavirus</b>	Never reported
<b>Infectious haematopoietic necrosis</b>	Disease present
<b>Koi herpesvirus disease</b>	Disease present <sup>3</sup>
<b>Red sea bream iridoviral disease<sup>1</sup></b>	Never reported
<b>Spring viraemia of carp</b>	2003
<b>Viral haemorrhagic septicaemia</b>	2009

<sup>1</sup> The disease is not notifiable in Denmark.

<sup>2</sup> Infectious salmon anaemia virus of the genotype HPRO was detected in a wild Atlantic salmon (*Salmo salar*) at a facility for the restoration of wild salmon. The salmon was caught in the river of Gudenåen.

<sup>3</sup> The infection was detected in a private garden pond and in a put-and-take lake.

## Infectious salmon anaemia

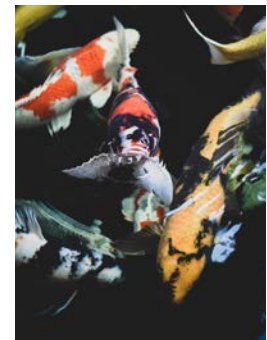
Infection with HPR-deleted infectious salmon anaemia virus (ISAV) has never been reported in Denmark, and the whole territory is approved free from HPR-deleted ISAV by the European Union (Commission Decision 2009/177/EC<sup>33</sup>). However, infection with HPRO infectious salmon anaemia virus was detected in a facility for the restoration of wild salmon in 2019.

## Koi herpesvirus disease

Koi herpesvirus disease (KHV) has never been reported in Danish carp farms, but has occasionally been detected in imported ornamental koi carp and in garden ponds with koi carp.

In July 2021, KHV was detected in a put-and-take lake located near Roskilde in the municipality of Roskilde.

In August 2021, KHV was detected in a private garden pond located near Knabstrup in the municipality of Holbæk.



Koi herpesvirus disease (KHV) has never been reported in Danish carp farms, but has occasionally been detected in imported ornamental koi carp and in garden ponds with koi carp.

<sup>33</sup> As from 21 April 2021, according to Annex XIV to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

### Spring viraemia of carp

The last occurrence of spring viraemia of carp (SVC) in Denmark was in 2003. Denmark (whole territory) is approved free from SVC by the European Union (Commission Decision 2010/221/EU<sup>34</sup>). SVC has never been reported in any Danish carp farms, but has occasionally been detected in imported ornamental carp with no access to natural waters.

### Viral haemorrhagic septicaemia

The last outbreak of viral haemorrhagic septicaemia (VHS) in Denmark was confirmed in January 2009, and the whole continental territory of Denmark was approved as VHS-free by the European Union in 2013 (Commission Implementing Decision 2013/706/EU<sup>35</sup>). The Danish programme for the eradication of VHS began in 2009 and ended in November 2013. The programme was approved by the European Commission and was co-financed by the European Fisheries Fund. In 2021, an eradication programme for VHS in Danish marine waters was approved by the EU. The eradication programme comprises two years of intensified surveillance in which 75 fish are sampled and analysed twice a year from each fish farm supplied by saltwater.

Information pertaining to the WOAH-listed fish diseases is given in Table 23.

<sup>34</sup>As from 21 April 2021, according to Annex I to Commission Implementing Decision (EU) 2021/260 of 11 February 2021.

<sup>35</sup>As from 21 April 2021, according to Annex XII to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

## BOX 11

### National disease control plan for infectious pancreatic necrosis virus and bacterial kidney disease in freshwater fish farms

Infectious pancreatic necrosis virus (IPNV) and bacterial kidney disease (BKD) are present in Denmark. Ongoing surveillance is conducted for IPNV and BKD, and breeding and production farms can be registered as IPNV-free and BKD-free by the DVFA. In 2021, 25 freshwater fish farms were registered as being IPNV-free and 14 freshwater fish farms as being BKD-free (Executive Order No. 967 of 18 July 2013 on the surveillance and registration of IPN and BKD). These farms were also recognised by the EU as being free from the diseases in question (Commission Implementing Decision (EU) 2021/260).

Targeted surveillance is conducted at aquaculture production businesses (APBs) registered as free from IPN and/or BKD. Those APBs are inspected and sampled twice a year if the fish are reared at broodstock farms and once a year if they are reared at production farms. For each inspection, a sample of 30 fish is collected for virological examination for IPNV and another sample of 30 fish for bacteriological examination for BKD.

# 2.9 Mollusc diseases

Denmark has intensive fisheries of natural mussel stocks (*Mytilus edulis*). Natural stocks of European flat oyster (*Ostrea edulis*) only exist in the inlet of Limfjorden. The Danish oyster production is mainly based on the utilisation of the natural stock. For more than 15 years, a number of marine aquaculture facilities producing mussels on ropes (lines or nets) in water column have been established in Denmark. In 2021, the annual production totalled approximately 8,500 tonnes of mussels.

## Infection with *Bonamia ostreae*

In March 2015, *B. ostreae* was detected in samples collected in November 2014 in the inlet of Limfjorden. This was the first time that the disease was ever reported in Denmark. Since the detection in 2015, the presence of the disease has been confirmed every year. In 2021, *B. ostreae* was detected in samples collected from the inlet of Limfjorden. The Danish Veterinary and Food Administration consider it unlikely that the inlet of Limfjorden will regain the status of disease-free.

**Table 24:** Occurrence of WOA-listed mollusc diseases in Denmark

<b>Infection with abalone herpesvirus<sup>1,2</sup></b>	Never reported
<b>Infection with <i>Bonamia exitiosa</i><sup>2</sup></b>	Never reported
<b>Infection with <i>Bonamia ostreae</i></b>	Disease present
<b>Infection with <i>Marteilia refringens</i></b>	Never reported
<b>Infection with <i>Perkinsus marinus</i></b>	Never reported
<b>Infection with <i>Perkinsus olseni</i></b>	Never reported
<b>Infection with <i>Xenohaliotis californiensis</i><sup>1,2</sup></b>	Never reported

<sup>1</sup> The disease is not notifiable in Denmark.

<sup>2</sup> Host is not present in Denmark.



# 3. Animal by-products

**Animal by-products (ABPs) are products of animal origin not intended for human consumption.**

**The ABPs emerge from slaughterhouses, plants producing food for human consumption and dairies and as fallen stock from farms.**

**ABPs must be categorised, collected, transported, processed, used, stored and disposed of in accordance with EU legislation.<sup>36</sup>**

**The rules are in place to prevent and minimise risks to public and animal health arising from ABPs, and in particular to protect the safety of the food and feed chain.**

ABPs are divided into three categories depending on the risks associated with each type of product:

- Category 1 includes animals suspected of being infected with TSEs and specified risk material (SRM) from cattle or small ruminants, experimental animals, pet animals, zoo animals and circus animals.
- Category 2 includes manure and by-products presenting a risk of being infected with contagious animal diseases.

- Category 3 includes parts of animals slaughtered for human consumption, raw milk, fish, former foodstuffs of animal origin, blood, hides and skins, hooves, feathers, wool, horns, hair and fur.

Regardless of processing and specific treatment of the product and hereby minimising the risk, it cannot change to another category. If products from different categories are mixed, the final product is categorised by the lowest category (with the biggest risk).

<sup>36</sup> Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal By-products Regulation), and Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive.

The total amount of ABPs produced in Denmark from slaughterhouses and cutting plants and as fallen stock are on average 600,000 tonnes per year.

In Denmark more than 1,500 plants, establishments, users or operators are registered and/or approved by the Danish Veterinary and Food Administration in accordance with their ABP activity.

ABPs are used in a huge variety of products. ABPs such as hides, skins, wool, feathers, hair and fur are used in well-known products, whereas other ABPs end up as feed and feed materials for animals, organic fertilisers and soil improvers, biogas, fuel and energy.

The total amount of ABPs produced in Denmark from slaughterhouses and cutting plants and as fallen stock are on average 600,000 tonnes per year.





# 4. Livestock statistics

**Table 25:** Livestock population. Establishments and animals in Denmark, 2019-2021

		2019	2020	2021
<b>Cattle</b>	<b>Animals</b>	1,505,474	1,513,084	1,483,019
	<b>Establishments</b>	16,101	16,181	15,516
<b>Sheep</b>	<b>Animals</b>	143,080	139,633	131,610
	<b>Establishments</b>	6,211	6,149	6,002
<b>Goats</b>	<b>Animals</b>	19,744	18,745	18,698
	<b>Establishments</b>	2,980	3,001	3,087
<b>Horses</b>	<b>Animals</b>	175,000 <sup>1</sup>	175,000 <sup>1</sup>	175,000 <sup>1</sup>
	<b>Establishments</b>	78,000 <sup>2</sup>	78,000 <sup>2</sup>	78,000 <sup>2</sup>
<b>Farmed deer</b>	<b>Animals</b>	14,202	13,201	12,417
	<b>Establishments</b>	465	458	457
<b>Pigs</b>	<b>Animals</b>	13,351,997	13,311,160	13,626,322
	<b>Establishments</b>	7,400	7,698	7,663
<b>Poultry</b>	<b>Animals</b>	29,651,173	29,201,439	29,533,554
	<b>Establishments</b>	1,242	1,282	1,235

Source: Central Husbandry Register, with the exception of horses.

<sup>1</sup> Estimate based on registrations in the national horse database.

<sup>2</sup> Statistics Denmark.



**Table 26: Animals imported from the EU and third countries to Denmark 2019-2021**

	2019	2020	2021
<b>Horses<sup>1</sup></b>	3,221	2,823	2,986
<b>Cattle<sup>2</sup></b>	117	73	113
<b>Pigs<sup>3</sup></b>	2	25	35
<b>Sheep/goats</b>	51	1,216 <sup>5</sup>	694
<b>Poultry<sup>4</sup></b>	7,512,626 <sup>6</sup>	5,290,658 <sup>6</sup>	4,334,373

<sup>1</sup> Horses, asses, mules and hinnies.

<sup>2</sup> Bovine animals.

<sup>3</sup> Pigs include domestic pigs (*Sus scrofa domesticus*), Central European boar (*Sus scrofa scrofa*) and warthogs (*Phacochoerus* spp.).

<sup>4</sup> Fowls of the species *Gallus gallus domesticus*, ducks, geese, turkeys and guinea fowls.

<sup>5</sup> Imports of sheep intended for slaughter.

<sup>6</sup> Imports of mainly day-old chicks.

Source: Based on the Trade Control and Expert System of the European Commission (TRACES).

**Table 27: Animals exported from Denmark to the EU and third countries, 2019-2021**

	2019	2020	2021
<b>Horses<sup>1</sup></b>	504	541	3,957
<b>Cattle<sup>2</sup></b>	91,759	80,212	92,474
<b>Pigs</b>	15,337,132	15,029,923	12,685,501
<b>Sheep/goats</b>	1,642	706	450
<b>Poultry<sup>3</sup></b>	62,504,659	64,112,987	73,860,831

<sup>1</sup> Horses, asses, mules and hinnies.

<sup>2</sup> Bovine animals.

<sup>3</sup> Fowls of the species *Gallus gallus domesticus*, ducks, geese, turkeys and guinea fowls.

Source: Based partly on the Trade Control and Expert System of the European Commission (TRACES).



# 5. Index of diseases

## A

African horse sickness, 18, 67  
African swine fever (ASF), 11-13, 44-50  
Anthrax, 28  
Aujeszky's disease, 12, 16, 18, 20-22, 28, 47, 48, 51  
Avian chlamydiosis, 65  
Avian infectious laryngotracheitis, 65  
Avian influenza, 13, 18, 53-65  
Avian influenza (highly pathogenic), 13, 18, 53-65  
Avian influenza (low pathogenic), 53, 57, 65  
Avian mycoplasmosis (*Mycoplasma gallisepticum*), 65  
Avian mycoplasmosis (*Mycoplasma synoviae*), 65

## B

Bacterial kidney disease (BKD), 75  
Bluetongue, 16, 18, 20, 22, 24, 28  
Bovine anaplasmosis, 36  
Bovine babesiosis, 36  
Bovine genital campylobacteriosis, 36  
Infectious bovine rhinotracheitis (IBR)/ Infectious pustular vulvovaginitis (IPV), 18, 30, 35, 36  
Bovine spongiform encephalopathy (BSE), 12, 18, 30-33, 36  
Bovine virus diarrhoea, 11, 18, 30, 34, 36-37  
Brucella/Brucellosis, 11, 14, 16, 18, 20, 23, 25, 28, 37  
Burkholderia mallei (Glanders), 66-67  
Bursal disease (Gumboro disease), 65

## C

Caprine arthritis/encephalitis, 39, 43  
Classical swine fever, 11, 12, 18, 44, 46, 49-51  
Contagious agalactia, 43  
Contagious bovine pleuropneumonia, 36  
Contagious caprine pleuropneumonia, 43  
Contagious equine metritis, 66, 67  
Covid, 68  
Crimean Congo haemorrhagic fever, 28

## D

Dourine, 66, 67  
Duck virus hepatitis, 65

## E

Echinococcus granulosus, 28  
Echinococcus multilocularis, 28  
Enzootic abortion of ewes (ovine chlamydiosis), 43  
Enzootic bovine leukosis, 16, 18, 30, 34-35, 36  
Epizootic haematopoietic necrosis disease, 74  
Epizootic haemorrhagic disease, 28  
Equid herpesvirus-1 (EHV-1), 67  
Equine encephalomyelitis (Eastern), 28  
Equine encephalomyelitis (Western), 67  
Equine arteritis virus/Equine viral arteritis, 66, 67  
Equine infectious anaemia, 66, 67  
Equine influenza, 67  
Equine piroplasmiasis, 67

## F

Foot and mouth disease, 17, 18, 20, 25, 28  
Fowl typhoid, 65

## G

Glanders, 66-67

## H

Haemorrhagic septicaemia, 36

Heartwater, 28

## I

Infection with abalone herpesvirus, 76

Infection with *Aphanomyces invadans* (epizootic ulcerative syndrome), 74

Infection with *Bonamia exitiosa*, 76

Infection with *Bonamia ostreae*, 76

Infection with *Gyrodactylus salaris*, 74

Infection with HPR-deleted infectious salmon anemia (ISA) virus, 74

Infection with HPRO infectious salmon anaemia virus, 74

Infection with *Marteilia refringens*, 76

Infection with *Perkinsus marinus*, 76

Infection with *Perkinsus olseni*, 76

Infection with salmonid alphavirus, 72, 74

Infection with *Xenohalictis californiensis*, 76

Infectious haematopoietic necrosis, 72-74

Infectious pancreatic necrosis virus (IPNV), 75

## J

Japanese encephalitis, 28

## K

Koi herpesvirus disease, 74

## L

Lumpy skin disease, 36

## M

Maedi-visna, 39, 43

Mycobacterium Tuberculosis-complex, 18, 20, 25, 28

Myxomatosis, 68

## N

Nairobi sheep disease, 43

New World screwworm (*Cochliomyia hominivorax*), 28

Newcastle disease, 56, 64, 65

Nipah virus encephalitis, 50

## O

Old World screwworm (*Chrysomya bezziana*), 28

Ovine epididymitis (*Brucella ovis*), 43

## P

Paratuberculosis, 28

Peste des petits ruminants, 18, 43

Porcine cysticercosis, 50

Porcine epidemic diarrhoea (PED) virus, 12, 51

Porcine reproductive and respiratory syndrome virus (PRRS), 50

Pullorum disease, 65

## Q

Q fever, 28

## R

Rabbit haemorrhagic disease, 68  
Rabies, 18, 20, 26, 28  
Red sea bream iridoviral disease, 74  
Rift Valley fever, 28  
Rinderpest, 28

## S

Salmonellosis (*Salmonella abortusovis*), 43  
Scrapie (transmissible spongiform encephalopathy, classical scrapie), 12, 39, 40-43  
Sheep pox and goat pox, 43  
Spring viraemia of carp, 72, 74-75  
Surra (*Trypanosoma evansi*), 28

## T

Theileriosis, 36  
Transmissible gastroenteritis (TGE), 50-51  
Transmissible spongiform encephalopathy (classical scrapie), 12, 39, 40-43  
Trichinellosis (*Trichinella* spp.), 12, 20, 27, 28, 46, 47, 48  
Trichomonosis, 36  
Trypanosomosis, 36  
Tularemia, 28  
Turkey rhinotracheitis, 65

## U

Usutu virus, 24, 29

## V

Venezuelan equine encephalomyelitis, 67  
Viral haemorrhagic septicaemia (VHS), 16, 18, 72, 74, 75

## W

West Nile fever, 11, 24, 28-29





# 6. Animal health contacts in Denmark

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