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Danish Veterinary and
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Animal Health in Denmark 2020

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Preface

It is a pleasure for me to present the 2020 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 2020 in the field of animal health in Denmark. The focus is on OIE-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. Furthermore, the report contains statistics on animal by-products as well as livestock.

I hope that you will find the information in this Annual Report useful; however, please visit our website at **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 with that of 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 healthy, 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 28 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 (OIE) and meets all obligations of transparency on the animal disease situation, including the obligation to give notification of any occurrence of a listed disease. Further, as a



Relative to its size and compared with that of other countries, the level of animal production in Denmark is quite high, and production has increased over the past decades.



A description of all notifiable animal diseases in Denmark is available at www.fvst.dk

member of the EU, Denmark has adopted the harmonised EU legislation on animal health and animal production and is currently adapting its national legislation to EU Regulation 2016/429 on transmissible animal diseases (the EU Animal Health Law¹), which is applicable from 21 April 2021.

The DVFA is constantly adapting the legal framework of the disease control regulations to changes in farming practices, disease risk assessments, EU legislation etc. Therefore, the contingency plans for disease outbreaks are revised on a regular basis. 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 purpose of the improvements in operational capabilities is:

- To reduce the likelihood of the introduction of exotic livestock diseases in Denmark.
- To curb disease spread in susceptible animal populations by restricting hazardous animal

trade practices and maintaining a constant focus on improving biosecurity measures.

- To ensure effective disease surveillance and early detection of diseases.
- To have plans in place for appropriate and effective actions to control disease outbreaks.

Animal disease preparedness

Obligation to notify suspicions

The Danish Animal Health Act² provides the legal basis for the requirement to notify suspected cases and the presence of notifiable diseases to the authorities. The Animal Health Act³ also provides the legal basis for laying down a list of notifiable animal diseases in Denmark and the rules for the notification of suspected cases of those diseases. Furthermore, the Animal Health Act provides legal powers to carry out diagnostic and epidemiological investigations, impose movement restrictions, create protection and surveillance zones, control movements within such zones, take samples, cull infected and in-contact animals, pay compensation to farmers, destroy carcasses and potentially infectious materials, carry out cleaning and disinfection and, if necessary, carry out emergency vaccination.

¹ 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)

² The Animal Health Act has been amended since the year under review. The statute in force as at the date of this publication is Animal Health (Consolidation) Act No. 330 of 2 March 2021 (Danish language version). It is available at <https://www.retsinformation.dk/eli/ta/2021/330>.

³ As from 21 April 2021, the EU Animal Health Law and the Danish Animal Health Act form the legislative basis for the requirement to notify the competent authority in case there is reason to suspect the presence of notifiable diseases in animals.



Together, the EU Animal Health Law and the Danish Animal Health Act form the legal basis for the requirement to notify the competent authority if there is reason to suspect the presence of a notifiable disease in animals.

The notifiable animal diseases listed in Executive Order No. 1171 of 17 July 2020 are divided into two groups: list 1 and list 2 diseases. Any suspicion of a list 1 disease must immediately be notified to the DVFA, whereas notification of a list 2 disease is mandatory after confirmation of the disease. The Danish list 1 of notifiable diseases includes all serious diseases in animals as well as several zoonotic diseases. A description of all notifiable animal diseases in Denmark is available at **www.fvst.dk** (in Danish).

Effective surveillance for clinical signs of contagious diseases is required for early detection of disease outbreaks. According to the Animal Health Act, all

farmers are obliged to call a veterinarian right away in case of suspicion of a notifiable disease. If the veterinarian suspects a list 1 disease, the veterinarian must immediately notify the relevant Veterinary Inspection Unit (VIU) of the DVFA. A veterinary officer from the VIU will inspect the herd or flock within five hours and make a report to the DVFA on the suspected case. If the veterinary officer cannot rule out the suspicion of a list 1 disease, official restrictions will be 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 all animals at shows as well as animals intended for production, slaughter or export at assembly centres and animals intended for export directly from the farm. Ante-mortem inspection and post-mortem examination at slaughterhouses are also important elements of the surveillance system.

The database is publicly available at www.fvst.dk

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

Handling of suspected cases

The DVFA ensures that all suspected cases are handled in a uniform way. This is achieved by the application of 'action cards' developed for most of the notifiable diseases. The action cards, which are available on the DVFA intranet, list all actions necessary to handle a suspected case.

Transparency in dealing with suspected cases and outbreaks

All suspected cases of a notifiable disease will immediately be published on the website of the DVFA (in Danish). The official website of the DVFA displays information on each individual suspicion notified. This is done to increase the awareness among farmers and veterinarians of the potential presence of 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 www.fvst.dk (in Danish).

Compensation for losses caused by notifiable diseases

The DVFA offers compensation to animal owners who suffer a financial loss due to an outbreak of a notifiable disease. The compensation scheme contributes significantly to making animal owners 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 offers compensation for 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 due to the disease outbreak.

Pathogen-specific surveillance

Denmark has several pathogen-specific surveillance programmes intended to demonstrate the absence of diseases that usually cause mild or no clinical symptoms, or 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



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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, s/he is obliged to contact his or her 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 his or her veterinarian of ways to increase biosecurity that can contribute to the general health of his or her herd, while the veterinarian also acts as a first-line defence in the surveillance of notifiable animal diseases.



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, the close connection between animals, food, people and the environment therefore necessitates 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 (75%) 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.

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,



27%

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Denmark has achieved, through the Yellow Card Initiative commencing in 2010, a 27% reduction in the total use of antimicrobials in pigs from 2009 to 2020. Moreover, the use of critically important antimicrobials 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).

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 of their introduction into Denmark in the near future. The DVFA has implemented a rapid and systematic model to qualitatively evaluate the risk of disease introduction in case of disease outbreaks in other EU Member States or certain third countries. For more information on this rapid risk assessment of 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 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.

Being prepared is an important precautionary principle to enable a rapid and effective response to any outbreak of an infectious disease.

- Swine carcass samples submitted by pig farms 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 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, which continued in 2020. For more information on the non-existence 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 the SSI (Statens Serum Institut) as the NRL for most diseases, SYNLAB Analytics & Services Sweden the NRL for bovine spongiform encephalopathy (BSE) and transmissible spongiform encephalopathy (TSEs), and DTU Aqua 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: one university laboratory and four 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 official and the approved laboratories. 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.



The DVFA offers free testing for Aujeszky's disease, African swine fever, classical swine fever and *Trichinella* spp. of wild boars hunted in Denmark.

Box 3

Rapid qualitative risk assessment of the threat of disease introduction

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 (e.g. through transport vehicles), there is a risk of introduction of new infectious diseases into Denmark.

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

The rapid qualitative risk assessment is a document reporting on the estimated risk of introduction of epizootic or zoonotic diseases in susceptible animal populations into Denmark. 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 this qualitative risk assessment 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 of introduction of specific diseases into Denmark.
- 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.

Depending on the estimated risk level, the DVFA will consider whether to launch risk-mitigating actions.

Results from the rapid risk assessment are then used by the risk managers for determining risk-mitigating actions, such as the imposition of a requirement of more thorough inspection of vehicles for international transportation of animals, further 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 rapid risk assessment reports are published by the DVFA at **www.fvst.dk** (in Danish with a summary in English) within three working days from the time when the official outbreak notification is received.

In 2020, specific risk assessments were made for 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.

Disease control

Contingency plans

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

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 consists of a general plan and disease-specific manuals. The Danish contingency plan comprises an overall eradication strategy, tools for eradication, a crisis organisation and a crisis management and communication plan. The disease-specific manuals include operational instructions for those involved in managing the response to the following diseases: foot and mouth disease, classical swine fever, African swine fever, bovine spongiform encephalopathy, scrapie, avian influenza, Newcastle disease, bluetongue, lumpy skin disease, Rift Valley fever, peste des petits ruminants, sheep pox and goat pox, epizootic haemorrhagic

disease, African horse sickness, West Nile fever and aquaculture diseases. All contingency plans are publicly available at www.fvst.dk (in Danish).

The following types of specific information are 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 experience 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 suspected of housing infected animals, killing of infected animals, cleaning and disinfection, and zoning.

In general, preventive vaccination is banned. However, following an epidemiological analysis of

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) 2019/628 of 8 April 2019. Certificates can only be issued 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 governing the issuance of certificates in Denmark, certificates can be issued on the basis of regular auditing and verification procedures at establishments. Certificates are issued by a person authorised by the competent authority on the basis of facts obtained from regular, official 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 have not been inspected or 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 following 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 issued prior to the outbreak will be assessed and consignments already shipped are recalled, if necessary.

the disease situation, the DVFA may use emergency vaccination to control an outbreak. However, emergency vaccination requires an approval by the European Commission.

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 since 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.

On many occasions, the animal farming industry has launched voluntary initiatives to control the occurrence of infections. Those initiatives have 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 due to the efficient ‘Danish model’, e.g. 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 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 VIU(s). 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



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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.

auspices of the EU 'Better Training for Safer Food' (BTSF) programme and training organised by 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.

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 establish the most beneficial exercise programme for the following year.

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, Danish livestock have a favourable health status regarding a large number of OIE-listed diseases, and only few diseases cause problems in the production of livestock.

Denmark is officially recognised by the OIE 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 OIE. 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*, infection with *Mycobacterium tuberculosis*-complex, enzootic bovine leukosis, infectious bovine rhinotracheitis (IBR), infectious haematopoietic

necrosis (IHN), infectious salmon anaemia (ISA) and viral haemorrhagic septicaemia (VHS)⁴.

Like in several other European countries, a highly pathogenic avian influenza (HPAI) H5N8 epidemic started in the autumn of 2020 in Denmark when dead wild birds were diagnosed as infected with HPAI H5N8. Two outbreaks of HPAI H5N8 were also detected in poultry and other captive birds in 2020.

As regards fur animals, the emerging zoonosis COVID-19 caused a large outbreak of coronavirus disease (SARS-CoV-2) in the Danish population of mink in 2020.

An overview of the animal health status in Denmark for OIE-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 <https://dvfa.dk>

⁴ Since the year under review, Denmark has also been granted disease-free status from infection with rabies virus by the European Commission in pursuance of 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 trichinellosis. 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, Denmark is recognised as officially free from Aujeszky’s disease by the European Commission⁵. The disease has not occurred in Denmark since 1991.

Table 1
Blood samples examined under the Danish Aujeszky’s disease surveillance programme, 2018-2020

Year	Samples
2018	43,553
2019	39,977
2020	45,039

Source: The SSI (Statens Serum Institut), 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. In addition, all boars at semen collection centres are regularly tested in accordance with the provisions of Council Directive 90/429/EEC⁶. Moreover, breeding pigs intended for export to certain countries outside the EU are tested for Aujeszky’s disease. Due to trade fluctuations, the number of samples tested varied during the three-year period mentioned in Table 1.

Two suspected cases of Aujeszky’s disease were notified to the Danish Veterinary and Food Administration (DVFA) in 2020. One case was notified because an animal had tested positive in a serological test performed before it entered a semen collection centre, and one case because

⁵ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

⁶ As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

The DVFA was notified of four suspected cases of bluetongue in 2020, all in cows.

an animal had tested positive in a 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.

The number of blood samples examined for Aujeszky's disease in the period 2018-2020 is given in Table 1.

Bluetongue

Since 1 January 2011, Denmark has been recognised as free from bluetongue according to Commission Regulation (EC) No 1266/2007⁷.

In 2007 and 2008, not only Denmark, but also 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 altogether in Denmark since 1 January 2011.

A surveillance programme for bluetongue has been implemented in Denmark according to Commission Regulation (EC) No 1266/2007⁸. Serological tests were performed on blood samples collected from 60 cattle herds in 2020. 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.

The DVFA was notified of four suspected cases of bluetongue in 2020, all in cows. Two cases were reported due to clinical symptoms. One of the cases was rejected by the relevant Veterinary Inspection Unit (VIU) of the DVFA based on an evaluation of the clinical symptoms. Two cases were reported because the animals had tested positive in a serological test performed prior to export. 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.



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.

⁷ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

⁸ 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, 2018-2020

Year	Cattle: Blood samples	Pigs: Blood samples	Sheep and goats: Blood samples
2018	1,223	33,973	2,270
2019	1,019	33,356	2,314
2020	1,177	43,024	1,807

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

Brucellosis

Denmark has been recognised as officially free from brucellosis in bovine herds since 1979 (Commission Decision 2003/467/EC⁹). 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/EEC¹⁰. Cattle intended for export to certain countries outside the EU are also tested. In 2020, 34 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.

Brucellosis has not been detected in pigs since 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/EEC¹¹. Also breeding pigs intended for export to certain countries outside the EU are tested for brucellosis. Due to trade fluctuations, the number of samples tested varied during the three-year period mentioned in Table 2.

Brucella melitensis has never been reported in Denmark, and Denmark has been recognised as being officially free from *B. melitensis* since 1995 (Commission Decision 93/52/EC¹²). A serological surveillance programme for *B. melitensis* is carried out by testing blood samples collected through the

⁹ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.
¹⁰ As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.
¹¹ As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.
¹² As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

Box 5

Surveillance for disease vectors in Denmark in 2020

Over the years, there has been 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 Copenhagen) 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 CO₂-baited suction traps in private gardens and light traps at cattle farms. National average abundance estimates are updated weekly at 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 2020 was exceptionally cold, and the abundance of *Culicoides*, mosquitoes and *Tabanidae* biting flies was characterised as low based on surveillance results. The *Tabanidae* surveillance programme is still new, and it is difficult to compare density in 2020 with that of previous years. However, the season appears to be very short in Denmark. The prevalence of ticks in Denmark in 2020 corresponded to the average abundance of ticks.

In general, the risk of transmission of insect-borne infections was low in 2020 due to the low density of midges and mosquitoes and the unusually low temperatures in July. Especially, the West Nile bridge vector *Culex modestus*, which has its northernmost distribution in Denmark, was affected by the low temperatures in July, and the species was almost absent in 2020. Relevant species of mosquitoes, *Culex pipiens/torrentium* and *C. modestus*, collected under the

surveillance programme were tested for West Nile virus (WNV). Only 240 mosquitoes of relevant species were collected; all tested negative (the WNV surveillance programme is described in Box 6). The surveillance of ticks in 2020 focused on endemic as well as exotic ticks. Danish 'hot spots' of tick-borne encephalitis virus identified in previous years were confirmed in 2020 as well. *Dermacentor* ticks were also identified in 2020. *Dermacentor* ticks are vectors of exotic pathogens like *Babesia canis*, a severe acute infection in dogs. They are also vectors of exotic zoonotic pathogens like *Rickettsia raoultii*, which was identified in *D. reticulatus* ticks introduced into Denmark by a long-distance migrating golden jackal in 2017. Furthermore, these new tick species have a different geographical distribution compared to the predominantly forest endemic *I. ricinus* tick and may thus increase the area in which there is a risk of tick bites in Denmark.

voluntary lentivirus control programme managed by SEGES, the Danish Agriculture and Food Council (see section 2.3 on sheep and goat diseases).

In 2020, 13 suspected cases of brucellosis were notified to the DVFA: 12 in pigs and one in a bull. All cases were notified because the animals had tested positive in a serological test. 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 2018-2020 is given in Table 2.

Foot and mouth disease

Denmark is recognised by the OIE as a country 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 2020, the DVFA was notified of one suspected case of FMD in cattle due to clinical symptoms. However, the case was rejected by the relevant Veterinary Inspection Unit (VIU) based on a thorough evaluation of the clinical symptoms.

Infection with *Mycobacterium tuberculosis*-complex¹³

Denmark has been recognised as officially free from tuberculosis in bovine herds since 1980 (Commission Decision 2003/467/EC¹⁴).

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

¹³ In previous reports referred to as 'bovine tuberculosis'.

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

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 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. Furthermore, bulls at semen collection centres are regularly tuberculin-tested in accordance with the provisions of Council Directive 88/407/EEC¹⁵. Cattle intended for export to certain countries outside the EU are also tested. In 2020, approximately 1,800 animals were tested for MTBC. All tested negative.

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 1981¹⁶.

Bat rabies, the European bat lyssavirus, 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 and in Danish bats in 2009.

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.

In 2020, 13 bats were tested, and all tested negative. Two other animals (one cat and one otter) were submitted for examination. Both animals tested negative.

In addition, active surveillance for rabies among bats is conducted. In 2020, saliva samples were collected from 88 bats living at different locations in Denmark. All saliva samples tested negative for European bat lyssavirus (EBLV-1 and EBLV-2).

Trichinellosis

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

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

¹⁶ Since the year under review, Denmark has been approved by the EU as officially free from infection with rabies virus according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

Box 6

Active surveillance for West Nile virus in Denmark

During the past few years, an increasing number of European countries have experienced outbreaks of infection with West Nile virus (WNV), and in 2020, 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 2020, the Danish Veterinary and Food Administration, the SSI (Statens Serum Institut) 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 (464 individuals) and migratory birds (268 individuals) were included in the serological surveillance programme and tested

for WNV-specific antibodies. Altogether, 732 samples were examined, and two of these samples were found positive for WNV antibodies (one migratory bird and one outdoor hen). Like previous years, this suggests that a small percentage of migratory birds that stayed in or passed through Denmark in 2020 had previously been exposed to WNV, probably during the annual winter stay in Africa.

As regards outdoor poultry, the detection of WNV-specific antibodies in this group of birds is a new observation that calls for future focus. Therefore, resources will be dedicated to the collection of samples from birds and vectors in the relevant geographic area under next year's surveillance programme.

Further, mosquitoes collected through the insect vector surveillance programme mentioned in Box 5 (25 pools, or a total of 240 mosquitoes) were used to carry out virological surveillance for WNV. Also, brain tissue from 129 wild birds found dead in nature was analysed for WNV. The testing of dead birds focused on species that are



464

Serum from poultry held outdoors (464 individuals) and migratory birds (268 individuals) were included in the serological surveillance programme and tested for WNV-specific antibodies.

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 2020 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.

Information pertaining to the OIE-listed multiple species diseases is given in Table 4.

Table 3
Animals examined under the Danish trichinellosis surveillance programme, 2018-2020

Year	Pigs (incl. boars and sows)	Farmed wild boars*	Horses
2018	17,956,829	575	1,334
2019	16,639,006	909	1,321
2020	17,312,459	637	918

* Privately hunted wild boars are included.

Source: Danish Veterinary and Food Administration Laboratory Division and other laboratories accredited to test for *Trichinella* spp., 2021.

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 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) No 2015/1375.

The number of animals from each category of slaughtered animals examined under the Danish trichinellosis surveillance programme in the period 2018-2020 appears from Table 3.

The number of animals from each category of slaughtered animals examined under the Danish trichinellosis surveillance programme in the period 2018-2020 appears from Table 3.

Table 4

Last occurrence of OIE-listed multiple species diseases in Denmark

Anthrax	1988
Bluetongue	2008
Crimean Congo haemorrhagic fever¹	Never reported
Epizootic haemorrhagic disease	Never reported
Equine encephalomyelitis (Eastern)	Never reported
Heartwater¹	Never reported
Infection with Aujeszky's disease virus	1991
Infection with <i>Brucella abortus</i>, <i>Brucella melitensis</i> and <i>Brucella suis</i>	Cattle: 1962 Pigs: 1999 Sheep and goats: Never reported
Infection with <i>Echinococcus granulosus</i>	Not reported ²
Infection with <i>Echinococcus multilocularis</i>	2018 ³
Infection with foot and mouth disease virus	1983
Infection with <i>Mycobacterium tuberculosis</i>-complex	1994
Infection with rabies virus	1982 ⁴
Infection with Rift Valley fever virus	Never reported
Infection with rinderpest virus	1782
Infection with <i>Trichinella</i> spp.	1930
Japanese encephalitis	Never reported
New World screwworm (<i>Cochliomyia hominivorax</i>)¹	Never reported
Old World screwworm (<i>Chrysomya bezziana</i>)¹	Never reported
Paratuberculosis¹	Disease present ⁵
Q fever	Suspected, but not confirmed
Surra (<i>Trypanosoma evansi</i>)¹	Never reported
Tularemia	2016 ⁶
West Nile fever	Never reported

¹ The disease is not notifiable in Denmark.² Year of last outbreak not known.³ Detected in wildlife (fox).⁴ Infection with classical rabies virus in domestic animals.⁵ The disease is not officially controlled in Denmark; however, the cattle industry carries out a voluntary control programme.⁶ Detected in wildlife (rabbit).

2.2 Cattle diseases

In Denmark, 20% of the cattle farms are dairy farms and 80% produce beef. The trend towards fewer but larger dairy herds has been evident for many years. Dairy farms account for most of the production with approximately 565,000 milking cows producing approximately 5,600,000 tonnes of milk (2020 figures)¹⁷. The rest of the herds comprise approximately 80,000 cows for beef production.

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

Denmark is recognised by the EU as officially free from enzootic bovine leukosis and infectious bovine rhinotracheitis (IBR).

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 OIE 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.
- The feed ban, which has been in place in Denmark since 1990 (ruminant-to-ruminant feed ban).

- 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.

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.

¹⁷ Source: Danish Agriculture and Food Council.



No BSE-positive animals have been born after the implementation of the total feed ban in 2001. This fact highlights the importance and effectiveness of the total feed ban.

No BSE-positive animals have been born after the implementation of the total feed ban in 2001. This fact highlights the importance and effectiveness of the total feed ban.

In 2020, one suspected case of BSE was notified to the DVFA due to clinical symptoms. However, based on a thorough evaluation of the clinical symptoms, the relevant Veterinary Inspection Unit (VIU) rejected the case.

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, 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 destroyed 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 destroyed as SRM (one carcass upstream – two carcasses downstream) if the final result is positive.

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 2018-2020 are shown in Table 6.

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 2018-2020 are shown in Table 6.

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

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

Table 6
Results of the Danish BSE surveillance programme, 2018-2020

Category	2018		2019		2020	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Fallen stock	22,272	0	22,872	0	22,450	0
Emergency-slaughtered animals	1,565	0	1,705	0	1,756	0
AM animals	0	0	0	0	0	0
Healthy slaughter animals	63	0	0	0	0	0
Clinical suspects	1	0	1	0	0	0
Total	23,901	0	24,578	0	24,206	0

Source: EFSA (the European Food Safety Authority), 2021.

Bovine virus diarrhoea

No new infected cattle herds with bovine virus diarrhoea (BVD) were detected in Denmark in 2020. Two infected herds, considered as a single epidemiological unit, were detected in 2019. These herds were kept under official restrictions in 2020.

A voluntary control and eradication programme for BVD was implemented in Denmark in 1994. The voluntary programme was replaced in 1996 by a compulsory surveillance programme, and BVD became notifiable in the entire country. The programme was carried out jointly by the DVFA and the Danish cattle industry, represented by SEGES, the Danish Agriculture and Food Council. 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 restric-

Table 7
Bulk milk samples and blood samples examined under the Danish bovine virus diarrhoea surveillance programme, 2018-2020

Year	Bulk milk samples	Blood samples from beef herds
2018	12,651	21,522
2019	12,927	20,918
2020	12,293 ¹	20,174

¹ 2,886 dairy herds in 2020 (Source: Central Husbandry Register).

Source: SEGES, 2021.

tions were imposed on the remaining infected herds. Since 2006, BVD has only occurred very sporadically.

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 collection centres are regularly tested according to the test regime required in accordance with the provisions of Council Directive 88/407/EEC¹⁸.

In 2020, ten suspected cases of BVD were notified to the DVFA. Two cases were notified due to clinical symptoms, and eight cases because animals had tested positive in a serological test. 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 2018-2020 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/EC¹⁹).

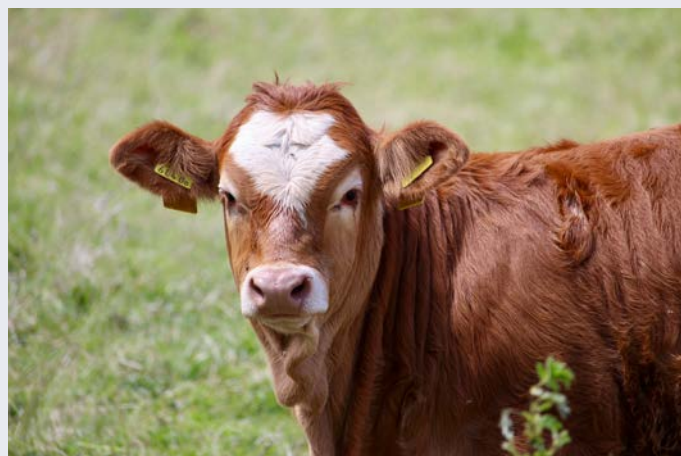
EBL has been notifiable in Denmark since 1959, and a surveillance programme was initiated the same year. For several years, the absence of EBL was demonstrated by tests of bulk milk samples every three years and by regular tests of blood samples collected at slaughter.

¹⁸ As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

¹⁹ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

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 2020, 34 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.

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 the slaughterhouses. Furthermore, bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC²⁰. Cattle intended for export to certain countries outside the EU are also tested. In 2020, 1,129 animals were tested.

In 2020, the DVFA was notified of three suspected cases of EBL. All cases were suspected due to clinical symptoms. Official restrictions were imposed on the herds of origin while laboratory testing was conducted at the national reference laboratory. All suspected cases tested negative.

Infectious bovine rhinotracheitis/ infectious pustular vulvovaginitis

Denmark was recognised as free from infectious bovine rhinotracheitis (IBR) in 1992 (Commission Decision 2004/558/EC²¹).

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 in a single animal diagnosed in 2005.

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. Due to the decreased risk of introduction from neighbouring countries, Danish dairy herds were tested only once in 2019. Furthermore, bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC²². Cattle intended for export to certain countries outside the EU are also tested.



The number of bulk milk samples and the number of blood samples from beef herds examined for IBR in the period 2018-2020 are given in Table 8.

²⁰ As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

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

²² As from 21 April 2021, in accordance with the provisions of Commission Delegated Regulation (EU) 2020/686 of 17 December 2019.

In 2020, the DVFA was notified of six suspected cases of IBR. Five cases were suspected due to a positive serological test of individual animals and one case due to a test-positive bulk milk sample performed under the surveillance programme. 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 2018-2020 are given in Table 8.

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

Table 8

Bulk milk samples and blood samples examined under the Danish infectious bovine rhinotracheitis surveillance programme, 2018-2020

Year	Bulk milk samples	Blood samples from beef herds
2018	9,074	11,878
2019	3,056	12,039
2020	2,783 ¹	11,681

¹ 2,886 dairy herds in 2020 (Source: Central Husbandry Register).

Source: SEGES, 2021.

Table 9

Last occurrence of OIE-listed cattle diseases in Denmark

Bovine anaplasmosis¹	Never reported
Bovine babesiosis¹	Suspected, but not confirmed
Bovine genital campylobacteriosis¹	1995
Bovine spongiform encephalopathy (BSE)	2009
Bovine virus diarrhoea	Disease present
Enzootic bovine leukosis	1990
Haemorrhagic septicaemia¹	Never reported
Infection with Lumpy skin disease virus	Never reported
Infection with <i>Mycoplasma mycoides</i> subsp. <i>mycoides</i> SC (contagious bovine pleuropneumonia)	1886
Infectious bovine rhinotracheitis (IBR)/ Infectious pustular vulvovaginitis (IPV)	2005
Theileriosis¹	Never reported
Trichomonosis¹	1990
Trypanosomosis¹	Never reported

¹ The disease is not notifiable in Denmark.



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. In 2020, one case of atypical scrapie was diagnosed in a Danish goat. Denmark only had few cases of other sheep and goat diseases listed by the OIE in 2020, all of which were Maedi-visna in sheep. Maedi-visna and caprine arthritis/encephalitis are included in the 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 present in Danish goats.

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 2020, 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

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

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.

In 2020, two of 1,865 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 2020, one case of atypical scrapie was diagnosed in a 12-year old goat after four years without any cases. However, cases of atypical scrapie are not surprising 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 investigates 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 TSE.

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 a random sample of sheep and goats older than 18 months were tested, the reason being the substantial number of TSE tests performed during the preceding eight-year period without finding any cases of classical scrapie. The sample size depends on the size of the population and the rules laid down in the TSE Regulation (Council Regulation (EC) No 999/2001) as amended (Annex III).



Since 2002, more than 70,000 animals have been tested for TSEs.

Table 10
Results of the Danish surveillance programme for TSEs in sheep, 2018-2020

	2018		2019		2020	
Category	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Animals not slaughtered for human consumption	437	0	517	0	509	0
Healthy slaughter animals	1	0	0	0	0	0
Cases of clinically suspected TSE	1	0	0	0	0	0
Total	439	0	517	0	509	0

Source: EFSA (the European Food Safety Authority), 2021.

Table 11
Table 11: Results of the Danish surveillance programme for TSEs in goats, 2018-2020

	2018		2019		2020	
Category	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Animals not slaughtered for human consumption	98	0	110	0	91	0
Healthy slaughter animals	0	0	0	0	0	0
Cases of clinically suspected TSE	0	0	1	0	1	0
Total	98	0	111	0	92	0

Source: EFSA (the European Food Safety Authority), 2021.

Table 12
Last occurrence of OIE-listed sheep and goat diseases in Denmark

Caprine arthritis/encephalitis	Disease present
Contagious agalactia ¹	Never reported
Contagious caprine pleuropneumonia ¹	Never reported
Infection with <i>Chlamydophila abortus</i> (Enzootic abortion of ewes, ovine chlamydiosis) ¹	Never reported
Infection with peste des petits ruminants virus	Never reported
Maedi-visna	Disease present
Nairobi sheep disease ¹	Never reported
Ovine epididymitis (<i>Brucella ovis</i>) ¹	Never reported
Salmonellosis (<i>Salmonella abortusovis</i>)	Never reported
Scrapie (transmissible spongiform encephalopathy, classical scrapie)	Never reported
Sheep pox and goat pox	1879

¹ The disease is not notifiable in Denmark.

A major amendment to the TSE Regulation concerning imports was made in 2013 in order to approximate EU legislation and the OIE 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 2018-2020 are shown in Tables 10 and 11.

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

The results of the surveillance programme for TSEs in sheep and goats in Denmark in the period 2018-2020 are shown in Tables 10 and 11.

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



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 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 animals²³.

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 2020, 366 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, 439 samples from pigs were tested for ASF prior to export to certain countries outside the EU. All samples tested negative.

²³ 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 five suspected cases of ASF in 2020. All cases were reported due to clinical symptoms. 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 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.



5

By the end of 2020, the estimated number of free-living wild boars was less than five.

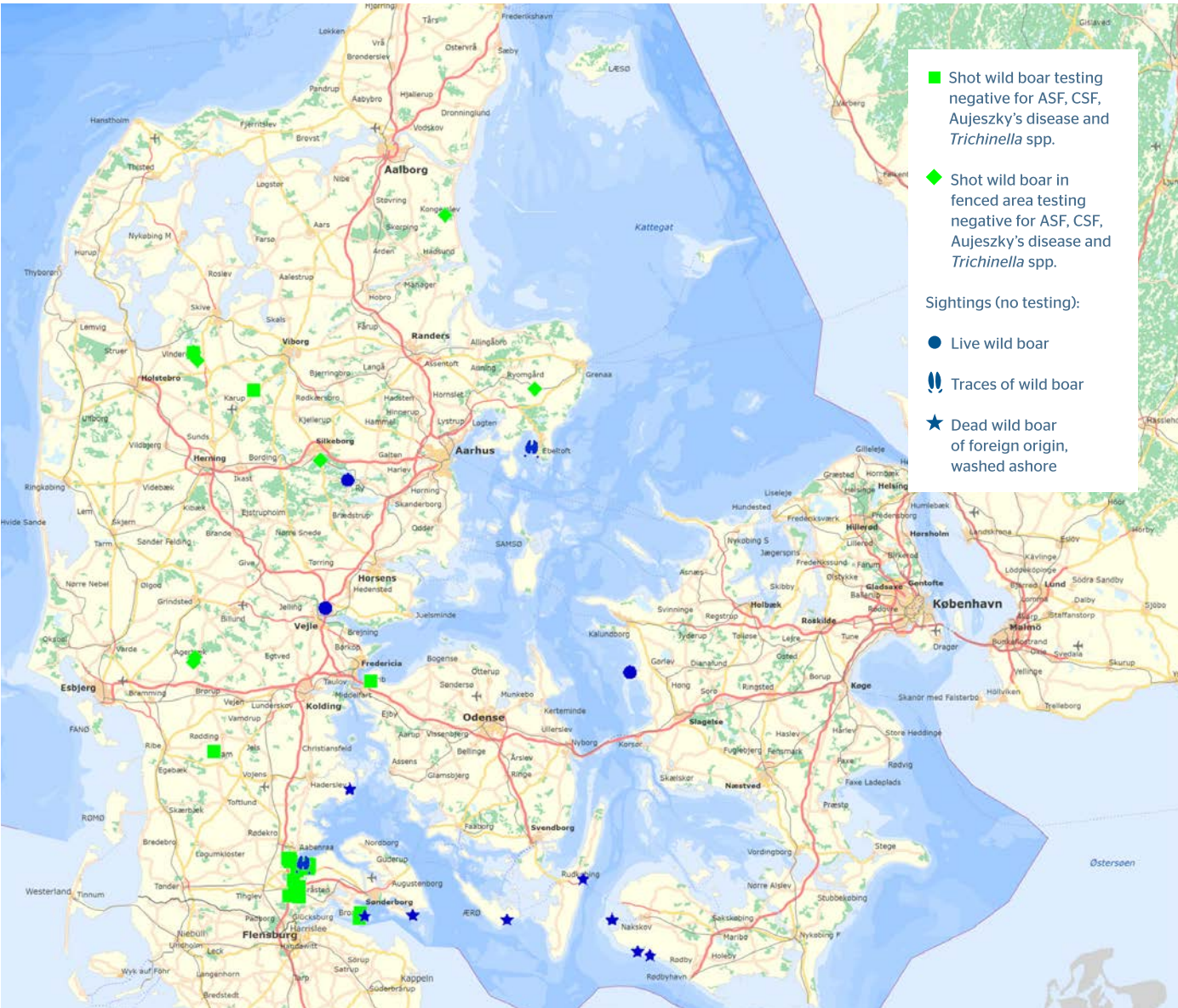
The public is encouraged to take part in the eradication of wild boars by reporting animals found to the DVFA. This can easily be done by using the smartphone app 'VildsvineTip' (in English: Wild Boar Tip-off). Sightings of both dead and live animals are stored in the wild boar database. Each record 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 (in Danish). Sightings of wild boars reported in 2020 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 2020, the estimated number of free-living wild boars was less than five.

Figure 1
Wild boars registered in 2020.



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/EEC²⁴.
- 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 2018-2020 is given in Table 13. Due to trade fluctuations, the number of samples tested for CSF

²⁴ 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 the 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 2020, samples from 366 submissions were tested; all tested free from ASF and CSF.

If a pig shows clinical symptoms of CSF, ASF is also suspected.

Table 13
Serum samples from pigs examined under the Danish classical swine fever surveillance programme, 2018-2020

Year	Samples
2018	23,658
2019	31,940
2020	26,090

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

Table 14
Last occurrence of OIE-listed swine diseases in Denmark

Infection with African swine fever virus	Never reported
Infection with classical swine fever virus	1933
Infection with porcine reproductive and respiratory syndrome virus (PRRS)	Disease present ²
Infection with <i>Taenia solium</i> (Porcine cysticercosis)	Not reported ¹
Nipah virus encephalitis	Never reported
Transmissible gastroenteritis	Never reported

¹ Year of last outbreak is not known.

² PRRS is endemic in Denmark.

varied significantly during the three-year period mentioned in Table 13.

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 2020, the DVFA was notified of seven suspected cases of CSF (in five of the cases, there was a suspicion of both ASF and CSF). Two cases were suspected due to clinical signs in pigs at the ante-mortem inspection at a slaughterhouse, two cases due to clinical symptoms observed at a

general post-mortem examination at a diagnostic laboratory and one case due to clinical symptoms in animals in a herd. Two 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 Veterinary Inspection Unit (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 OIE-listed diseases in pigs is given in Table 14.

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 not a notifiable disease in Denmark. The symptoms are similar to those of transmissible gastroenteritis (TGE), which is a notifiable disease that has never been reported in Denmark. This means that even though PED is not notifiable in Denmark, potential cases of PED would most likely have been detected because of the obligation to report suspected cases of TGE.

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 2020, 180 samples from piglets with diarrhoea were subjected to a PCR test, and 56 blood samples from pigs were subjected to serological testing. All samples tested negative for PED.



2.5 Poultry diseases

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

An epidemic of highly pathogenic avian influenza (HPAI) H5N8 broke out in the autumn of 2020. A total of 92 dead wild birds were diagnosed with HPAI H5 in 2020. Furthermore, two outbreaks of H5N8 were detected, one on a commercial poultry holding and one on a holding with other captive birds. The presence of low pathogenic avian influenza was also detected on a holding with organic laying hens in January 2020.

Only few other poultry diseases listed by the OIE occurred in Denmark in 2020.

The EU-coordinated surveillance programme for avian influenza (AI) in poultry as revised in 2015 continued in 2020.

Avian influenza

On 5 November 2020, Denmark reported the first incidence of HPAI in 2020. The disease was detected in a wild bird. Subsequently, HPAI was detected in several dead wild birds in the last two months of 2020. The epidemic was not unexpected as the European Centre for Disease Prevention and Control had issued an alert on 30 September 2020 about the risk of HPAI outbreaks in especially Northern and Eastern Europe due to HPAI outbreaks among wild and domestic birds in Western Russia and Kazakhstan over the past months. This region is a known autumn migration route for wild water birds heading to Europe. At the end of October and early November, outbreaks of HPAI in poultry and wild birds were reported in the Netherlands, the United Kingdom and Germany.

In May 2020, Denmark regained its status as a country free from notifiable avian influenza according to the OIE Terrestrial Animal Health Code after a previous outbreak of LPAI. The status was maintained until October 2020, when an outbreak of HPAI H5N8 was confirmed on a commercial poultry farm. By the end of 2020, the HPAI epidemic in wild birds was still ongoing.

Avian influenza (AI) H5/H7 is notifiable in Denmark according to national legislation. Veterinarians and farmers are obliged to notify the Danish Veterinary and Food Administration (DVFA) immediately in case of clinical signs of AI.

92

A total of 92 dead wild birds were diagnosed with HPAI H5 in 2020.

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.

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 2020, 18 suspected cases of AI were notified to the DVFA due to clinical symptoms. Three cases were rejected by the Veterinary Inspection Unit (VIU) based on a thorough evaluation of the clinical symptoms. Fourteen cases tested negative in the virological test, and one tested positive for HPAI H5N8. All suspected cases with clinical symptoms were also tested for Newcastle disease (ND). All tested negative for ND.

Furthermore, nine suspected cases of AI were notified to the DVFA because birds had tested positive in a serological test performed under the Danish serological surveillance programme for AI. In the subsequent virological tests, one case tested positive for HPAI and one for LPAI.

Strengthened biosecurity measures due to the HPAI epidemic

The DVFA followed a pre-determined strategy for the implementation of measures in case of an HPAI epidemic. Following a rapid risk assessment performed after findings of HPAI in several wild birds in the northern part of Germany, the risk level was raised from very low to high.

Consequently, a compulsory housing order was introduced on 6 November 2020, requiring all poultry and other captive birds to be housed indoors or confined under roof, net or wire to protect the poultry from contact with wild birds. The housing order applied to the whole country and to all categories of poultry and other captive birds with certain exemptions for animal welfare reasons. In addition, fairs, markets, shows and other gatherings of poultry or other captive birds were prohibited across the country.

On 8 December 2020, Denmark imposed random checks on the cleansing and disinfection standards of foreign poultry transport vehicles and crates. Under the control campaign, checks were performed on empty foreign poultry vehicles headed towards Danish poultry farms to collect parts of broiler flocks for slaughter in other EU Member States. The purpose was to reduce the potential risk of introducing avian influenza into poultry houses through exposure to transport crates contaminated with faeces.

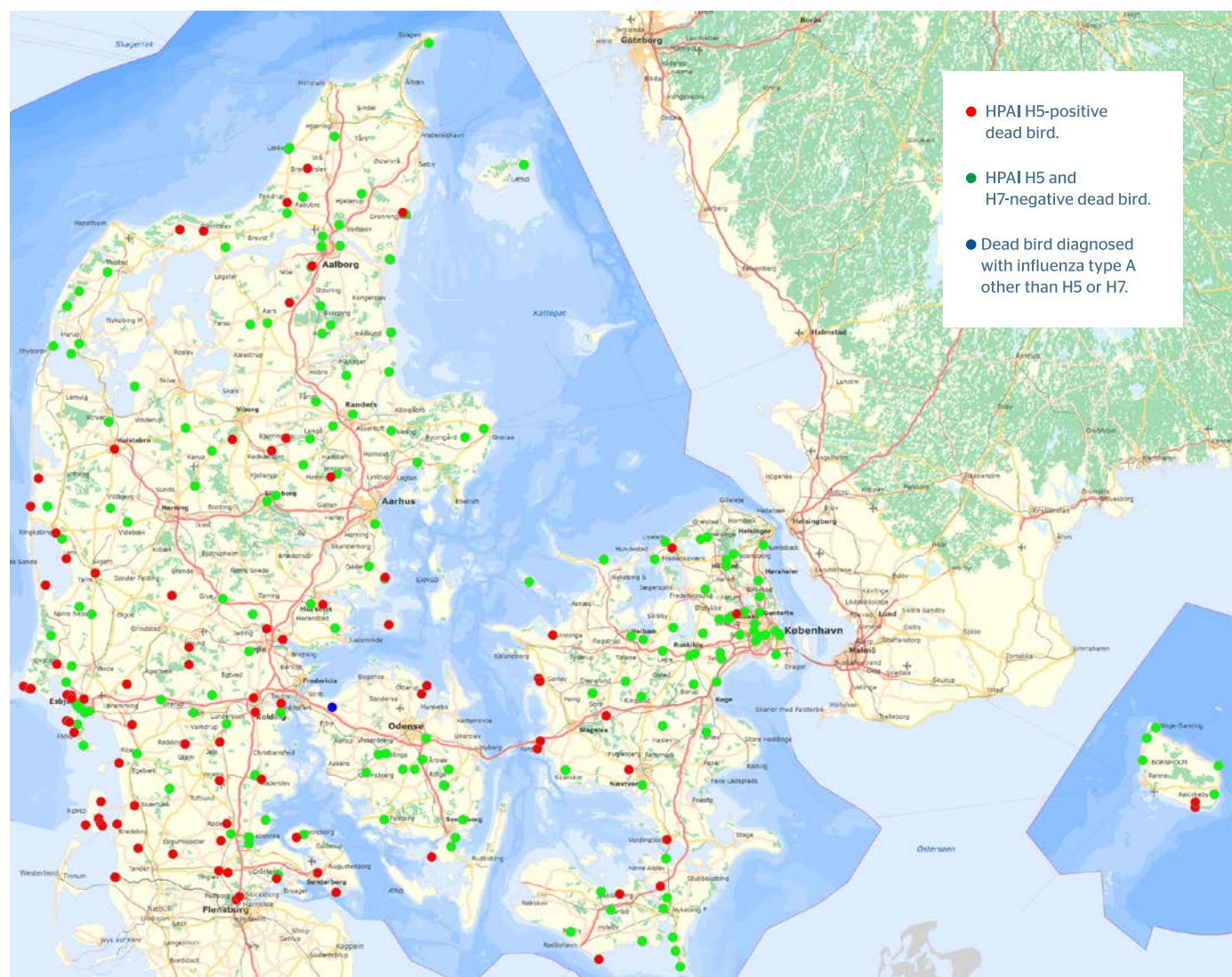
The following risk mitigation measures must always be observed at poultry farms regardless of the AI situation:

- Poultry or other captive birds must be fed and watered indoors or under fixed roofs or fixed coverings, ensuring that larger wild birds cannot get into contact with the feed and water.



A compulsory housing order was introduced on 6 November 2020, requiring all poultry and other captive birds to be housed indoors or confined under roof, net or wire to protect the poultry from contact with wild birds.

Figure 2
Dead wild birds tested for avian influenza in 2020.



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

Table 15
 Outbreaks of avian influenza in poultry and other captive birds in Denmark, 2020

Outbreak number	Municipality	Confirmed date	Virus type	Susceptible birds	Species	Type of holding	Approval of cleaning and disinfection, date
1	Aalborg	29/01/2020	LPAI H5N1	48,000	<i>Gallus gallus</i>	Organic laying hens	04/02/2020
2	Randers	16/11/2020	HPAI H5N8	29,000	<i>Gallus gallus</i>	Laying hens	19/11/2020
3	Vejle	09/12/2020	HPAI H5N8	900	Ornamental birds	Other captive birds	12/12/2020

- Poultry and other captive birds are not allowed to have access to surface water or rainwater.
- Ponds/lakes in outdoor poultry areas must be shielded from larger wild birds.
- Ducks and geese must be kept separated from other poultry.

Low pathogenic avian influenza

In 2020, a subclinical infection with low pathogenic avian influenza (LPAI) H5N1 broke out on a holding with organic layers near Sæderup in the municipality of Aalborg in the northern part of Jutland. The outbreak was detected on 29 January 2020 under the Danish surveillance programme for AI in poultry and game birds, and the outbreak was promptly reported to the OIE through WAHIS (World Animal Health Information System). All samples were analysed at the national reference laboratory. During the suspicion period and after confirmation of LPAI, the holding was placed under official movement restrictions.

Immediately after the confirmation of LPAI, the DVFA established a restriction zone of 1 km around

the infected holding and implemented the necessary measures as required by Council Directive 2005/94/EC²⁵ and national legislation. All birds on the infected holding were culled.

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

The cleaning and disinfection of the infected holding was approved on 4 February 2020, and all restrictions were lifted on 26 February 2020.

Highly pathogenic avian influenza in poultry

On 15 November 2020, the DVFA was informed of a clinical suspicion of avian influenza on a poultry holding in Tustrup in the municipality of Randers in Jutland.

The poultry holding had approximately 29,000 breeding hens in a stable with a high level of bio-security. Movement restrictions were immediately imposed on the holding by the relevant Veterinary Inspection Unit (VIU) of the DVFA, and samples

²⁵ As from 21 April 2021, as required by Commission Delegated Regulation (EU) 2020/687 of 17 December 2019.

were collected for testing at the national reference laboratory.

HPAI H5N8 was confirmed on 16 November 2020. The outbreak was promptly reported to the OIE through WAHIS.

A 3 km protection zone and a 10 km surveillance zone around the infected holding were set up immediately after confirmation of the HPAI outbreak, and all necessary measures were implemented in accordance with Council Directive 2005/94/EC²⁶ and national legislation.

The epidemiological investigation revealed that the source of infection was most likely indirect contact with wild birds through the ventilation system.

Investigations revealed that there had been no trade from the holding during the incubation period, except from hatching eggs delivered to a Danish hatchery. The hatching eggs were traced and destroyed.

The culling of all poultry on the infected holding was initiated and completed on 17 November 2020. On 19 November 2020, the DVFA approved the

²⁶ As from 21 April 2021, in accordance with Commission Delegated Regulation (EU) 2020/687 of 17 December 2019.

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 ten birds of the flock for virological examination.

Thirteen early warnings of AI were notified to the DVFA in 2020. One of the cases was rejected after a thorough assessment of the anamnesis. All samples from the 12 other cases tested free from AI and ND.



On 9 December 2020, the national reference laboratory detected HPAI H5N8 on a holding with approximately 900 ornamental birds (other captive birds) near Jelling in the municipality of Vejle in Jutland.

cleaning and disinfection of the facilities. All restrictions were lifted on 20 December 2020.

Highly pathogenic avian influenza in other captive birds

On 9 December 2020, the national reference laboratory detected HPAI H5N8 on a holding with approximately 900 ornamental birds (other captive birds) near Jelling in the municipality of Vejle in Jutland. The outbreak was detected under the Danish surveillance programme for AI in poultry and game birds and was promptly reported to the OIE through WAHIS. During the suspicion period and after confirmation of HPAI, movement restrictions were imposed on the holding.

A 3 km protection zone and a 10 km surveillance zone around the infected holding were set up,

and all necessary measures were implemented in accordance with Council Directive 2005/94/EC²⁷ and national legislation.

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

The culling of all birds on the infected holding was completed on 11 December 2020. On 12 December 2020, the DVFA approved the cleaning and disinfection of the facilities. All restrictions were lifted on 12 January 2021.

Table 15 gives further details of the three outbreaks.

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

The Danish surveillance programme for AI in poul-

²⁷ As from 21 April 2021, in accordance with Commission Delegated Regulation (EU) 2020/687 of 17 December 2019.

Table 16

Results of the Danish surveillance programme for avian influenza in poultry and game birds for restocking, 2020

Poultry category	Holdings (h)/ flocks (f) in Denmark ¹	Holdings (h)/ flocks (f) tested ²	Serologically positive holdings/flocks (H5, H7)			Virologically positive holdings/flocks	
			H5	H7	H5 and H7	H5	H7
Chicken breeders	195 (f)	99 (f)	0	0	0	-	-
Free-range laying hens	160 (f)	143 (f)	5³	0	0	1	0
Free-range broilers	47 (h)	17 (h)	0	0	0	-	-
Fattening turkeys	52 (h)	12 (f)	0	0	0	-	-
Fattening geese	10 (h)	4 (h)	0	0	0	-	-
Fattening ducks	82 (h)	21 (h)	0	0	0	-	-
Other captive birds⁴	-	-	1	0	0	1	0
Mallards⁵	19 (h)						
- Breeding animals		10 (h)	2	0	0	0	0
- Offspring		16 (h)	-	-	-	0	0
Pheasants, partridges, rock partridges and red-legged partridges⁵	74 (h)						
- Breeding animals		32 (h)	1	0	0	0	0
- Offspring		51 (h)	-	-	-	0	0
Total positives			9	0	0	2	0

¹ All holdings/flocks with more than 100 animals are registered. The holdings/flocks do not necessarily have active production throughout the year.² Some flocks/holdings are tested more than once a year; the figures only include one annual testing per flock/holding, except that all positive results are included even in case the same holding tested positive more than once in the year under review.³ One holding tested serologically positive twice in the year under review.⁴ This category is normally not included in the surveillance, but one holding of ornamental birds was included this year due to a large number of birds on this holding.⁵ Bred for restocking of game birds.

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

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.

try and game birds for restocking was established to detect AI virus of subtype H5 or H7 circulating in the poultry population. Consequently, when positive serological findings are reported, the relevant holdings will be subjected to further testing in order to detect whether the virus is circulating. All birds will be killed on holdings where AI H5/H7 virus is detected, 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.

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

Farmed game birds for restocking (gallinaceous birds and waterfowl) are tested four times during the production season from February to August.



Table 17
HPAI in dead wild birds by species in 2020

Species	H5N not determined Number of birds	H5N5 Number of birds	H5N8 Number of birds	Positive birds per species
<i>Accipiter nisus</i>			1	1
<i>Anas platyrhynchos</i>			1	1
<i>Anas strepera</i>			1	1
<i>Anser albifrons</i>			1	1
<i>Anser anser</i>			7	7
<i>Anser brachyrhynchus</i>			3	3
<i>Anser fabalis</i>			1	1
<i>Branta bernicla</i>			1	1
<i>Branta leucopsis</i>	3	1	35	39
<i>Buteo buteo</i>			12	12
<i>Cygnus cygnus</i>			2	2
<i>Cygnus olor</i>			3	3
<i>Falco peregrinus</i>		1	4	5
<i>Gallinula chloropus</i>	1			1
<i>Haliaeetus albicilla</i>			1	1
<i>Larus argentatus</i>			4	4
<i>Larus marinus</i>			1	1
<i>Larus ridibundus</i>	1		2	3
<i>Morus bassanus</i>			1	1
<i>Numenius arquata</i>			1	1
<i>Phasianus colchicus</i>			1	1
<i>Somateria mollissima</i>			2	2
Total number of positive birds	5	2	85	92

Table 18
Results of the Danish surveillance programme for avian influenza in wild birds, 2020

	Passive surveillance (dead or sick wild birds)	Active surveillance (live wild birds)
Birds sampled	288	786
Samples/pools	288 samples	220 pools ¹
Influenza A-positive birds	93	63 pools ²
LPAI H5-positive birds	0	7 pools ²
LPAI H7-positive birds	0	1 pool ²
HPAI H5/H7-positive birds	92	2 birds

¹ Pools of cloacal swabs taken from up to five birds of the same species at the same time and location.
² The actual number of positive birds is not known. If a pool is positive, at least one of the pooled birds is positive.
Source: The SSI (Statens Serum Institut) and the University of Copenhagen, 2021.

of a positive serological result to confirm whether the relevant flock is infected by the AI virus.

A total of nine holdings/flocks tested positive for AI H5 under the Danish serological surveillance programme in 2020. Two of them also tested positive in the following virological test, one case tested positive for HPAI and one for LPAI.

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.

The surveillance programme for avian influenza in wild birds

In 2020, 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 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).

In total, 288 dead wild birds were tested in 2020 (passive surveillance), most of them in the fourth quarter of the year.

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 Tables 17 and 18.



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.

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 ten 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 in order to rule out the presence of the virus.

In 2020, two suspected cases of ND in backyard flocks were reported to the DVFA due to clinical symptoms; however, no circulating virus was detected in the virological test.

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

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

Table 19

Outbreaks of poultry diseases listed by the OIE and notifiable in Denmark, 2018-2020

Poultry disease	2018	2019	2020
Avian chlamydiosis¹	9	18	2
Avian infectious laryngotracheitis	2	4	6
Avian mycoplasmosis (<i>Mycoplasma gallisepticum</i>)	(1967)	(1967)	(1967)
Fowl typhoid	(2002)	(2002)	(2002)
Infection with highly pathogenic avian influenza viruses (poultry)	(2016)	(2016)	1
Infection with highly pathogenic avian influenza A virus (other captive birds)	(2017)	(2017)	1
Infection with low pathogenic avian influenza viruses	2	3	1
Infection with Newcastle disease virus	(2005)	(2005)	(2005)
Pullorum disease	(2010)	2	(2019)

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

¹ Occurrence mainly in ornamental, hobby and backyard birds.

Table 20

Last occurrence of other OIE-listed poultry diseases not notifiable in Denmark

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

¹ 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.

Few of the OIE-listed equine diseases are known to be present in Denmark. However, several cases of contagious equine metritis were reported in 2020. Further, 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 2020. Most of the cases were in horses of the Icelandic breed. 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 these tested negative for *T. equigenitalis*. Further, the DVFA recommended the tracing and treatment of infected mares and not to carry out breeding activities until the horses 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 OIE-listed equine diseases in Denmark

Contagious equine metritis	Disease present
Dourine	Never reported
Equine encephalomyelitis (Western)	Never reported
Equine infectious anaemia	1928
Equine influenza¹	Suspected, but not confirmed ²
Equine piroplasmosis¹	Not reported ³
Infection with <i>Burkholderia mallei</i> (Glanders)	1928
Infection with African horse sickness virus	Never reported
Infection with equid herpesvirus-1 (EHV-1)¹	Disease present
Infection with equine arteritis virus	Not reported
Venezuelan equine encephalomyelitis	Never reported

¹ The disease is not notifiable in Denmark.

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

³ Year of last outbreak is not known.

2.7 Fur animal diseases

For many years, Denmark has been among the world's leading producers of animal fur.

In recent years, consumer demand for animal welfare in modern Danish farming has increased, and the fur-farming industry responded by collaborating with animal welfare experts in drafting guidelines for fur animal welfare. Those guidelines became incorporated in the legislation on fur animal production with effect from 2007.

One consequence of this legislation was that all Danish mink farms had to undergo mandatory inspections by an authorised veterinarian in addition to regular inspections carried out by veterinary officers from the Danish Veterinary and Food Administration. Those inspections (4-5 each year) were routine inspections covering health and welfare issues on the farm.

By midsummer 2020, 1,147 mink farms with a population of approximately 15 million mink were registered in Denmark²⁸. During the remainder of 2020, the COVID-19 pandemic had a severe impact on the Danish mink production, and a temporary ban on mink farming was imposed in Denmark. The ban will remain in effect until the end of 2021.

In addition to the production of mink, 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 more than 100,000 fur animals in 2020.

²⁸ Source: Copenhagen Fur (owned by the Danish Fur Breeders' Association).



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 2020, RHD was diagnosed on one 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.

COVID-19 in mink (SARS-CoV-2)

In 2020, a new zoonosis, COVID-19, emerged causing a pandemic and a large outbreak of the coronavirus (SARS-CoV-2) in mink.

COVID-19 was made a notifiable disease upon suspicion (clinical signs as well as other means of suspecting infection with COVID-19) in Denmark under national legislation.



Being a zoonosis, the transmission of the virus between humans and animals is possible. Cooperation between the Danish Veterinary and Food Administration and the Danish health authorities was instigated to facilitate the exchange of information on the location of mink farms and anonymised data on infected individuals from the Danish population with possible contact to mink farms. Investigations and the sampling of mink from the farms thus identified in June led to the discovery that three farms in the northern part of Jutland were asymptotically infected with the coronavirus (Figure 3).

The results showed the presence of both virus and antibodies but with no apparent signs of illness at the time of inspection and sampling. Official restrictions were imposed on the infected herds, and the mink were culled as a precautionary measure.

In 2020, RHD was diagnosed on one 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.

Figure 3
Epidemic curve showing the number of infected farms per week and per community in 2020

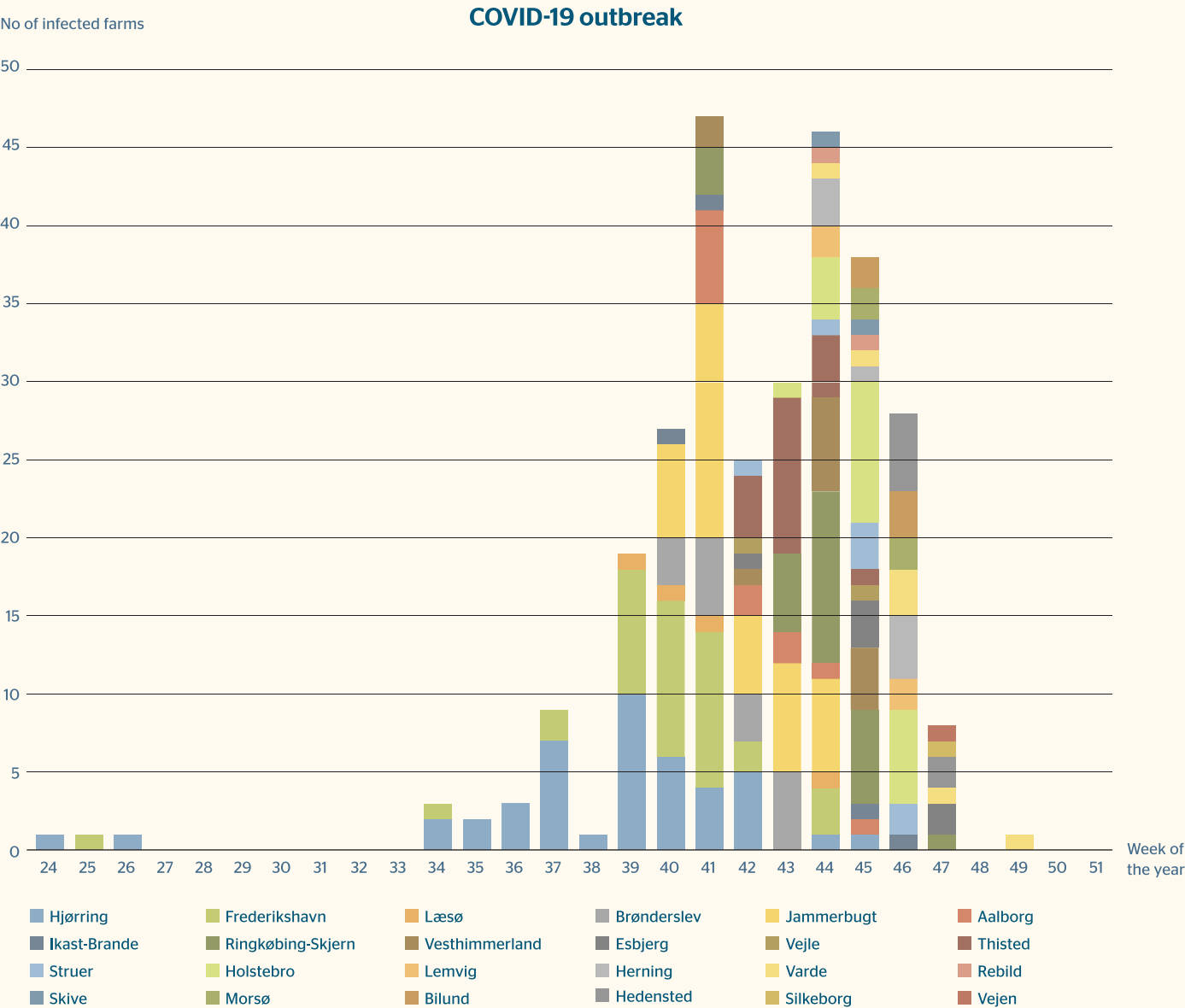
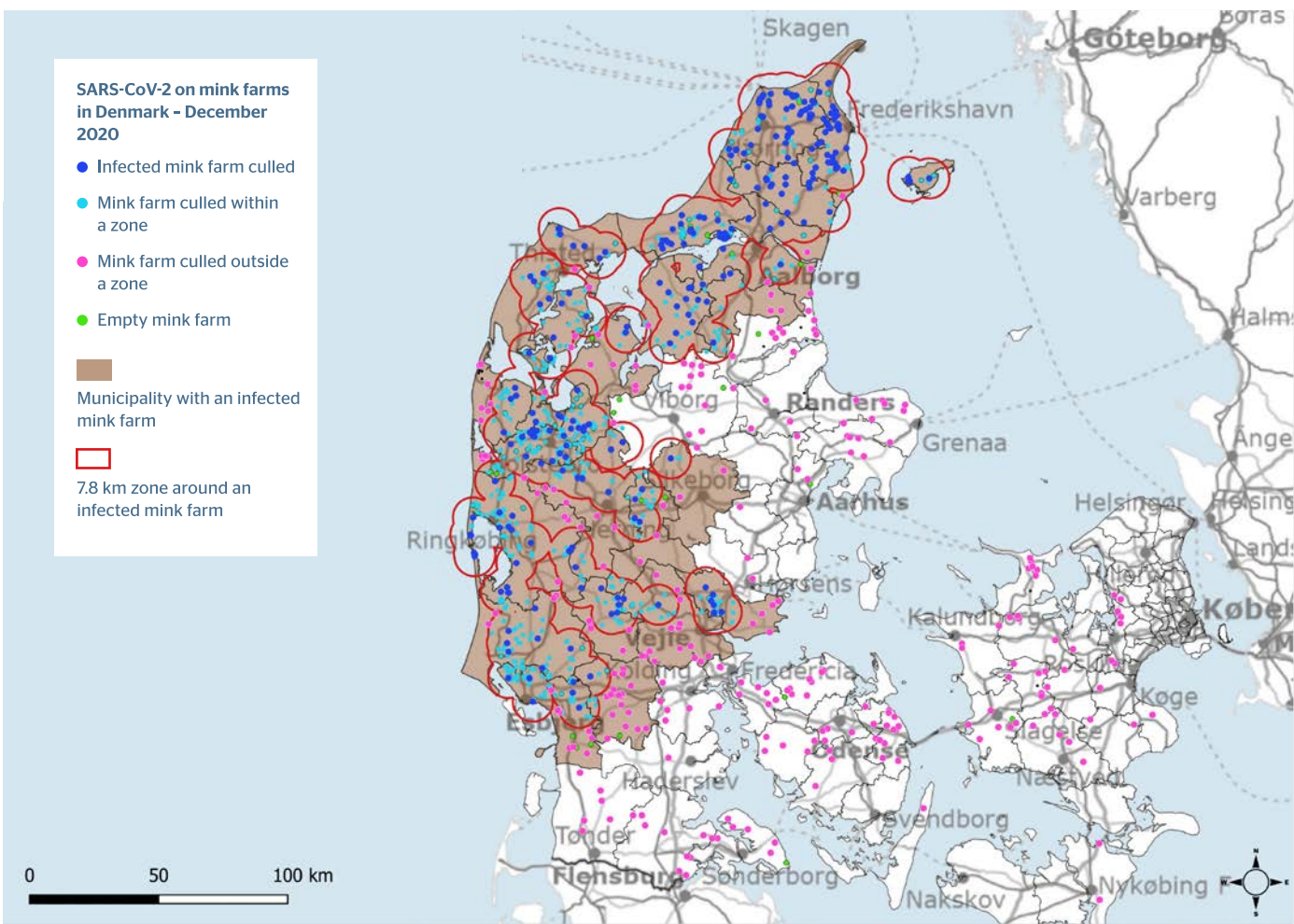


Figure 4
Geographical extent of the COVID-19 outbreak in Denmark by December 2020



Epidemiological investigations and further genotyping of the isolated virus strains indicated that the unique strains were transmitted not only between mink and persons connected to the farms, but also between humans in the local community who had no connection to the farms.

To follow up on the initial results and to investigate the possible spread of the disease in the country, a survey of samples from 125 random mink farms all over Denmark was carried out in June 2020. All samples tested negative for COVID-19.

Based on the information available, it was decided on 7 July 2020 to discontinue the culling strategy. Legislation was adapted to make it mandatory for mink farm staff to wear personal protective equipment when working on the farm and to observe strict infection control measures when entering and leaving the farm. In late July, a surveillance programme was launched.

Surveillance programme for COVID-19 in mink and ferrets

The surveillance comprised swab samples collected by the herd owner and submitted to the national reference laboratory for analysis.

Initially, herd owners had to take samples at three-week intervals from the throat of five mink which had recently died. This scheme was later

Box 11

Disease control in mink farms



The Danish mink farming industry has implemented control and eradication programmes for infectious diseases that previously caused heavy losses for farmers. Infection with Aleutian disease virus is notifiable in Denmark, and legislation has been put in place to support the programme for the prevention of future virus infection.

Aleutian disease (mink plasmacytosis)

The Danish control programme for Aleutian disease is run by the Danish Fur Breeders' Association. Outbreaks occur rarely. In 2020, few serologically positive animals were registered on 35 farms in Northern Jutland north of the inlet of Limfjorden. South of Limfjorden, no infected farms were detected in 2020.

As set out in the control programme, the infected herds were culled, and the farms were cleaned and disinfected.

Box 12

Testing of wild carnivores for COVID-19



Carnivorous species like mink, raccoon dogs and foxes that are part of the Danish fauna are susceptible to SARS-CoV-2 infection. To determine whether those species played a role in the transmission of the disease, dead carnivores were collected for analysis between August 2020 and 31 December 2020.

Carnivores originating mainly from the northern, western and southern parts of Jutland were submitted for analysis by hunters and municipal authorities. Dead cats collected locally and wild cats caught and euthanised in Northern Jutland were received via a local veterinary clinic.

In total, 354 animals were sampled, mainly foxes (130), wild caught mink (121), cats not living on farms or in private households (37), but also some martens (19), raccoon dogs (12), rats (23), badgers (4), ferrets (4) and otters (2) as well as a weasel and a hedgehog. All samples tested negative for SARS-CoV-2.

revised as the outbreak intensified. Herd owners in communities with infected farms were asked to submit samples twice a week of all mink which had recently died, while the rest of the mink farms continued with the initial sampling plan. In November 2020, the scheme was revised to weekly sampling and submission of swab samples from up to five mink which had recently died at all mink farms. In total, 238 submissions tested positive. The results are presented in Table 22.

The COVID-19 outbreak - investigation and measures taken

As from August 2020, more farms became infected in Northern Jutland. Outbreak investigations and epidemiological investigations did not point to a definite route of transmission. However, most mink farms were located close to each other in those parts of Jutland (see Figure 4). It was determined that virus most probably was introduced by persons with access to the infected farms. Besides the introduction of virus by persons, other routes of transmission were considered (wind, birds, other animals, feed trucks/delivery routes, insects etc.). Investigations were made into possible ways of disease transmission through feed and feed distribution routes as well as wild birds and wild carnivores. The results of the testing of feed and birds are given in Table 22 and of wild carnivores in Box 12.

Table 22
 Samples and results of analyses for SARS-CoV-2 virus and antibodies in different matrices.

Species/material	Virus	Antibody	Samples analysed	Submissions of samples	Submissions testing positive
Surveillance					
Mink	x		14,636	6,099	238
Investigations					
Mink	x	x	18,056	572	353
Dogs/cats	x	x	202	34	– ³
Ferrets	x		4	3	0
Other species¹	x	x	139	27	1 ⁴
Other material sampled²	x		360	35	9 ⁵

¹ Rabbits, pigs, birds and a horse etc.
² Air and environmental samples from infected farms and samples collected from feed, feed trucks and clothing of feed truck driver (all negative).
³ Dogs and cats from infected mink farms. The number of positive submissions is included in the number of positive submissions of mink samples.
⁴ The positive animal was a bird.
⁵ The positive submissions originated from infected mink farms.

As from mid-September 2020, the pandemic took hold in earnest in both mink and humans (Figure 3), at first in Northern Jutland and later along the west coast of Jutland (Figure 4).

On 1 October 2020, a new decision was made to cull all mink from infected Danish farms and from mink farms within the special risk zones, defined as a radius of 7.8 km from infected farms (Figure 4). Surveillance in mink farms in communities with infected mink farms was considerably intensified to be able to detect new infections more quickly, but the efforts did not slow down the outbreak. At the same time, new variants of the virus emerged in mink. One variant in particular showed the ability

to limit the effect of antibodies in humans (referred to as the cluster 5 variant). This development raised concerns as to whether a future vaccine for humans would offer protection against this variant. On 4 November 2020, the Danish government decided to cull mink on all farms and to temporarily ban mink farming in Denmark by law until 31 December 2021. The statute banning mink farming entered into force on 15 January 2021.



2.8 Fish diseases

In 2020, 220 aquaculture production businesses (APBs) producing fish were registered in Denmark. The majority were freshwater fish farms, but 20 of the 220 APBs were marine fish farms producing rainbow trout 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. Since then, the surveillance programme has been conducted according to the provisions laid down in this Directive²⁹.

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

In 2020, the Danish Veterinary and Food Administration (DVFA) carried out approximately 200 inspections of fish farms. The surveillance samples (including export samples) tested in 2020 are described in Table 23.

200

In 2020, the Danish Veterinary and Food Administration (DVFA) carried out approximately 200 inspections of fish farms.

²⁹ As from 21 April 2021, the surveillance programme will be conducted according to the provisions of Commission Delegated Regulation (EU) 2020/689 of 17 December 2019.

Table 23
 Number of surveillance samples (including export samples) tested under the Danish aquaculture surveillance programme in 2020

Disease	Type of tissue sampled ¹	Testing method ²	Number of samples tested in 2020 ³
Epizootic haematopoietic necrosis disease	1	A	255
Infectious haematopoietic necrosis	1	A	537
Infection with infectious salmon anaemia virus	2	B	240
Infection with salmonid alphavirus	1	B	120
Spring viraemia of carp	1	A	148
Viral haemorrhagic septicaemia	1	A	535

¹ 1: Kidney, spleen and heart (and in some cases brain).
 2: Same tissues as in sample type 1 + gills.
² A: Cultivation in cell culture followed by observation of cytopathic effect.
 B: PCR test.
³ Each sample tested is a pooled sample of up to ten fish per sample.

Each sample tested is a pooled sample of up to ten fish. The most common species tested is rainbow trout, which constitutes approximately 97% of the production of salmonids in Danish fish farms. Brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*) are also produced in some freshwater fish farms. These species are therefore also tested under the surveillance programme. Samples from wild salmon (*Salmo salar*) and brown trout (*Salmo trutta*) are also collected for testing under the surveillance programme. A few aquaculture farms produce species such as zander, turbot and eel. 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 23.

Infectious haematopoietic necrosis

Infectious haematopoietic necrosis (IHN) has never been reported in Denmark, and the whole territory is approved free from IHN by the European Union (Commission Decision 2009/177/EC³⁰).

Infectious salmon anaemia

Infection with HPR-deleted infectious salmon anaemia (ISA) virus has never been reported in Denmark, and the whole territory is approved free from ISA by the European Union (Commission Decision 2009/177/EC³¹). However, infection with HPRO infectious salmon anaemia virus was detected in a facility for restoration of wild salmon in 2019.

³⁰ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.
³¹ As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.



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 August 2020, KHV was detected in a private garden pond located near the village of Kjellerup in the municipality of Silkeborg.

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/EU³²). 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.

Table 24
Occurrence of OIE-listed fish diseases in Denmark

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

¹ The disease is not notifiable in Denmark.
² Infectious salmon anaemia virus of the genotype HPRO was detected in a wild Atlantic salmon (*Salmo salar*) in a facility for restoration of wild salmon. The salmon was caught in the river of Gudenåen.
³ The infection was detected in a private garden pond.

³² As from 21 April 2021, according to Commission Implementing Regulation (EU) 2021/620 of 15 April 2021.

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/EU³³). 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. All freshwater trout farms are approved free from VHS (category I).

Information pertaining to the OIE-listed fish diseases is given in Table 24.

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

Box 13

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 2020, 25 freshwater fish farms were registered as being IPNV-free and 16 freshwater fish farms as being BKD-free (Executive Order No. 967 of 18 July 2013 on the surveillance and registration of IPN and BKD).

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. 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 natural stock.

During the past more than 15 years, a number of marine aquaculture facilities producing mussels on ropes in a water column have been established in Denmark. At the moment, the annual production totals approximately 5,000 tonnes of mussels.

Infection with *Bonamia ostreae*

In 2020, *B. ostreae* was detected in samples collected in the inlet of Limfjorden in March, August and December 2020. The Danish Veterinary and Food Administration has decided to discontinue the surveillance in Limfjorden as it is unlikely that the area will regain the disease-free status once its population has become infected.

Infection with *Marteilia refringens*

Although infections with *M. refringens* have never been detected in Denmark, it has been decided to discontinue the surveillance for *M. refringens*. This decision was based on a cost-effectiveness analysis. All areas in Denmark have therefore shifted disease categories from being 'disease-free' to 'undetermined' as set out in EU legislation.

Information pertaining to the OIE-listed mollusc diseases is given in Table 25.

Table 25
Occurrence of OIE-listed mollusc diseases in Denmark

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

¹ The disease is not notifiable in Denmark.

² 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 according to EU legislation³⁴.

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.

Table 26 shows a breakdown of the ABPs produced in Denmark in 2020.



Table 26 shows a breakdown of the ABPs produced in Denmark in 2020.

³⁴ 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.



Table 26
Animal by-products produced in Denmark in 2020

Source	Category 1 (tonnes)	Category 2 (tonnes)	Category 3 (tonnes)
Slaughterhouses/cutting plants	44,018	105,564	354,434
Fallen stock	21,680	108,003	None

Source: The Danish Agriculture & Food Council, 2021.

4. Livestock statistics

Table 27
Livestock population. Establishments and animals in Denmark, 2017-2019

		2018	2019	2020
Cattle	Animals	1,560,757	1,505,474	1,513,084
	Establishments	16,452	16,101	16,181
Sheep	Animals	149,532	143,080	139,633
	Establishments	6,404	6,211	6,149
Goats	Animals	19,370	19,744	18,745
	Establishments	2,961	2,980	3,001
Horses	Animals	175,000 ¹	175,000 ¹	175,000 ¹
	Establishments	78,000 ²	78,000 ²	78,000 ²
Farmed deer	Animals	14,131	14,202	13,201
	Establishments	479	465	458
Pigs	Animals	13,840,542	13,351,997	13,311,160
	Establishments	7,967	7,400	7,698
Poultry	Animals	32,604,504	29,651,173	29,201,439
	Establishments	1,266	1,242	1,282

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

¹ Estimate based on registrations in the national horse database.

² Statistics Denmark.



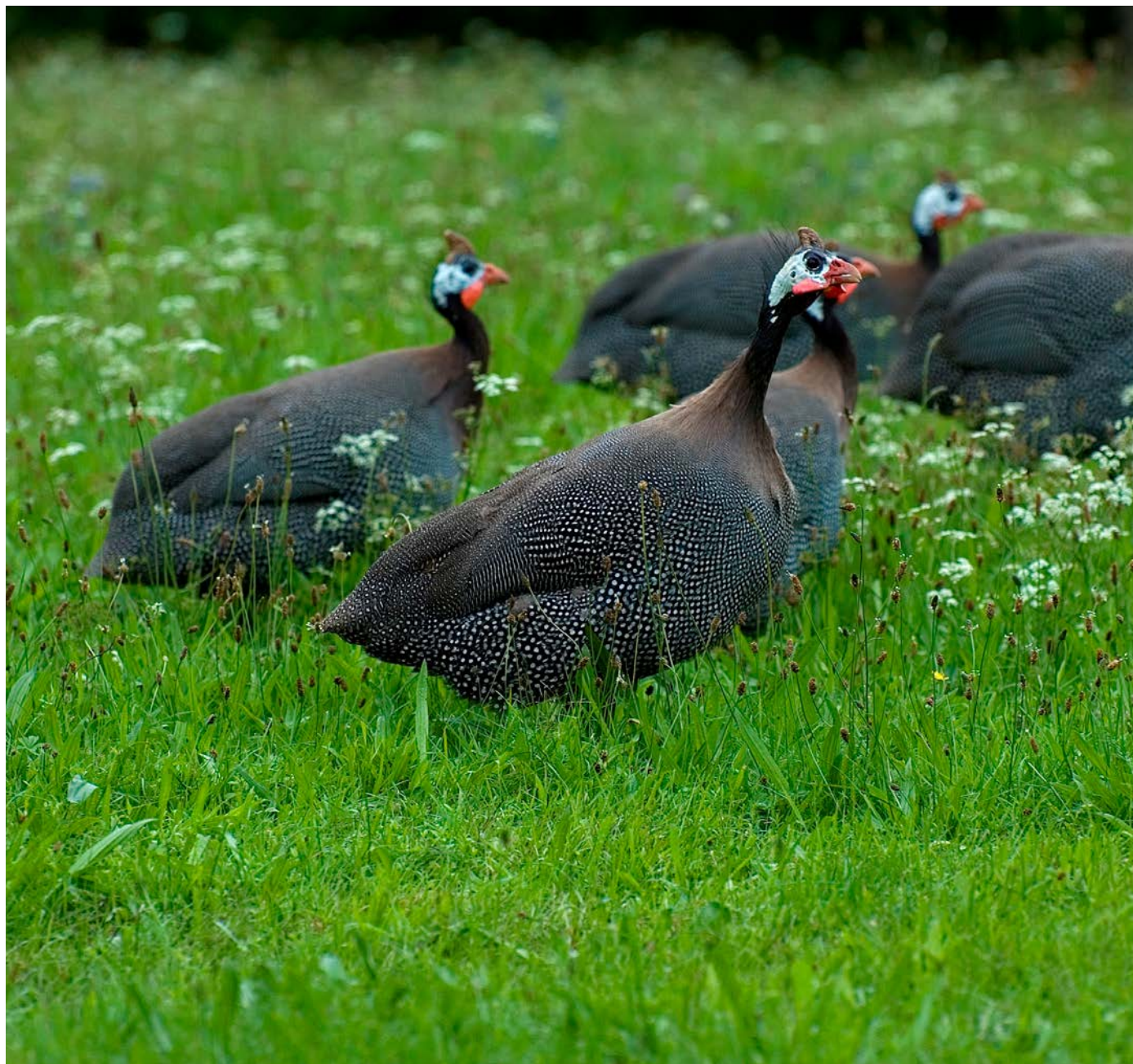


Table 28

Animals imported from the EU and third countries to Denmark 2018-2020

	2018	2019	2020
Horses¹	3,064	3,221	2,823
Cattle²	181	117	73
Pigs³	6	2	25
Sheep/goats	813 ⁵	51	1,216 ⁵
Poultry⁴	6,021,736 ⁶	7,512,626 ⁶	5,290,658 ⁶

¹ Horses, asses, mules and hinnies.

² Bovine animals.

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

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

⁵ Imports of sheep intended for slaughter.

⁶ Imports of mainly day-old chicks.

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

Table 29

Animals exported from Denmark to the EU and third countries, 2018-2020

	2018	2019	2020
Horses¹	648	504	541
Cattle²	70,790	91,759	80,212
Pigs	14,968,784	15,337,132	15,029,923
Sheep/goats	1,156	1,642	706
Poultry³	54,076,715	62,504,659	64,112,987

¹ Horses, asses, mules and hinnies.

² Bovine animals.

³ 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).

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