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Danish Veterinary and
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Animal Health in Denmark 2018

July 2019

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Preface

It is a pleasure for me to present the 2018 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 to Danish livestock.

The report also reviews developments in 2018 in the field of animal health in Denmark. The main 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, disease surveillance and control programmes have been developed to improve animal health and animal welfare and thereby support the production of safe foods.

Regulations on animal disease control have been imposed to benefit animal welfare, to prevent

infections in humans and animals, to advance food safety and to defend trade interests. 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 27 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).

The DVFA is constantly adapting the legal framework of the disease control regulations to changes in farming practices, disease risk assessments 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.



Information on livestock statistics is given in Chapter 4 of this report.

Disease status is paramount when it comes to the issuance of export certificates for Danish animals and products (see the description in Box 4).



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

The main purpose of the improvements in operational capabilities is:

- To reduce the likelihood that exotic livestock diseases will be introduced into 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 in place plans for appropriate and effective actions for the control of disease outbreaks.

Animal disease preparedness

Obligation to notify suspicions

The Danish Animal Health Act¹ is the legislative basis for the current notification procedures. The Act also lays down the list of notifiable animal diseases in Denmark and the rules for the notification of suspected cases of those diseases. Furthermore, the Act gives 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 infective materials, carry out cleaning and disinfection and, if necessary, carry out emergency vaccination.

The notifiable animal diseases listed in Executive Order No. 532 of 25 May 2018 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 within a specified number of hours (three or five hours depending on whether the suspicion has

¹ The Animal Health Act has been amended since the year under review.

The most recent statute is Animal Health (Consolidation) Act No. 1 of 2 January 2019.

See www.retsinformation.dk (in Danish). <https://www.retsinformation.dk/Forms/R0710.aspx?id=206320>

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 involved: 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 can 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 consults the same veterinarian every time. 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, he is obliged to contact his 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 a specified number of hours and report the suspected case to the DVFA. All suspected cases of notifiable diseases 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 veterinarian advises the farmer of ways to increase the general health of his herd, while the veterinarian also acts as a first-line defence in the surveillance of notifiable animal diseases.

The DVFA offers compensation to animal owners who suffer a loss due to a notifiable disease.

arisen in a slaughterhouse or at a farm) 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 are imposed on the herd, 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 herd premises. Also ante-mortem inspection and post-mortem examination at slaughterhouses are important elements of the surveillance system.

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. Uniform handling 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 necessary actions to be taken when handling 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. 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.

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



If a suspected case is deemed to be of potential interest to the general public and/or export markets, the notice on the website 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 a notifiable disease. The offer of compensation contributes significantly to animal owners' compliance 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 loss of income due to the disease outbreak. If the outbreak is in either cattle or pigs, the Cattle Levy Fund or the Pig Levy Fund will cover the remaining income loss.

Pathogen-specific surveillance

Denmark has several pathogen-specific surveillance programmes intended to demonstrate the absence of diseases that usually cause insignificant 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 applied. Several Danish surveillance programmes are mentioned in Chapter 2 of this report.

The DVFA focuses especially on infectious diseases with increased incidence in other countries and an epidemic potential, thus increasing 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 countries outside the EU. See more information on this rapid evaluation of the risk of disease introduction in Box 3 in this chapter.

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

Blood samples from outdoor poultry are tested for West Nile fever. See Box 6 in section 2.1 of this report for more information on the surveillance scheme for West Nile virus in Denmark.

Several Danish surveillance programmes are mentioned in Chapter 2 of this report.

See more information on this rapid evaluation of the risk of disease introduction in Box 3 in this chapter.

See Box 6 in section 2.1 of this report for more information on the surveillance scheme for West Nile virus in Denmark.

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 urgent 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. The Danish approach was developed in close collaboration between authorities, industry and scientists, and stakeholders continuously discuss interventions to ensure a high level of compliance and 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.

The large Danish pig production accounts for the vast majority (75%) of antimicro-

bials used in animals in Denmark. Many initiatives are therefore aimed at the pig sector. In 2010, the 'Yellow Card' scheme was introduced to reduce the use of antimicrobials in the pig production. By specifically targeting the farms with the highest consumption of antimicrobials, the 'Yellow Card' scheme creates an incentive for pig farmers to reduce their use of antimicrobials. In 2016-2017, the 'Yellow Card' scheme was expanded to include multiplication factors to reduce the use of critically important antimicrobials (third-generation and fourth-generation cephalosporins, fluoroquinolones and colistin). Furthermore, it is a requirement under the scheme that laboratory exami-



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nation must be performed before group treatment of pigs is prescribed.

These initiatives are supported by materials such as guidelines on the prudent use of antimicrobials in pigs and cattle aimed at veterinary practitioners.

Denmark continuously aims at a more prudent use of antimicrobials. A new advisory Committee on Veterinary Medicines was established in 2018 to advise the authorities on future initiatives and target areas.

Due to the acknowledgement that AMR is an international problem, Denmark has also set up the independent International Centre for Antimicrobial Resistance Solutions (ICARS). ICARS will provide evidence and guidance on how to translate policy into feasible solutions, in particular in low- and middle-income countries, taking into account all aspects of the One Health approach.

Denmark's long history of AMR initiatives is also highlighted in a new report published in collaboration with FAO in 2019 (**see www.fao.org**).

Cattle farmers are offered laboratory examination of material from abortions in the form of post-mortem examination and 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.

Samples from carcasses of pigs submitted for post-mortem examination are tested for classical swine fever and African swine fever. See more information on the supplementary surveillance for African swine fever and classical swine fever in Box 8 in section 2.4 of this report.

A special surveillance programme for porcine epidemic diarrhoea was initiated by the DVFA in 2014 and continued in 2018. See more information on the non-existence of porcine epidemic diarrhoea virus in Denmark in Box 9 in section 2.4 of this report.

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.

See more information on the supplementary surveillance for African swine fever and classical swine fever in Box 8 in section 2.4 of this report.

See more information on the non-existence of porcine epidemic diarrhoea virus in Denmark in Box 9 in section 2.4 of this report.

Despite a history of few disease outbreaks in Denmark, the DVFA has made great efforts to prepare and revise its contingency plans.

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 be taken when handling infected herds in order to ensure an efficient control of a disease outbreak.

The general contingency plan and the disease-specific plans

The Danish contingency plans comprise 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 diseases in aquaculture. 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, 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 new knowledge.



Box 3

Rapid qualitative risk assessment of the threat of disease introduction (AMR)

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, 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 that foreign infectious diseases will be introduced into Denmark.

The DVFA has implemented a rapid, structured, systematic and transparent model to qualitatively evaluate the risk of disease introduction in case of outbreaks of diseases in other EU Member States or in certain countries outside the EU. Early warnings of animal disease outbreaks enable national authorities to inform farmers and high-risk populations about prevention and control measures against the identified risks and to prepare and develop mitigation strategies to minimise the risk of introduction and spread of diseases.

The rapid qualitative risk assessment is a document communicating the estimated risk of the introduction of epizootic or zoonotic diseases to susceptible animal populations in 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 risk that the disease will enter Denmark and infect susceptible Danish animal populations.
- The significance of the consequences if the disease gains a stronghold in Denmark and spreads between the relevant animal populations.

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

Results from the rapid risk assessment for disease introduction into Denmark are presented to the risk managers, who can then decide to take risk mitigation actions, such as requiring more thorough inspections of vehicles for international transportation of animals, further testing of recently imported live animals and, depending on the estimated risk level, the provision of specific information to relevant groups of the public. If necessary, risk mitigation measures are recommended to stakeholders.

All qualitative rapid risk assessment reports are published by the DVFA at www.fvst.dk (in Danish).

In 2018, specific risk assessments were made for avian influenza, African swine fever, bluetongue, Newcastle disease and West Nile fever due to outbreaks in the EU and countries neighbouring the EU.

Several animal diseases besides tuberculosis and brucellosis have been eradicated in Denmark due to the efficient 'Danish model'.

Vaccination policy

The main methods for disease control described in the Danish contingency plans are the quarantining of farms suspected of housing infected animals, culling of infected animals, cleaning and disinfection, and zoning.

In general, preventive vaccination is banned. However, following an epidemiological analysis of 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. A prominent example is that tuberculosis and brucellosis were eradicated from domestic livestock in Denmark by the mid-1900s. The eradication was achieved as a result of the close collaboration between the veterinary research laboratory, the veterinary administration authority and the industry since the late 1800s.

Initially, the animal farming industry launched a voluntary initiative to control the occurrence of infections. This initiative gained broad support from all farmers, and effective eradication measures were subsequently 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

Danish legal powers, financial provisions and the direct chain of command facilitate the response of the public administration to an outbreak of a notifiable disease. 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 first staffed by employees of the central offices of the DVFA, and the LDCC by employees of 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 of the DVFA, including veterinarians of the VIUs, plan and prepare practical training in the contingency plans. The field staff are trained at seminars and targeted courses and by participation in simulation exercises.

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, Member States exporting products of animal origin must generally comply with bilateral agreements with third countries. However, products of animal origin complying with the relevant EU legislation can be exported to all third countries at the exporter's own expense and risk. Regulation (EC) No 882/2004 governs official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules.

The issuing of certificates for products of animal origin is based on national legislation (Executive Order No. 671 of 1 June 2018 implementing Council Directive 96/93/EC). Certificates must be based on 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 for the issuing of certificates in Denmark, certificates can be issued on the basis of regular auditing and verification procedures at establishments. Certificates will

be issued based on facts obtained within the context of monitoring programmes, officially recognised quality assurance schemes and epidemiological surveillance programmes by a person authorised by the competent authority. The certifying officer must not certify data of which s/he has no personal knowledge or which cannot be ascertained. No blank or incomplete certificates, or certificates for products which have not been inspected or are no longer available for inspection, can be issued.

If an animal disease breaks out, all Danish certificates of animals and animal products in which data on the disease status have been certified are immediately assessed by the DVFA, and no new certificates will be issued if certified data no longer apply.



In 2018, Denmark conducted procedure exercises at regional level and a crisis management exercise with the aim of developing and expanding crisis management skills.

Veterinary officers from the DVFA maintain their expertise in recognising the symptoms of specific notifiable diseases at the National Veterinary Institute, Technical University of Denmark. They are invited to observe the development of the diseases during research experiments performed by the Institute, e.g. experiments on pigs artificially infected with classical or African swine fever.

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 as well as lessons learned 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.

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.

In 2018, Denmark conducted procedure exercises at regional level and a crisis management exercise with the aim of developing and expanding crisis management skills. Further, the DVFA participated in several exercises planned and conducted by other organisations.



2. Livestock disease status

In general, the Danish livestock have a favourable health status, and only few diseases cause problems in the production of livestock.

Denmark is 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 a decade, and the last case of BSE in Denmark occurred in 2009 in a 14-year old cow. No cattle born after the most recent tightening of the feed ban in January 2001 have acquired BSE.

In 2018, no outbreaks of highly pathogenic avian influenza (HPAI) were diagnosed in poultry and other captive birds. However, HPAI H5N6 was diagnosed in dead wild birds in 2018. Further, two outbreaks of low pathogenic avian influenza (LPAI) were detected in duck holdings.

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>





2.1 Multiple species diseases

For decades, Denmark has experienced no outbreaks of Aujeszky’s disease, brucellosis in bovine herds, 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. As from 2011, Denmark has been recognised as free from bluetongue.

Aujeszky’s disease

Denmark is recognised as officially free from Aujeszky’s disease by the European Commission (Commission Decision 2008/185/EC). The disease has not occurred in Denmark since 1991.

Table 1
Blood samples examined under the Danish Aujeszky’s disease surveillance programme, 2016-2018

Year	Samples
2016	48,051
2017	44,247
2018	43,553

Source: National Veterinary Institute, Technical University of Denmark, and other official laboratories in the EU.

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/EEC. Moreover, breeding pigs intended for export to certain countries outside the EU are tested for Aujeszky’s disease.

No suspected cases of Aujeszky’s disease were notified to the Danish Veterinary and Food Administration (DVFA) in 2018.

The number of blood samples examined for Aujeszky’s disease in the period 2016-2018 is given in Table 1.

The number of blood samples examined for Aujeszky’s disease in the period 2016-2018 is given in Table 1.

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

Bluetongue

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

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.

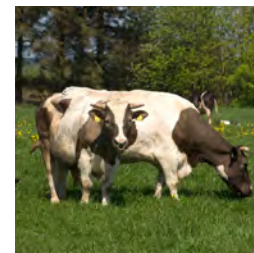
A surveillance programme for bluetongue has been implemented in Denmark according to Commission Regulation (EC) No 1266/2007. Serological tests were performed on blood samples collected from 60 cattle herds in 2018. In total, 600 blood samples were tested. All tested negative for bluetongue.

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 three suspected cases of bluetongue in cattle in 2018. All three cases were reported due to clinical symptoms. However, one case was rejected by the relevant Veterinary Inspection Unit (VIU) based on the evaluation of the clinical symptoms. Official restrictions were imposed on the herds under suspicion while laboratory testing was conducted. The virological tests of samples from all herds under suspicion proved negative.

Brucellosis

Denmark has been recognised as officially free from brucellosis in bovine herds since 1979 (Commission Decision 2003/467/EC). The official Danish eradication programme for brucellosis in bovine herds began in 1948, and all cattle herds were identified as free from brucellosis in 1959. Brucellosis has not occurred in cattle in Denmark since 1962. All bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC. Cattle intended for export to certain countries outside the EU are also tested. In 2018, 54 aborted fetuses from cattle underwent laboratory testing for brucellosis. All tested negative. See Box 7 in section 2.2 for more information on this supplementary surveillance.



For further details on vector surveillance, see Box 5 in this section.

See Box 7 in section 2.2 for more information on the supplementary surveillance for brucellosis in cattle.

Box 5

Surveillance for *Culicoides*, mosquitoes and tick-borne pathogens in Denmark in 2018

Since 2012, the Danish Veterinary and Food Administration (DVFA) and the National Veterinary Institute, Technical University of Denmark, have carried out systematic surveillance of mosquitoes and biting midge abundance during the warmest half of the year. Vectors have been collected on a weekly basis using octenol and CO₂-baited suction traps in private gardens and light traps at cattle farms. National average abundance estimates have been published weekly at www.myggetal.dk (in Danish). Additional traps have been 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 2018 was exceptionally dry and warm, resulting in the lowest number of mosquitoes collected during the summer season since the programme started. However, the Nile fever mosquito,

Culex modestus, appeared less affected by the draught with a human landing rate of one *C. modestus* every 7 minutes during the afternoon in late August at the particular location at Vestamager near Copenhagen where *C. modestus* is well-established. Also *Culicoides* were affected by the weather. Consequently, the abundance of *Culicoides* was very low in the late summer and autumn of 2018. *Tabanidae* were almost absent in 2018, while *I. ricinus* ticks were recorded in higher numbers compared with 2017. The warm weather resulted in the first records of adult Hyalomma ticks in Denmark.

These ticks are likely to arrive as nymphs on migrating birds each spring. But while Hyalomma ticks normally perish in the Scandinavian climate, the dry, warm summer of 2018 allowed the development to the adult stage of a Hyalomma tick found on a horse in West Zealand. The screening of 18,000 nymphs collected by flagging identified no ticks of the *I. persulcatus* or *Dermacentor reticulatus* species.

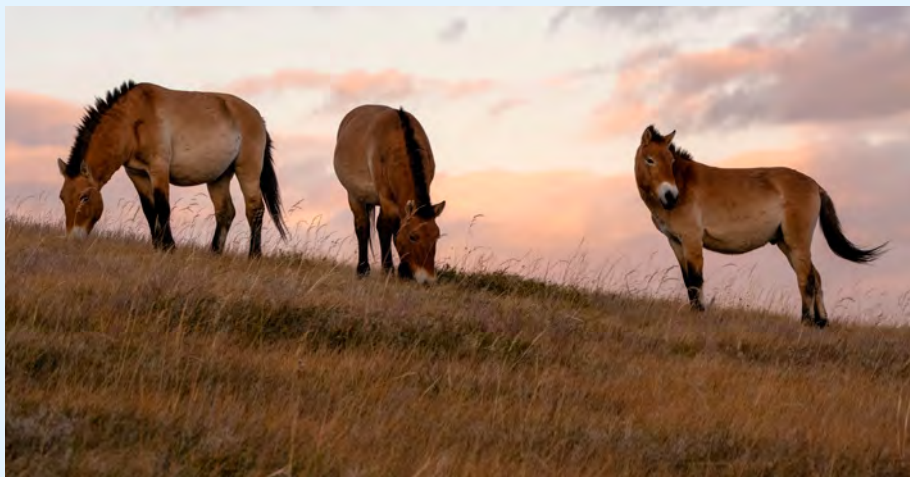


Table 2
Blood samples examined under the Danish brucellosis surveillance programme, 2016-2018

Year	Cattle: Blood samples	Pigs: Blood samples	Sheep and goats: Blood samples
2016	2,352	40,929	2,329
2017	1,007	33,429	1,986
2018	1,223	33,973	2,270

Source: National Veterinary Institute, Technical University of Denmark, and other official laboratories in the EU.

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/EEC. Also breeding pigs intended for export to certain countries outside the EU are tested for brucellosis. Due to fluctuations in trade, the number of samples tested varied in the period under review.

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/EC). A serological surveillance programme for *B. melitensis* is carried out by testing blood samples collected through the voluntary lentivirus control programme managed by SEGES, the Danish Agriculture and Food Council.

In 2018, five suspected cases of brucellosis were notified to the DVFA: one in cattle, two in pigs, one in sheep and one in a goat. All cases were notified because the animals had tested positive in serological analysis performed under the surveillance programme. Official restrictions were imposed on all herds under suspicion while confirmatory laboratory testing was conducted.

The number of blood samples examined for brucellosis in the period 2016-2018 is given in Table 2.

In 2018, five suspected cases of brucellosis were notified to the DVFA: one in cattle, two in pigs, one in sheep and one in a goat.



Samples of all suspected cases tested negative at the National Reference Laboratory.

The number of blood samples examined for brucellosis in the period 2016-2018 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 2018, the DVFA was notified of three suspected cases of FMD in cattle. All three cases were reported due to clinical symptoms; however, one case was rejected by the relevant Veterinary Inspection Unit (VIU) after a post-mortem examination of the suspected animal and a thorough clinical examination of the herd of origin. Official restrictions were imposed on the two herds under suspicion while epidemiological investigation and laboratory testing were conducted. All samples tested free from FMD.

Rabies

The rabies virus (classical rabies virus) has not been reported in domestic animals in Denmark since 1982. In wild animals, the last occurrence was in 1981.

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 addition, active surveillance for rabies among bats is conducted. In 2018, saliva samples were collected from 138 bats living at different locations in Denmark. All saliva samples tested negative for European bat lyssavirus (EBLV-1 and EBLV-2).

In 2018, 17 bats were tested, and all tested negative. Five other animals (two foxes, one mink and two sheep) were submitted for examination. However, all animals tested negative.

Box 6

Active surveillance for West Nile virus in Denmark

During the past few years, several outbreaks of infection with West Nile virus (WNV) have occurred in southern and central Europe, and during 2018, the infection moved further north and west. This indicates that the infection has become established in Europe. As WNV may spread further north with migratory birds from endemic areas, surveillance activities have been set up to determine whether the infection has reached Danish territories.

In 2018, the Danish Veterinary and Food Administration, the National Veterinary Institute (Technical University of Denmark) and the Natural History Museum of Denmark (University of Copenhagen) continued the ongoing surveillance for WNV in Denmark.

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

Serum from poultry held outdoor (491 individuals) and migratory birds (323 individuals) was included in the serological surveillance programme and tested for WNV-specific antibodies. Altogether, 814 samples were examined, and two samples of serum from migratory birds (medium/

long distance migratory species) were found positive for WNV antibodies. This indicates that at least two of the migratory birds that stayed in or passed through Denmark in 2018 had been exposed to WNV at some point in their previous life span, probably during their annual winter stay in Africa.

Further, mosquitoes collected through the insect vector surveillance programme mentioned in Box 5 (9 pools, or a total of 33 mosquitoes) were examined for WNV. All samples tested negative. This means that no viral RNA was found in the material collected.

In conclusion, data from the 2018 surveillance programme indicate that there is not yet an active ongoing WNV infection in the Danish bird and mosquito populations. However, there is no doubt that migratory birds provide a link between WNV-endemic areas and Denmark.

Selected material collected under this programme was further tested for the Usutu virus (USUV) and corresponding antibodies: Mosquitoes were tested for USUV, and selected serum samples from migratory birds were tested for USUV-



814

Altogether, 814 samples were examined, and two samples of serum from migratory birds (medium/long distance migratory species) were found positive for WNV antibodies.

specific antibodies. All mosquitoes were negative for WNV; however, one migratory bird was found positive for USUV-specific antibodies.

Table 3
Animals examined under the Danish trichinellosis surveillance programme, 2016-2018

Year	Pigs (incl. boars and sows)	Farmed wild boars	Horses
2016	18,774,085	594	1,542
2017	17,340,351	445	1,542
2018	17,956,829	575	1,334

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

Trichinellosis

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

For more than 80 years, targeted tests have been performed in Denmark without finding any *Trichinella* spp. in pork or horse meat. In 2007, Denmark was classified 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 no testing for *Trichinella* spp. is 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. 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 2016-2018 appears from Table 3.

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

The number of animals from each category of slaughtered animals examined under the Danish trichinellosis surveillance programme in the period 2016-2018 appears from Table 3.

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

Table 4

Last occurrence of OIE-listed multiple species diseases in Denmark

Anthrax	1988
Bluetongue	2008
Crimean Congo haemorrhagic fever ¹	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 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>Cochliomya hominivorax</i>)¹	Never reported
Old World screwworm (<i>Chrysomya bezziana</i>)¹	Never reported
Paratuberculosis¹	Disease present ⁵
Q fever	Disease present
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 herds account for most of the production with approximately 580,000 milking cows producing 5,615,000 tonnes of milk (2018 figures).² The rest of the herds comprise approximately 90,000 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 as officially free from bovine tuberculosis, 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, which include:

- 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 19 years since the birth of the youngest Danish case of BSE.

² Source: SEGES.

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 cases of BSE have been found in Denmark since 2009 when a BSE case was found in a 14-year old cow. In the period 2000-2009, a total of 18 cases of BSE were detected. The youngest Danish case of BSE was a cow born in 1999. No 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.

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. The National Veterinary Institute, Technical University of Denmark, subsequently performs confirmatory testing of material from the relevant animal. 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. It follows from the amendment to Decision 2009/719/EC that certain Member States, including Denmark, are authorised to make revisions to their BSE surveillance programmes.

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.

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

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 had been 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.

In 2018, one suspected case of BSE was notified to the DVFA. Samples from the suspected case tested free from 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 2016-2018 are shown in Table 6.

Bovine tuberculosis

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

The eradication of bovine tuberculosis in Denmark was initiated in 1893. In 1959, the eradication programme was replaced by a surveillance programme because only few outbreaks were diagnosed each year.

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 2016-2018 are shown in Table 6.

Table 6
Results of the Danish BSE surveillance programme, 2016-2018

	2016		2017		2018	
Category	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Fallen stock	19,367	0	21,036	0	22,272	0
Emergency-slaughtered animals	1,307	0	1,295	0	1,565	0
AM animals	0	0	0	0	0	0
Healthy slaughter animals	21	0	59	0	63	0
Clinical suspects	1	0	1	0	1	0
Total	20,696	0	22,391	0	23,901	0

Source: The EU TSE database.

The last outbreak of tuberculosis in cattle occurred in 1988, the infection being of human origin. However, bovine tuberculosis was also diagnosed in farmed deer in 1988. A surveillance programme for bovine tuberculosis 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/EEC. Cattle intended for export to certain countries outside the EU are also tested. In 2018, 806 animals were tested for bovine tuberculosis. All tested negative.

Bovine virus diarrhoea

One Danish cattle herd had Bovine virus diarrhoea (BVD) in 2018. The infected herd was kept under official restrictions. Besides the aforementioned herd, no new infected herds were detected in 2018.

Table 7
Bulk milk samples and blood samples examined under the Danish bovine virus diarrhoea surveillance programme, 2016-2018

Year	Bulk milk samples	Blood samples from beef herds
2016	15,017	21,828
2017	12,708	25,209
2018	12,651 ¹	21,522

Source: SEGES.

¹ 3,174 dairy herds as per 1 July 2018 (Source: Central Husbandry Register).

Since 2006, BVD has reoccurred in few new herds every year, but not in 2018.

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 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 restrictions were imposed on the remaining infected herds. Since 2006, BVD has reoccurred in few new herds every year, but not in 2018.

The 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/EEC.

In 2018, seven suspected cases of BVD were notified to the DVFA. Six cases were notified because

Box 7 Supplementary surveillance for brucellosis in cattle

The Danish Veterinary and Food Administration (DVFA) collaborates with the National Veterinary Institute, Technical University of Denmark, 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 2018, 54 aborted foetuses from cattle underwent laboratory testing under this scheme.

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

the animals had tested positive in serological analysis performed under the surveillance programme and one case due to clinical symptoms. Official restrictions were imposed on all seven herds under suspicion while confirmatory laboratory testing was conducted at the National Reference Laboratory. Six of the suspected herds tested free from BVD in the year under review, while one herd was still under suspicion and subject to further testing at year-end, but has subsequently proved free from the disease.

The number of bulk milk samples and the number of blood samples from beef herds examined for BVD in the period 2016-2018 are given in Table 7.

Enzootic bovine leukosis

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

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

Since 2011, the Danish surveillance programme demonstrating the absence of EBL in cattle has comprised post-mortem examination of all

slaughtered animals as part of the meat inspection programme at the slaughterhouses. Furthermore, bulls at semen collection centres are regularly tested in accordance with the provisions of Council Directive 88/407/EEC. Cattle intended for export to certain countries outside the EU are also tested. In 2018, a total of 1,188 animals were tested.

In 2018, the DVFA was notified of four suspected cases of EBL due to clinical symptoms. One of these cases was rejected by the relevant Veterinary Inspection Unit (VIU) of the DVFA based on an evaluation of the clinical symptoms. Official restrictions were imposed on the herds of origin while laboratory testing was being conducted. 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/EC).

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 pro-

The number of bulk milk samples and the number of blood samples from beef herds examined for BVD in the period 2016-2018 are given in Table 7.

The number of bulk milk samples and the number of blood samples from beef herds examined for IBR in the period 2016-2018 are given in Table 8.

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

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

In 2018, the DVFA was notified of 13 suspected cases of IBR, three cases due to clinical symptoms and ten cases because the animals had tested positive in serological analysis 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 2016-2018 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, 2016-2018

Year	Bulk milk samples	Blood samples from beef herds
2016	13,070	12,897
2017	13,017	14,571
2018	9,074 ¹	11,878

Source: SEGES.

¹ 3,174 dairy herds as per 1 July 2018 (Source: Central Husbandry Register).

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 tuberculosis	1994
Bovine virus diarrhoea	Disease present
Enzootic bovine leukosis	1990
Haemorrhagic septicaemia¹	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
Lumpy skin disease	Never reported
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. However, few of the sheep and goat diseases listed by the OIE in 2018 have occurred in Denmark, such as Maedi-visna in sheep and caprine arthritis/encephalitis in goats. 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 the infection is diagnosed.

In 2018, 80 of the 467 goats tested were serologically positive (source: National Veterinary Institute, Technical University of Denmark).



Maedi-visna

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

In 2018, 2,871 sheep were tested, and 332 tested positive (source: National Veterinary Institute, Technical University of Denmark).

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, 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. The most recent case of atypical scrapie was diagnosed in a seven-year old sheep in 2016

after five 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 Veterinary Institute 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 surveillance programme according to the rules of Commission Regulation (EC) No 1874/2003, as amended by Commission Regulation (EC) No 546/2006. According to the Danish surveillance programme, all fallen sheep and goats older than 18 months were tested, and Denmark was, therefore, granted additional guarantees regarding stringent import rules. At the beginning of 2012, Denmark was allowed to amend the extended Danish surveillance programme and to test only random samples of fallen sheep and goats each year. The amendment was allowed due to the substantial number of TSE tests performed without finding any cases of classical scrapie. The sample size is now determined by the size of the population and the rules laid down in the TSE

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).



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

Table 10
Results of the Danish surveillance programme for TSEs in sheep, 2016-2018

Category	2016		2017		2018	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Fallen stock	680	1 ¹	503	0	437	0
Healthy slaughter animals	0	0	1	0	1	0
Cases of clinically suspected TSE	0	0	1	0	1	0
Total	680	1	505	0	439	0

Source: The EU TSE database.

¹ A case of atypical scrapie.

Regulation (Council Regulation (EC) No 999/2001) as amended (Annex III).

A major amendment to the TSE Regulation concerning imports was made in 2013 in order to approximate EU legislation and the OIE Terrestrial Animal Health Code. This amendment also repealed Commission Regulation (EC) No 1874/2003. 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 with a national control programme for classical scrapie as Denmark, the most stringent EU rules on imports still apply.

In 2018, one suspected case of TSE in sheep was notified to the DVFA. However, samples from the suspected case tested free from TSEs.

The results of the surveillance programmes for TSEs in sheep and goats in Denmark in the period 2016-2018 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 programmes for TSEs in sheep and goats in Denmark in the period 2015-2017 are shown in Tables 10 and 11.

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

Table 11
Results of the Danish surveillance programme for TSEs in goats, 2016-2018

Category	2016		2017		2018	
	Animals tested	Positive animals	Animals tested	Positive animals	Animals tested	Positive animals
Fallen stock	132	0	106	0	98	0
Healthy slaughter animals	0	0	0	0	1	0
Cases of clinically suspected TSE	0	0	0	0	0	0
Total	132	0	106	0	99	0

Source: The EU TSE database.

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

Caprine arthritis/encephalitis	Disease present
Contagious agalactia¹	Never reported
Contagious caprine pleuropneumonia¹	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 disease¹	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.

2.4 Swine diseases

The Danish pig production is characterised by large, industrialised pig farms. Approximately 90% of the production is exported either as live piglets for fattening or as meat or meat products.³

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 2018, 365 samples were tested under a supplementary surveillance programme for ASF (and classical swine fever) in Denmark. For further information see Box 8. If a pig shows clinical symptoms of ASF, classical swine fever (CSF) is also suspected. The Danish Veterinary and Food Administration (DVFA) was notified of 14 suspected cases of ASF (or CSF) in 2018. 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

365

In 2018, 365 samples were tested under a supplementary surveillance programme for ASF (and classical swine fever) in Denmark.

³ Source: Danish Agriculture & Food Council.



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

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 African swine fever 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 African swine fever virus on Danish territory. The measures comprise veterinary actions and actions to eradicate wild boars in Denmark. The main elements appear from the following.

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 the general prohibition of swill feeding.

- Larger 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.
- Increased surveillance for ASF in the wild boar population through the offer of free testing of caught wild boars for *Trichinella* spp.
- Strengthening of the cooperation with the Danish Hunters Association.

The public is encouraged to take part in the eradication of wild boars by reporting findings of animals to the DVFA. This can easily be done by using the app 'VildsvineTip' (in English: Wild Boar Tip-off). Notifications of both dead and live animals are stored in the wild boar database. Each record comprises the date, type of the finding (e.g. dead or alive), number of animals, geographical location and a photo of the animal(s). Information on live animals is forwarded to the Danish Nature Agency, which organises the hunting of wild boars and reports the animals killed to the database. The



The findings of wild boars reported in 2018 are illustrated in Figure 1.

relevant Veterinary Inspection Unit (VIU) then collects samples from the dead wild boars (whether shot, road-killed and otherwise deceased) for testing, and the laboratory enters the test results into the database. The samples are tested for ASF, CSF, Aujeszky's disease and *Trichinella* spp. The person reporting the wild boar will also be notified of the test results through the app. All results are publicly available at www.vildsvin.fvst.dk (in Danish). The findings of wild boars reported in 2018 are illustrated in Figure 1.

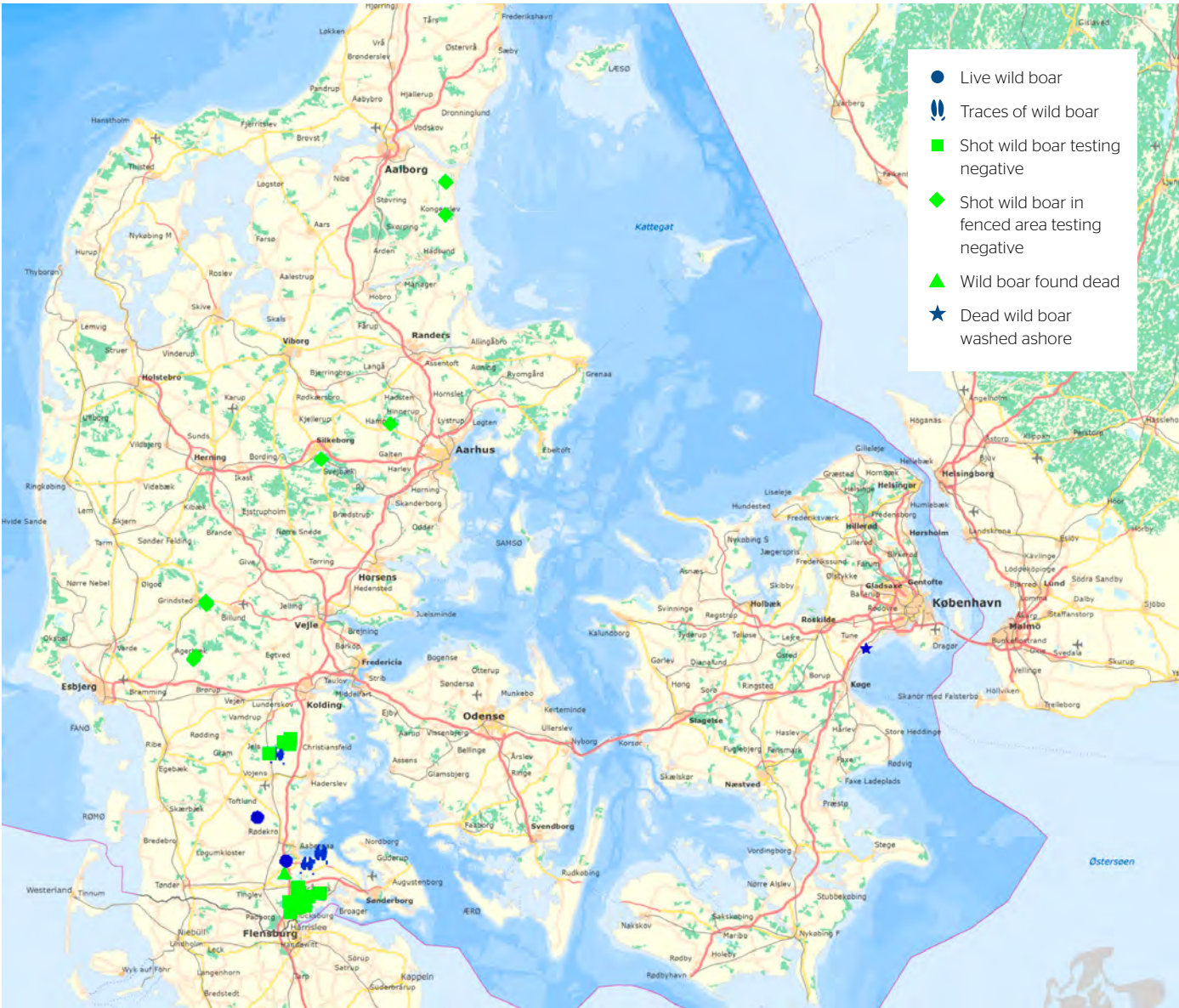
Classical swine fever

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

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

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

Figure 1
Findings of wild boars tested for ASF, CSF, Aujeszky's disease and *Trichinella* spp. in 2018.



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

Due to fluctuations in trade, the number of samples tested for CSF changed significantly during the period under review. The number of samples examined in 2016-2018 is given in Table 13.

Table 13

Serum samples from pigs examined under the Danish classical swine fever surveillance programme, 2016-2018

Year	Samples
2016	41,842
2017	35,705
2018	23,658

Source: National Veterinary Institute, Technical University of Denmark, and other official laboratories in the EU.

Box 8

Supplementary surveillance for African swine fever and classical swine fever

Samples from carcasses of pigs submitted for post-mortem examination is 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 2018, samples from 365 submissions were tested; all tested free from ASF and CSF.

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

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 2018, 14 suspected cases of CSF (or ASF) were notified to the DVFA. Six cases were suspected due to clinical signs in a pig at the ante-mortem inspection or post-mortem examination at a slaughterhouse, two cases were suspected due to a sero-positive reaction, and six cases were reported due to clinical symptoms in animals in herds. One of these cases was rejected by the relevant Veterinary Inspection Unit (VIU) of the DVFA after a thorough assessment of the anamnesis. In the remaining 13 cases, the herd of origin was subjected to thorough clinical examination and laboratory testing. Official restrictions were imposed 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.



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

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

¹ Year of last outbreak is not known.

² PRRS is endemic in Denmark.

Box 9

No porcine epidemic diarrhoea virus in Denmark

Porcine epidemic diarrhoea (PED) has never been recorded in Denmark or in any other Scandinavian country 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 most likely would 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 National Veterinary Institute, 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 2018, 157 blood samples were subjected to testing. All samples tested negative.



157

In 2018, 157 blood samples were subjected to testing. All samples tested negative.



2.5 Poultry diseases

The poultry production in Denmark comprises two major categories: table egg production and meat production. There are 3.5 million laying hens and 115 million broilers in Denmark at any one time.⁴

Only few poultry diseases listed by the OIE occurred in Denmark in 2018.

The EU-coordinated surveillance programme for avian influenza (AI) in poultry as revised in 2015 continued in 2018.

Avian influenza

No outbreaks of highly pathogenic avian influenza (HPAI) were reported in poultry and other captive birds in 2018. However, HPAI H5N6 was diagnosed in 42 dead wild birds in 2018.

Two outbreaks of low pathogenic avian influenza (LPAI) were detected in holdings with poultry. More information on these outbreaks is provided below.

In October 2018, Denmark regained its status as a country free from notifiable avian influenza according to the OIE Terrestrial Animal Health Code. The status was maintained during the rest of 2018.

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

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.

Four clinical suspicions were notified to the DVFA in 2018. Three of the cases were rejected after a thorough assessment of the anamnesis. The remaining case tested negative in the virological test.

Low pathogenic avian influenza in two flocks

In 2018, two outbreaks of subclinical infection with LPAI occurred in Denmark, on 2 May and 25 June 2018, respectively. The outbreaks were detected under the Danish surveillance programme for AI in poultry and game birds and were promptly reported to the OIE through WAHIS (World Animal Health Information System). A stamping-out policy was applied in both outbreaks.

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HPAI H5N6 was diagnosed in 42 dead wild birds in 2018.

⁴ Source: Danish Agriculture & Food Council.

Table 15
Low pathogenic avian influenza (LPAI) in poultry, Denmark, 2018

Outbreak number	Municipality	Confirmed date	Virus type	Number of susceptible birds	Species	Type of holding	Approval of cleaning and disinfection, date
1	Holstebro	05/05/2018	LPAI H5*	20,900	Ducks	Ducks for slaughter, free range	11/05/2018
2	Vordingborg	26/06/2018	LPAI H5N2	2,679	Mallards	Game birds for restocking	28/06/2018

*N type could not be determined

During the suspicion period, the holdings were put under national movement restrictions.

Immediately after the confirmation of LPAI, the DVFA established a restriction zone of 1 km around the infected holdings and implemented the necessary measures in accordance with Council Directive 2005/94/EC and national legislation.

The following measures were applied on the infected holdings:

- All poultry were immediately killed, and the carcasses were disposed of by rendering.
- The cleaning and disinfection of buildings, equipment, vehicles etc. were initiated immediately after the killing. The cleaning and disinfection of the last infected holding was approved on 28 June 2018.
- An epidemiological investigation was conducted in both cases.

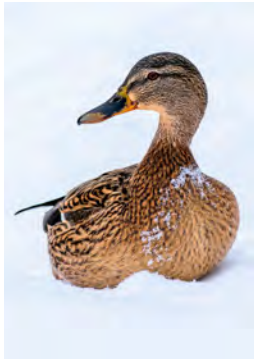
Information on the two LPAI-infected flocks is provided in Table 15.

In both outbreaks, contact holdings were traced and tested for AI; all samples tested negative for AI. The epidemiological investigation of both outbreaks concluded that the most likely cause of the disease was contact with wild birds.

There were no other commercial poultry holdings in the restriction zone. However, in connection with the second outbreak, two hobby poultry flocks were registered in the restriction zone. The hobby flocks were placed under the supervision of the relevant Veterinary Inspection Unit (VIU) of the DVFA.

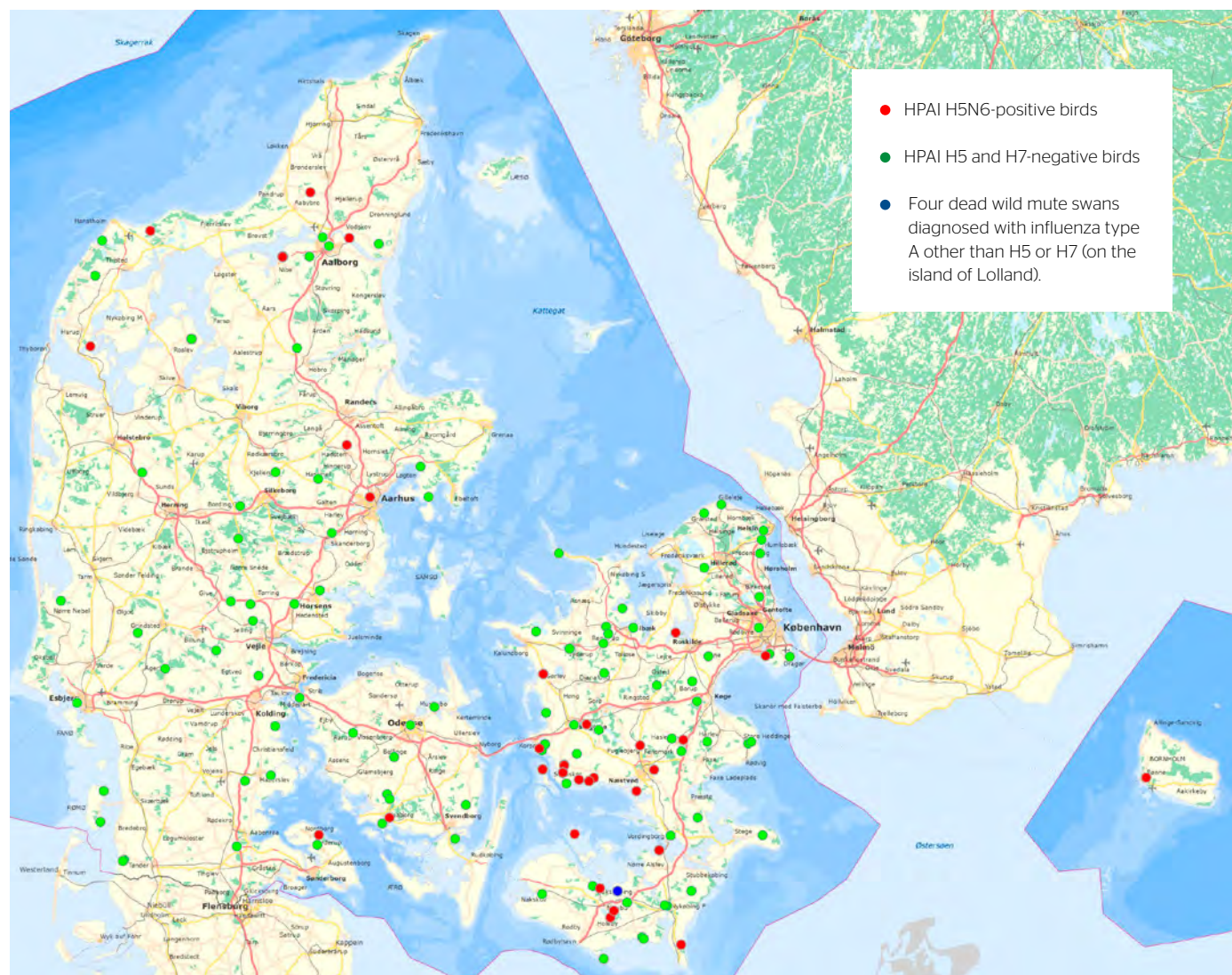
Denmark handled the LPAI outbreaks as pre-scribed by Council Directive 2005/94/EC, taking the precautionary approach. All birds in the affected holdings were killed in order to mitigate the risk of mutation or reassortment of the AI virus.

The last restriction zone was lifted on 19 July 2018.



Information on the two LPAI-infected flocks is provided in Table 15.

Figure 2
Dead wild birds tested for avian influenza in 2018.



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

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

The Danish surveillance programme for AI in poultry and game birds for restocking was established to find AI virus of subtype H5 or H7 circulating in the poultry population. Consequently, when positive serological findings are reported, the holdings will be subjected to further testing in order to detect whether the virus is present. In holdings where avian influenza H5 and H7 virus is detected, the virus will be eradicated by killing all birds of the infected holdings, and the infected premises/ establishment will be subjected to cleaning and disinfection.

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.

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



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

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

In total, 18 holdings/flocks tested positive for AI H5 under the serological surveillance programme in 2018. Some of the positive holdings/flocks tested positive more than once in 2018, reducing the number of serological positive holdings/flocks to 11. One of those also tested positive in the following virological test (LPAI H5). Furthermore, one holding tested positive for LPAI H5 in the virological surveillance programme for offspring of gamebirds. Both cases are described in detail above.

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 avian influenza in poultry and game birds for restocking are shown in Table 16.

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.

Five early warnings of AI were notified to the DVFA in 2018. One of the cases was rejected after a thorough assessment of the anamnesis. All samples from the four other cases tested free from AI and ND.

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.

Table 16
Results of the Danish surveillance programme for avian influenza in poultry and game birds for restocking, 2018

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	196 (f)	164 (f)	0	0	0	-	-
Free-range laying hens	176 (f)	146 (f)	16 ³	0	0	0	0
Free-range broilers	66 (h)	14 (h)	0	0	0	-	-
Fattening turkeys	60 (h)	12 (f)	0	0	0	-	-
Breeder ducks	0 (h)	0 (h)	0	0	0	-	-
Breeder geese	0 (h)	0 (h)	0	0	0	-	-
Fattening geese	11 (h)	3 (h)	0	0	0	-	-
Fattening ducks	80 (h)	17 (h)	1	0	0	1	0
Mallards bred for restocking of game birds	18 (h)						
- Breeding animals		9 (h)	1	0	0	0	0
- Offspring		13 (h)	-	-	-	1	0
Pheasants, partridges, rock partridges and red-legged partridges	66 (h)						
- Breeding animals		26 (h)	0	0	0	-	-
- Offspring		42 (h)	-	-	-	0	0
Total positives			18	0	0	2	0

Source: The Poultry Database of the Danish Agriculture & Food Council, 2019.

¹ The holdings/flocks do not necessarily have active production throughout the year.
² Some flocks/holdings were 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 Some holdings tested serologically positive more than once in the year under review.

The surveillance programme for avian influenza in wild birds

In 2018, 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.

In total, 148 dead wild birds were submitted for laboratory testing in 2018 (passive surveillance), most of them in the first quarter of the year.

The DVFA used the media to increase the awareness of AI in wild birds and to encourage the public to report findings of dead wild birds. In addition, the DVFA introduced an app for smartphones called 'FugleinfluenzaTip' (in English: Bird Flu Tip-off) to make it easier for the public to notify the DVFA in case of findings of dead wild birds.

The monitoring of dead wild birds covered the whole country, and a total of 42 dead wild birds

Table 17
HPAI H5N8 in dead wild birds by species in 2018

Species	Positive birds
<i>Accipitridae</i>	23
Common buzzard	11
White-tailed eagle	12
<i>Anatidae</i>	9
Common eider	2
Greylag goose	1
Mute swan	4
Mallard	2
<i>Laridae</i>	2
Black-headed gull	1
Herring gull	1
<i>Phalacrocoracidae</i>	1
Great cormorant	1
<i>Phasianidae</i>	5
Common pheasant	5
<i>Corvidae</i>	2
Hooded crow	2
Total	42

The monitoring of dead wild birds covered the whole country, and a total of 42 dead wild birds with HPAI H5N6 were detected (see Figure 2).

with HPAI H5N6 were detected (see Figure 2). The last positive bird was found on 22 December 2018. All the wild birds were tested at the National Reference Laboratory. Sequence analyses revealed that the HPAI H5N6 virus detected in Denmark had not changed during the year.

Table 18
Results of the Danish surveillance programme for avian influenza in wild birds, 2018

	Passive surveillance (dead or sick wild birds)	Active surveillance (live wild birds)
Birds sampled	148	866
Samples/pools	148 samples	251 pools ¹
Influenza A-positive birds	46	57 pools ¹
LPAI H5-positive birds	0	1 pools ¹
LPAI H7-positive birds	0	0 pools ¹
HPAI H5/H7-positive birds	42	0

Source: National Veterinary Institute, Technical University of Denmark, 2019.

¹ Pools of cloacal swabs taken from up to five birds of the same species at the same time and location.
The actual number of positive birds is not known, but at least one positive bird will give a positive pool.

Table 19
Outbreaks of poultry diseases listed by the OIE and notifiable in Denmark, 2016-2018

Poultry disease	2016	2017	2018
Avian chlamydiosis¹	11	3	9
Avian infectious laryngotracheitis¹	9	6	2
Avian mycoplasmosis (<i>Mycoplasma gallisepticum</i>)	(1967)	(1967)	(1967)
Fowl typhoid	(2002)	(2002)	(2002)
Infection with highly pathogenic avian influenza viruses (poultry)	1	0	0
Infection with highly pathogenic avian influenza A virus (other captured birds)	–	1	0
Infection with low pathogenic avian influenza viruses	2	0	2
Infection with Newcastle disease virus	(2005)	(2005)	(2005)
Pullorum disease¹	((2010)	(2010)	(2010)

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. However, in 2018, an outbreak was detected in a holding of mallards kept for restocking.

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)	2015
Turkey rhinotracheitis	2007

¹ Year of last outbreak is not known.

As seen on the map in Figure 2, the majority of the findings were made in the southern part of the island of Zealand. Several of these findings were made during the summer, and the situation was considered a local epidemic. The most frequently infected bird species were common buzzard (26%), white-tailed eagle (26%) and Anatidae (21%) (see Table 17).

Under the active surveillance programme, 251 pools of cloacal swabs were analysed; however, none of the live wild birds tested positive for HPAI. The results are displayed in Table 18.

Newcastle disease

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

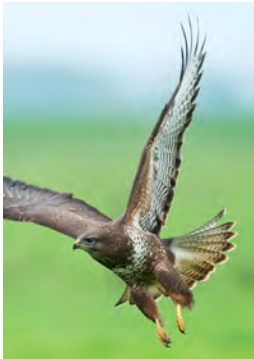
Prophylactic vaccination against ND is compulsory for hens and turkeys in both breeding and layer flocks. Vaccination is also compulsory for flocks of broilers kept free-range or slaughtered when older

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 this virus.

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



The most frequently infected bird species were common buzzard (26%), white-tailed eagle (26%) and Anatidae (21%) (see Table 17).

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

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, equine viral arteritis is notifiable and suspected to be present in Denmark, but the infection has not been confirmed.

Contagious equine metritis

Taylorella equigenitalis, which causes contagious equine metritis (CEM), has not been reported in Denmark since 2009. Microbiological examinations are performed 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 examinations are performed 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 examinations are performed 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 examinations are performed 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.

Dourine, which is caused by the protozoan parasite *Trypanosoma equiperdum*, has never been reported in Denmark



Table 21
Occurrence of OIE-listed equine diseases in Denmark

Contagious equine metritis	2009
Dourine	Never reported
Equine encephalomyelitis (Western)	Never reported
Equine infectious anaemia	1928
Equine influenza¹	Suspected, but not confirmed ²
Equine piroplasmosis¹	Not reported ³
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

In 2018, 1,384 mink farms were registered in Denmark, the annual production of skins exceeding 16 million.⁵

During the past years, consumer demand for animal welfare in modern Danish farming has increased. The industry has therefore collaborated with animal welfare experts to prepare guidelines for fur animal welfare, which formed the basis for national legislation enacted in 2007.

All Danish mink farms undergo annual, mandatory inspections by an authorised veterinarian as set out in legislation. The inspections (4-5 each year) are routine inspections to identify potential health or welfare issues on the farm.

Mink farms are also regularly inspected by veterinary officers from the Danish Veterinary and Food Administration (DVFA).

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

In total, Denmark exported more than 105,000 fur animals in 2018.

⁵ 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 2018, RHD was diagnosed in two pet holdings of rabbits where several rabbits had died. The wild population is considered a reservoir for the disease.

Vaccination against myxomatosis has been allowed in Denmark since 2008.





Box 10

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 occasionally in the northern part of Jutland north of the Limfjord.

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



2.8 Fish diseases

In 2018, 229 aquaculture production businesses (APBs) producing salmonids were registered in Denmark. The majority were freshwater fish farms, but 20 of the 229 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 Directive.

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 2018, the Danish Veterinary and Food Administration (DVFA) carried out approximately 200 inspections of fish farms. The number of surveil-

lance samples (including export samples) tested in 2018 is presented in Table 22.

Each sample tested is a pooled sample of up to ten fish. The most common species tested is rainbow trout, which constitutes approximately 99% 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 22.

The number of surveillance samples (including export samples) tested in 2018 is presented in Table 22.

The types of tissue sampled and the testing methods are also specified in Table 22.

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/EC).

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/EC).

In 2010, ISA virus HPRO (type 2) was detected in an RT-PCR analysis of one sample of Atlantic salmon smolt from a facility with mixed fish species and year classes under water recirculation conditions. All samples include gill material to enhance the possibility of identifying HPRO ISA virus. There was no suspicion or clinical signs of ISA at the facility. As no clinical signs of ISA were found, the detection did not meet the case definition under EU legislation, which is identical with the case definition of the OIE. The European Commission was consulted and agreed with the DVFA that the presence of ISA in Denmark had not been confirmed.

Table 22
Number of surveillance samples (including export samples) tested under the Danish aquaculture surveillance programme in 2018

Disease	Type of tissue sampled ¹	Testing method ²	Number of samples tested in 2018 ³
Epizootic haematopoietic necrosis disease	1	A	133
Infectious haematopoietic necrosis	1	A	619
Infection with infectious salmon anaemia virus	2	B	153
Infection with salmonid alphavirus	1	A	174
Spring viraemia of carp	1	A	99
Viral haemorrhagic septicaemia	1	A	619

¹ 1: Kidney, spleen and heart (and in some cases brain).
² 2: Same tissues as in sample type 1 + gills.
³ 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.



The last occurrence of spring viraemia of carp in Denmark was in 2003.

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 September 2018, KHV was detected in a private garden pond located near the village of Ørum in the municipality of Viborg.

Spring viraemia of carp

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

Viral haemorrhagic septicaemia

The last outbreak of viral haemorrhagic septicaemia (VHS) in Denmark was confirmed in January 2009, and the whole continental territory of Denmark was approved as VHS-free by the European Union in 2013 (Commission Implementing Decision 2013/706/EU). The Danish programme for the eradication of VHS began in 2009 and ended in November 2013. The programme has

been 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 23.

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

Table 23
Last 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	2010
Infection with salmonid alphavirus	Never reported
Infectious haematopoietic necrosis	Never reported
Koi herpesvirus disease	2018 ²
Red sea bream iridoviral disease¹	Never reported
Spring viraemia of carp	2003 ²
Viral haemorrhagic septicaemia	2009

¹ The disease is not notifiable in Denmark.

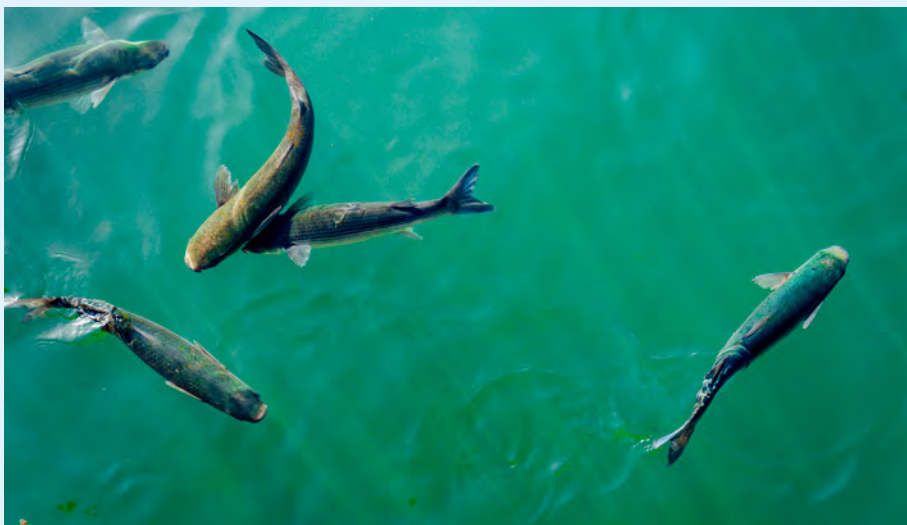
² The infection was detected in a private garden pond.

Box 12

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 2018, 27 freshwater fish farms were registered as being IPNV-free and 21 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 30 fish for bacteriological examination for BKD.



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In 2018, 27 freshwater fish farms were registered as being IPNV-free and 21 freshwater fish farms as being BKD-free (Executive Order No. 967 of 18 July 2013 on the surveillance and registration of IPN and 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 Limfjord. The Danish oyster production is mainly based on the utilisation of natural stock. Only at one site are mussels reared under experimental aquaculture conditions.

During the past more than 15 years, a number of marine aquaculture facilities producing mussels on ropes in the water column (in contrast to natural production on the seabed) have been established in Denmark. At the moment, there are 35 plants with a total annual production of approximately 2,400 tonnes of mussels.

Infection with *Bonamia ostreae*

In January 2018, *B. ostreae* was detected in surveillance samples collected in the Limfjord in November 2017. It has been decided to discontinue the surveillance in the Limfjord 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 24.

Table 24
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, dairies and as fallen stock from farms.

ABPs must be categorised, collected, transported, processed, used, stored and disposed of according to EU legislation.⁶

Animal by-products are categorised into three categories depending on the risks associated with each type of product.

- Category 1 includes animals suspected of being infected with TSEs, 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 25 shows a breakdown of the ABPs produced in Denmark in 2018.

Table 25 shows a breakdown of the ABPs produced in Denmark in 2018.

⁶ 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 25
Animal by-products produced in Denmark in 2018

Source	Category 1 (tonnes)	Category 2 (tonnes)	Category 3 (tonnes)
Slaughterhouses/cutting plants	39,249	109,323	446,571
Fallen stock	18,642	109,329	None

Source: The Danish Agriculture & Food Council, 2019.

4. Livestock statistics

Table 26
Livestock population. Establishments and animals in Denmark, 2016-2018

		2016	2017	2018
Cattle	Animals	1,560,289	1,557,453	1,560,757
	Establishments	18,002	17,428	16,452
Sheep	Animals	142,354	147,347	149,532
	Establishments	6,861	6,537	6,404
Goats	Animals	20,600	19,536	19,370
	Establishments	3,071	3,004	2,961
Horses	Animals	170,000 ¹	174,500 ²	175,000 ²
	Establishments	No data	No data	78,000 ³
Farmed deer	Animals	14,983	14,490	14,131
	Establishments	514	486	479
Pigs	Animals	13,390,751	13,440,375	13,840,542
	Establishments	8,675	8,526	7,967
Poultry	Animals	29,570,001	32,836,800	32,604,504
	Establishments	1,239	1,268	1,266

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

¹ Estimate based on the number of horse passports issued.

² Estimate based on registrations in the national horse database.

³ Statistics Denmark.



Table 27
Animals imported from the EU and third countries to Denmark 2016-2018

	2016	2017	2018
Horses¹	3,351	3,224	3,210
Cattle²	137	168	181
Pigs³	330 ⁵	3	16
Sheep/goats	4,215 ⁶	3,362 ⁶	813
Poultry⁴	6,788,262 ⁷	5,793,280 ⁷	6,021,736 ⁷

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

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 Import, extraordinary event.

⁶ Imports of sheep intended for slaughter.

⁷ Imports of mainly day-old chicks.

Table 28
Animals exported from Denmark to the EU and third countries, 2016-2018

	2016	2017	2018
Horses¹	730	716	648
Cattle²	57,113	62,929	70,790
Pigs	13,421,804	14,673,815	14,968,784
Sheep/goats	1,413	1,075	1,156
Poultry³	57,457,138	56,116,342	54,076,715

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

¹ Horses, asses, mules and hinnies.

² Bovine animals.

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



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