

# SURVEILLANCE OF INFECTIOUS DISEASES

IN ANIMALS AND HUMANS IN SWEDEN 2022

*Chapter excerpt:  
Post mortem examinations in wildlife*



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**Cover:** A cultivation of *Salmonella* at the Public Health Agency of Sweden.  
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**Reporting guidelines:** Reporting guidelines were introduced in 2018 for those chapters related to purely animal pathogens. The guidelines build on experiences from several EU projects, and have been validated by a team of international experts in animal health surveillance. The aim is to develop these guidelines further in collaboration within the global surveillance community and they have therefore been made available in the form of a wiki on the collaborative platform GitHub (<https://github.com/SVA-SE/AHSURED/wiki>). Feel free to contribute!

**Layout:** The production of this report continues to be accomplished using a primarily open-source toolset. The method allows the source text to be edited independently of the template for the layout which can be modified and reused for future reports. Specifically, the chapter texts, tables and captions are authored in Microsoft Word and then converted to the LaTeX typesetting language using a custom package written in the R software for statistical computing. The package uses the pandoc document conversion software with a filter written in the lua language. Most figures and maps are produced using R and the LaTeX library pgfplots. Development for 2022 has focused on generalising the R package to accommodate conversion into formats other than LaTeX and PDF, with a focus on markdown files which can be published as HTML websites using the Quarto publishing system. The report generation R package and process was designed by Thomas Rosendal, Wiktor Gustafsson and Stefan Widgren.

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# Post mortem examinations in wildlife



Figure 72: Northern gannet found dead on the Swedish west coast during an outbreak of avian influenza in the summer of 2022. Photo: Anonymous.

## BACKGROUND

The national general wildlife disease surveillance programme is based on pathology and ancillary testing at the National Veterinary Institute (SVA). The surveillance programme is financed partly by annual state hunting permit fees, and partly by governmental funding. The aim is to monitor and follow the wildlife disease situation in Sweden and to diagnose and acquire knowledge on present and emerging diseases in Swedish wildlife. The wildlife disease surveillance not only provides key information for wildlife management, but also constitutes an important part of the Swedish One Health surveillance, including surveillance for new and potentially emerging diseases. The WOA national focal point for wildlife for Sweden is based at SVA and is responsible for reporting of diagnosed cases of listed diseases in wildlife, as well as specified non-listed wildlife diseases to the Board of Agriculture.

## SURVEILLANCE

The general public, local authorities and especially hunters report and, when relevant and possible, also help to submit wildlife that is found dead, or found sick and then euthanised, to SVA for diagnostic examination. Use of the SVA online form ([rapporteravilt.sva.se](http://rapporteravilt.sva.se)) to report sick or dead wildlife helps SVA to map the disease situation in wildlife, and to access suitable samples with the help of the public.

Standard samples are collected for bio-banking from suitable submitted carcasses. All large carnivores: brown bear (*Ursus arctos*), lynx (*Lynx lynx*), wolf (*Canis lupus*), and wolverine (*Gulo gulo*) found dead, euthanised, or when harvested by hunters must be submitted to SVA for examination, as skinned carcasses or as sets of predetermined tissue samples.

## RESULTS

In 2022, whole carcasses or parts of 3528 free-ranging wildlife were submitted to the Department of Pathology and Wildlife Diseases at SVA. Any examined farmed or captive wildlife species are not included here. The most important wildlife disease events in 2022 are mentioned below.

The circulation of avian influenza with outbreaks in wild birds was ongoing almost continuously throughout the year. There were occasional cases of spillover to scavenging mammals, such as red foxes. Surveillance of CWD continued in 2022, but with a focus on possible clinical cases, targeting cervids with signs of neurologic disease or wasting. No further cases of CWD were found this year.

Table 39: Reportable infectious diseases in wildlife and number of outbreaks/cases diagnosed at SVA in 2022. Here, individual cases are listed, and may differ from other official numbers of disease outbreaks or number of index cases. Where a disease was diagnosed in several species, the number of cases per species is listed in parentheses.

Disease	Total	Species and no. per species
Avian influenza	96	Northern goshawk (3), Eider (1), Greylag goose (2), Grey-backed gull (4), Northern gannet (12), Greater black-backed gull (2), White-tailed eagle (2), Canada goose (4), Sandwich tern (15), Mute swan (6), Buzzard (12), Peregrine falcon (2), Common murre (4), Lesser black-backed gull (1), Magpie (1), Black-headed gull (5), Rock pigeon (1), White stork (1), Northern fulmar (1), Great cormorant (2), Mediterranean gull (2), Whooper swan (1), Razorbill (4), Barnacle goose (7), Harbour porpoise (1)
Avian malaria	3	Blackbird
Avian paramyxovirus	2	Rock pigeon
Avian pox	5	Magpie (2), Great tit (3)
Circovirus	6	Wild boar
Echinococcus multilocularis	1	Red fox <sup>A</sup>
Lagovirus	10	Wild rabbit <sup>B</sup>
Listeriosis	1	European brown hare
Mycoplasma infection	3	Pheasant
Myxomatosis	3	Wild rabbit
Pox virus	2	Harbour porpoise
Pseudotuberculosis	4	European brown hare
Psittacosis	1	Great tit
Sarcoptic mange	7	Lynx (3), Red fox (3), Wild boar (1)
Salmonellosis	79	Bullfinch (7), Green woodpecker (1), Siskin (14), Hedgehog (1), Roe deer (1), Black-headed gull (1), Goldfinch (1), Great tit (1), Wild boar (51)
Toxoplasmosis	1	Mountain hare
Trichinosis	15	Bear (2), Lynx (5), Wolf (2), Wild boar (6) <sup>C</sup>
Trichomoniasis	24	Chaffinch (1), Greenfinch (2), Siskin (1), Yellowhammer (2), Wood pigeon (12), Stock dove (1), Rock pigeon (4), Collar-necked dove (1)

<sup>A</sup> Cases in new areas. Sample submitted in 2022, analysis finalised in 2023.

<sup>B</sup> Rabbit viral haemorrhagic disease.

<sup>C</sup> Bear and wild boar are hunter submissions.

The enhanced passive surveillance of African swine fever virus in found dead wild boar continued, but so far, the disease has not been found in Sweden. The finding of *Salmonella Choleraesuis* in several areas in Sweden in 2020 has been followed by both general and targeted surveillance also in 2022, with continued findings in both found dead and in hunter harvested wild boar. For details, see the chapter about infectious diseases in wild boars (page 129).

The programme for health and disease surveillance of marine mammals initiated in 2020, continued with necropsies of cetaceans and seals, a work done in collaboration with the Museum of Natural History, financed by the Swedish Agency for Marine and Water Management. A coastal network reporting and handling stranded marine mammals is maintained to find suitable carcasses for necropsy. One notable case was the first finding of high pathogenic avian influenza in a clinically ill harbour porpoise (*Phocoena phocoena*) that died in 2022.

## DISCUSSION

The general disease surveillance in wildlife is based on citizen science, with the interested general public and hunters especially, reporting and helping to submit samples. A high public interest in wildlife health and conservation continues to make this work possible, together with state financing. Among scientists and relevant authorities, it is well recognised that wildlife disease surveillance is an integral part of the One Health concept. The surveillance results regarding reportable infectious diseases (Table 39) show that there are only few serious infectious disease threats to wildlife, but some that may infect domestic animals or humans.

## REFERENCES

SVA annual report (Årsredovisning) 2022.

SVALA data on wildlife diagnoses 2022.

SVA report: Wildlife disease surveillance in Sweden 2022.