



# SARS-CoV-2 in animals: animal and public health risk, monitoring, prevention and control

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# AUTHORS OF THE RISK ASSESSMENT

- EFSA Panel on Animal Health and Welfare
- Ad hoc WG on SARS CoV-2 in animals
- EFSA Team on Animal Health
- ECDC
  
- Input by EMA



## BACKGROUND AND SCOPE

- Evolution of epidemiological situation
- Scientific knowledge on SARS-CoV-2 spread in humans and animals
- New or refinement or better understanding of prevention and control measures
  - vaccination (animals and humans)
  - diagnostic techniques
  - biosecurity requirements
  - risks related to genetic mutations of SARS-CoV-2

in light of the above :

>>> To review the current monitoring system in the EU



TOR 1

Revision of relevant scientific literature available globally on SARS-CoV-2 infection in animal species of epidemiological concern



# ANIMAL SPECIES OF POTENTIAL EPIDEMIOLOGICAL CONCERN

Species able to shed infectious virus and are able to transmit SARS-CoV-2 to other animals or humans

- American mink
- raccoon dog
- cat
- Syrian hamster
- ferret
- house mouse (some virus variants only)
- Egyptian fruit bat
- deer mouse species (not present in Europe)
- white-tailed deer

Farmed animals



pets

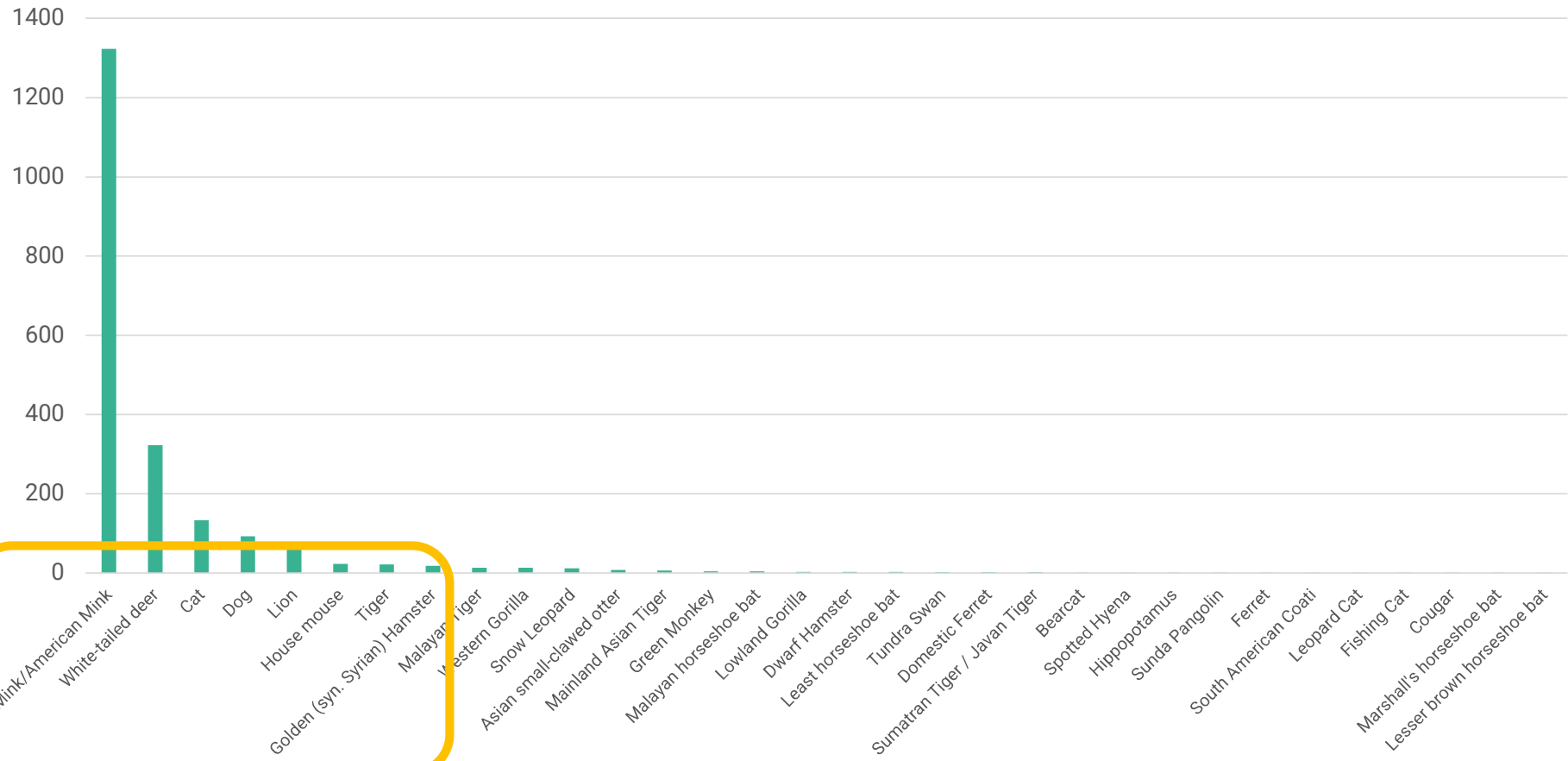


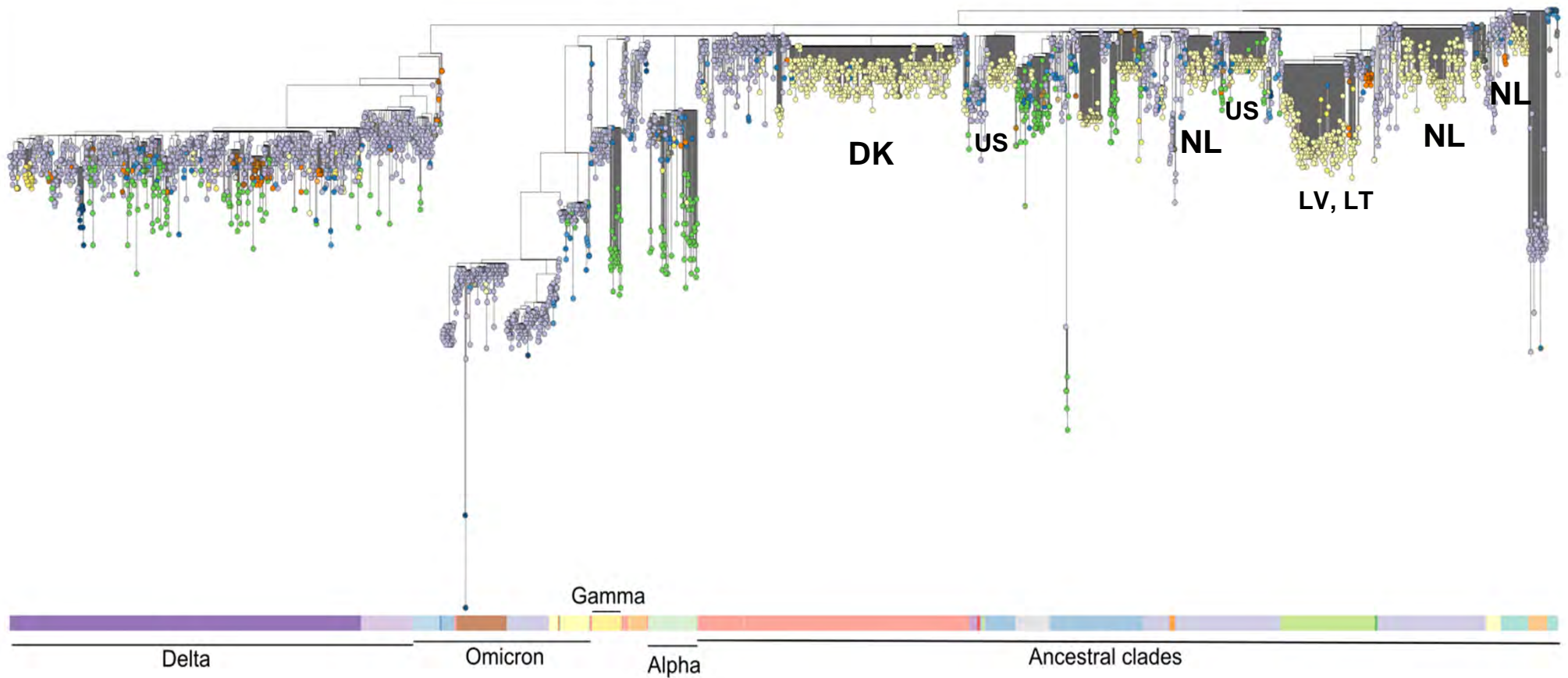
Wildlife /zoo animals



# NUMBER OF DEPOSITED SARS-COV-2 SEQUENCES FROM ANIMAL SOURCES

GISAID





Mink



White-tailed deer

**high intra-cluster variability**

- mink-to-mink transmission
- high rates of virus evolution within the mink population



## FARMED MINK

- highest likelihood to become infected and transmit SARS-CoV-2 within animal populations and to in-contact humans

Main reasons:

- **inherent susceptibility** to SARS-CoV-2 infection of the species
- **characteristics of husbandry system:** density, contiguous cages





# WILDLIFE

- Wildlife species reported infected SARS-CoV-2 grows steadily
  - active research
  - wild carnivores and white-tailed deer in North America
- North American white-tailed deer >> maintain and possibly spill back the infection to humans
  - No cases of infected wildlife reported in EU (few feral American mink)
  - Epidemiological role of susceptible wildlife in the EU: abundance and exposure to humans
  - Clarify possible role of white-tailed deer in the EU?
- Further epidemiological research recommended



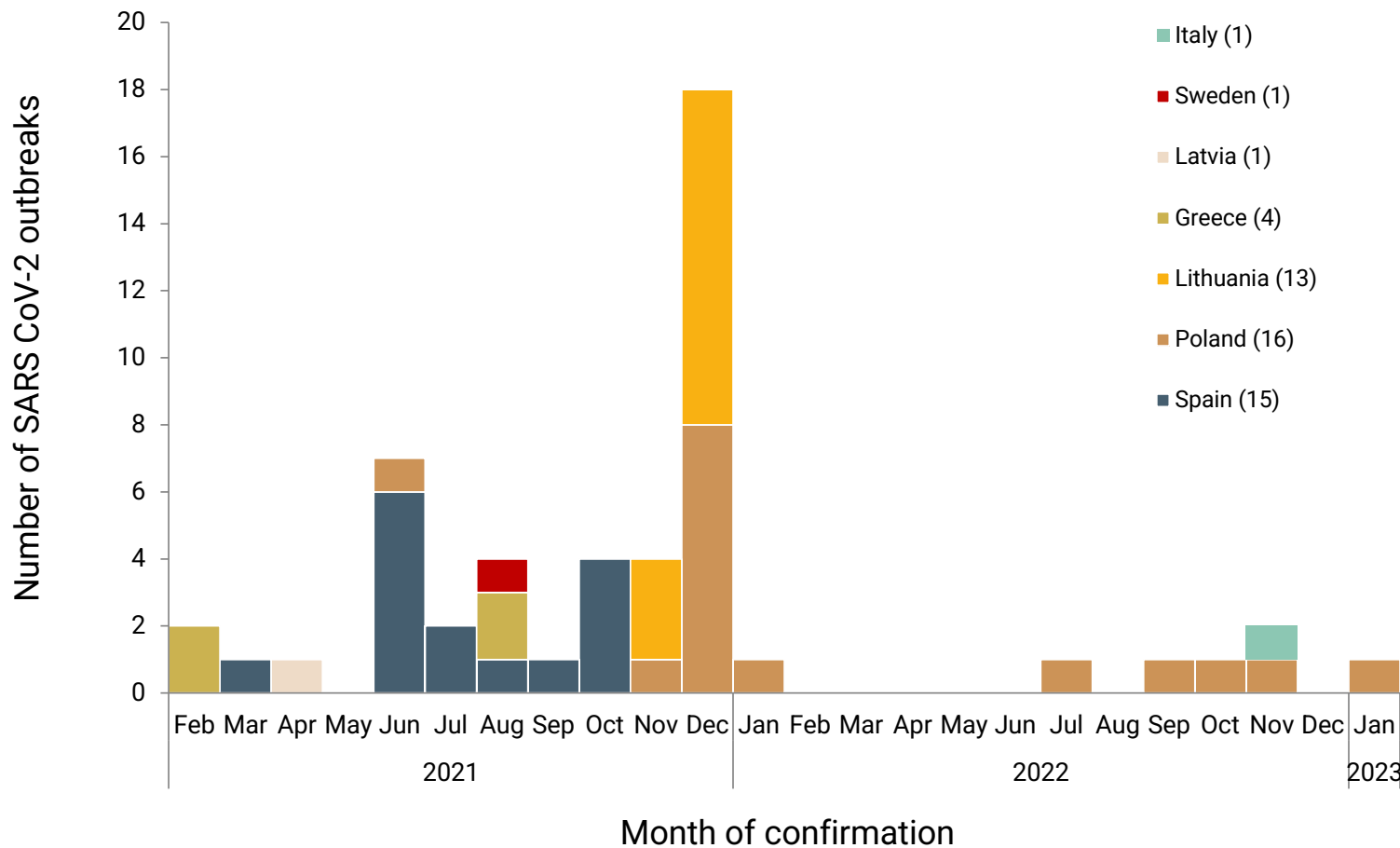
## TOR 2

Assess the **current epidemiological situation** in the EU and elsewhere as regards

the **risk for human and animal health** posed by SARS-CoV-2 infection in animals species of concern



# SARS-COV-2 OUTBREAKS IN MINK FARMS 2021-2022



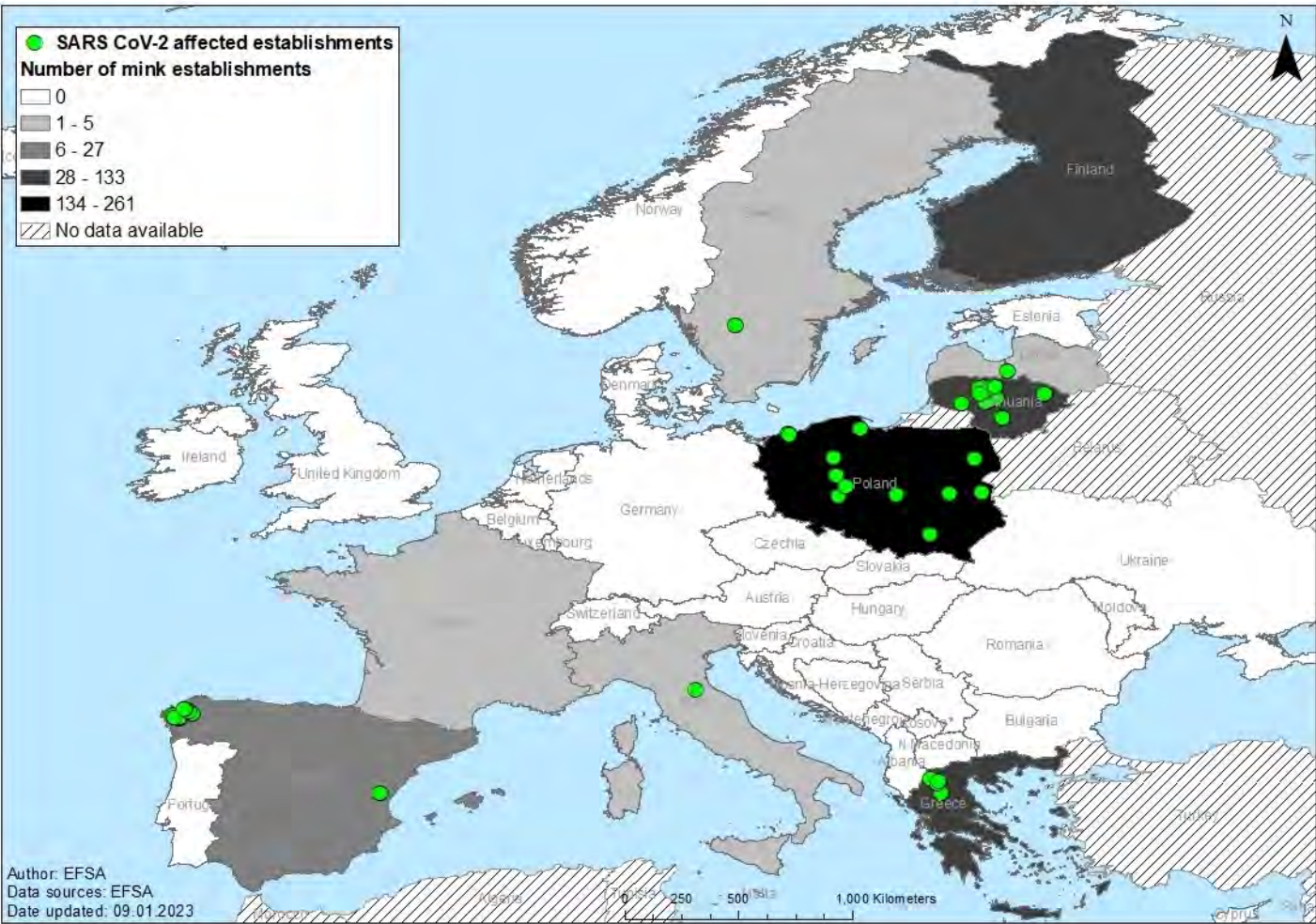
- 2021: 44 in 7 MSs
- 2022: 6 in 2 MSs

For comparison, in 2020 till Jan 2021:

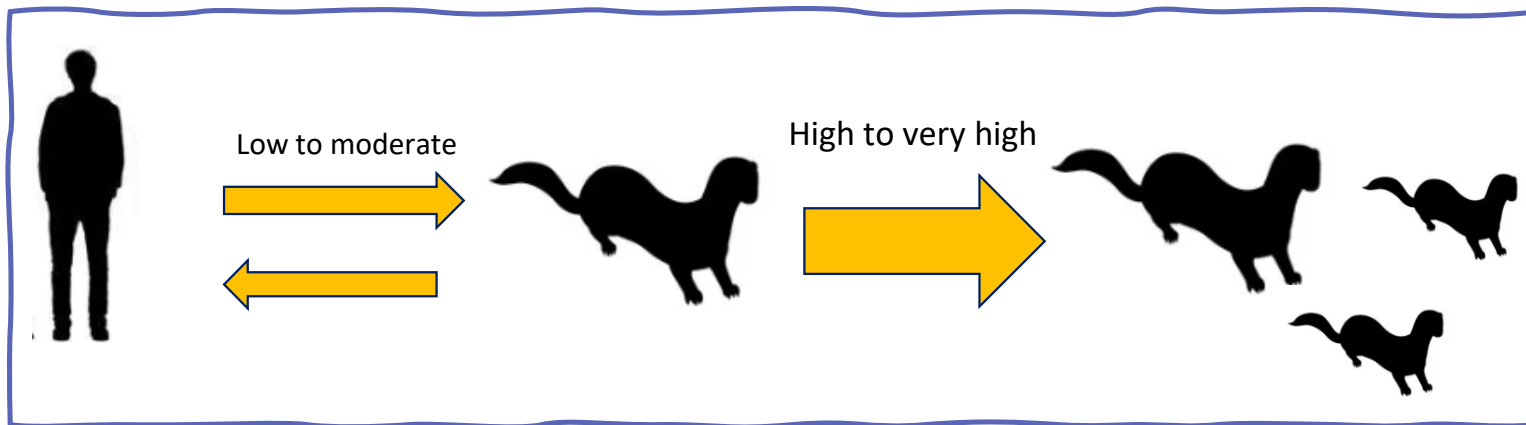
- 290 outbreaks in DK
- 69 in NL



# 1<sup>ST</sup> FEBRUARY 2021 TO 30 NOVEMBER 2022



# TRANSMISSION PATHWAYS AND PROBABILITY OF TRANSMISSION



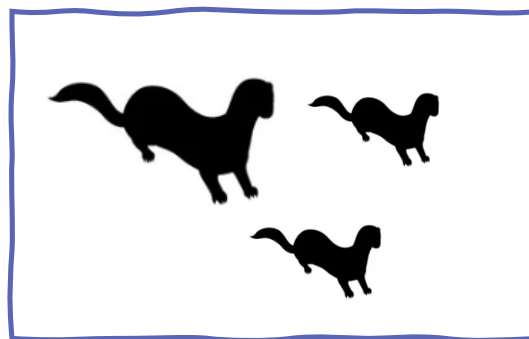
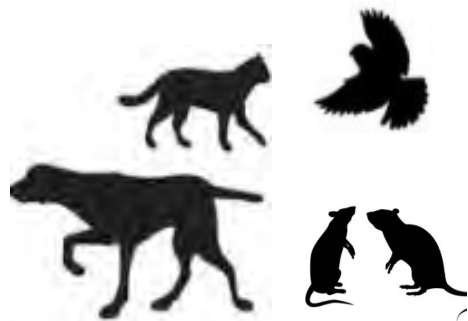
Farm 1

Very low



Moderate

Low to moderate



Farm 2



# PUBLIC HEALTH RISK FOR DIFFERENT ANIMAL CATEGORIES

Category and animal species	Risk for an individual with no or limited exposure	Risk for occupationally exposed	Risk for general population
<b>Farmed animals (mink)</b>	None to very low	Low to moderate	Very low to low
<b>Companion animals (Cat, hamster, mouse, rat and ferret)</b>	Very low	very low to low	none to very low
<b>Wildlife (White-tailed deer, bats)</b>	None to very low	Very low	None to very low
<b>Zoo animals</b>	None to very low	Very low	None to very low



## TOR 3

In different epidemiological scenarios, recommend options for **reviewing the monitoring strategies**



## SCENARIOS AND MONITORING OBJECTIVES

	Early detection of SARS-CoV-2	Measuring exposure (serology)	Confirmation of SARS-CoV-2 infection based on suspicion	Monitoring virus evolution (sequencing)
Farmed animals (minks, raccoon dogs)		X	X	X
Companion animals			X	X
Stray cats		X	X	X
Wild animals		X	X	X
Zoo animals			X	X





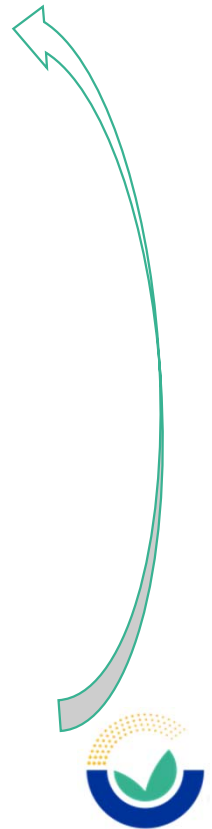
## MONITORING SARS-COV-2: CONSIDERATIONS

- general aim of SARS-CoV-2 monitoring >> information for planning and implementing appropriate preventive and control measures
- Changing epidemiological situation globally: decrease in mortality and incidence, relaxing test intensity
- Humans are still the main population maintaining the circulation of SARS-CoV-2 virus and transmitting infection to animals
- genomic surveillance of the emergence of new variants of the virus, risk of establishment in novel hosts



# MONITORING IN FARMED MINK

- **Confirm suspicion**: sampling in case of increased mortality or morbidity in mink, or farm personnel testing positive
  - PCR testing by oral swab of dead animals or with clinical signs
  - If positive personnel and in absence of clinical signs in animals >> random sample assuming a 20% prevalence (95% confidence, 15 samples)
    - To increase chance of detection >> to repeat sampling after 8-10 days after exposure of infected worker or take larger sample
- to **periodically assess the situation** in the farms: sampling at pelting by serology or PCR tests to assess the level of exposure or infection
- **genomic characterisation** of all positive isolates, at least representative of each positive farm or epidemiological unit.
- **Systematic frequent (e.g., at least weekly) testing of farm personnel or visitors** >> key measure to prevent introduction of SARS-CoV-2 into the farm



# MONITORING IN WILDLIFE

- possible targets for SARS-CoV-2 monitoring
  - white-tailed deer
  - wild carnivores
  - bats
  - rodents such as wild synanthropic mice and rats (those living in or close to human settlements).
- monitoring based on **suspicion**, clinical **signs** or **dead-found** animals.
- Positive samples should be subjected to **genomic analysis** to monitor virus evolution
- research on **possible role of bats** in the European context and in general on wildlife

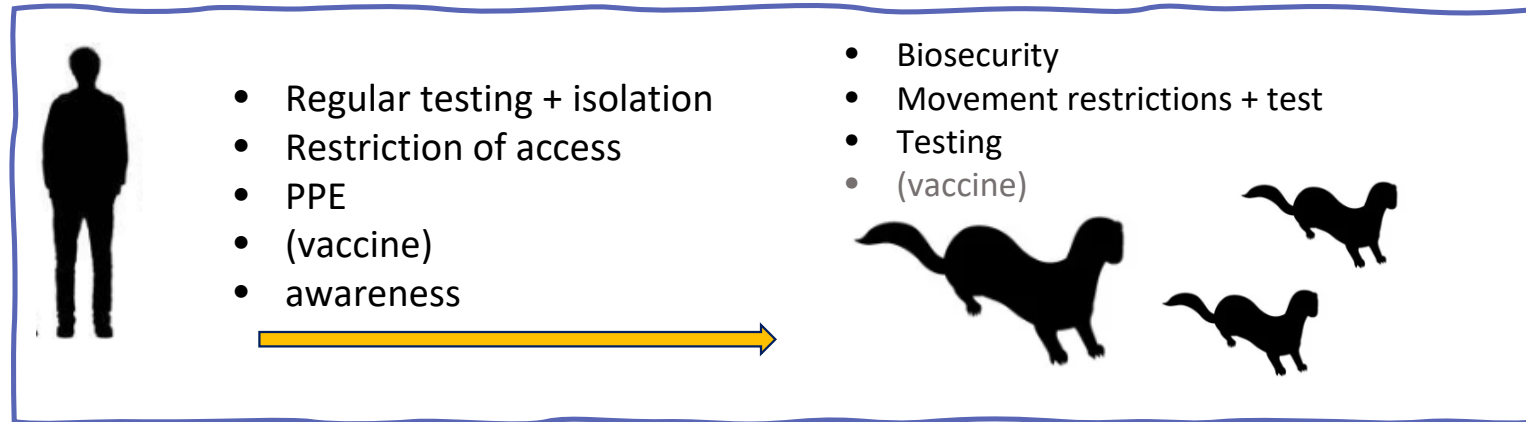


TOR 4

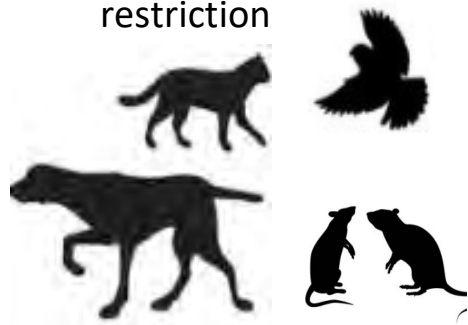
Options for prevention and control measures,  
strengths and drawbacks



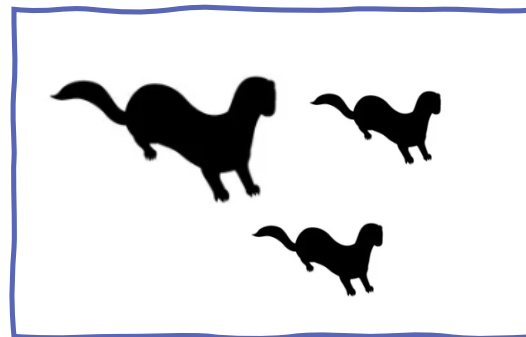
# PREVENTION AND CONTROL IN MINK FARM



- Biosecurity
- Fencing
- Access restriction



Movement restrictions + test



# PREVENTION AND CONTROL IN WILDLIFE

- >>> **risk factor : exposure of animals to humans**
  - minimising direct contact with wild animals
  - good hunting practices (avoiding feeding or baiting)
  - biosecurity measures
  - safe disposal of garbage and waste from human communities
- avoid overabundance or aggregation of game species (e.g. avoiding feeding sites, monitoring group size)



# ACKNOWLEDGEMENTS

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**THANK YOU FOR  
YOUR ATTENTION**

<https://www.efsa.europa.eu/it/topics/efsa-and-covid-19>