

Erasmus MC



Viroscience lab

WHERE SKILLS MEET TO STUDY & PROTECT

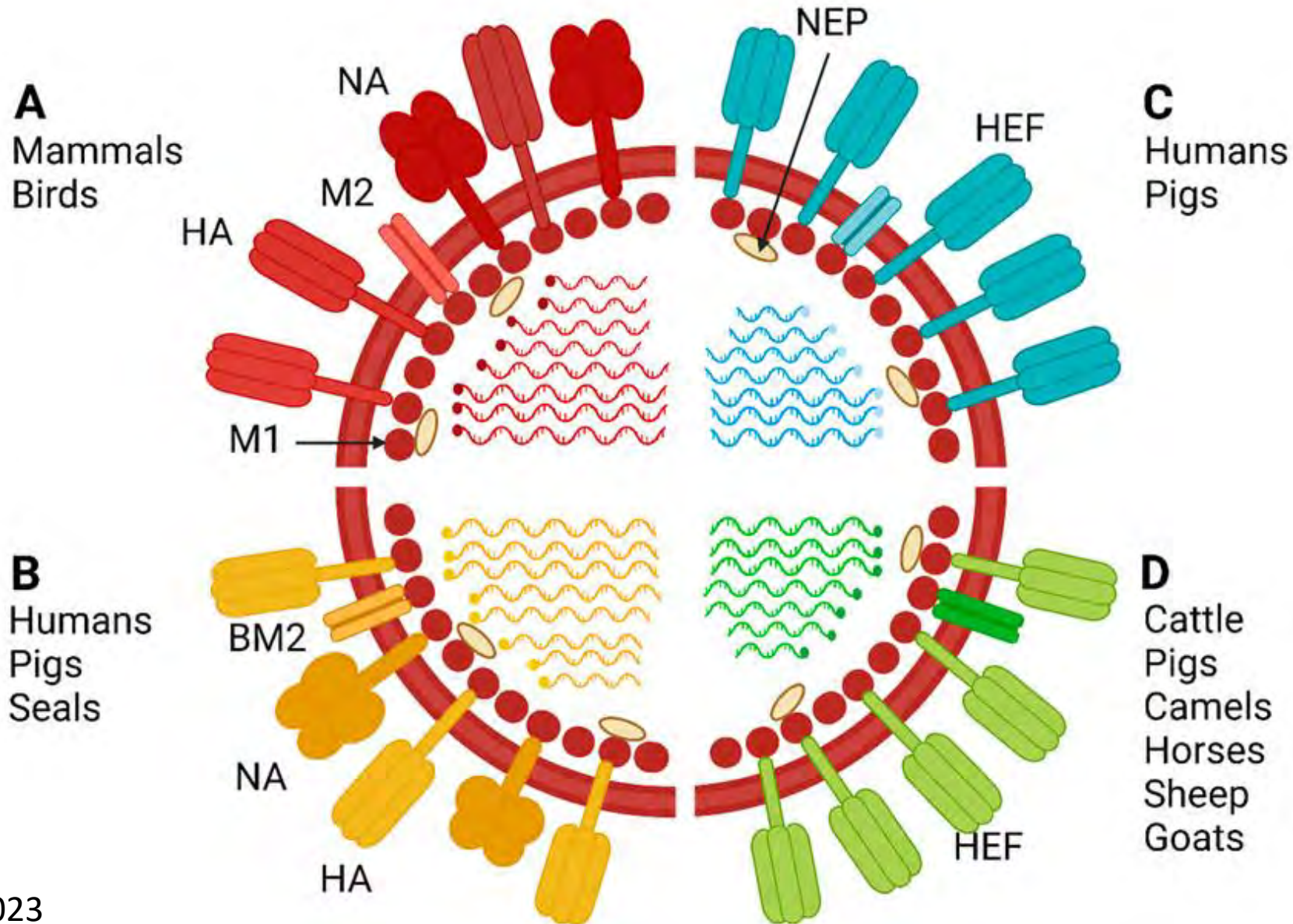
Aviaire Influenza (AIV) in zoogdieren, een update

Dr. Reina S. Sikkema
One Health Virology

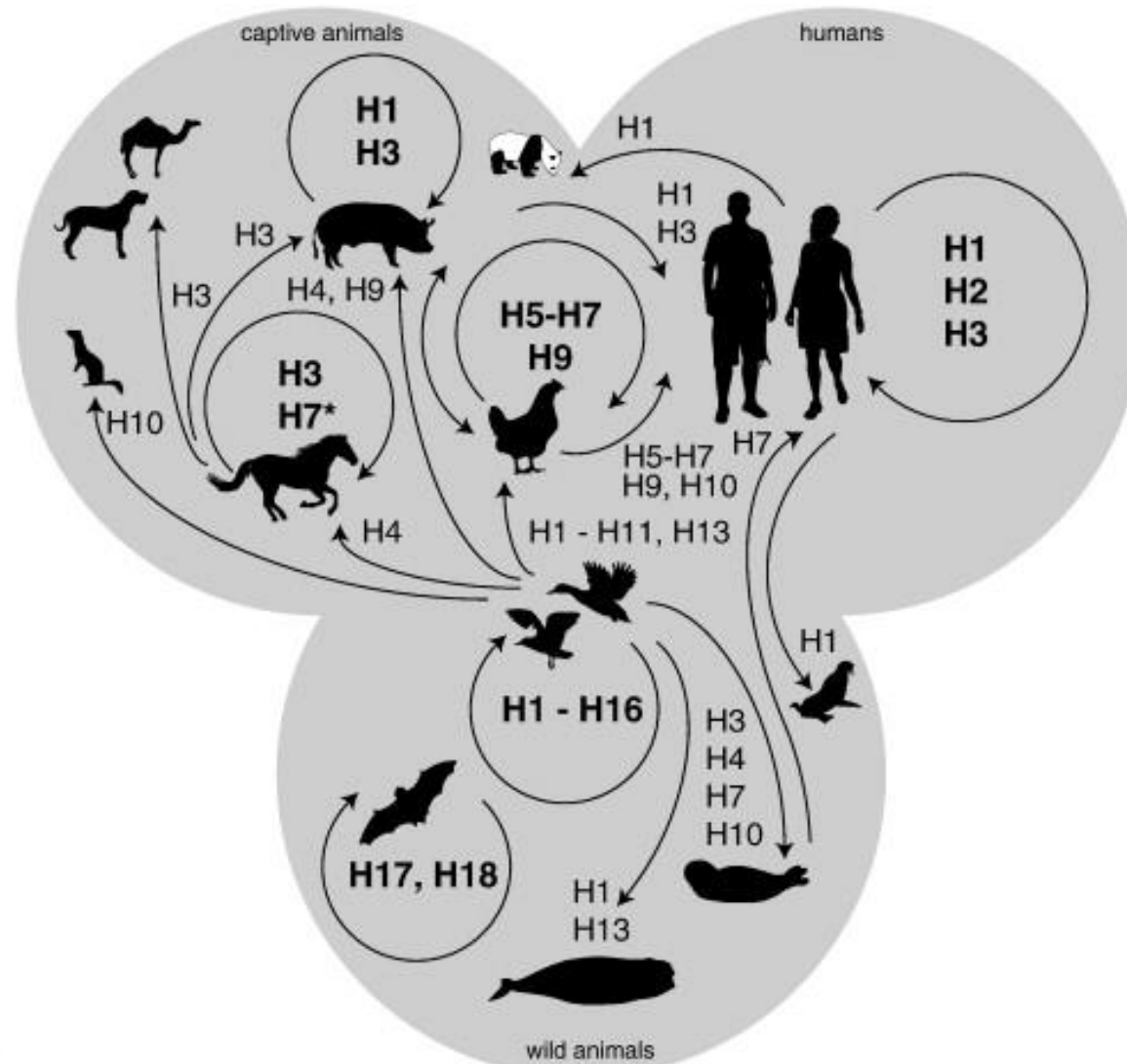
r.sikkema@erasmusmc.nl

 @ReinaSikkema

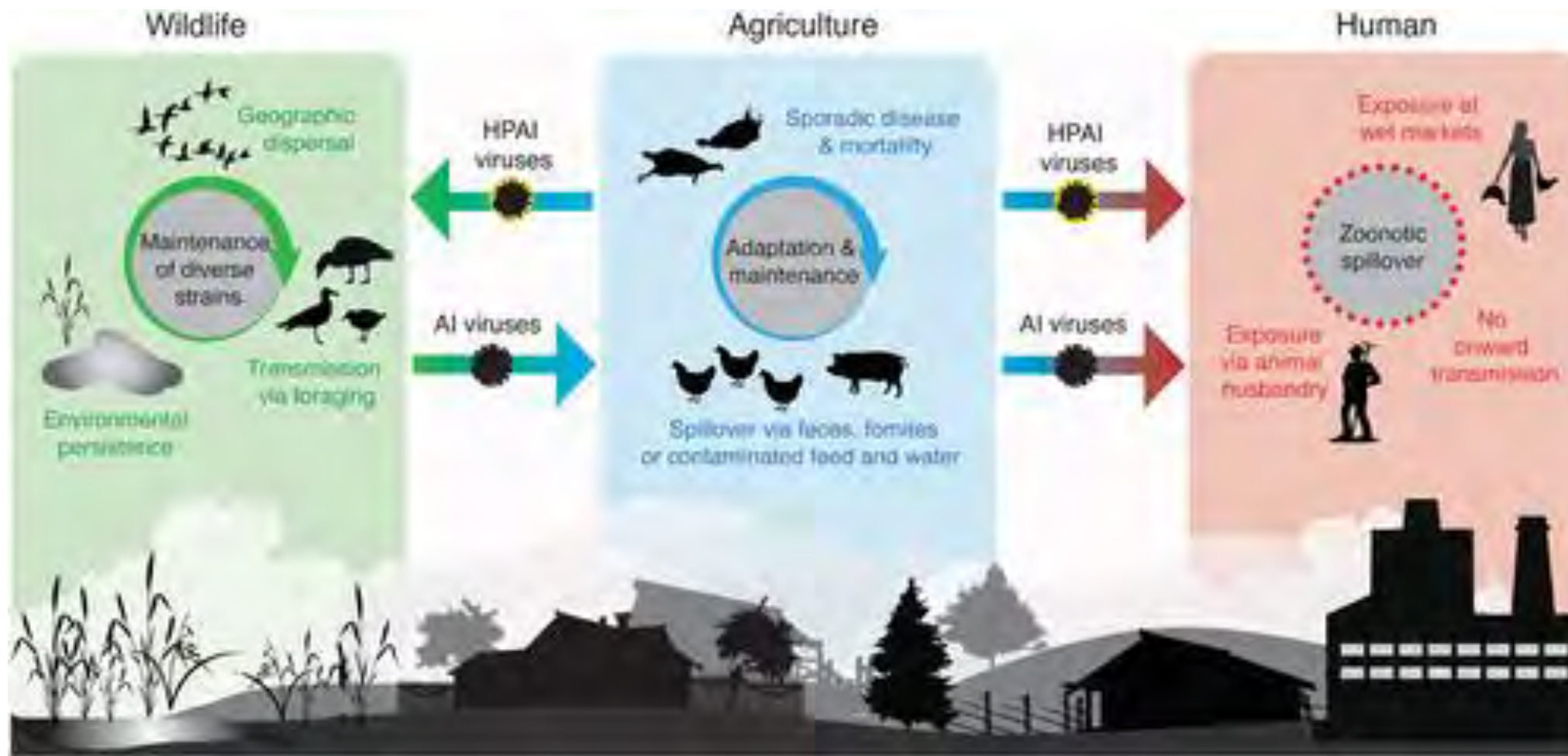
Influenza A, B, C en D virussen



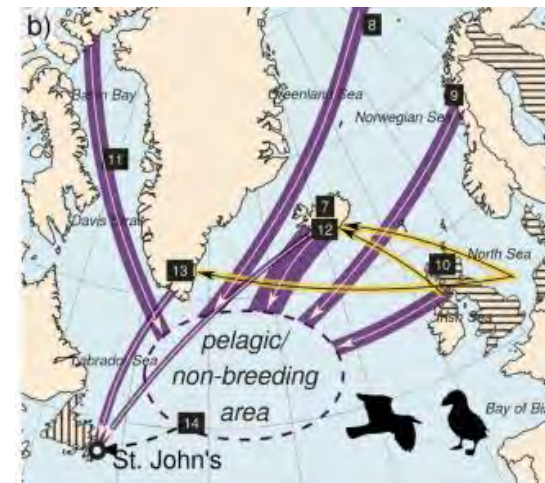
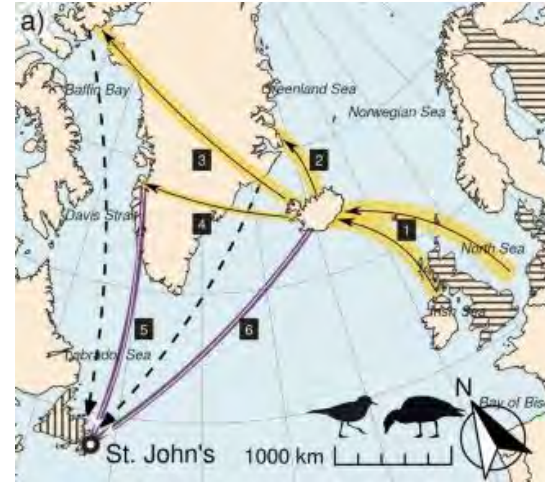
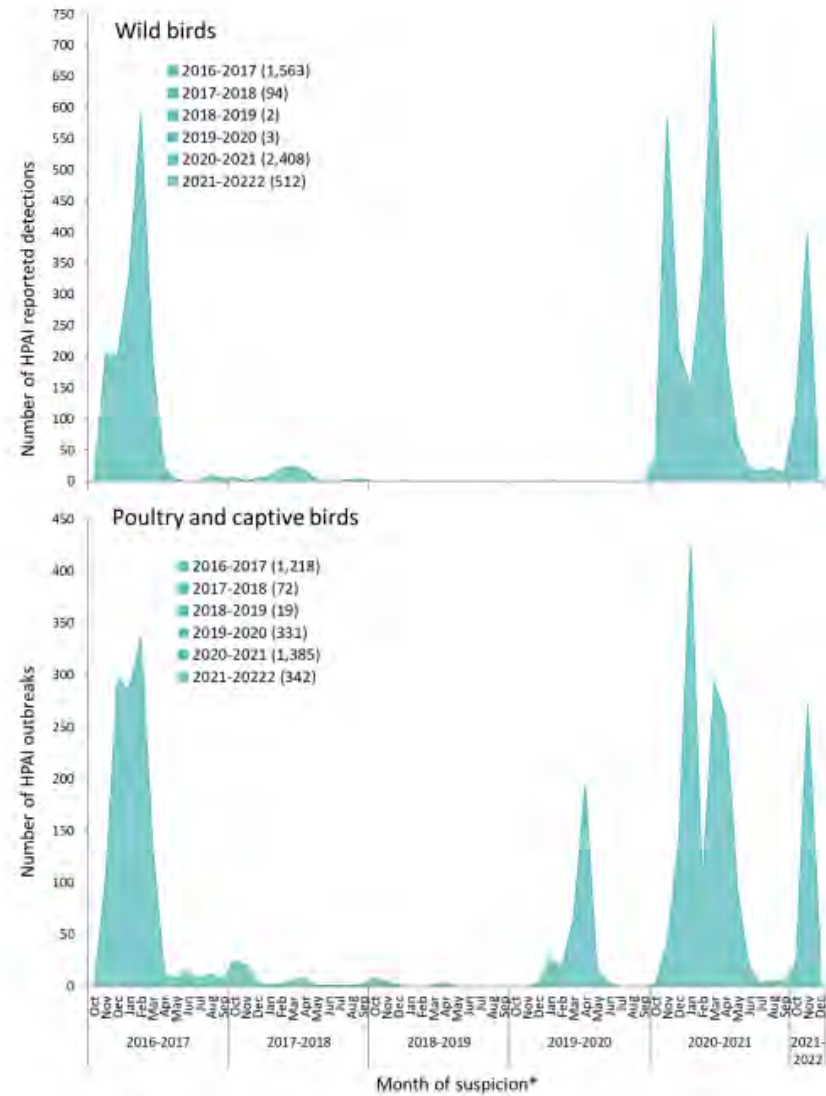
Influenza A virussen in vele gastheren



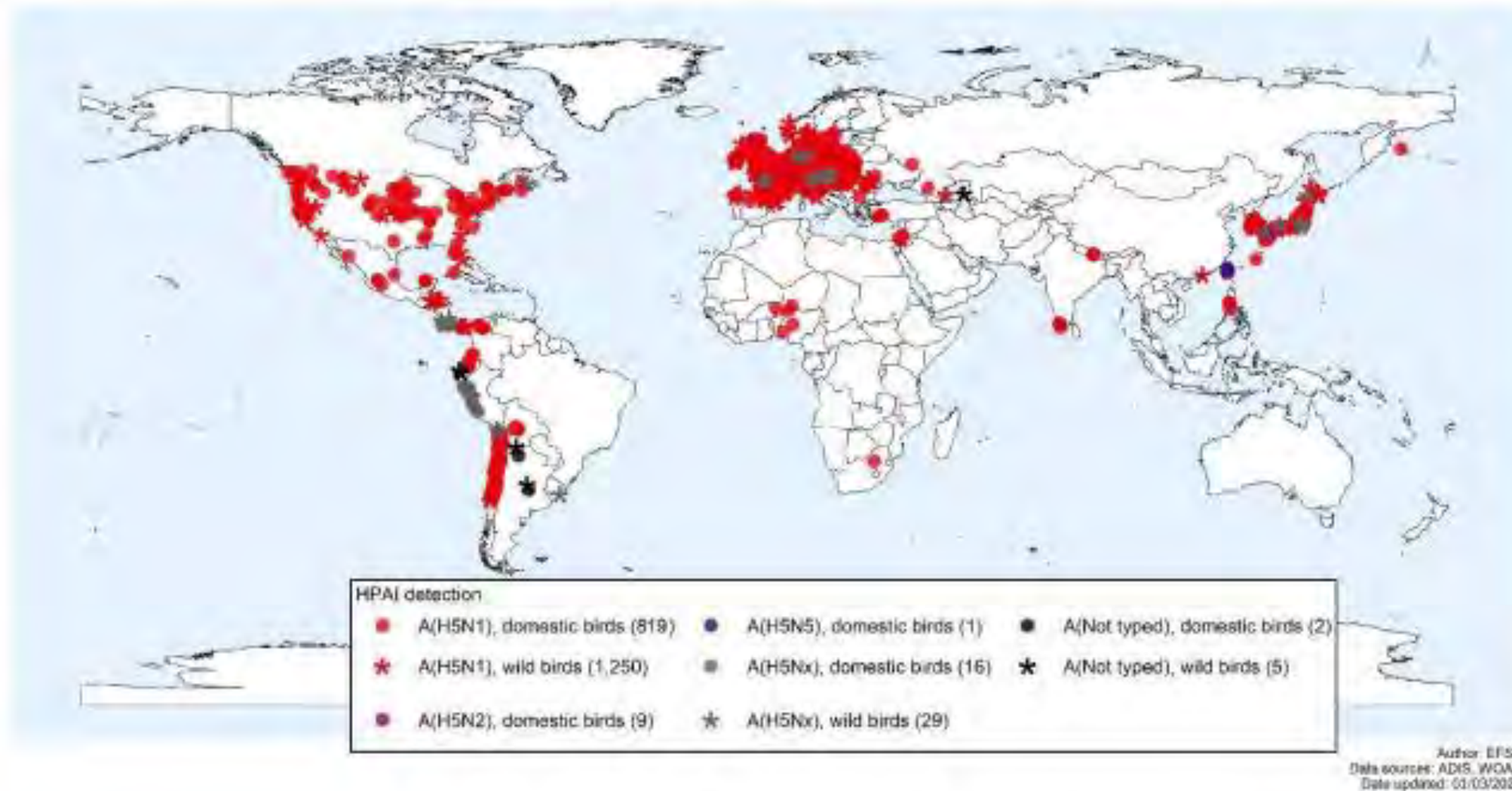
Opduiken va A/goose/Guangdong/1/1996-lineage H5Nx virussen



2020 HPAI H5 uitbraak in Europa

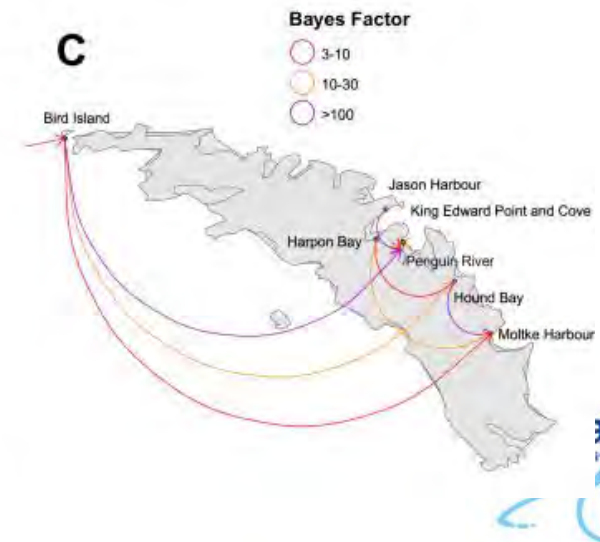
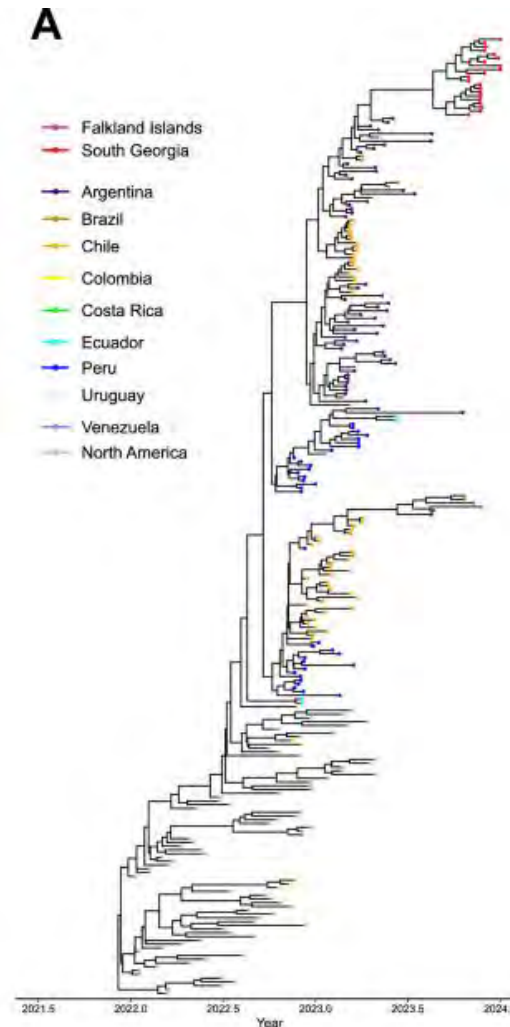


Grootste HPAI H5 uitbraak ooit

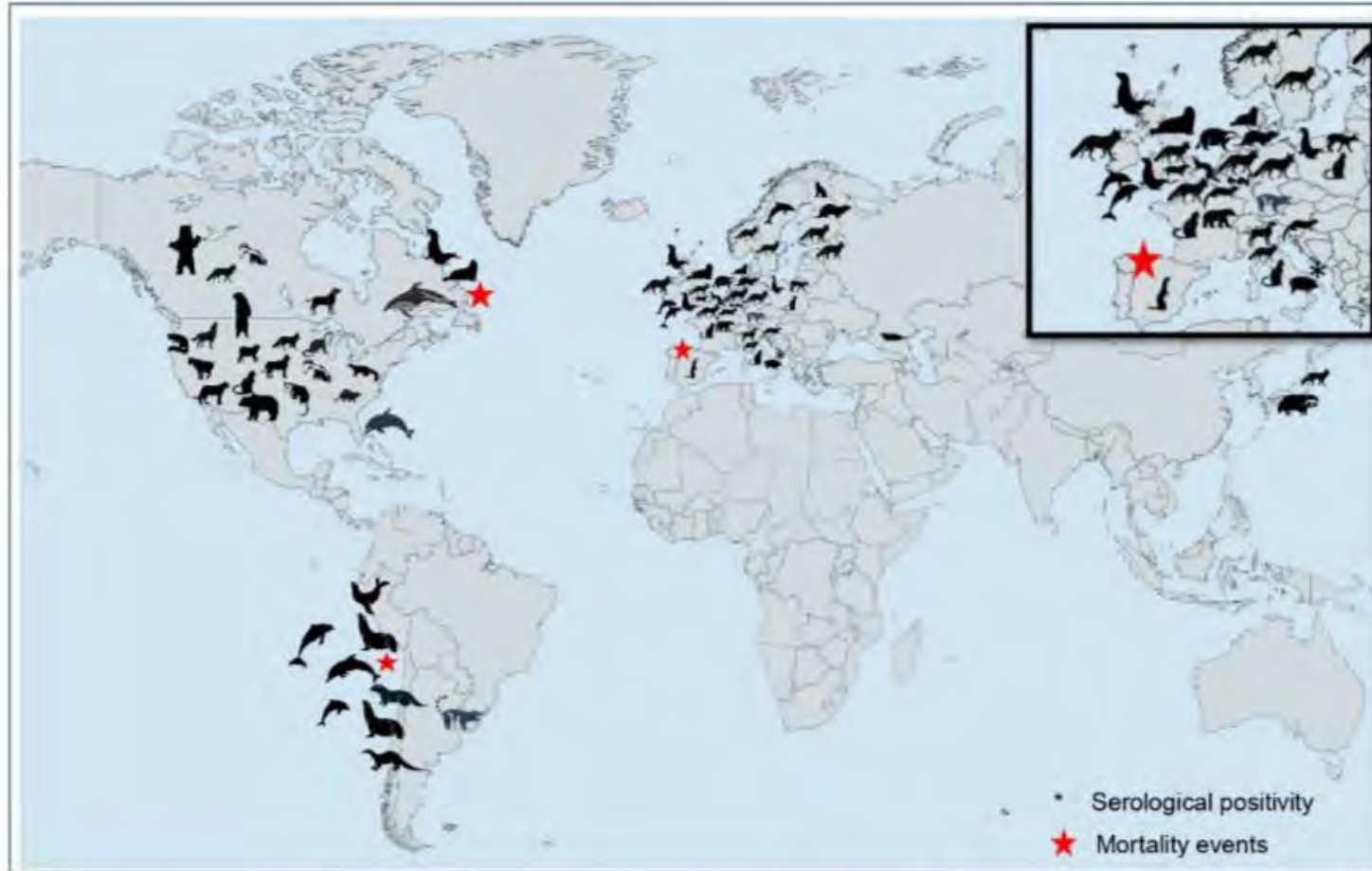


3 December 2022 to 1 March 2023; EFSA

Verspreiding tot in Antarctica

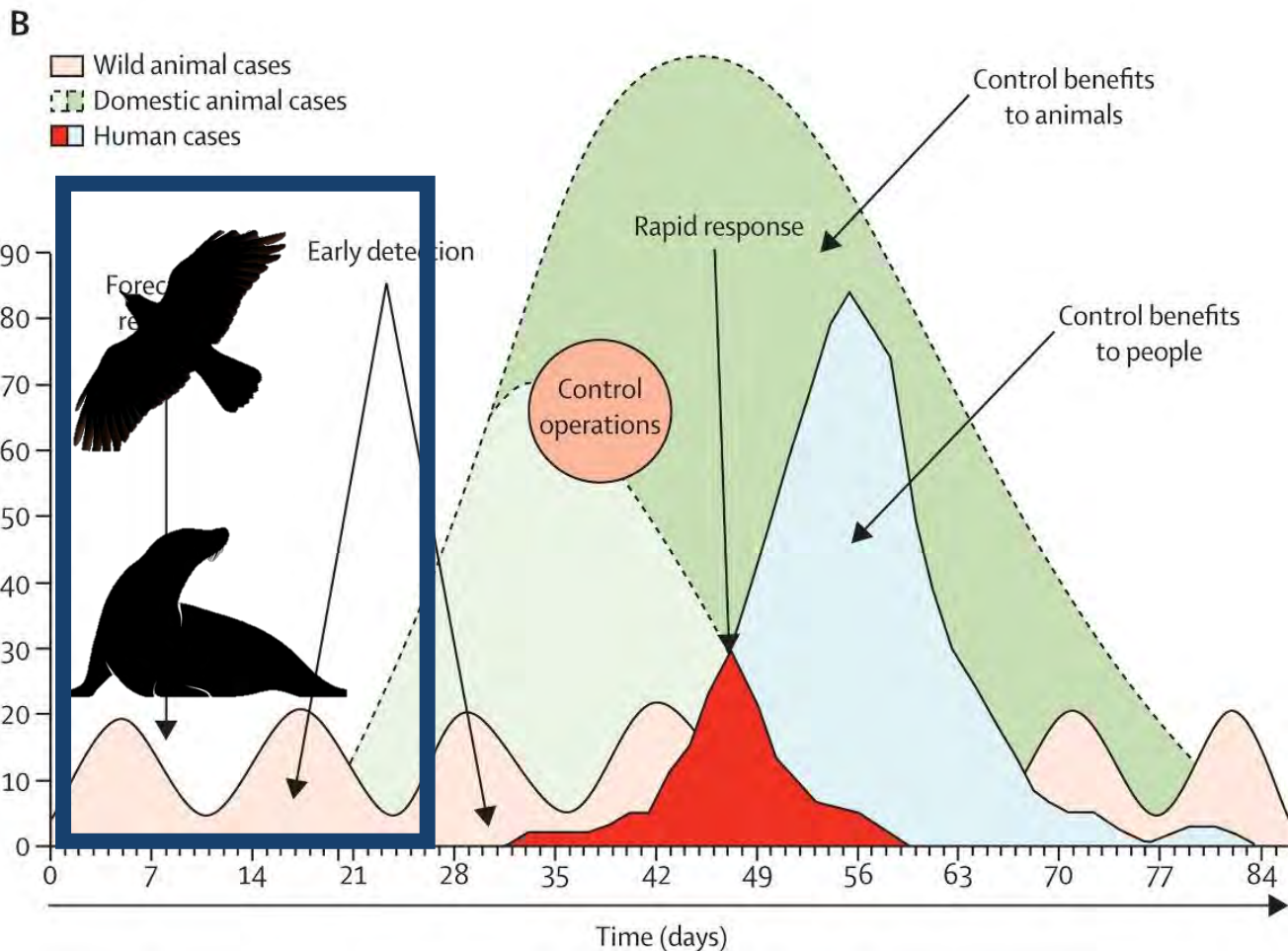


“Spillovers” naar zoogdieren



- | | | | |
|--|---|--|---|
| American black bear (<i>Ursus americanus</i>) | Caracal (<i>Caracal caracal</i>) | Ferret (<i>Mustela fura</i>) | Raccoon (<i>Procyon lotor</i>) |
| American mink (<i>Neogale vison</i>) | Caspian seal (<i>Pusa caspica</i>) | Fisher cat (<i>Pekania pennanti</i>) | Red fox (<i>Vulpes vulpes</i>) |
| American pine marten (<i>Martes americana</i>) | Cat (<i>Felis catus</i>) | Grey seal (<i>Halichoerus grypus</i>) | Skunk (<i>Mephitis mephitis</i>) |
| Amur leopard (<i>Panthera pardus orientalis</i>) | Chilean dolphin (<i>Cephalorhynchus eutropia</i>) | Harbour porpoise (<i>Phocoena phocoena</i>) | South American coati (<i>Nasua nasua</i>) |
| Amur tiger (<i>Panthera tigris</i>) | Common dolphin (<i>Delphinus delphis</i>) | Harbour seal (<i>Phoca vitulina</i>) | South America fur seal (<i>Arctocephalus australis</i>) |
| Asiatic black bear (<i>Ursus thibetanus</i>) | Coyote (<i>Canis latrans</i>) | Japanese raccoon dog (<i>Nyctereutes viverrinus</i>) | South American bush dog (<i>Speothos venaticus</i>) |

HPAI H5 circulatie in wilde dieren



Adapted from Karesh et al

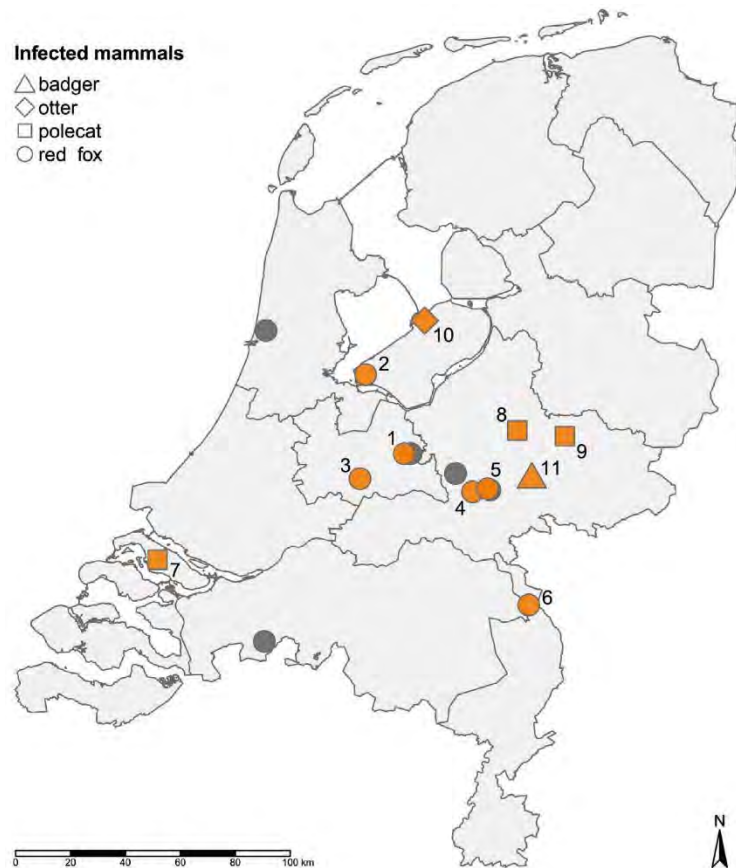
Floyd et al 2021; Postel et al 2022; Gamarra-Toledo et al 2022;
Leguia et al 2023 Vreman et al 2023; Tammiranta et al 2023



Cafering

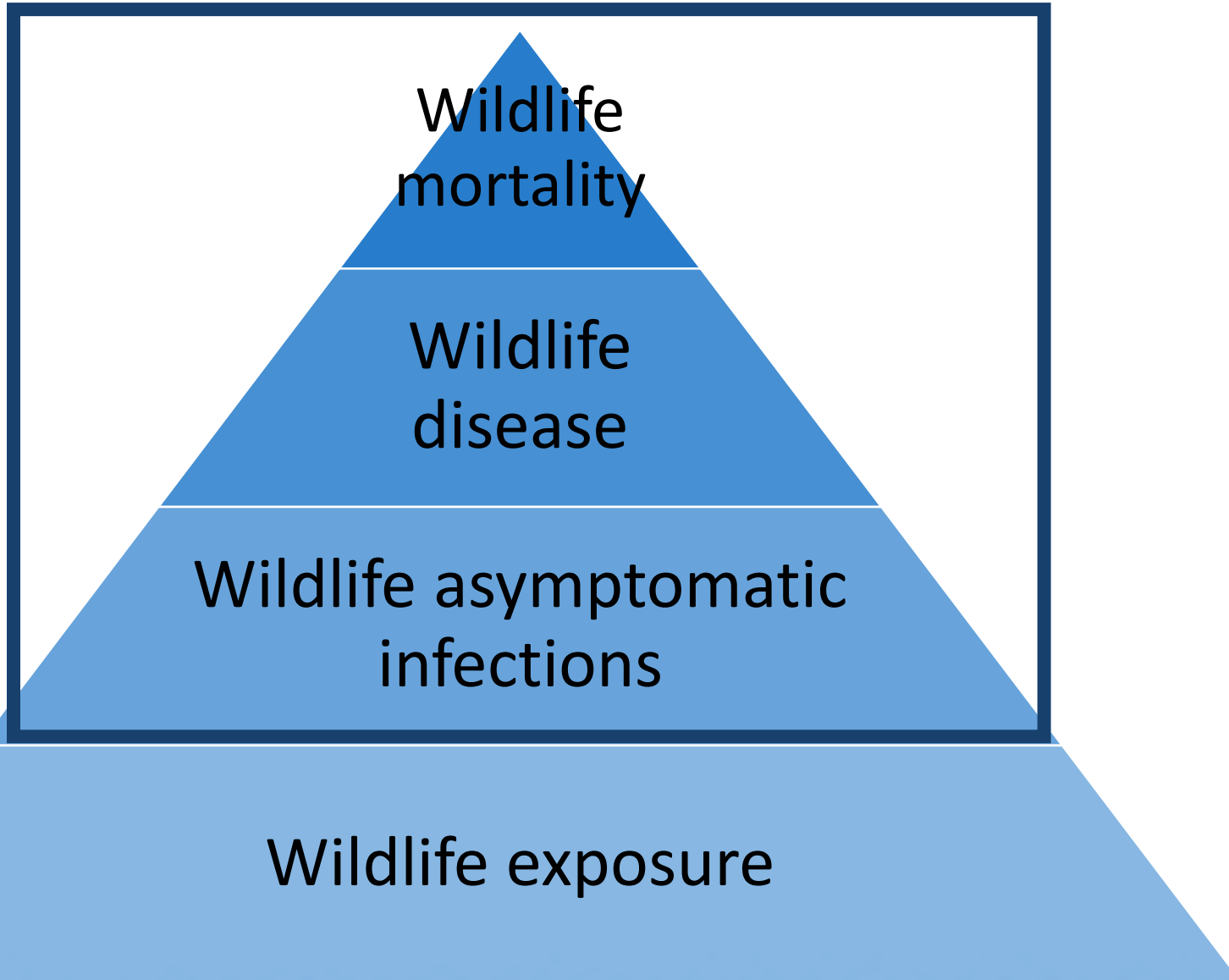
© Marcela Uhart, UC Davis; VÍCTOR GAMARRA

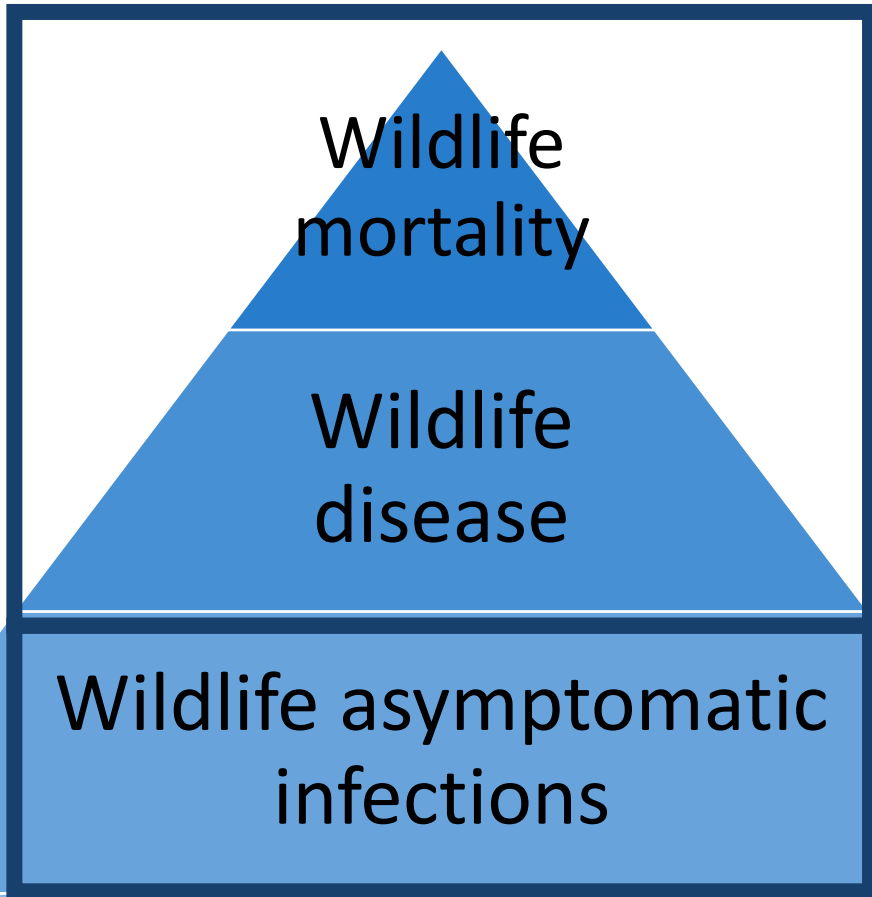
Zoogdieren geïnfecteerd in Nederland



Rijks et al 2021; Vreman et al 2022;
Bordes et al 2023

Topje van de ijsberg?





Wild carnivores dead or euthanized
(*citizen reporting*)

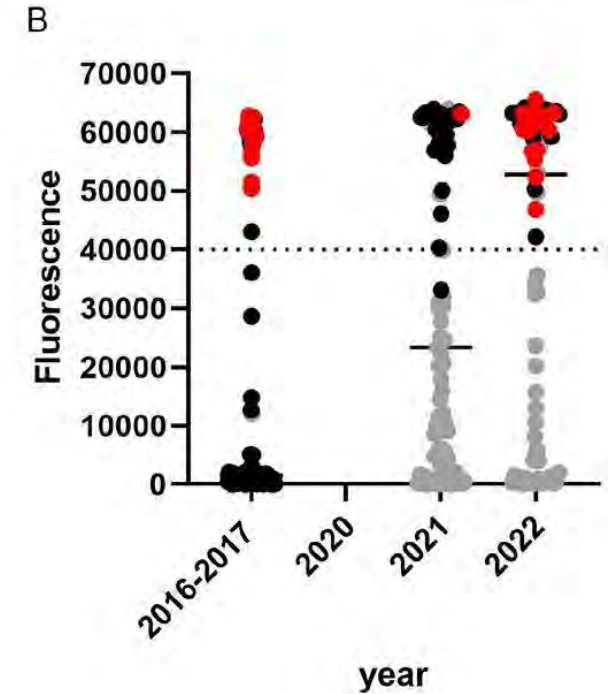
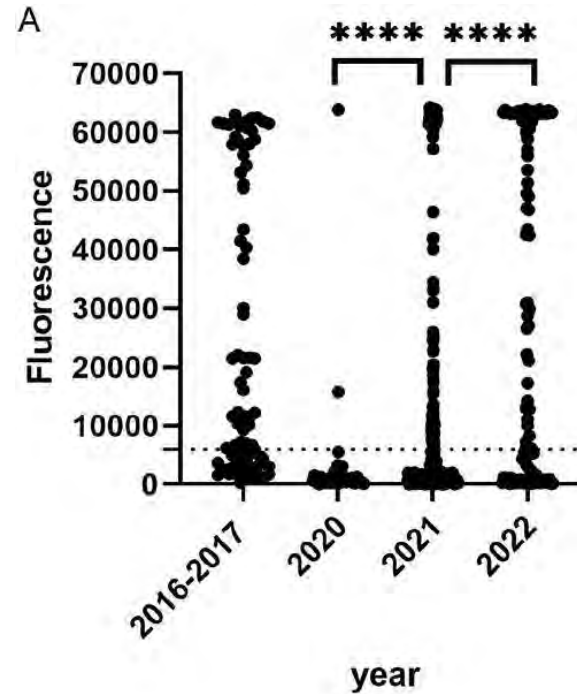
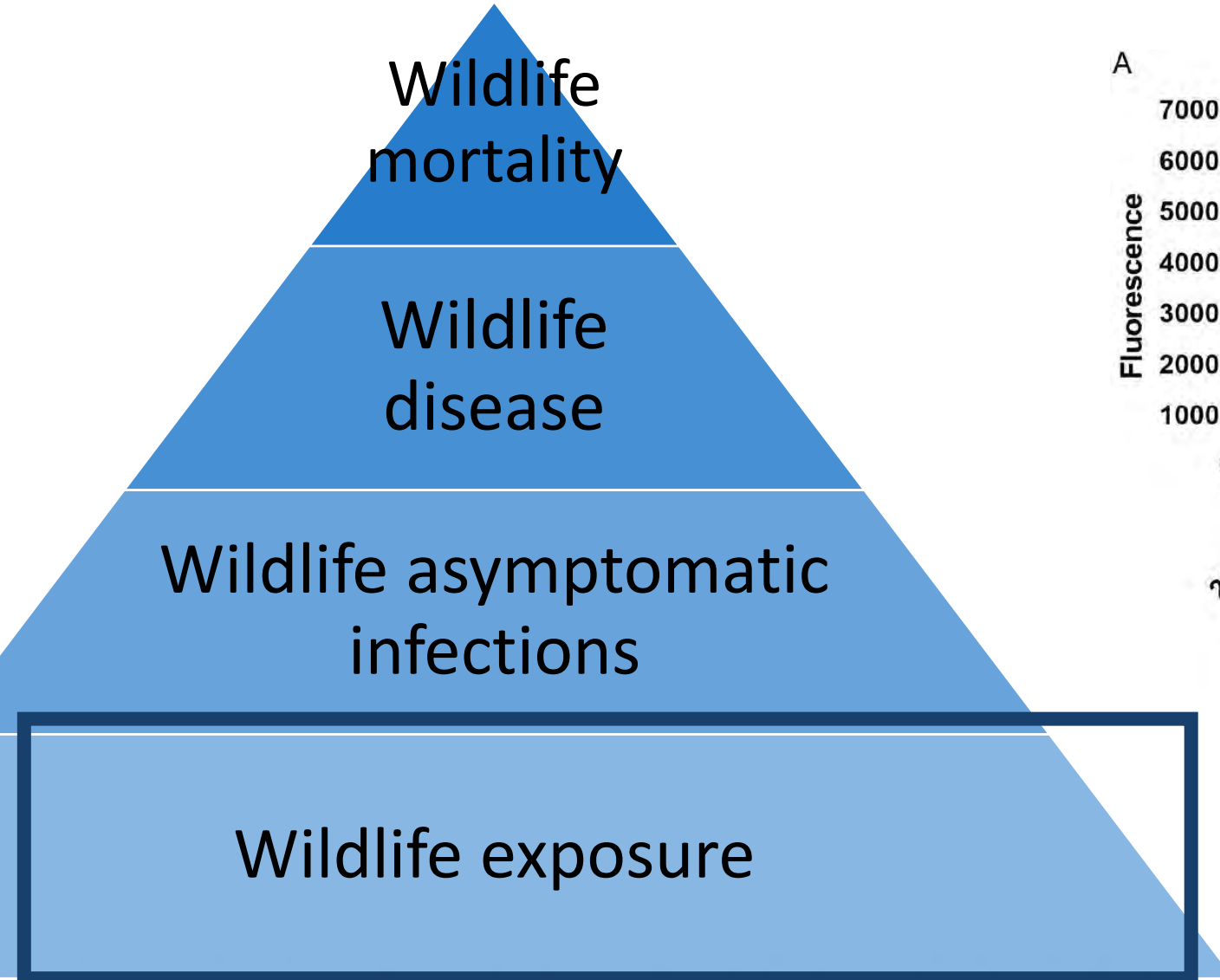
("infection"): 6/34 (**18%**)
("unknown"): 1/18 (**6%**)

Foxes (9/31; 29%)
Polecats (4/17; 24%)

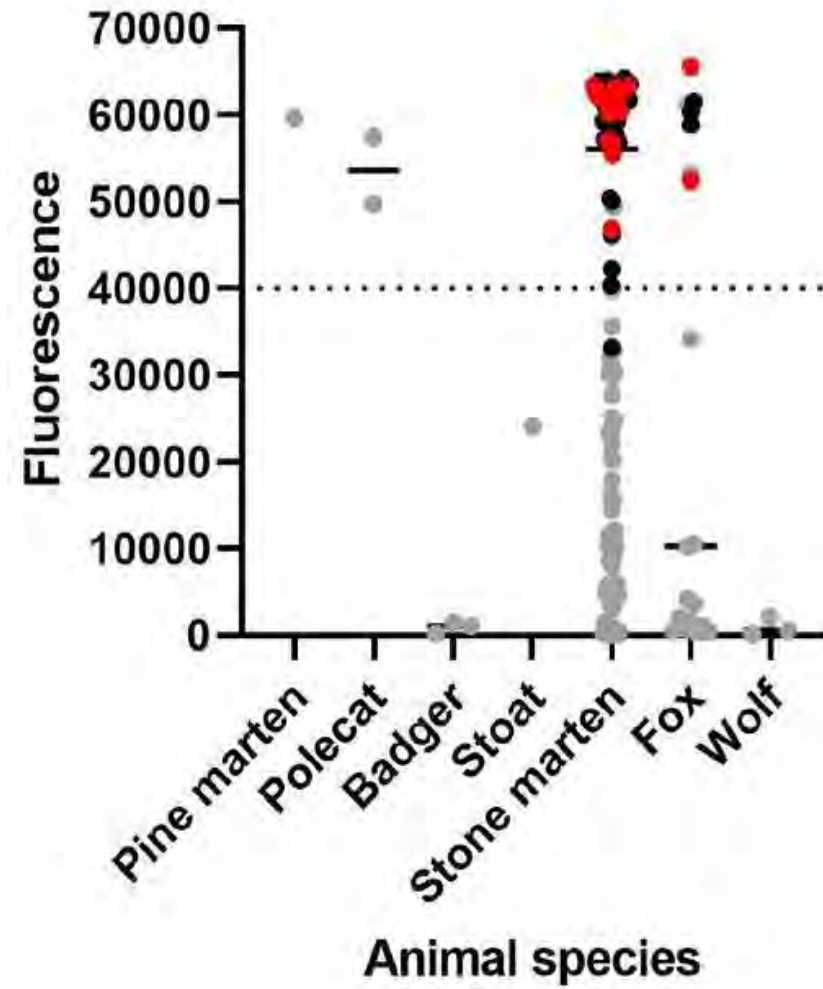
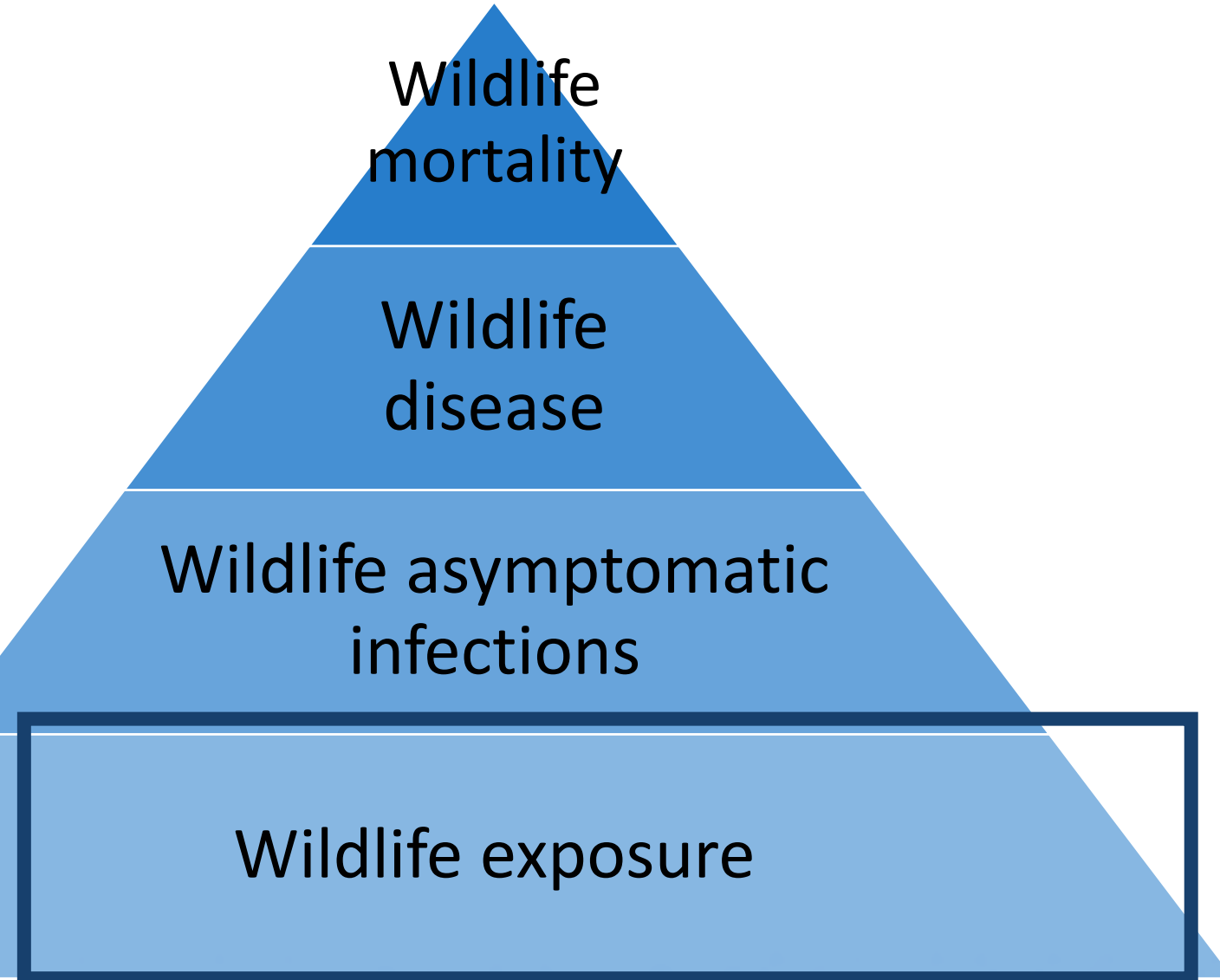
("trauma"): 7/129 (**5%**)

Trapped stonemartens: 6/375 (**2%**)

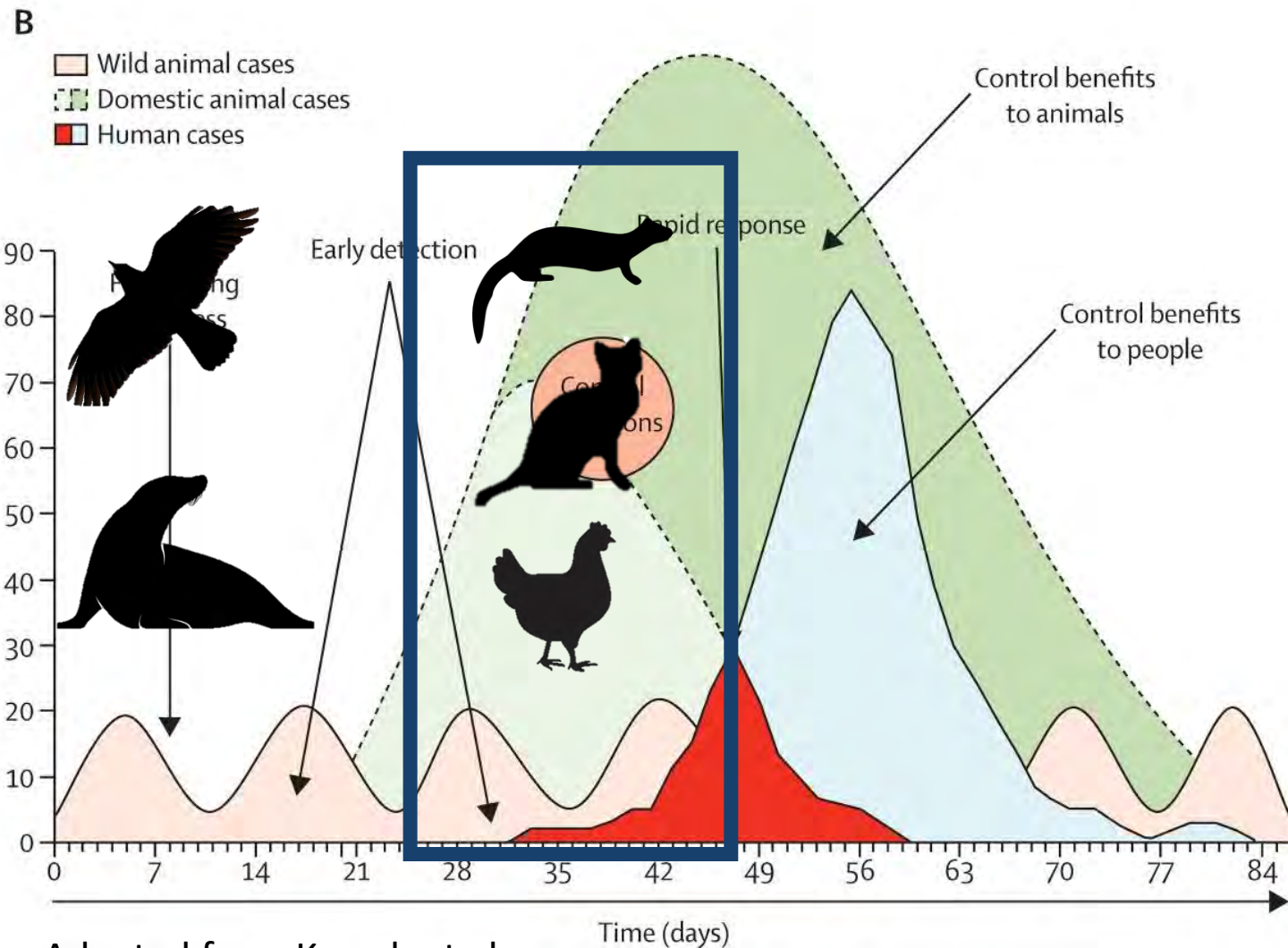
Blootstelling vs mortaliteit



Blootstelling vs mortaliteit



Circulatie in gehouden dieren



Adapted from Karesh et al

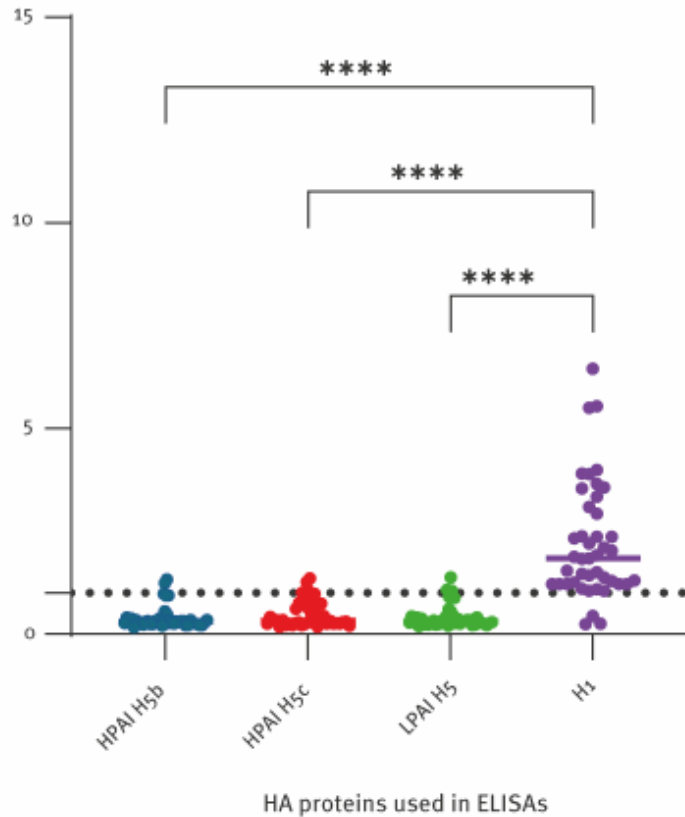
(Tammiranta et al 2023; Rabalski et al 2023; Agüero et al 2023)



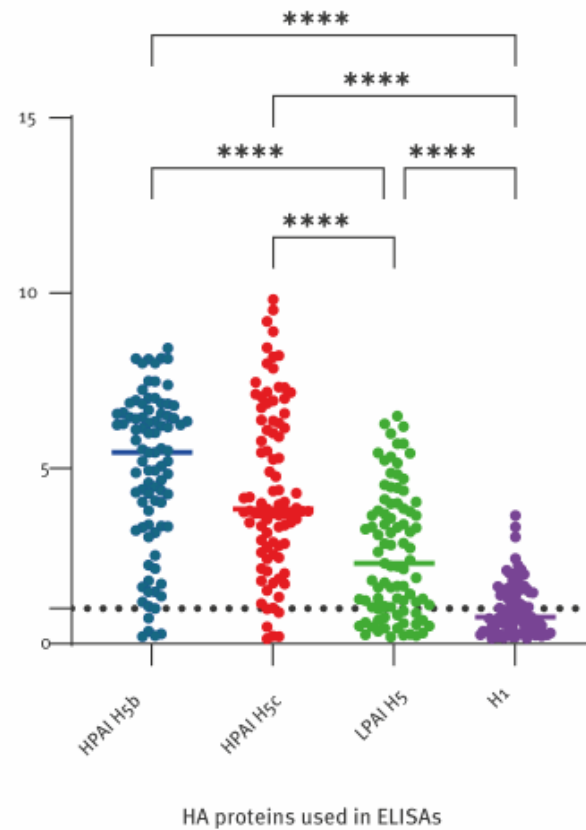
Gehouden dieren geïnfecteerd in Nederland



D. Scatterplot, domestic cats



B. Scatterplot, stray cats



Duijvestijn et al, 2024



HPAI Confirmed Cases in Livestock Herds

Reporting period: March 25, 2024 through November 22, 2024

Last reported new confirmed case: Wednesday, November 20, 2024

The genetic sequence for all cattle cases and the alpaca case is influenza A, H5, clade 2.3.4.4b, genotype B3.13; the backyard swine were associated with a backyard poultry flock and confirmed as the same genotype as the poultry on the premises: Influenza A, H5 clade 2.3.4.4b, genotype D1.2.

Data updated weekdays by 12pm Eastern

[Download Data](#)

Choose time period
Total Outbreak

Choose species
Cattle

Situational Update

[Click for International Exports](#)

In the Total Outbreak, in Cattle, there were:
616 Confirmed Cases in 15 States

Number of Confirmed Cases in Cattle by State, Total Outbreak

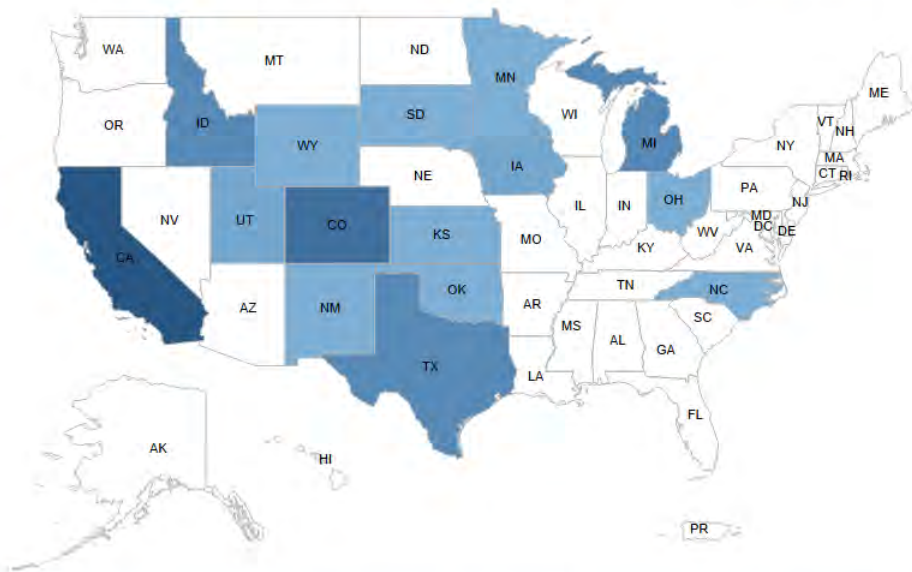
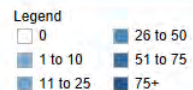


Table Sort
Confirmation Date

List of Confirmed Cases by Confirmation Date

Limit to month and year
All

Confirmed	State	Production	Species
20-Nov-24	California	Dairy Milking Cows	Cattle
		Dairy Milking Cows	Cattle
		Dairy Milking Cows	Cattle
		Dairy Milking Cows	Cattle
		Dairy Milking Cows	Cattle
19-Nov-24	California	Dairy Milking Cows	Cattle
		Dairy Milking Cows	Cattle

Onverwachtse wending: koeien

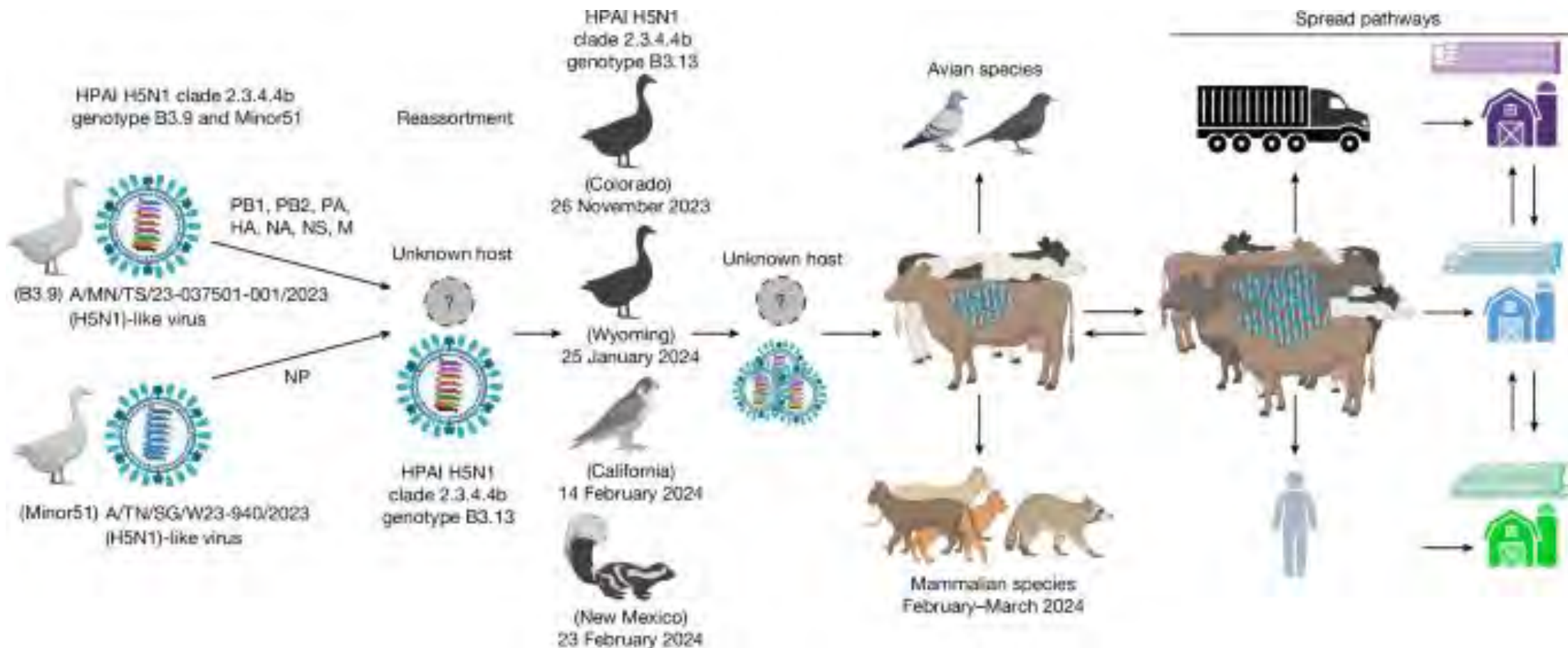


A DEPARTMENT OF **Erasmus MC**
University Medical Center Rotterdam

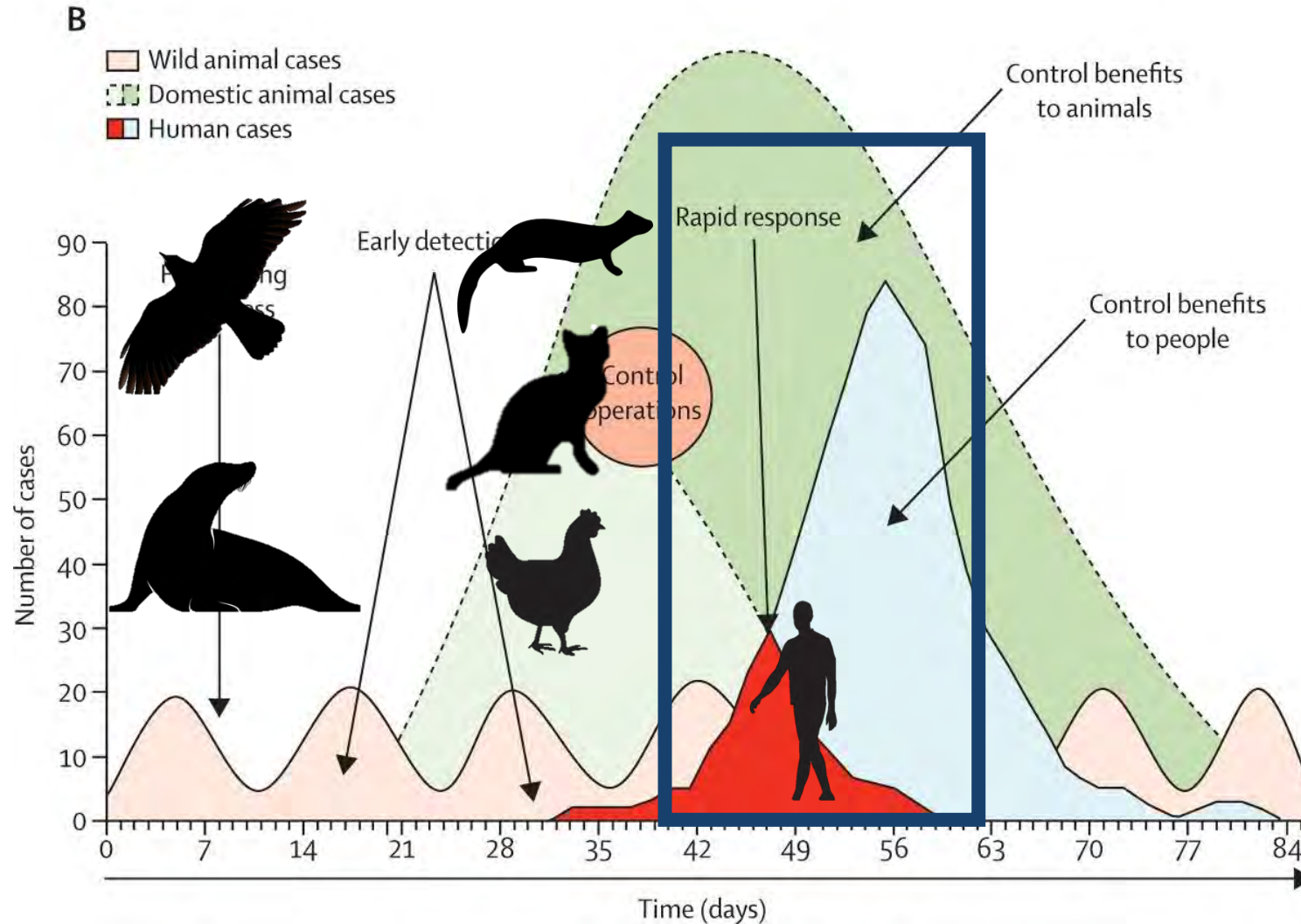


USDA, 2024

Onverwachtse wending: koeien



Risico's voor de volksgezondheid?



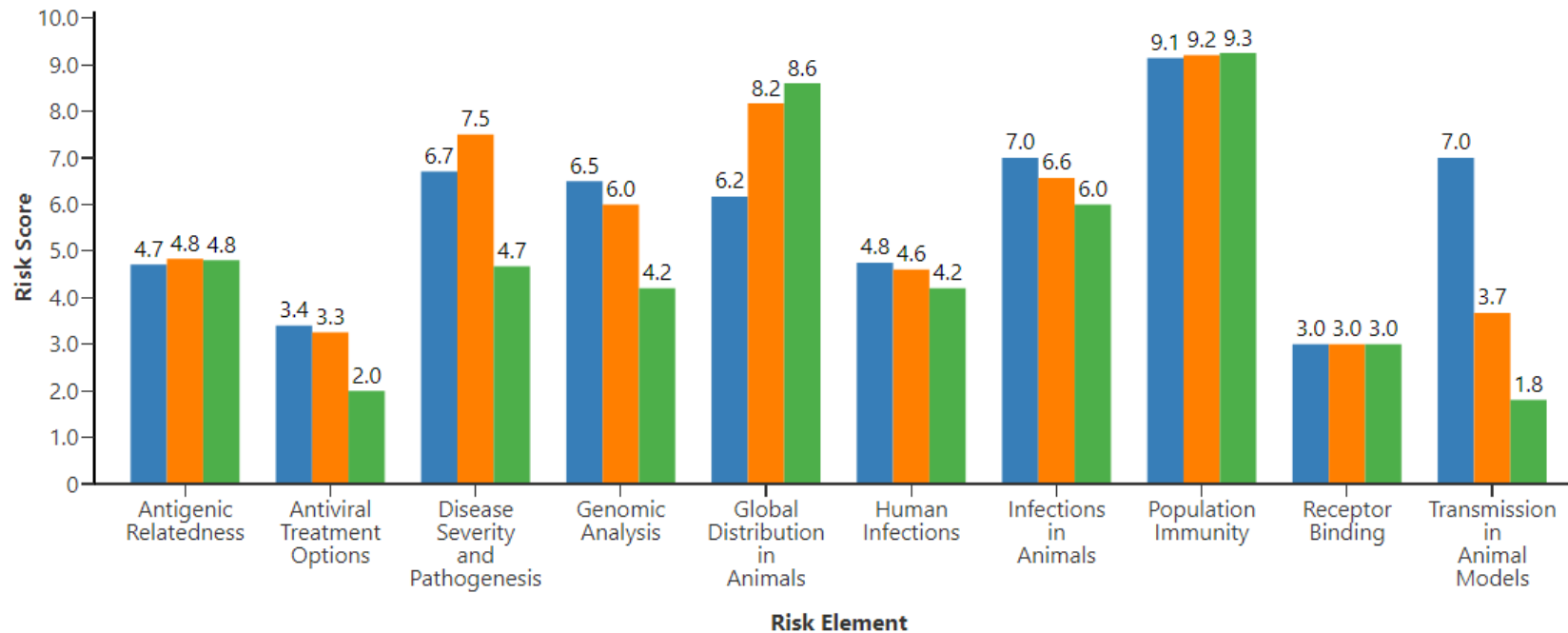
Adapted from Karesh et al

Risk assessment(s)



- At this time, CDC considers the human health risk to the U.S. public from HPAI A(H5N1) viruses to be **low**;
- People with close or prolonged, unprotected exposures to infected birds or other animals, or to environments contaminated by infected birds or other animals, are at greater risk of infection.
- CDC considers HPAI A(H5N1) viruses to have the potential to cause severe disease in infected humans

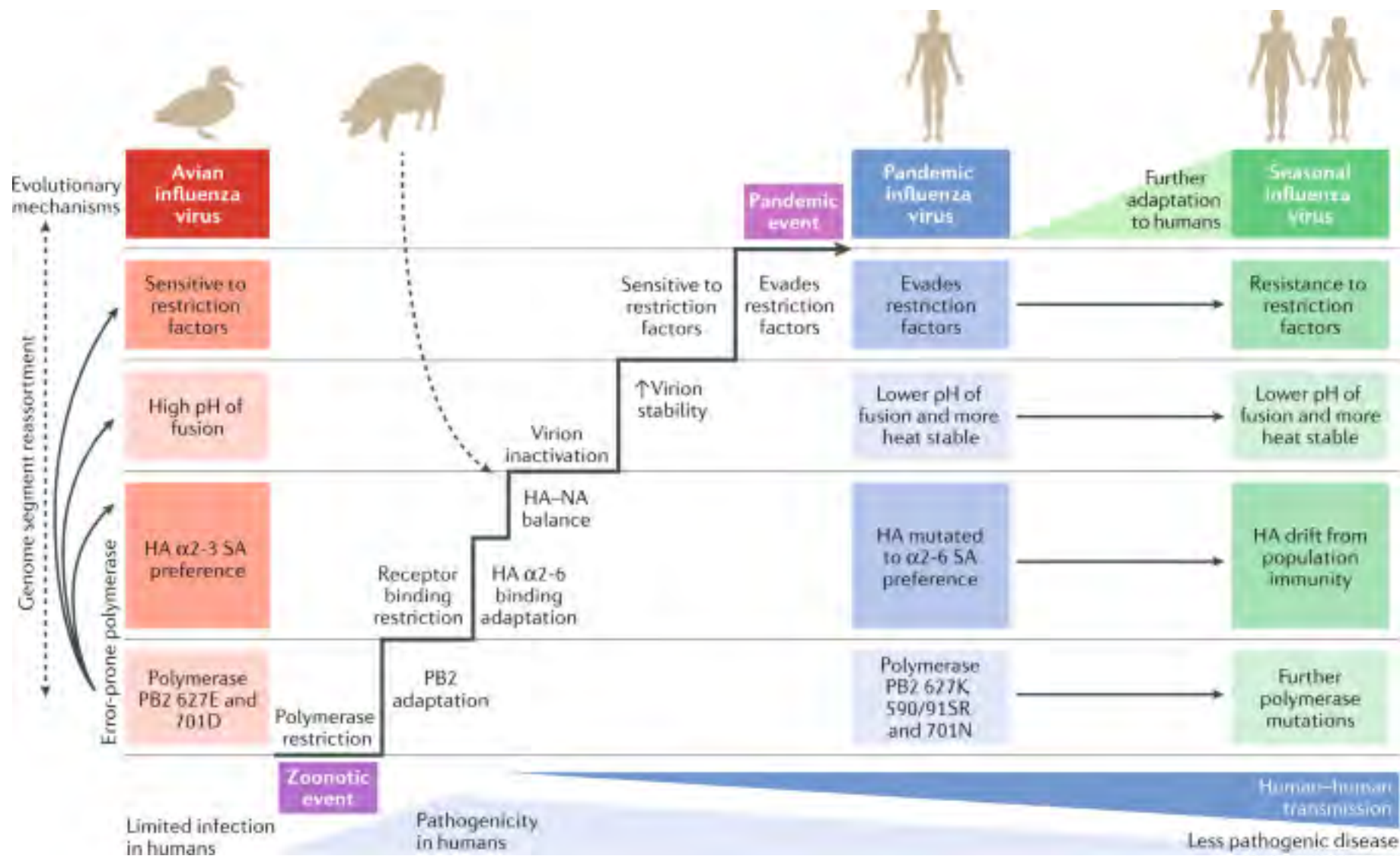
H5N1 Clade 2.3.4.4b Virus Comparison by Risk Element Score



● A/Texas/37/2024

● A/Mink/Spain/3691-8_22VIR10586-10/2022

● A/American wigeon/South Carolina/AH0195145/2021



Humane infecties (VS)



Confirmed human case summary during the 2024 outbreak, by state and exposure source

Exposure Source

State	Cattle	Poultry	Unknown	State Total
California	28	0	1	29
Colorado	1	9	0	10
Michigan	2	0	0	2
Missouri	0	0	1	1
Oregon	0	1	0	1
Texas	1	0	0	1
Washington	0	11	0	11
Source Total	32	21	2	55

Blootstelling en **infectierisico's**



- Onbeschermd direct of indirect contact met geïnfecteerde vogels of koeien
- Mens-mens transmissie (nog) niet vastgesteld
- Zeer incidenteel: route van infectie onbekend:

Missouri resident who had no contact with animals tests positive for bird flu

The case is the first H5 bird flu infection during this outbreak in a person who didn't have contact with sick animals



The case is the first H5 bird flu infection during this outbreak in a person who didn't have contact with sick animals. Scott Olson/Getty Images

morning
rounds

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Empowering women, eliminating viral
hepatitis: Gilead's vision for a healthier
future

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CDC 2024

Blootstelling en infectierisico's



FORBES > BUSINESS

BREAKING

Bird Flu Detected In Batch Of Raw Milk Sold In California

Siladitya Ray Forbes Staff

Siladitya Ray is a New Delhi-based Forbes news team reporter.

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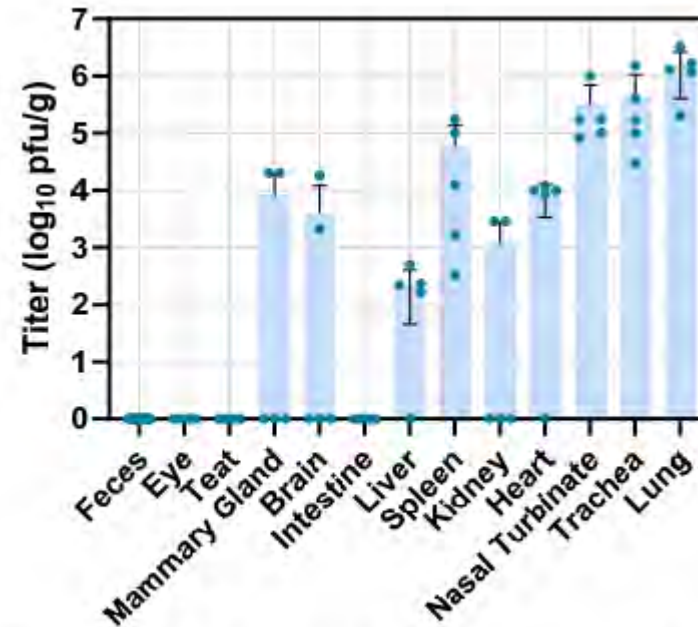


Figure S3. Organ and feces titers in five mice orally inoculated with sample NM#93. Dots indicate values from individual mice, bars show the mean of all titers for each tissue, error bars show a single standard deviation.

Discussie



- Grootste uitbraak ooit van AIV, met jaarronde verspreiding in Europa
- Grote variatie in zoogdieren, en grote aantallen AIV infecties
- Zoogdier-zoogdier transmissie vastgesteld
- Mutaties die risico op humane infecties verhogen
- Tot nu toe: risico volksgezondheid **laag**

Acknowledgements



- Valentina Caliendo
- Andrea Gröne
- Judith M.A. van den Brand

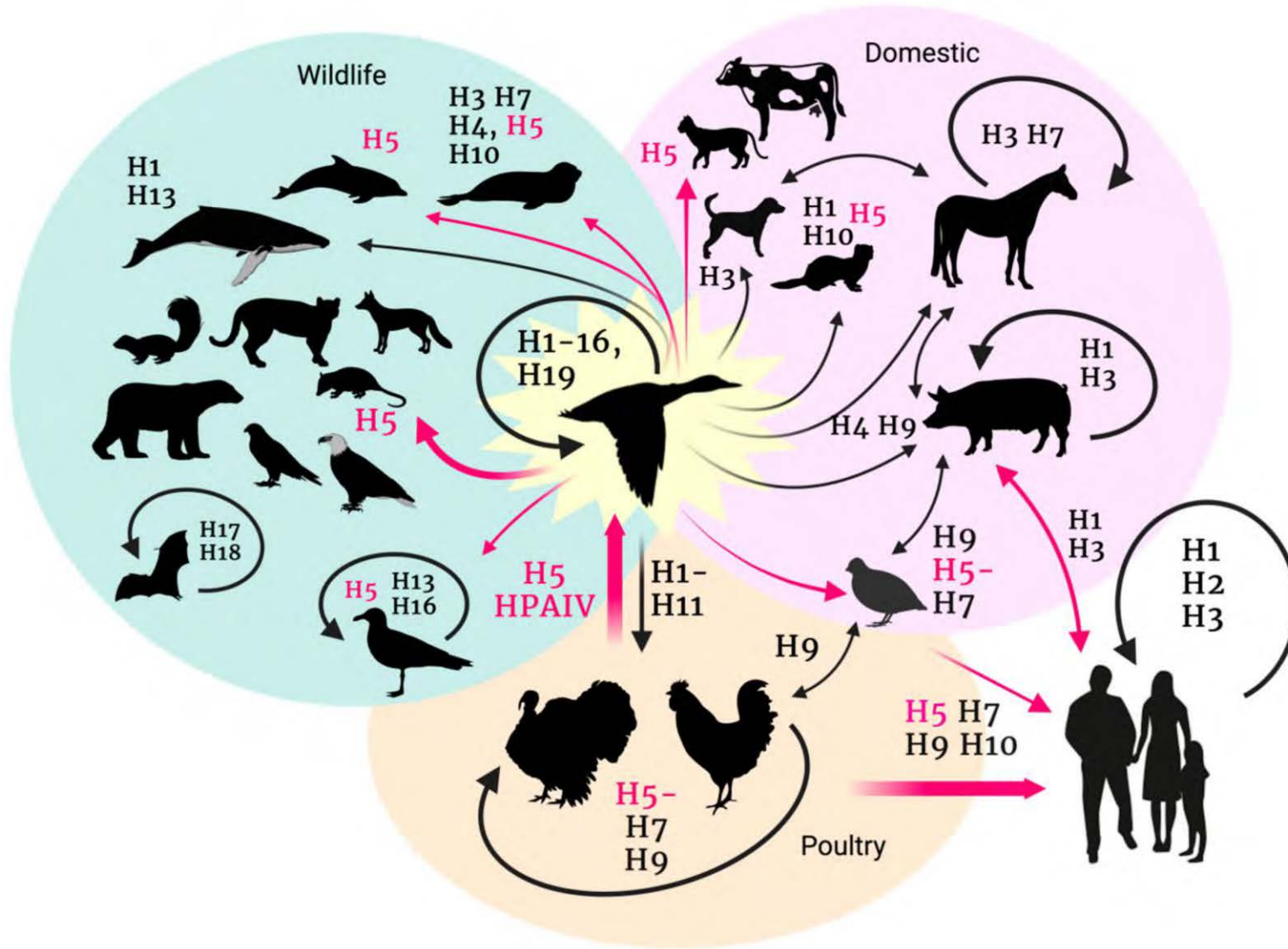


- Jasja Dekker
- Bob Jonge Poerink

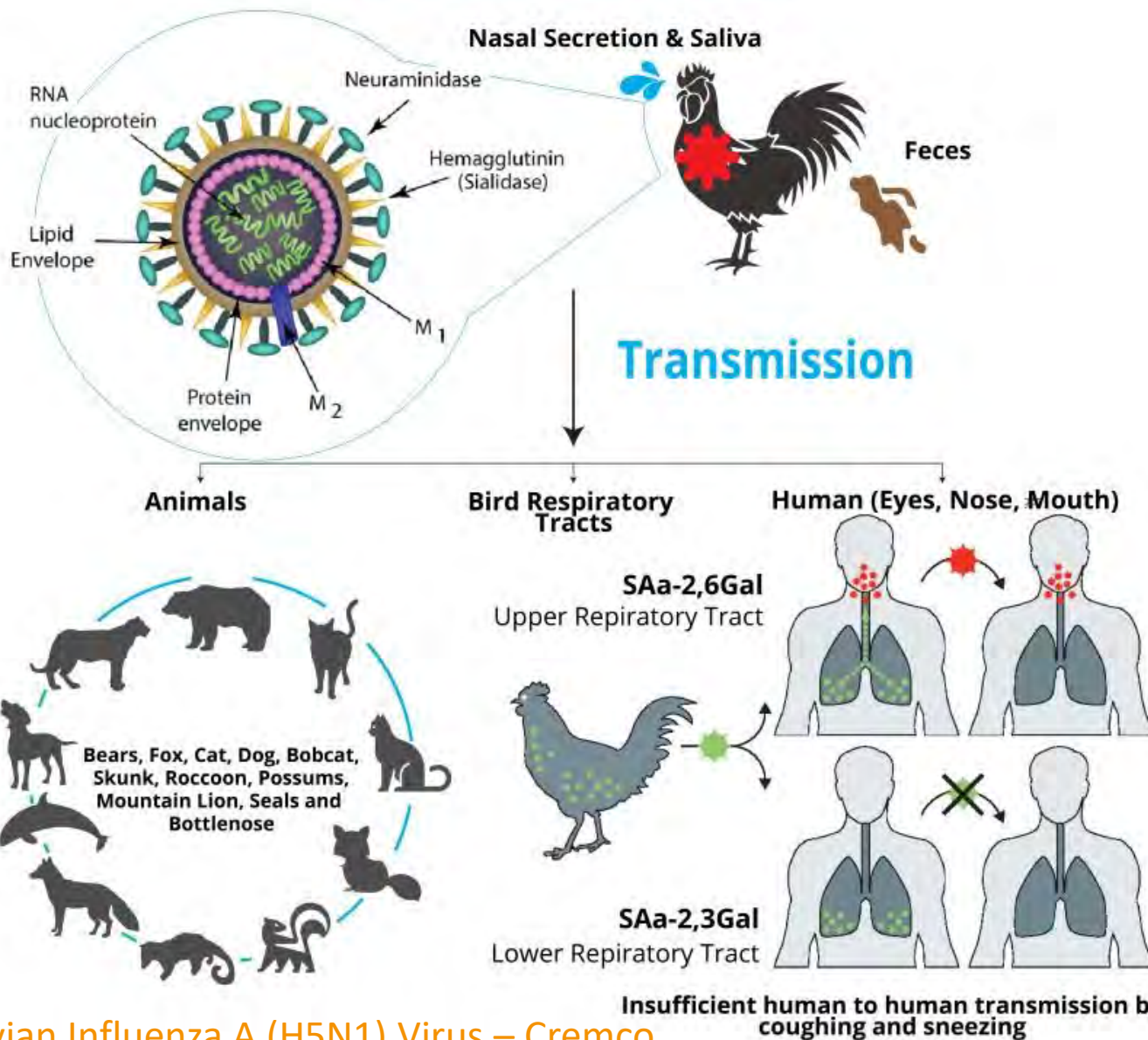


- Irina V. Chestakova
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- Oanh Vuong
- Sanne Thewessen
- Tijmen Hartung
- Theo Bestebroer
- Marion Koopmans
- Ron Fouchier





Avian Influenza Virus



[Highly Pathogenic Avian Influenza A \(H5N1\) Virus – Cremco](#)