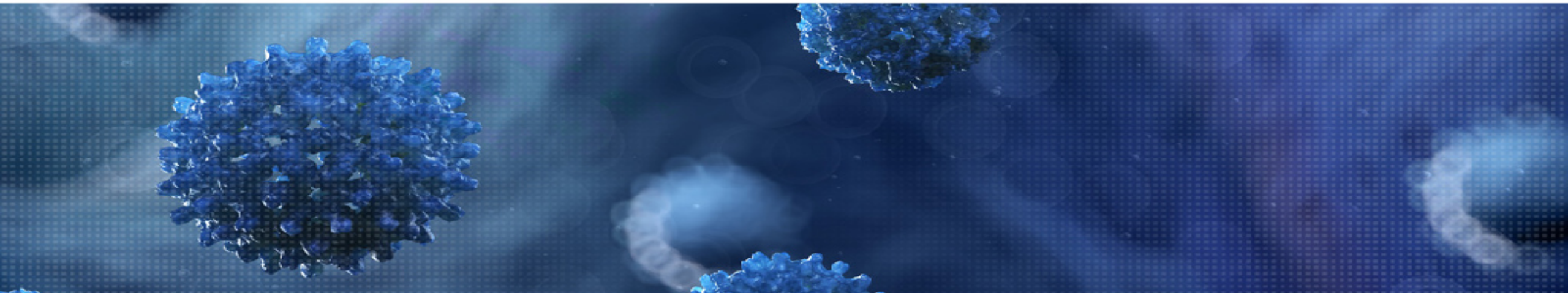




WHO collaborating centre for
Arbovirus and Hemorrhagic
Fever Reference and Research

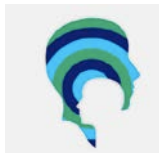


Viroscience lab
WHERE SKILLS MEET TO STUDY & PROTECT



Van nCOV-Wuhan naar pandemie

www.pdpcenter.nl



m.koopmans@erasmusmc.nl; @MarionKoopmans

武汉不明原因肺炎已隔离 检测结果将第一时间公布



一财网

12月31日 10:16

+ 关注

原标题

On the evening of the 30th, an "urgent notice on doing a good job in the treatment of pneumonia of unknown causes" was settled as a redhead document of the Medical, Administrative and Medical Office of the Wuhan Municipal Health Committee, which was widely spread on the Internet.

30日晚

生健康

第一财

实的。

12320

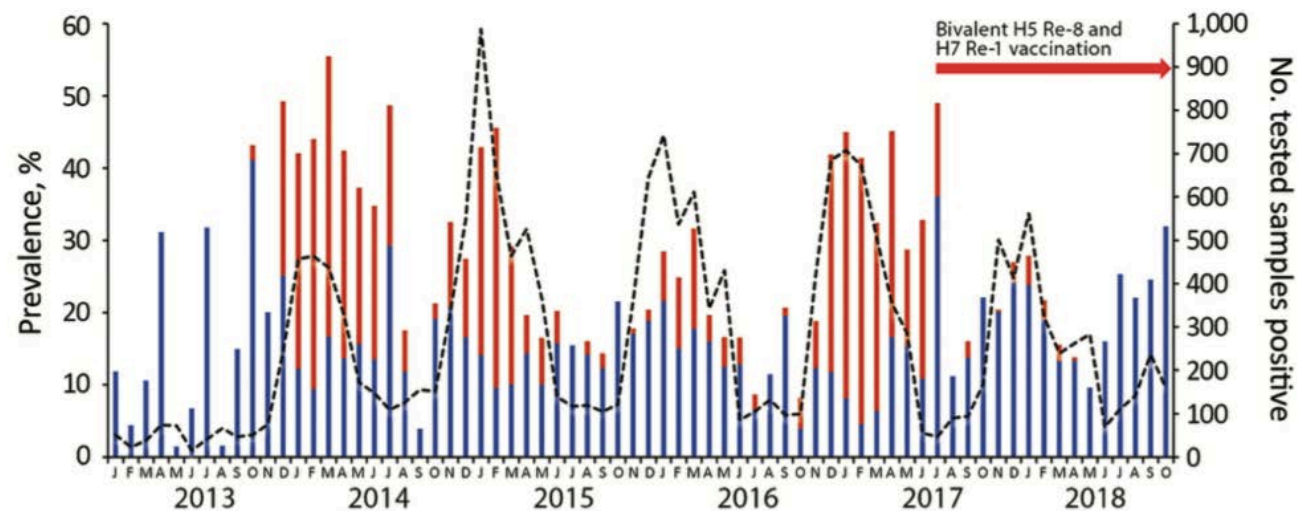
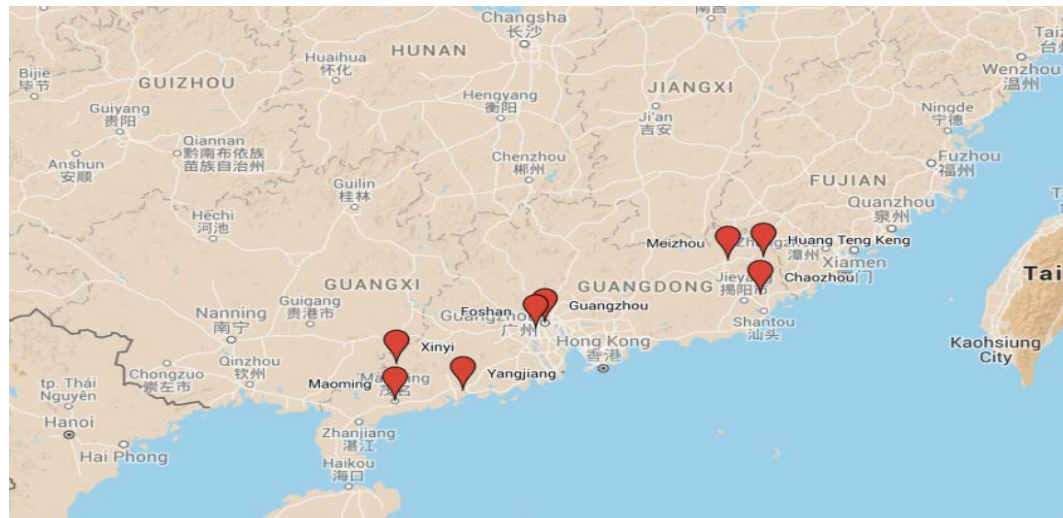
On the morning of the 31st, the reporter of China Business News dialed the official hotline of Wuhan Municipal Health and Health Committee 12320 and learned that the content of the document is true.

市卫

是真

待查明

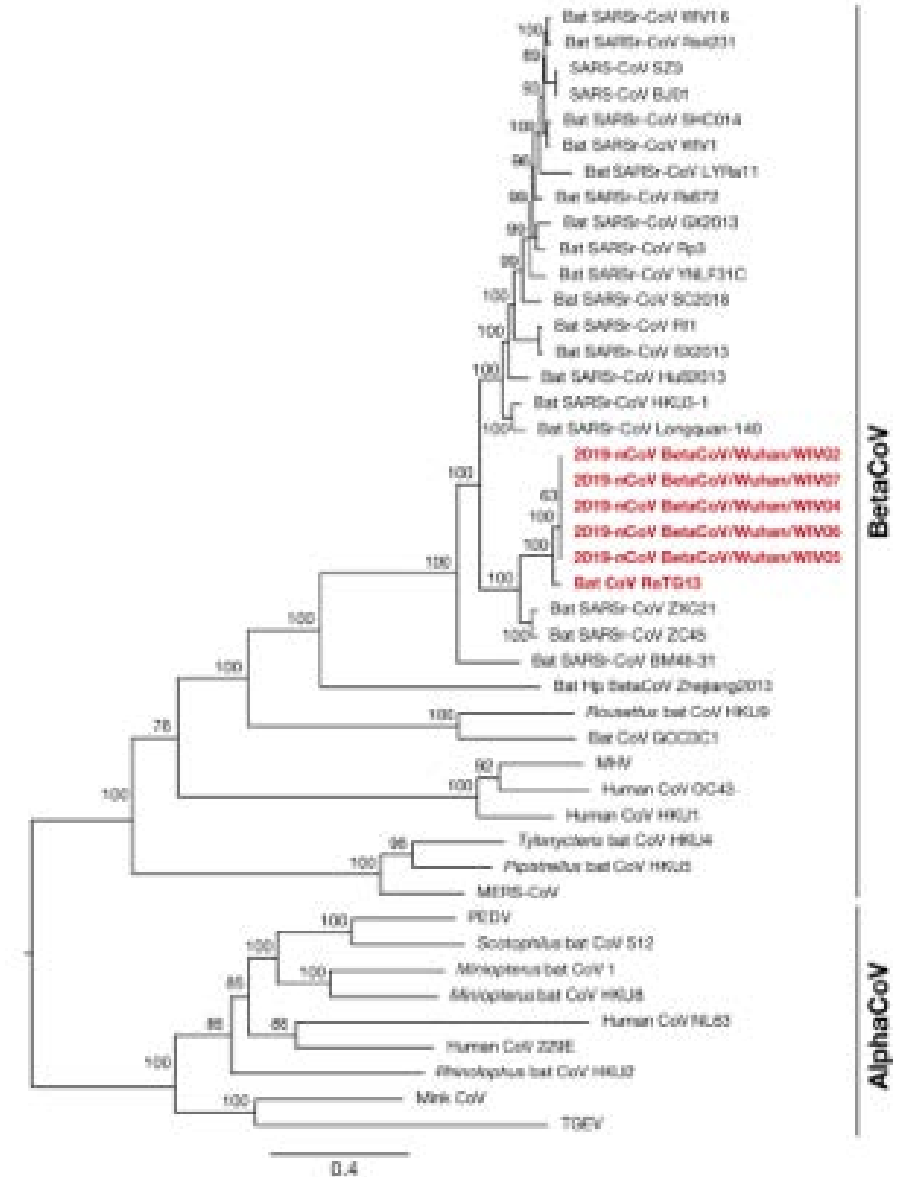
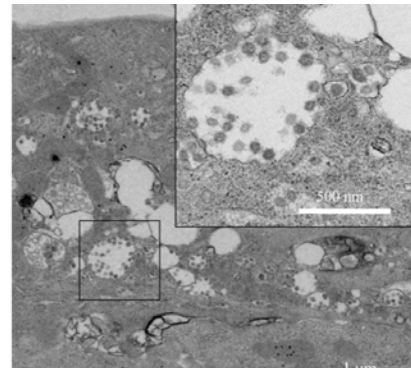
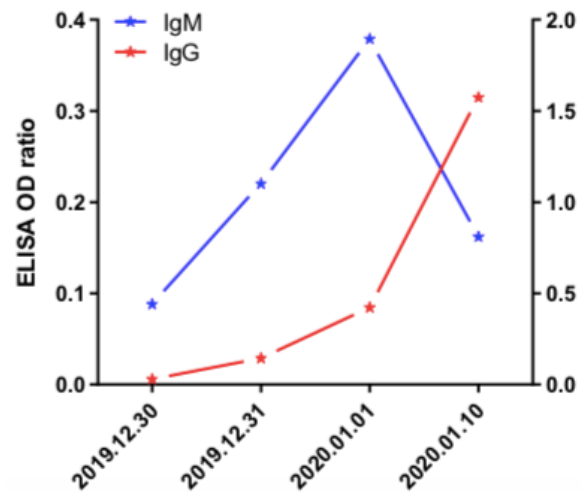
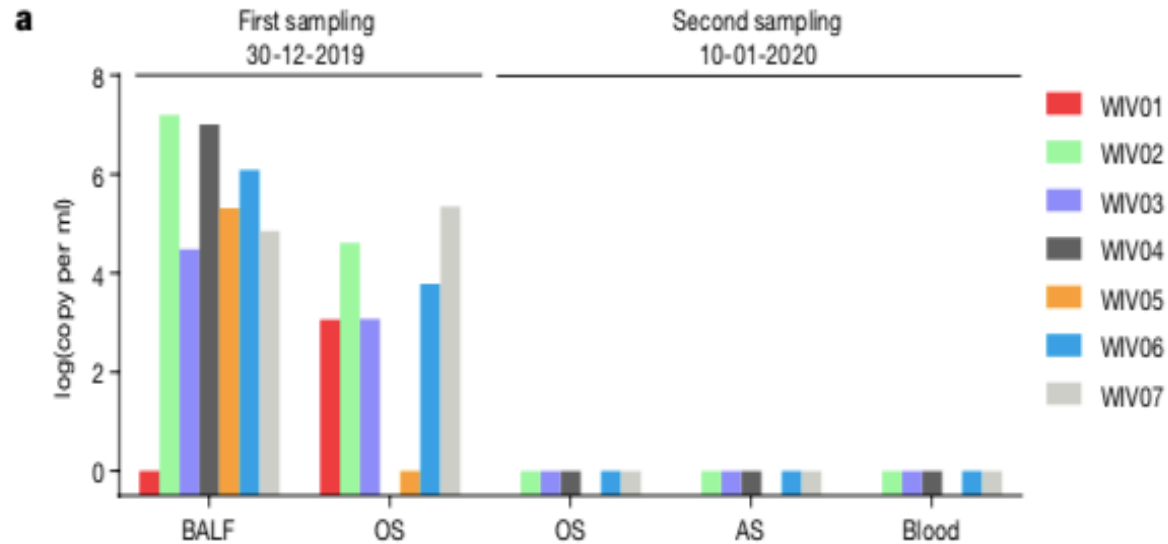
China en levende dieren markten

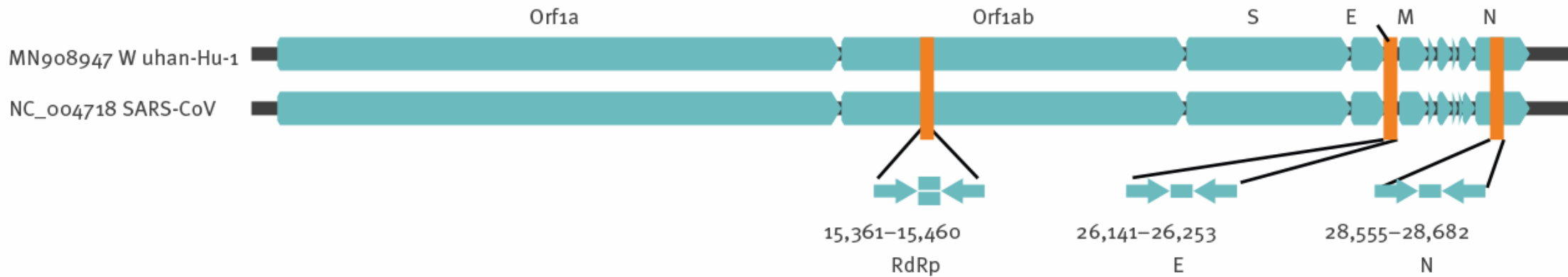


Bai et al., 2019; Sikkema et al, in preparation



Het eerste bewijs

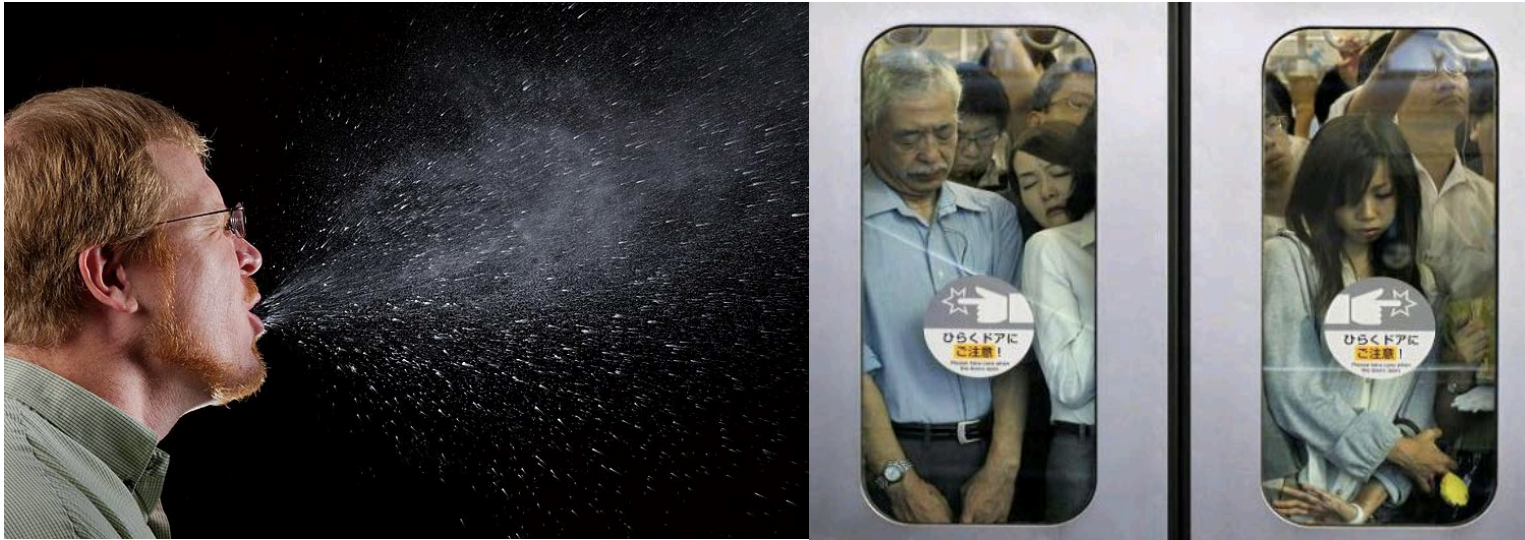




- Sequence provided virological.org: [Jan 12th](#)
- Primers shipped Rotterdam, London, HongKong [Jan 13th](#)
- Validation from biobanked resp samples and from SARS RNA
- Protocol shared on WHO site [Jan 17th](#), published 20th



Belangrijke vraag: hoe verspreidt het precies? De eerste inschatting



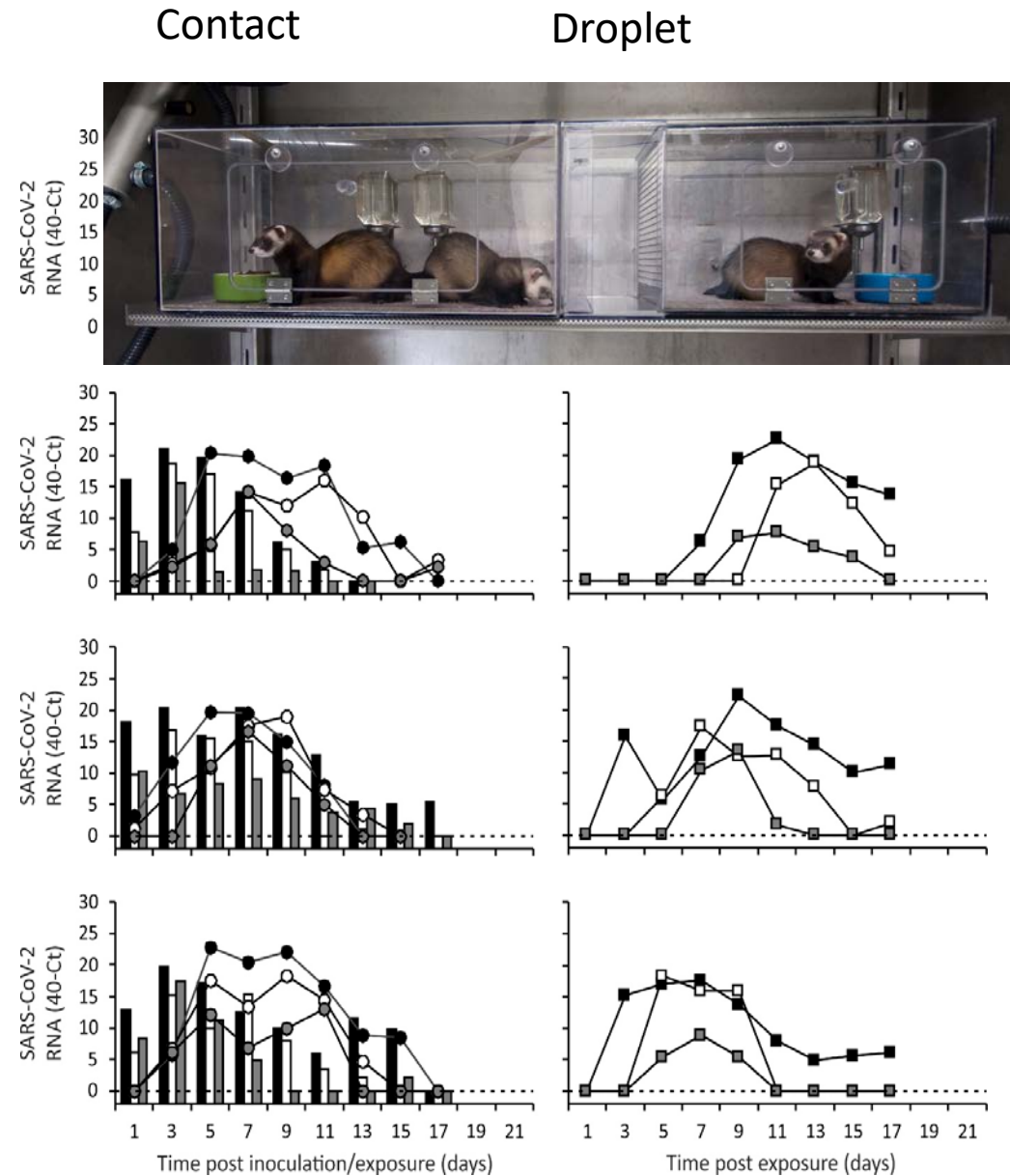
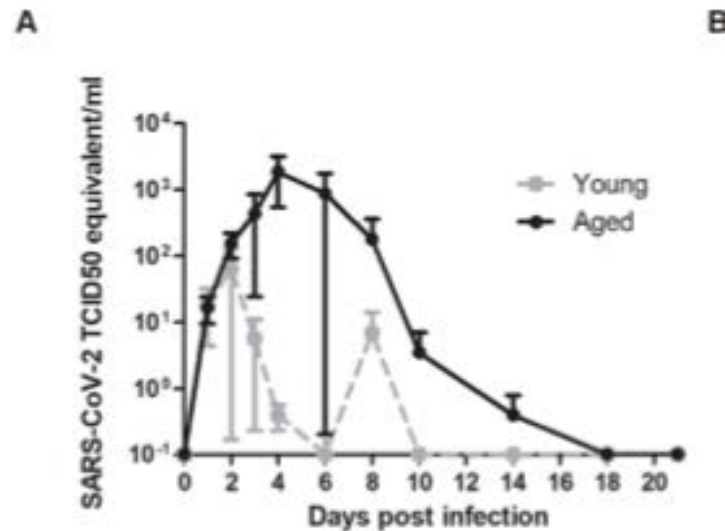
1. Droplets: yes
2. Aerosols: in high risk situations
3. Feces: ?
4. Surfaces: ?



Hot topic debates,
challenging science

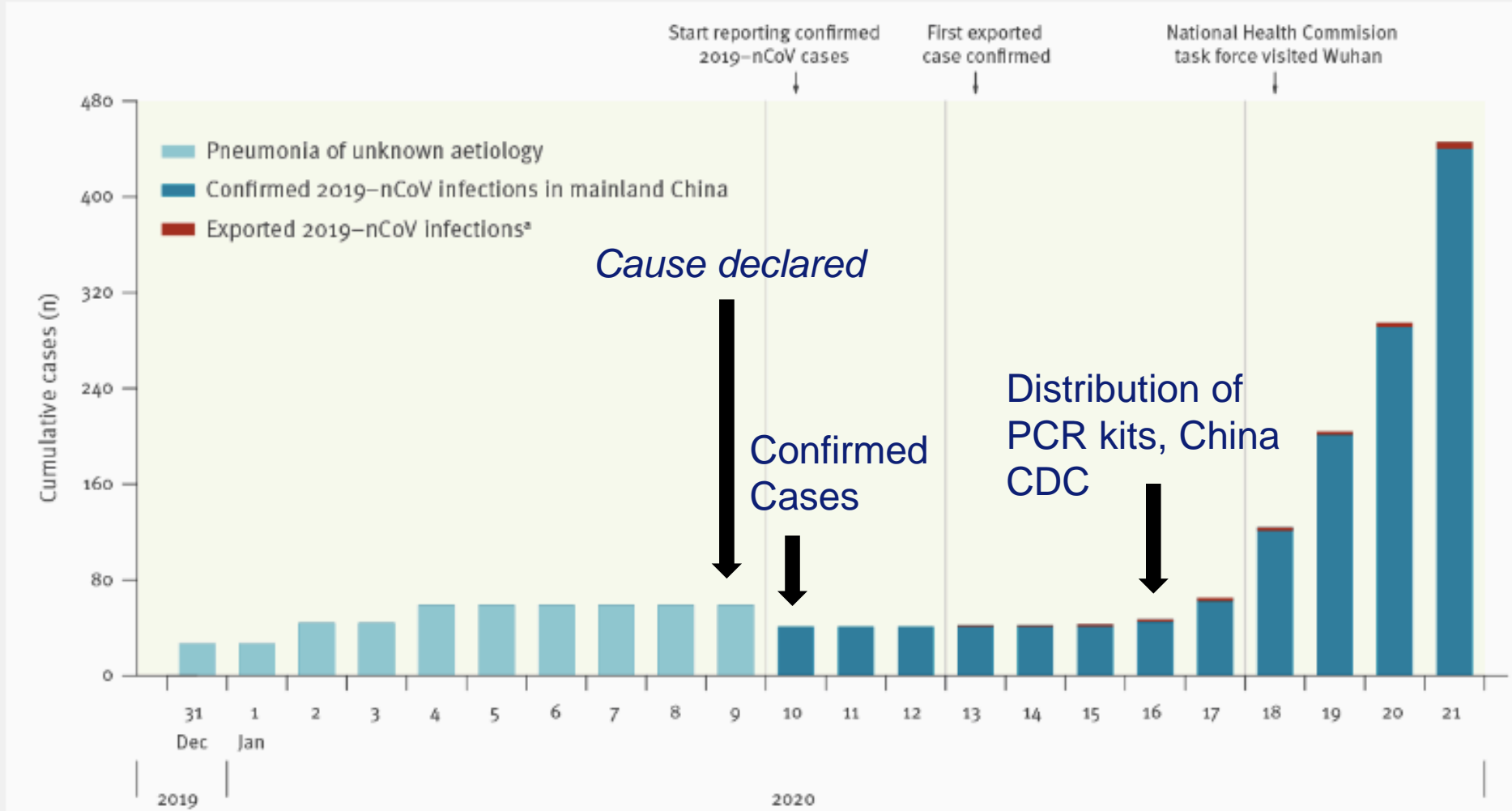
Onderzoek naar SARS Cov 2 transmissie

Macaques:
Virus replicates in the nose
(and in the lungs)

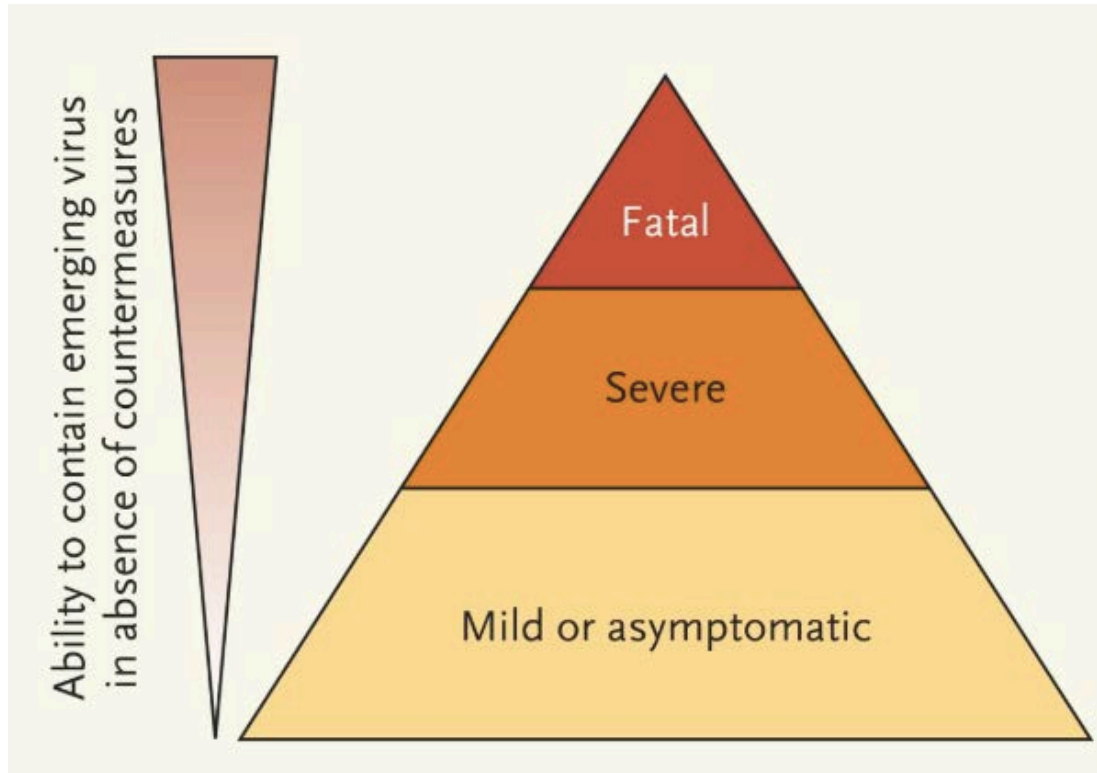


De eerste gegevens uit Wuhan

Figure 1. Increase in laboratory-confirmed cases of 2019-nCoV infection over time, as at 21 January 2020

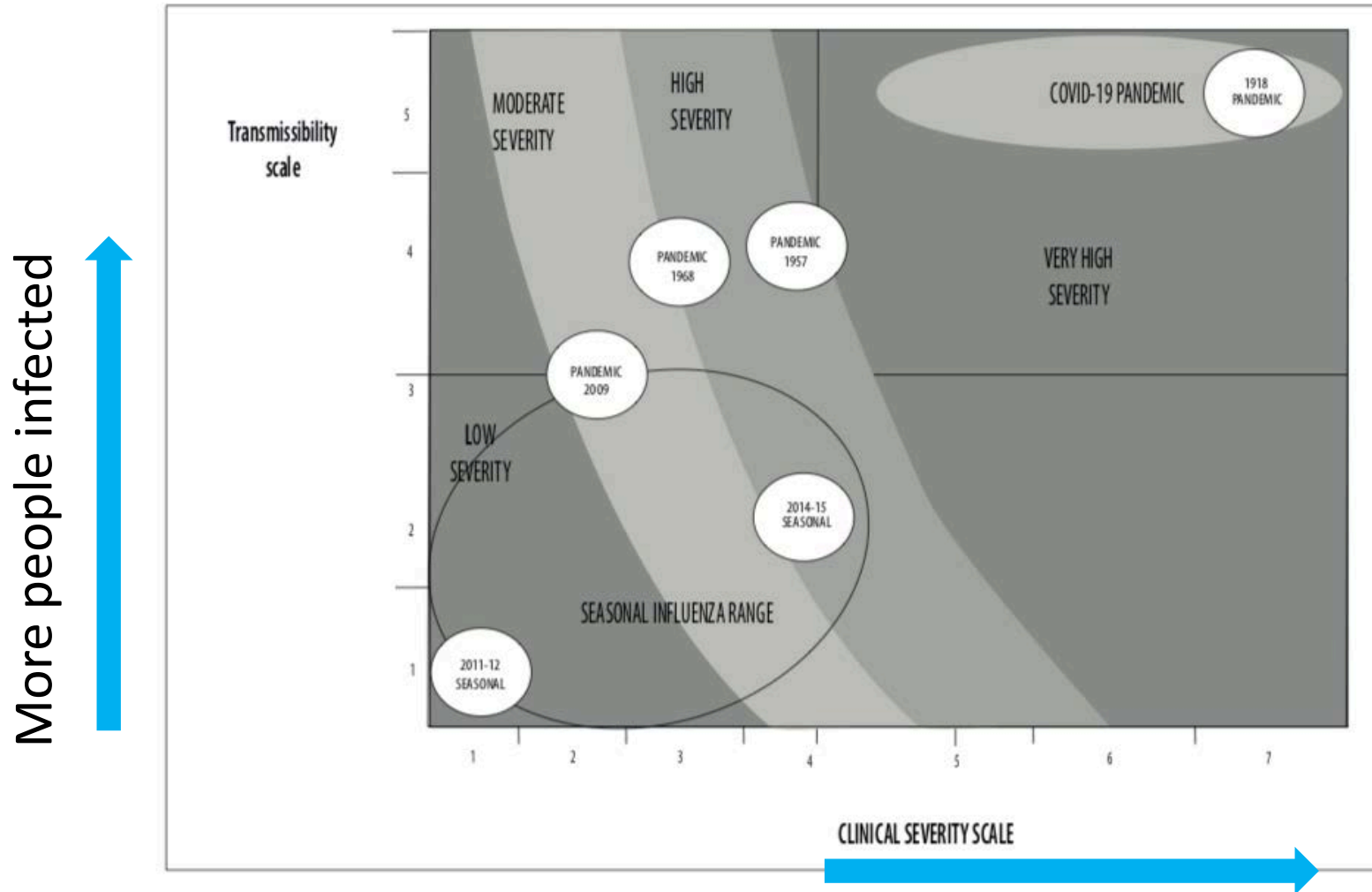


Ernst en omvang van de uitbraak vaststellen: een lastige vraag



1. Diagnostiek ontbreekt
2. Klachten zijn niet specifiek
3. Personen met milde klachten zijn niet in beeld
4. Serologische studies nodig
5. Onderzoek kost tijd
6. Combinatie van uitbraak onderzoek en bestrijding kan conflicteren

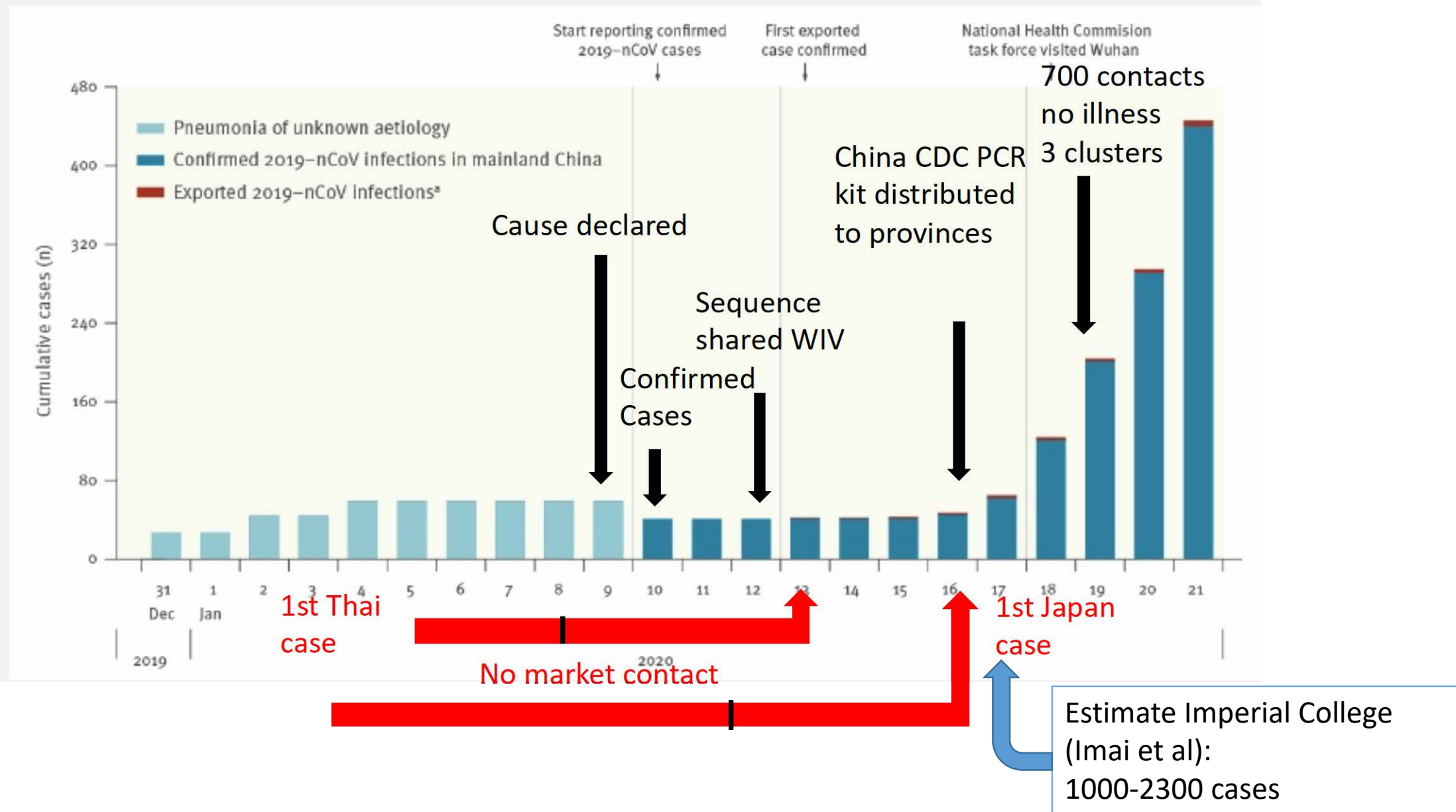
Impact of a pandemic is determined by transmissibility and severity



Adapted from: Reed C, Biggerstaff M, Finelli, Koonin LM, et al, Novel framework for assessingn epidemiologic effect of influenza epidemics pandemic. Emerg infect Dis 2013;19(1):85-91

More people severely ill

Figure 1. Increase in laboratory-confirmed cases of 2019-nCoV infection over time, as at 21 January 2020



De Europese seeding: wat zou jij hebben geadviseerd?



Feb 2020 Wintersports Austria, Switzerland, Italy



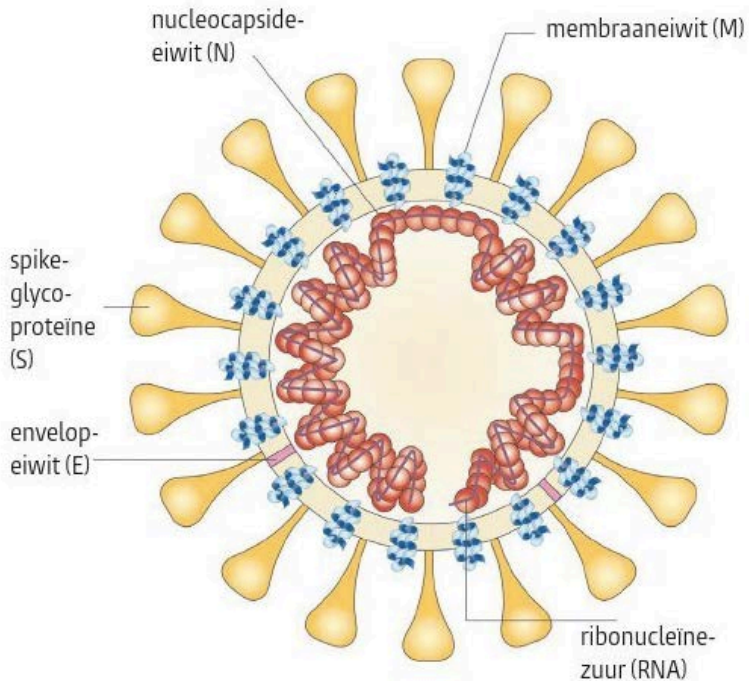
Feb 2020 Carnaval South of the country

Tot Feb 21, 47 bevestigde gevallen in Europa

Spiteri et al, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7068164/>

Doorbraak: real-time sequencing

Informatie die in de genetische code zit opgesloten



Wat is het?

Waar komt het vandaan?

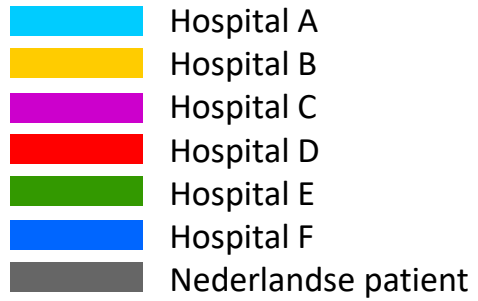
Hoe verschilt het van bekende virussen?

Is het onderdeel van een uitbraak?

.....

Schematische voorstelling van het nieuwe coronavirus sars-cov-2 (diameter 60-140 nanometer).

Illustratie: Peiris e.a., Nature Medicine Review, 2004 (met aanpassingen)

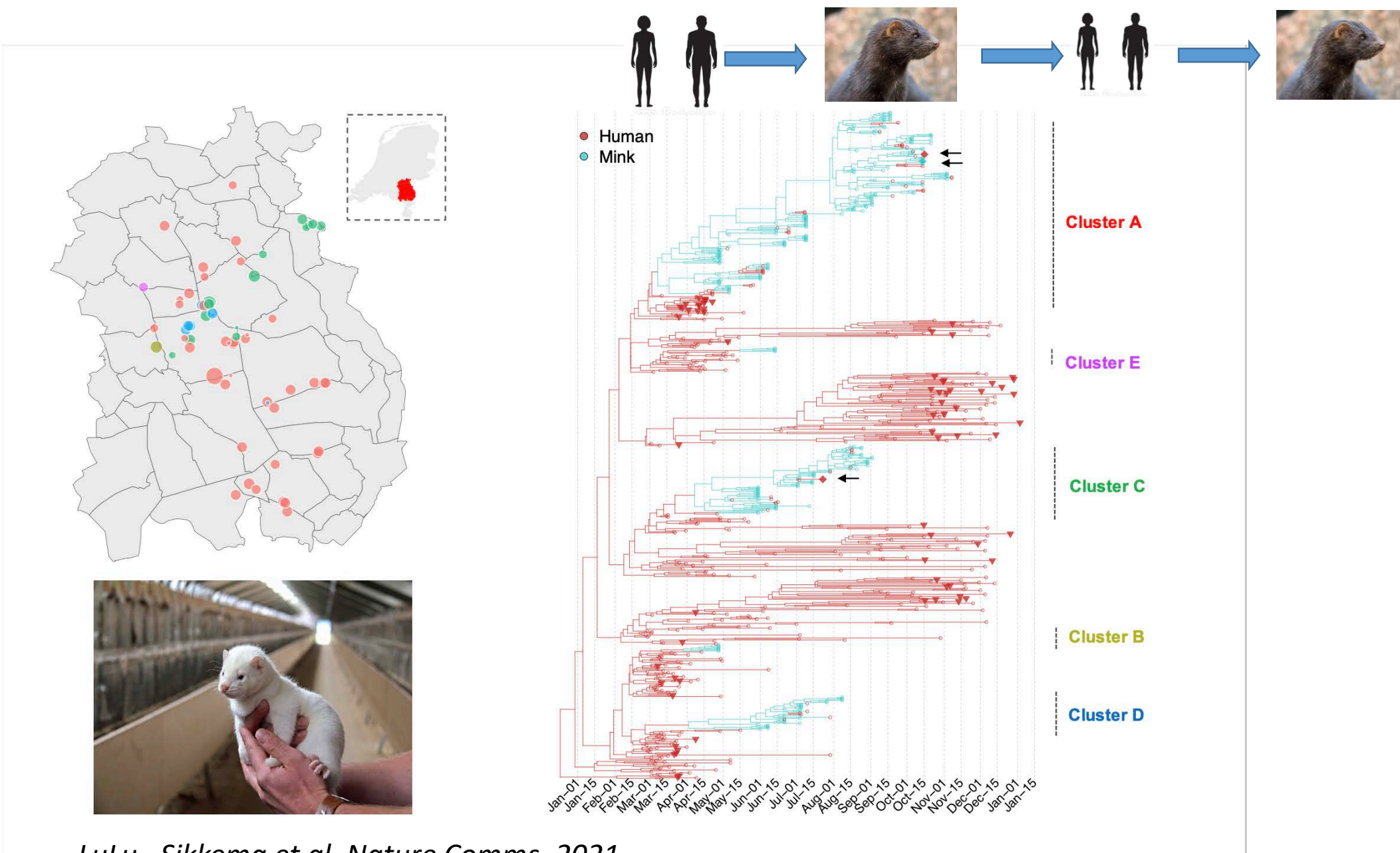


Phase 2: Weekend 5-8 March, screening HCW
Hospitals in Brabant

- “bombardment” of viruses
- Enhanced control measures



Kluytmans et al., 2020; Oude Munnink et al., 2020; Reusken et al., 2020; Sikkema et al., 2020



LuLu, Sikkema et al, Nature Comms, 2021

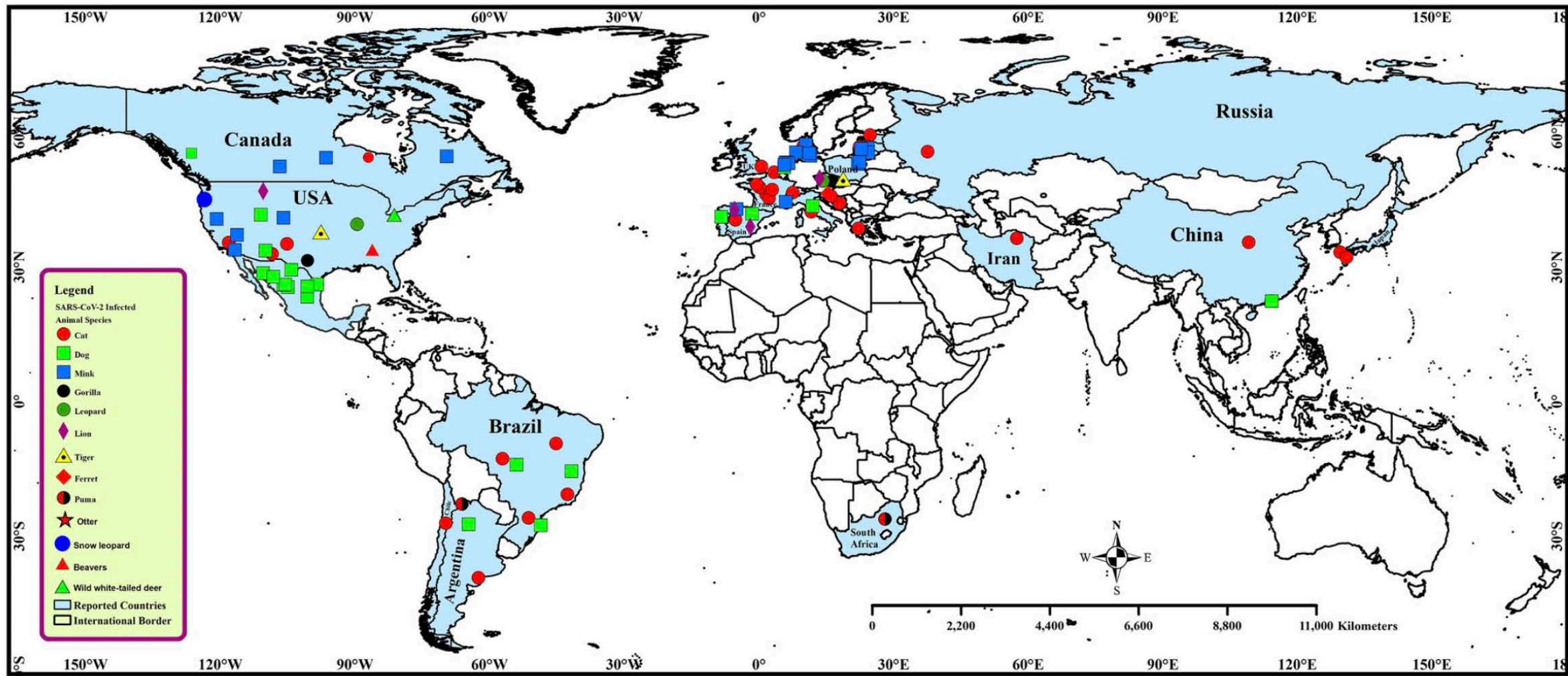


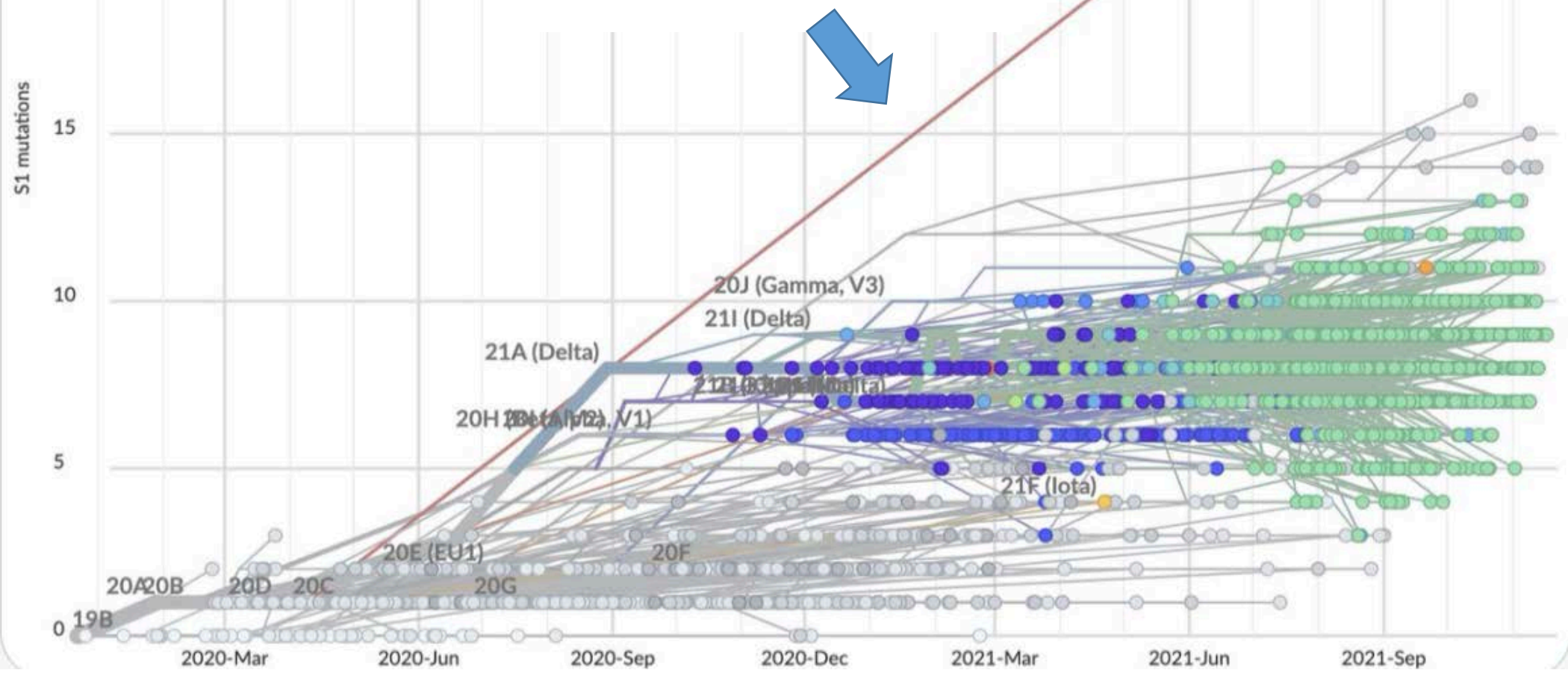
Fig 3. Spatial distribution of SARS-CoV-2 in domestic and wild animals in the world.

<https://doi.org/10.1371/journal.pone.0260635.g003>

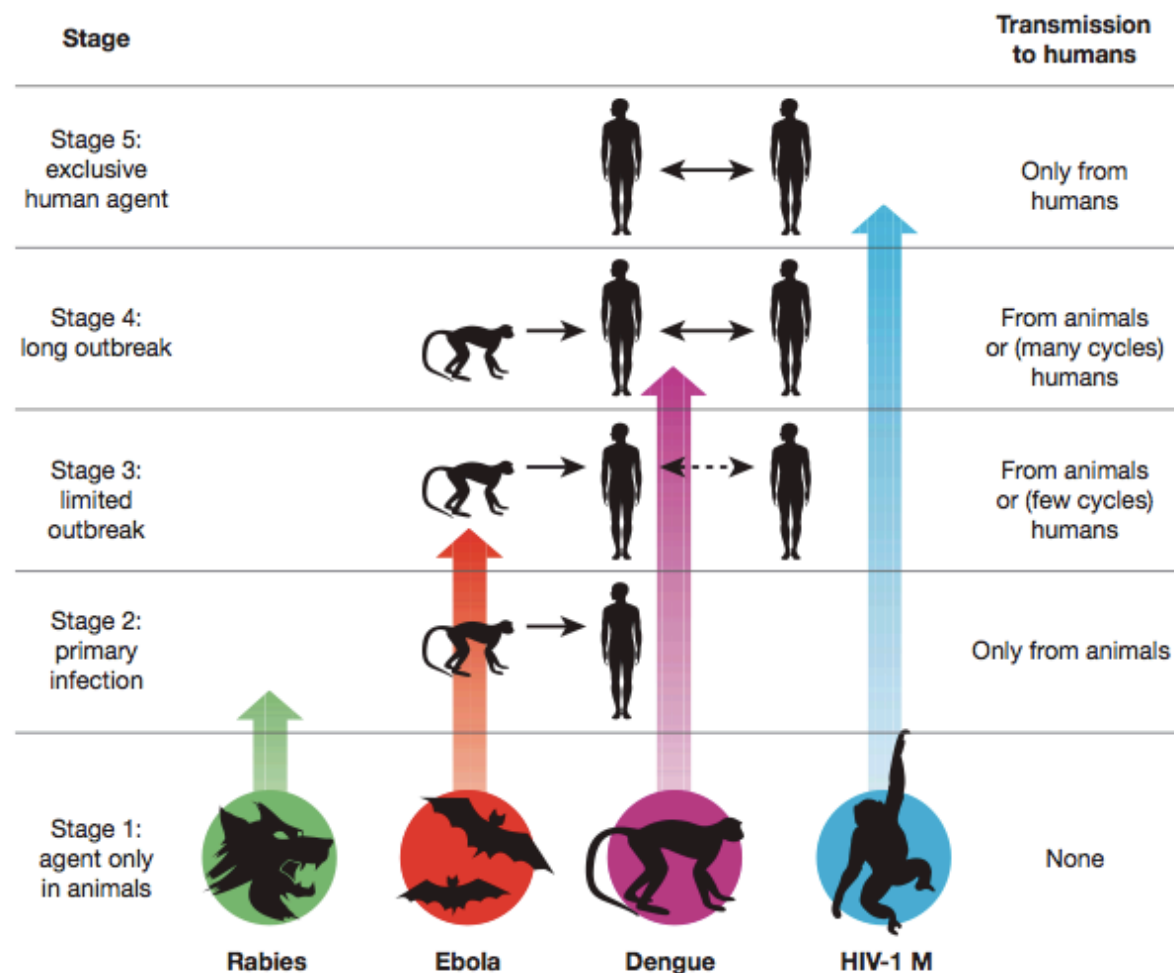
Clade

- 20H (Beta, V2)
- 20I (Alpha, V1)
- 20J (Gamma, V3)
- 21A (Delta)
- 21I (Delta)
- 21J (Delta)
- 21B (Kappa)
- 21F (Iota)
- 21G (Lambda)
- 21H (Mu)
- 21K
- 19A
- 19B
- 20A
- 20G
- 20B
- 20D
- 20F
- 20E (EU1)
- 20C

New introduction?
Evolution within
immunocompromised?
Animal passage?



Vragen bij een virale spillover



1. Wat is de oorzaak?
2. Waar komt het vandaan?
3. Hoe ver is het verspreid?
4. Hoe ernstig is de ziekte?
5. Is het besmettelijk?
6. Zijn mensen (deels) beschermd?
7. Hoe is het te stoppen?







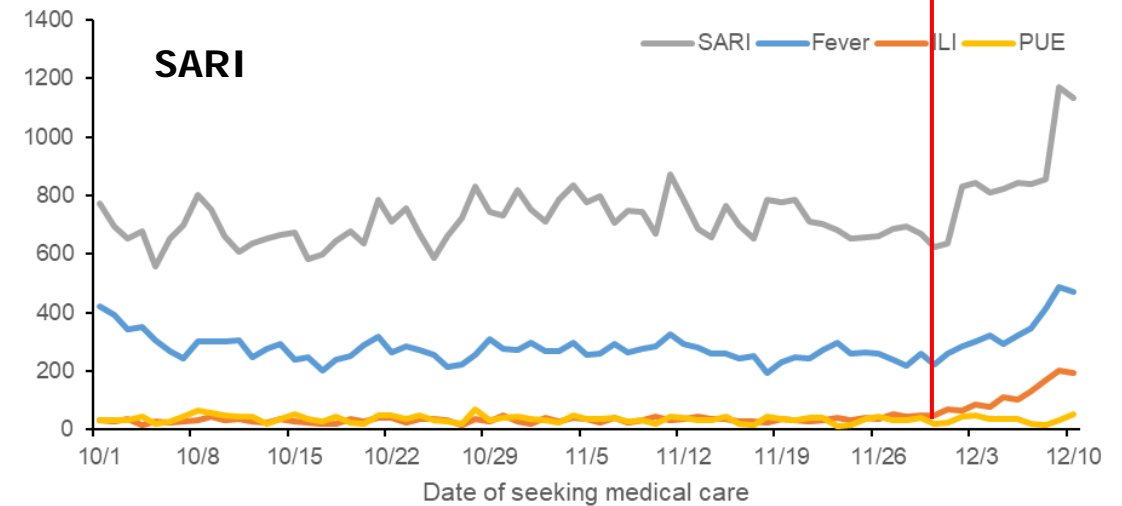
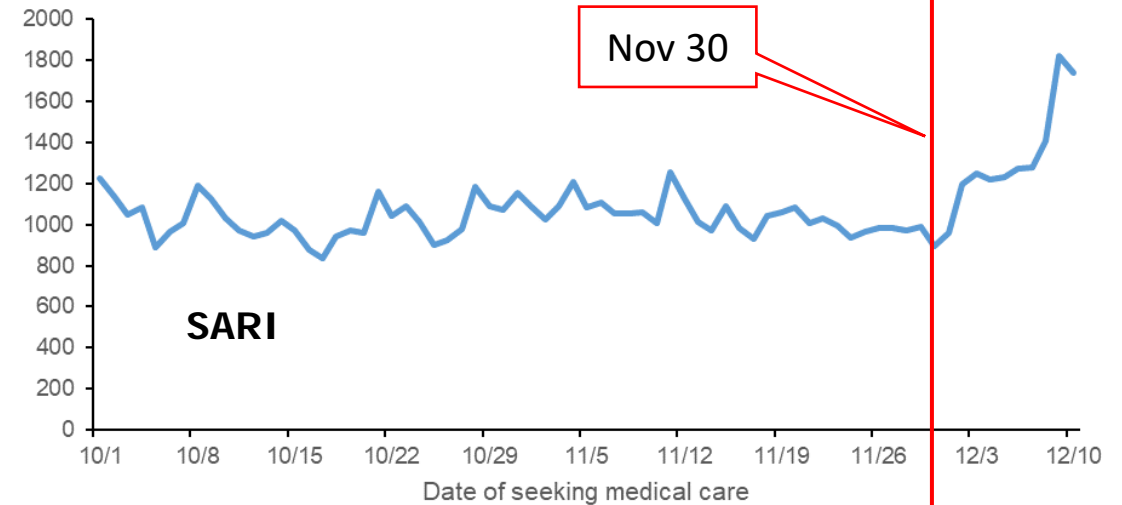
Studies

Meldingen van mensen met griepverschijnselen tweede helft 2019

>76,000 patiënten dossiers van 233 gezondheidscentra in 15 districten van Wuhan, Oct 1 tot Dec 10, 2019

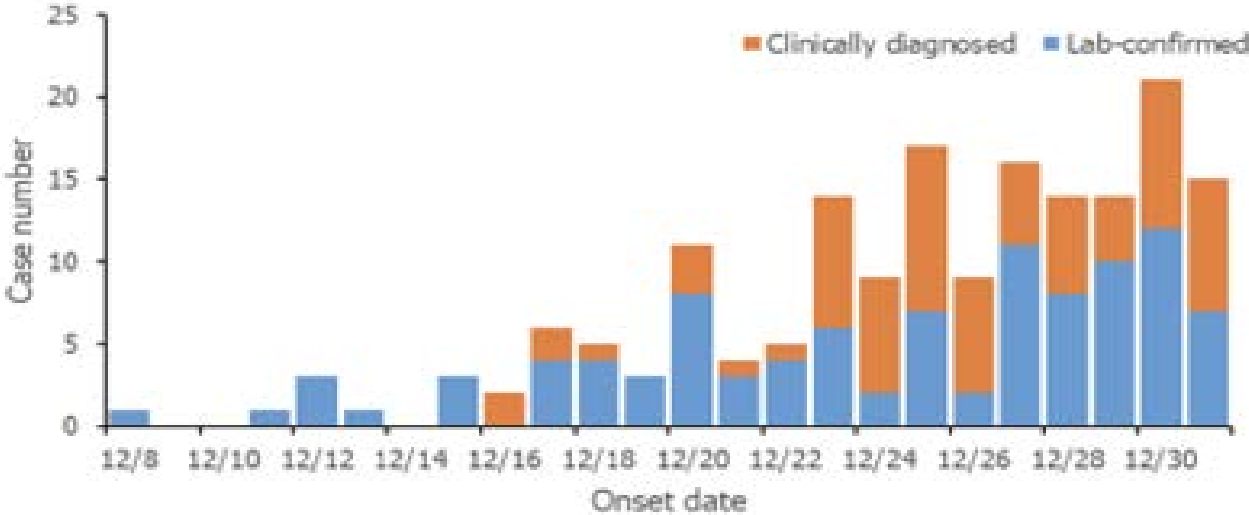
Hertesten van verdachte patiënten cases October 2019-December 2019

No. of cases



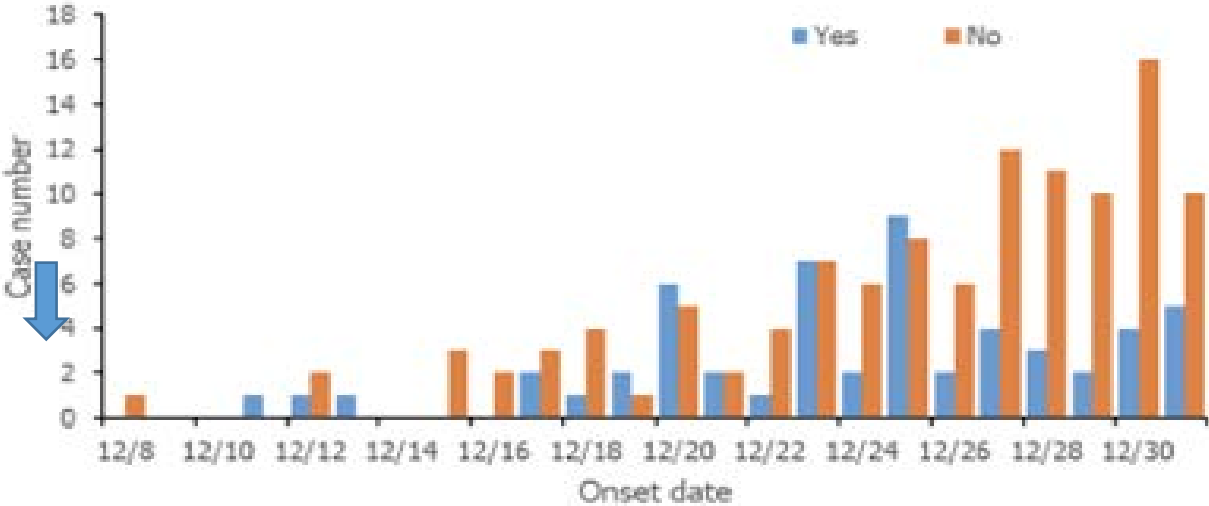
COVID-19 gevallen en vermoedelijke gevallen uit onderzoek

Aantal cases

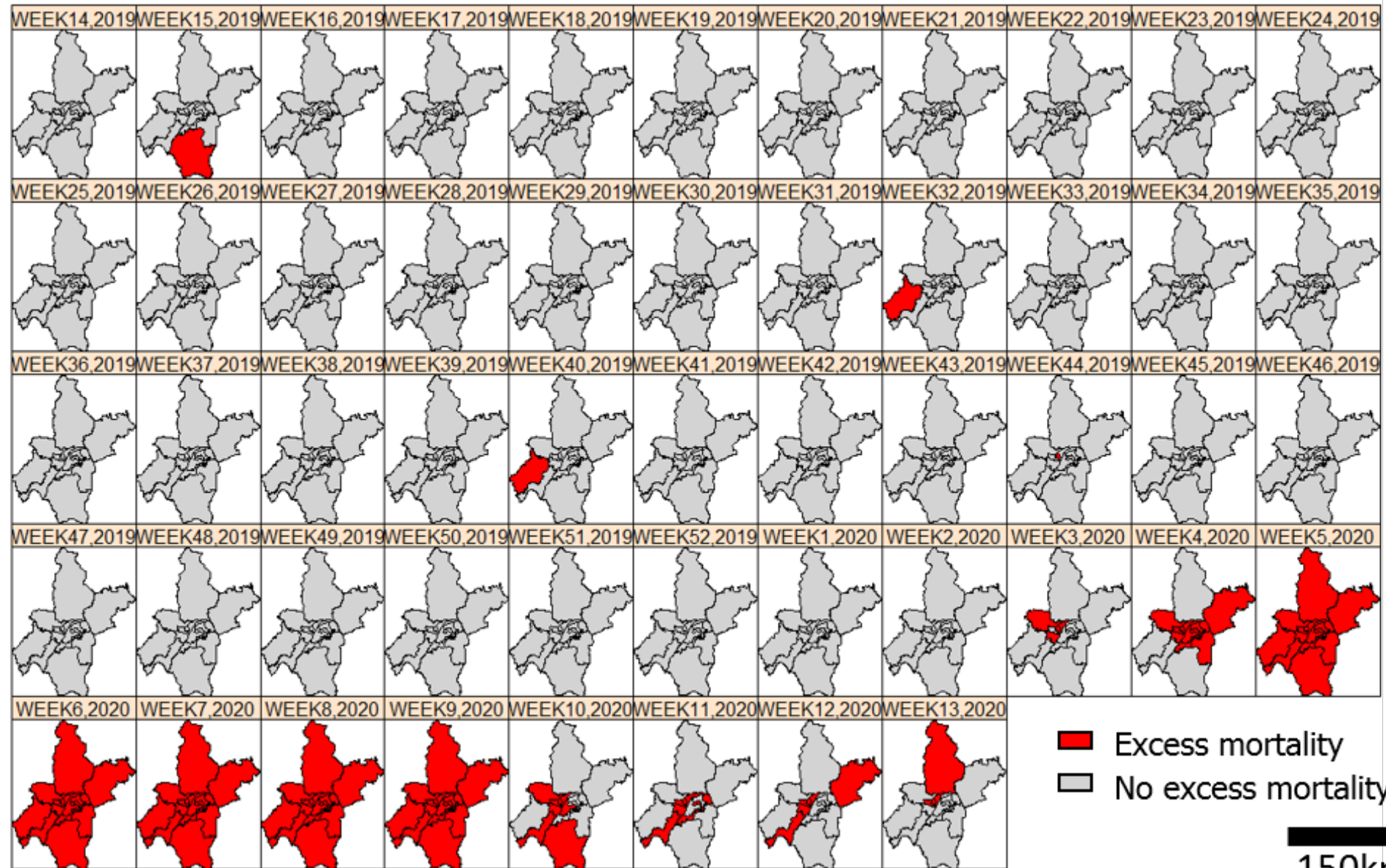


N = 174

Contact met de markt



2/3d no contact

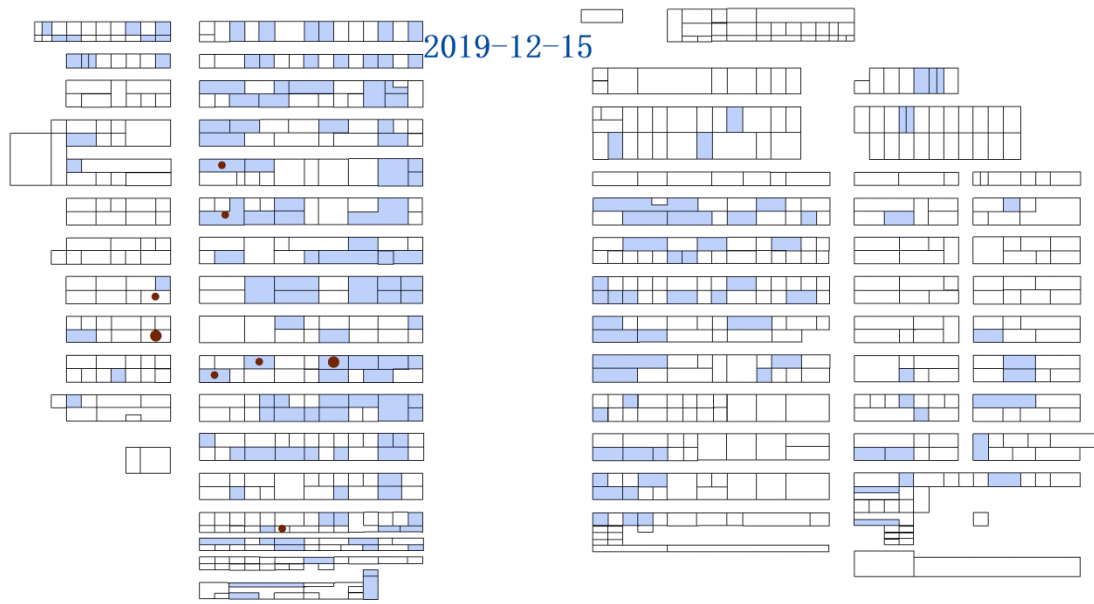




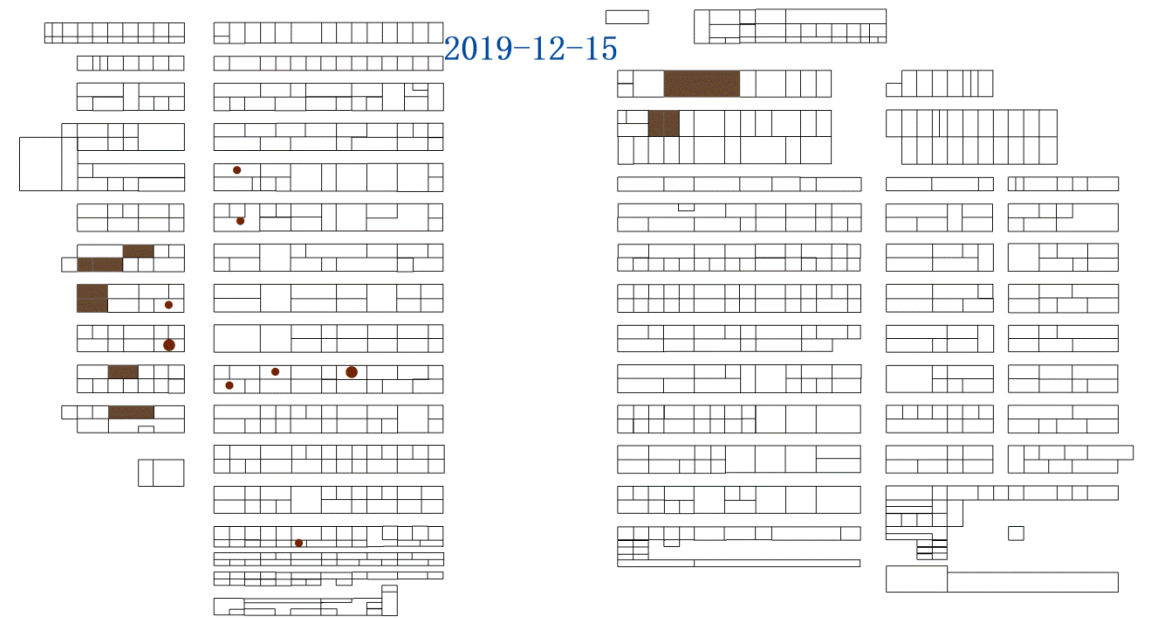
Case notification:
December 27th
2019



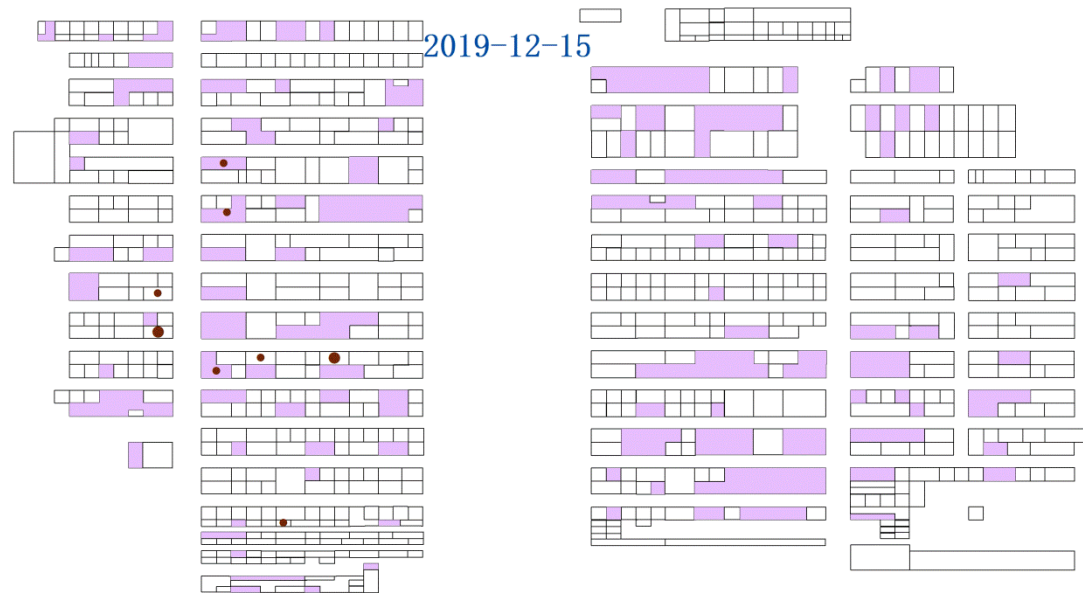




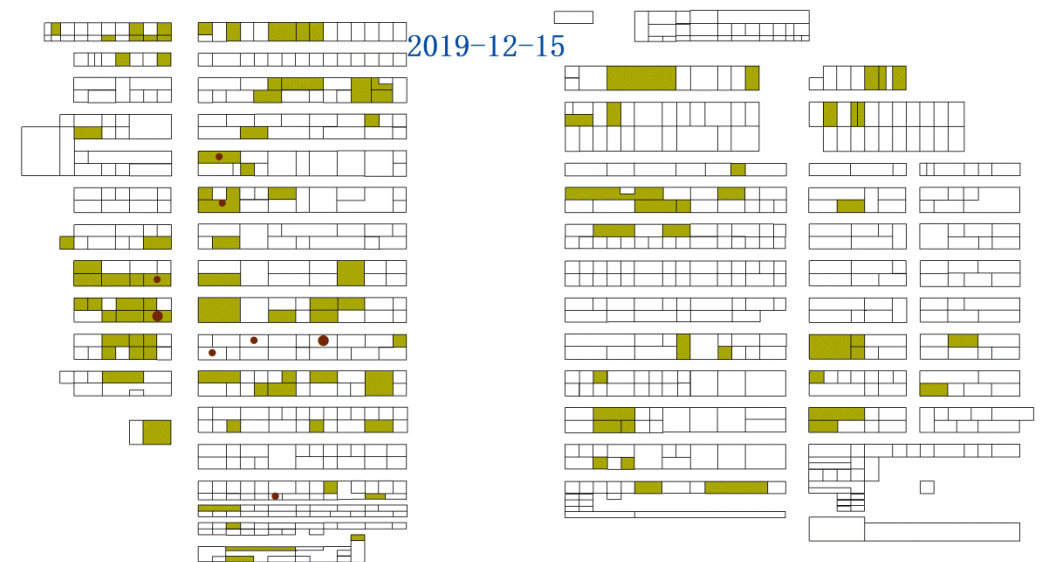
Aquatic products



Wild animal meat



Meat



Poultry

西8-36,38 (1122)

West 8-36,38 (1122)

	35. 35. 37/5119		28. 28/2024	27/2034	25/5114	
27/1067	28/2022	28. 28/2024	22/2070	20/2041	28. 28/2024	
	28. 28/2024		27. 29/2032		25/2028	
	28. 28/2022	27. 28/2024	28/2022	26. 25/1054		
	27/1067	35/1063	22/1069	29. 21/1091	27	28. 28/2022
	26. 28/4143	24/1092	28. 22/1090	28. 28/2022		
	35. 37/5101	28. 28/2022	29/4132	27/1065	28. 28/2022	
	28. 28/2022	26/3002	24/1065	22/1013	28. 28/2022	28/1065
28/27/5108	27/2024	35/3119	28. 28. 28/2024		25. 27/1065	

摊位	编号	摊主姓名	售卖类型	来源
大众家禽 批发	西8-36,38 (1122)	曾**	鸡	未知
			蛇	陕西山阳县建惠生态种养专业合作社 刘*
			竹鼠	云南永德县竹鼠产销专业合作社 尹**
			兔	未知
			暹罗鳄	广州黄沙 洪**
			白条野鸡	武汉黄浦区三里桥 丁**
Stall	Serial number	Owner	Animal type	Sources
Dazhong wholesale poultry	West 8- 36,38 (1122)	Zen **	chicken	unknown
			snake	Liu *, Shanyang, Shanxi
			Bamboo rat	Yin **, bamboo farms, Yongde, Yunnan
			rabbit	unknown
			Siamese crocodile	Hong **, Huangsha, Guangzhou
			pheasant	Mr. Ding, Sanliqiao, Huangpi district, Wuhan, Hubei

Survey wild animals on markets in Wuhan

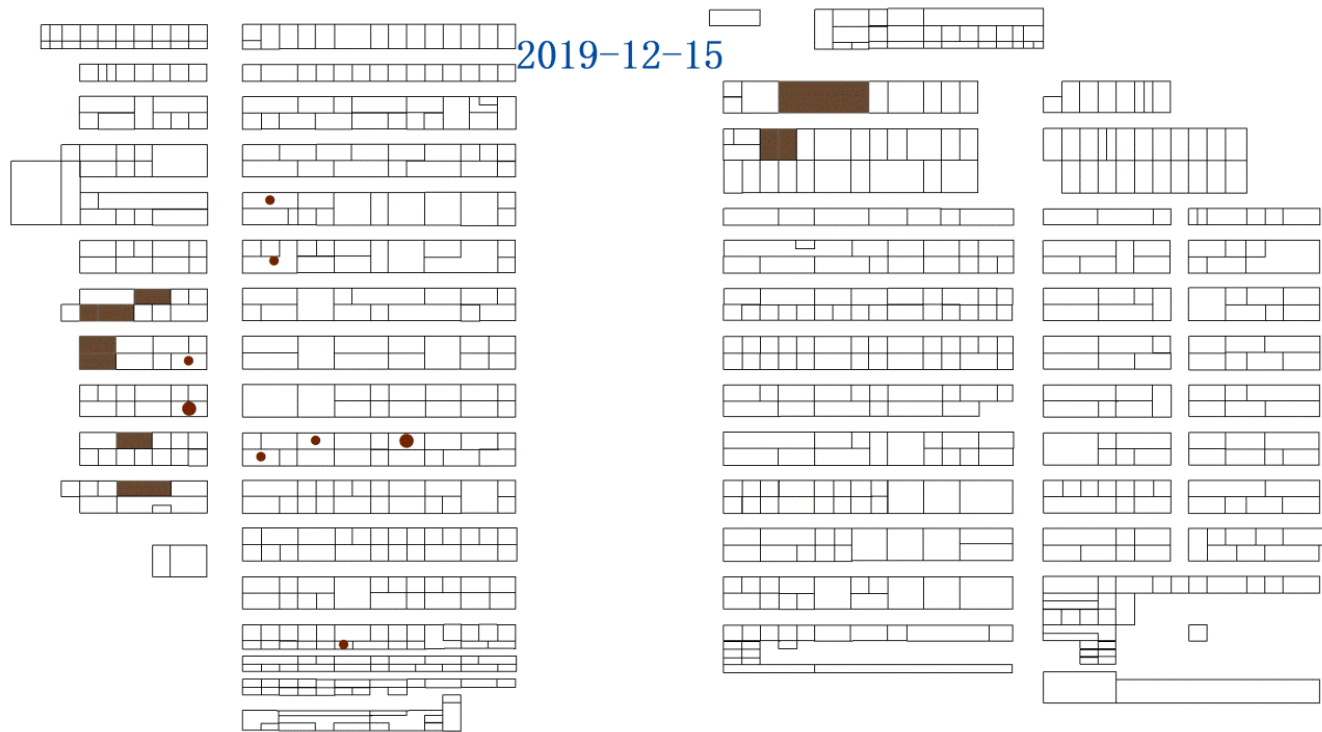
Between May 2017
and November 2019

47000 individuals, 38
species, including 31
protected

Several susceptible
species

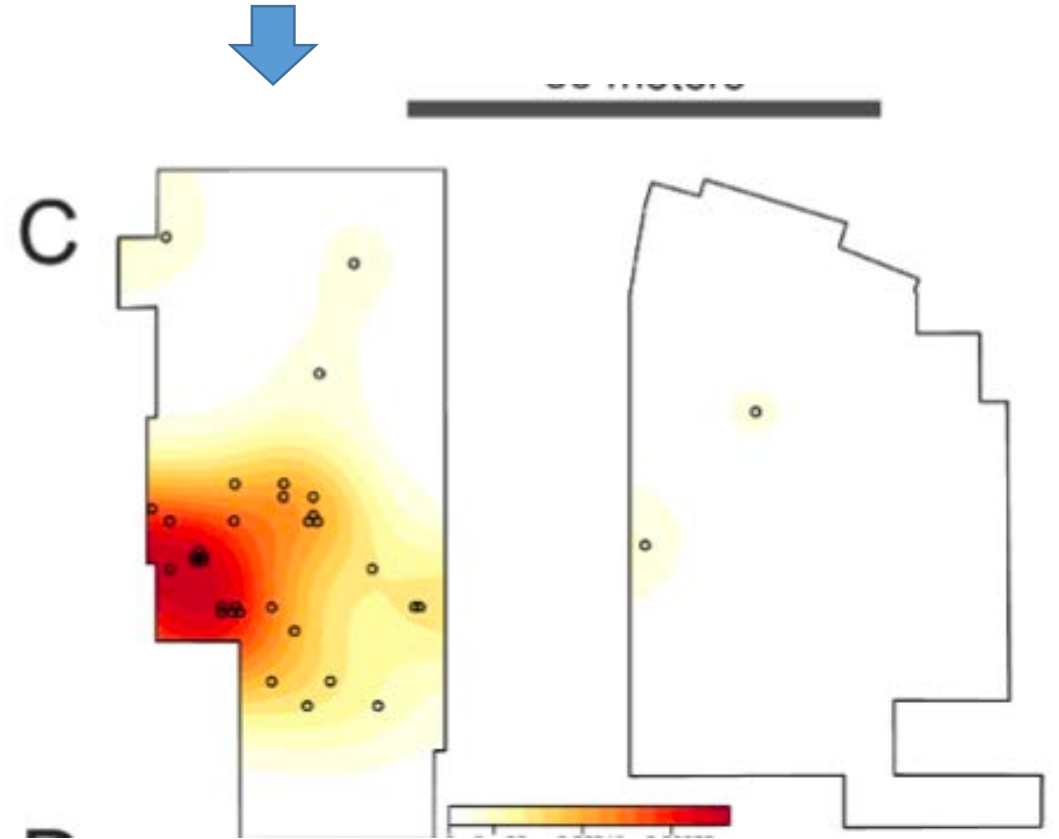


Map of the Huanan market



Strong association with location of stalls selling live wild animals

Positive environmental samples



Worobey et al. <https://zenodo.org/record/6299116#.Yh5lIC1Q23V>



Laboratorium hypothese

Wuhan instituut voor virologie doet onderzoek naar virussen in vleermuizen

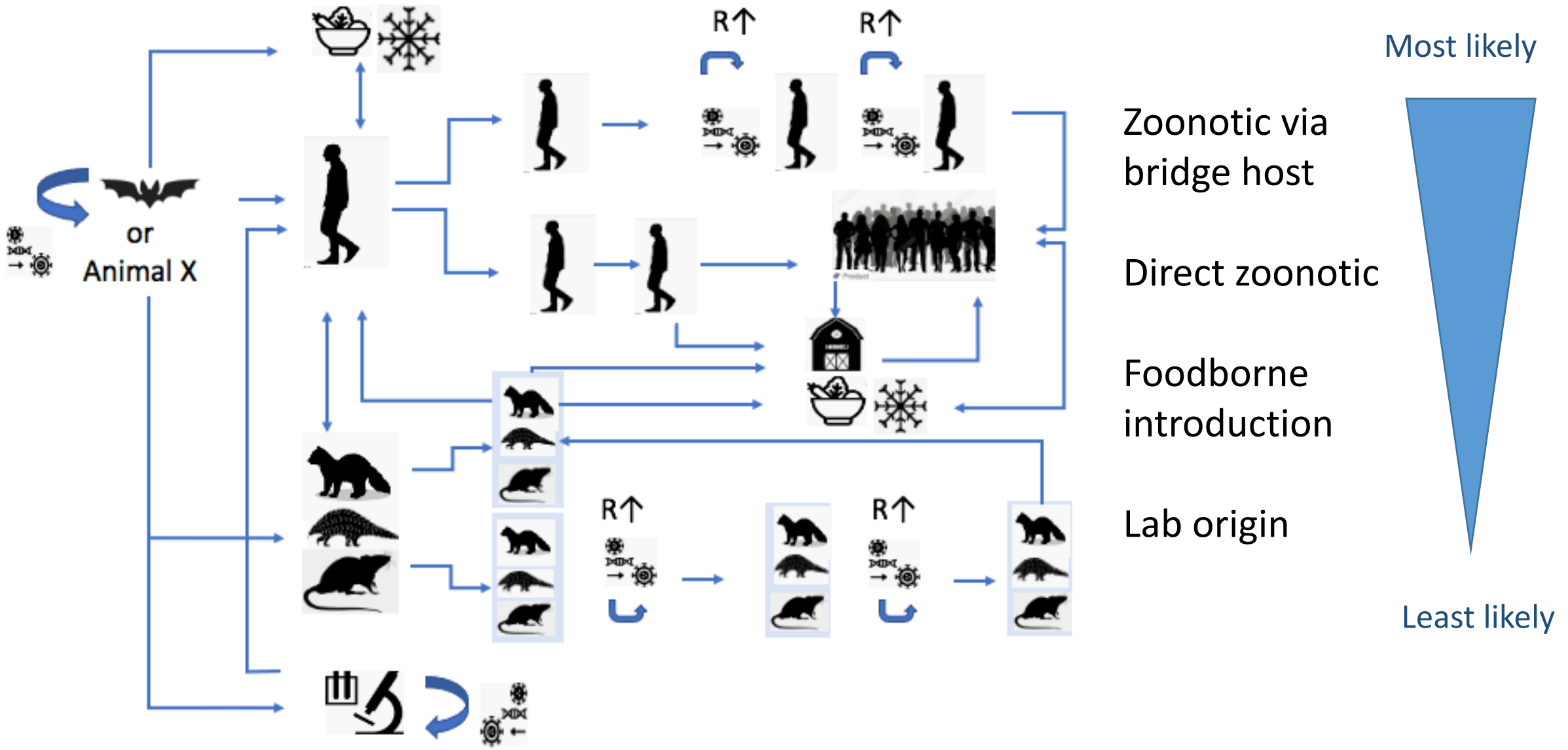
Vooral genetisch onderzoek (sequencing van vleermuizen poep)

Meerdere publikaties met gegevens en onderzoekers doen mee aan congressen , presenteren veel

Geen aanwijzingen voor aanwezigheid virus in lab

Geen aanwijzingen voor zieke medewerkers (ook getest dmv bloedonderzoek)





“Every day is a brand new day with this pandemic”

Michael Osterholm

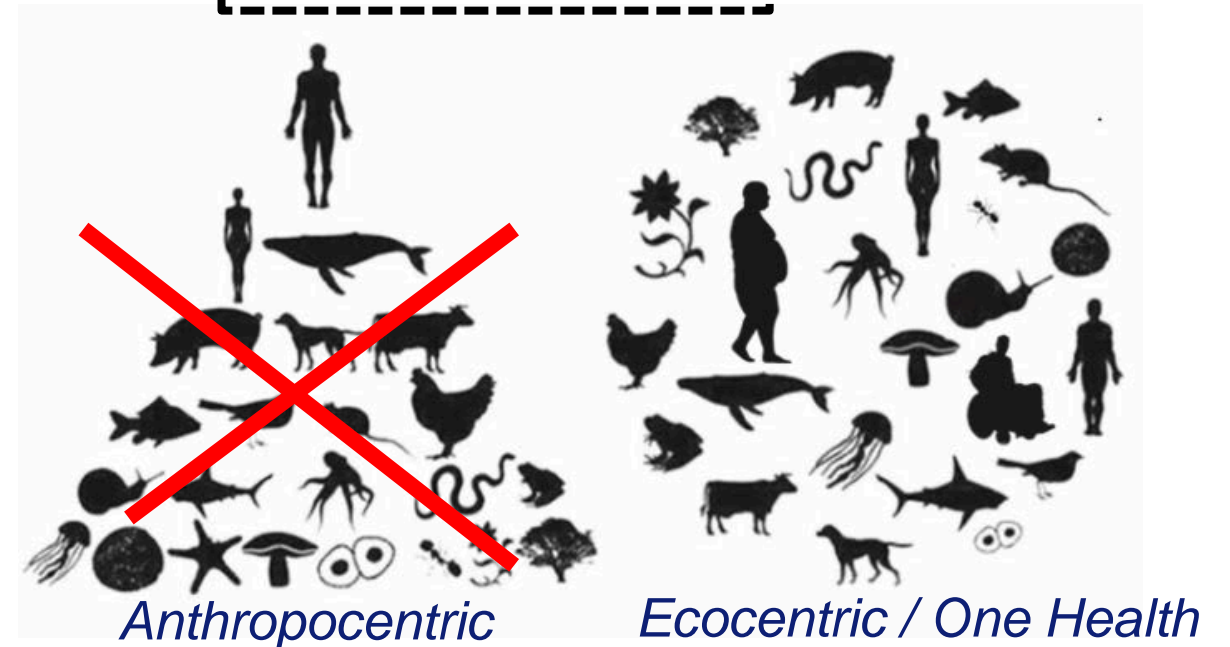
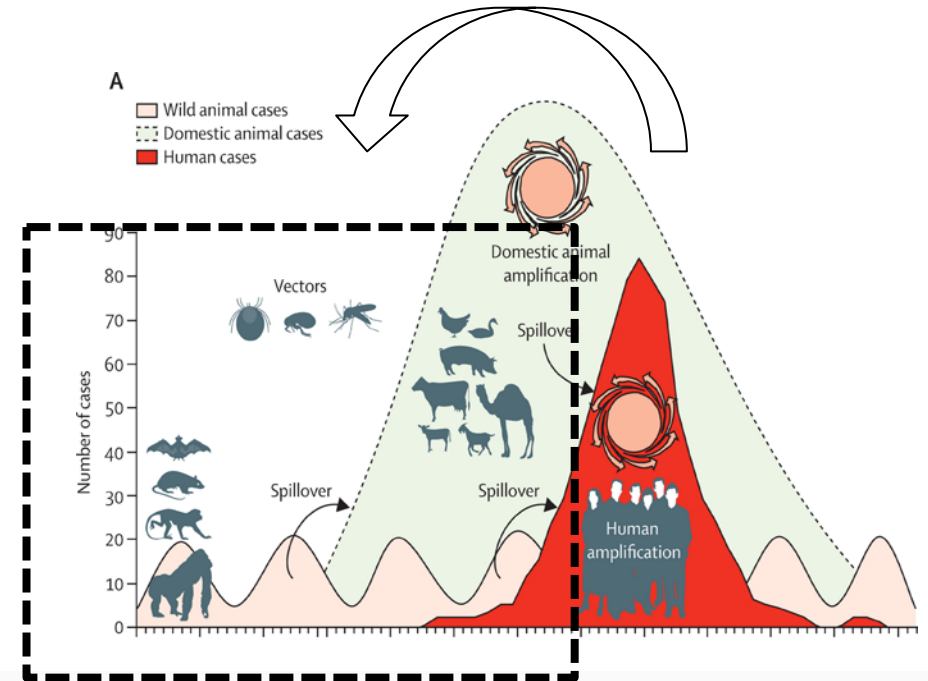
“We all long to go back to normal but normal led to this”

Ed Yong

EID preparedness research

Can we:

- Predict Risk?
- Develop capacity to detect all relevant pathogens / infections?
- Detect outbreaks early?
- Prevent?



Propositions for discussion

The human-animal-ecosystem interface is a crucial part of emerging disease outbreaks

A new immune-escape variant with increased transmissibility that evolved from passage through Dutch mink, we would not have been detected timely enough for control

The current One Health response systems work for slow evolving outbreaks, but lack a sense of urgency needed for timely intervention