

# WHO-convened Global Study of Origins of SARS-CoV-2: China Part

## Joint WHO-China Study

14 January-10 February 2021

Joint Report

# Stage 1 SARS-CoV-2 origins: Detailed reconstruction of current knowledge

## Epidemiology

Studies on earliest known cases  
Studies investigating possibility of earlier circulation in Wuhan or elsewhere

## Molecular epidemiology

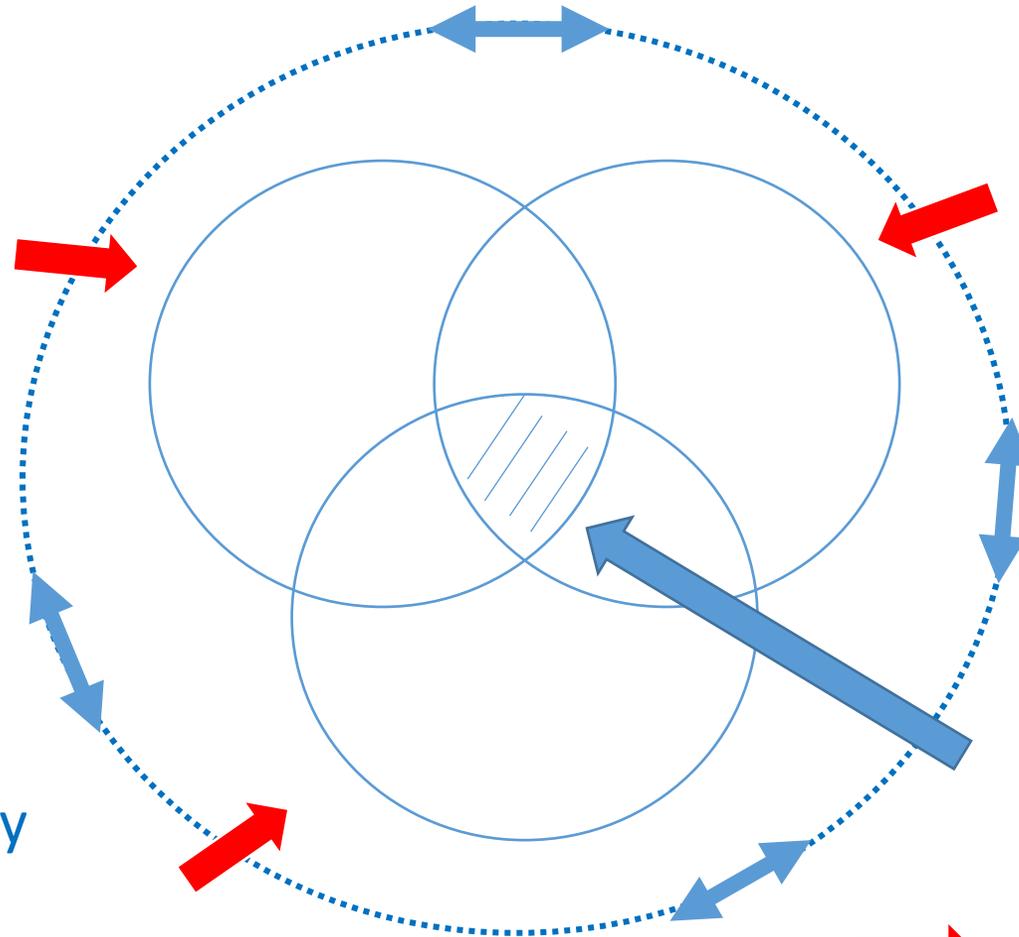
Linking genomes with earliest known cases  
Analyse in combination with epi information

## Animals and environment

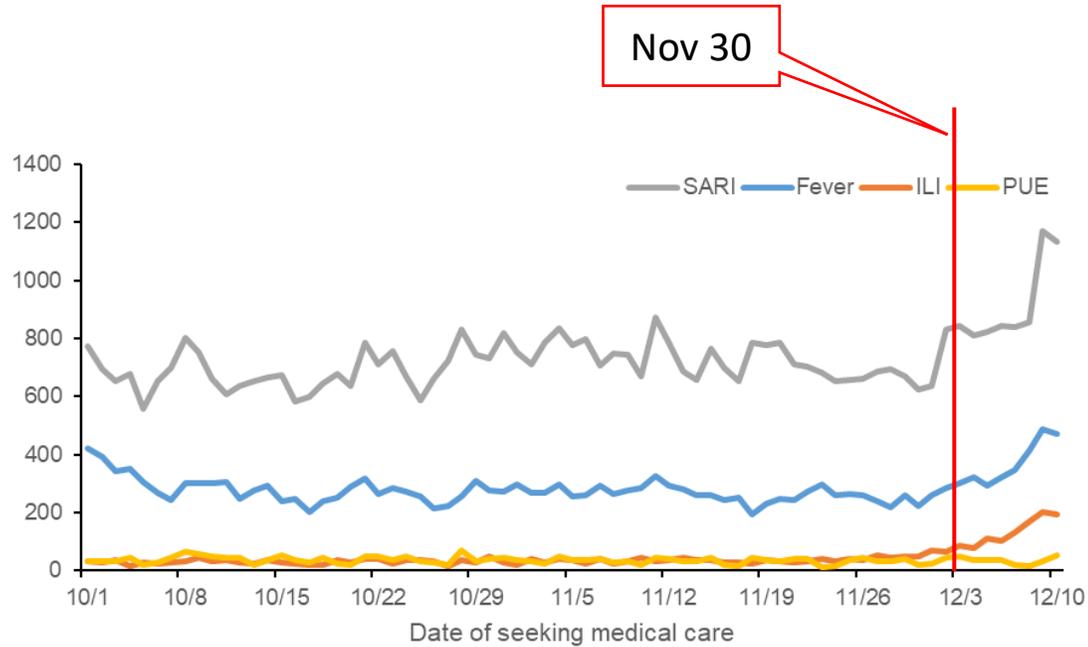
Studies on market and supply chain  
Animal surveys

## Databases

 Topic / working group specific  
 Cross working group

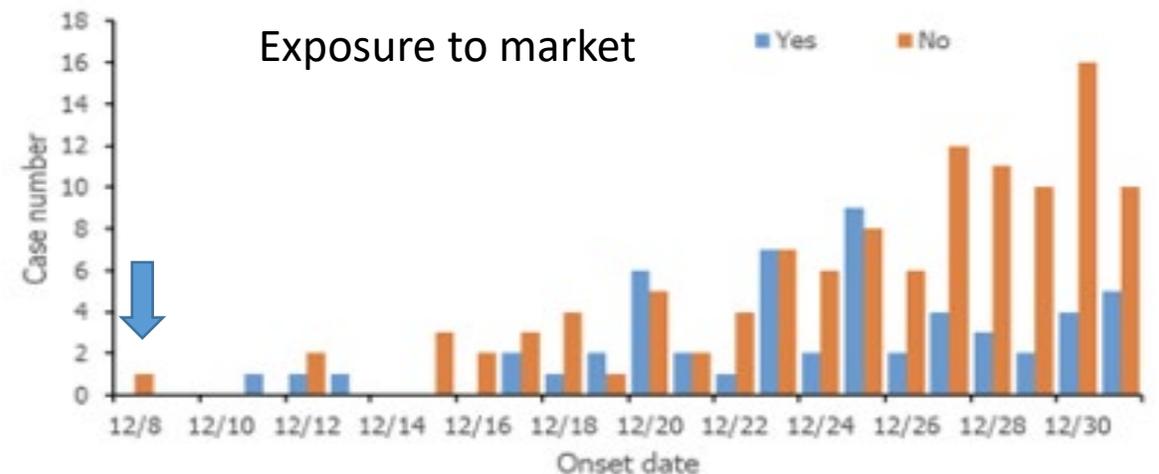
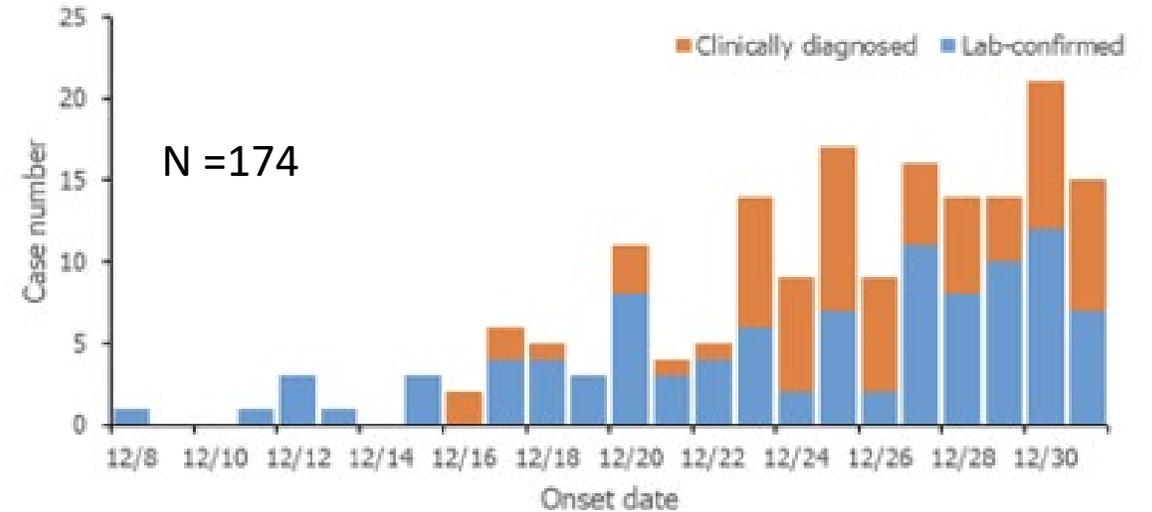


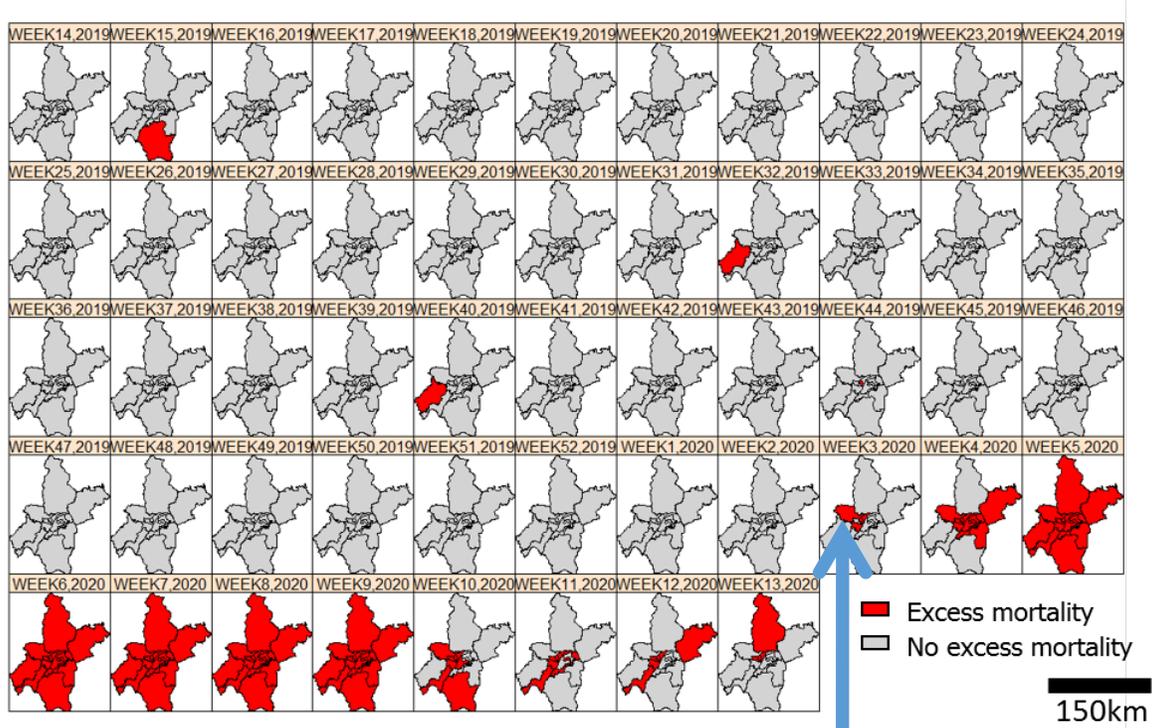
# Fever, ILI, ARI, and unspecified pneumonia in Wuhan, 1 Oct to 10 Dec 2019, and cases notified in December 2019



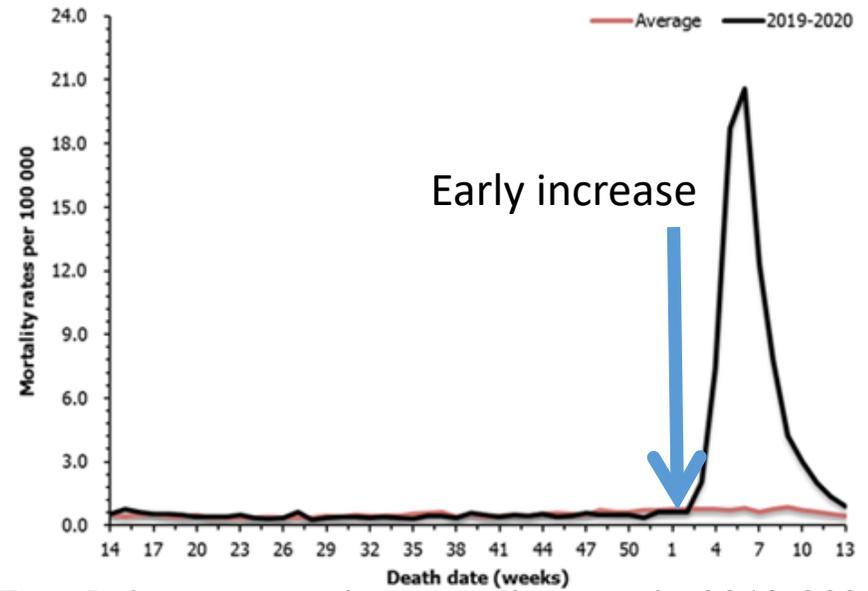
76,253 records, 233 health facilities, Wuhan. 92 COVID-19 compatible cases: 62 tested after one year – all seronegative

Retrospective testing of ILI cases: 9 positives in January, none in December

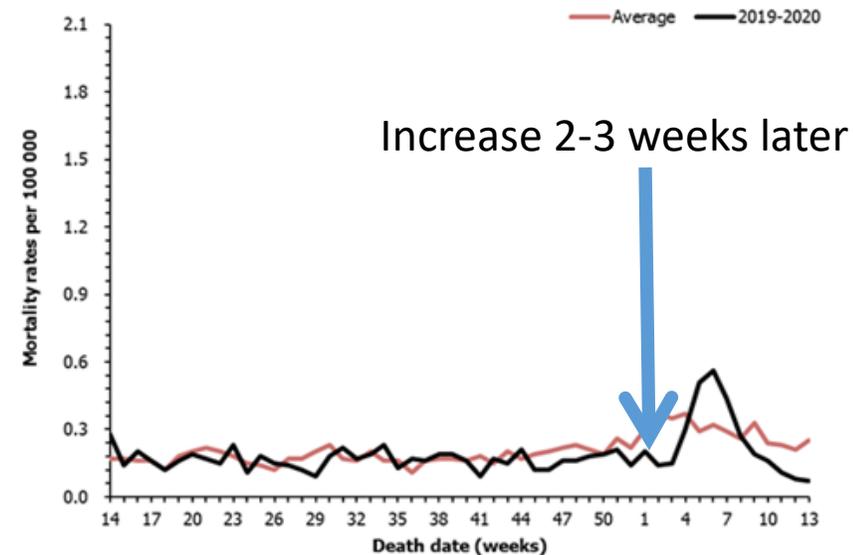




**Huanan Market**

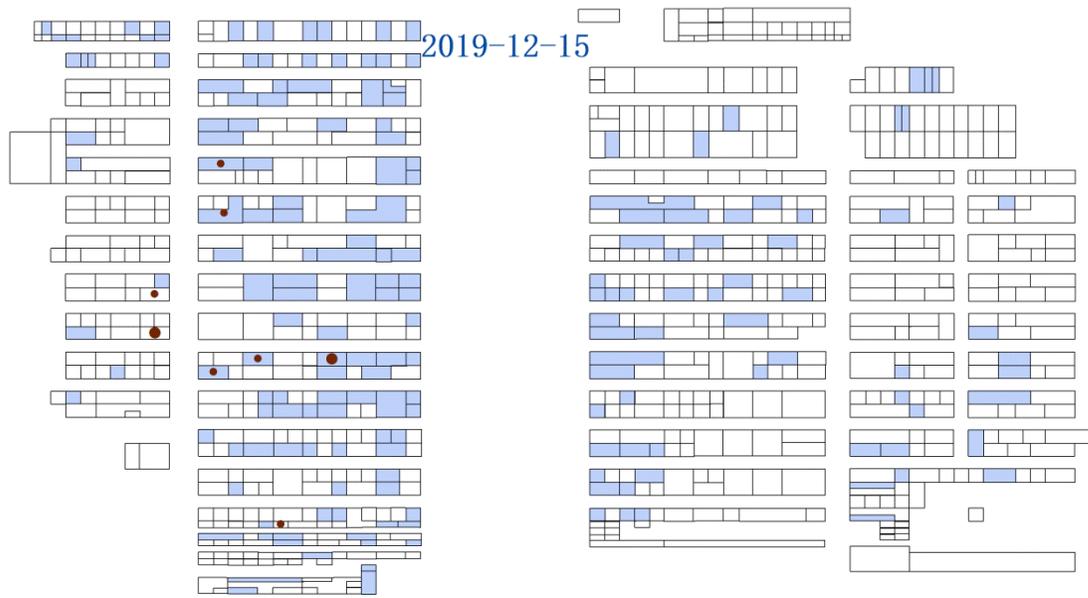


**Trends in pneumonia mortality rate in 2019-2020 versus 2016-2018, Wuhan, all ages.**

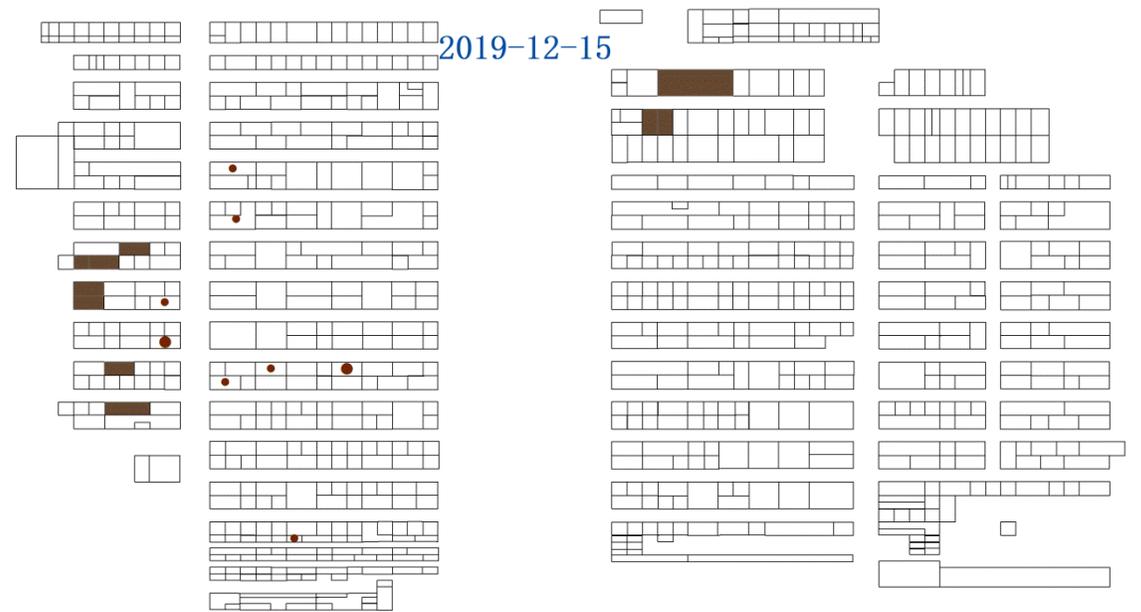


**Trends of the pneumonia mortality rate in 2019-2020 compared to 2016-2018, Hubei Province (excl Wuhan), all ages.**

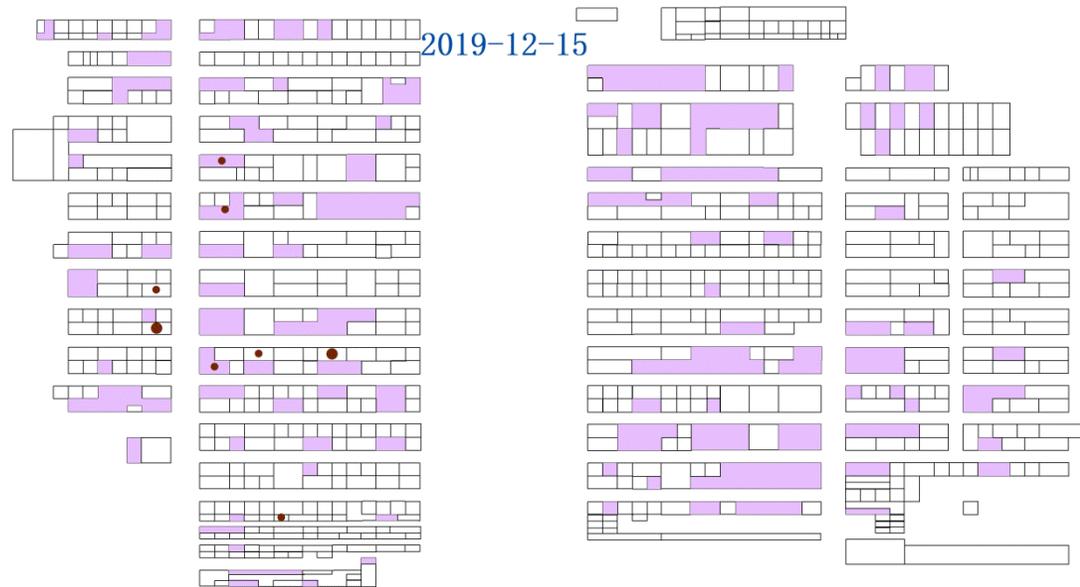




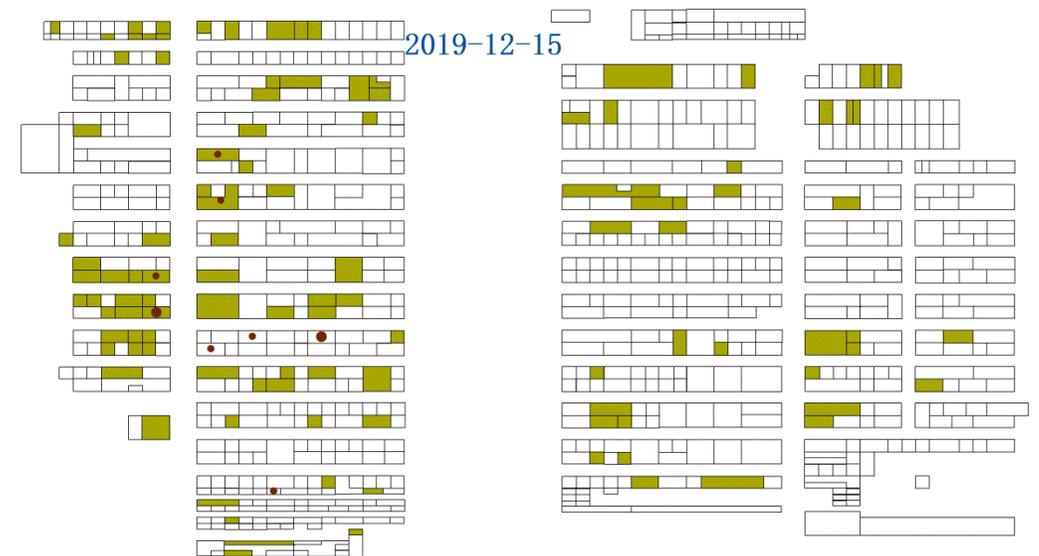
Aquatic products



Wild animal meat



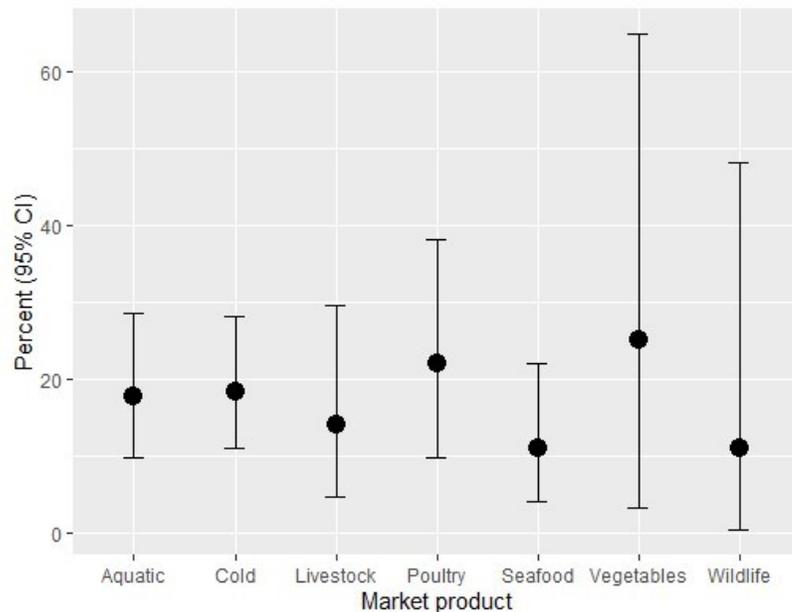
Meat



Poultry

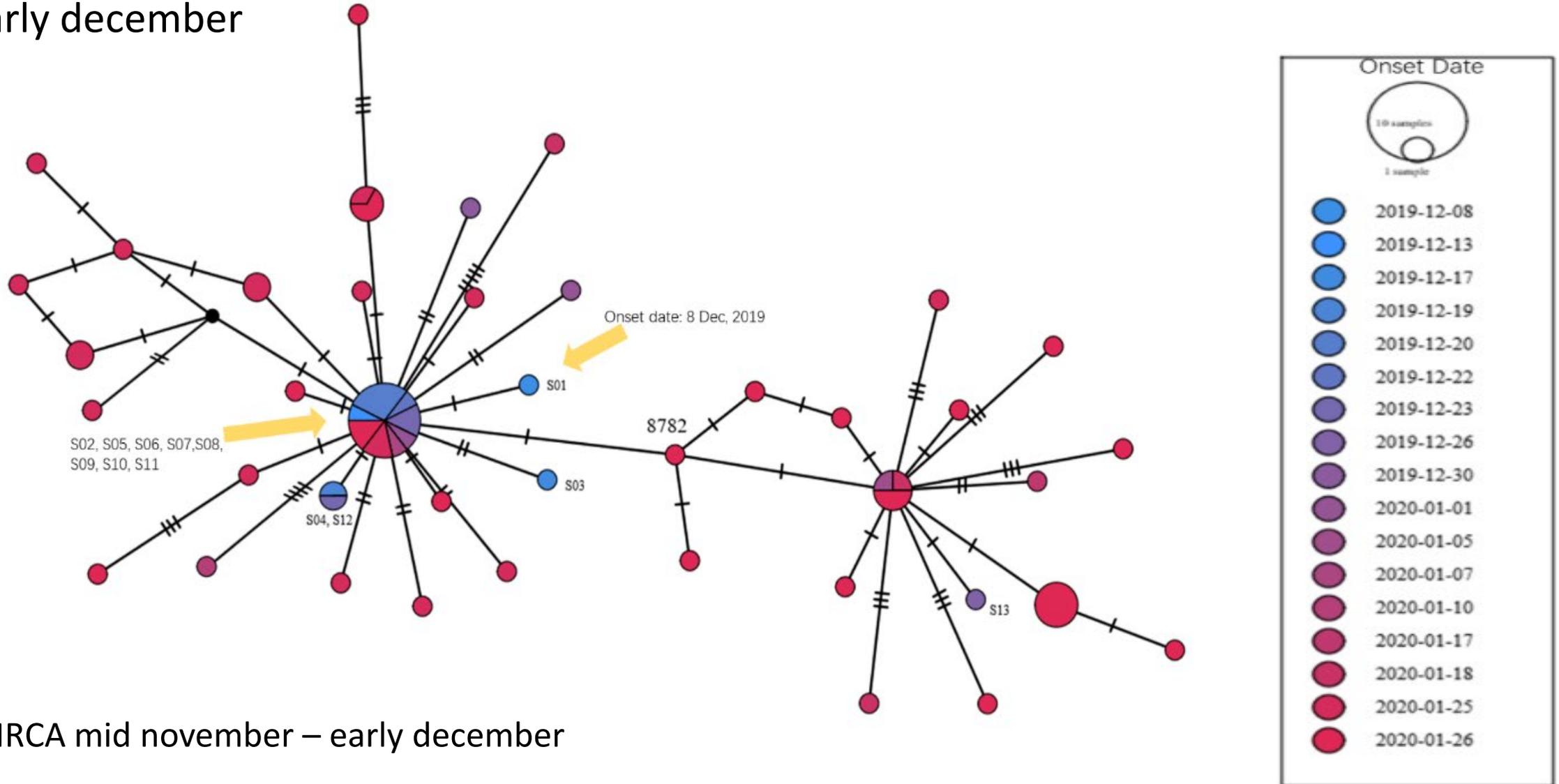
- 460 (frozen) Products from 9 provinces and 58 countries
- farmed wild animals and products from regions that are bat SARSr-CoV hotspots, including provinces where closest relatives to SARS-CoV-2 are found

## 西8-36,38 (1122) West 8-36,38 (1122)



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)	[Redacted]	鸡	未知
			蛇	陕西山阳县建惠生态种养专业合作社 [Redacted]
			竹鼠	云南永德县竹鼠产销专业合作社 [Redacted]
			兔	未知
			暹罗鳄	广州黄沙 [Redacted]
			白条野鸡	武汉黄陂区三里桥 [Redacted]
Stall	Serial number	Owner	Animal type	Sources
Dazhong wholesale poultry	West 8-36,38 (1122)	[Redacted] **	chicken	unknown
			snake	[Redacted] *, Shanyang, Shanxi
			Bamboo rat	[Redacted] bamboo farms, Yongde, Yunnan
			rabbit	unknown
			Siamese crocodile	[Redacted] *, Huangsha, Guangzhou
			pheasant	[Redacted] Sanliqiao, Huangpi district, Wuhan, Hubei

Sequences of cases with onset of illness in December:  
Market may have served as amplification event, but already some diversity early december



tMRCA mid november – early december

ELISA testing of animals in & around Wuhan **during** Epidemic period:

Nov 2019-Mar 2020

Species	Number tested	Result
Pig	187	Negative
Cow	107	Negative
Sheep	133	Negative
Horse	18	Negative
Chicken	153	Negative
Duck	153	Negative
Goose	25	Negative
Mice	81	Negative
Rat	67	Negative
Guinea pig	30	Negative
Rabbit	34	Negative
Monkey	39	Negative
Dog	487	Negative
Cat	87	Negative
Camel	31	Negative
Fox	89	Negative
Mink	91	Negative
Alpaca	10	Negative
Ferret	2	Negative
Bamboo rat	8	Negative
Peacock	4	Negative
Eagle	1	Negative
Tiger	8	Negative
Rhinoceros	4	Negative
Pangolin	17	Negative
Leopard cat	3	Negative
Jackal	1	Negative
Giant panda	14	Negative
Masked civet	10	Negative
Porcupine	2	Negative
Bear	9	Negative
Yellow-throated marten	4	Negative
Weasel	1	Negative
Red pandas	3	Negative
Wild boar	1	Negative

Also

1115 fecal samples from different bat species from Hubei (Nuclear Acid Testing (NAT))

Main livestock species:  
11708 samples for serology  
12092 samples for NAT

~27000 samples of different animals stored in 2019-2020 from 24 provinces for NAT

# Evidence syntheses pathways of emergence

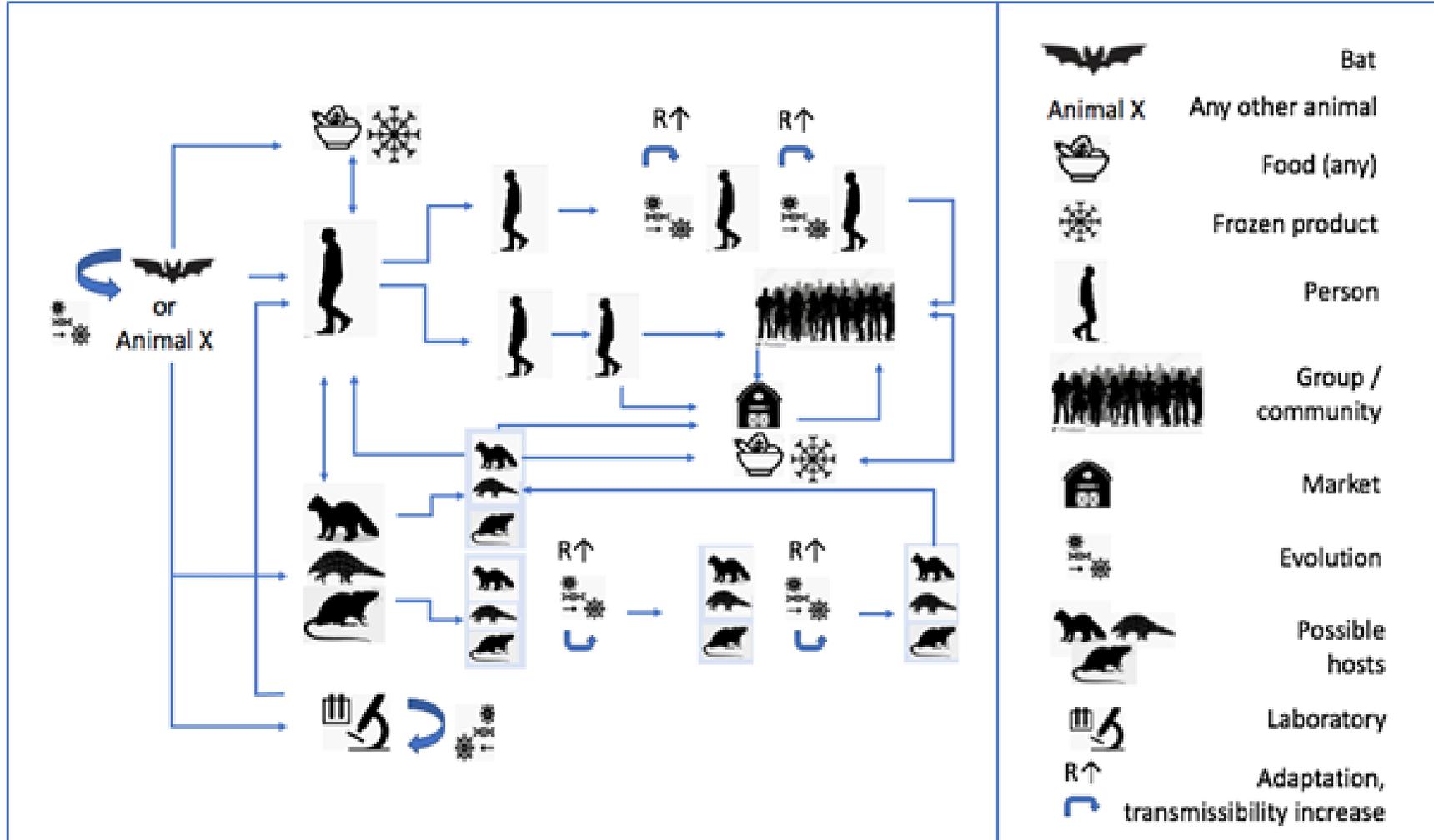
Arguments  
pro/con:

Zoonotic

Zoonotic +  
intermediate host

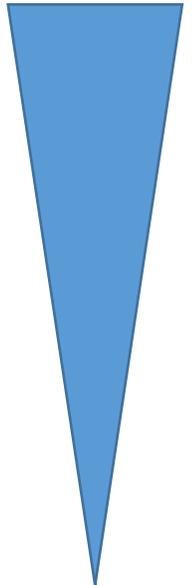
(Cold) food chain  
related

Laboratory related



Likelihood  
based on  
evidence:

High



Low

# Recommendations

- Serosurveys using retained blood samples from Sept – Dec 2019 from Wuhan/Hubei and other regions with evidence of early circulation
- Review of earliest cases from central genetic cluster Sichuan and elsewhere
- Review of notified cases, and potential cases from retrospective search, using less stringent case definitions
- Review of mortality data from other provinces with early cases as guided by phylogenetic analyses
- Retesting of suspected cases by serology, or following vaccination (primary or booster response)
- Further tracing-back of wild animal farms and testing (incl frozen products) based on supply chain analysis
- Fur animal farm screening (Asia)
- Further bat surveys within China, in Southeast Asia, and in other countries where *Rhinolophus* bats are found