HELLENIC REPUBLIC
National and Kapodistrian University of Athens

Επιδημιολογία COVID-19

Που βρισκόμαστε σήμερα;

Γκίκας Μαγιορκίνης

Επίκουρος Καθηγητής Υγιεινής και Επιδημιολογίας
Ιατρός – Βιοπαθολόγος – Κλινικός Ιόλογος FRCPath

Εργαστήριο Υγιείνης, Επιδημιολογίας
και Ιατρικής Στατιστικής

Ιατρική Σχολή


D'où Venons Nous
Que Sommes Nous
Où Allons Nous

D’ou

Venons

Nous

Προέλευση

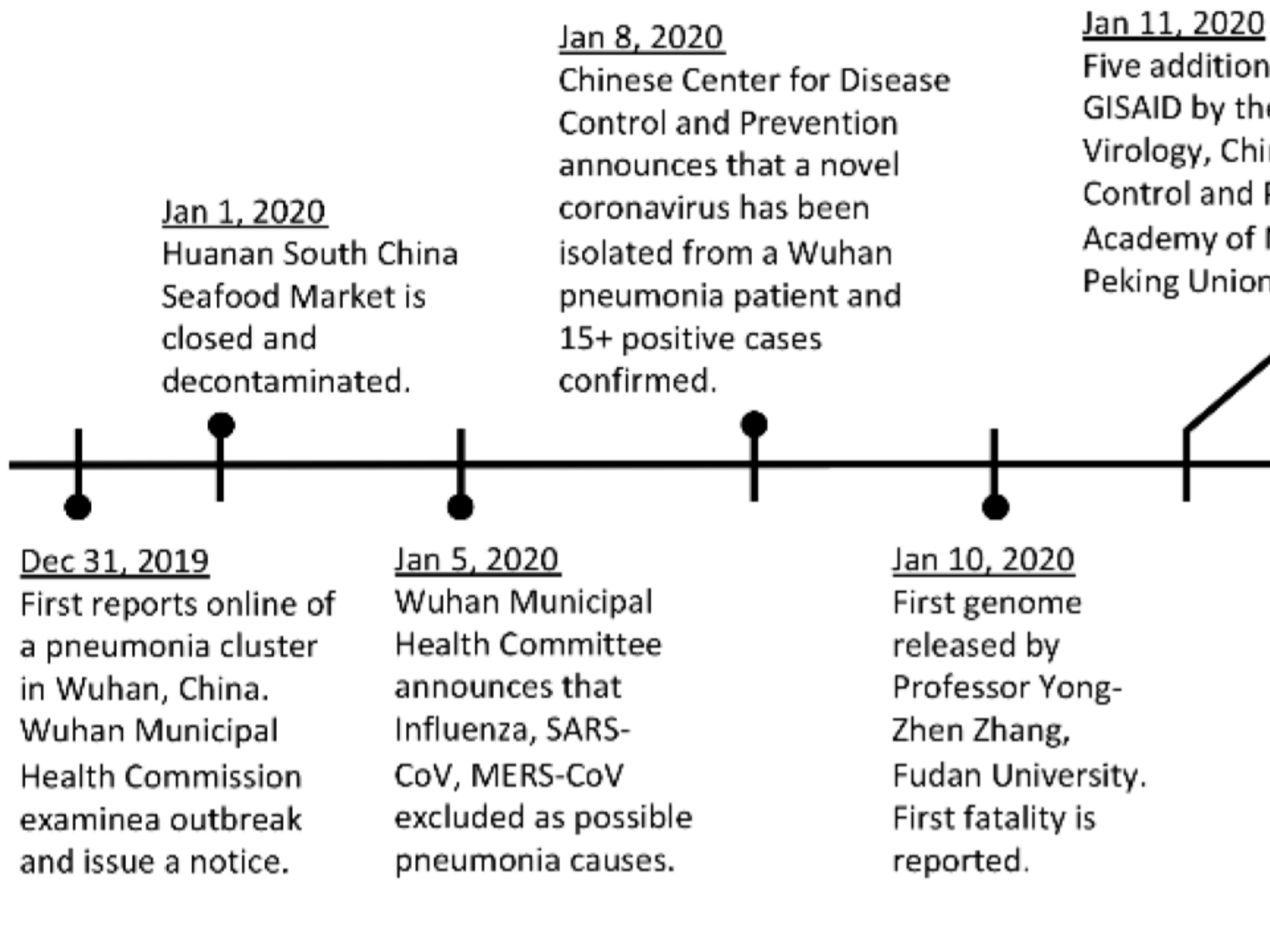
Applied Evolutionary Virology
4 Ιανουαρίου ·

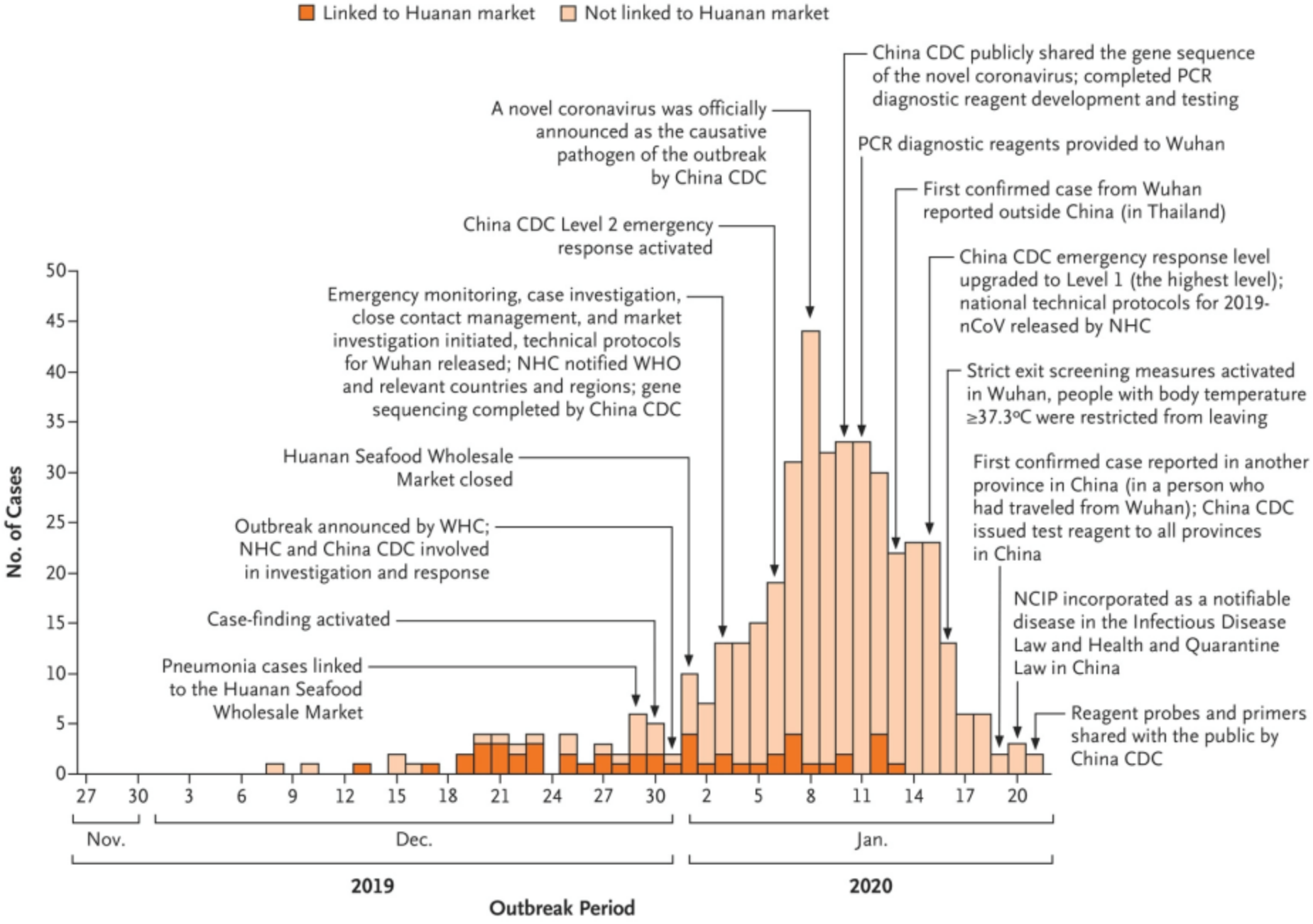
A pneumonia epidemic in China speculated to be caused by a virus?
https://www.bbc.com/news/world-asia-china-50984025

BBC.COM
Mystery pneumonia virus probed in China
Some 44 people have been infected in the central city of Wuhan, official...

78 Απήχηση
7 Αλληλεπιδράσεις
Προώθηση δημοσίευσης

1
1 κοινοποίηση


Jan 1, 2020
Huanan South China Seafood Market is closed and decontaminated.
Jan 8, 2020
Chinese Center for Disease Control and Prevention announces that a novel coronavirus has been isolated from a Wuhan pneumonia patient and 15+ positive cases confirmed.
Jan 11, 2020
Five addition
GISAID by th
Virology, Chi
Control and
Academy of
Peking Union
Dec 31, 2019
First reports online of a pneumonia cluster in Wuhan, China. Wuhan Municipal Health Commission examinea outbreak and issue a notice.
Jan 5, 2020
Wuhan Municipal Health Committee announces that Influenza, SARS-CoV, MERS-CoV excluded as possible pneumonia causes.
Jan 10, 2020
First genome released by Professor Yong-Zhen Zhang, Fudan University. First fatality is reported.


Linked to Huanan market
Not linked to Huanan market
China CDC publicly shared the gene sequence of the novel coronavirus; completed PCR diagnostic reagent development and testing
A novel coronavirus was officially announced as the causative pathogen of the outbreak by China CDC
PCR diagnostic reagents provided to Wuhan
First confirmed case from Wuhan reported outside China (in Thailand)
China CDC Level 2 emergency response activated
China CDC emergency response level upgraded to Level 1 (the highest level); national technical protocols for 2019-nCoV released by NHC
Emergency monitoring, case investigation, close contact management, and market investigation initiated, technical protocols for Wuhan released; NHC notified WHO and relevant countries and regions; gene sequencing completed by China CDC
Strict exit screening measures activated in Wuhan, people with body temperature ≥37.3°C were restricted from leaving
Huanan Seafood Wholesale Market closed
First confirmed case reported in another province in China (in a person who had traveled from Wuhan); China CDC issued test reagent to all provinces in China
Outbreak announced by WHC; NHC and China CDC involved in investigation and response
NCIP incorporated as a notifiable disease in the Infectious Disease Law and Health and Quarantine Law in China
Case-finding activated
Pneumonia cases linked to the Huanan Seafood Wholesale Market
Reagent probes and primers shared with the public by China CDC
No. of Cases
0
5
10
15
20
25
30
35
40
45
50
27
30
3
6
9
12
15
18
21
24
27
30
2
5
8
11
14
17
20
Nov.
Dec.
Jan.
2019
2020
Outbreak Period

Coronaviruses

Common Cold

(229E, NL63, OC43, HKU1)

Severe Acute

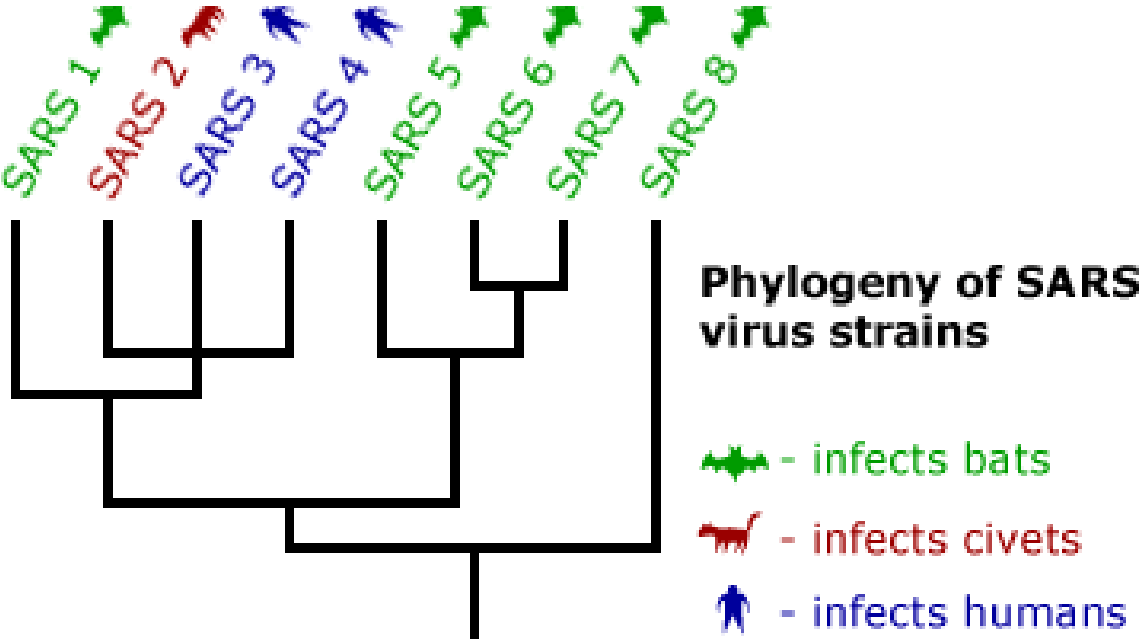
Respiratory Syndrome

(SARS)

Middle East

Respiratory Syndrome

(MERS)


SARS 1
SARS 2
SARS 3
SARS 4
SARS 5
SARS 6
SARS 7
SARS 8
Phylogeny of SARS virus strains
- infects bats
- infects civets
- infects humans

Πηγή;

Que

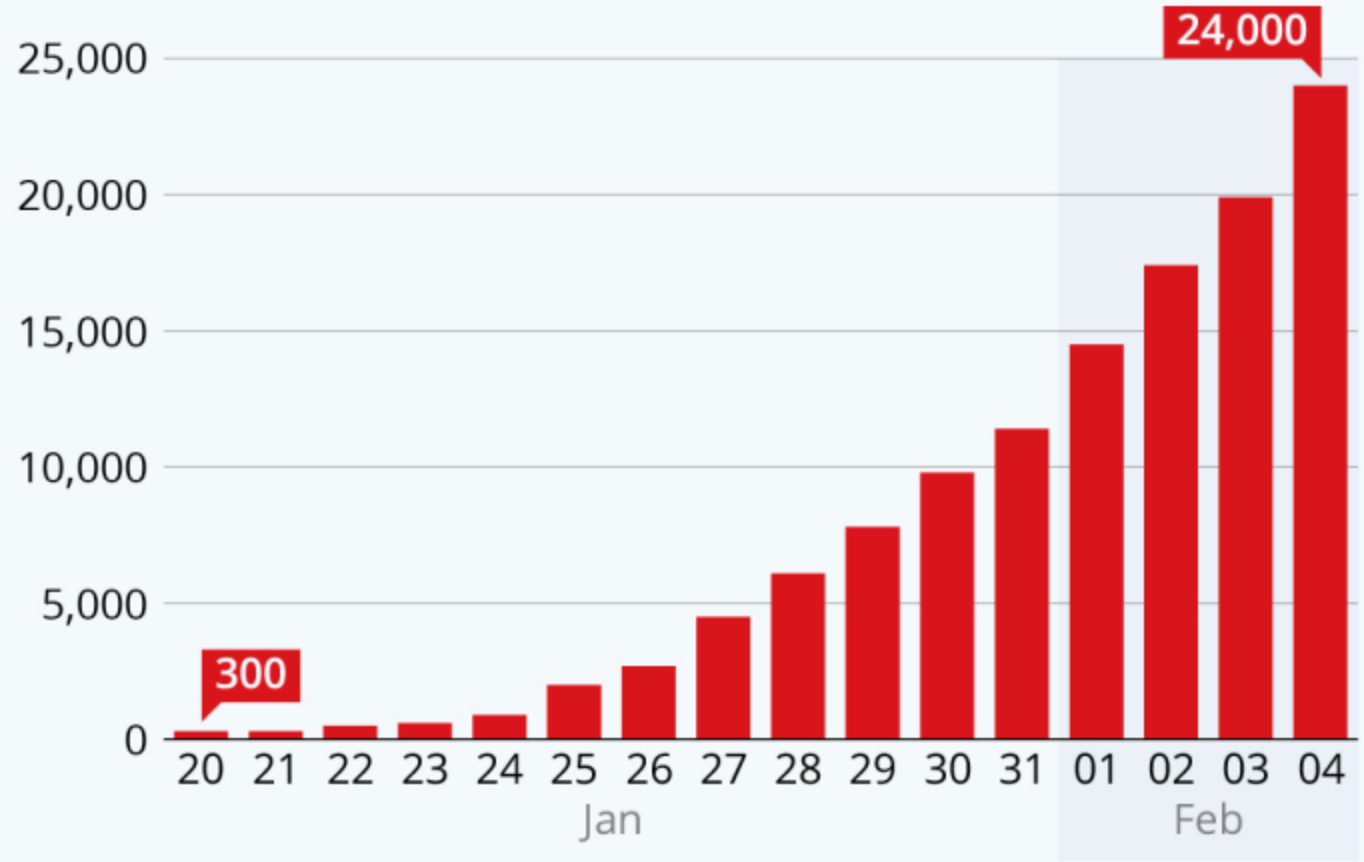
Sommes

Nous

Μεταδοτικότητα

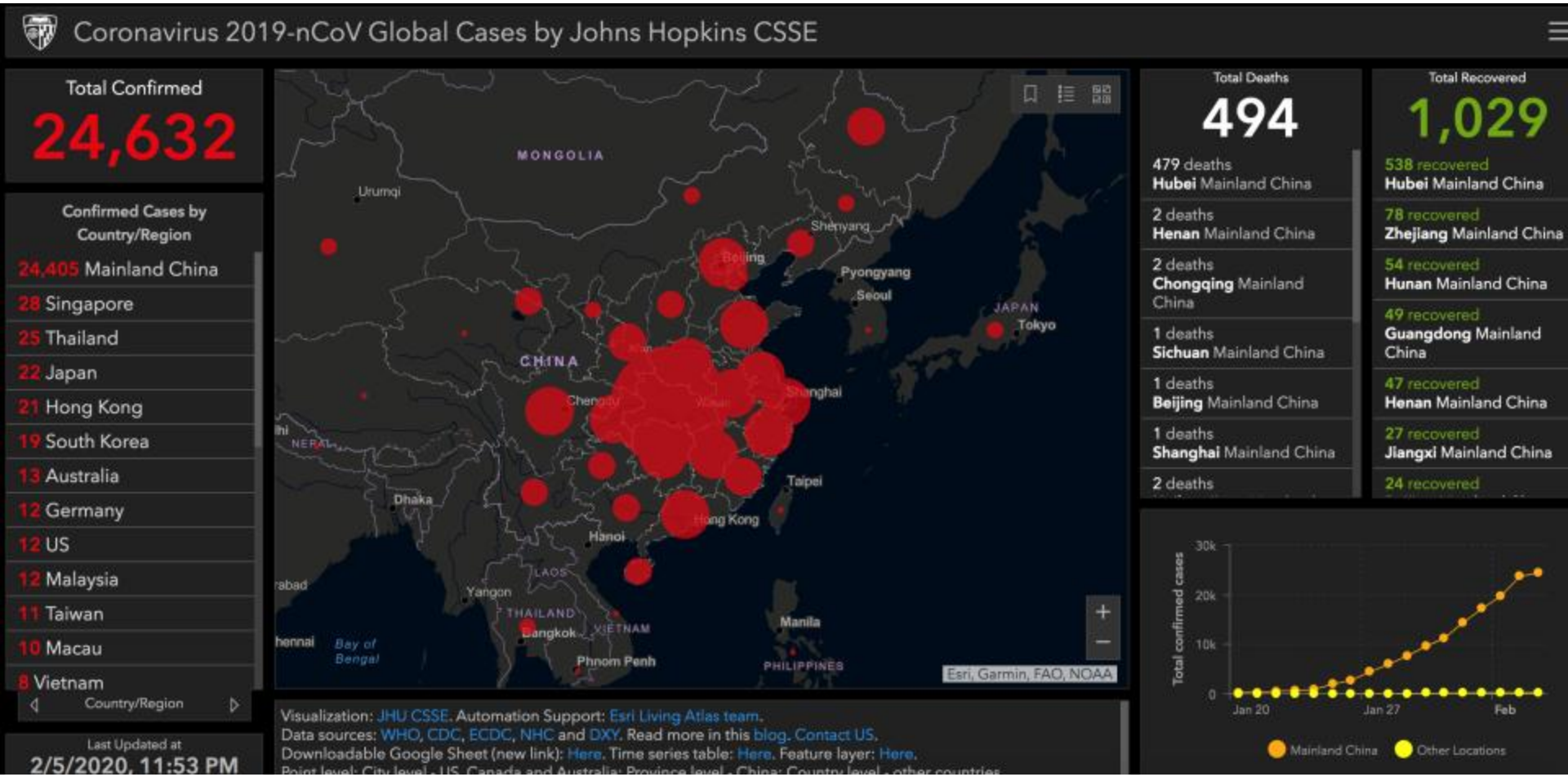
Confirmed Coronavirus Cases

Total confirmed cases of the Wuhan coronavirus in 2020

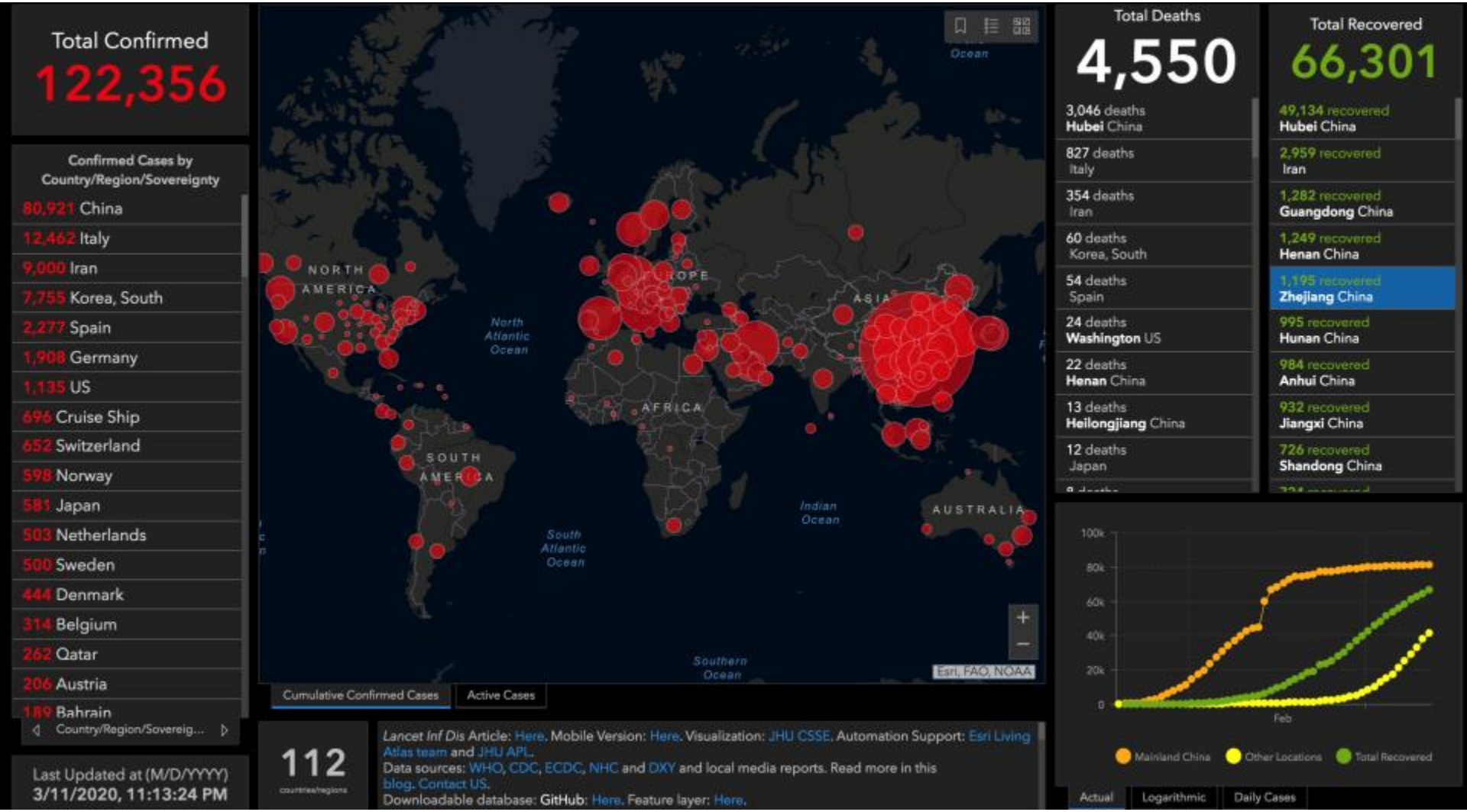


Figures rounded to the nearest hundred
Source: Johns Hopkins University

Πρώιμες ημέρες της Πανδημίας
Φεβρουάριος 2020



Πρώιμες ημέρες της Πανδημίας
Μάρτιος 2020



Βασικός Αριθμός Αναπαραγωγής

Αριθμός Μεταδόσεων Ανά μόλυνση

>1 επιδημία

25 January 2020 - Imperial College London

2.6 [1.5-3.5]

Report 3: Transmissibility of 2019-nCoV

(Download Report 3)

Natsuko Imai, Anne Cori, Ilaria Dorigatti, Marc Baguelin, Christl A. Donnelly, Steven Riley, Neil M. Ferguson
WHO Collaborating Centre for Infectious Disease Modelling, MRC Centre for Global Infectious Disease Analysis, J-IDEA, Imperial College London, UK

Correspondence: neil.ferguson@imperial.ac.uk

Note: This is an extended version of an analysis previously shared with WHO, governments and academic networks between 22/1/20-24/1/20.

Summary Report 3

Self-sustaining human-to-human transmission of the novel coronavirus (2019-nCoV) is the only plausible explanation of the scale of the outbreak in Wuhan. We estimate that, on average, each case infected 2.6 (uncertainty range: 1.5-3.5) other people up to 18th January 2020, based on an analysis combining our past estimates of the size of the outbreak in Wuhan with computational modelling of potential epidemic trajectories. This implies that control measures need to block well over 60% of transmission to be effective in controlling the outbreak. It is likely, based on the experience of SARS and MERS-CoV, that the number of secondary cases caused by a case of 2019-nCoV is highly variable – with many cases causing no secondary infections, and a few causing many.

Disease	R_o*
Diphtheria	6 – 7
Ebola	1.5 – 2.5
Seasonal flu	1 – 2
Measles	**12 – 18**
Mumps	4 – 7
Pertussis (whooping cough)	12 – 17
Polio	5 – 7
Rubella	5 – 7
Smallpox	**5 – 7**
SARS coronavirus	**3**
MERS coronavirus	**<1**
2019 novel coronavirus	**1.4 – 2.5****

nature

Letter | Published: 17 November 2005

Superspreading and the effect of individual variation on disease emergence

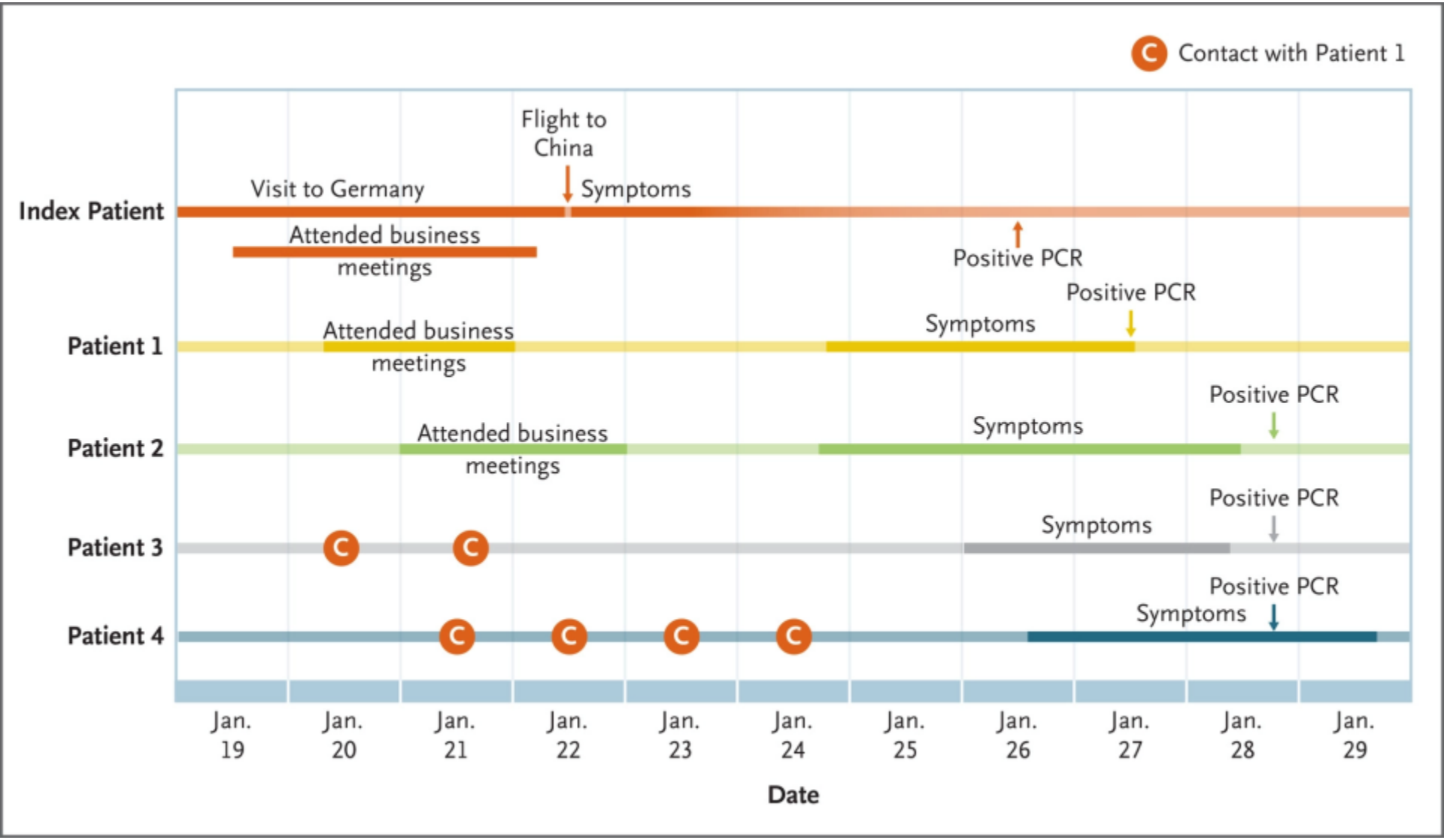
J. O. Lloyd-Smith ✉, S. J. Schreiber, P. E. Kopp & W. M. Getz

Nature **438**, 355–359(2005) | Cite this article

Υπερμετάδοση

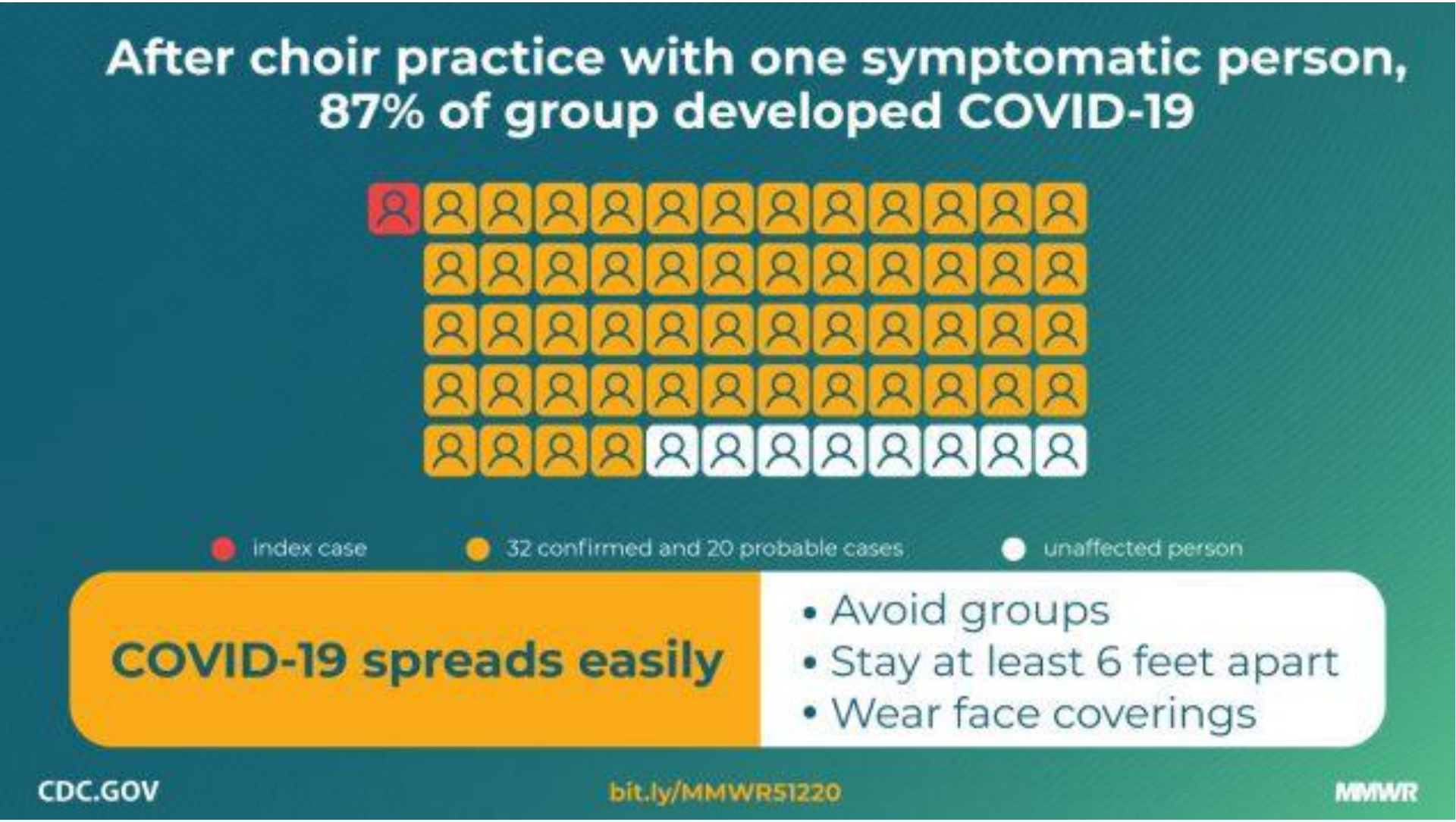
- Κάποιοι δεν μεταδίδουν
- Κάποιοι μεταδίδουν πολύ
- Η Απομόνωση-Καραντίνα είναι πολύ αποτελεσματική όταν απομονωθούν οι υπερμεταδότες

Μετάδοση από Ασυμπτωματικούς



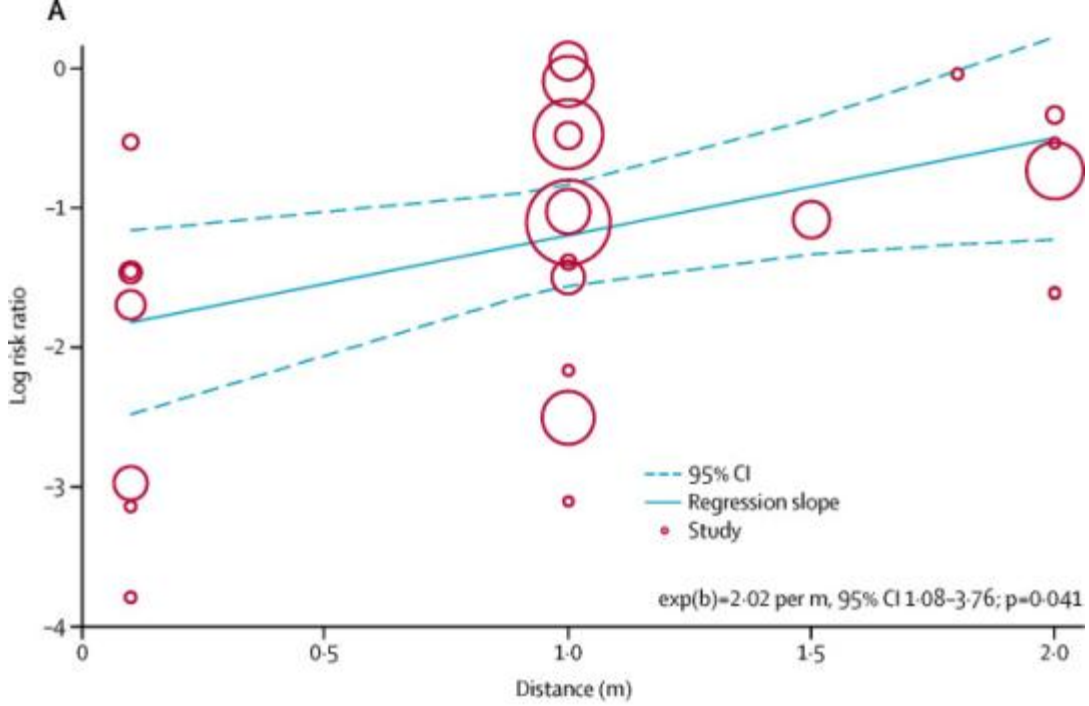
Πηγή: NEJM

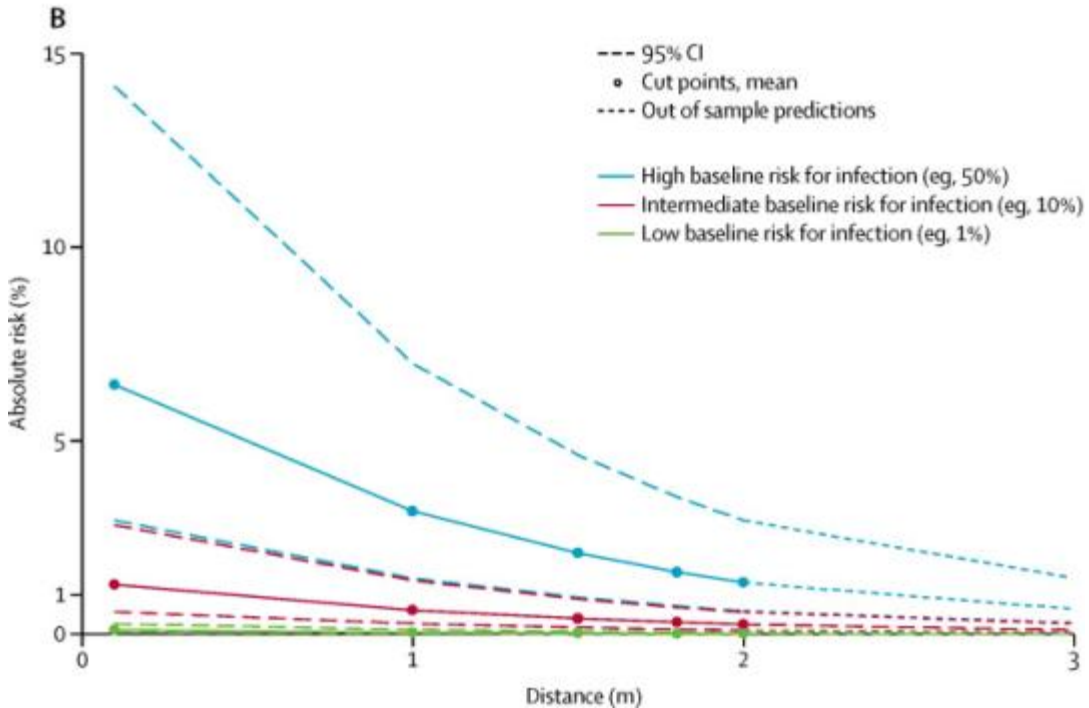
Μετάδοση από Δυνατές Εκπομπές



Ατομική Πρόληψη

- Φυσική απόσταση
- Μάσκα
- Προστασία οφθαλμών

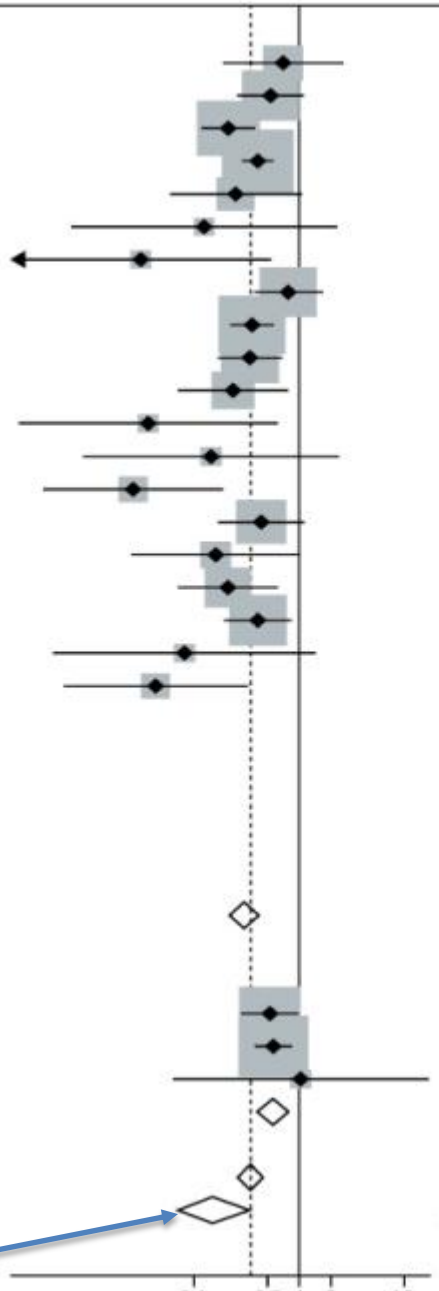




Φυσική Απόσταση

	Country	Respirator (0=no)	Infection	Events, face mask (n/N)	Events, no face mask (n/N)	RR (95% CI)	% weight (random)
Health-care setting							
Scales et al (2003)[66]	Canada	0	SARS	3/16	4/15	0·70 (0·19–2·63)	3·2
Liu et al (2009)[51]	China	0	SARS	8/123	43/354	0·54 (0·26–1·11)	6·7
Pei et al (2006)[61]	China	0	SARS	11/98	61/115	0·21 (0·12–0·38)	7·9
Yin et al (2004)[75]	China	0	SARS	46/202	31/55	0·40 (0·29–0·57)	10·3
Park et al (2016)[59]	South Korea	0	MERS	3/24	2/4	0·25 (0·06–1·06)	2·8
Kim et al (2016)[48]	South Korea	0	MERS	0/7	1/2	0·13 (0·01–2·30)	0·8
Heinzerling et al (2020)[44]	USA	0	COVID-19	0/31	3/6	0·03 (0·002–0·54)	0·9
Nishiura et al (2005)[55]	Vietnam	0	SARS	8/43	17/72	0·79 (0·37–1·67)	6·5
Nishiyama et al (2008)[56]	Vietnam	0	SARS	17/61	14/18	0·36 (0·22–0·58)	9·0
Reynolds et al (2006)[64]	Vietnam	0	SARS	8/42	14/25	0·34 (0·17–0·69)	6·7
Loeb et al (2004)[53]	Canada	1	SARS	3/23	5/9	0·23 (0·07–0·78)	3·6
Wang et al (2020)[41]	China	1	COVID-19	0/278	10/215	0·04 (0·002–0·63)	0·9
Seto et al (2003)[67]	China	1	SARS	0/51	13/203	0·15 (0·01–2·40)	0·9
Wang et al (2020)[70]	China	1	COVID-19	1/1286	119/4036	0·03 (0·004–0·19)	1·7
Alraddadi et al (2016)[34]	Saudi Arabia	1	MERS	6/116	12/101	0·44 (0·17–1·12)	5·0
Ho et al (2004)[45]	Singapore	1	SARS	2/62	2/10	0·16 (0·03–1·02)	1·9
Teleman et al (2004)[68]	Singapore	1	SARS	3/26	33/60	0·21 (0·07–0·62)	4·2
Wilder-Smith et al (2005)[72]	Singapore	1	SARS	6/27	39/71	0·40 (0·19–0·84)	6·5
Ki et al (2019)[47]	South Korea	1	MERS	0/218	6/230	0·08 (0·005–1·43)	0·8
Kim et al (2016)[49]	South Korea	1	MERS	1/444	16/308	0·04 (0·01–0·33)	1·6
Hall et al (2014)[43]	Saudi Arabia	1	MERS	0/42	0/6	(Not calculable)	0
Ryu et al (2019)[65]	South Korea	1	MERS	0/24	0/10	(Not calculable)	0
Park et al (2004)[58]	USA	1	SARS	0/60	0/45	(Not calculable)	0
Peck et al (2004)[60]	USA	1	SARS	0/13	0/19	(Not calculable)	0
Burke et al (2020)[37]	USA	1	COVID-19	0/64	0/13	(Not calculable)	0
Ha et al (2004)[42]	Vietnam	1	SARS	0/61	0/1	(Not calculable)	0
Random subtotal (I^2=50%)				**126/3442**	**445/6003**	**0·30 (0·22–0·41)**	**81·9**
Non-health-care setting							
Lau et al (2004)[50]	China	0	SARS	12/89	25/98	0·53 (0·28–0·99)	7·5
Wu et al (2004)[74]	China	0	SARS	25/146	69/229	0·57 (0·38–0·85)	9·7
Tuan et al (2007)[69]	Vietnam	0	SARS	0/9	7/154	1·03 (0·06–16·83)	0·9
Random subtotal (I^2=0%)				**37/244**	**101/481**	**0·56 (0·40–0·79)**	**18·1**
Unadjusted estimates, overall (I^2=48%)				**163/3686**	**546/6484**	**0·34 (0·26–0·45)**	**100·0**
Adjusted estimates, overall (1 COVID-19, 1 MERS, 8 SARS)						**aOR 0·15 (0·07–0·34)**	
						aRR 0·18 (0·08–0·38)	

Interaction by setting, p=0·049; adjusted for N95 and distance, p=0·11



>80% μείωση μετάδοσης

Two hair stylists with COVID-19 spent at least 15 minutes with 139 clients

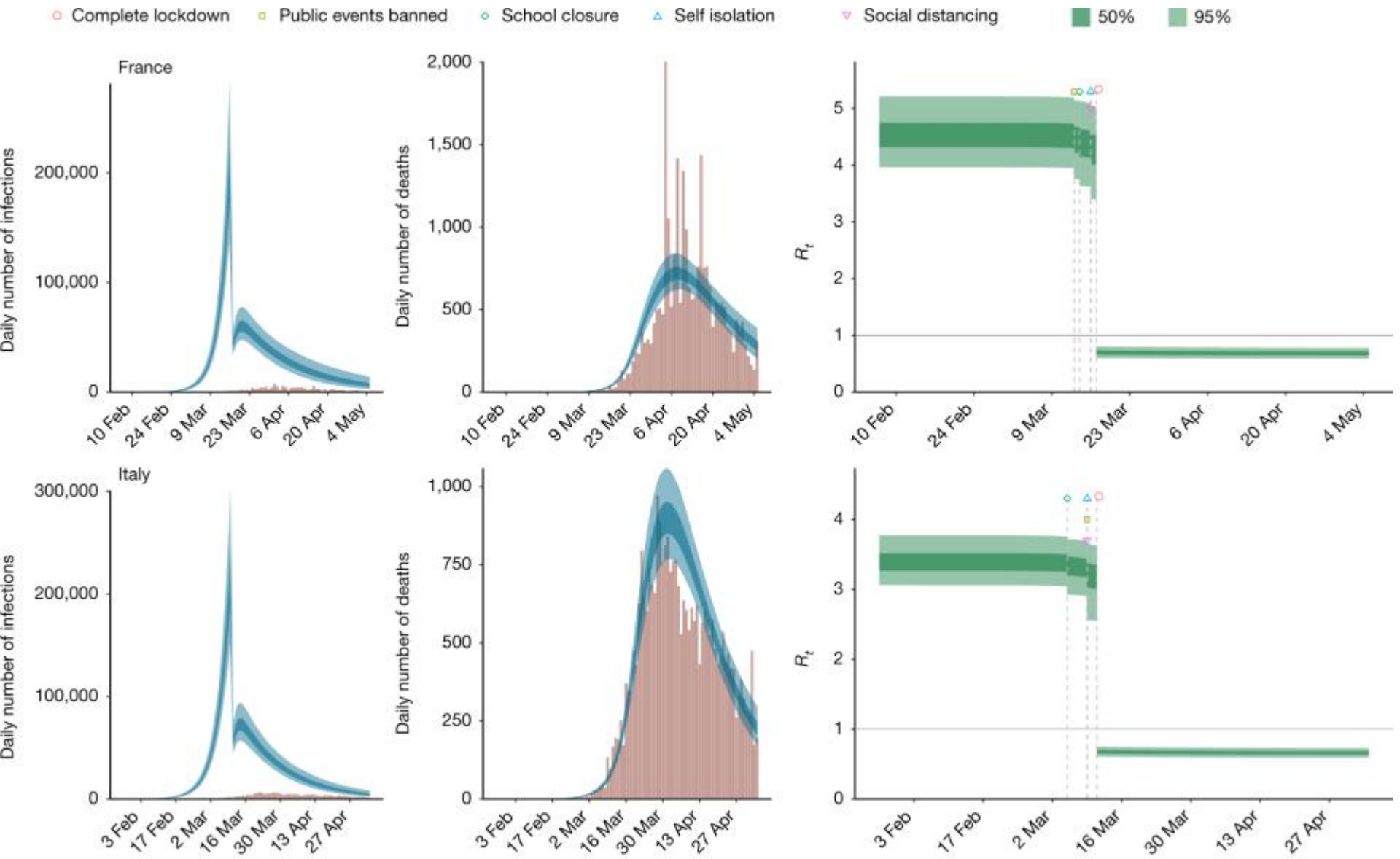
EVERYONE WORE FACE COVERINGS NO CLIENTS ARE KNOWN TO BE INFECTED*

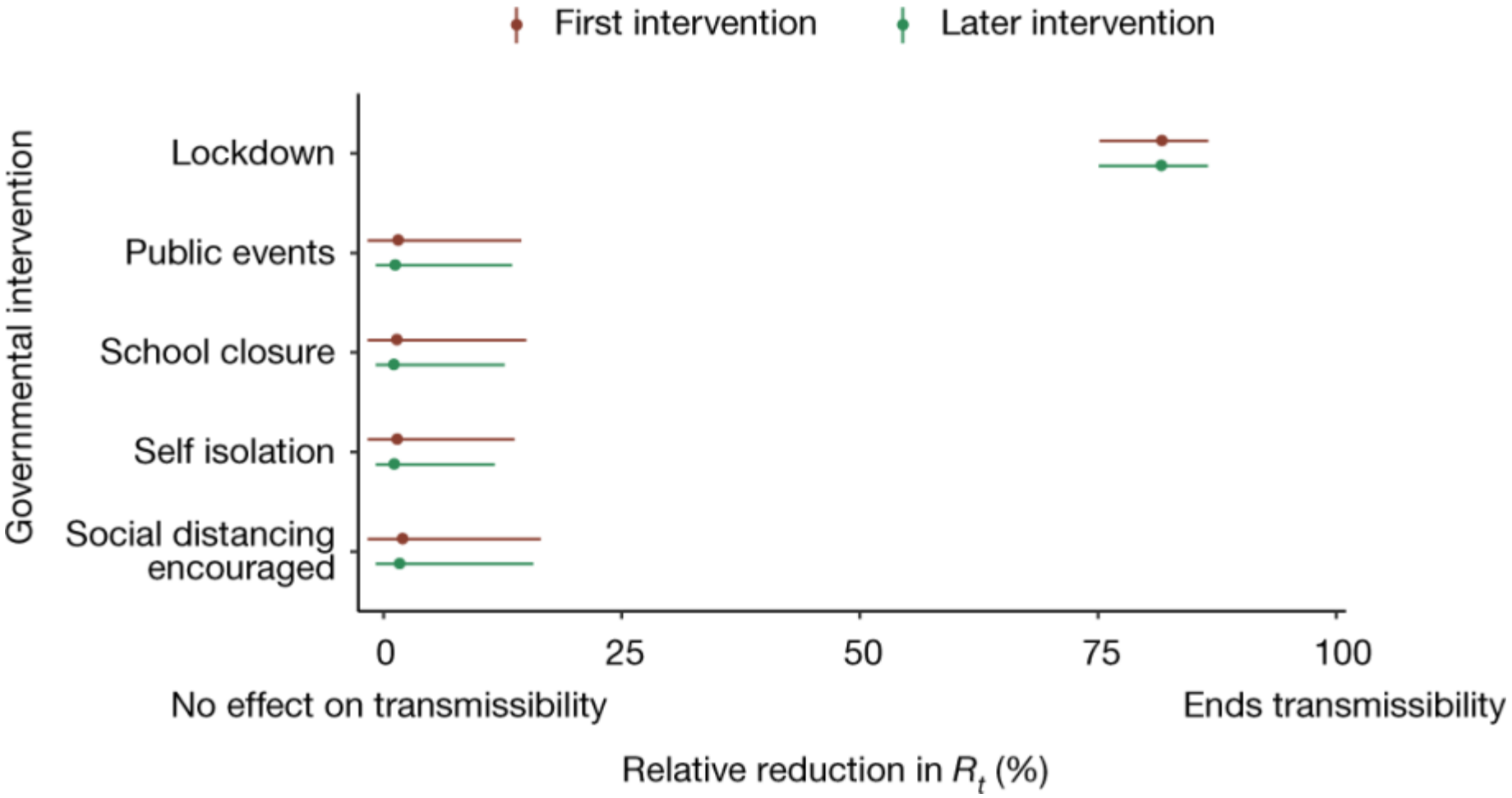
WEAR CLOTH FACE COVERINGS CONSISTENTLY AND CORRECTLY TO SLOW THE SPREAD OF COVID-19

*No clients reported symptoms; all 67 customers tested had negative tests

Παρεμβάσεις σε Πληθυσμιακό Επίπεδο

- Δημόσιες Συγκεντρώσεις
- Κλείσιμο Σχολείων
- Συστάσεις για κοινωνική αποστασιοποίηση
- Lockdown
- Testing


Complete lockdown
Public events banned
School closure
Self isolation
Social distancing
50%
95%
France
Daily number of infections
Daily number of deaths
R_t
Italy
10 Feb
24 Feb
9 Mar
23 Mar
6 Apr
20 Apr
4 May
3 Feb
17 Feb
2 Mar
16 Mar
30 Mar
13 Apr
27 Apr


First intervention
Later intervention
Governmental intervention
Lockdown
Public events
School closure
Self isolation
Social distancing encouraged
0
25
50
75
100
No effect on transmissibility
Ends transmissibility
Relative reduction in R_t (%)

Παρεμβάσεις σε ατομικό επίπεδο

- Απομόνωση
- Καραντίνα
- Ιχνηλάτιση
- Self-test

Δράσεις Προσυμπτωματικού Ελέγχου

- Προγράμματα self-test

- Tests στις πύλες εισόδου

Χάρτης Υγειονομικής Ασφάλειας

- Τοπική επιδημιολογική επιτήρηση

- Τοπικές παρεμβάσεις

Η Δυναμική της Ψυχρής Περιόδου

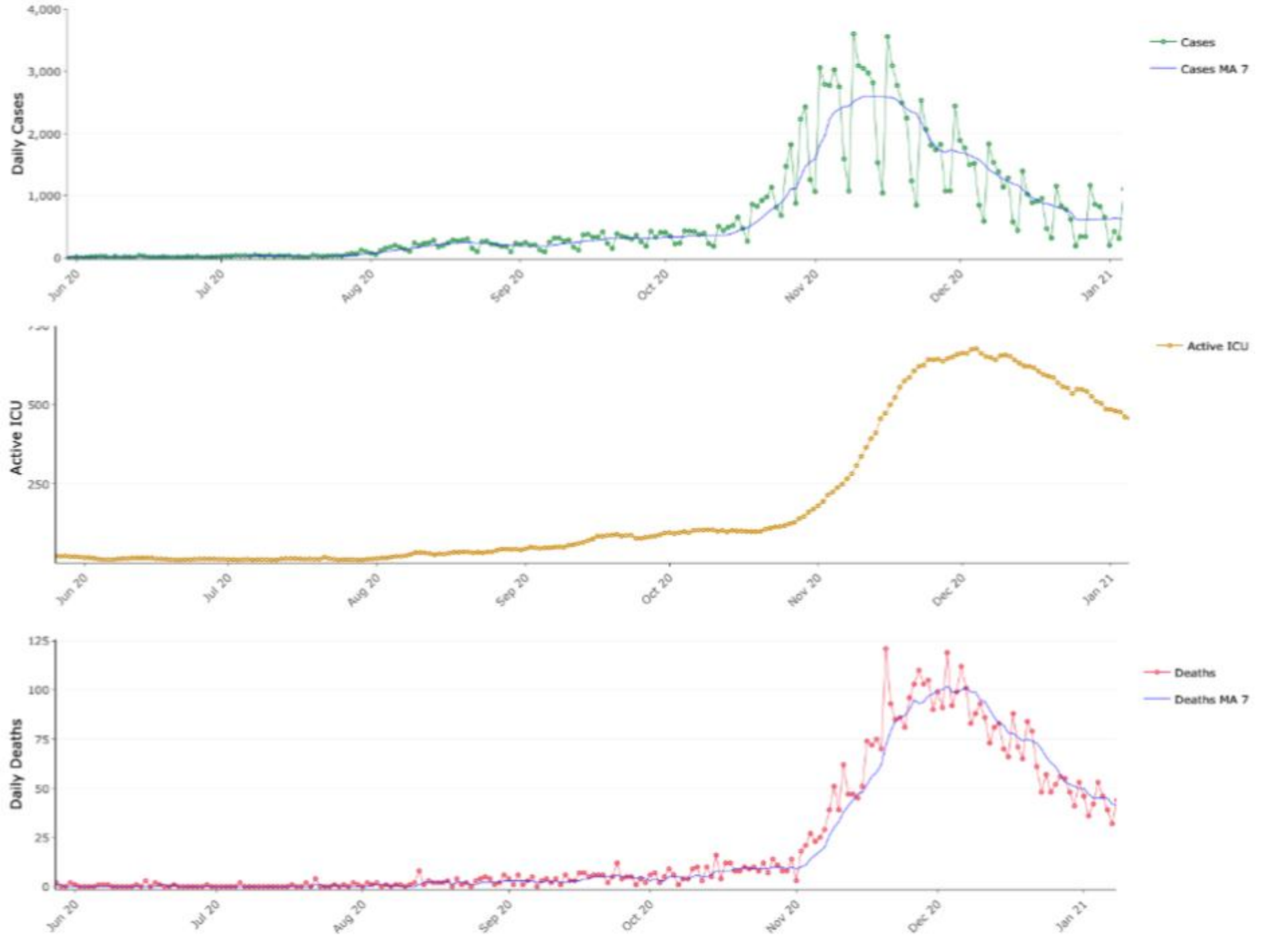

Daily Cases
4,000
3,000
2,000
1,000
0
Cases
Cases MA 7
Jun 20
Jul 20
Aug 20
Sep 20
Oct 20
Nov 20
Dec 20
Jan 21
Active ICU
500
250
Active ICU
Jun 20
Jul 20
Aug 20
Sep 20
Oct 20
Nov 20
Dec 20
Jan 21
Daily Deaths
125
100
75
50
25
0
Deaths
Deaths MA 7
Jun 20
Jul 20
Aug 20
Sep 20
Oct 20
Nov 20
Dec 20
Jan 21

Figure 2a

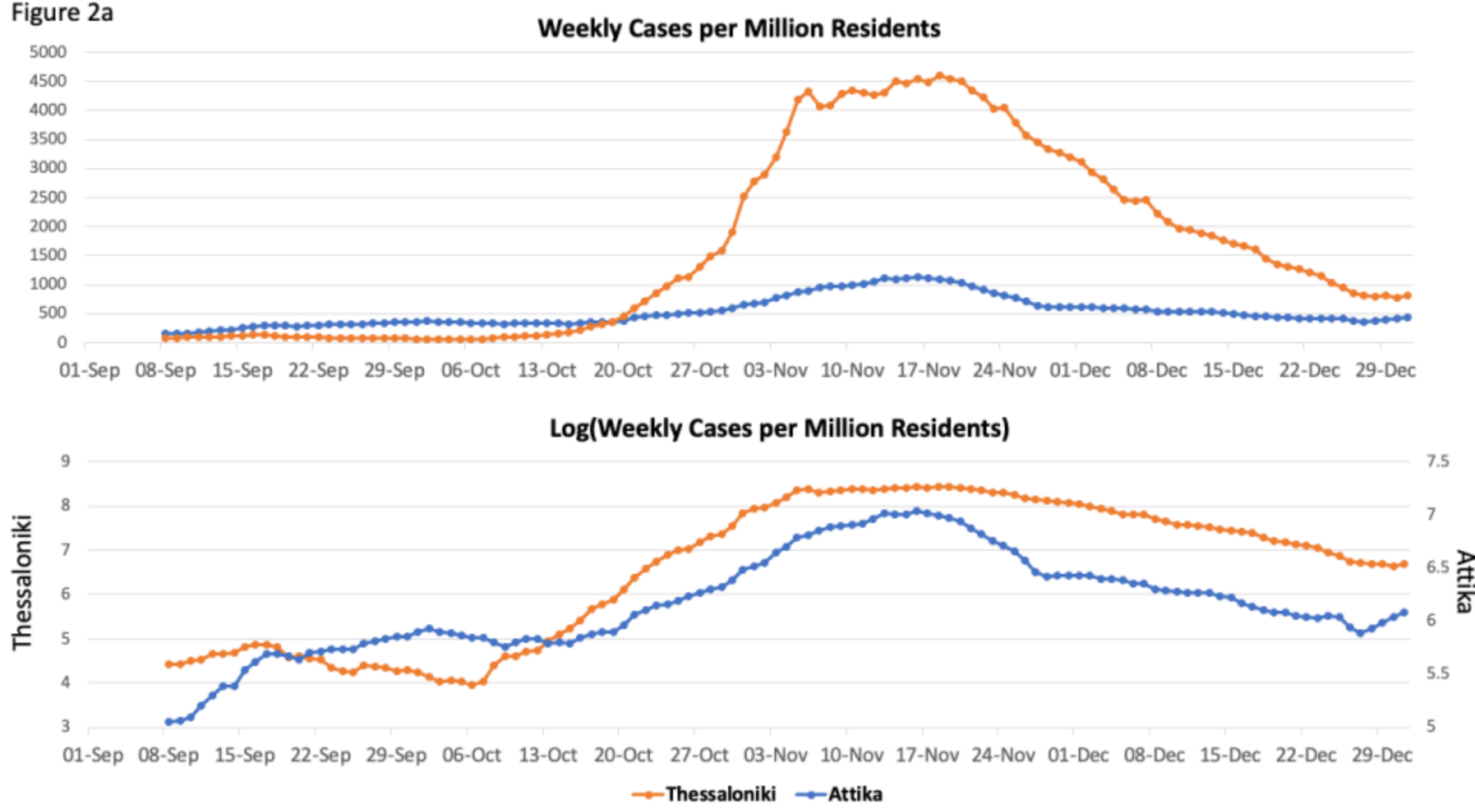
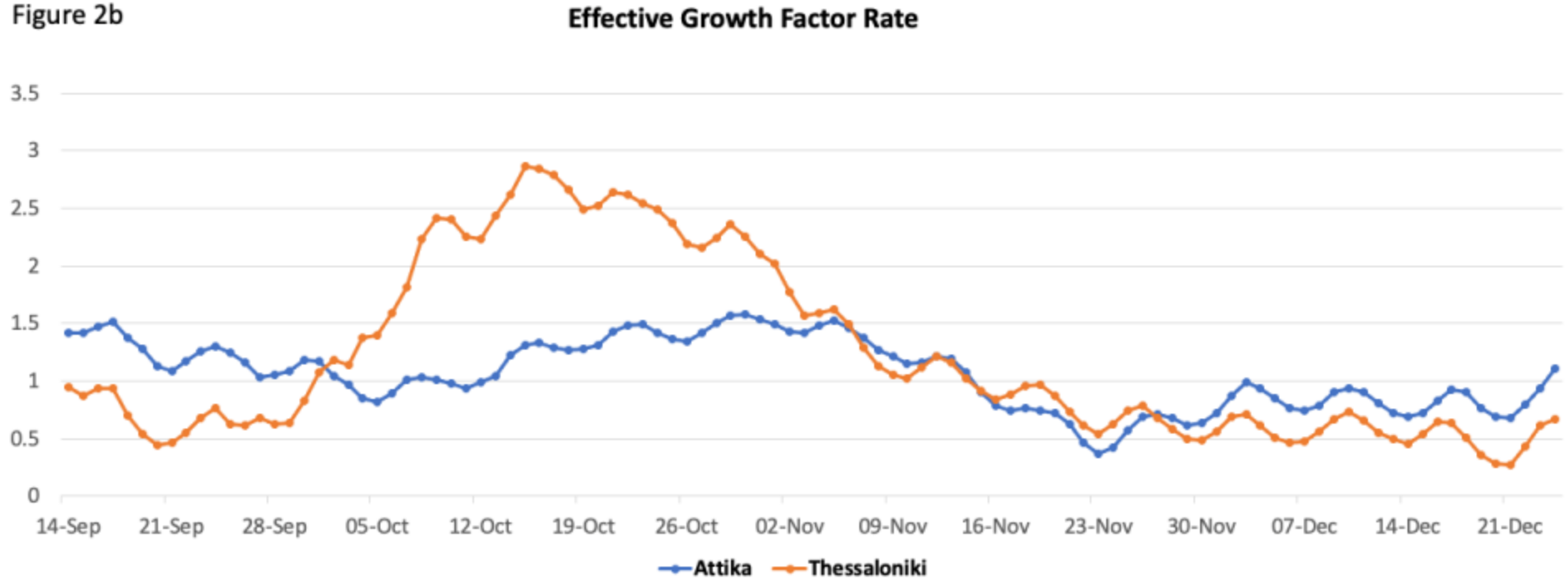

Weekly Cases per Million Residents
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
01-Sep
08-Sep
15-Sep
22-Sep
29-Sep
06-Oct
13-Oct
20-Oct
27-Oct
03-Nov
10-Nov
17-Nov
24-Nov
01-Dec
08-Dec
15-Dec
22-Dec
29-Dec
Log(Weekly Cases per Million Residents)
Thessaloniki
Attika
9
8
7
6
5
4
3
7.5
7
6.5
6
5.5
5
Thessaloniki
Attika

Figure 2b


Effective Growth Factor Rate
3.5
3
2.5
2
1.5
1
0.5
0
14-Sep
21-Sep
28-Sep
05-Oct
12-Oct
19-Oct
26-Oct
02-Nov
09-Nov
16-Nov
23-Nov
30-Nov
07-Dec
14-Dec
21-Dec
Attika
Thessaloniki

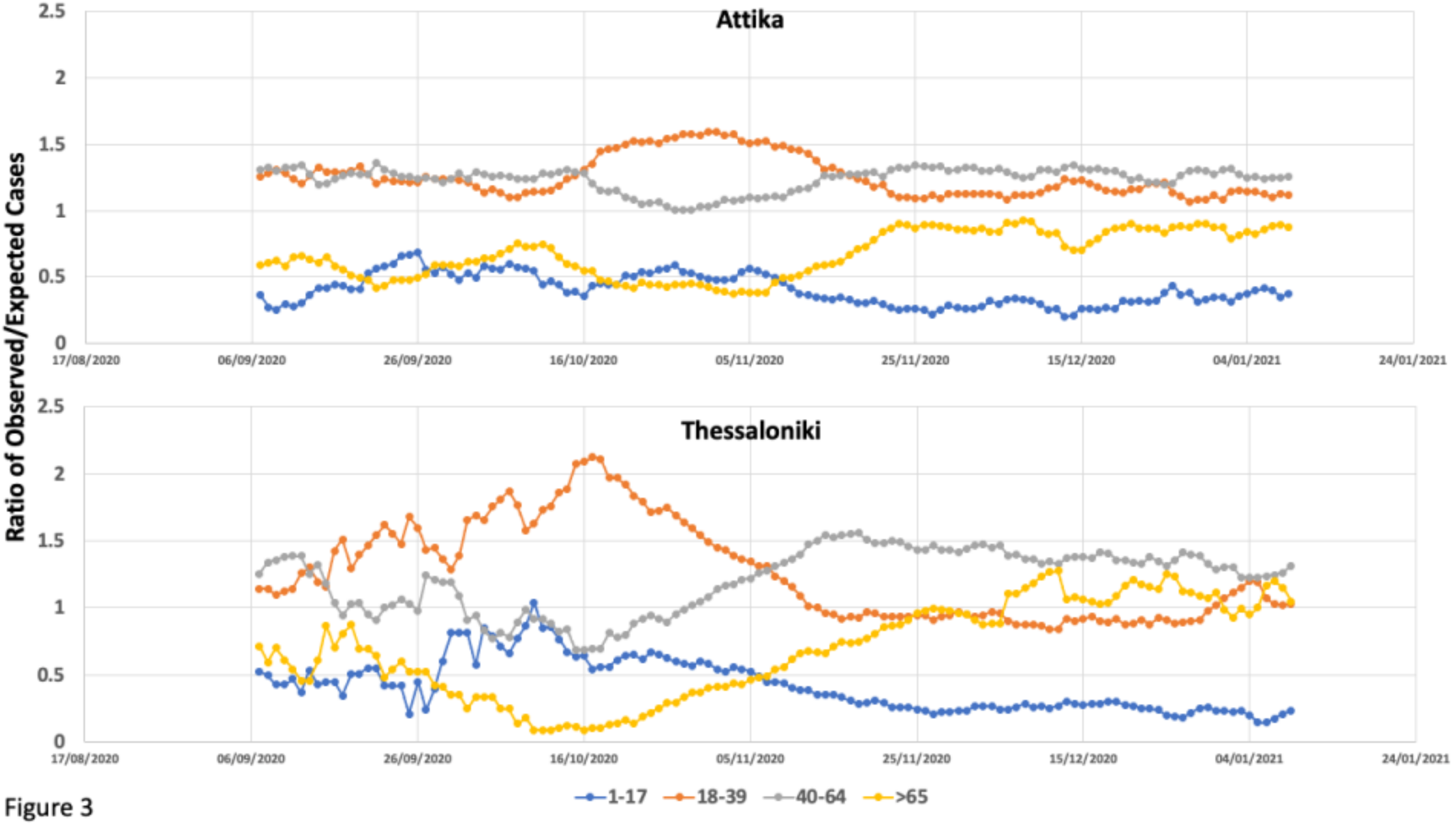

Attika
Thessaloniki
Ratio of Observed/Expected Cases
2.5
2
1.5
1
0.5
0
17/08/2020
06/09/2020
26/09/2020
16/10/2020
05/11/2020
25/11/2020
15/12/2020
04/01/2021
24/01/2021
1-17
18-39
40-64
>65

Figure 3

Figure 4a

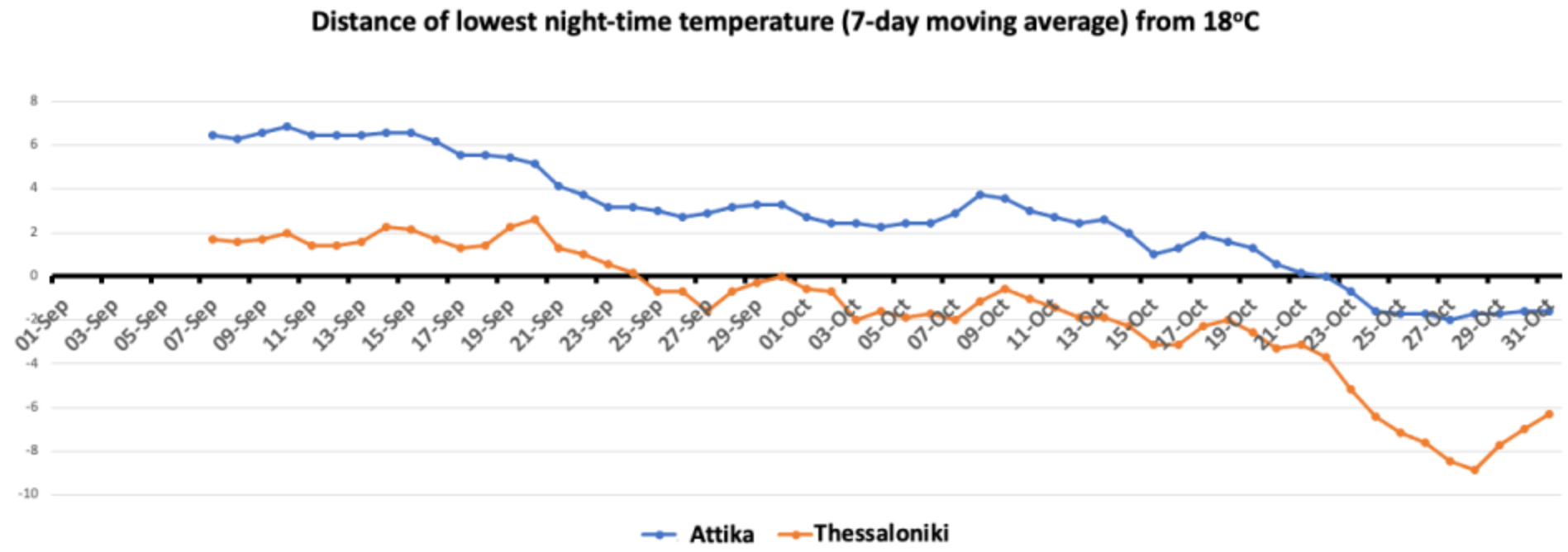

Distance of lowest night-time temperature (7-day moving average) from 18°C
8
6
4
2
0
-2
-4
-6
-8
-10
01-Sep
03-Sep
05-Sep
07-Sep
09-Sep
11-Sep
13-Sep
15-Sep
17-Sep
19-Sep
21-Sep
23-Sep
25-Sep
27-Sep
29-Sep
01-Oct
03-Oct
05-Oct
07-Oct
09-Oct
11-Oct
13-Oct
15-Oct
17-Oct
19-Oct
21-Oct
23-Oct
25-Oct
27-Oct
29-Oct
31-Oct
Attika
Thessaloniki

Figure 4b

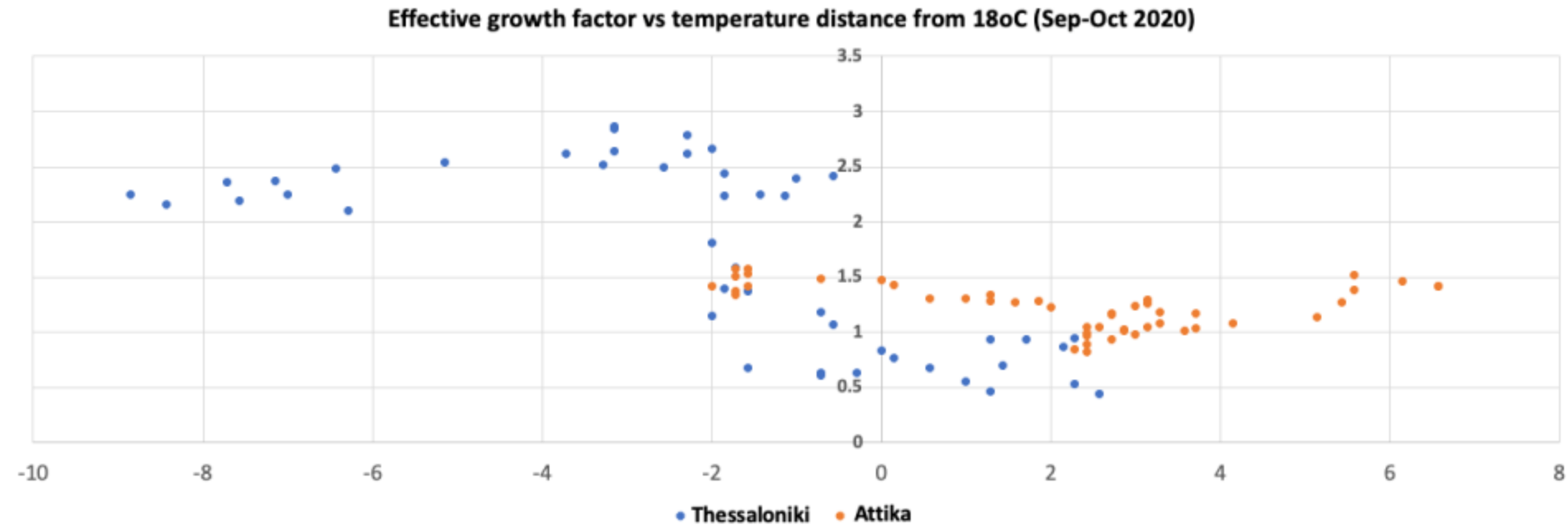

Effective growth factor vs temperature distance from 18oC (Sep-Oct 2020)
3.5
3
2.5
2
1.5
1
0.5
0
-10
-8
-6
-4
-2
0
2
4
6
8
Thessaloniki
Attika

Figure 5a

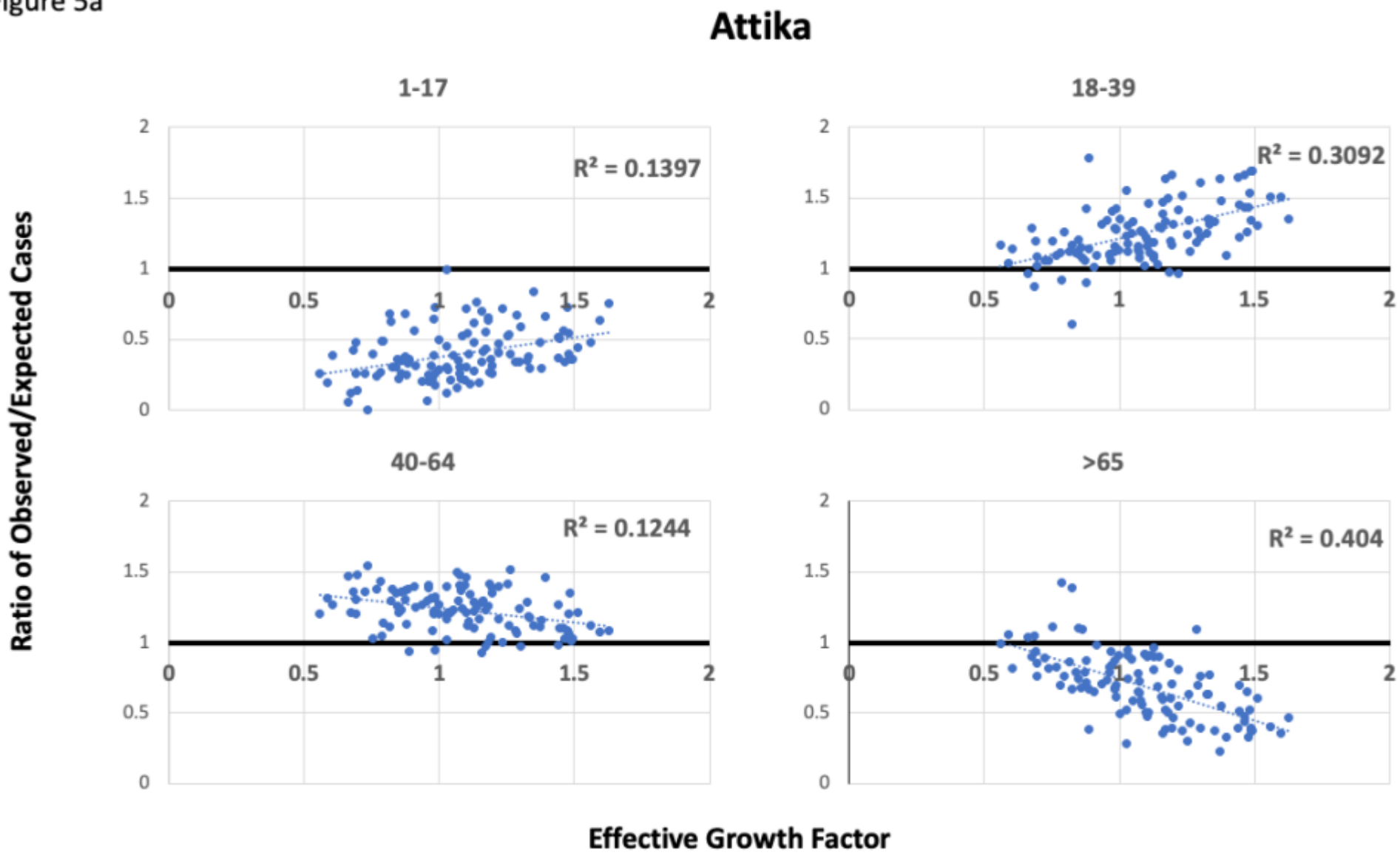
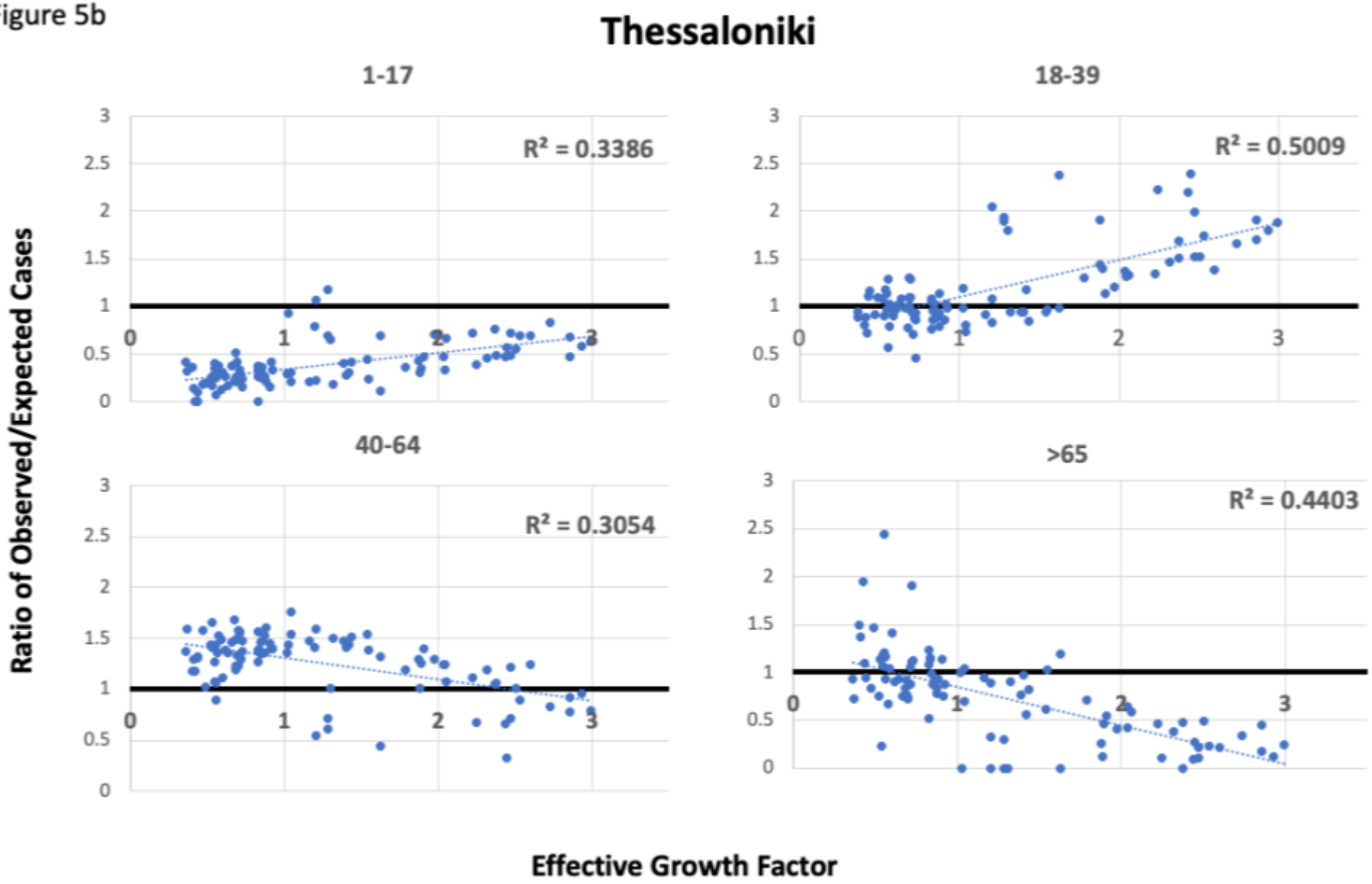

Attika
1-17
R² = 0.1397
18-39
R² = 0.3092
40-64
R² = 0.1244
>65
R² = 0.404
Ratio of Observed/Expected Cases
Effective Growth Factor
0
0.5
1
1.5
2

Figure 5b


Thessaloniki
1-17
R² = 0.3386
18-39
R² = 0.5009
40-64
R² = 0.3054
>65
R² = 0.4403
Ratio of Observed/Expected Cases
Effective Growth Factor

RESEARCH ARTICLE

Age groups that sustain resurging COVID-19 epidemics in the United States

MÉLODIE MONOD, ALEXANDRA BLENKINSOP, XIAOYUE XI, DANIEL HEBERT, SIVAN BERSHAN, SIMON TIETZE, MARC BAGUELIN, VALERIE C. BRADLEY, YU CHEN, [...] ON BEHALF OF THE IMPERIAL COLLEGE COVID-19 RESPONSE TEAM +19 authors Authors Info & Affiliations

SCIENCE • 2 Feb 2021 • Vol 371, Issue 6536 • DOI: 10.1126/science.abe8372

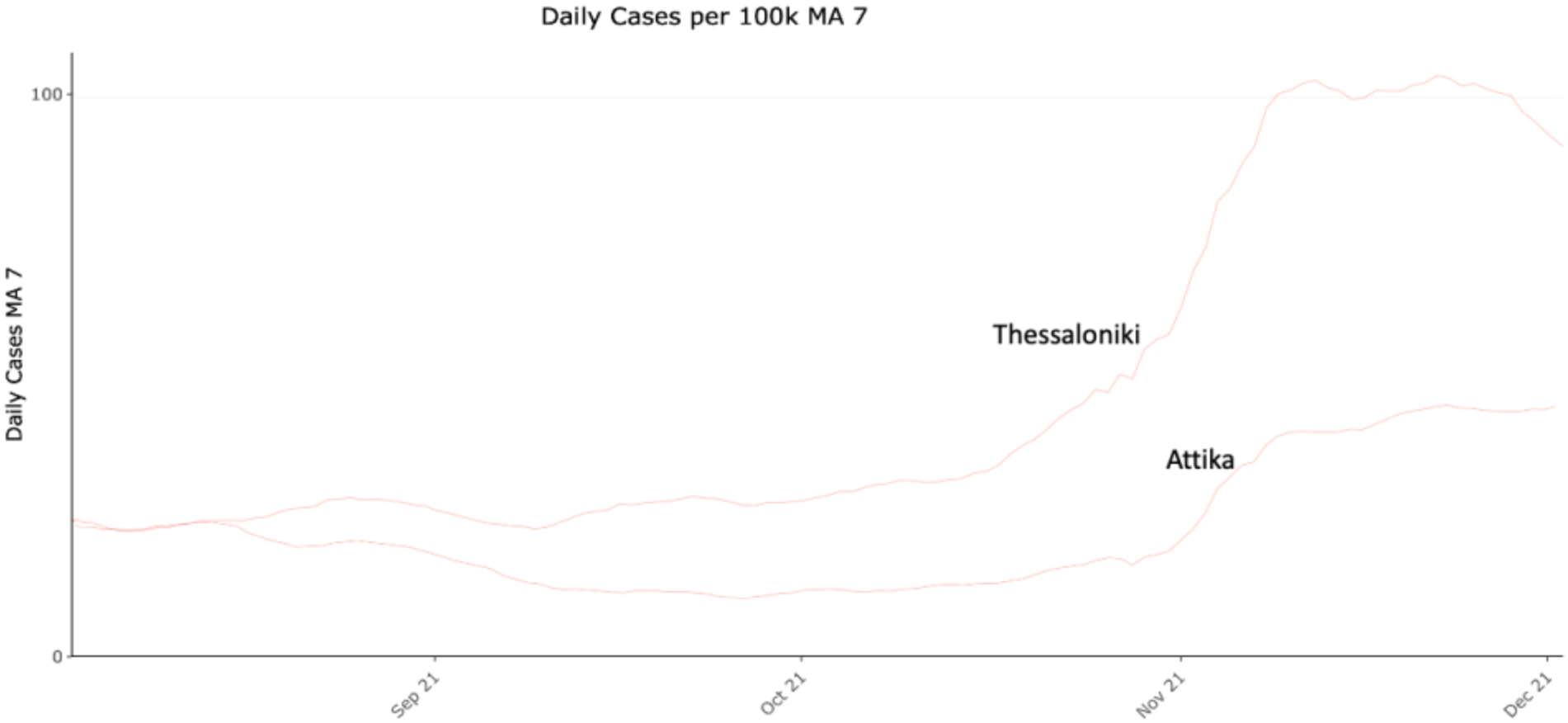
The majority of COVID-19 infections originate from age groups 20 to 49

To quantify how age groups contribute to resurgent COVID-19, it is not enough to estimate reproduction numbers, because reproduction numbers estimate the number of secondary infections per infectious individual, and the number of infectious individuals varies by age as a result of age-specific susceptibility gradients and age-specific

Δεύτερο κύμα

- Ο ρόλος της ηλικιακής ομάδας 18-39
- Οκτώβριος;
- Η συνεισφορά των <18 ήταν ελάχιστη=> τα σχολεία δεν συμμετείχαν
- Πτώση θερμοκρασίας=> Κλειστοί χώροι

Figure 6


Daily Cases per 100k MA 7
100
0
Daily Cases MA 7
Thessaloniki
Attika
Sep 21
Oct 21
Nov 21
Dec 21

Παθογένεια και Συννοσηρότητες

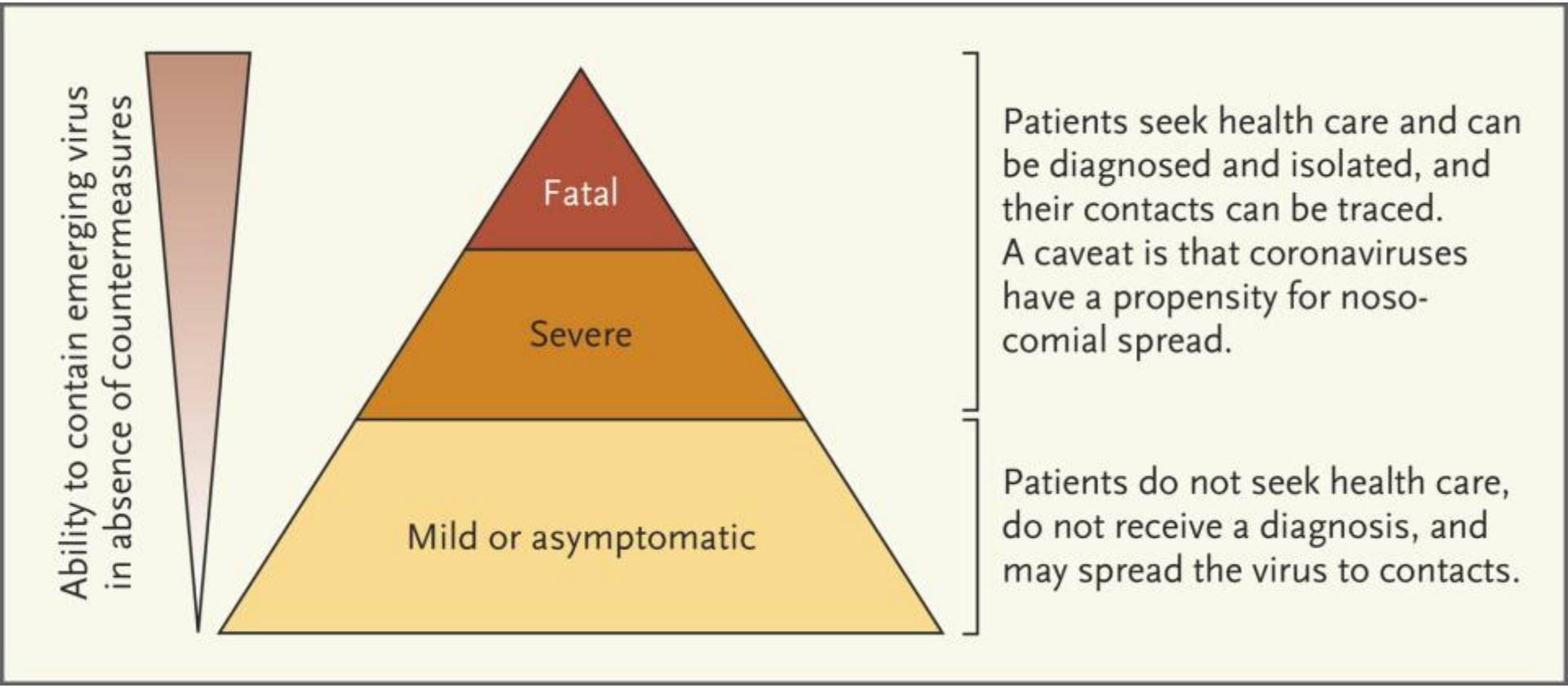
Παθογένεια το 2020

Table 1. Pathogenicity and Transmissibility Characteristics of Recently Emerged Viruses in Relation to Outbreak Containment.

Virus	Case Fatality Rate (%)	Pandemic	Contained	Remarks
2019-nCoV	Unknown*	Unknown	No, efforts ongoing	
pH1N1	0.02–0.4	Yes	No, postpandemic circulation and establishment in human population	
H7N9	39	No	No, eradication efforts in poultry reservoir ongoing	
NL63	Unknown	Unknown	No, endemic in human population	
SARS-CoV	9.5	Yes	Yes, eradicated from intermediate animal reservoir	58% of cases result from nosocomial transmission
MERS-CoV	34.4	No	No, continuous circulation in animal reservoir and zoonotic spillover	70% of cases result from nosocomial transmission
Ebola virus (West Africa)	63	No	Yes	

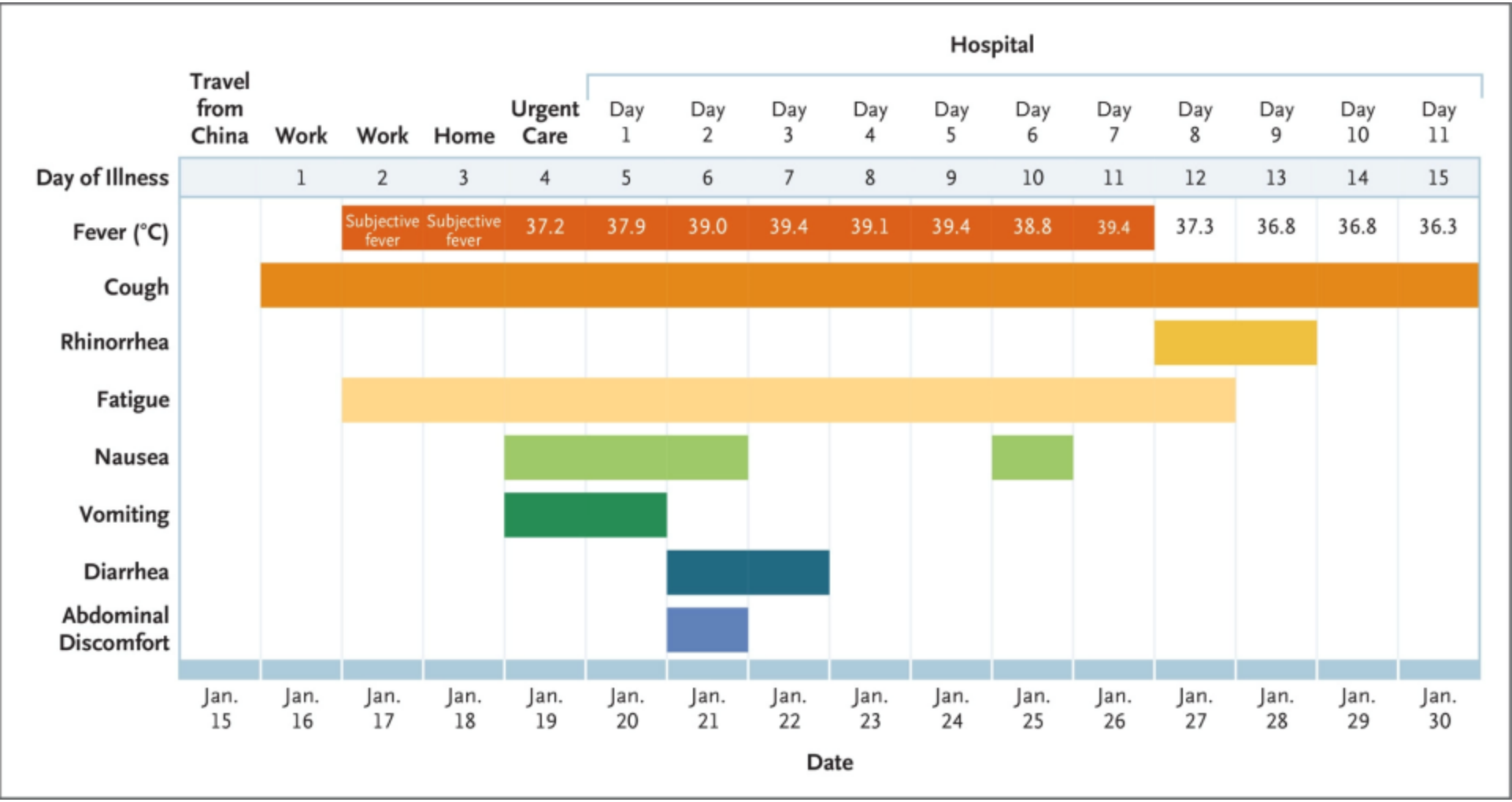
* Number will most likely continue to change until all infected persons recover.

Source: NEJM


Ability to contain emerging virus in absence of countermeasures
Fatal
Severe
Mild or asymptomatic
Patients seek health care and can be diagnosed and isolated, and their contacts can be traced. A caveat is that coronaviruses have a propensity for nosocomial spread.
Patients do not seek health care, do not receive a diagnosis, and may spread the virus to contacts.

Πηγή: NEJM

Συμπτώματα των αρχικών στελεχών



Πρώιμες ημέρες της πανδημίας

Disease	R_o*	Compiled by @Vaccinologist Case-fatality rate
Diphtheria	6 – 7	5 – 10%
Ebola	1.5 – 2.5	25 – 90 %
Seasonal flu	1 – 2	< 0.1 %
Measles	**12 – 18**	**0.1 – 0.2 %**
Mumps	4 – 7	0.01 %
Pertussis (whooping cough)	12 – 17	4%
Polio	5 – 7	5 – 10% (paralytic polio)
Rubella	5 – 7	3–6% (developing countries)
Smallpox	**5 – 7**	**30% (variola major)**
SARS coronavirus	**3**	**9 – 16%**
MERS coronavirus	**<1**	**30 – 40%**
2019 novel coronavirus	**1.4 – 2.5****	**4%****

**R_0 value does not take into account case-fatality rate. Ebola, with a small R_0 value, cause widespread panic because of the high case-fatality rate. Measles is very infectious but perceived as not dangerous (as deadly as Ebola) but we now know measles cause "immune amnesia" (i.e. erase immune memory from previous infections) **figures will change in the course of the outbreak* || @Vaccinologist

Κύριοι Παράγοντες

- Ηλικία
- Φύλο
- Συννοσηρότητες
- Γενετική ευαισθησία

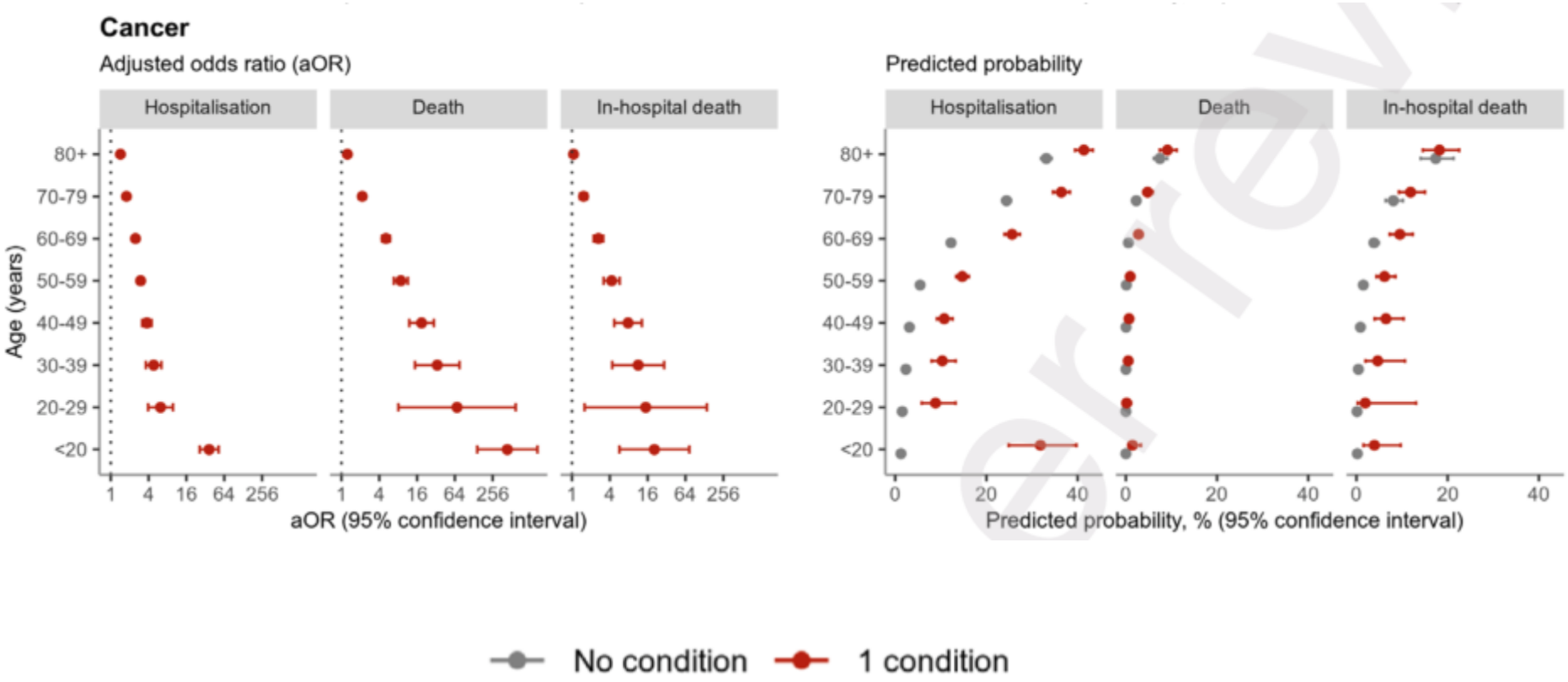
- Diabetes
- Obesity
- Hypertension
- History of Heart Failure
- Ischaemic Heart Disease
- Solid Organ Tumours
- Chronic Obstructive Pulmonary Disease
- Chronic Kidney Disease
- Immune Compromised Status
- Cancer
- Neurological Conditions
- Smoking
- Pregnancy

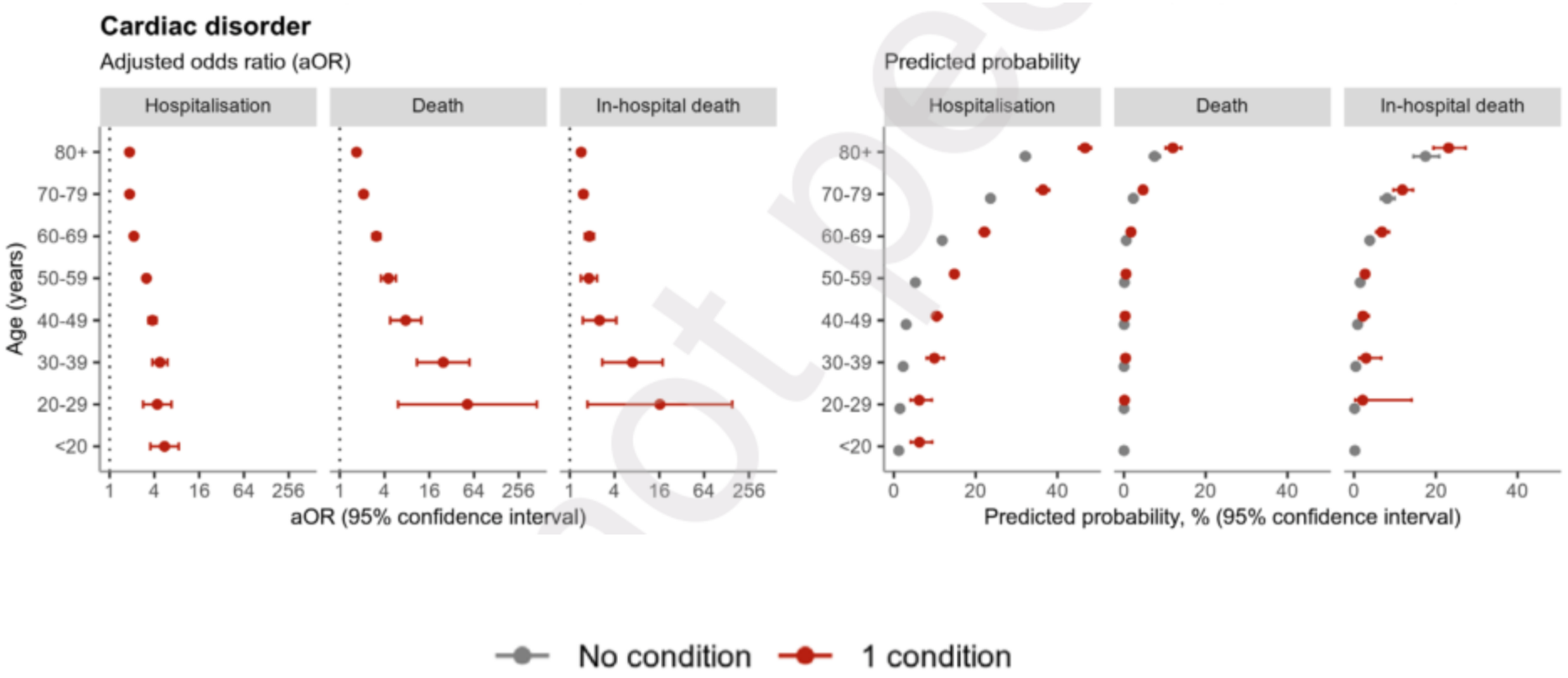
Source: ECDC (Retrieved on 24-10/21)
https://www.ecdc.europa.eu/en/covid-19/latest-evidence/risk-factors-risk-groups

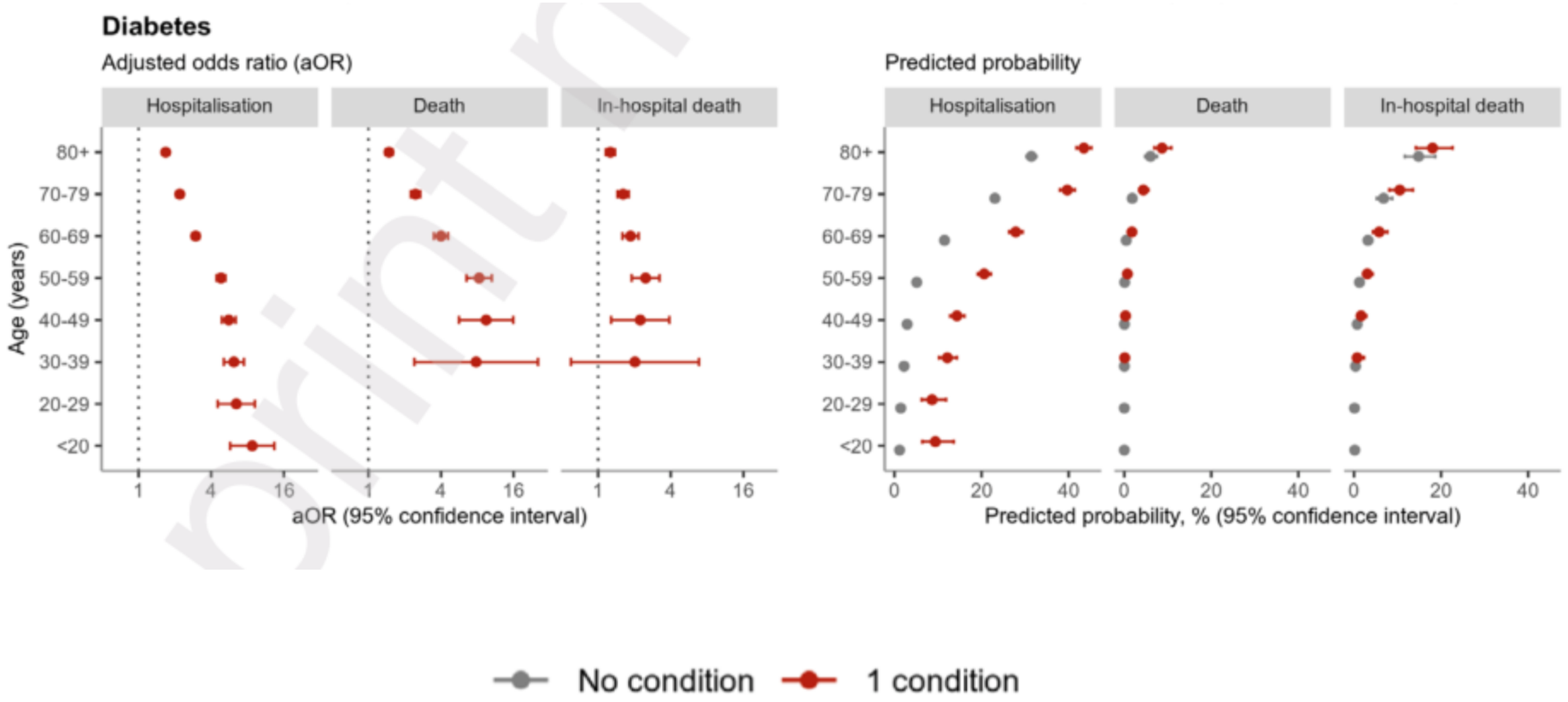
Preprints with THE LANCET

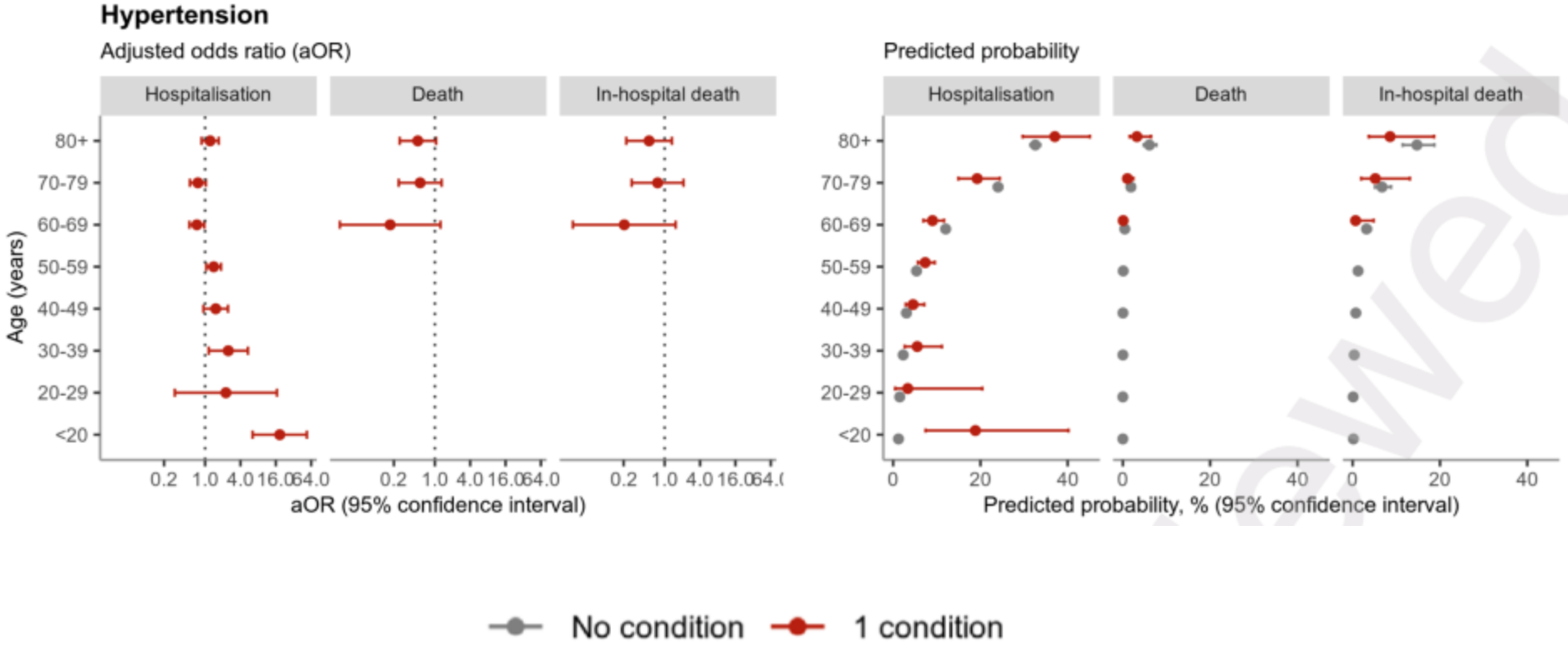
Age Specific Associations Between Underlying Conditions and Hospitalisation, Death and In-Hospital Death Among Confirmed COVID-19 Cases: A Multi-Country Study Based on Surveillance Data

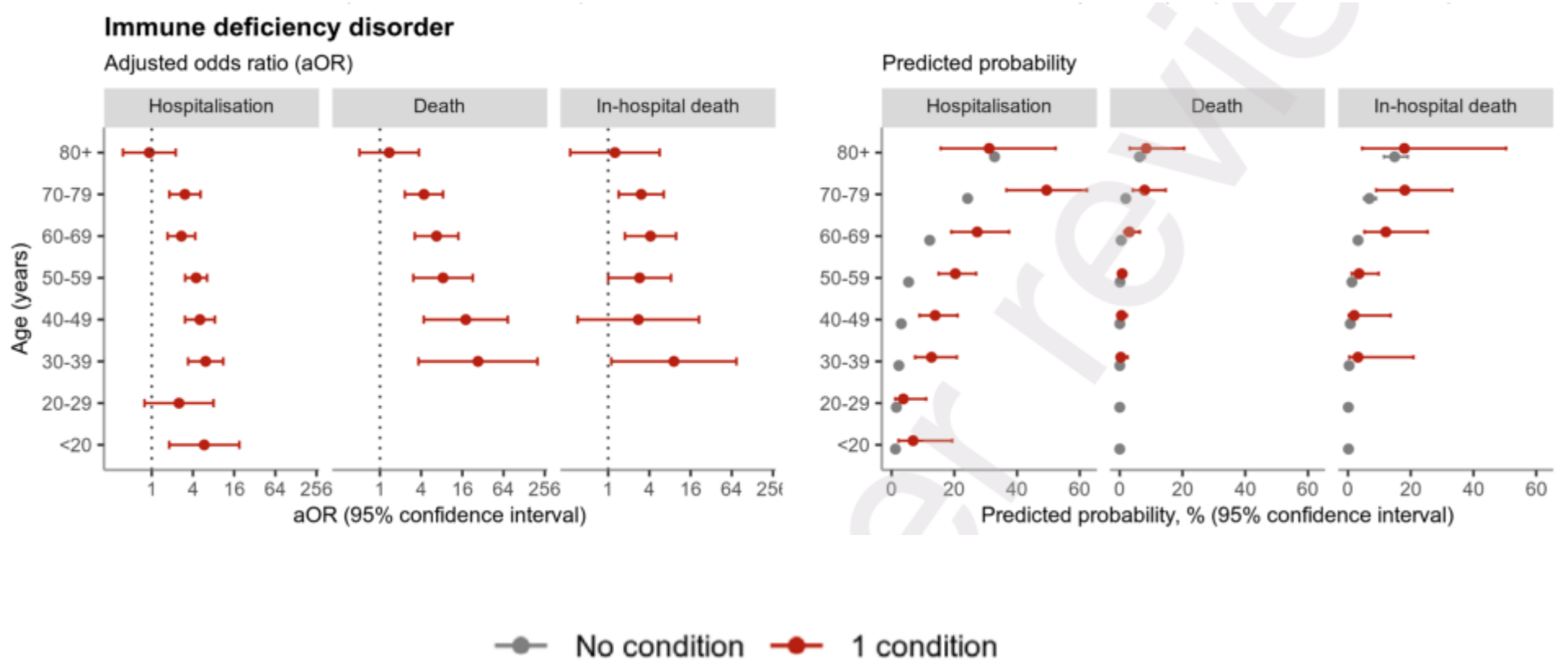
21 Pages • Posted: 31 Aug 2021

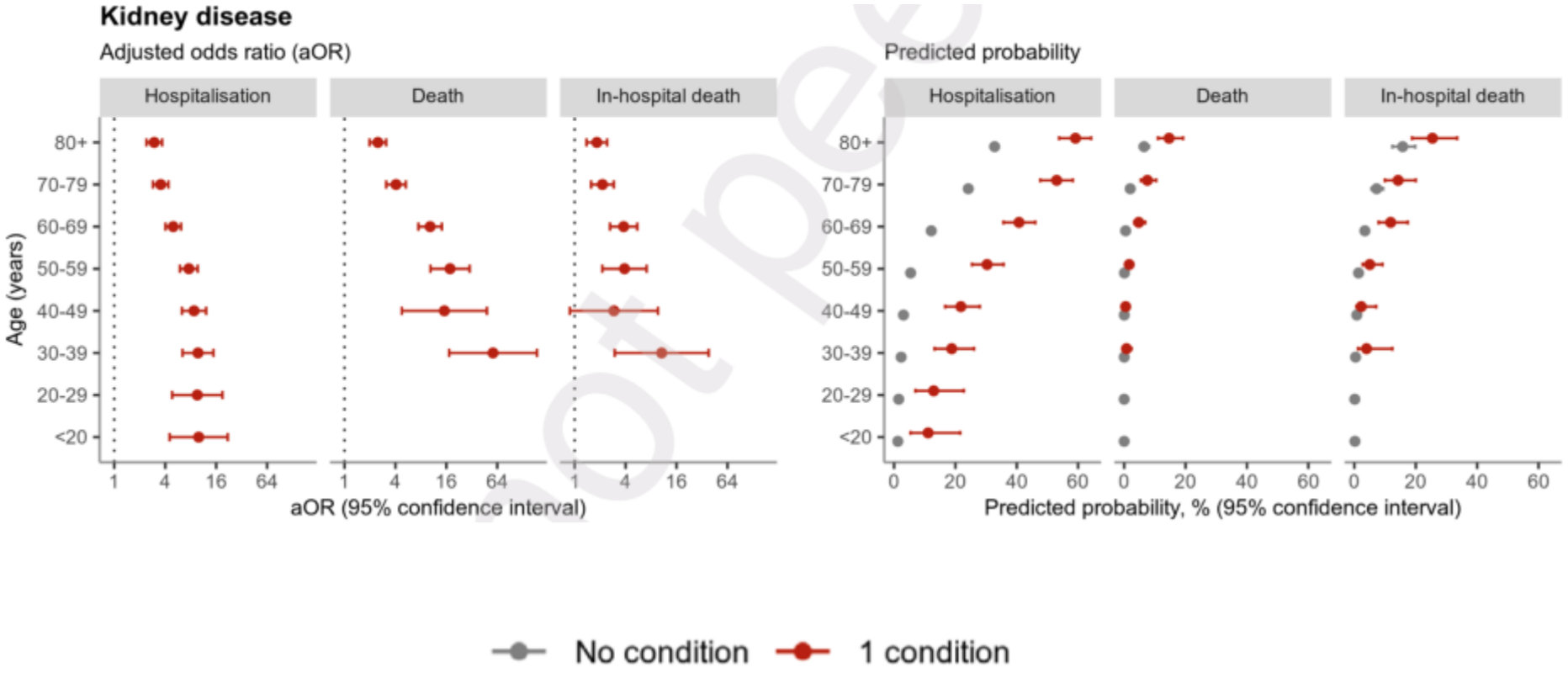

Cancer
Adjusted odds ratio (aOR)
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
256
aOR (95% confidence interval)
Predicted probability
0
20
40
Predicted probability, % (95% confidence interval)
No condition
1 condition

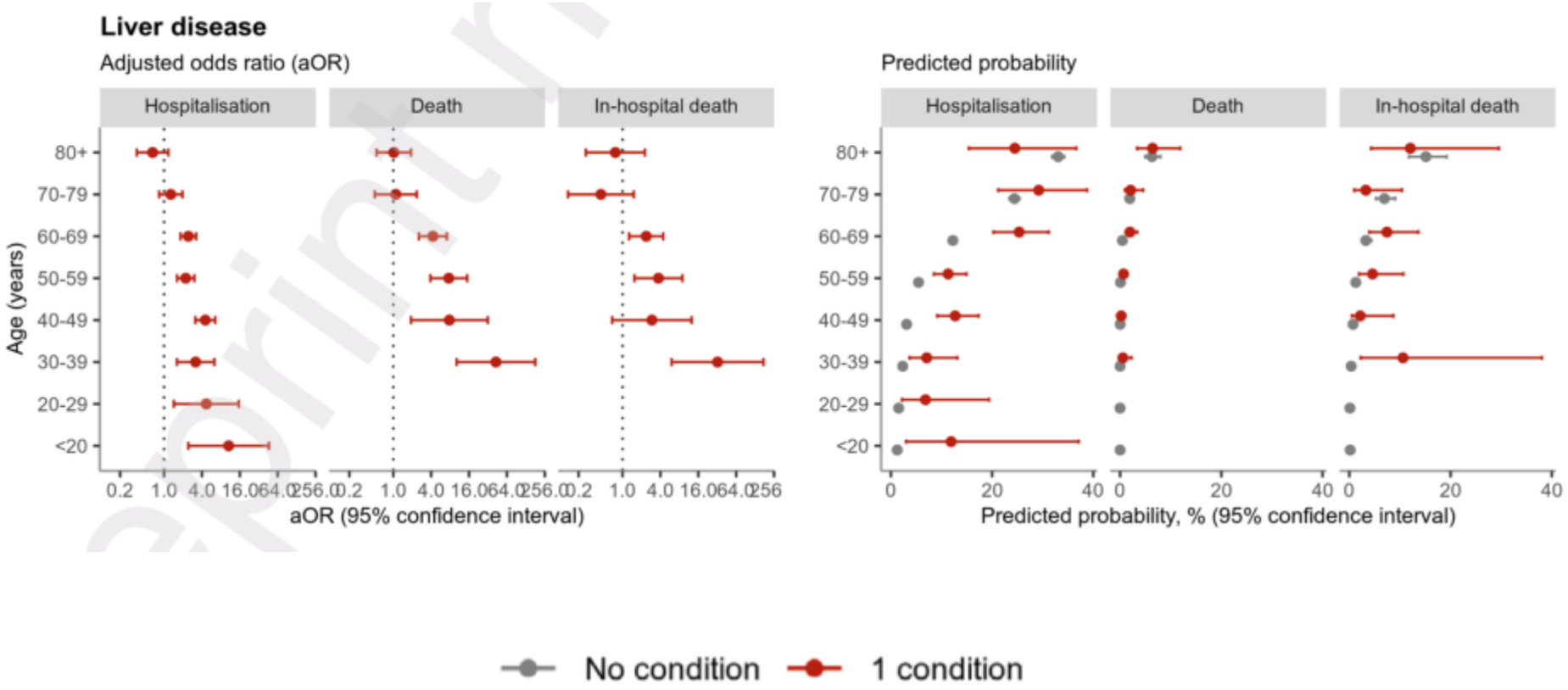

Cardiac disorder
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
256
0
20
40
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
No condition
1 condition

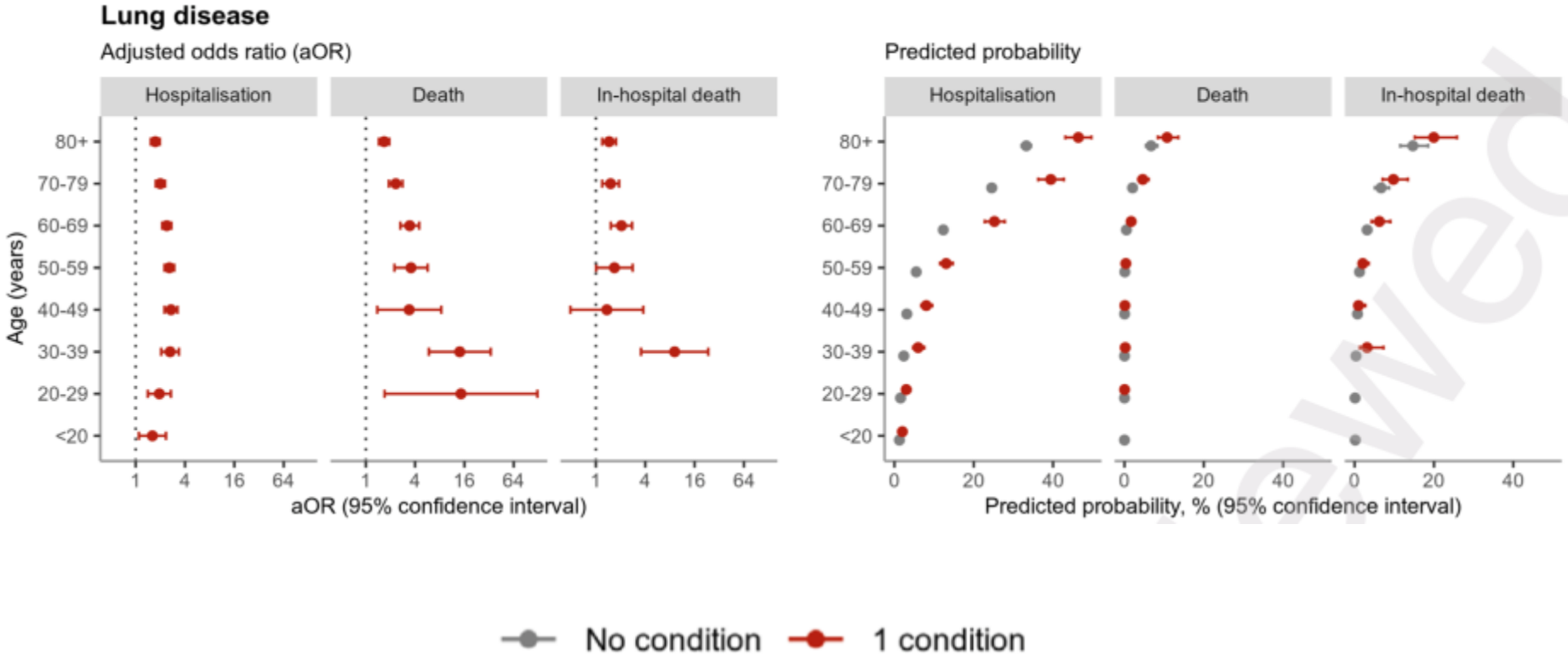

Diabetes
Adjusted odds ratio (aOR)
Hospitalisation
Death
In-hospital death
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
Age (years)
1
4
16
aOR (95% confidence interval)
Predicted probability
0
20
40
Predicted probability, % (95% confidence interval)
No condition
1 condition

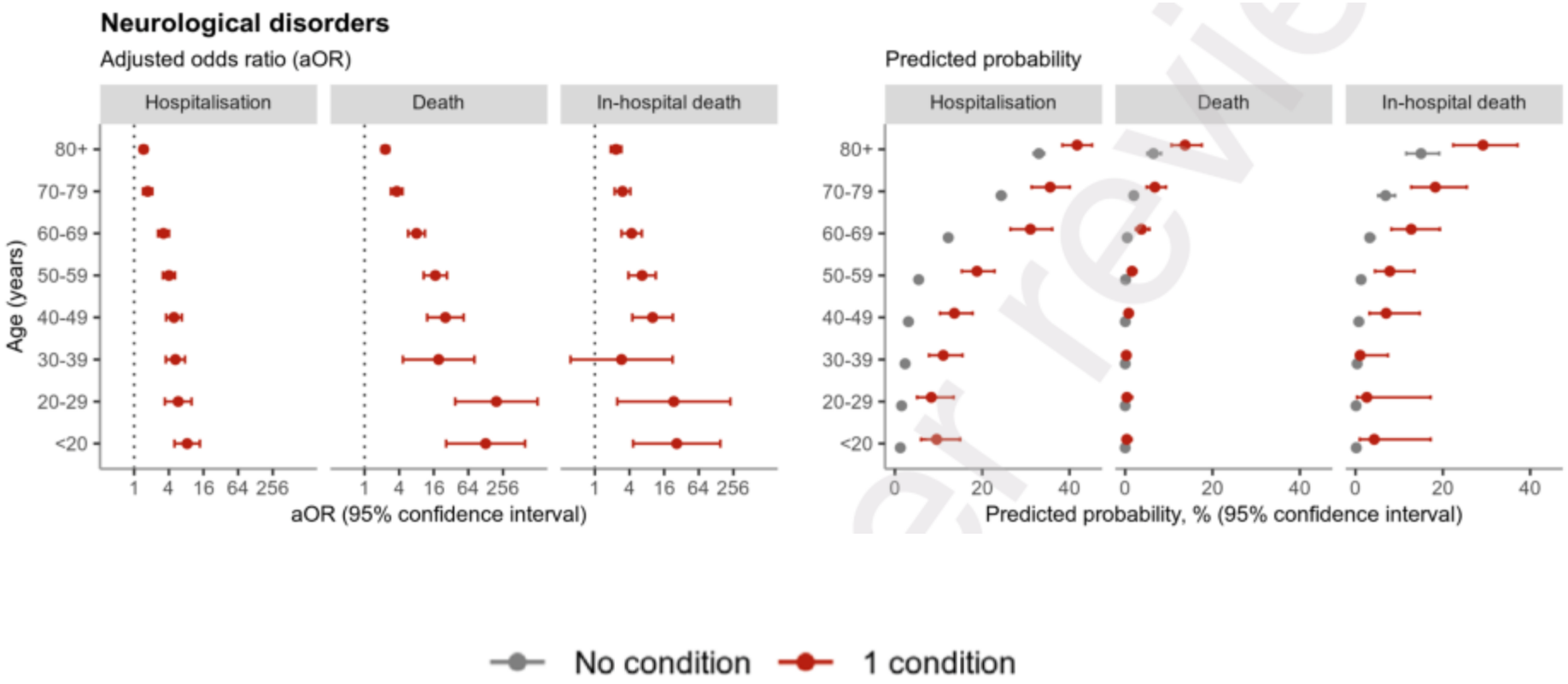

Hypertension
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
0.2
1.0
4.0
16.0
64.0
aOR (95% confidence interval)
0
20
40
Predicted probability, % (95% confidence interval)
No condition
1 condition


Immune deficiency disorder
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
256
0
20
40
60
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
No condition
1 condition


Kidney disease
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
0
20
40
60
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
No condition
1 condition


Liver disease
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
0.2
1.0
4.0
16.0
64.0
256.0
aOR (95% confidence interval)
0
20
40
Predicted probability, % (95% confidence interval)
No condition
1 condition


Lung disease
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
0
20
40
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
No condition
1 condition


Neurological disorders
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
256
0
20
40
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
No condition
1 condition

Pfizer-BioNTech and Oxford AstraZeneca COVID-19 vaccine effectiveness and immune response among individuals in clinical risk groups

Heather J Whitaker[1], Ruby SM Tsang[2], Rachel Byford[2], Nick J Andrews[1,3], Julian Sherlock[2], Praveen Sebastian Pillai[5], John Williams[2], Elizabeth Button[2], Helen Campbell[3], Mary Sinnathamby[3], Georgina Pike[4], Sneha Anand[2], Ezra Linley[6], Jacqueline Hewson[7], Ashley D Otter[7], Joanna Ellis[3,5], Richard FD Hobbs[2], Maria Zambon[5], Mary Ramsay[3], Kevin E Brown[3], Simon de Lusignan[2], Gayatri Amirthalingam[3*], Jamie Lopez Bernal[3*]

Figure 2a: cohort vaccine effectiveness 28 to 90 days after dose one of vaccination

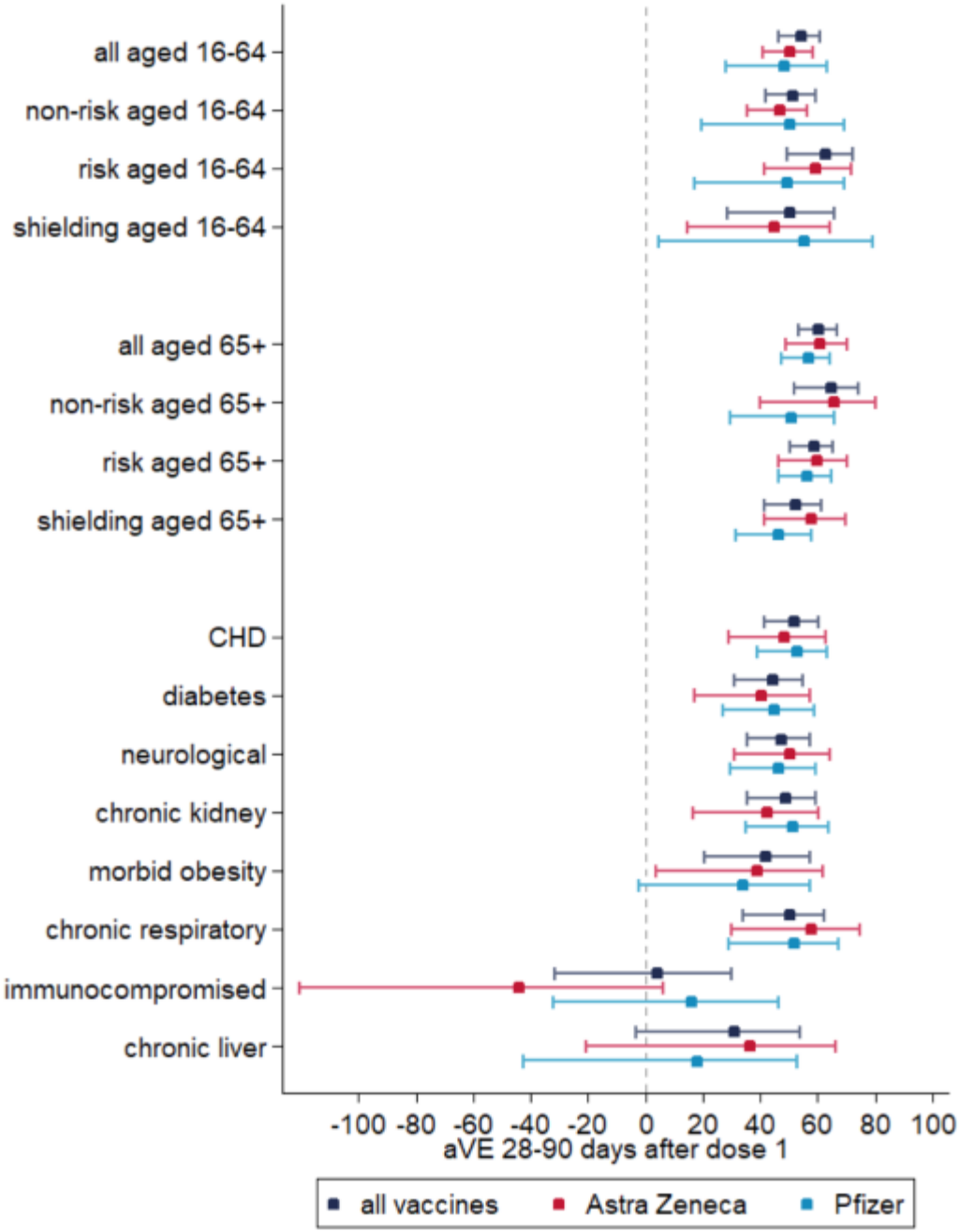
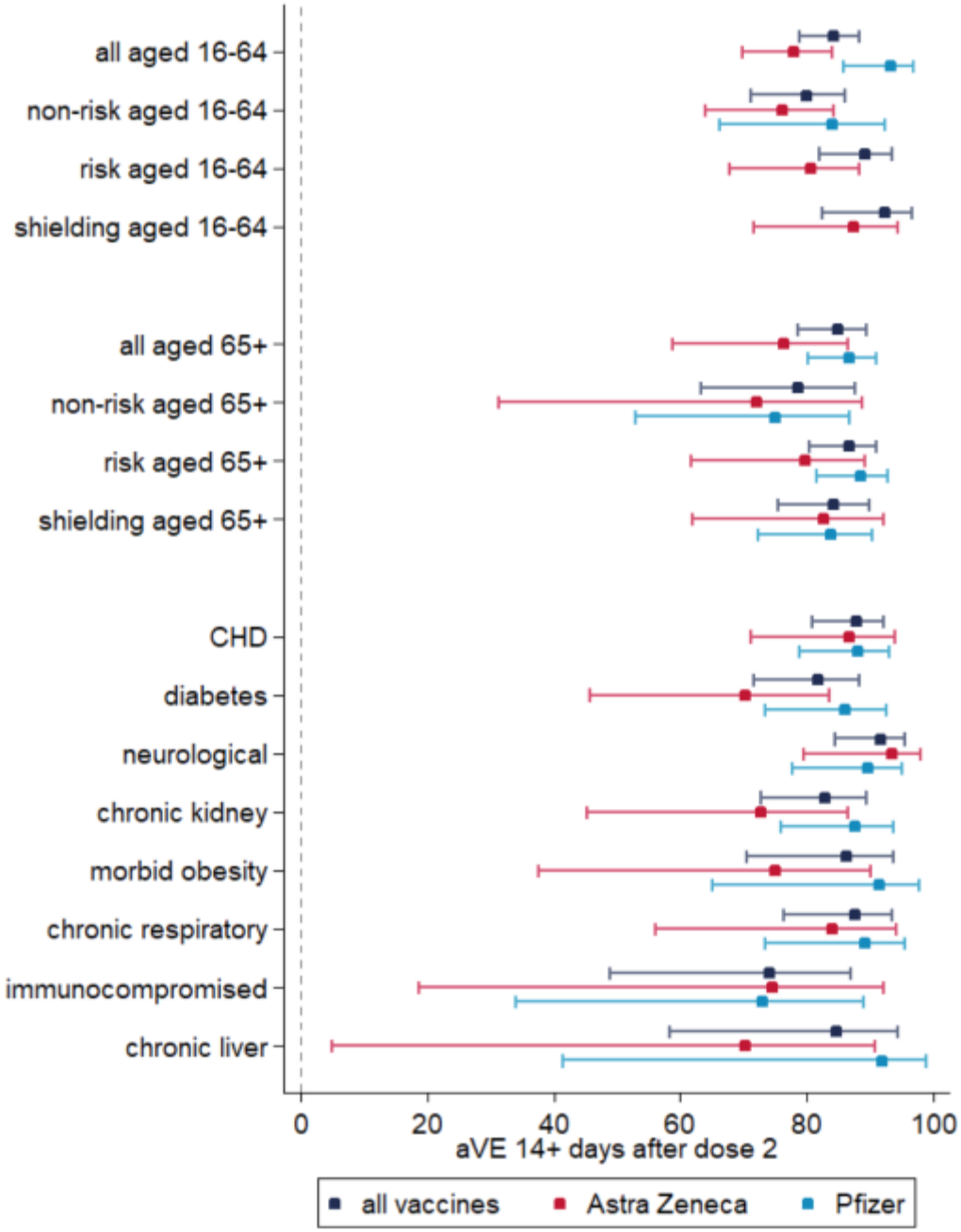


Figure 2b: cohort vaccine effectiveness 14+ days after dose 2 of vaccination



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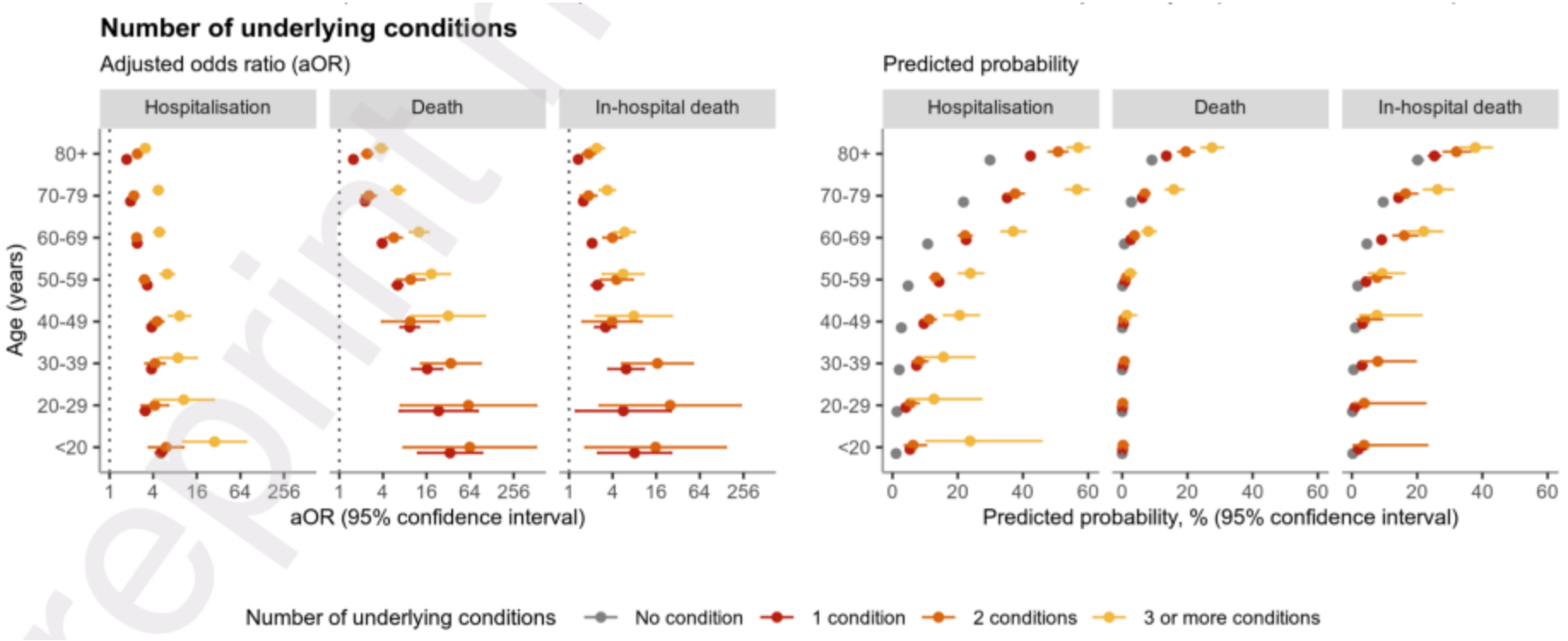

Number of underlying conditions
Adjusted odds ratio (aOR)
Predicted probability
Hospitalisation
Death
In-hospital death
Age (years)
80+
70-79
60-69
50-59
40-49
30-39
20-29
<20
1
4
16
64
256
0
20
40
60
aOR (95% confidence interval)
Predicted probability, % (95% confidence interval)
Number of underlying conditions
No condition
1 condition
2 conditions
3 or more conditions

Ou

Allons

Nous

Εξελικτική Επιδημιολογία

PNAS
Proceedings of the
National Academy of Sciences
of the United States of America

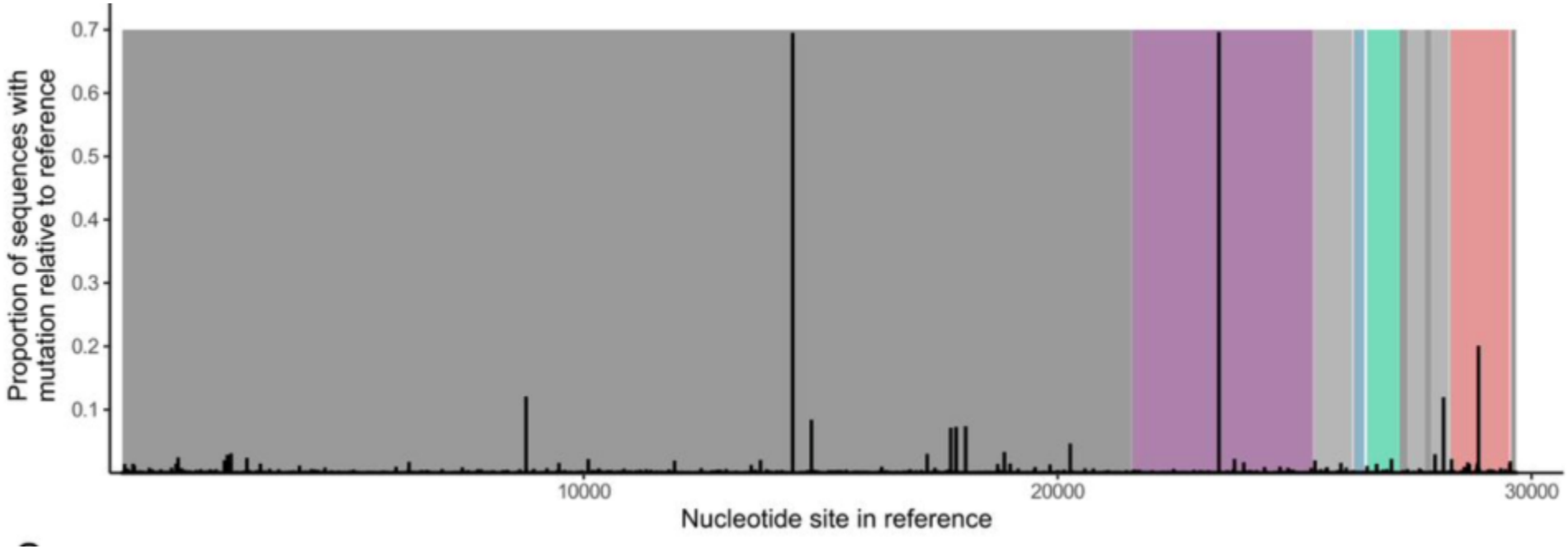
RESEARCH ARTICLE

A SARS-CoV-2 vaccine candidate would likely match all currently circulating variants

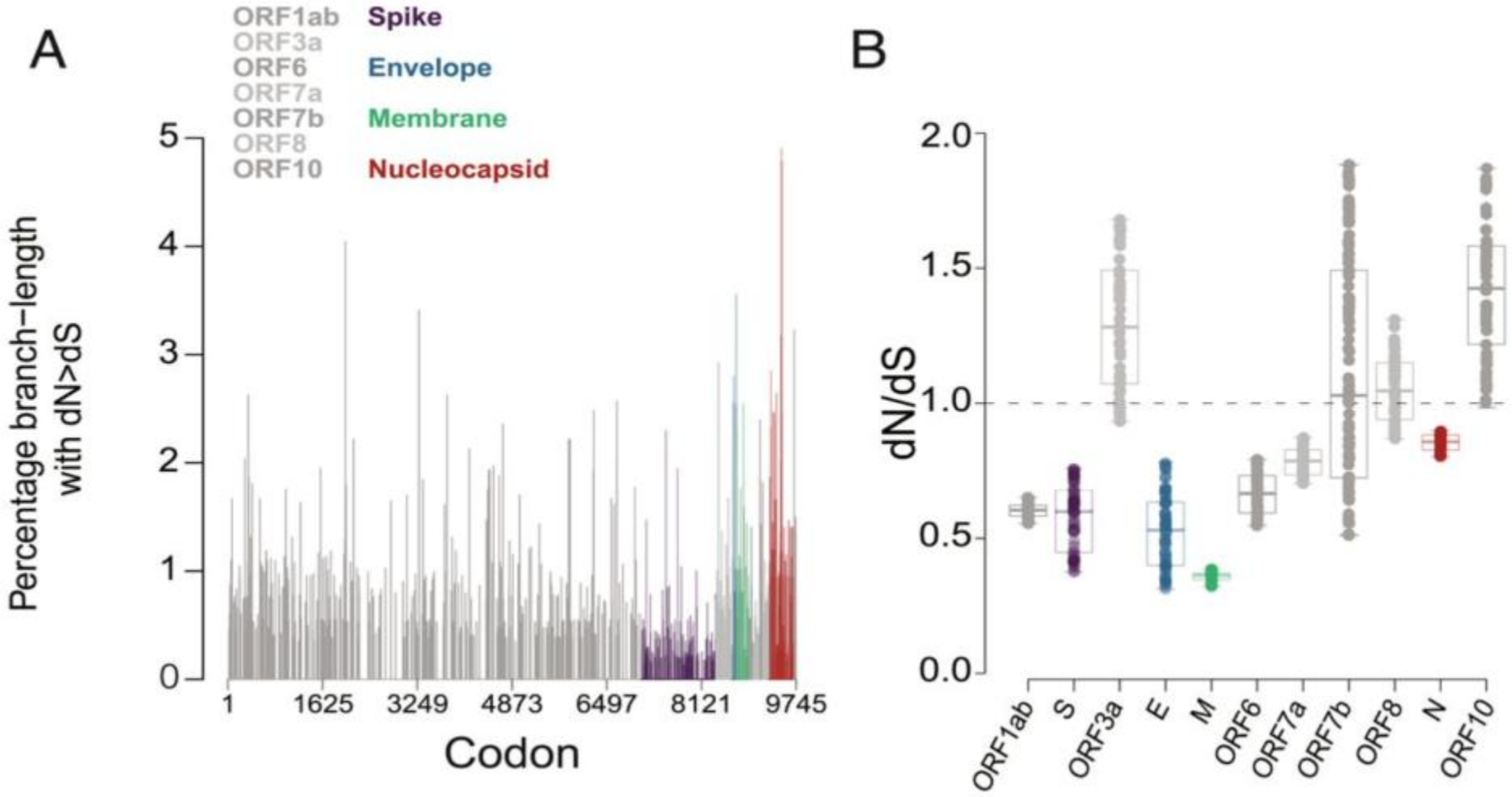
Bethany Dearlove, Eric Lewitus, Hongjun Bai, Yifan Li, Daniel B. Reeves, M. …

+ See all authors and affiliations

Μεταλλάξεις των πρώιμων στελεχών (2020)



D614G


A
ORF1ab
ORF3a
ORF6
ORF7a
ORF7b
ORF8
ORF10
Spike
Envelope
Membrane
Nucleocapsid
Percentage branch−length with dN>dS
0
1
2
3
4
5
1
1625
3249
4873
6497
8121
9745
Codon
B
dN/dS
0.0
0.5
1.0
1.5
2.0
ORF1ab
S
ORF3a
E
M
ORF6
ORF7a
ORF7b
ORF8
N
ORF10

Στελέχη

- Στελέχη Ανησυχίας

- Στελέχη Ενδιαφέροντος/Στελέχη υπό διερεύνηση

Στελέχη Ανησυχίας
Δεκέμβριος 2020

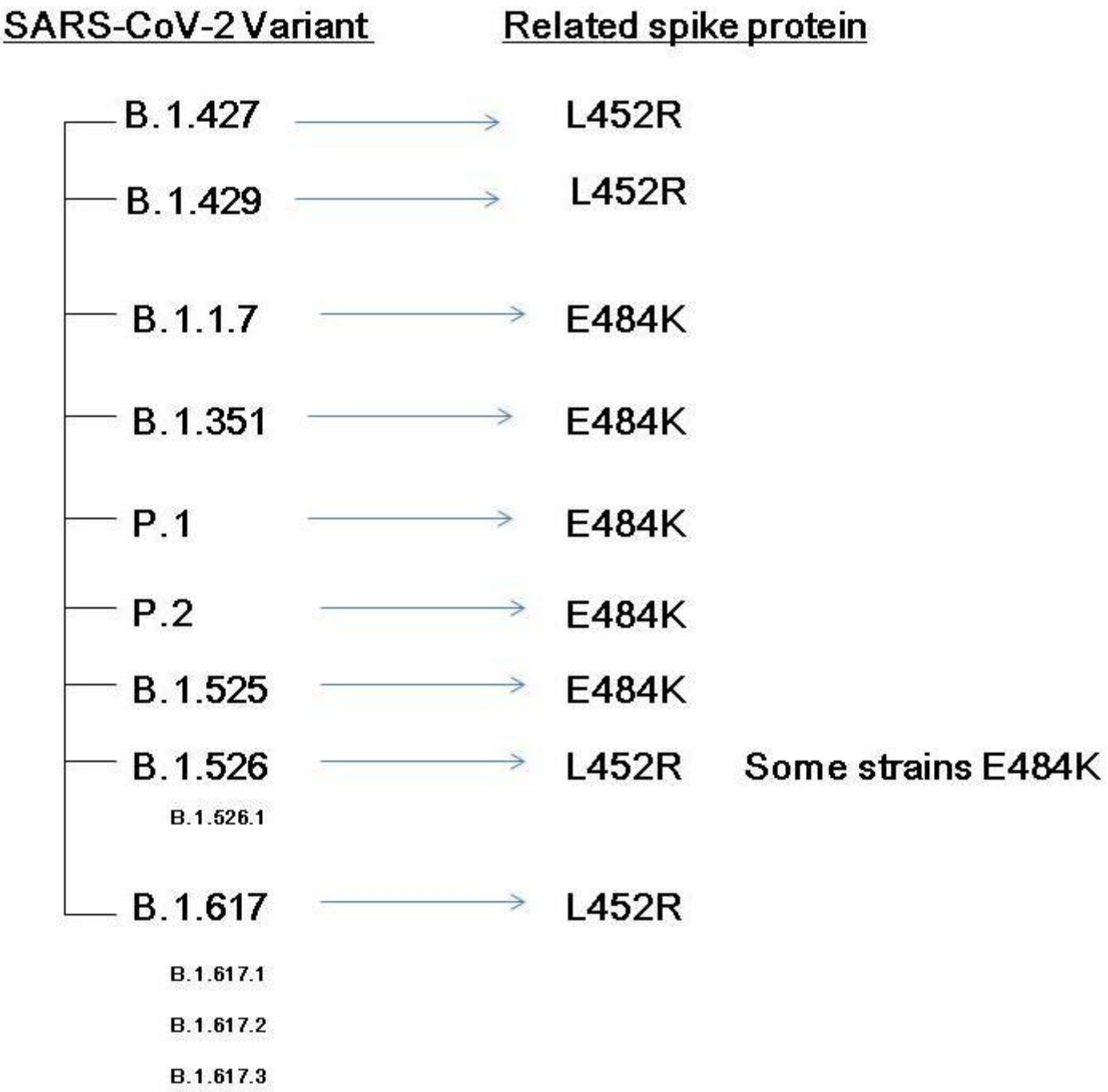
Alpha (UK):	N501Y (“Nelly”)	69-70del	P681H
Beta (SA):	N501Y	E484K (“Eeek”)	K417N
Gamma (Brazil):	N501Y	E484K	K417T

Στέλεχος Ανησυχίας Φεβρουάριος 2021

Delta

D614G (“Doug”), T478K, P681R, L452R

Συγκλίνουσα Εξέλιξη



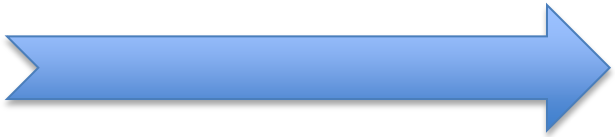
REPORT

Rapid assessment of SARS-CoV-2 evolved variants using virus-like particles

ABDULLAH M. SYED, TAHA Y. TAHA, TAKAKO TABATA, IRENE P. CHEN, ALISON CILING, MIR M. KHALID, BHARATH SREEKUMAR, PEI-YI CHEN, JENNIFER M. HAYASHI, KATARZYNA M. SOCZEK, MELANIE OTT, AND JENNIFER A. DOUDNA fewer Authors Info & Affiliations

SCIENCE • 4 Nov 2021 • First Release • DOI: 10.1126/science.abl6184

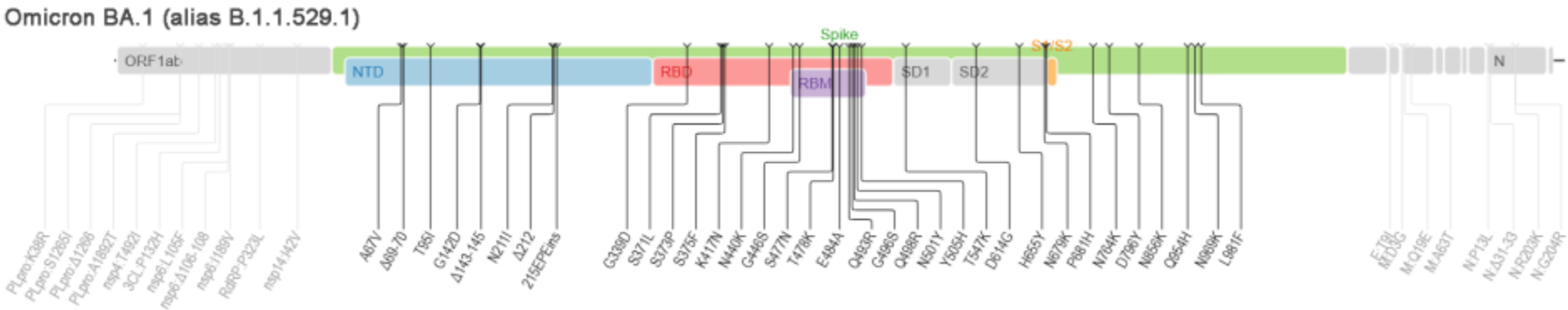
R203M



ΕΠΙΣΤΑΣΗ

Στελέχη Ανησυχίας
Δεκέμβριος 2021

Omicron



Τι άλλαξε στην επιδημιολογία εξαιτίας των μεταλλαγμένων στελεχών;

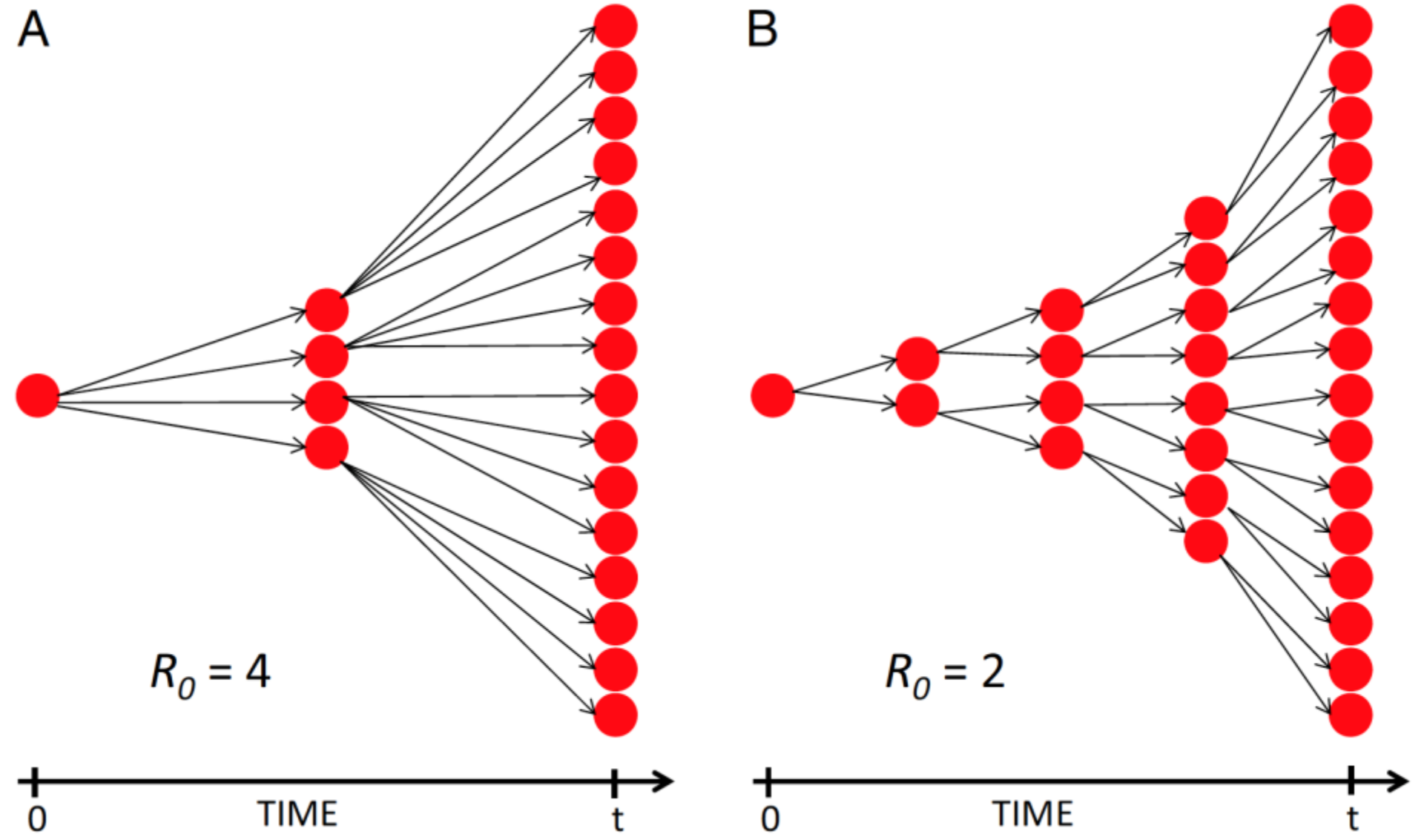
Προσαρμογή (Fitness)

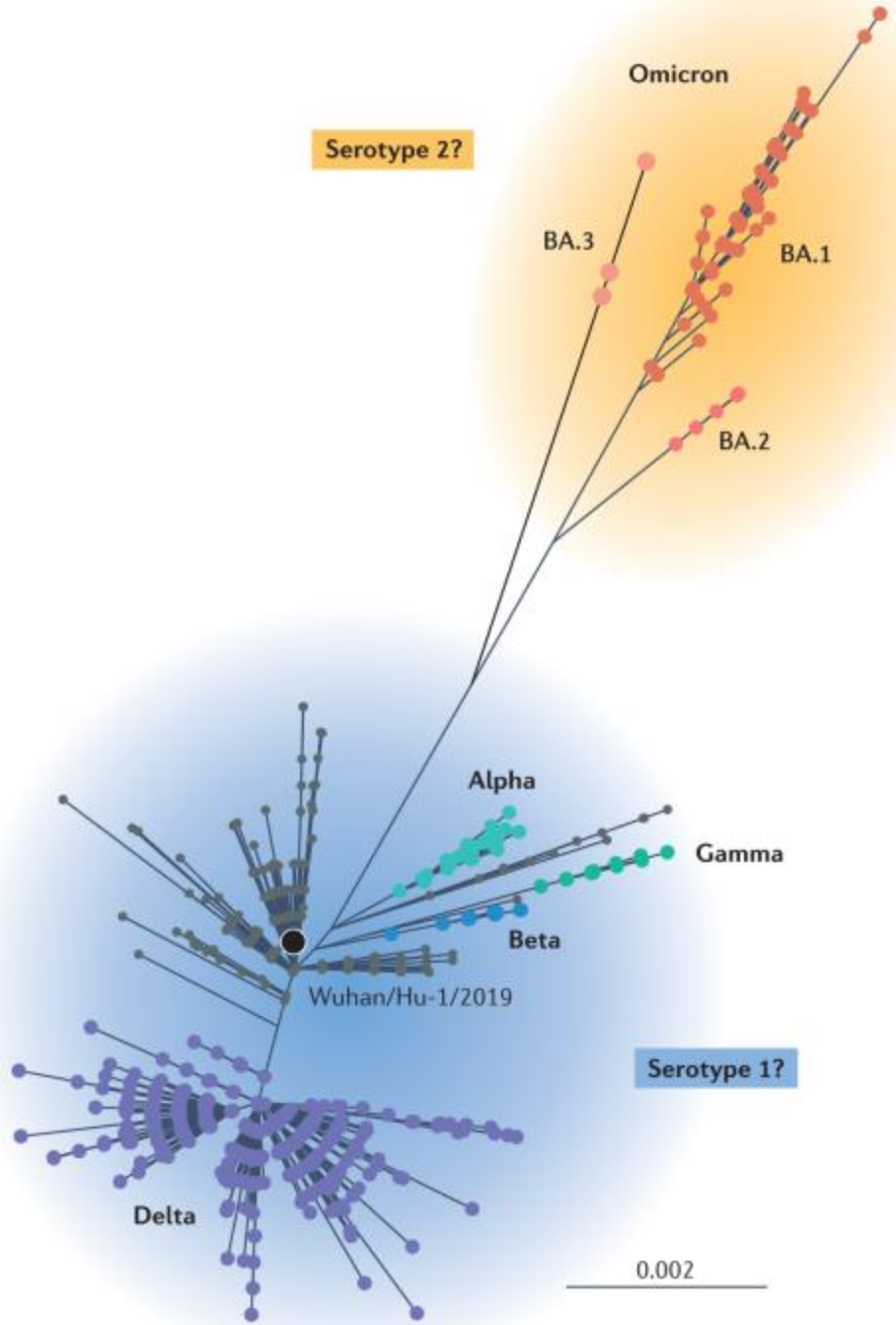
- Α) Μεταδοτικότητα
- Β) Ανοσολογική Διαφυγή

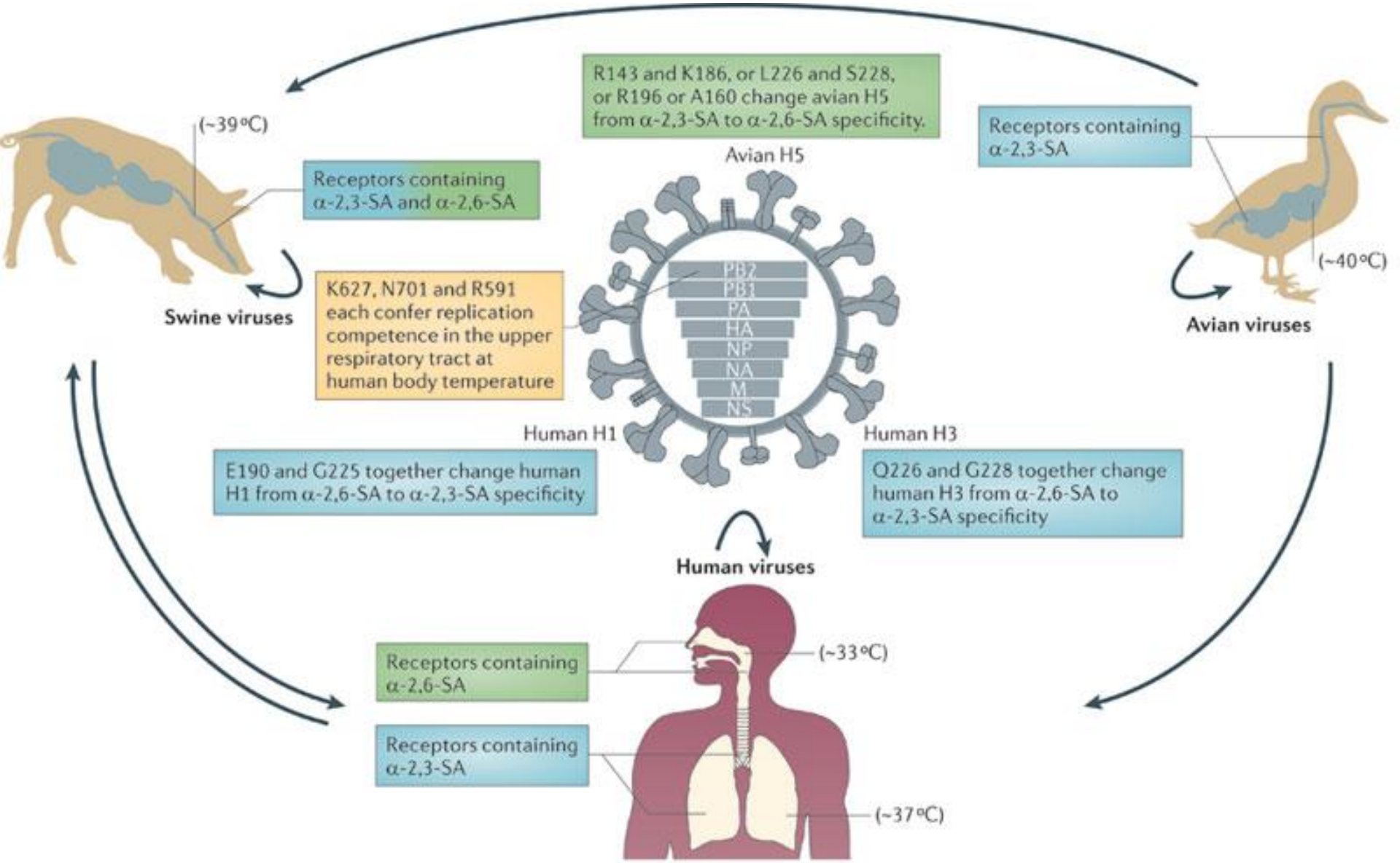
Νοσηρότητα

Μεταδοτικότητα Στελεχών

- Αυξάνεται το R_0;
- Αυξάνεται ο χρόνος γενιάς;
- Αλλάζει η δυναμική της υπερμετάδοσης;


A
$R_0 = 4$
0
TIME
t
B
$R_0 = 2$
0
TIME
t


Omicron
Serotype 2?
BA.3
BA.1
BA.2
Alpha
Gamma
Beta
Wuhan/Hu-1/2019
Serotype 1?
Delta
0.002


R143 and K186, or L226 and S228, or R196 or A160 change avian H5 from α-2,3-SA to α-2,6-SA specificity.
(~39°C)
Receptors containing α-2,3-SA and α-2,6-SA
Swine viruses
K627, N701 and R591 each confer replication competence in the upper respiratory tract at human body temperature
Avian H5
PB2
PB1
PA
HA
NP
NA
M
NS
Receptors containing α-2,3-SA
(~40°C)
Avian viruses
Human H1
E190 and G225 together change human H1 from α-2,6-SA to α-2,3-SA specificity
Human H3
Q226 and G228 together change human H3 from α-2,6-SA to α-2,3-SA specificity
Human viruses
Receptors containing α-2,6-SA
(~33°C)
Receptors containing α-2,3-SA
(~37°C)

Applied Evolutionary Virology Group

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Ευχαριστώ πολύ