Covid- 19 en Uruguay: conversacion entre ciencia y economía: "LA PREVIA"

Daniel Gianola

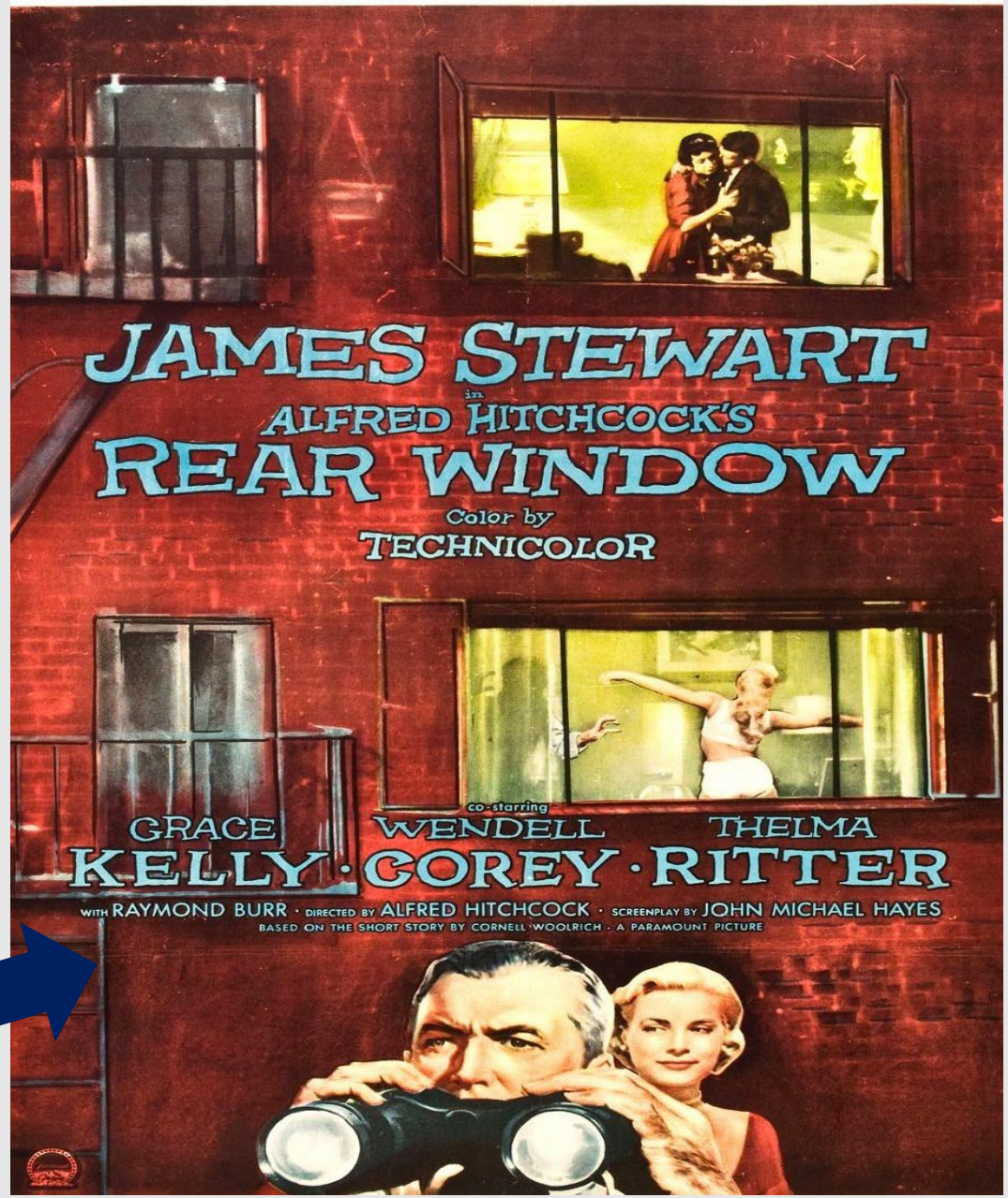
Sewall Wright Emeritus Professor

Department of Animal & Dairy Sciences
UNIVERSITY OF WISCONSIN-MADISON

VISTA DESDE: “LA VENTANA INDISCRETA” (en realidad, “VENTANA TRASERA”)

“Grace of Monaco”

“Ironside”



COVID-19: SITUACION GLOBAL

Casos CONFIRMADOS Global: 601 236 923	**Muertes** Global: 6 199 164
???? **EEUU: 95 345 859**	**EEUU: 1 065 569**
India: 44 348 960	Brasil: 682 587
Francia: 34 354 612	India: 527 368
Brasil: 34 284 612	Russia: 383 617
Alemania: 31 808 179	Mexico: 329 091
Reino Unido: 23 468 787	Peru: 251341
URUGUAY: 975 264	URUGUAY: 7429

https://www.worldometers.info/coronavirus/

Agosto 22, 2022

DECEMBER 30, 2019

- PATIENT; MYSTERIOUS PNEUMONIA
- PCR CONFIRMS NEW CORONAVIRUS.

WUHAN JIN YIN-TAN HOSPITAL
WUHAN, CHINA (11 million)

- DR LI WENLIANG INFORMS THROUGH WeChat ON DECEMBER 30
- DETAINED BY POLICE. FORCEDTO SIGN STATEMENT

DECEMBER 31, 2019

- HEALTH ALERT ISSUED. SEVERAL PATIENTS HOSPITALIZED: **ALL HAD VISITED HUANAN SEAFOOD-LIVE ANIMAL MARKET**

bats

civet

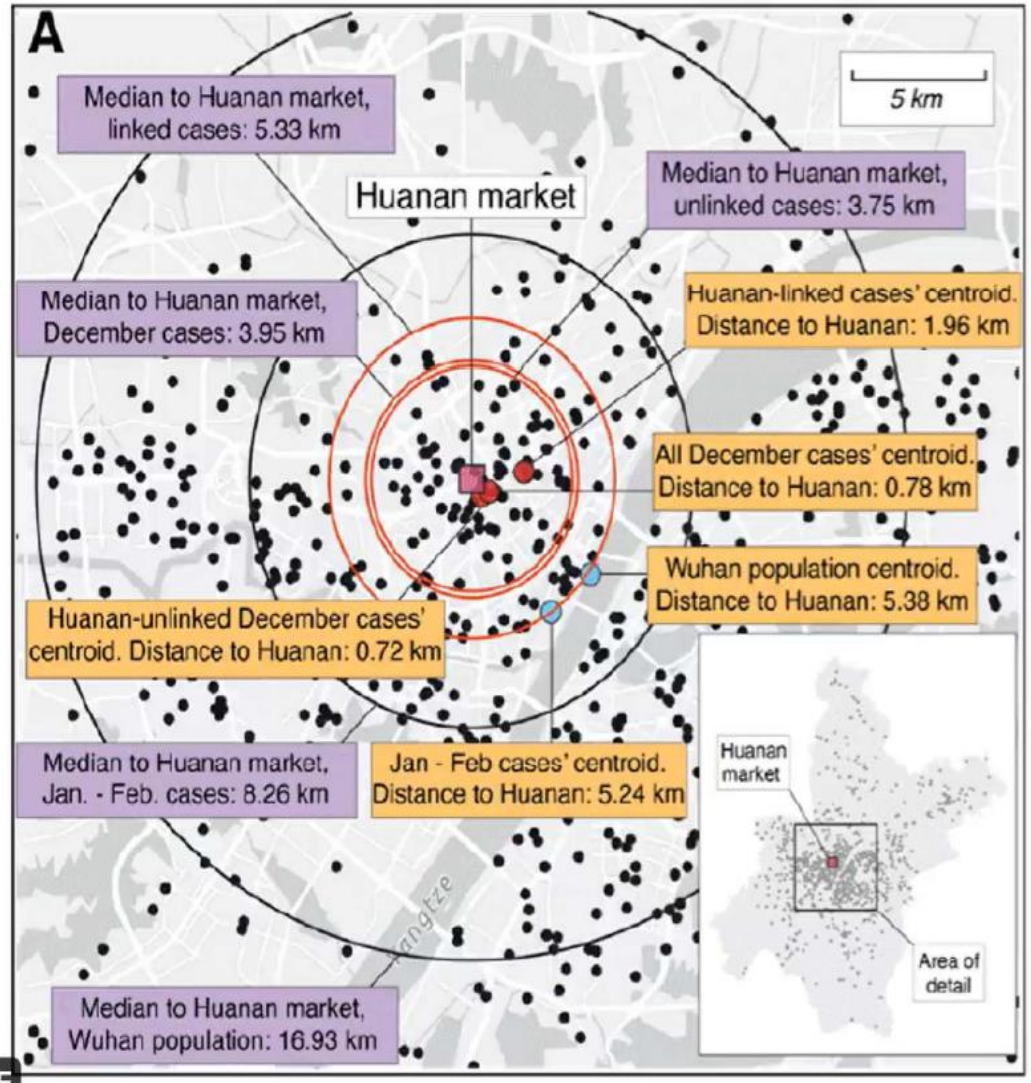
pangolin

Racoon dog

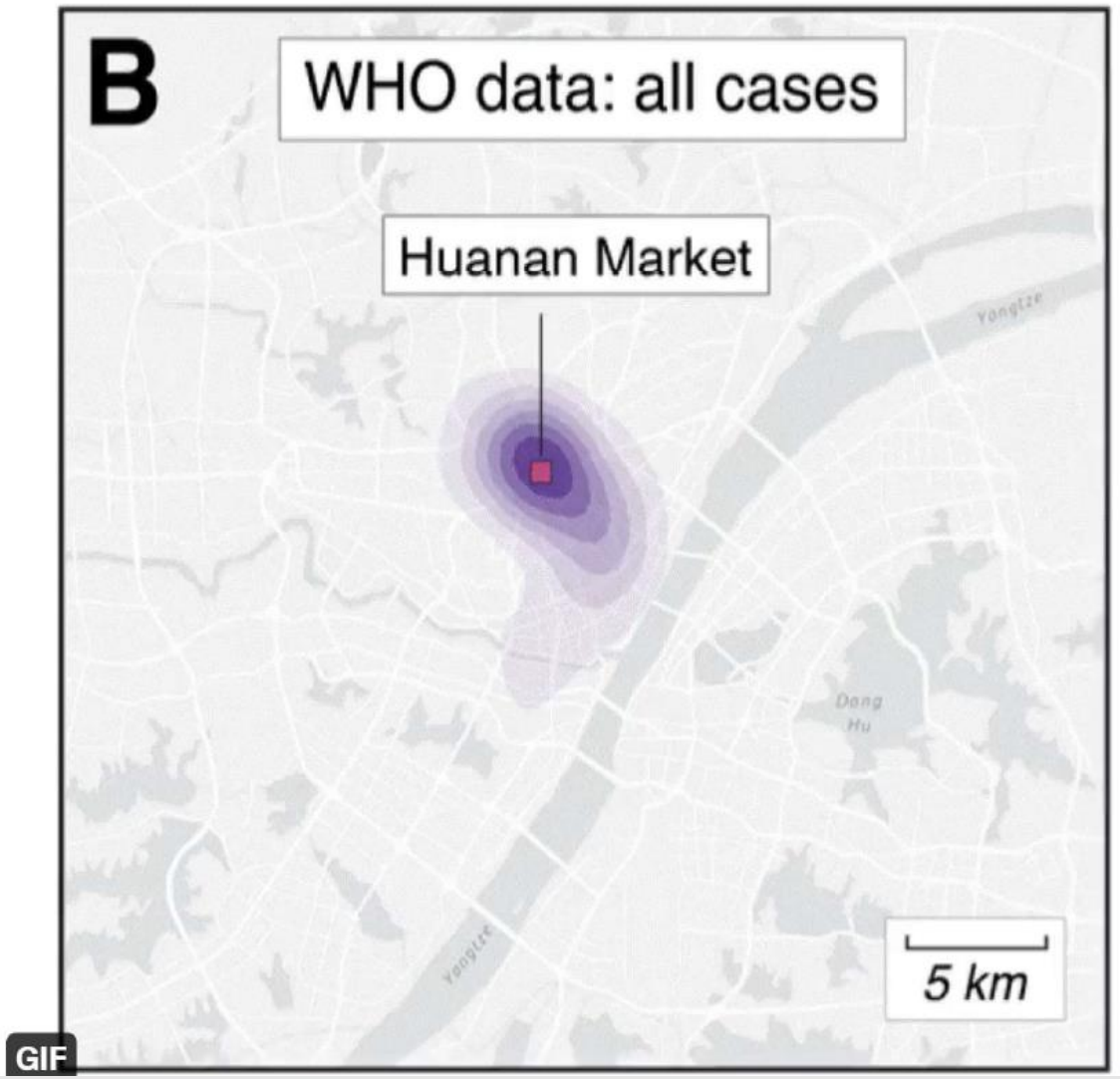
Red fox


PONY

Dec 2019 cases lived far closer to the Huanan market than later cases, or Wuhan's general population.



December 2019 cases lived adjacent to the Huanan Seafood Market



FUENTE: M. WOROBEY

(/searc

(https://www.arizona.edu)

News

(/)

SUBMIT A STORY IDEA (HTTPS://NEWS.ARIZONA.EDU/BLOG-FORM/SHOUT-BOX)

SUBSCRIBE (HTTPS://NEWS.ARIZONA.EDU/SIGNUPFORNEWS/SUBSCRIBE)

Studies link COVID-19 to wildlife sales at Chinese market, find other scenarios extremely unlikely

Analyses based on locations and viral sequencing of early cases indicate the COVID-19 pandemic started in Wuhan's Huanan Seafood Wholesale Market, with two separate jumps from animals to humans.

By Daniel Stolte, University Communications

July 26, 2022

Science

RESEARCH ARTICLES

Cite as: J. E. Pekar *et al.*, *Science* 10.1126/science.abp8337 (2022).

The molecular epidemiology of multiple zoonotic origins of SARS-CoV-2

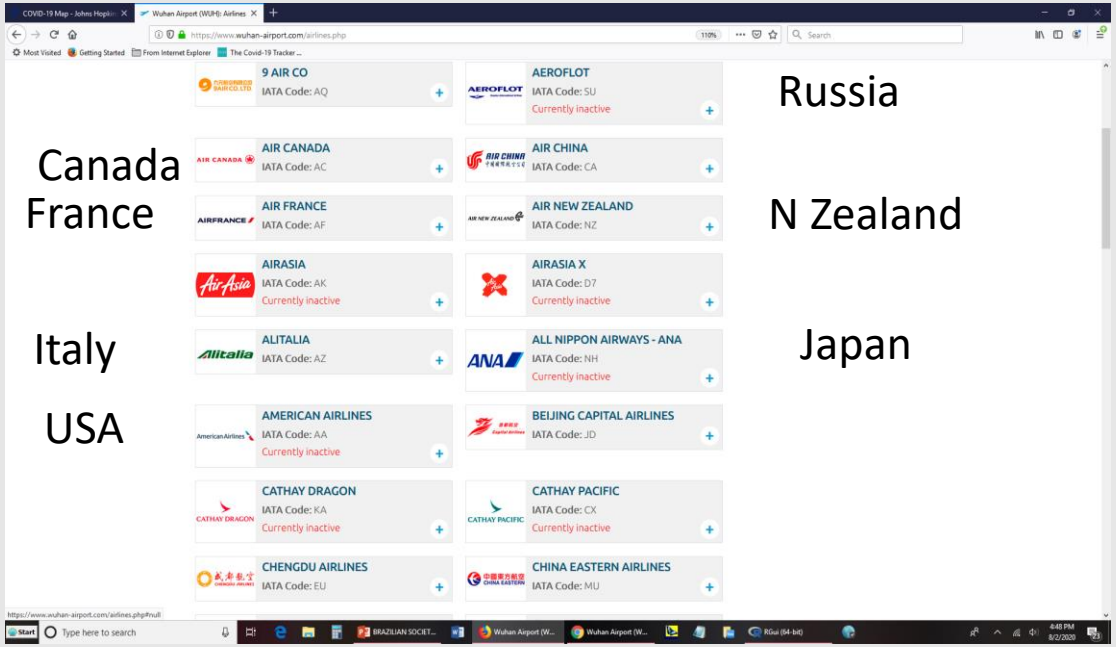
Jonathan E. Pekar[1,2*], Andrew Magee[3], Edyth Parker[4], Niema Moshiri[5], Katherine Izhikevich[5,6], Jennifer L. Havens[1], Karthik Gangavarapu[3], Lorena Mariana Malpica Serrano[7], Alexander Crits-Christoph[8], Nathaniel L. Matteson[4], Mark Zeller[4], Joshua I. Levy[4], Jade C. Wang[9], Scott Hughes[9], Jungmin Lee[10], Heedo Park[10,11], Man-Seong Park[10,11], Katherine Ching Zi Yan[12], Raymond Tzer Pin Lin[12], Mohd Noor Mat Isa[13], Yusuf Muhammad Noor[13], Tetyana I. Vasylyeva[14], Robert F. Garry[15,16,17], Edward C. Holmes[18], Andrew Rambaut[19], Marc A. Suchard[3,20,21*], Kristian G. Andersen[4,22*], Michael Worobey[7*], Joel O. Wertheim[14*]

[1]Bioinformatics and Systems Biology Graduate Program, University of California San Diego, La Jolla, CA 92093, USA. [2]Department of Biomedical Informatics, University of California San Diego, La Jolla, CA 92093, USA. [3]Department of Human Genetics, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA 90095, USA. [4]Department of Immunology and Microbiology, The Scripps Research Institute, La Jolla, CA 92037, USA. [5]Department of Computer Science and Engineering, University of California San Diego, La Jolla, CA 92093, USA. [6]Department of Mathematics, University of California San Diego, La Jolla, CA 92093, USA. [7]Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ 85721, USA. [8]W. Harry Feinstone Department of Molecular Microbiology and Immunology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland 21205, USA. [9]New York City Public Health Laboratory, New York City Department of Health and Mental Hygiene, New York, NY 11101, USA. [10]Department of Microbiology, Institute for Viral Diseases, Biosafety Center, College of Medicine, Korea University, Seoul, South Korea. [11]BK21 Graduate Program, Department of Biomedical Sciences, Korea University College of Medicine, Seoul, 02841, Republic of Korea. [12]National Public Health Laboratory, National Centre for Infectious Diseases, Singapore. [13]Malaysia Genome and Vaccine Institute, Jalan Bangi, 43000 Kajang, Selangor, Malaysia. [14]Department of Medicine, University of California San Diego, La Jolla, CA 92093, USA. [15]Tulane University, School of Medicine, Department of Microbiology and Immunology, New Orleans, LA 70112, USA. [16]Zalgen Labs, LCC, Frederick, MD 21703 USA. [17]Global Virus Network (GVN), Baltimore, MD 21201, USA. [18]Sydney Institute for Infectious Diseases, School of Life and Environmental Sciences and School of Medical Sciences, The University of Sydney, Sydney, NSW 2006, Australia. [19]Institute of Evolutionary Biology, University of Edinburgh, King's Buildings, Edinburgh, EH9 3FL, UK. [20]Department of Biomathematics, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA 90095, USA. [21]Department of Biostatistics, Fielding School of Public Health, University of California Los Angeles, Los Angeles, CA 90095, USA. [22]Scripps Research Translational Institute, La Jolla, CA 92037, USA.

ANALISIS DE ‘RELOJ MOLECULAR’➔ acumulacion temporal de mutaciones

INTRODUCCION SINGULAR➔inconsistente con el reloj molecular

WUHAN TIAN-HE INTERNATIONAL AIRPORT



Russia

Canada

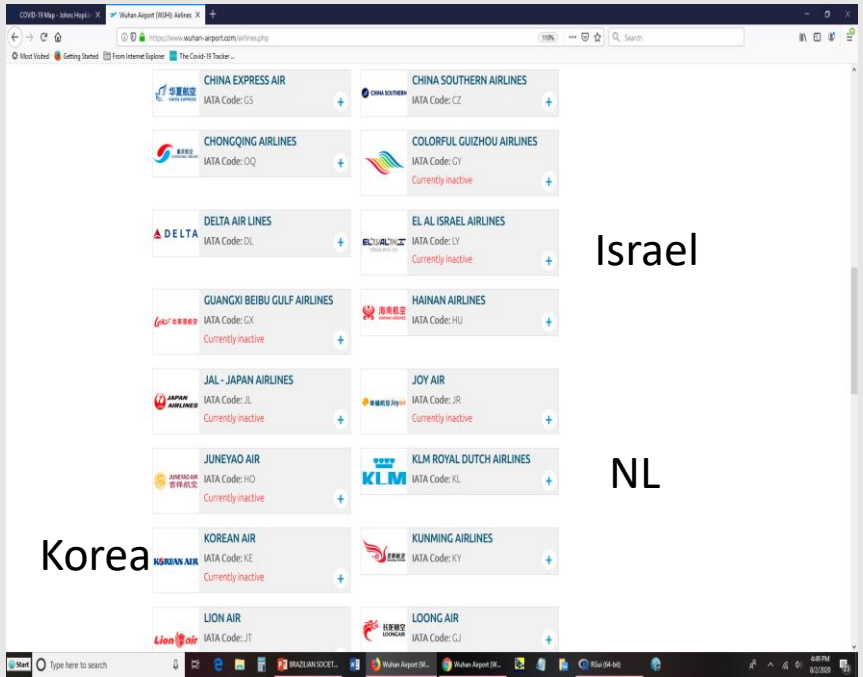
France

N Zealand

Italy

Japan

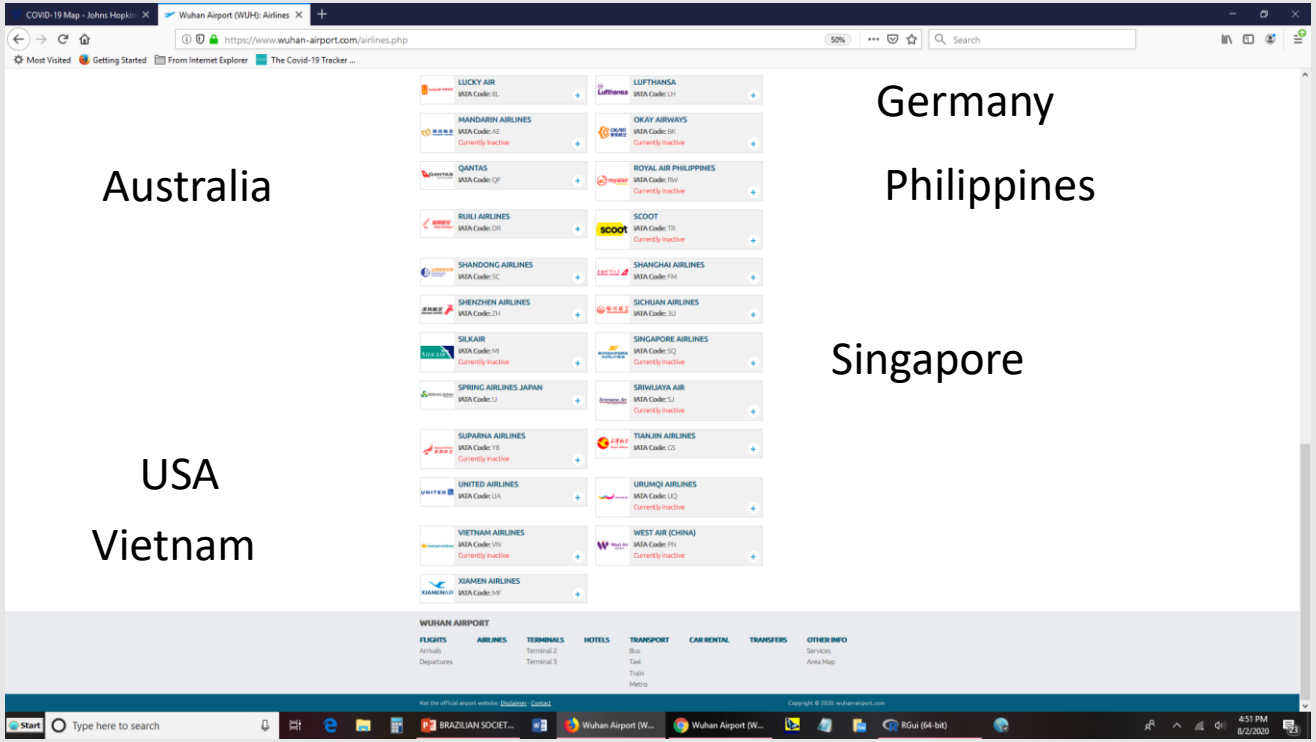
USA



Israel

NL

Korea



Germany

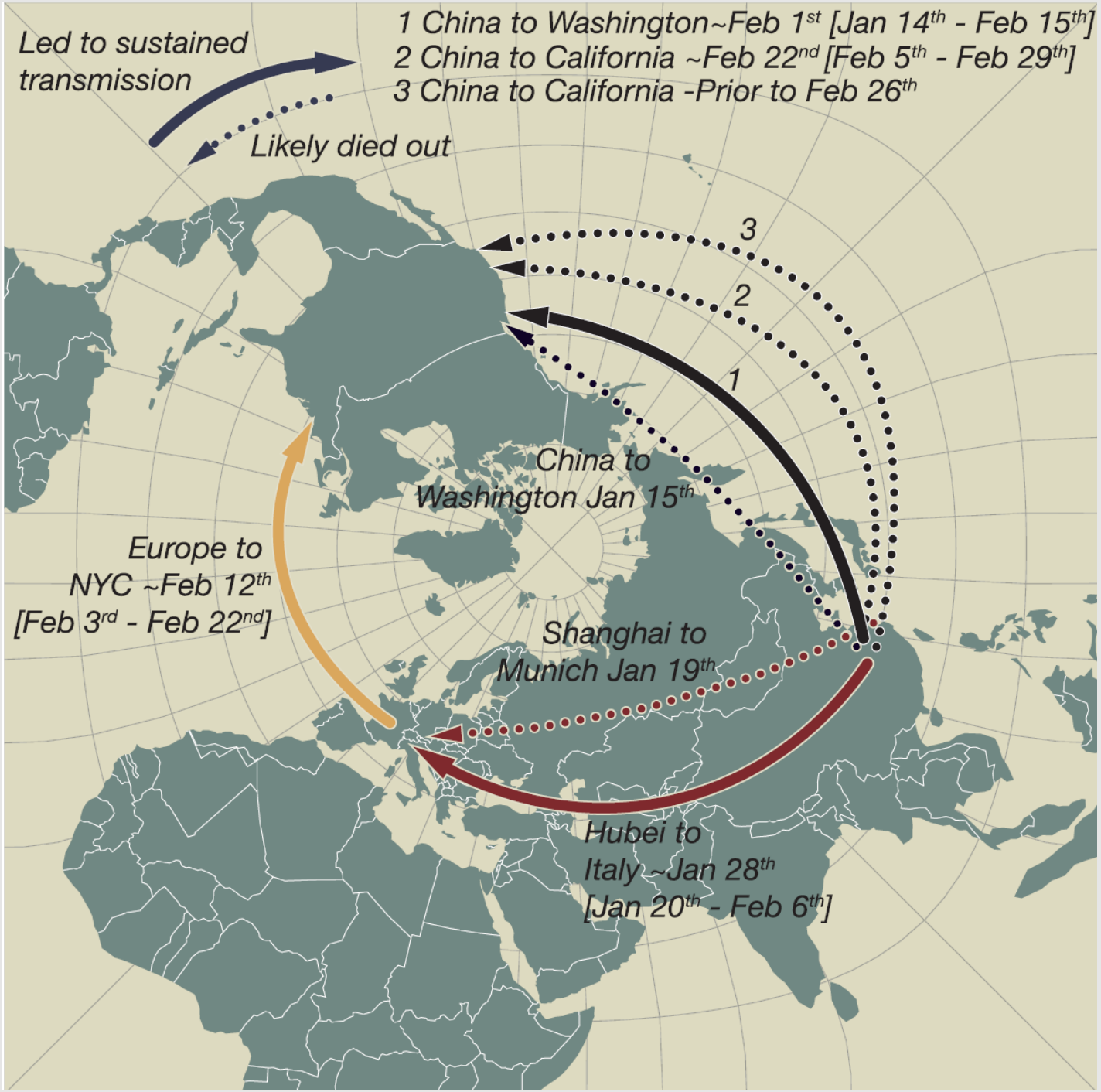
Australia

Philippines

Singapore

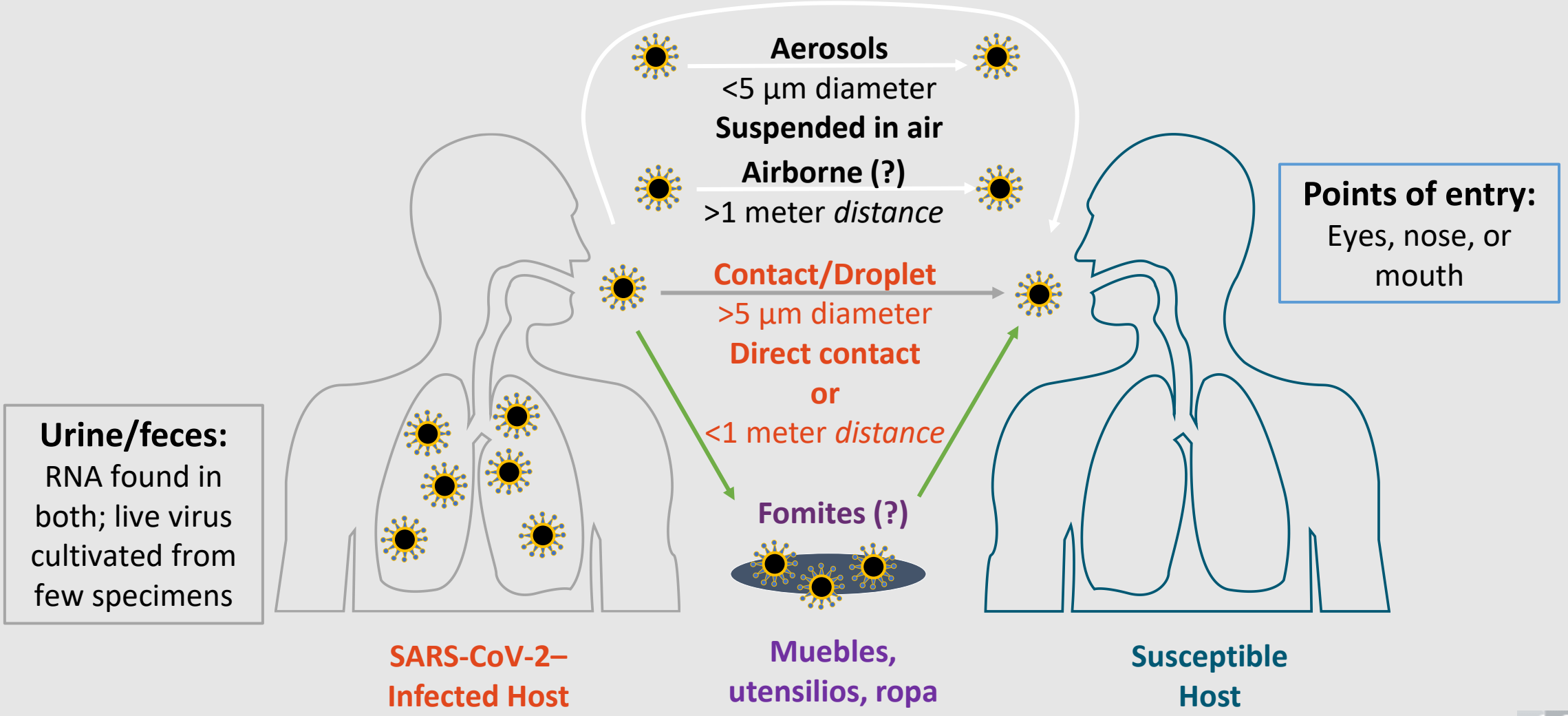
USA

Vietnam



Worobey et al. (2020, Science)

Proposed Routes of SARS-CoV-2 Transmission INCLUDING ASYMPTOMATIC!!!



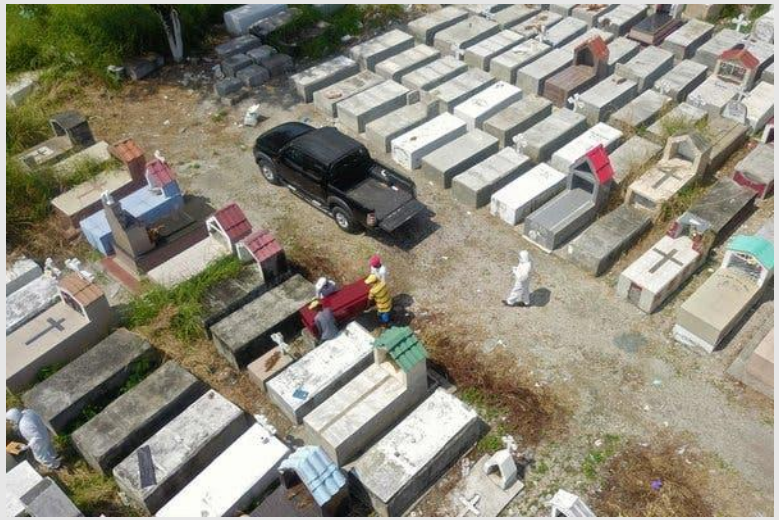
Galbadage. Front Public Health. 2020;8:163. WHO. Scientific Brief. July 9, 2020.

Slide credit: clinicaloptions.com

Wuhan: hospital de emergencia, hecho en <20 dias

Espana

Bergamo, Italia



Guayaquil, Ecuador

India

Sud-Africa

PRIMER CASO:
MARZO 13 2020

Que podria ocurrir en Uruguay
y que instrumentos se poseian?
(o no…)

- HITO: GOBIERNO DE URUGUAY SE APOYA EN LA CIENCIA
- TEORIA EPIDEMIOLOGICA
- INTERVENCIONES NO-FARMACOLOGICAS
- *“TETRIS”:* TESTING-TRACING-ISOLATION
- TRATAMIENTOS (TEMA PARA MEDICOS)
- VACUNAS
- LA ERA DE BIG DATA
- INFORMACION/DESINFORMACION
- CIENCIA Y ECONOMIA

GRUPO ASESOR CIENTÍFICO HONORARIO

Dr. Rafael Radi
Dr. Henry Cohen
Dr. Fernando Paganini

ABRIL 16, 2020

Uruguay
Presidencia

JUNIO 16, 2021

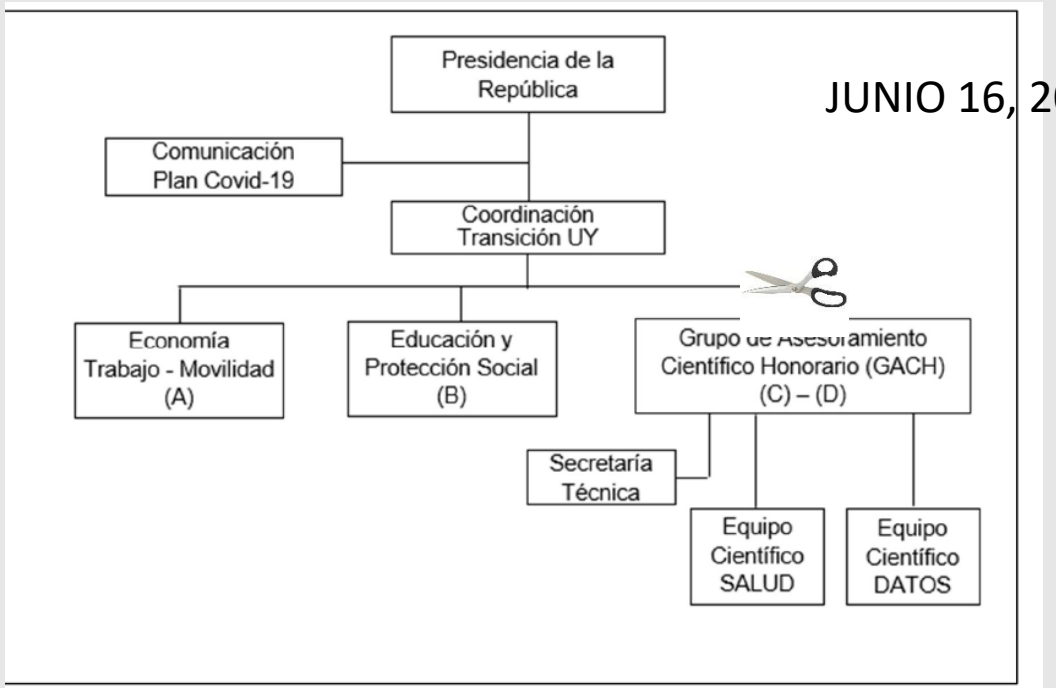
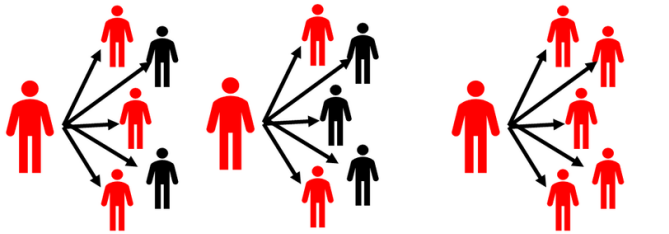


Diagrama 1. Estructura de funcionamiento GACH.

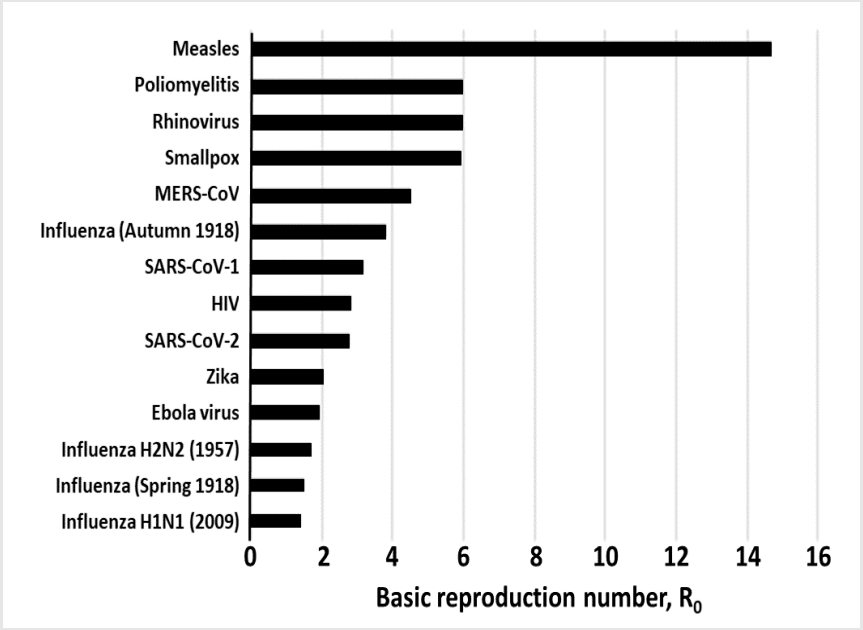
1. ELEMENTOS DE DE EPIDEMIOLOGIA

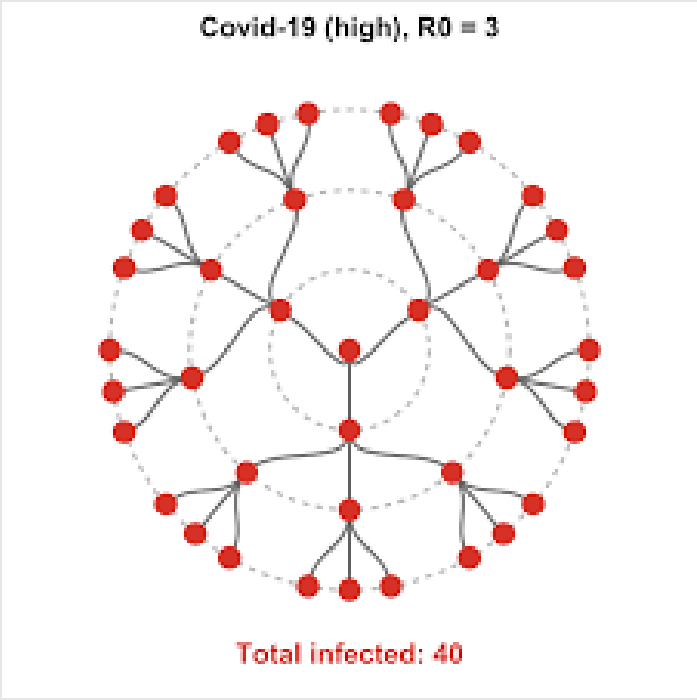
R= Average number of infected per infector

Basic Reproduction Number (R0) = Attack Rate * Contacts



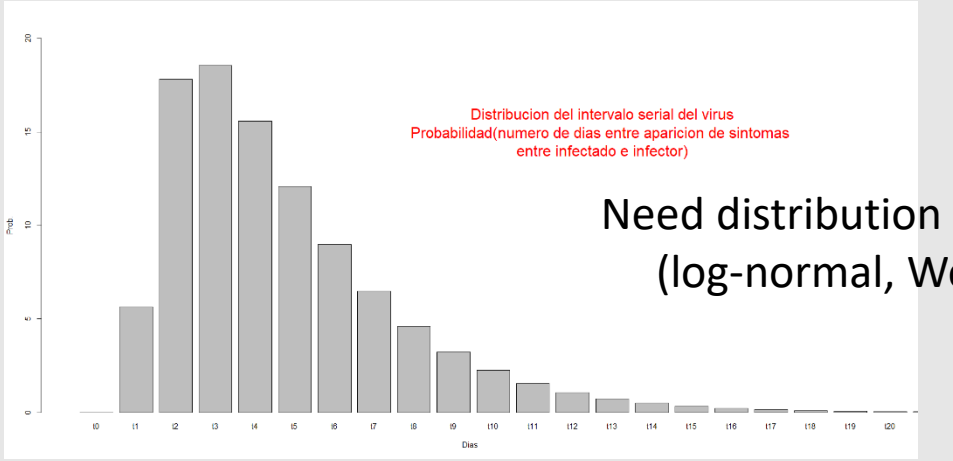
AR = 60% R0 = 3 | AR = 40% R0 = 2 | AR = 100% R0 = 5





$$
\begin{array}{lccccccc}
N_0 & . & . & . & . & . & . & . \\
N_1 = & X_{01} & . & . & . & . & . & . \\
N_2 = & X_{02} & X_{12} & . & . & . & . & . \\
N_3 = & X_{03} & X_{13} & X_{23} & . & . & . & . \\
N_4 = & . & X_{14} & X_{24} & X_{34} & . & . & . \\
N_5 = & . & . & X_{25} & X_{35} & X_{45} & . & . \\
N_6 = & . & . & . & X_{36} & X_{46} & X_{56} & . \\
 & . & . & . & . & X_{47} & X_{57} & X_{67}
\end{array}
$$

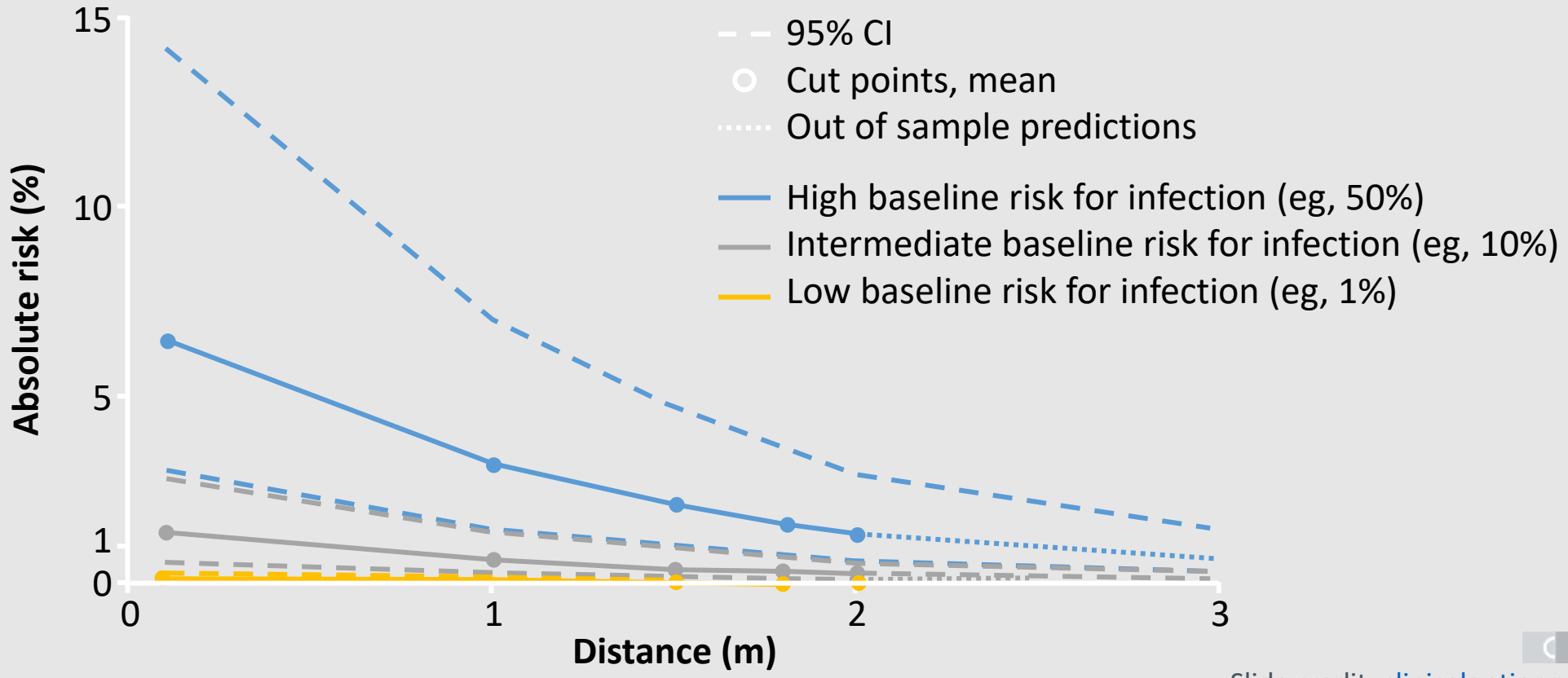
Infections appear over time



Need distribution over time (log-normal, Weibull)

2.1 INTERVENCIONES: DISTANCIA FISICA Y TRANSMISION

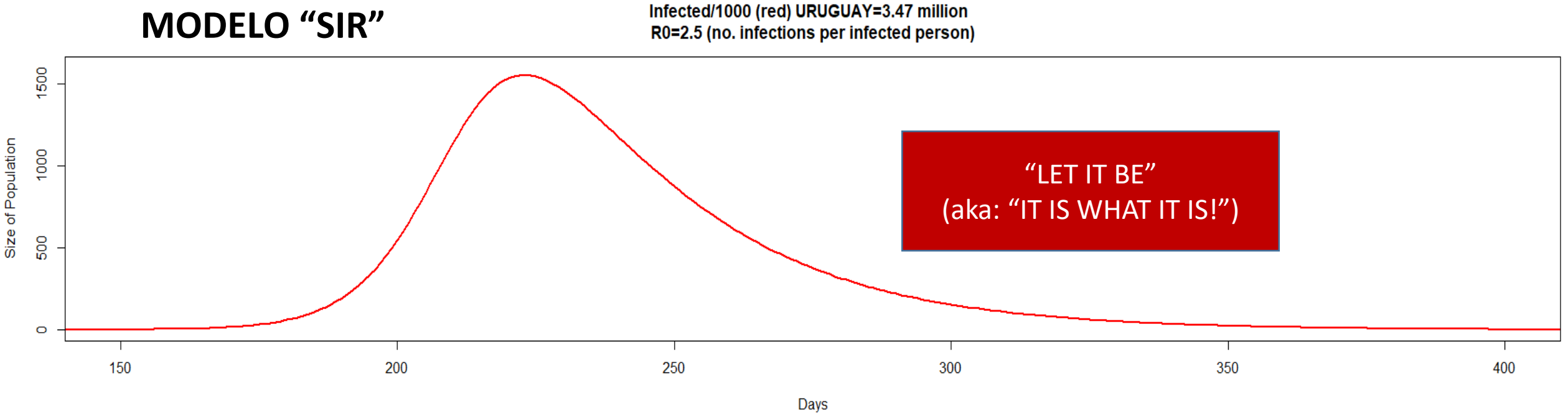
- Meta-analysis of data: 172 studies investigating the spread of SARS-CoV-2, SARS, and MERS (n = 10,736)

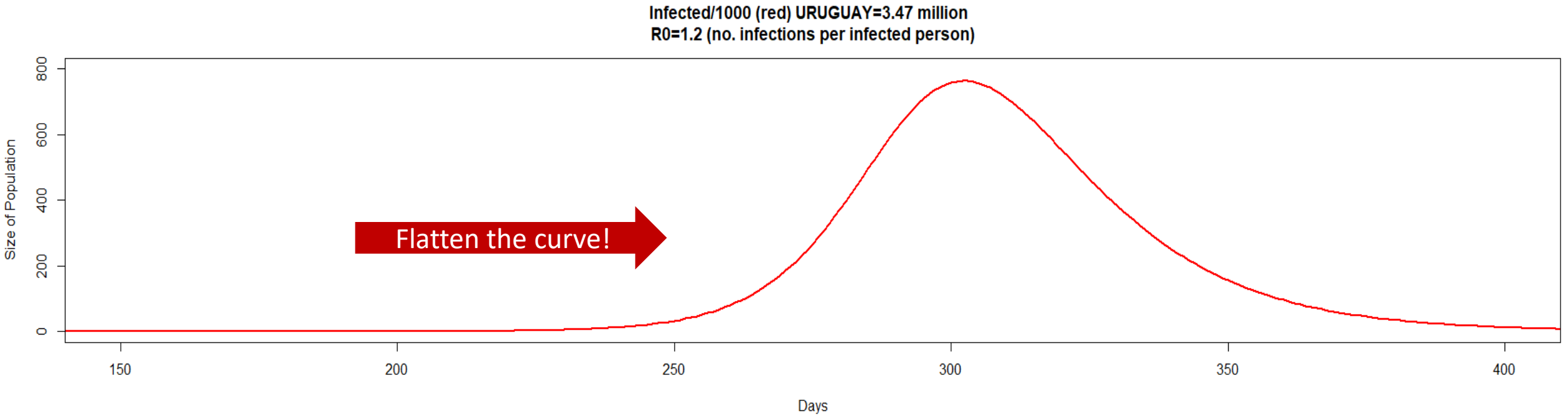


Chu. Lancet. 2020;395:1973.

Slide credit: clinicaloptions.com

MODELO “SIR”


Infected/1000 (red) URUGUAY=3.47 million
R0=2.5 (no. infections per infected person)
Size of Population
0
500
1000
1500
150
200
250
300
350
400
Days
“LET IT BE”
(aka: “IT IS WHAT IT IS!”)


Infected/1000 (red) URUGUAY=3.47 million
R0=1.2 (no. infections per infected person)
Size of Population
0
200
400
600
800
150
200
250
300
350
400
Days
Flatten the curve!

SIMULACION DIST. SOCIAL DINAMICO (MENOR DISTANCIAMIENTO CUANTO MAS BAJA LA TASA DE INFECCION)

➔ **NUMERO MAXIMO DE MUERTES (365 dias de epidemia)**
➔ **25 VALORES DE R0 (diferentes tasas de infeccion/recuperacion)**
➔ **SUPUESTO: TASA de MORTALIDAD= 1% DE INFECTADOS**
➔ **(CONTEXTO: en URUGUAY morian ~ 3200/anualmente)**

- Sin distanciamiento, entre 4114 y 16222.
- Con distanciamiento, entre 3601 y 13099

Intervención evitaria 513 -3122 fallecimientos.

SIN DISTANCIAMIENTO (MUERTES)

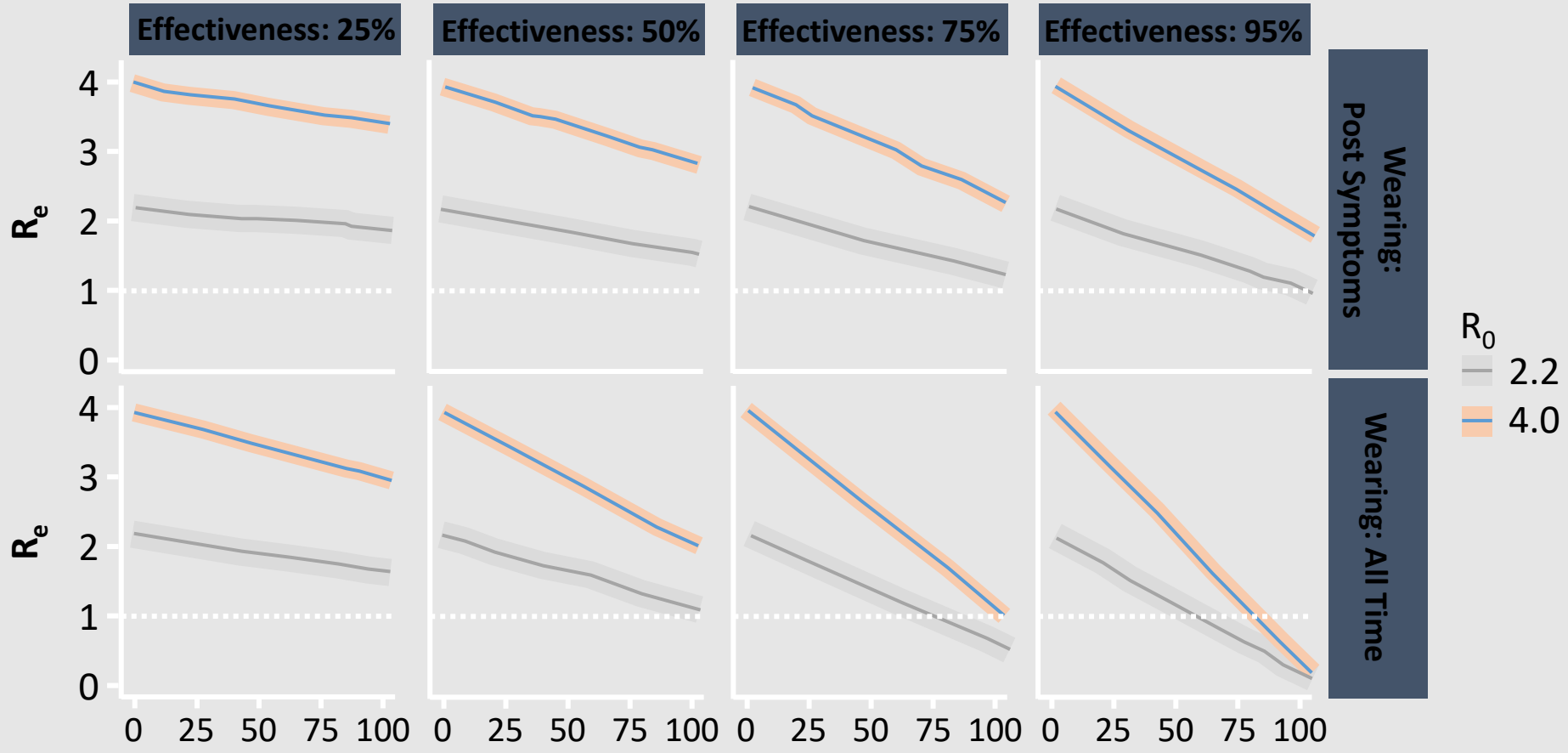
	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	8362	7115	5999	5000	4114
[2,]	10833	9575	8415	7359	6397
[3,]	12932	11689	10537	9455	8475
[4,]	14716	13511	12368	11317	10330
[5,]	16222	15059	13962	12944	11980

DISTANCIAMIENTO (MUERTES)

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	7026	6040	5144	4331	3601
[2,]	8957	7978	7072	6236	5462
[3,]	10577	9620	8729	7890	7117
[4,]	11945	11024	10144	9337	8568
[5,]	13099	12215	11372	10588	9846

2.2 Mascarillas y dinamica de transmision

- Simulations; reduction in transmission on the R_e (expected number of new cases caused by a single infectious person at any given point)



Stutt. Proc Math Phys Eng Sci. 2020;476:20200376.

Slide credit: clinicaloptions.com

2.3 CONFINAMIENTOS

[1]CNR-ISC, Applico Lab, 00185 Rome, Italy. [2]Big Data in Health Society, Rome, Italy. [3]Gubkin Russian State University of Oil and Gas, Moscow, Russia. email: antonio.scala@cnr.it

scientific reports

Check for updates

2021 OPEN

The mathematics of multiple lockdowns

Antonio Scala

While vaccination is the optimal response to an epidemic, recent events have obliged us to explore new strategies for containing worldwide epidemics, like lockdown strategies, where the contacts among the population are strongly reduced in order to slow down the propagation of the infection. By analyzing a classical epidemic model, we explore the impact of lockdown strategies on the evolution of an epidemic. We show that repeated lockdowns have a beneficial effect, reducing the final size of the infection, and that they represent a possible support strategy to vaccination policies.

Studies in Applied Economics

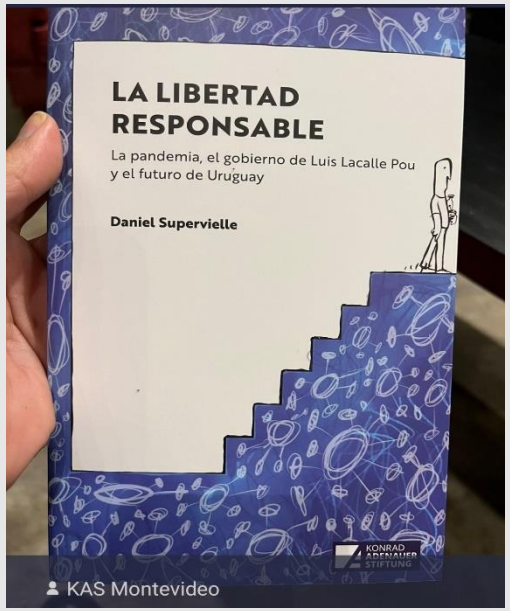
A LITERATURE REVIEW AND META-ANALYSIS OF THE EFFECTS OF LOCKDOWNS ON COVID-19 MORTALITY

Jonas Herby, Lars Jonung, and Steve H. Hanke

Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise

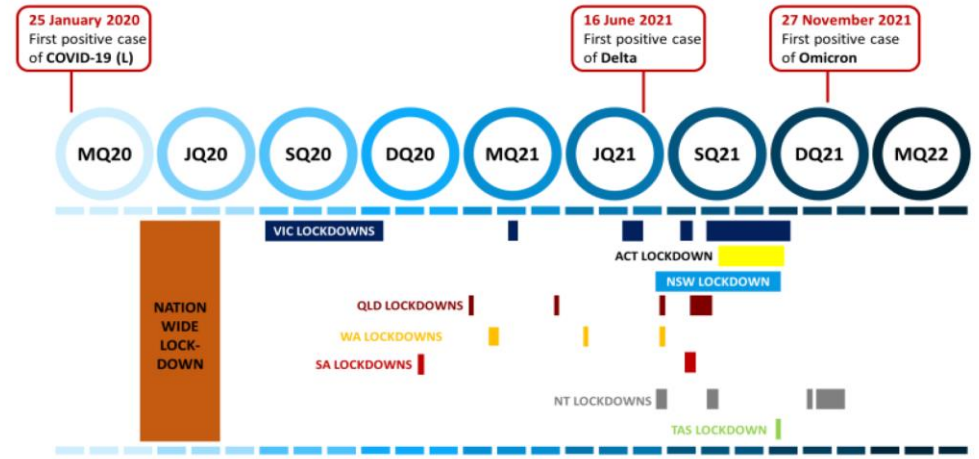
While this meta-analysis concludes that lockdowns have had little to no public health effects, they have imposed enormous economic and social costs where they have been adopted. In consequence, lockdown policies are ill-founded and should be rejected as a pandemic policy instrument.

Uruguay opto por no usar toques de queda o confinamientos



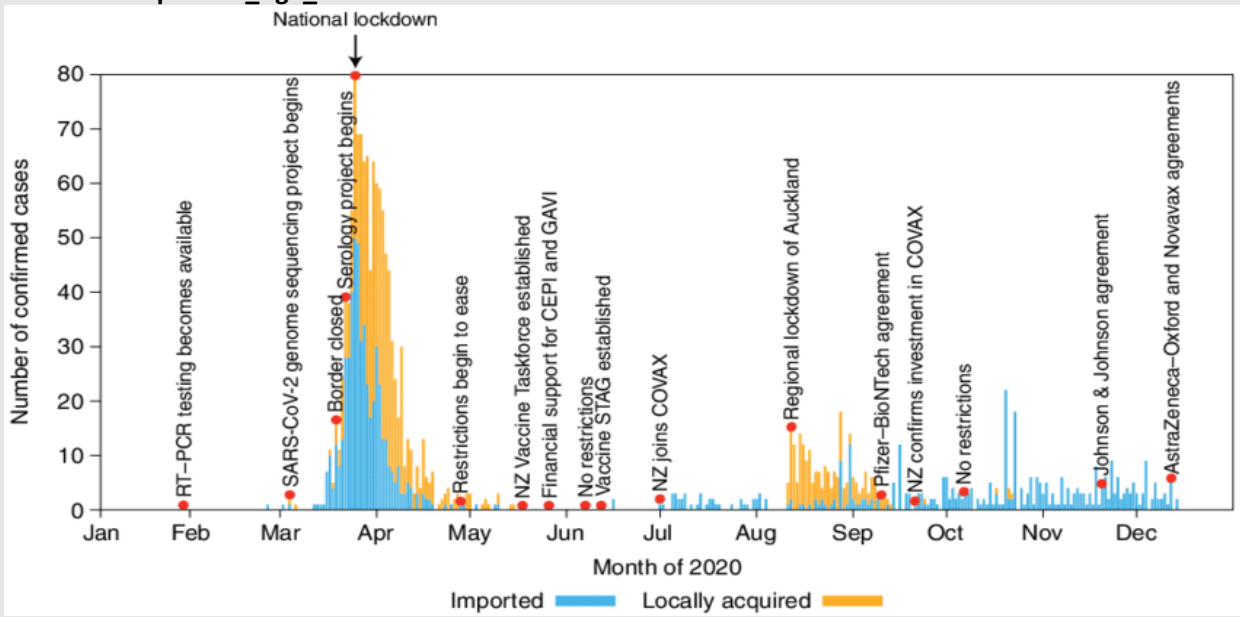
https://www.abs.gov.au/articles/effects-covid-19-strains-australian-economy

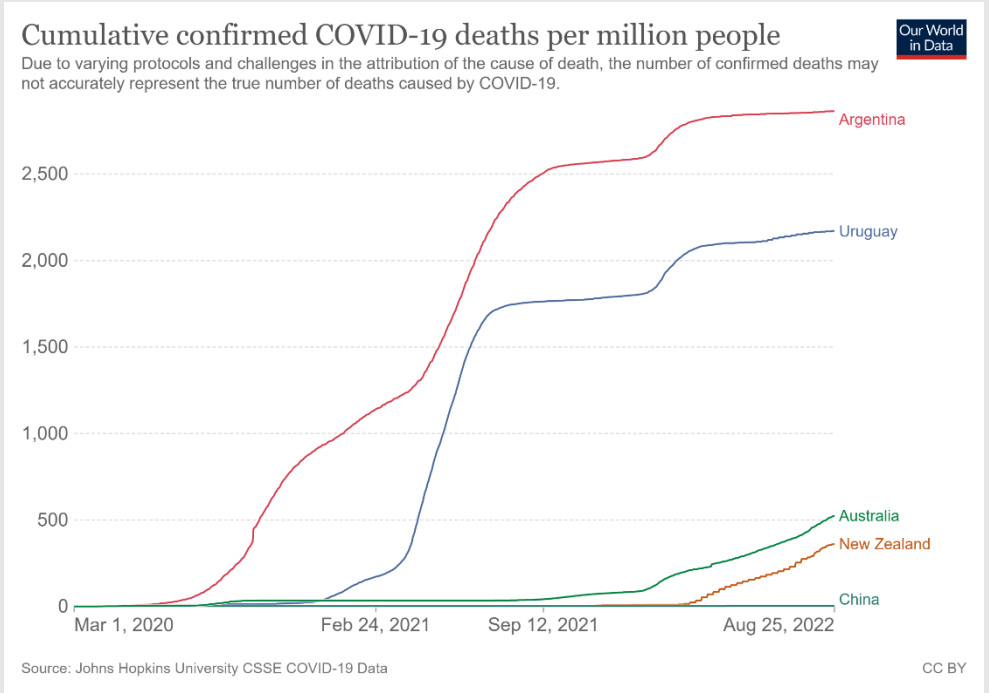
Figure 1: Timeline of COVID-19 strains in Australia and subsequent lockdowns

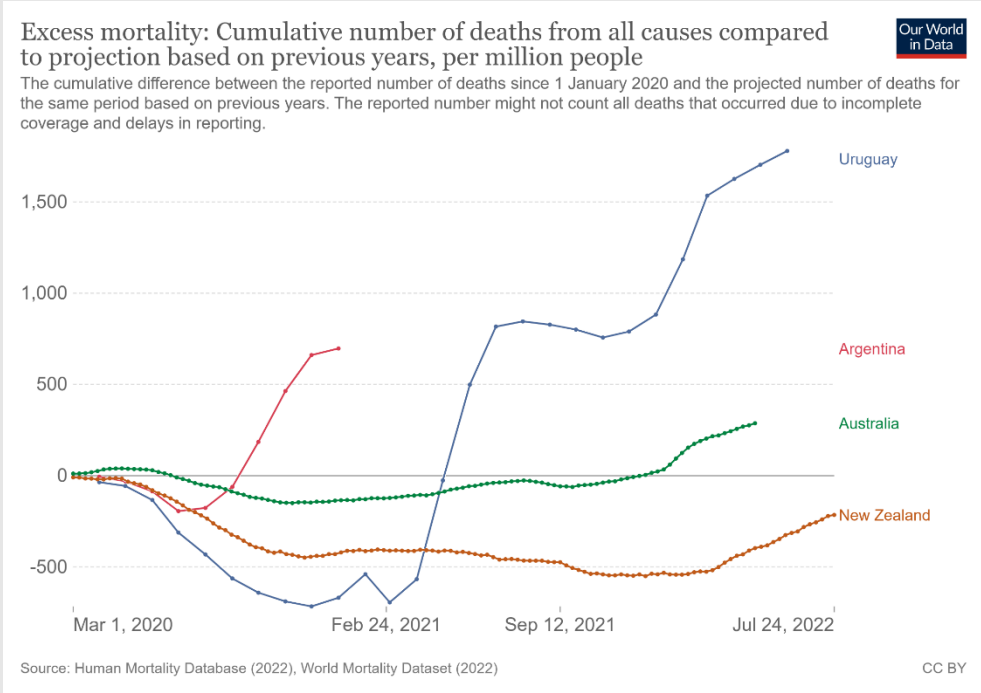


Note: the lockdowns shown in the above timeline are for metropolitan areas only.

https://www.researchgate.net/figure/Timeline-of-the-New-Zealand-governments-pandemic-control-measures-and-their-impact-on_fig1_349577869







3. VACUNAS

Name	Technology	Amount
Johnson & Johnson (Janssen Pharmaceutical)[31][32][33]	Non-replicating viral vector	$1 billion
AstraZeneca–University of Oxford[37] and Vaccitech[38]	Modified chimpanzee adenovirus viral vector	$1.2 billion
Moderna[29][30]	mRNA	$1.53 billion
Novavax[43][44][45]	SARS-CoV-2 recombinant spike protein nanoparticle with adjuvant	$1.6 billion for advance commercial-scale manufacturing
Merck and IAVI	Antiviral drug research and immune response therapy[46]	$38 million
Sanofi and GlaxoSmithKline[47]	Protein (insect cell lines) with adjuvant	$2.1 billion

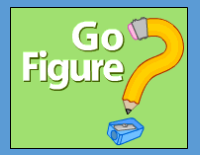
OPERACION "WARP SPEED": Mayo 15 2020 (Trump)
~USD 19 000 000 000

Y Pfizer/BioNTech?

-Enero 2020: Alemania otorga USD 445 m a BioNTech
-Pfizer anuncia "no participacion para "liberar a los cientificos de la burocracia".
-Pfizer anuncia que los anuncios fueron tomados "fuera de contexto".
-Despues de venderle 300 millones de dosis a Uncle Sam, Pfizer anuncia:

"Estamos orgullosos de haber participado en WARP SPEED como proveedores."

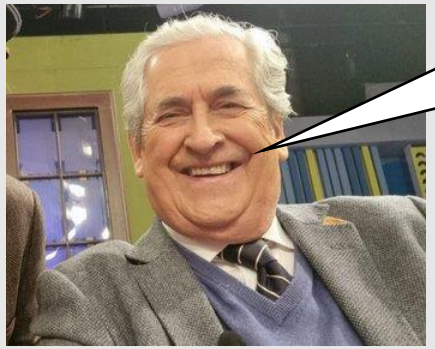
-



Coronavirus Vaccine Tracker

By Carl Zimmer, Jonathan Corum, Sui-Lee Wee and Matthew Kristoffersen Updated Aug. 26, 2022

PHASE 1	PHASE 1/2	PHASE 2	PHASE 2/3	PHASE 3	AUTHORIZED	APPROVED	ABANDONED
36	18	17	10	42	21	12	17
Vaccines testing safety and dosage	*Combined trials*	Vaccines in expanded safety trials	*Combined trials*	Vaccines in large-scale efficacy tests	Vaccines in early or limited use	Vaccines approved for full use	Vaccines abandoned after trials



"The plane, the plane

CONNIE HUGHES

Leading vaccines

Developer	How It Works	Phase	Status
Pfizer-BioNTech	mRNA	3	Approved in U.S., other countries. Emergency use in many countries.

Covid-19 Vaccine Tracker: Latest Updates - The New York Times

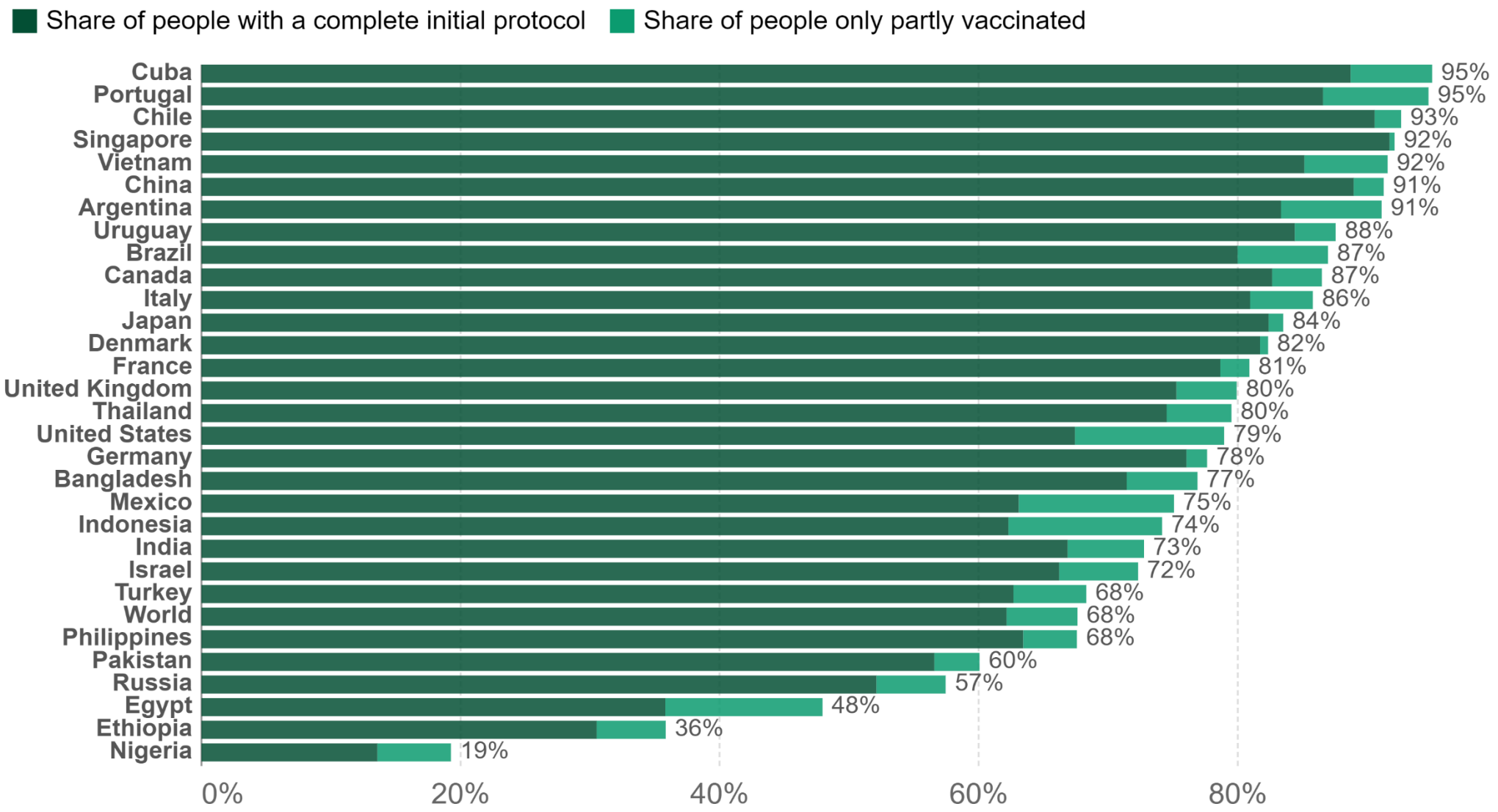
Sinopharm	Inactivated	3	Approved in China, Bahrain. Emergency use in many countries.
Oxford-AstraZeneca	ChAdOx1	2 3	Approved in Brazil, India. Emergency use in many countries.
Sinovac	Inactivated	3	Approved in China. Emergency use in many countries.
Moderna	mRNA	3	Approved in U.S., Canada, Switzerland. Emergency use in many countries.
Novavax	Protein	3	Approved in Canada, South Korea. Emergency use in several countries.
Bharat Biotech	Inactivated	3	Approved in India. Emergency use in other countries.
Johnson & Johnson	Ad26	3	Approved in Canada. Limited in U.S. Emergency use in many countries.
Baylor-Biological E	Protein	3	Emergency use in India, Botswana.
Gamaleya	Ad26, Ad5	3	Approved in Russia. Emergency use in many countries.

1ero de MARZO 2021
URUGUAY LANZA SU
BLITZKRIEG VACUNATORIO!!!!!

疫苗接種運動
Yìmiáo jiēzhǒng yùndòng

Share of people vaccinated against COVID-19, Aug 26, 2022

Our World in Data



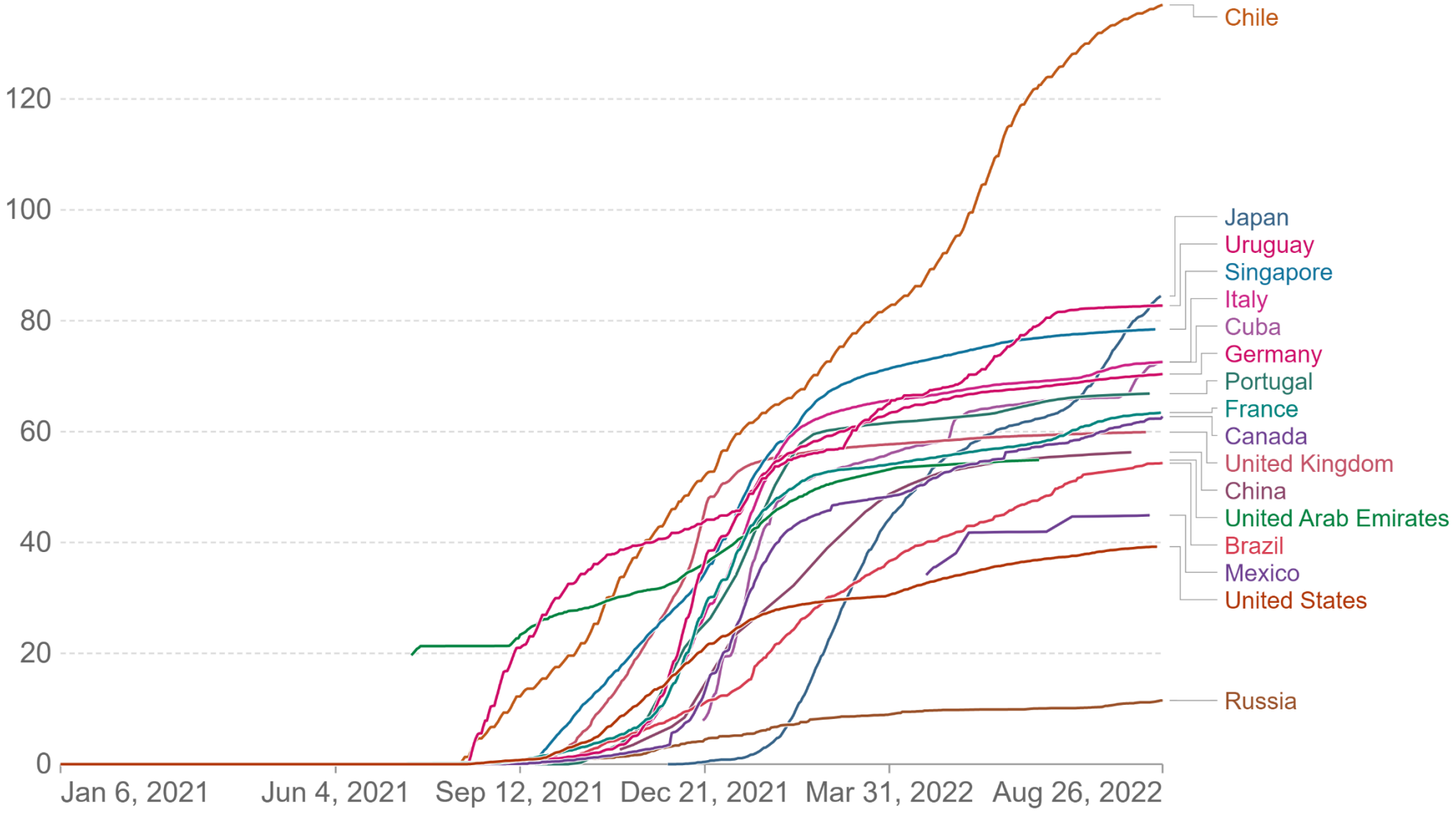
Source: Official data collated by Our World in Data

Note: Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries.

COVID-19 vaccine boosters administered per 100 people

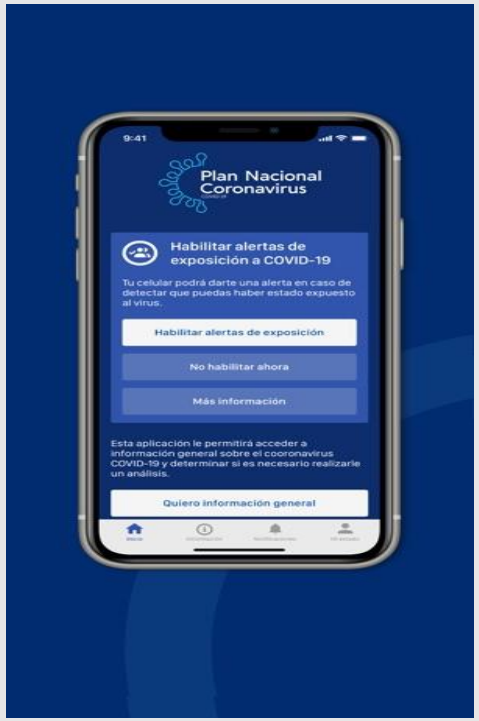
Total number of vaccine booster doses administered, divided by the total population of the country. Booster doses are doses administered beyond those prescribed by the original vaccination protocol.

Our World in Data



Source: Official data collated by Our World in Data

4. CIENCIA DE DATOS



scientific reports

Check for updates

OPEN

2022

Decoupling between SARS-CoV-2 transmissibility and population mobility associated with increasing immunity from vaccination and infection in South America

Marcelo Fiori[1✉], Gonzalo Bello[2], Nicolás Wschebor[3], Federico Lecumberry[4], Andrés Ferragut[5] & Ernesto Mordecki[6]

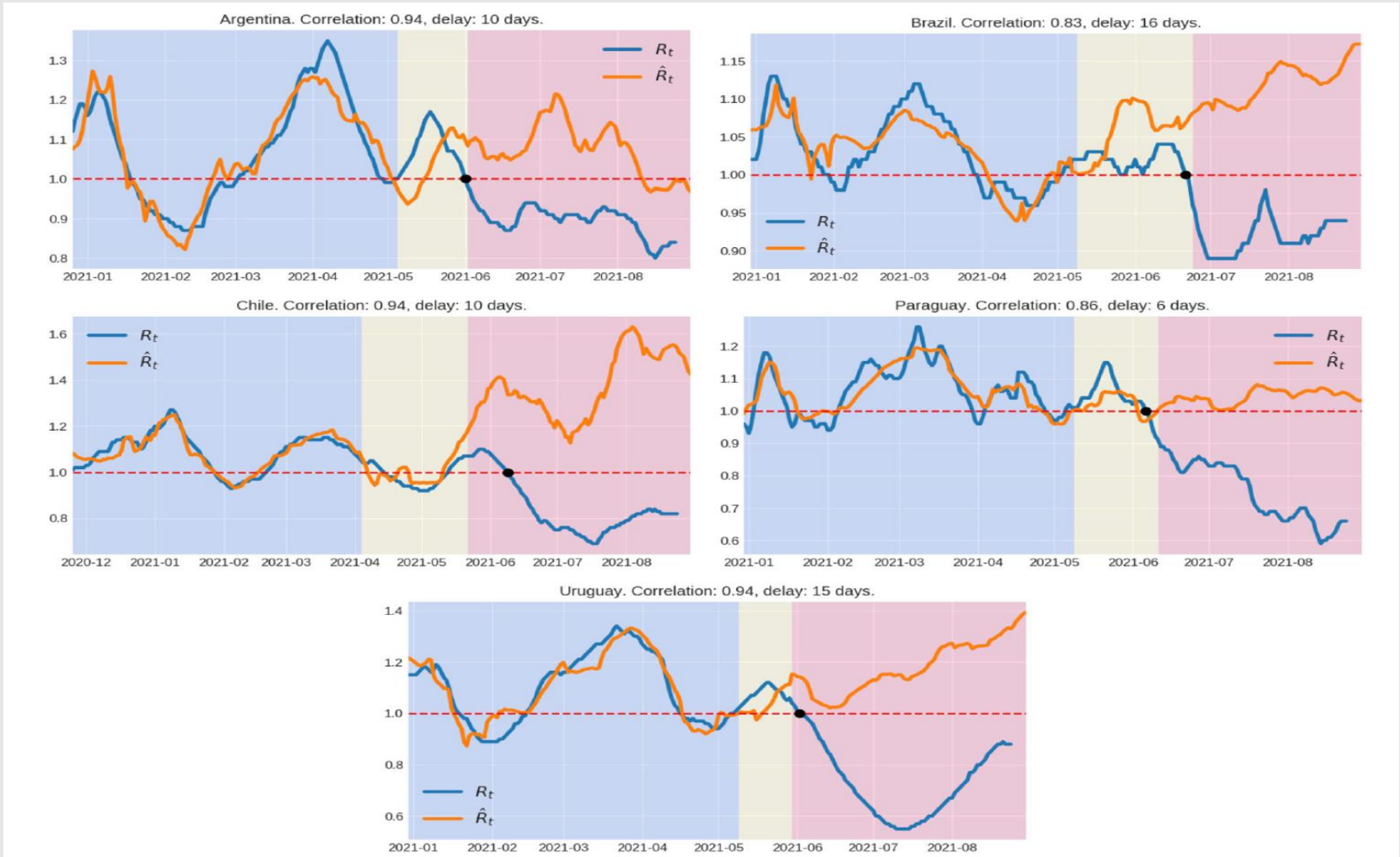
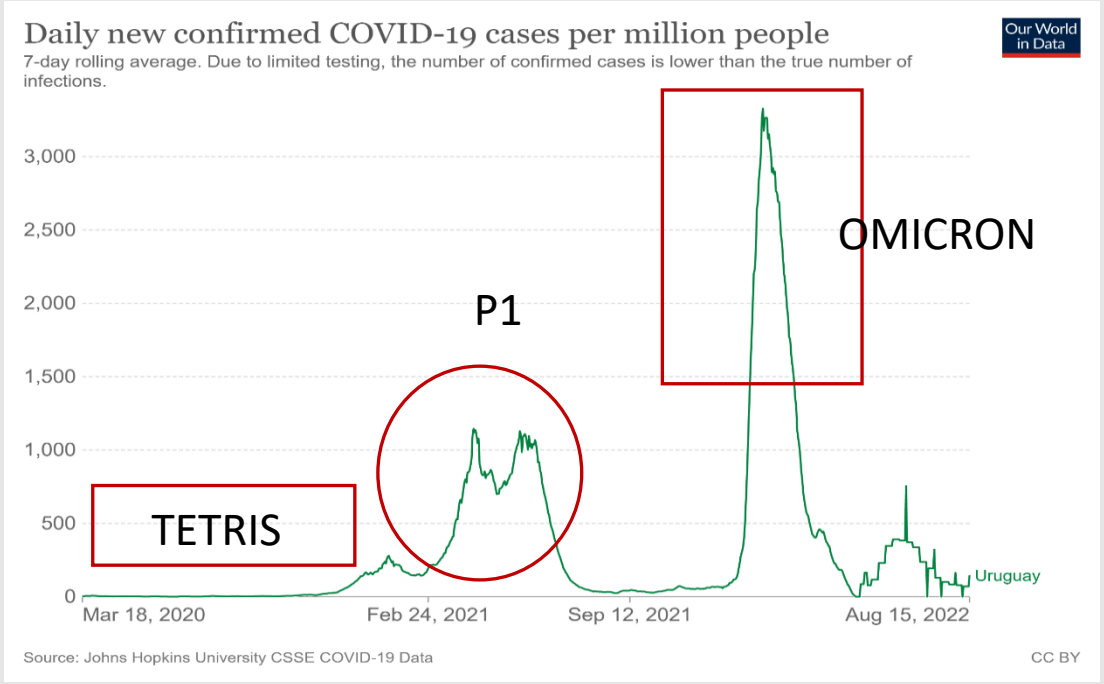
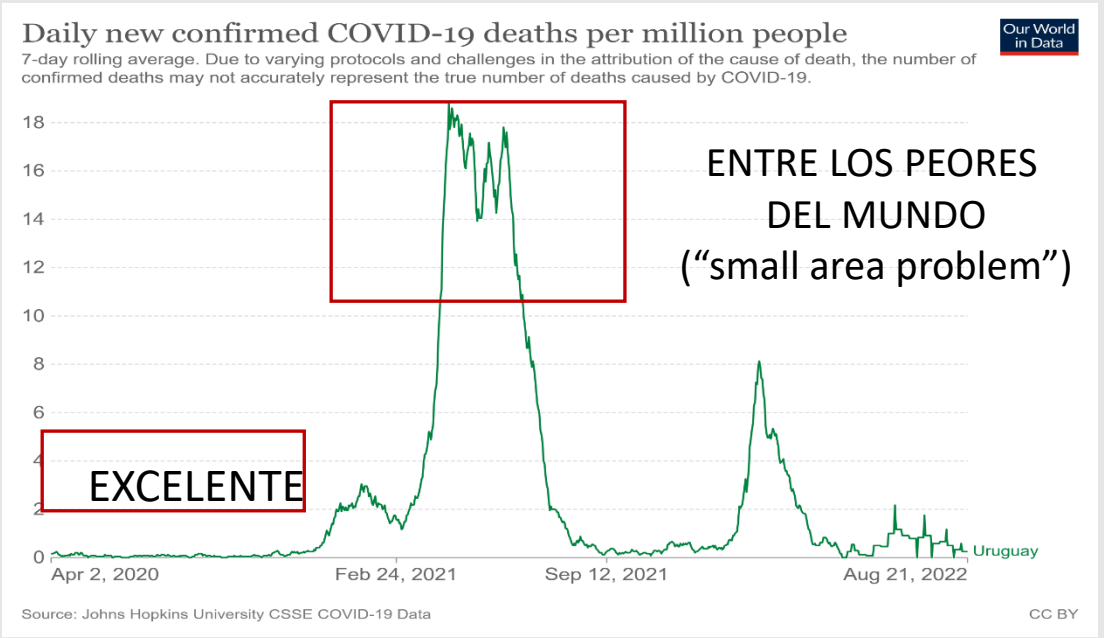
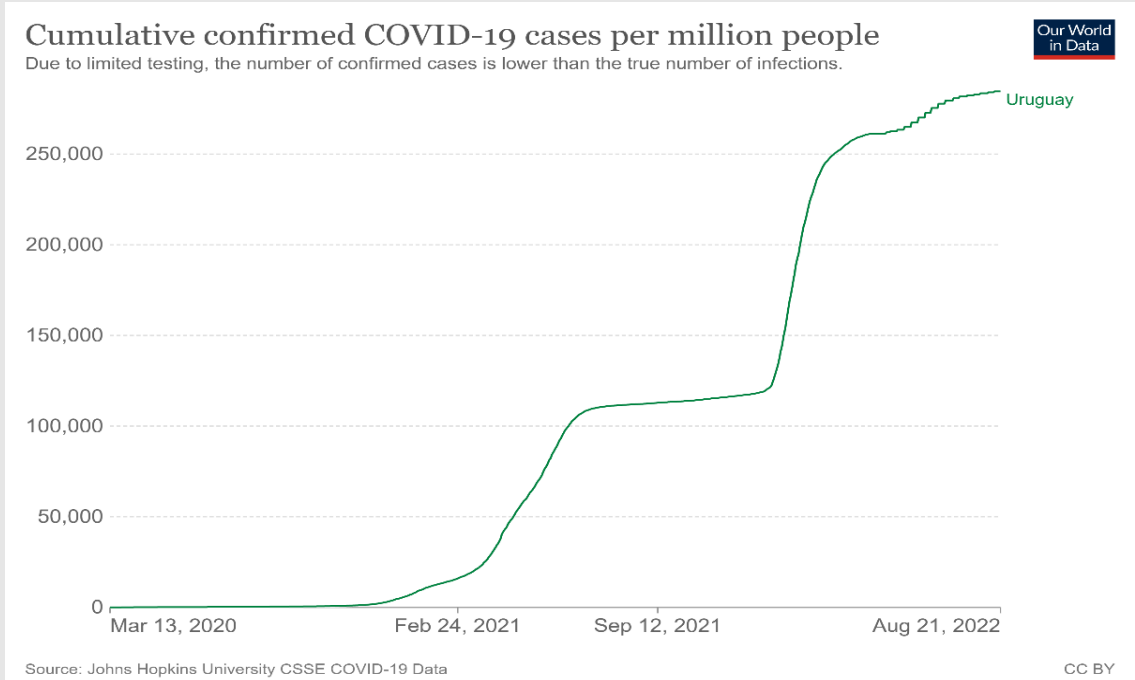


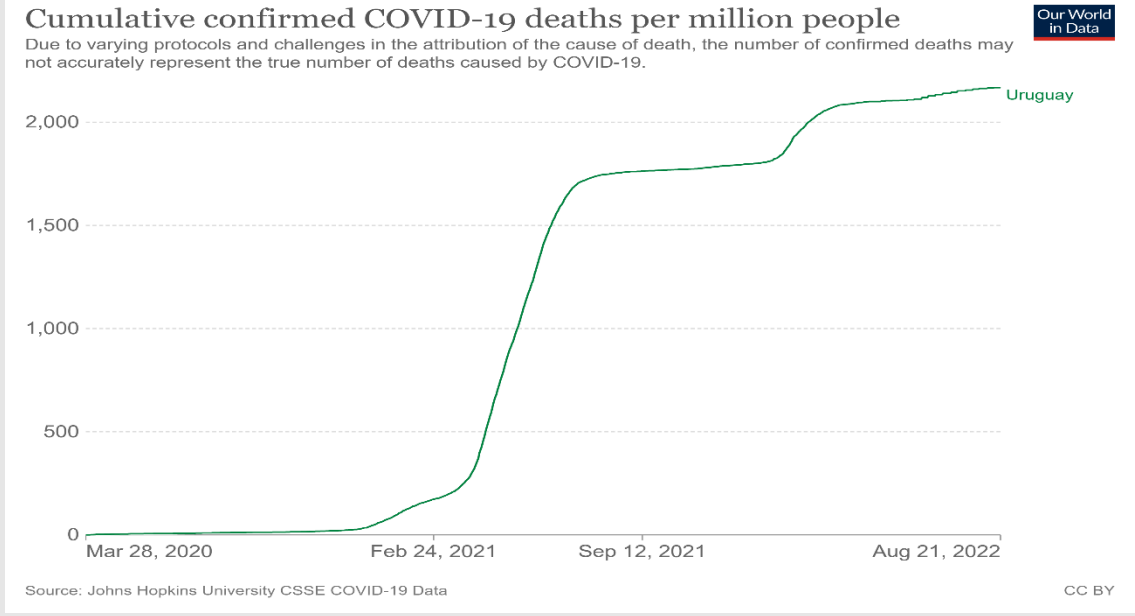
Figure 1. Temporal variation of viral effective reproduction number estimated from daily SARS-CoV-2 incidence data (R_t) and population mobility data ($\hat{R}_t$). Background colors indicate the following time periods: in blue, the time period used to fit the linear model (see "Estimation of the viral effective reproduction number and decoupling time" section), in yellow, the period after the fitting, but before the decoupling time, and in red after the decoupling point. The black dot corresponds to the last time the R_t was above one. The correlation corresponds to the period used to fit the model. The delay indicated is the time-shift between $\hat{R}_t$ and R_t in order to maximize their correlation in the linear regression.

URUGUAY: EVOLUCION DE LA EPIDEMIA





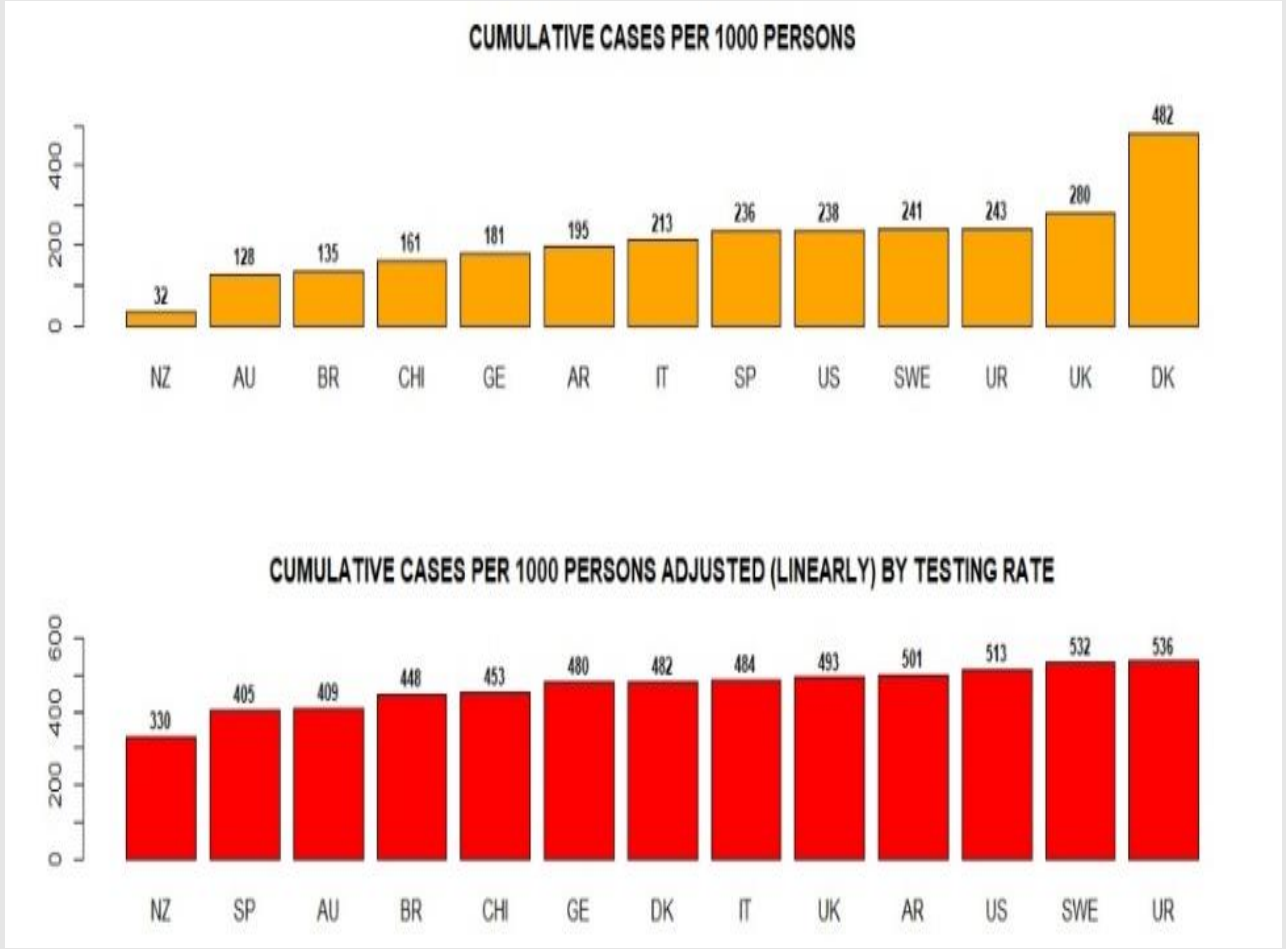




Mediados del 2022

El huevo o la gallina?

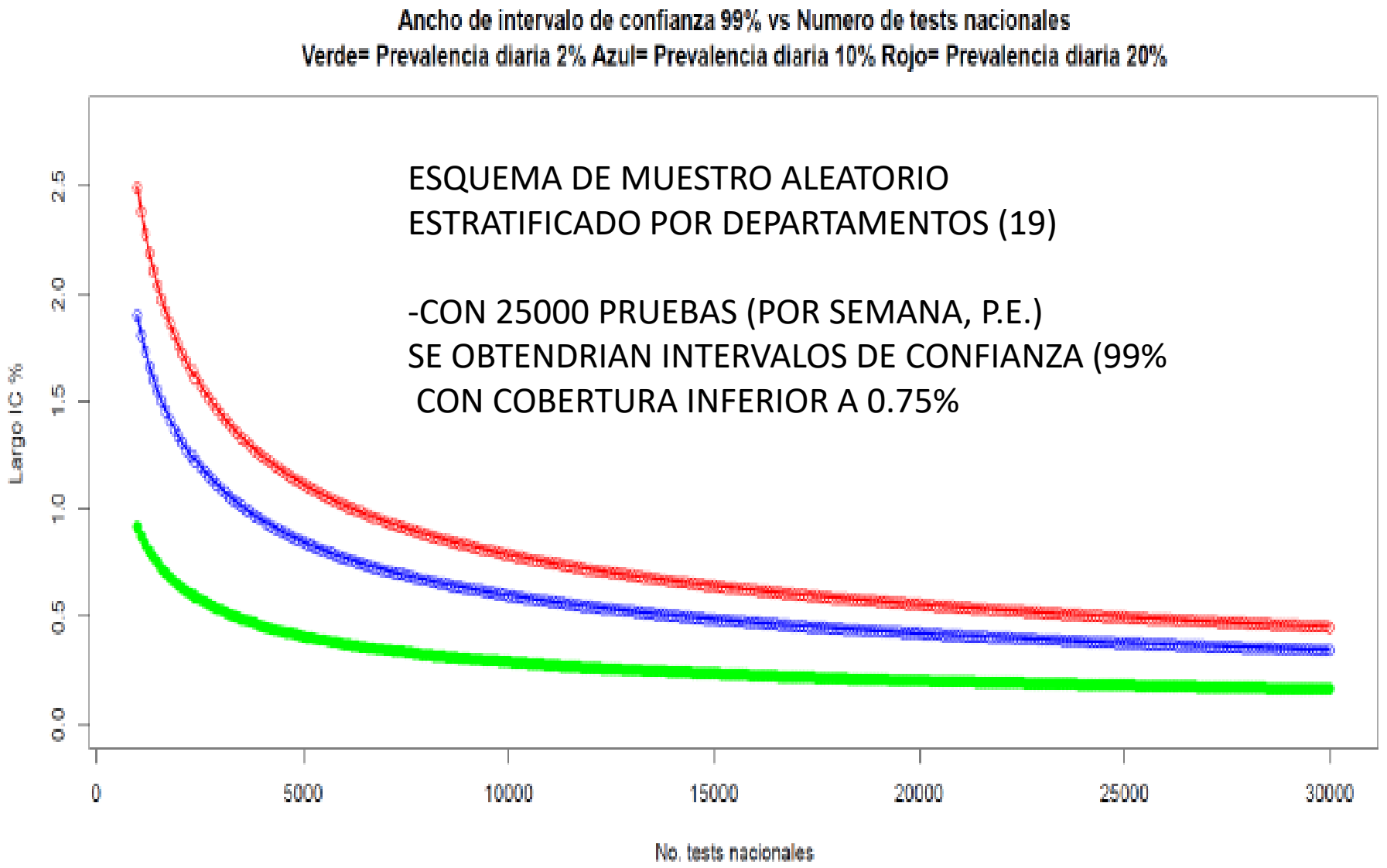
CASOS➔TESTS
TESTS➔ CASOS

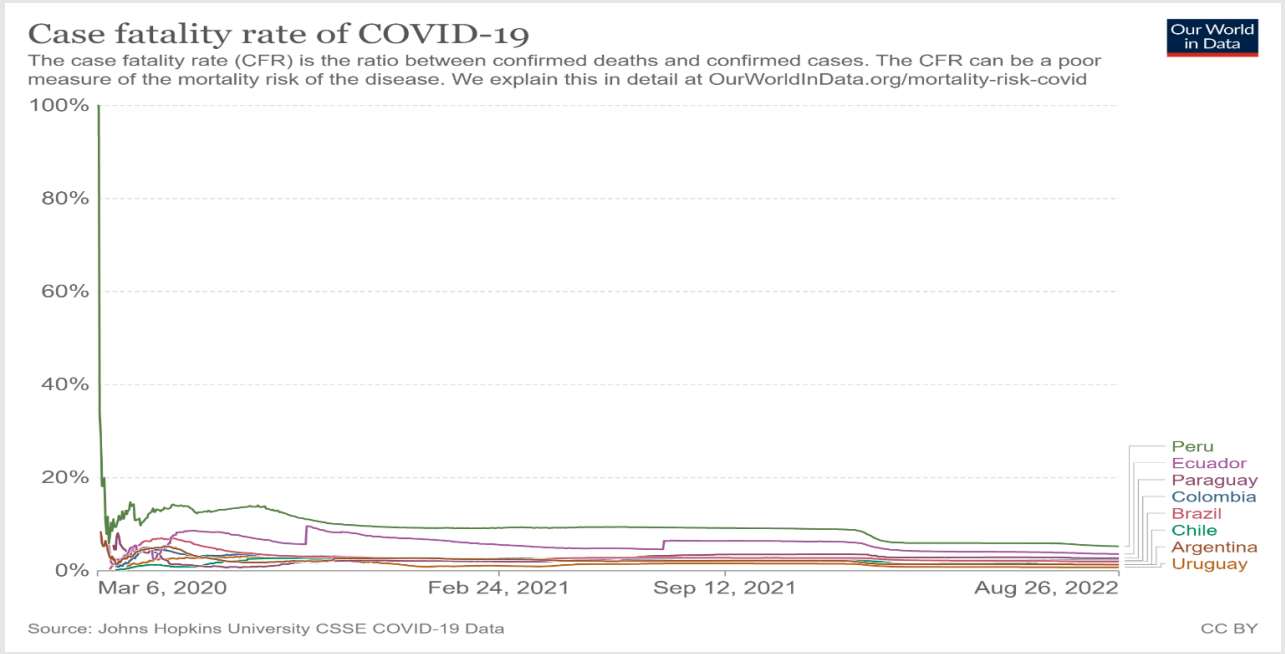


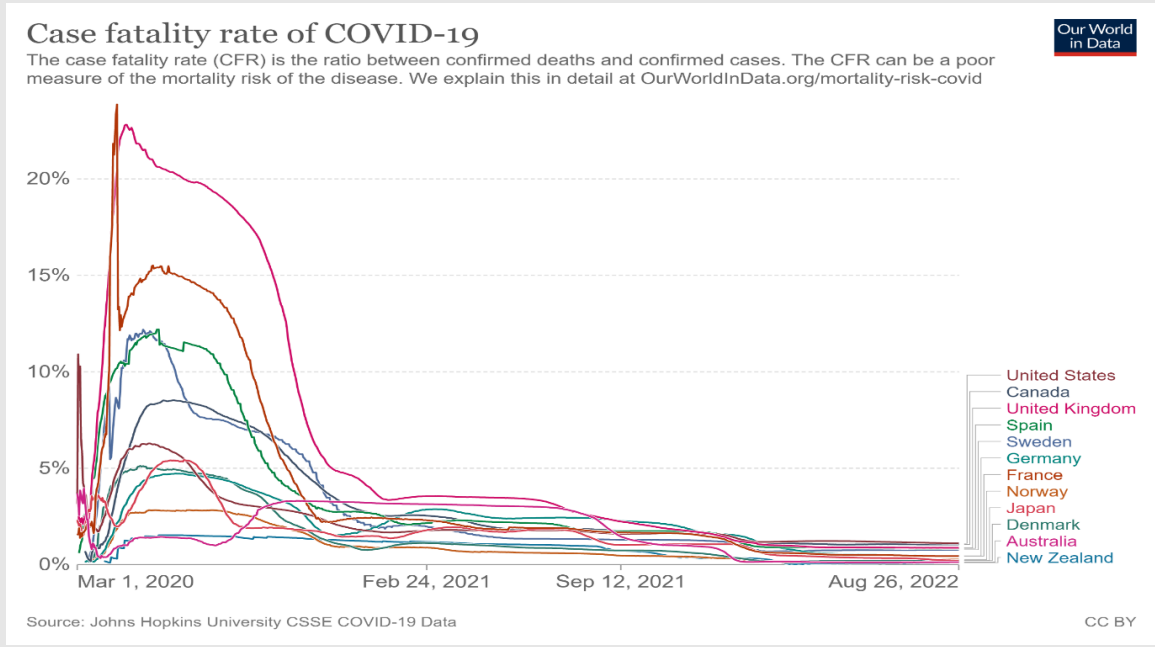
Top: Cumulative COVID-19 cases for 13 countries per million persons.
Bottom: Unadjusted and adjusted cases using Denmark (DK) as base.
Example: Adjusted Uruguay (UR)=Cases UR-14.7(Test rate UR-Test Rate DK).

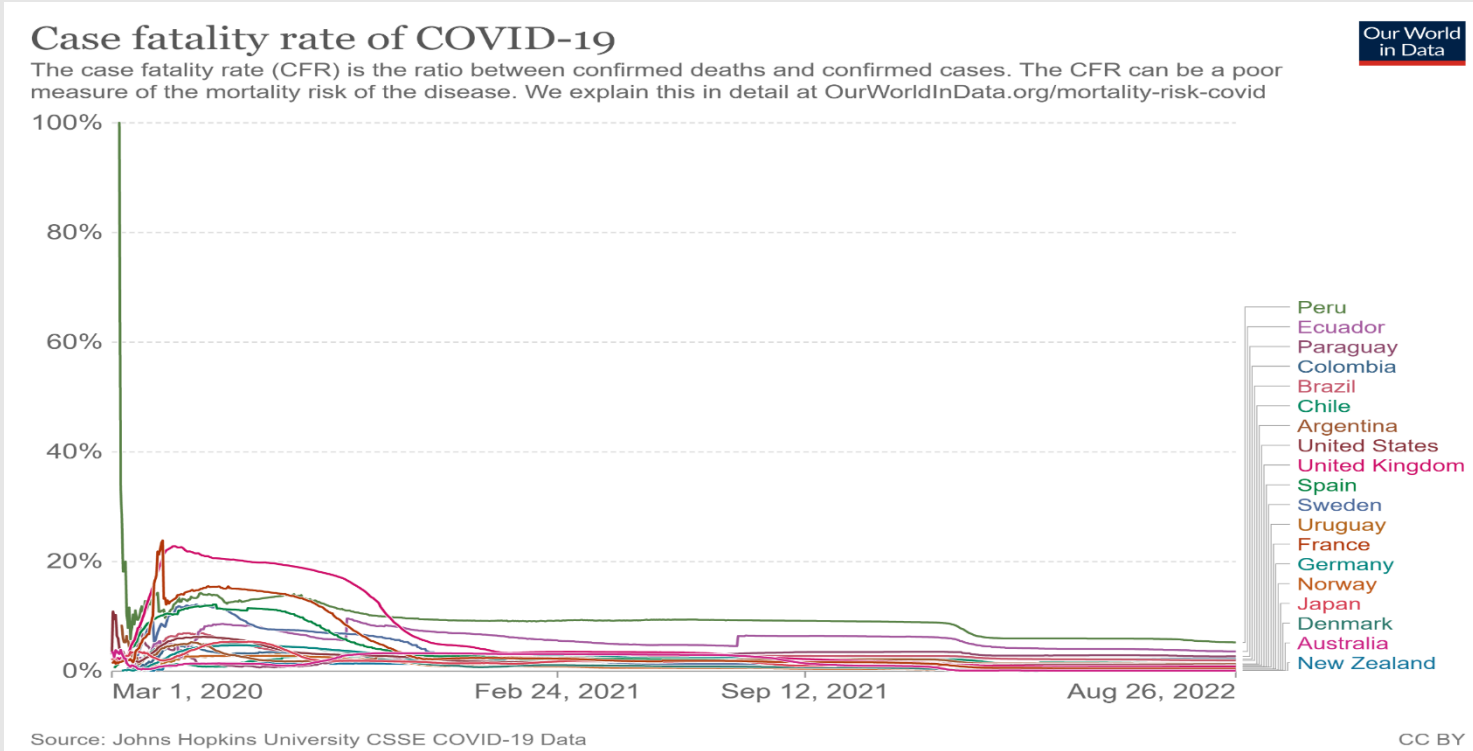
$$Adj\ Y_{country} = Y_{country} - \beta\left(X_{Country} - X_{Denmark}\right).$$

<u>COMENTARIO</u> : NO SE ESTIMO DE MANERA DIRECTA
LA PREVALENCIA/DINAMICA EN LA MAYORIA DE LOS PAISES DEL MUNDO.
URUGUAY NO FUE UNA EXCEPCION. SE PODRIA HABER HECHO?

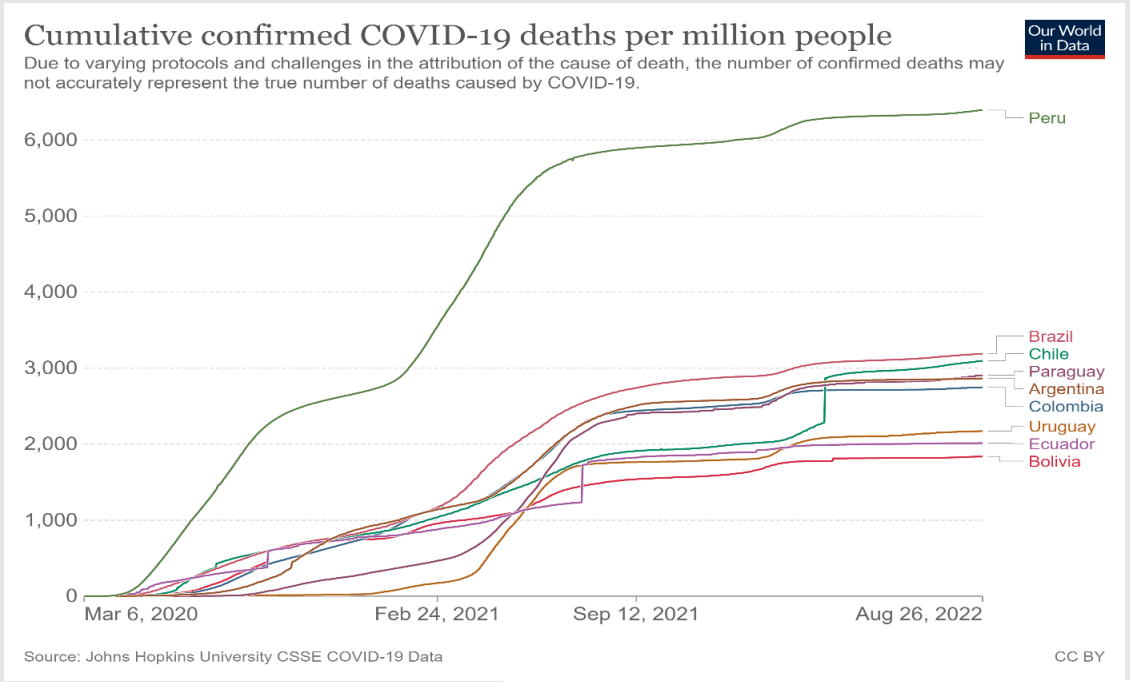


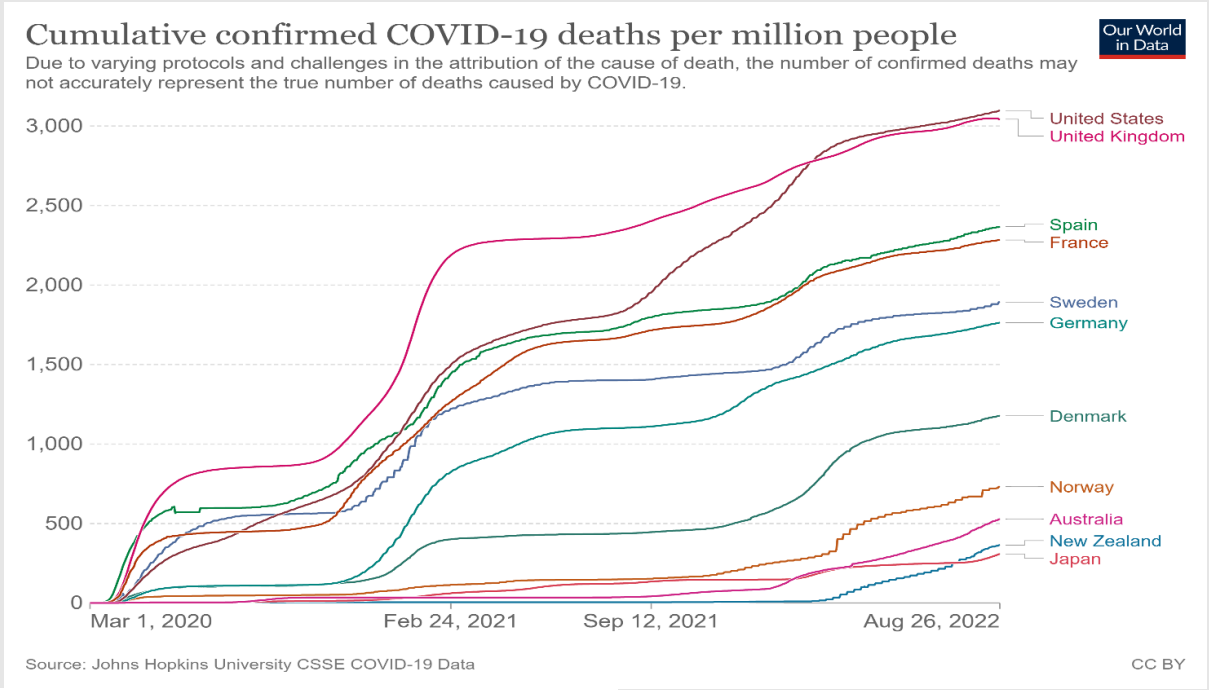


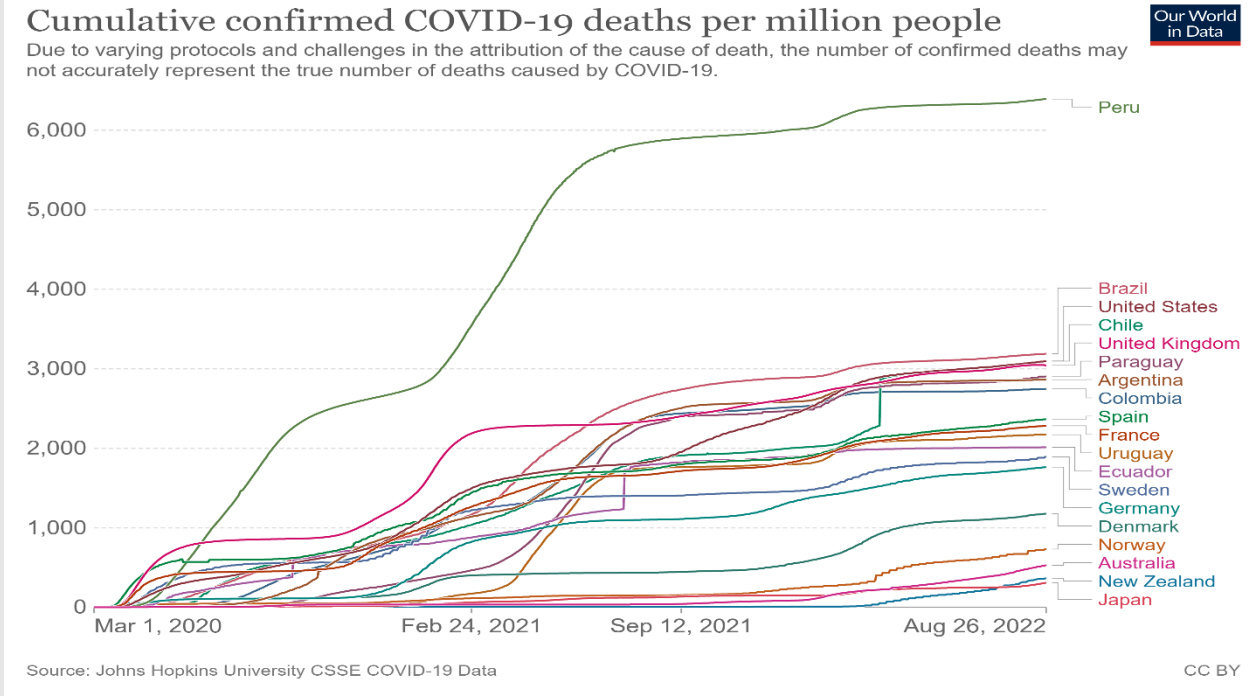




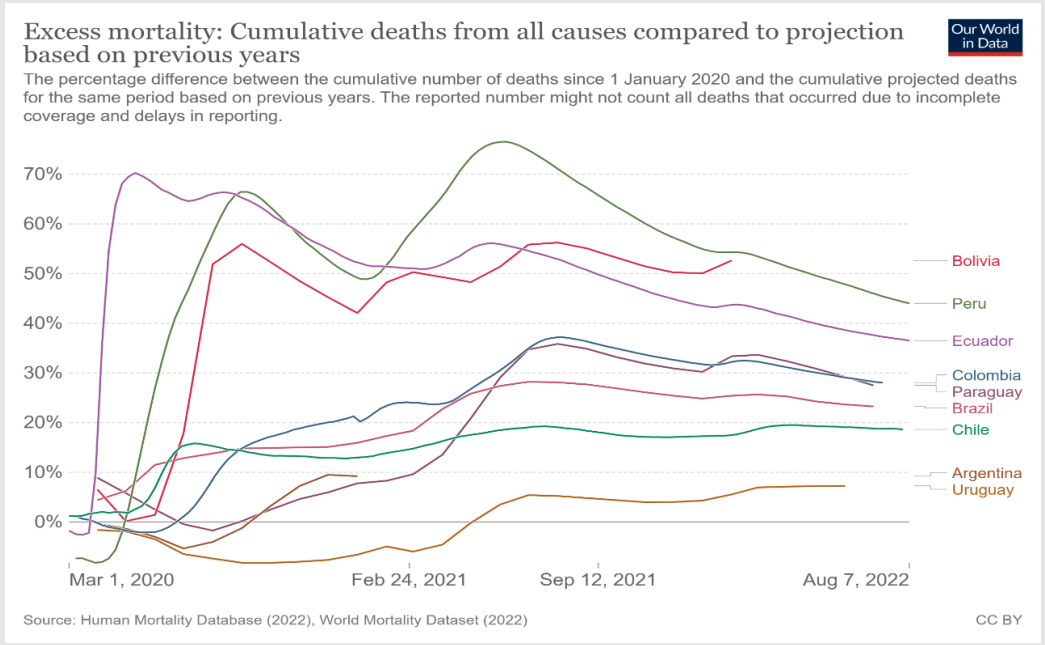
Peru	**5.26%**
Suecia	0.77%
Uruguay	**0.76%**
Alemania	0.46%
N Zelanda	**0.11%**

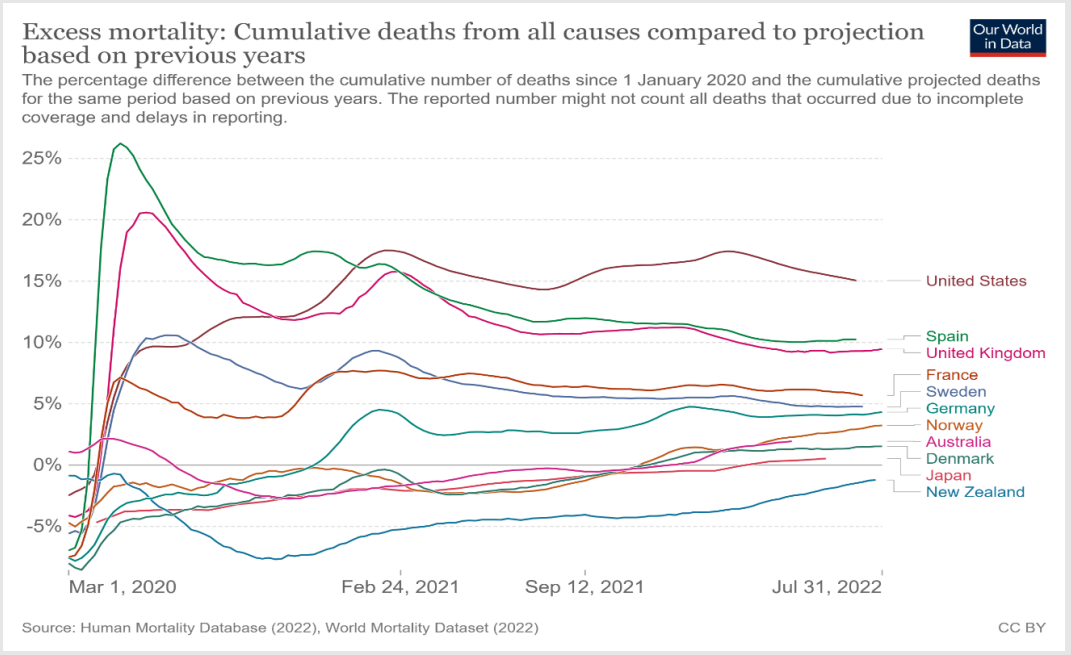


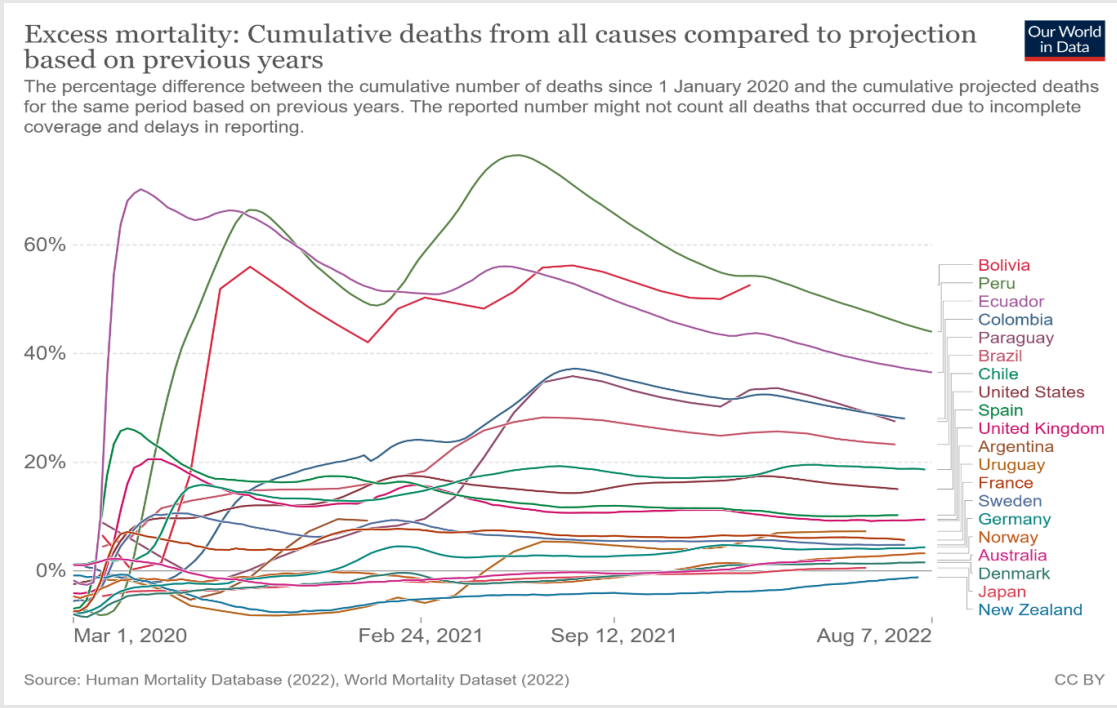




Peru	**6932**
Francia	2283
Uruguay	**2171**
Ecuador	2013
Japon	**309**







Ecuador	**30%**
Colombia	29%
EEUU	16%
Noruega	2.6%
Dinamarca	1.3%
N Zelanda	**-2.3%**

22/5/2022

Estimaciones de exceso de mortalidad p 100 000 habitantes (economist.com, 27/8/2022)

Bulgaria	1042
Serbia	891
Rusia	**851**
N Macedonia	821
Lituania	773

CINCO PEORES

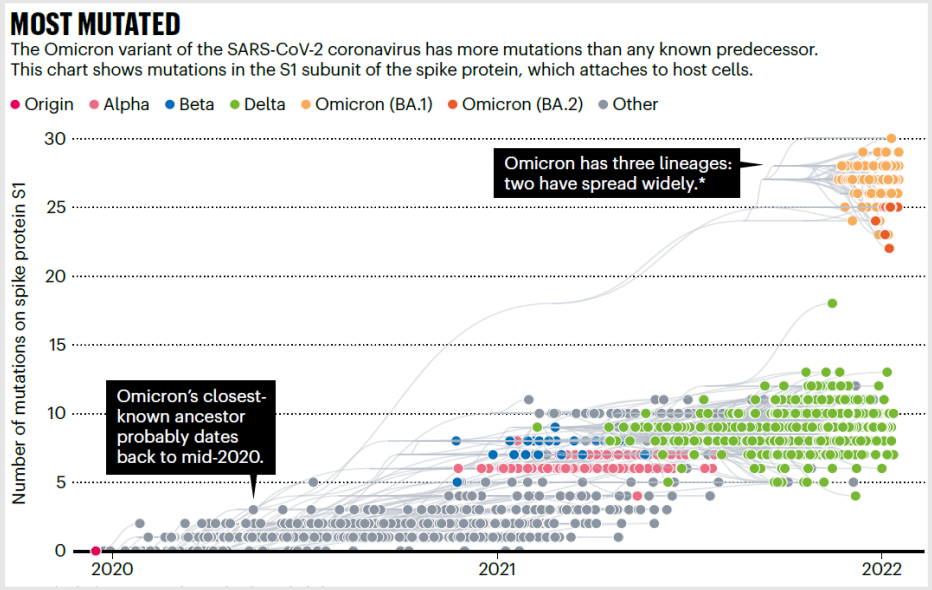
N Zelanda	-16
Lichstenstein	5
Malasia	7
Barbados	10
Taiwan	18

CINCO MEJORES

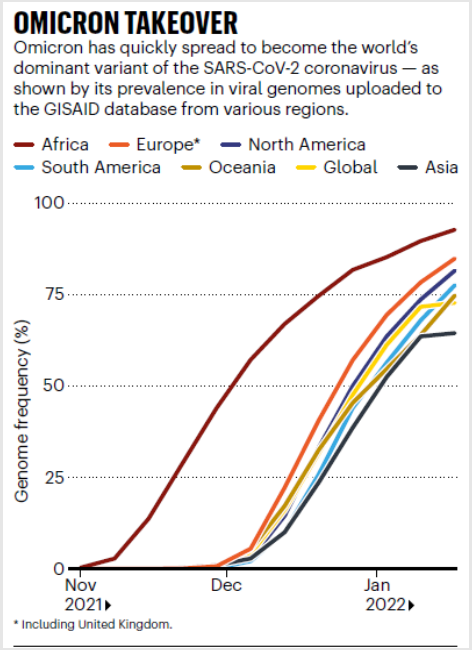
Brasil	365
EEUU	357
Chile	269
Uruguay	**249**
Suecia	135
Noruega	89
Dinamarca	84
Argentina	78

MISCELANEOS

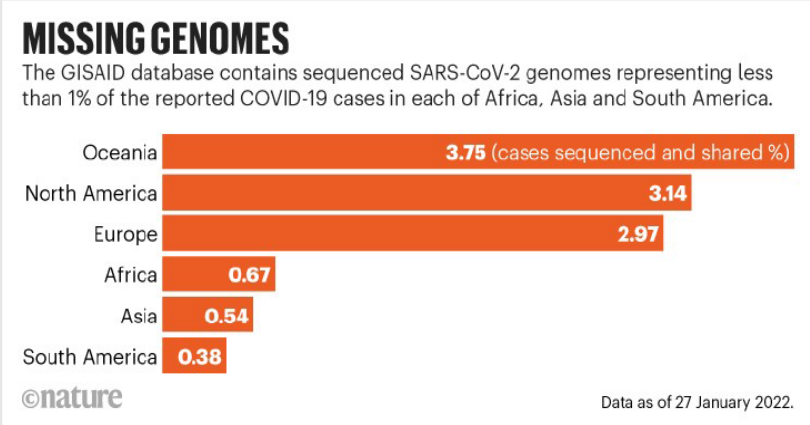
5. CIENCIA: EPIDEMIOLOGIA GENOMICA



No. mutaciones proteína espícula . Mayormente neutrales (sinventajas adaptativas); algunas incrementan en frecuencia, otras son desplazadas. De Nature (2022)



Omicron: porcentaje en muestras secuenciadas en diferentes continentes. Nature (2022)



Casos SARS-COV-2 examinados a nivel molecular para mutaciones y seguimiento epidemiológico. Nature (2022).

6. DESINFORMACION/POLITIZACION

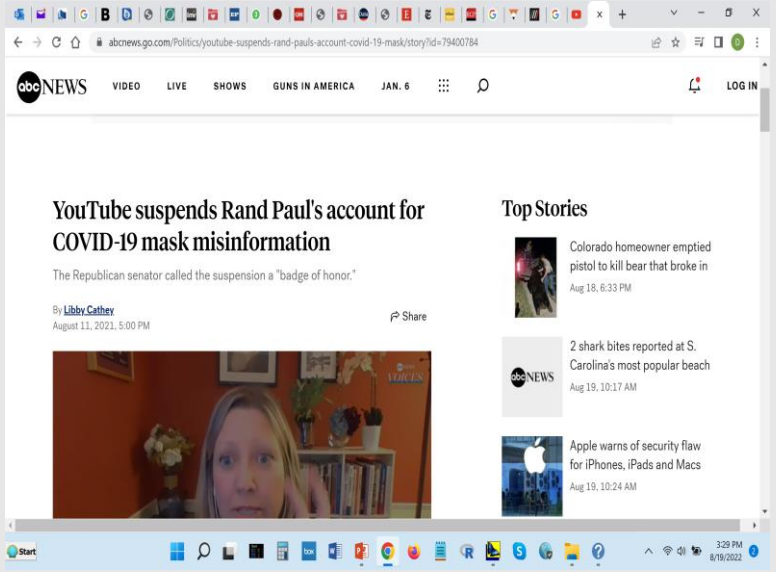
8/20/22, 5:13 PM How Trump damaged science — and why it could take decades to recover

nature

NEWS FEATURE | 05 October 2020 | Update 07 October 2020

How Trump damaged science — and why it could take decades to recover

The US president's actions have exacerbated the pandemic that has killed more than 200,000 people in the United States, rolled back environmental and public-health regulations and undermined science and scientific institutions. Some of the harm could be permanent.



8/20/22, 5:16 PM Brazil's COVID-19 Crisis and Jair Bolsonaro's Presidential Chaos | The New Yorker

DAILY COMMENT

BRAZIL'S COVID-19 CRISIS AND JAIR BOLSONARO'S PRESIDENTIAL CHAOS

LA DIARIA

Evidencia muestra dichos de César Vega sobre el coronavirus son falsos o sin sustento

30 de julio de 2021

How 'America's Frontline Doctors' Sold Access to Bogus COVID-19 Treatments—and Left Patients in the Lurch

Tablets of Ivermectin on May 19, 2021. Soumyabrata Roy—NurPhoto/Shutterstock

BY **VERA BERGENGRUEN**

AUGUST 26, 2021 6:34 PM EDT

The Washington Post
Democracy Dies in Darkness

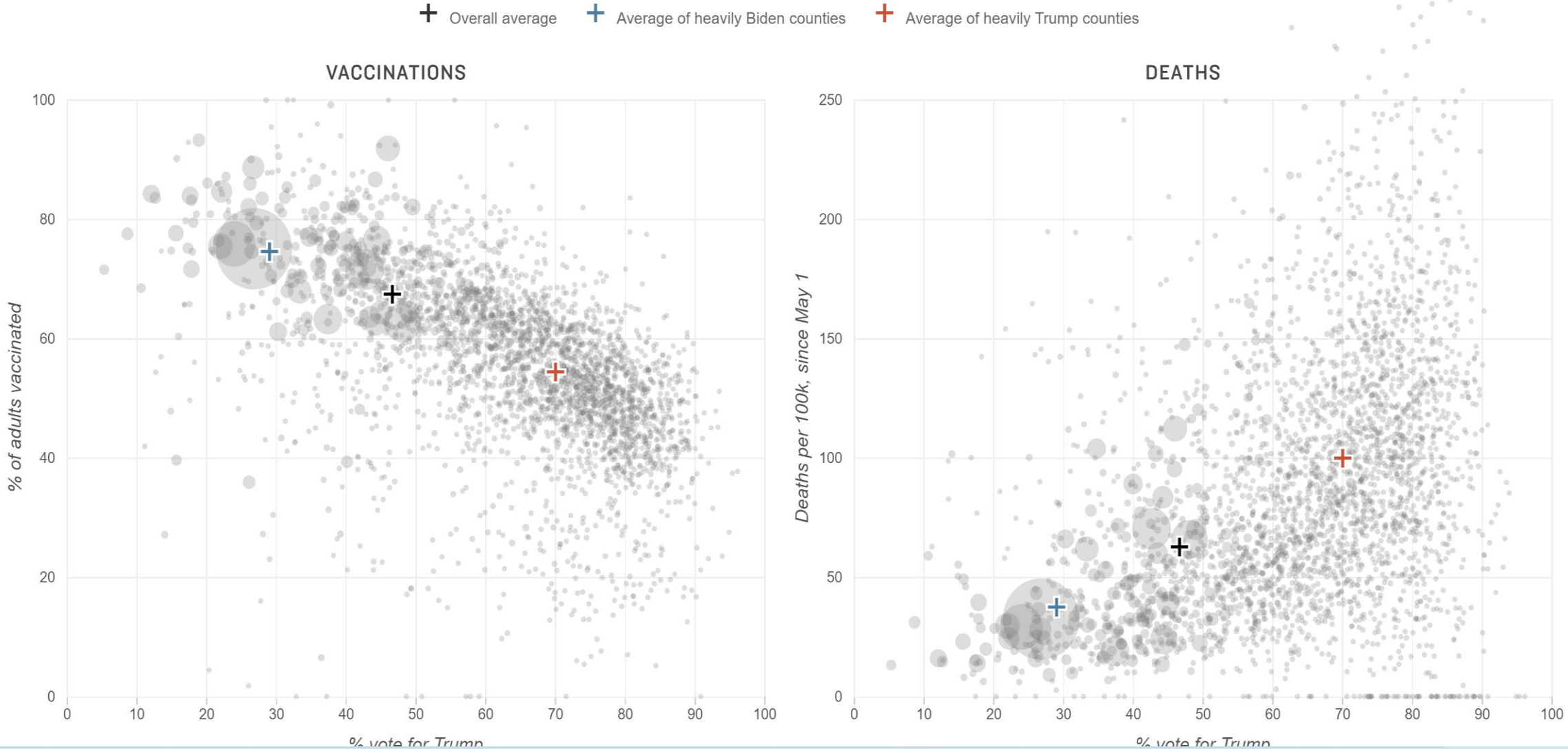
Trump retweeted a video with false covid-19 claims. One doctor in it has said demons cause illnesses.

By Travis M. Andrews and Danielle Paquette
July 29, 2020 at 10:17 a.m. EDT

After social media companies removed a viral video showing doctors spreading unsubstantiated information about the novel coronavirus, a phrase inspired by one doctor's past claims began trending on Twitter: demon sperm. It turns out Stella Immanuel has a history of making particularly outlandish statements — including that the uterine disorder endometriosis is caused by sex with demons that takes place in dreams.

The video showed a group that has dubbed itself America's Frontline Doctors, standing on the steps of the Supreme Court and claiming that neither masks nor shutdowns are necessary to fight the pandemic, despite a plethora of expertise to the contrary. It was live-streamed by the conservative media outlet Breitbart and viewed more than 14 million times — fueled by a tweet by Donald Trump Jr. and multiple retweets by President Trump, which have since been deleted.

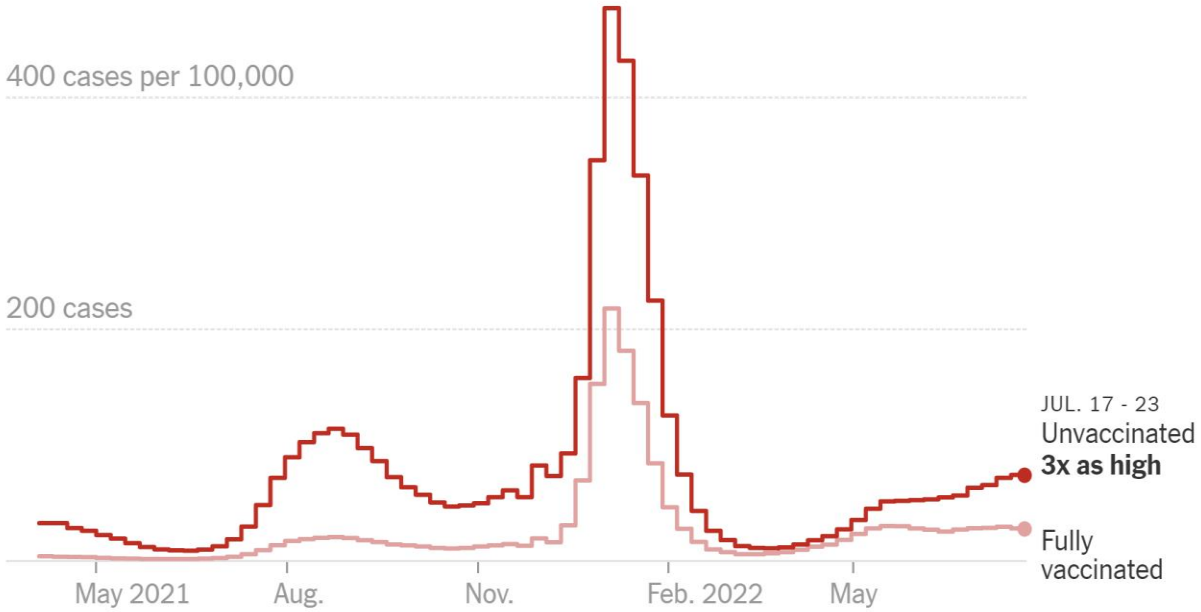
Counties that went heavily for Donald Trump have seen much lower vaccination rates and much higher death rates from COVID



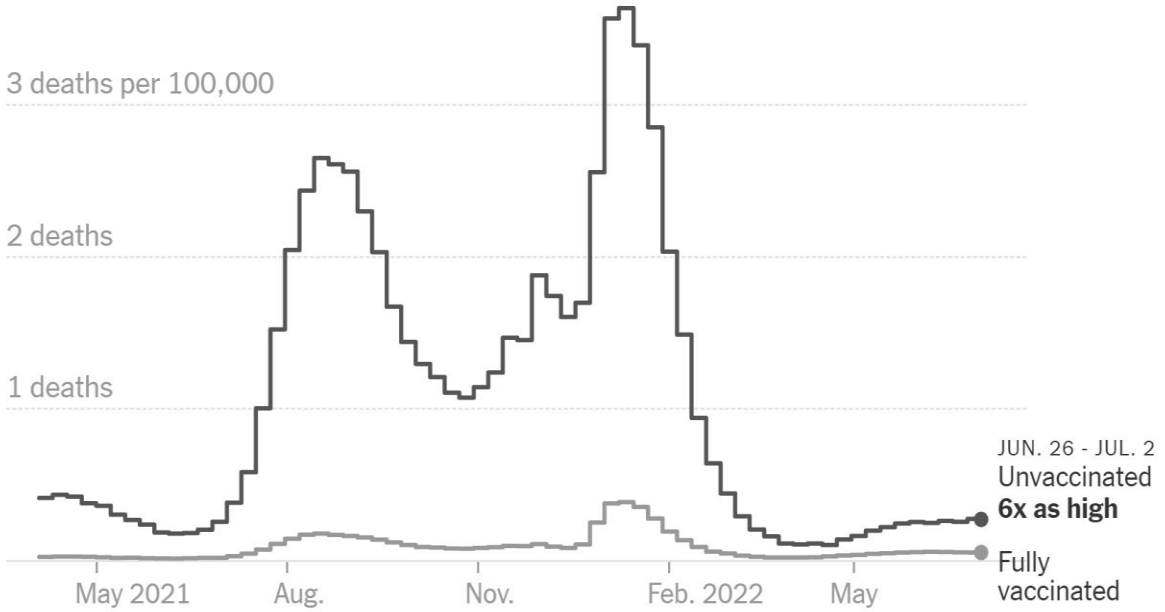
Rates for vaccinated and unvaccinated

Data from the Centers for Disease Control and Prevention shows that people who are unvaccinated are at a much greater risk than those who are fully vaccinated to die from Covid-19. These charts compare age-adjusted average daily case and death rates for vaccinated and unvaccinated people in the states and cities that provide this data.

Average daily cases



Average daily deaths

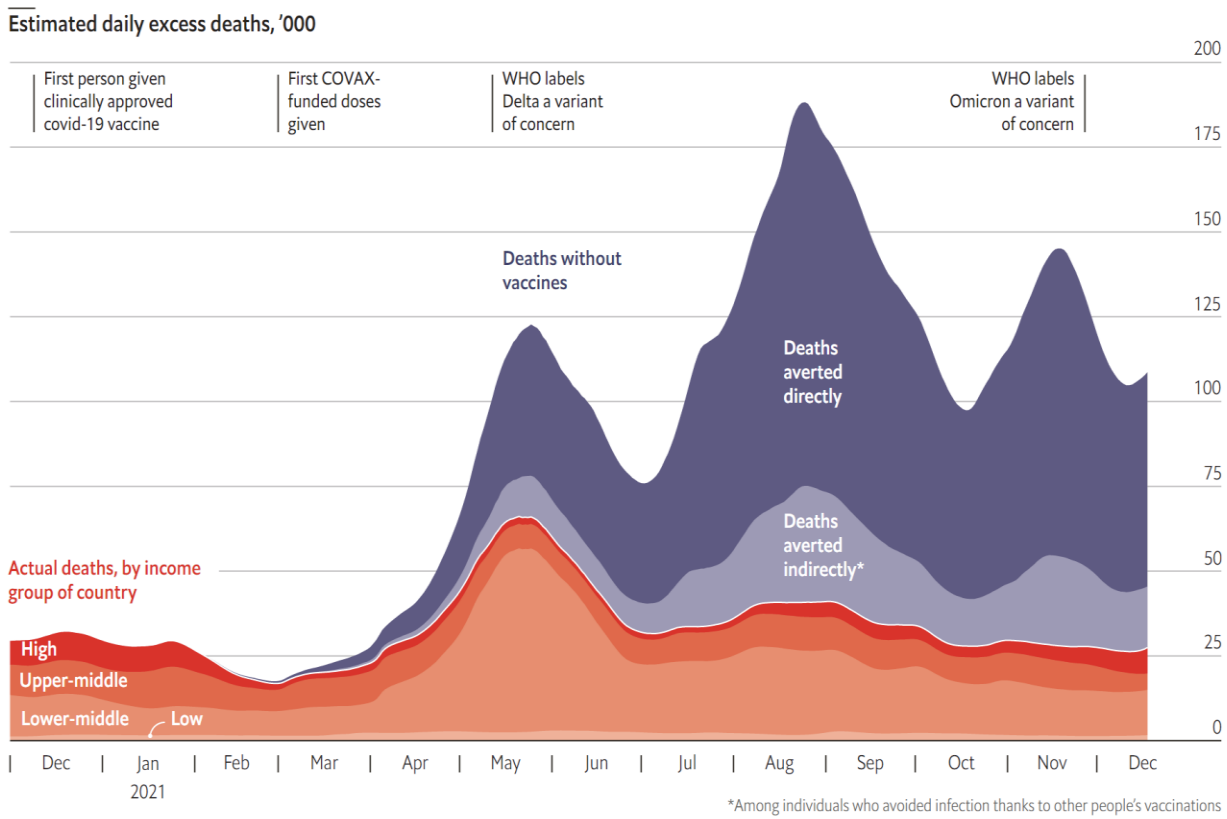


About this data

Covid-19 vaccines saved an estimated 20m lives during their first year

Their impact in poor countries depends on how effectively governments prioritised recipients

Jul 7th 2022



THE SWEDISH (and early British) STRATEGY: “herd immunity”

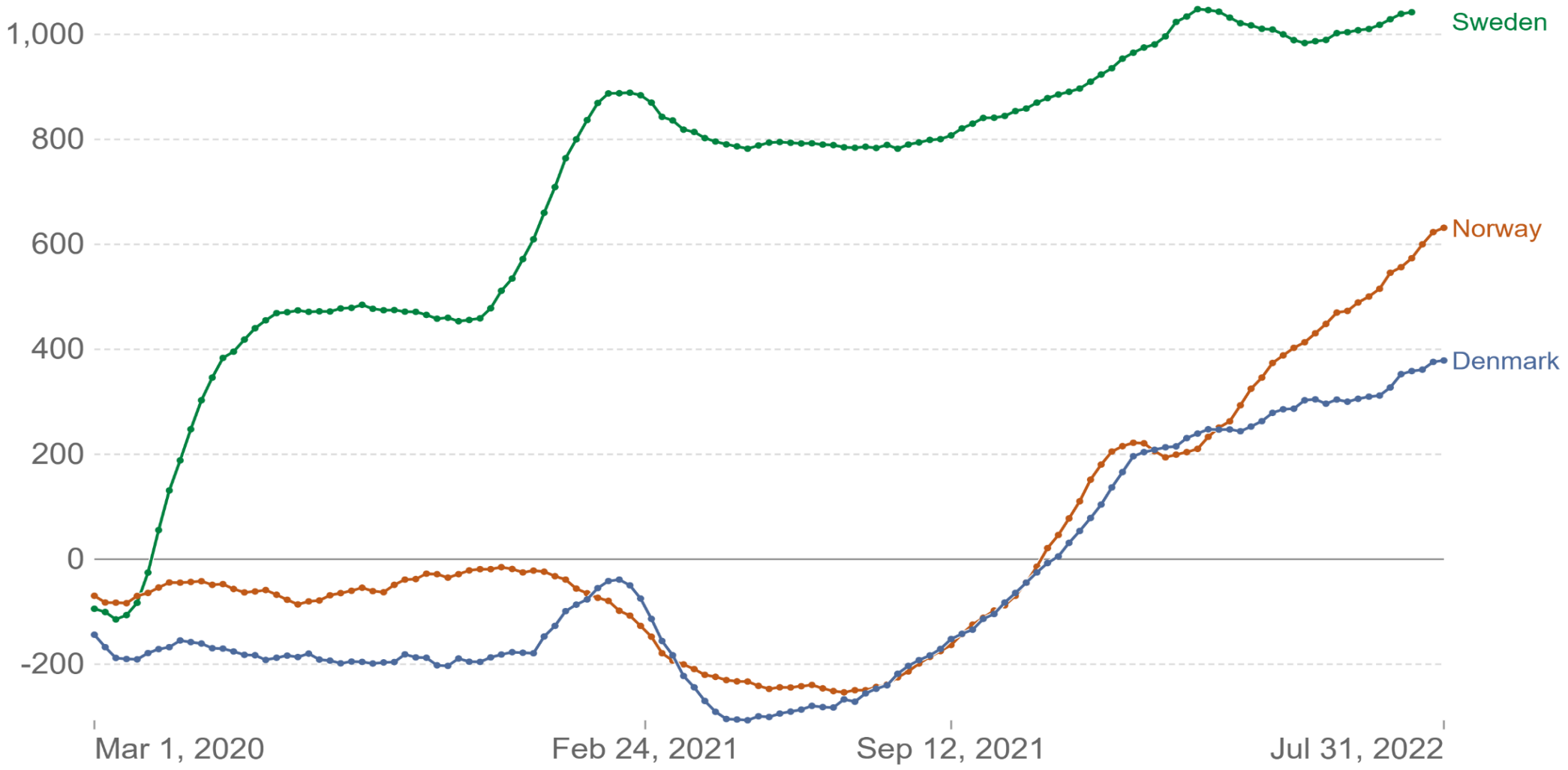
DATA FOR AUGUST 5 (WORLDOMETER) AND "THE ECONOMIST" (AUGUST 1, 2020)

	PAIS	POPULATION (millon)	Tests/ millon	Cases/ millon	Death/ millon	GNP 2020(%)	
	SWEDEN	10.1	85432	8069	570	-5.1	
	GERMANY	83.8	102454	2555	110	-5.9	
	DENMARK	5.8	281264	2448	106	-4.0	
	NORWAY	5.4	85769	1734	47	-5.5	
	USA	330.9	188042	14996	487	-5.3	
	URUGUAY	3.5	35194	243	7	-----	
	UNITED KINGDOM	67.9	253391	4523	683	-9.0	

Excess mortality: Cumulative number of deaths from all causes compared to projection based on previous years, per million people

Our World in Data

The cumulative difference between the reported number of deaths since 1 January 2020 and the projected number of deaths for the same period based on previous years. The reported number might not count all deaths that occurred due to incomplete coverage and delays in reporting.



Source: Human Mortality Database (2022), World Mortality Dataset (2022)

Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-022-01097-5 OPEN

Evaluation of science advice during the COVID-19 pandemic in Sweden

Nele Brusselaers[1,2,3,4✉], David Steadson[5], Kelly Bjorklund[6,7], Sofia Breland[8], Jens Stilhoff Sörensen[4,9], Andrew Ewing[4,10], Sigurd Bergmann[4,11] & Gunnar Steineck[4,12]

[1] Centre for Translational Microbiome Research, Karolinska Institutet, Stockholm, Sweden. [2] Global Health Institute, Antwerp University, Antwerp, Belgium. [3] Department of Head and Skin, Ghent University, Ghent, Belgium. [4] Science Forum COVID-19, Umeå, Sweden. [5] VanaTech Behavioural Science, Älvkarleby, Sweden. [6] Freelance Journalist, Stockholm, Sweden. [7] Freelance Journalist, Washington, DC, USA. [8] Oskarström Primary Care, Halmstad, Sweden. [9] School of Global Studies, Gothenburg University, Gothenburg, Sweden. [10] Department of Chemistry and Molecular Biology, Gothenburg University, Gothenburg, Sweden. [11] Department of Philosophy and Religious Studies, Norwegian University of Science and Technology, Trondheim, Norway. [12] Clinical Cancer Epidemiology, Department of Oncology, Gothenburg University, Gothenburg, Sweden. ✉email: nele.brusselaers@ki.se

“Sweden was well equipped to prevent the pandemic of COVID-19 from becoming serious.”

“Sweden had 10 times higher COVID-19 death rates (2020) than Norway.”

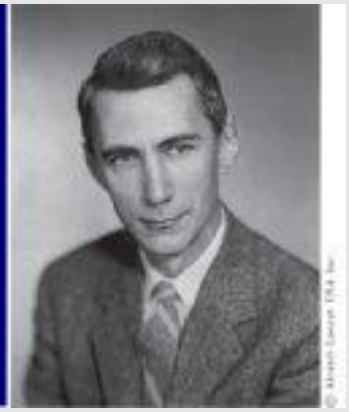
“Sweden’s strategy seemed targeted towards “natural” herd-immunity and avoiding a societal shutdown.”

“Swedes kept in ignorance of airborne and asymptomatic transmission and that face masks protect.”

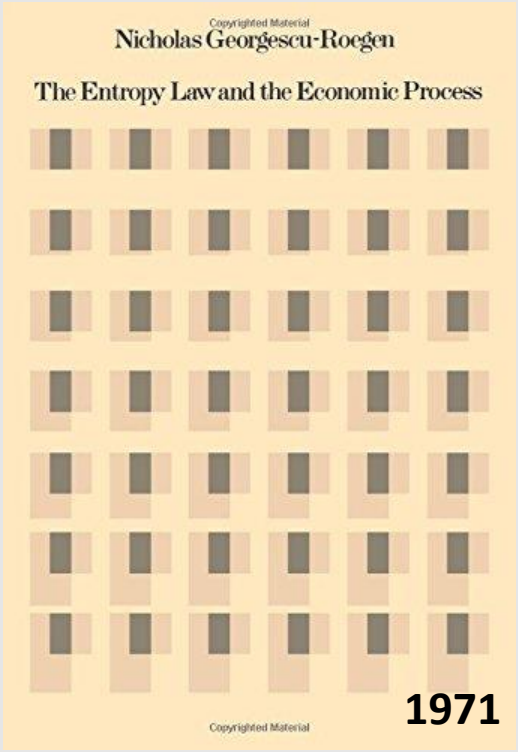
“Sweden should begin a self-critical process about political culture and lack of accountability of decision-makers.”

6. CIENCIA Y ECONOMIA

$$H = -\sum_{i=1}^{n} p_i \log p_i$$



Shannon (1948): Information y Entropia (H)



1971

JOURNAL OF HETERODOX ECONOMICS

The Notion of Entropy in Economic Analysis: The Classical Examples and New Perspectives

Liudmyla Yu. VOZNA[1]

DOI 10.1515/JHEEC-2016-0001

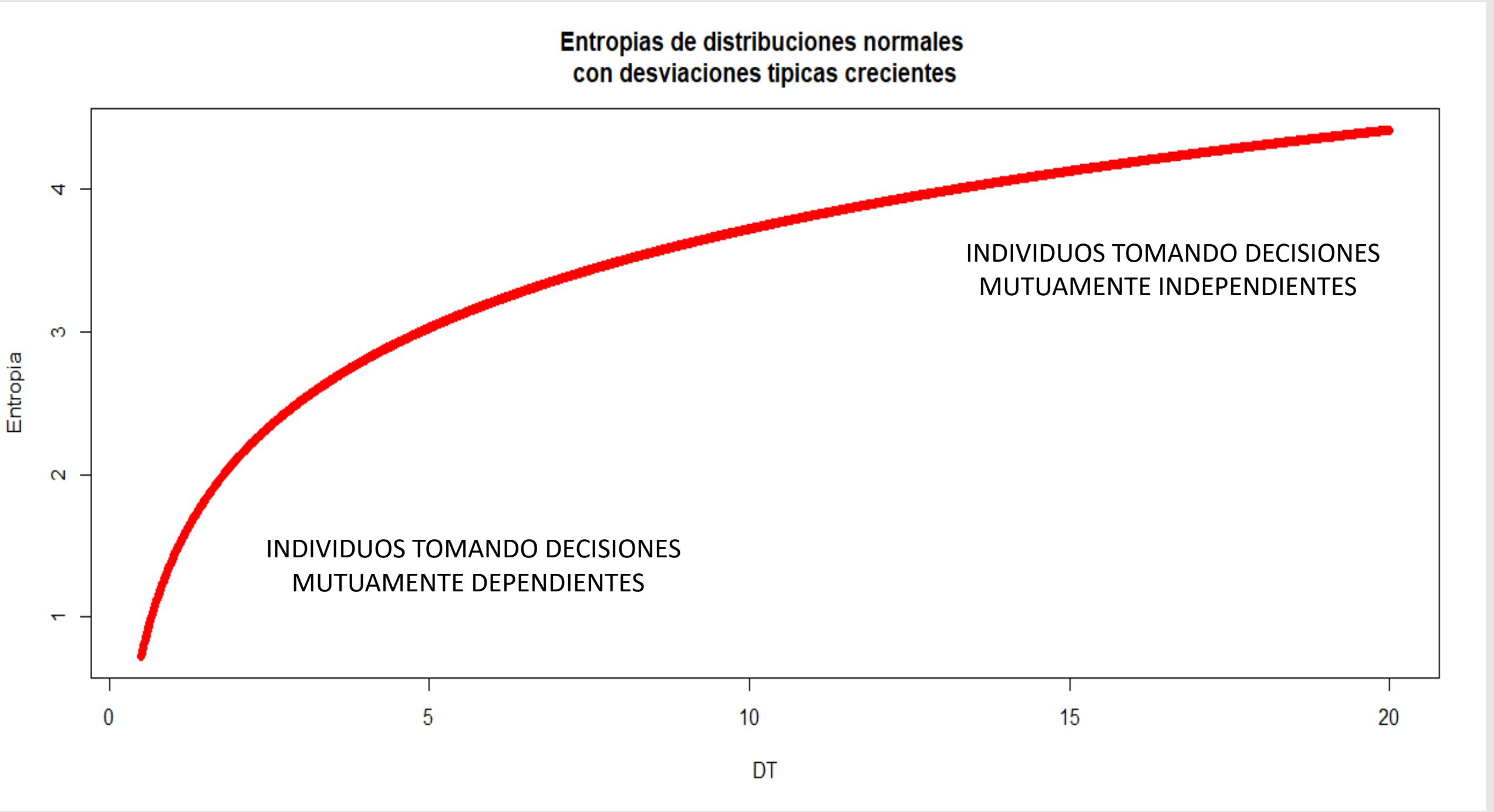
ANIMAL GENETICS Immunogenetics, Molecular Genetics and Functional Genomics

doi: 10.1111/j.1365-2052.2012.02326.x

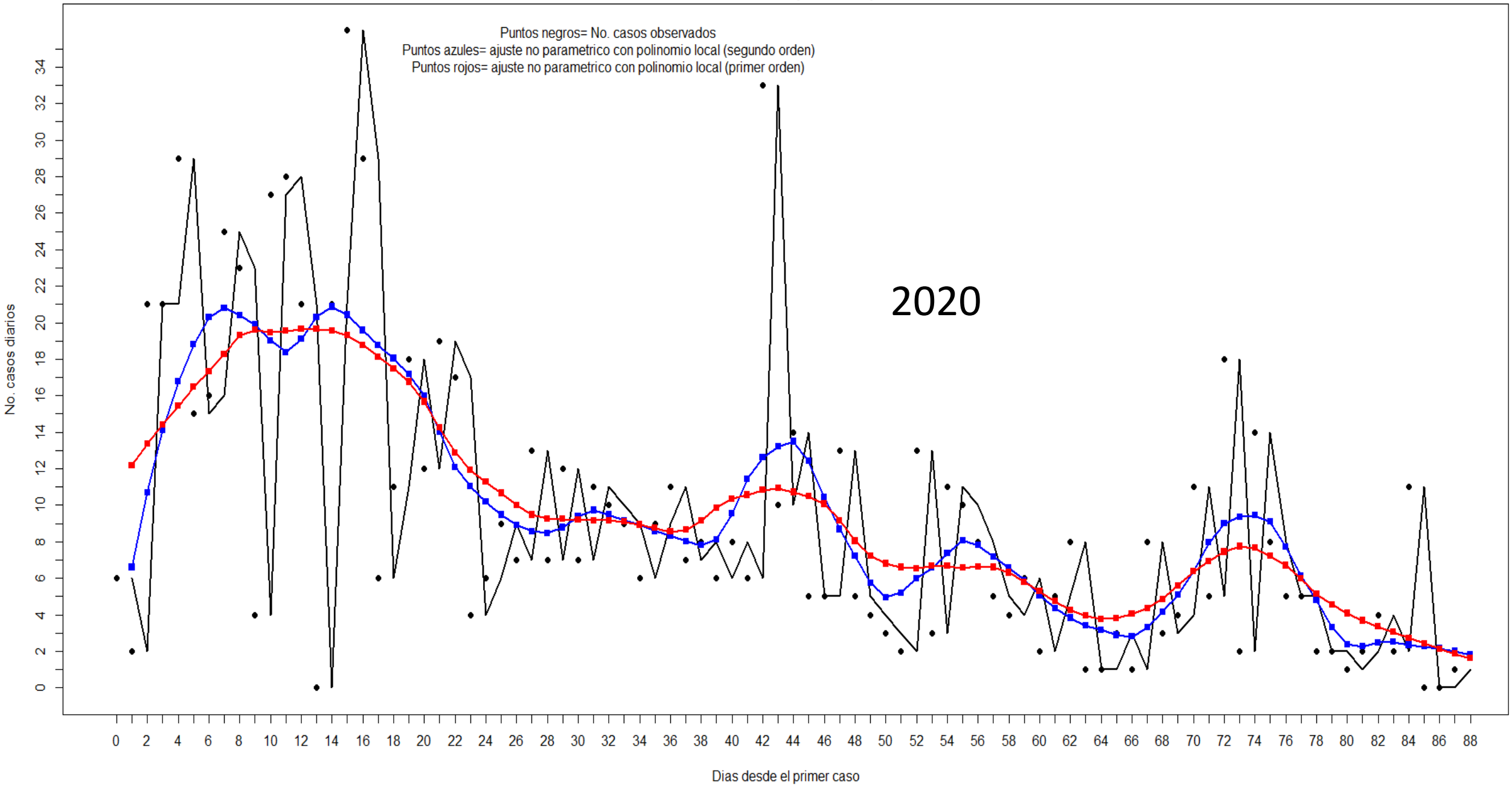
On measures of association among genetic variables

Daniel Gianola*,†, Eduardo Manfredi‡ and Henner Simianer§

*Department of Animal Sciences, University of Wisconsin-Madison, Madison, WI, 53706, USA. †Department of Animal and Aquacultural Sciences, Norwegian University of Life Sciences, N-1432, Ås, Norway. ‡Institut National de la Recherche Agronomique, UR631 Station d'Amélioration, Génétique des Animaux, BP 52627, 32326, Castanet-Tolosan, France. §Department of Animal Sciences, Georg-August-Universität, 37075, Göttingen, Germany


Entropias de distribuciones normales
con desviaciones tipicas crecientes
Entropia
1
2
3
4
0
5
10
15
20
DT
INDIVIDUOS TOMANDO DECISIONES
MUTUAMENTE DEPENDIENTES
INDIVIDUOS TOMANDO DECISIONES
MUTUAMENTE INDEPENDIENTES

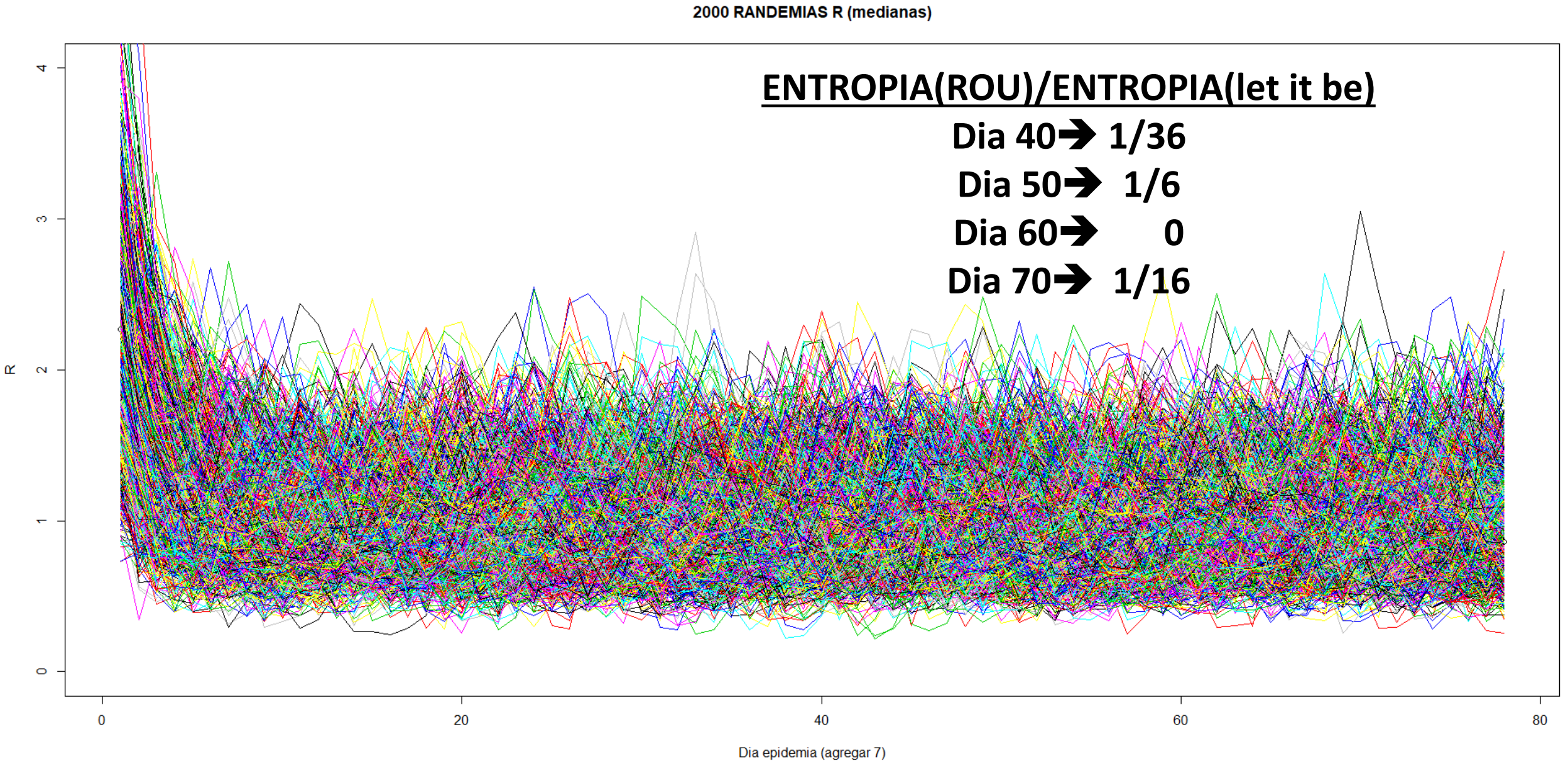
EPIDEMIA EN URUGUAY A JUNIO 9-DESCRIPCION ESTADISTICA
Base de datos: https://www.ecdc.europa.eu
Nota: curvas son descriptivas-no predictivas



RANDEMIAS
(R:“RANDOM”,”ALEATORIO”)

2.11×10^{132} *RANDEMIAS*

SARS-cov-2
“Gusano Loco,
Parque Rodo,
Montevideo


2000 RANDEMIAS R (medianas)
ENTROPIA(ROU)/ENTROPIA(let it be)
Dia 40➔ 1/36
Dia 50➔ 1/6
Dia 60➔ 0
Dia 70➔ 1/16
R
0
1
2
3
4
0
20
40
60
80
Dia epidemia (agregar 7)

CIENCIA E INCERTIDUMBRE

C=causas, explicaciones alternativas
D=Datos, observaciones, deducciones

Entropia(CAUSAS **ANTES** DE D)>=Entropia(CAUSAS **DESPUES** DE D)

Mecanismo de refutacion Y corroboracion:

Probabilidad(Dnuevos|Danteriores, Causa K)➔NEGLIGIBLE➔CAUSA REFUTADA

Probabilidad(Dnuevos|Danteriores, Causa K)➔Apreciable
➔CAUSA ACEPTADA (TEMPORARIAMENTE)

URUGUAY IN A NUTSHELL

- Sooner or later, SARS-COV-2 would arrive (equipment, ICU beds etc.)
- Uruguay not a “hub”. Low demographic density (but older population)
- Decided action. Strong political leadership
- Data-based evidence and scientific advice (“Triunvirate” and small battalion of MULTI-DISCIPLINE scientists)
- Few “small fires” EARLY. Huge outbreaks LATER
- Effective testing system (TETRIS) at the onset.
- Structured-universal health system
- Strong primary health system (doctors, ambulances, at-home visits)
- **Outstanding world-class vaccination campaign**
- Political consensus (within limits). Little (??) impact of disinformation
- Uruguayans: faced emergency with **GARRA CHARRUA!**
- **Science-awareness increased. Lessons for the future?**