International COVID-19 Conference

May 15th, 2020

7:45 am – 1:15 pm (Pacific Time)

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Introductory Remarks

May 15th, 2020

7:45 am – 8:00 am (Pacific Time)

Session 1: Public Health

May 15th, 2020

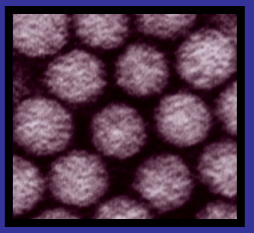
8:00 am – 9:00 am (Pacific Time)

SARS, MERS & COVID-19 What Lessons Have We Learned (and Not Learned)?

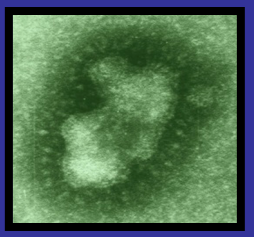
Joseph Sung MD, PhD
The Chinese University of Hong Kong

Animal Virus Family

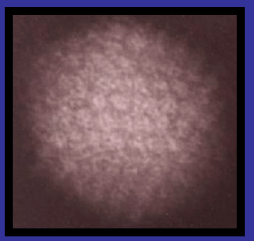
- *Rhinoviridae*



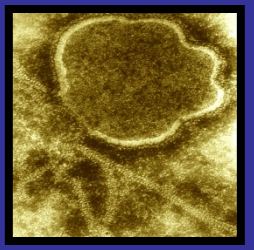
- *Coronaviridae*



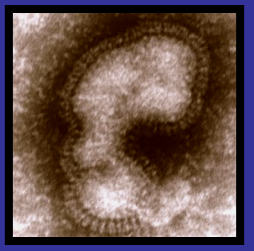
- *Adenoviridae*



- *Paramyxoviridae*
  - Parainfluenza 1-3
  - RSV



- *Orthomyxoviridae*
  - Flu A, B, C



Lesson 1: Don’t mess with mother Nature

Bats are natural reservoirs of **SARS**-like coronaviruses. Li W, et al. Science. 2005; 310(5748):676-9.

Severe acute respiratory syndrome coronavirus-like virus in Chinese horseshoe **bats**. Lau SK, et al. Proc Natl Acad Sci. 2005; 102(39):14040-5.

Identification of a novel coronavirus in **bats**. Poon LL, et al. J Virol. 2005;79(4):2001-9.

Article

A pneumonia outbreak associated with a new coronavirus of probable bat origin

https://doi.org/10.1038/s41586-020-2012-7
Received: 20 January 2020
Accepted: 29 January 2020

Peng Zhou[1,5], Xing-Lou Yang[1,5], Xian-Guang Wang[2,5], Ben Hu[1], Lei Zhang[1], Wei Zhang[1], Hao-Rui Si[1,3], Yan Zhu[1], Bei Li[1], Chao-Lin Huang[2], Hui-Dong Chen[2], Jing Chen[1,3], Yun Luo[1,3], Hua Guo[1,3], Ren-Di Jiang[1,3], Mei-Qin Liu[1,3], Ying Chen[1,3], Xu-Rui Shen[1,3], Xi Wang[1,3], Xiao-Shuang Zheng[1,3], Kai Zhao[1,3], Quan-Jiao Chen[1], Fei Deng[1], Lin-Lin Liu[4], Bing Yan[1],

A SARS-like cluster of circulating bat coronaviruses shows potential for human emergence

Menacherie VD, et al. Nature Med 2015

Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding

Roujian Lu, Xiang Zhao*, Juan Li*, Peihua Niu*, Bo Yang*, Honglong Wu*, Wenling Wang, Hao Song, Baoying Huang, Na Zhu, Yuhai Bi, Xuejun Ma, Faxian Zhan, Liang Wang, Tao Hu, Hong Zhou, Zhenhong Hu, Weimin Zhou, Li Zhao, Jing Chen, Yao Meng, Ji Wang, Yang Lin, Jianying Yuan, Zhihao Xie, Jinmin Ma, William J Liu, Dayan Wang, Wenbo Xu, Edward C Holmes, George F Gao, Guizhen Wu¶, Weijun Chen¶, Weifeng Shi¶, Wenjie Tan¶*

Summary

Background In late December, 2019, patients presenting with viral pneumonia due to an unidentified microbial agent

Lancet 2020; 395: 565–74

go, a large
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ARSr-CoVs
d
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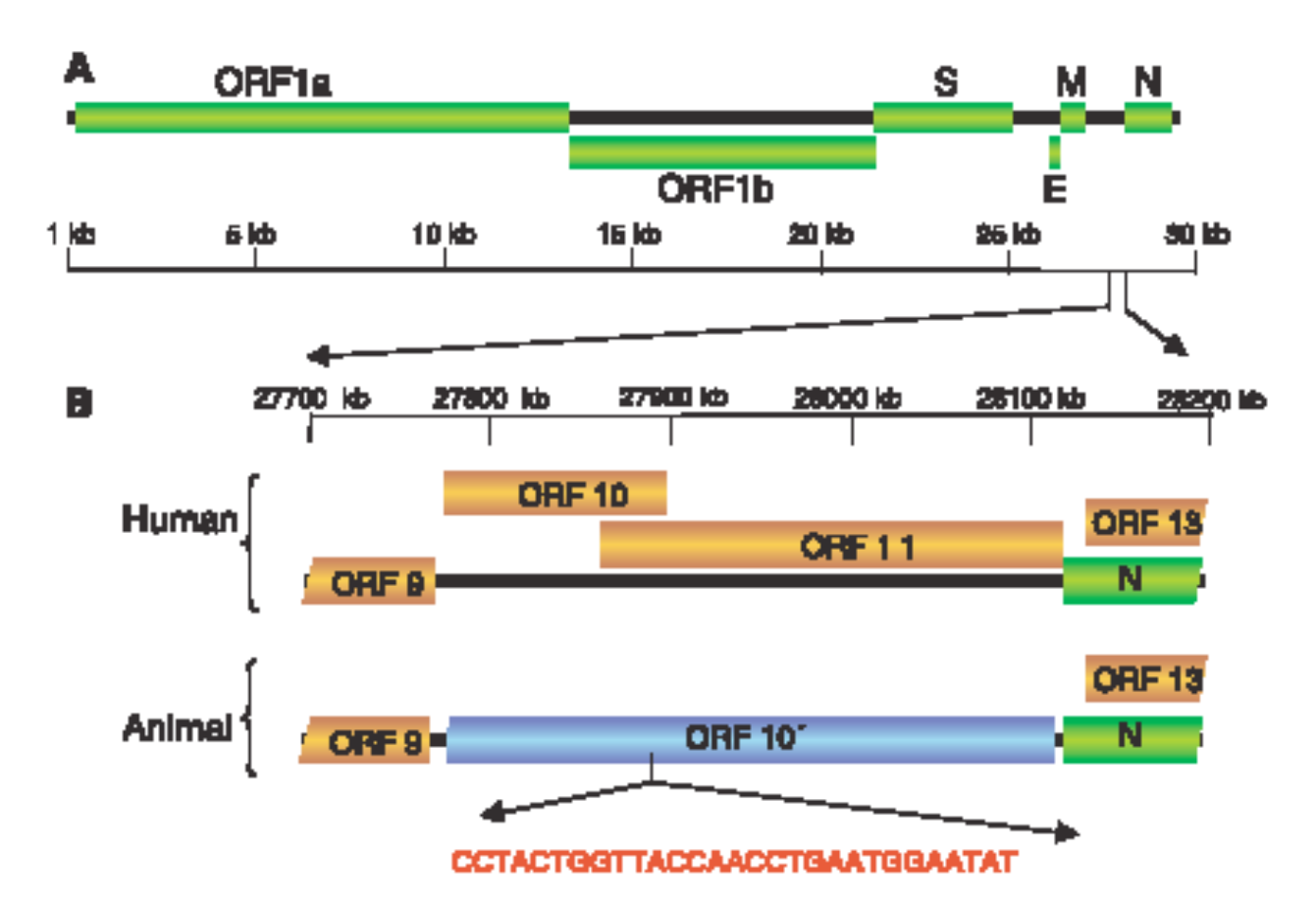
cluding 80

deaths by 26 January 2020. Full-length genome sequences were obtained from five patients at an early stage of the outbreak. The sequences are almost identical and share 79.6% sequence identity to SARS-CoV. Furthermore, we show that 2019-nCoV is 96% identical at the whole-genome level to a bat coronavirus. Pairwise protein sequence analysis of seven conserved non-structural proteins domains show that this virus belongs to the species of *SARSr-CoV*. In addition, 2019-nCoV virus isolated from the bronchoalveolar lavage fluid of a critically ill patient could be neutralized by sera from several patients. Notably, we confirmed that 2019-nCoV uses the same cell entry receptor—angiotensin converting enzyme II (ACE2)—as SARS-CoV.

A 29-nt sequence in animals islates results in fusing of ORFs 10 & 11 into a new ORF



追求最出色的新闻 Guangzhou Daily

广州日报

国内统一刊号 CN44——0010 第14675号

2004年1月11日 星期日 农历癸未年 十二月二十 三十大寒 今日20版 广州地区24版

报料热线:81919191 http://www.dayoo.com

"We refuse eating exotic food"

Signed by 1500 students from Shenzhen, Guangdong. Jan.11.2004

Guangzhou Daily
Jan.11.2004

深圳千五名小学生签名:

我们不吃野生动物

前日上午,1500多双稚嫩的小手郑重签下了自己的承诺——来自深圳市罗湖区洪湖小学31个班的全体学生和100多名教职工在"拒食野生动物树立文明新风"的横幅上签上了自己的名字。

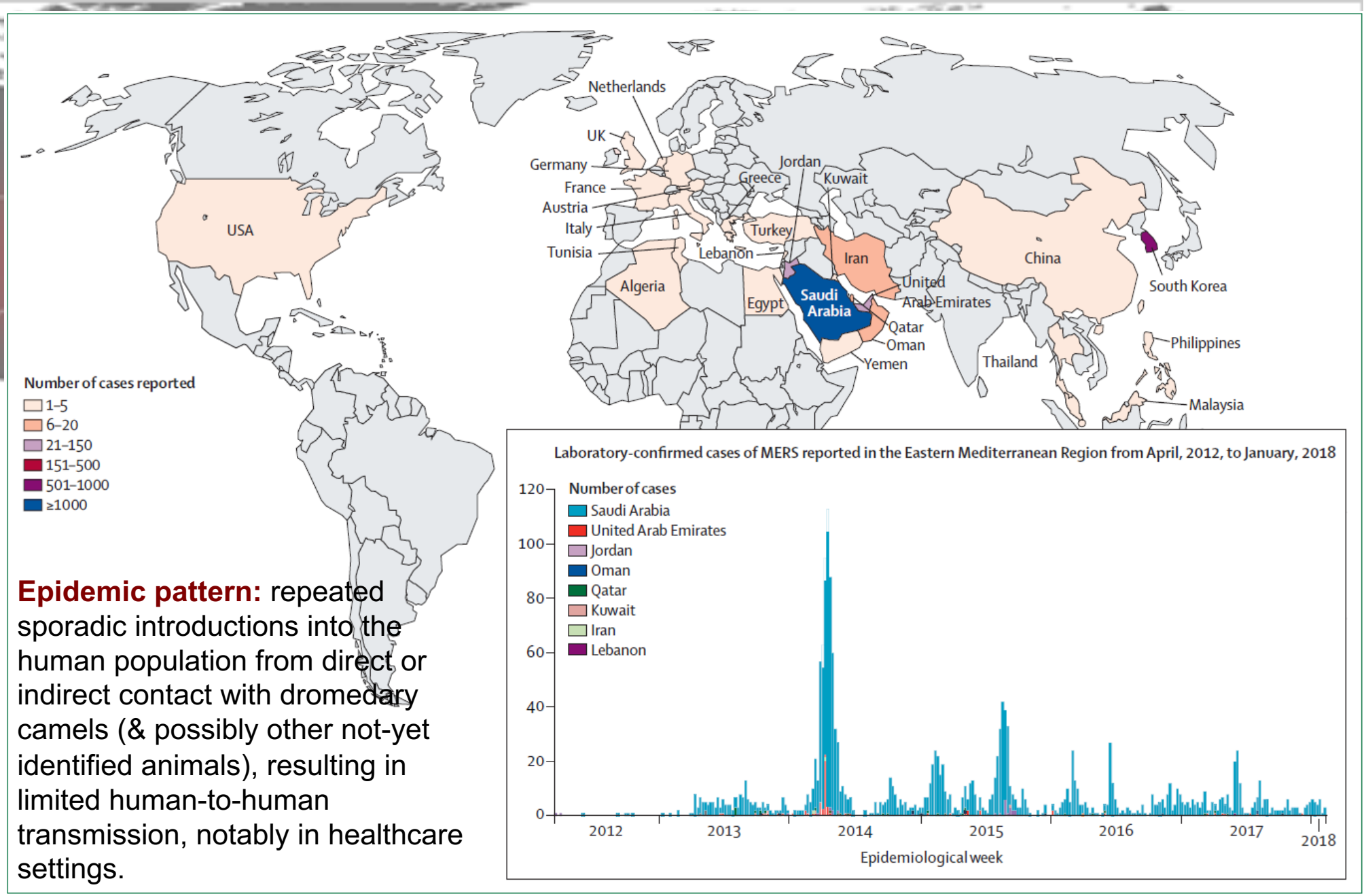
前日,该校校长带领学生们开始签名。五年(1)班的赖宇清同学签名后表示,今后她会自觉遵守拒吃野生动物的承诺,并让爸爸、妈妈也不买不吃野生动物。

罗湖区教育局有关负责人表示,学校教育孩子签名拒食野生动物,就是为了从小培养孩子们健康的饮食习惯。

目前,罗湖区已经在全区的学校中启动了相应的健康学校计划,在学校中开展各种健康教育。

记者何涛 通讯员属永清 摄

1500多名学生郑重承诺拒食野生动物



Epidemic pattern: repeated sporadic introductions into the human population from direct or indirect contact with dromedary camels (& possibly other not-yet identified animals), resulting in limited human-to-human transmission, notably in healthcare settings.

Figure: Global cases of MERS-CoV infection reported to WHO
Reproduced from WHO[4] by permission of World Health Organization. MERS CoV=Middle East respiratory syndrome coronavirus.

Hui DS, et al. Lancet ID 2018

Flight CA 112, 15 March 2003

Lesson 2: Travelling is a Risk

- One index patient, M/72, boarded CA 112
- Fever since Mar 11
- Subsequently died of SARS
- As of June 12, 22 cases associated with this flight

Transmission of SARS on Aircraft

Table 1. Frequency of Transmission on Three Aircraft Carrying One or More Persons Given a Diagnosis of a Probable Case of SARS.*

Flight No.	Model of Aircraft	Date of Flight	Duration of Flight	Phase of Illness (no. of patients)	No. Believed to Have Become Infected/Total No. of People on Aircraft (% [95% CI])	No. Who Became Ill/ No. Interviewed (% [95% CI])†
1	777-300	Feb. 21, 2003	90 min	Incubation (1)‡	0/315 (0 [0–1.2])	0/74 (0 [0–4.9])
2	737-300	Mar. 15, 2003	3 hr	Fever with cough (1)	22/120 (18.3 [11.9–26.4])	18/65 (27.7 [17.3–40.2])
3	777-300	Mar. 21, 2003	90 min	Fever (2); fever with cough (2)	1/246 (0.4 [0–2.2])	1/166 (0.6 [0–3.3])§

* The 95 percent confidence intervals (CIs) given are the exact binomial 95 percent confidence intervals around point estimates. SARS denotes the severe acute respiratory syndrome.

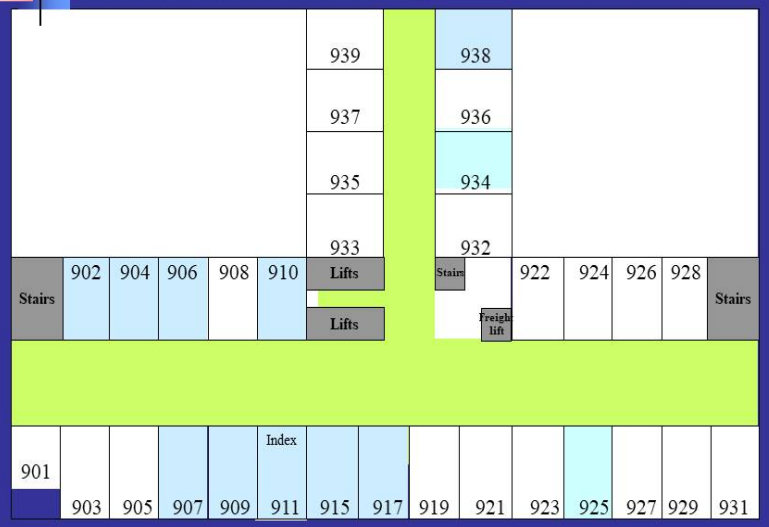
† Illness was defined as fever with cough, shortness of breath, or difficulty breathing. The number of patients who became ill excludes the index patient or patients.

‡ The incubation phase is defined as the 10 days before the onset of fever.

§ Illness in the one passenger who became ill met the WHO criteria for a suspected case of SARS; no chest radiograph was obtained.

CDC (US) and DH (HK), NEJM 2004

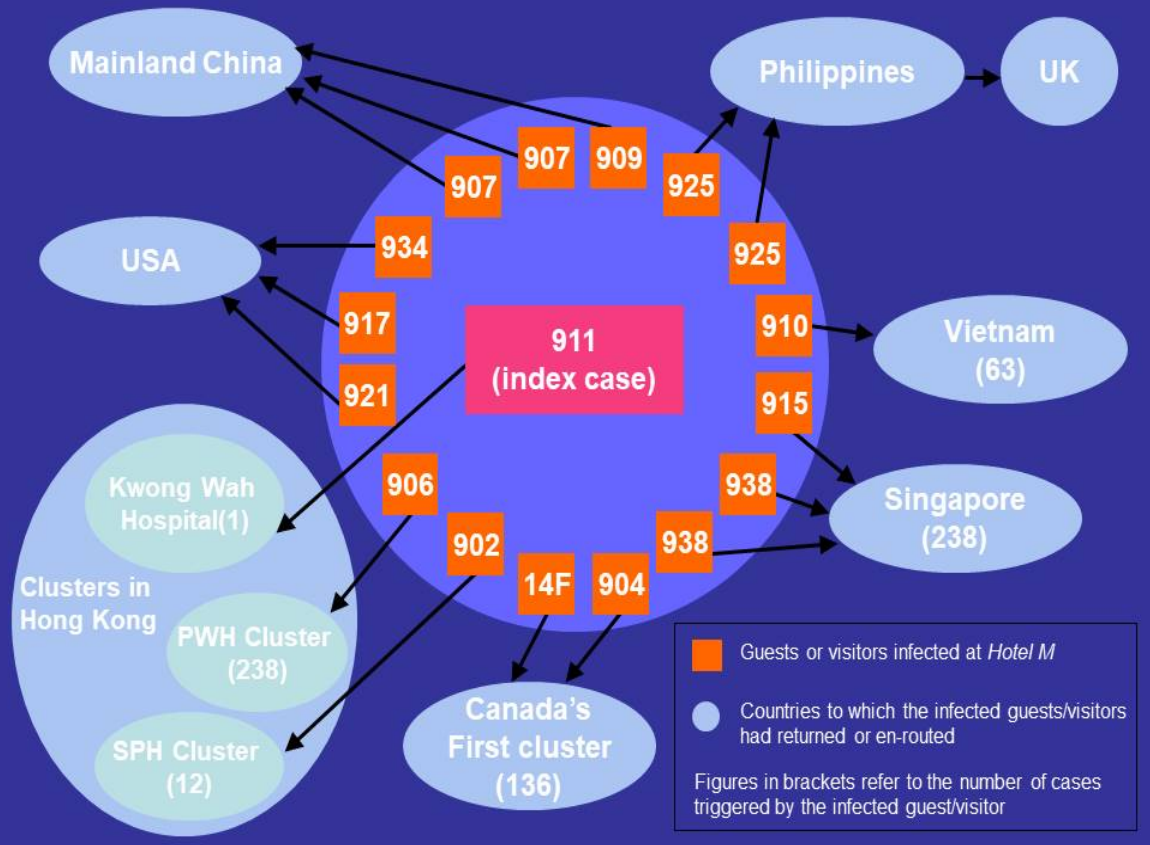
Hotel Metropole 9/F



Late 2002- early 2003
Fear of "atypical pneumonia" in mainland China.

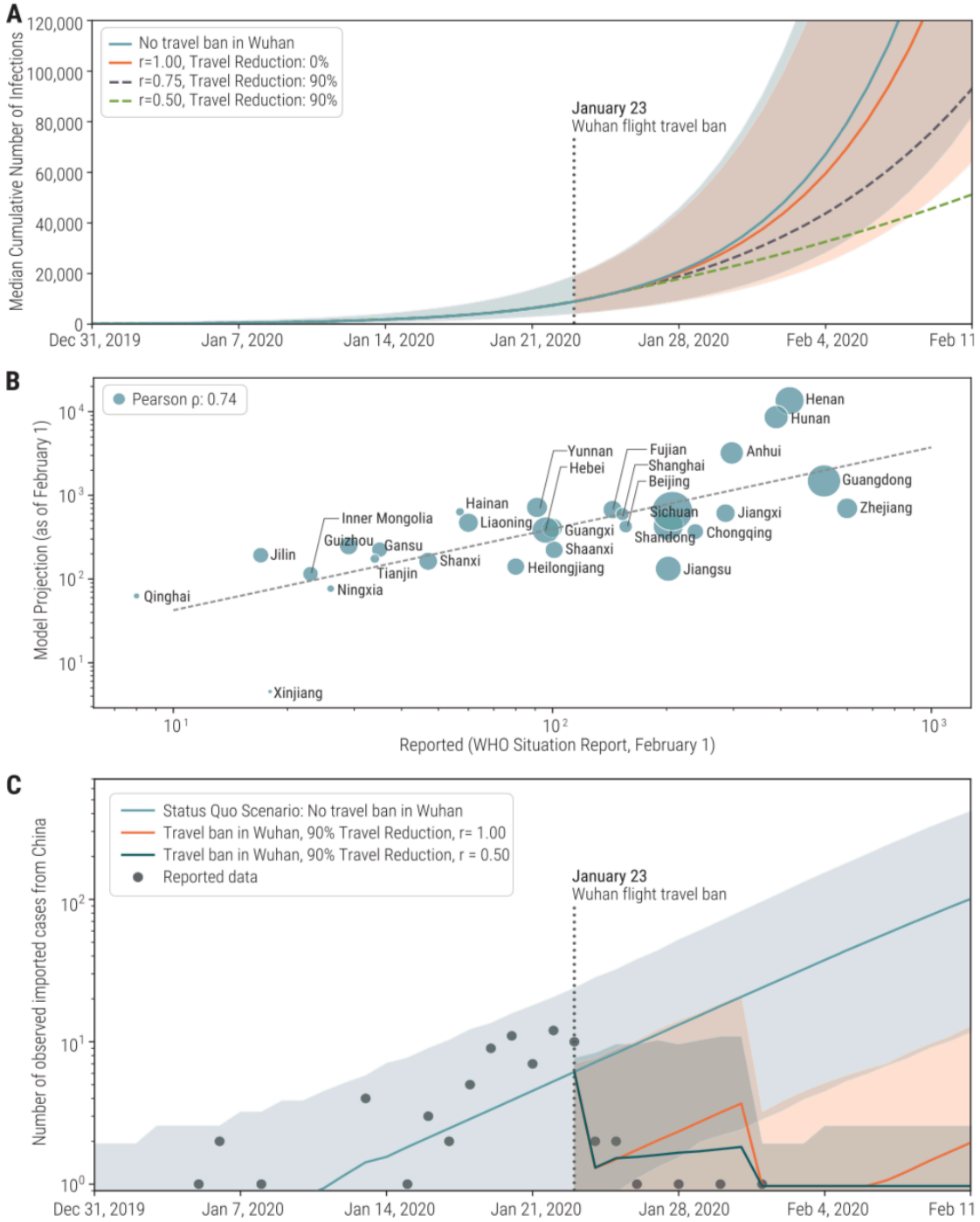
Physician from Guangzhou (ill since 15th Feb) arrived in HK on 21st Feb 03. Admitted to ICU on 22nd Feb & died on 4th Mar 2003. At least 16 hotel guests & visitors infected at Hotel M.

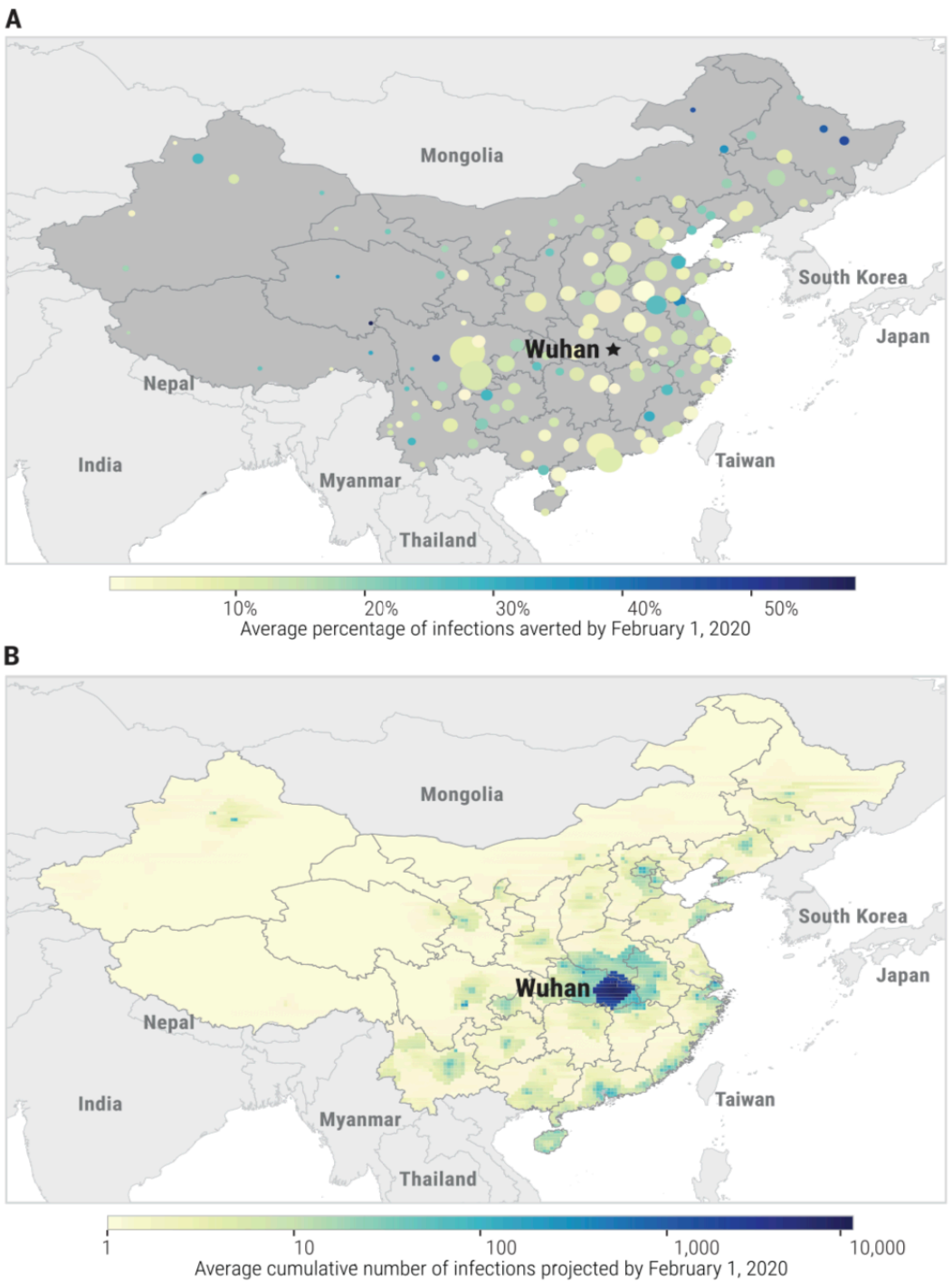
8096 cases in 33 countries and 774 deaths (9.6%).



Effects of travel restriction from Wuhan in spread of SARS-CoV2

Chinazzi M et al. Science April 2020





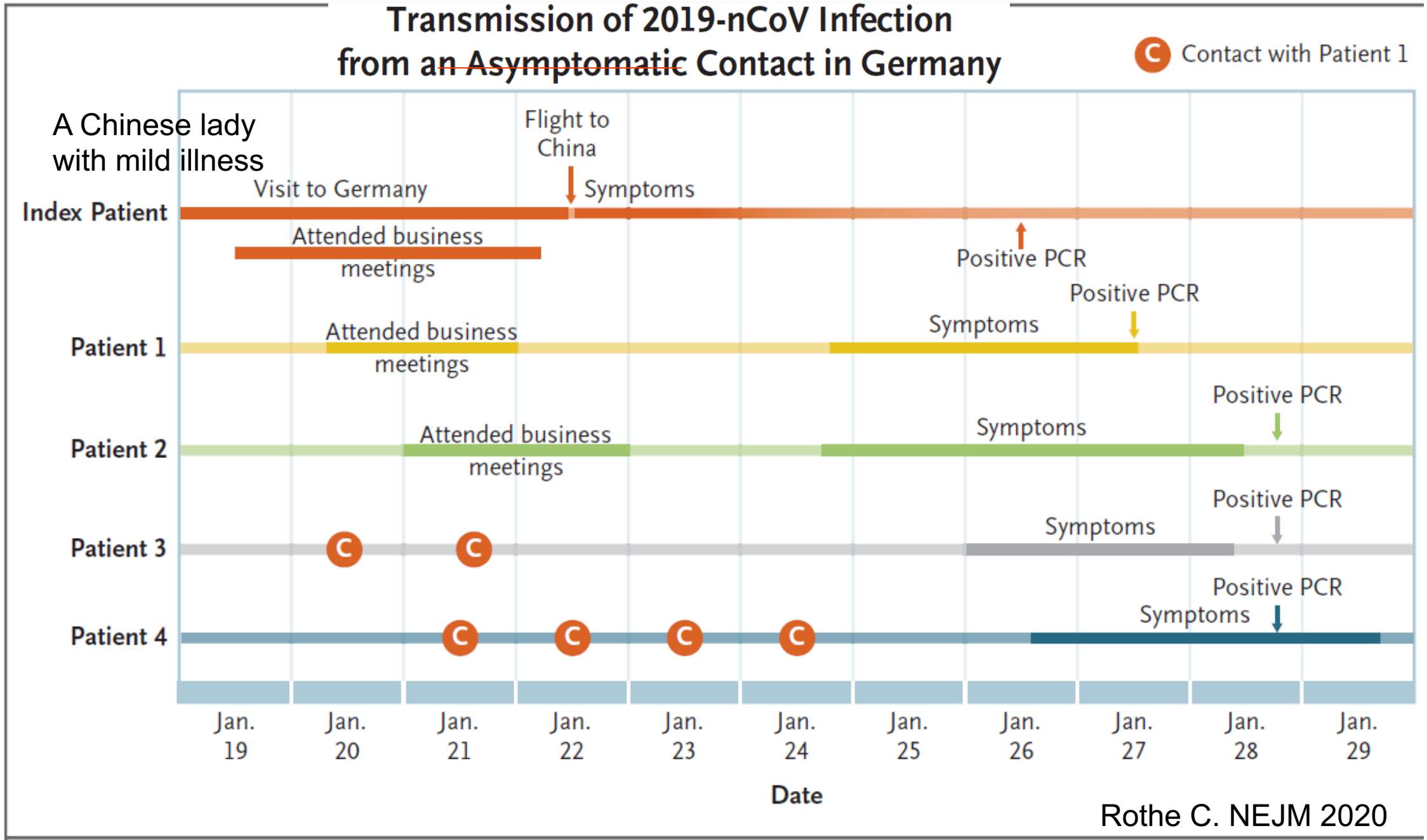


Figure 1. Timeline of Exposure to Index Patient with Asymptomatic 2019-CoV Infection in Germany.

The NEW ENGLAND JOURNAL of MEDICINE

Lesson 3: Hospitals are High Risk Areas

A Major Outbreak of Severe Acute Respiratory Syndrome in Hong Kong

Nelson Lee, M.D., David Hui, M.D., Alan Wu, M.D., Paul Chan, M.D., Peter Cameron, M.D., Gavin M. Joynt, M.D., Anil Ahuja, M.D., Man Yee Yung, B.Sc., C.B. Leung, M.D., K.F. To, M.D., S.F. Lui, M.D., C.C. Szeto, M.D., Sydney Chung, M.D., and Joseph J.Y. Sung, M.D.

Hospital outbreak of COVID 19 in Germany

OXFORD ACADEMIC

Head Serials and El

Clinical Infectious Diseases

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Article Contents

Abstract

Author notes

Comments (0)

ACCEPTED MANUSCRIPT

First reported nosocomial outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in a pediatric dialysis unit FREE

Vera Schwierzeck, Jens Christian König, Joachim Kühn, Alexander Mellmann, Carlos Luis Correa-Martínez, Heymut Omran, Martin Konrad, Thomas Kaiser, Stefanie Kampmeier ✉ Author Notes

Clinical Infectious Diseases, ciaa491, https://doi.org/10.1093/cid/ciaa491

Published: 27 April 2020 **Article history** ▾

Background

Coronavirus disease 2019 (COVID-19) is a life-threatening respiratory condition caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and was initially detected in China in December 2019. Currently, in Germany over 140,000 cases of COVID-19 are confirmed. Here we report a nosocomial outbreak of SARS-CoV-2 infections in the pediatric dialysis unit of the University Hospital of Münster (UHM).

Methods

Single-step real-time RT-PCR from nasopharyngeal swaps was used to diagnose the index patient and identify infected contacts. Epidemiological links were analyzed by patient interviews and chart reviews. In addition, each contact was assessed for exposure to the index case and monitored for clinical symptoms. Threshold cycle (C_t) values of all positive test results were compared between symptomatic and asymptomatic cases.

Results

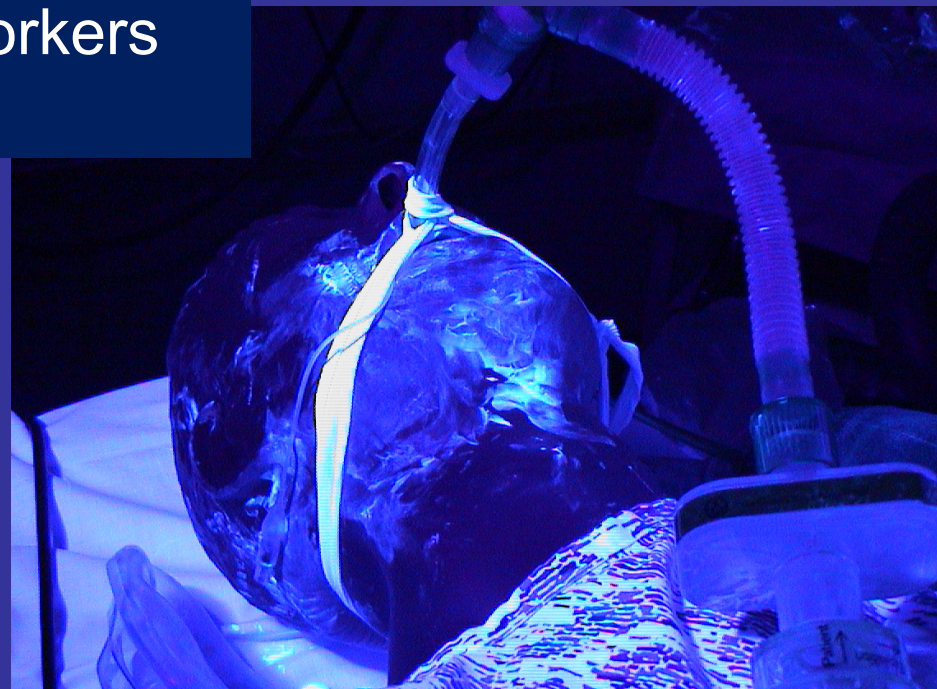
Forty-eight cases were involved in this nosocomial outbreak. Nine contact cases developed laboratory confirmed COVID-19 infections. Two SARS-CoV-2 positive cases remained clinically asymptomatic. Eleven cases reported flu-like symptoms without positive results. C_t values were significantly lower in cases presenting typical COVID-19 symptoms, suggesting high viral shedding ($p = 0.007$).

Conclusion

Person-to-person transmission was at the heart of a hospital outbreak of SARS-CoV-2 between healthcare workers (HCWs) and patients in the pediatric dialysis unit at the UHM. Semi quantitative real-time RT-PCR results suggest that individuals with high viral load pose a risk to spread SARS-CoV-2 in the hospital setting. Our epidemiological observation highlights the need to develop strategies to trace and monitor SARS-CoV-2 infected HCWs in order to

Overcrowded hospital beds
Poor ventilation & lack of isolation
Inadequate PPE
Unprepared healthcare workers
High risk procedures

Another public hospital ward in HK

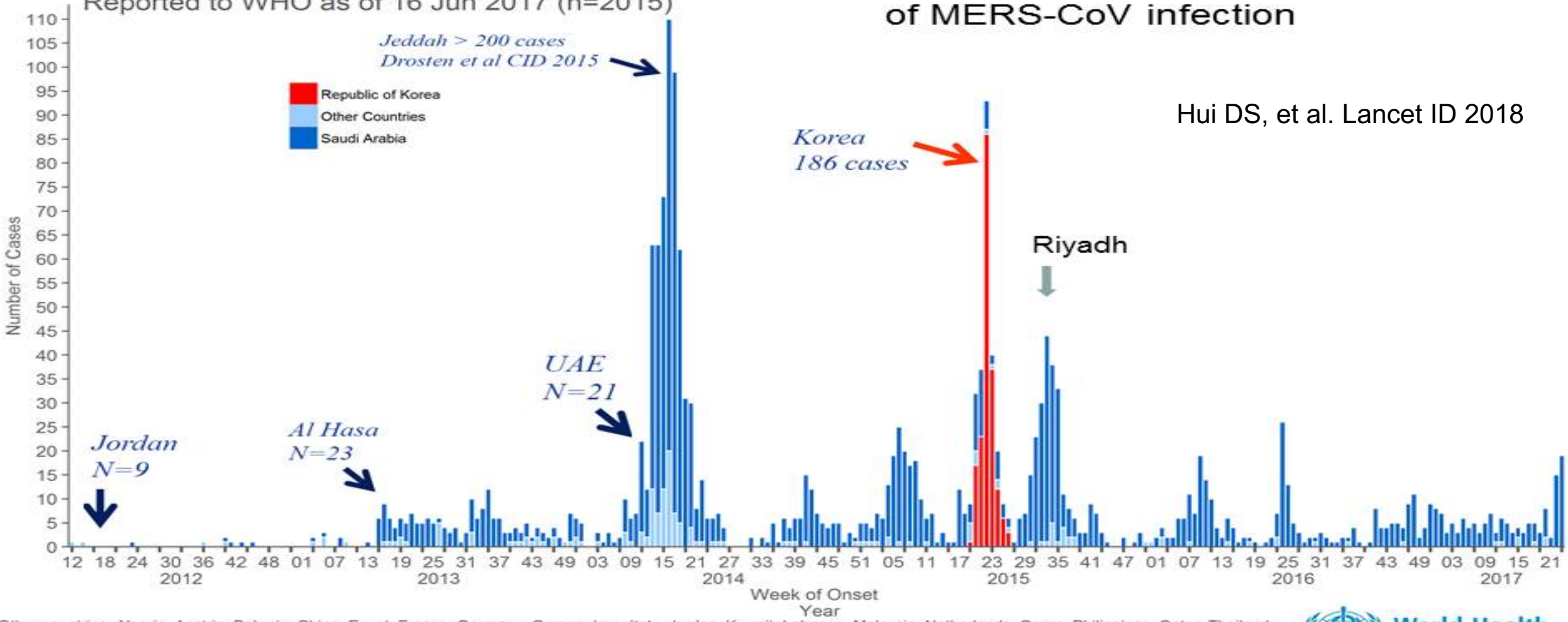


Confirmed global cases of MERS-CoV

Reported to WHO as of 16 Jun 2017 (n=2015)

Nosocomial outbreaks are a hallmark of MERS-CoV infection

Hui DS, et al. Lancet ID 2018



Other countries: Algeria, Austria, Bahrain, China, Egypt, France, Germany, Greece, Iran, Italy, Jordan, Kuwait, Lebanon, Malaysia, Netherlands, Oman, Philippines, Qatar, Thailand, Tunisia, Turkey, United Arab Emirates, United Kingdom, United States of America, Yemen

Please note that the underlying data is subject to change as the investigations around cases are ongoing. Onset date estimated if not available.

World Health Organization

Factors associated with super-spreading events of SARS, HK & Guangzhou, China, 2003

A case control study involving 124 medical wards in 26 hospitals in Guangzhou & HK has identified 6 independent risk factors of super-spreading nosocomial outbreaks of SARS:

Yu IT, et al. CID 2007

Factor
≤1m between beds
Presence of washing/changing facilities for staff
Staff working with symptoms
Performance of resuscitation
Resorting to oxygen therapy >6L/min
Use of BIPAP

358 Pitzer et al.

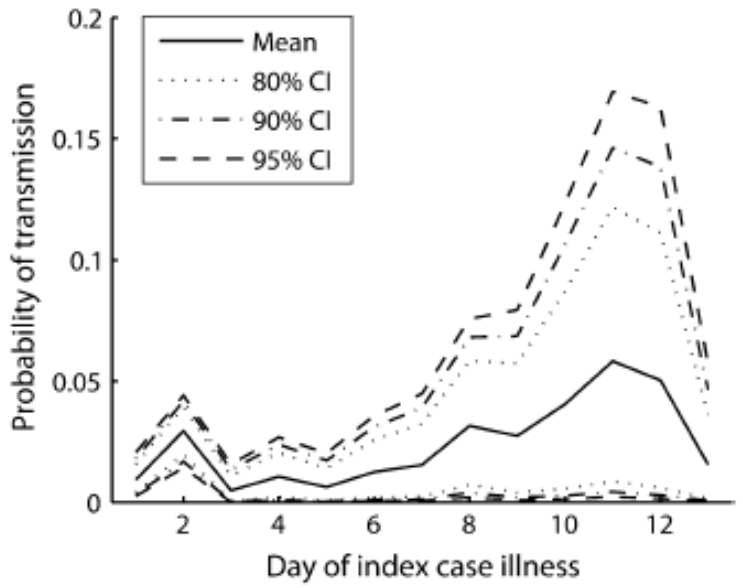


FIGURE 1. Probability of transmission of severe acute respiratory syndrome (SARS) according to day of index case illness during the 2003 SARS epidemic in Hong Kong, China. The solid line represents the estimated mean transmission probability, while the dotted, dash-dotted, and dashed lines represent the 80%, 90%, and 95% credible intervals (CIs), respectively.

Implications for super-spreading events of MERS-CoV infection in KSA and South Korea

Lesson 4: Healthcare system has Holes

COMMENTARY

Learning From SARS in Hong Kong and Toronto

C. David Naylor, MD
Cyril Chantler, MD
Sian Griffiths, MD

THE RECURRENCE OF SEVERE ACUTE RESPIRATORY SYNdrome (SARS) in China during 2004 has highlighted the continuing threat to human health from infectious disease outbreaks. A zoonosis caused by a novel coronavirus,[1,2] SARS first emerged among humans in the southern Chinese province of Guangdong during November 2002. By March 2003, SARS had spread to neighboring Hong Kong and from there to Toronto, Ontario, and many other areas in a matter of days.

The World Health Organization (WHO) has reported that by July 2003 when the epidemic had waned, in Hong Kong there were 1755 probable cases of SARS with 300 deaths (17%) and in Canada there were 251 probable cases with 43 deaths (17%).[3] Most Canadian cases and all deaths were in the Toronto area. Both areas had serious difficulties managing the outbreak, and several inquiries into public health and epidemic management have since been performed. We led the panels that first reported on SARS and public health in each jurisdiction. Both panels worked through the summer of 2003 and issued their reports within a week of one another in early October 2003.[4,5] Herein, we compare our findings, highlight common conclusions, and suggest some general lessons that may be applicable to other areas.

Contrasting Health Care Systems

In Toronto and throughout Canada, health care is provided through universal health insurance plans administered by each province. Hospitals rely on public grants and physicians work primarily as private state-dependent contractors.[6] About 45% of Ontario's 12 million individuals live in the greater Toronto area. Coordination of the response to SARS in the Toronto area was limited by 4 factors. First, Ontario is the only Canadian province that has no regional health authorities; thus, 28 general hospitals in Toronto function semiautonomously. Second, although they are paid by public insurance, physicians work as private fee-for-service practitioners. Third, public health units are funded partly by municipalities, and therefore also operate semiautonomously. Four different public health units in the Toronto area worked to contain the SARS outbreak, but did not share even the same information system. Finally, the federal role in public health and clinical care is limited constitutionally, creating potential challenges for national and international coordination during a health emergency.

Hong Kong is a Special Administrative Region of the People's Republic of China and its 6.8 million residents live on a 1100-km square area at the southeastern tip of the country. Population density is among the highest in the world at 6300 individuals per square kilometer. Hong Kong's economy is closely linked to the neighboring Pearl River Delta, and large numbers of individuals move daily between Hong Kong and the mainland. Hong Kong is therefore an international transit zone for infectious diseases that continue to emerge in south China. Overall responsibility for health in Hong Kong rests with the Health, Welfare, and Food Bureau. Both the Department of Health, which oversees public health among other services, and the Hospital Authority, which runs the public hospitals and related outpatient services for Hong Kong, report to the Secretary of Health, Welfare, and Food. However, while the public health system is available for all citizens, a fee-for-service private sector also exists. The private sector is substantial, providing primary, specialized, and institutional care services to a large number of individuals.

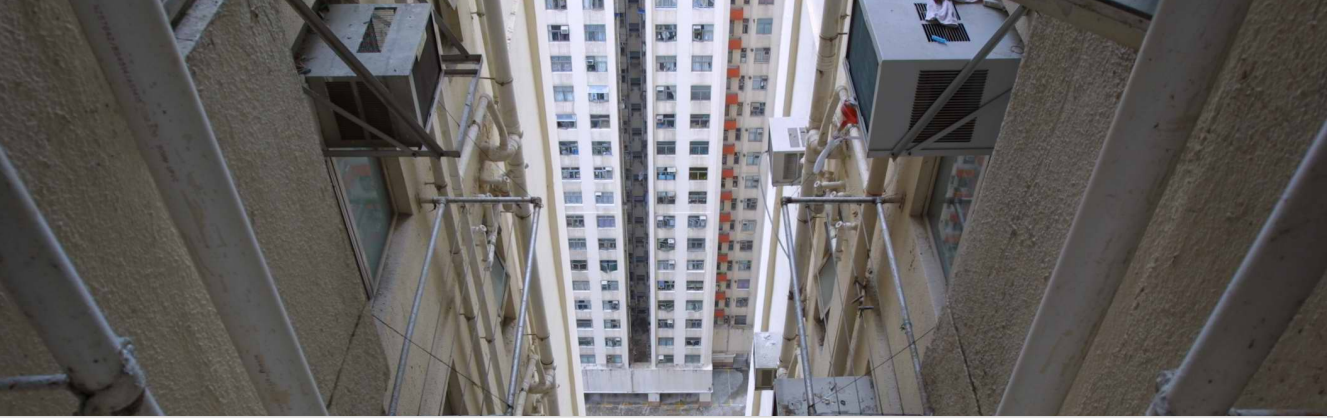
The Canadian system operates on 3 levels (federal, provincial, and municipal) while Hong Kong operates using 1. However, common features include the prominent role of autonomous private health care institutions and clinicians, uneven connections between public health and private sector health care, and financial pressures on publicly funded clinical systems.

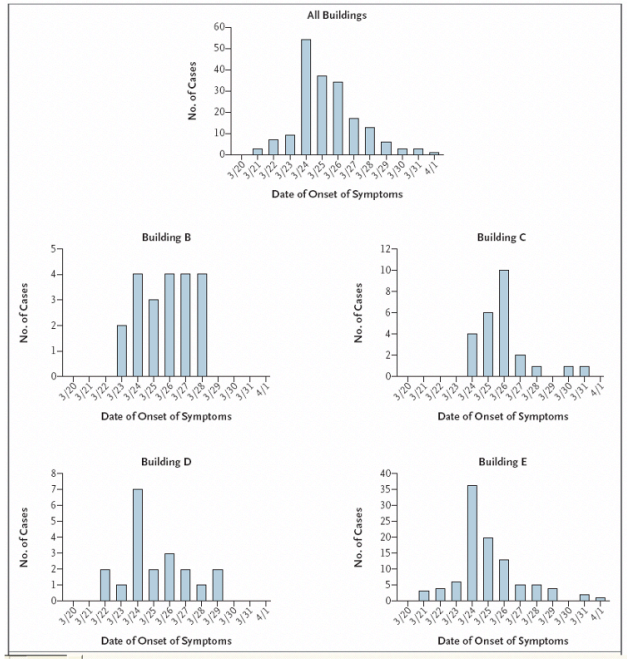
SARS Brought Similar Challenges to Both Areas

In Hong Kong, the outbreak spread first in the community, but eventually 22% of all persons affected were health care workers. In Toronto, where community spread was more limited, the proportion of SARS cases among health care workers was even higher at 43%.[3] Straightforward protection measures against droplet and contact transmission proved reasonably effective,[7] but the spread of the infec-

Author Affiliations: Faculty of Medicine, University of Toronto, Toronto, Ontario (Dr Naylor); Kings Fund, London, England (Dr Chantler); and Department of Public Health, University of Oxford, Oxford, England (Dr Griffiths).
Corresponding Author: C. David Naylor, MD, Faculty of Medicine, University of Toronto, MSB2109, 1 Kings College Cir, Toronto, Ontario M5S 1A8 Canada (david.naylor@utoronto.ca).

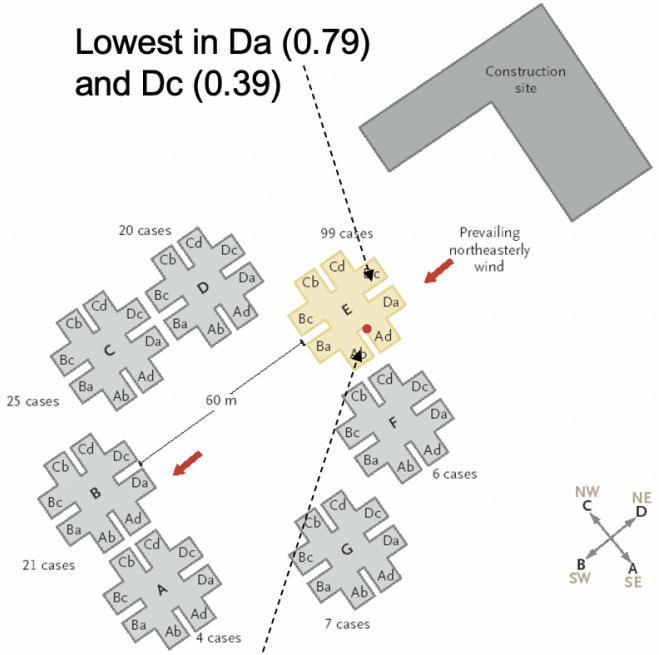
- Alert system was inadequate
- Absence of outbreak plans
- Lines of authority blurred
- Underinvestment in public health infrastructure
- Lack of agreements for sharing public health and clinical units
- Lack of sharing of public health system and private health sector





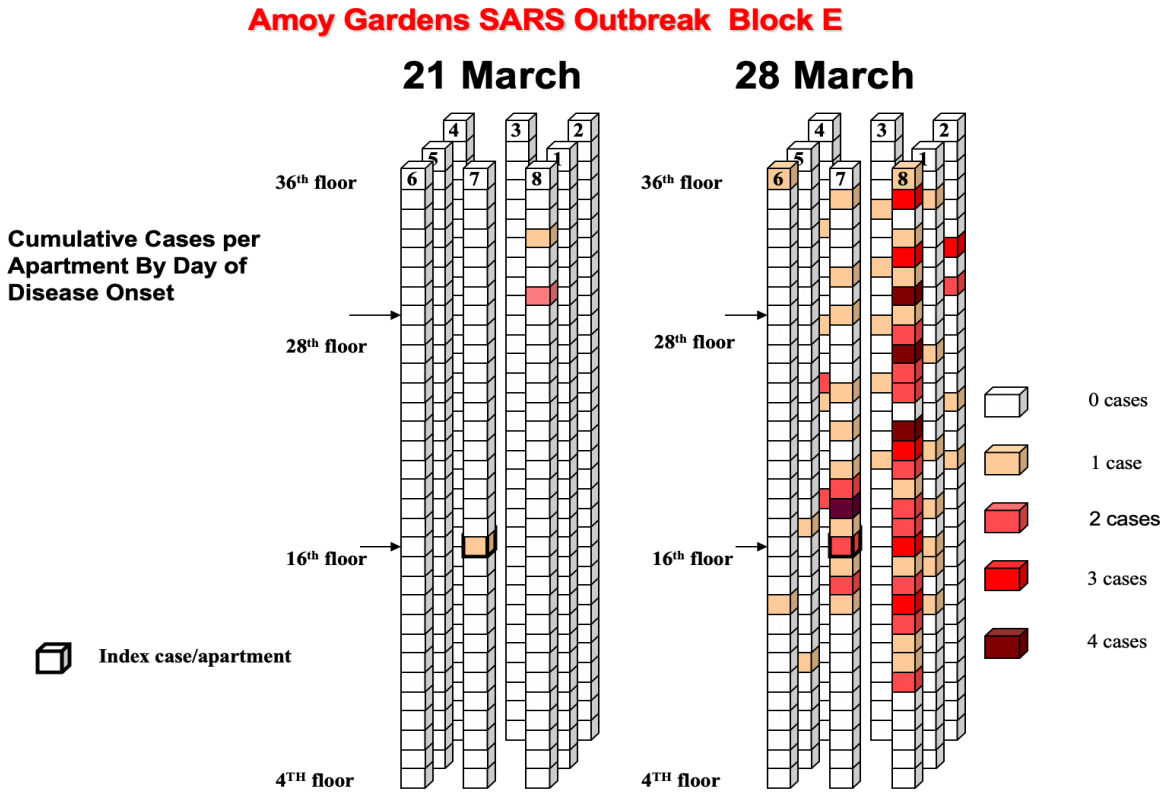
Epidemic curve of Block E is almost Identical with the curve of all cases

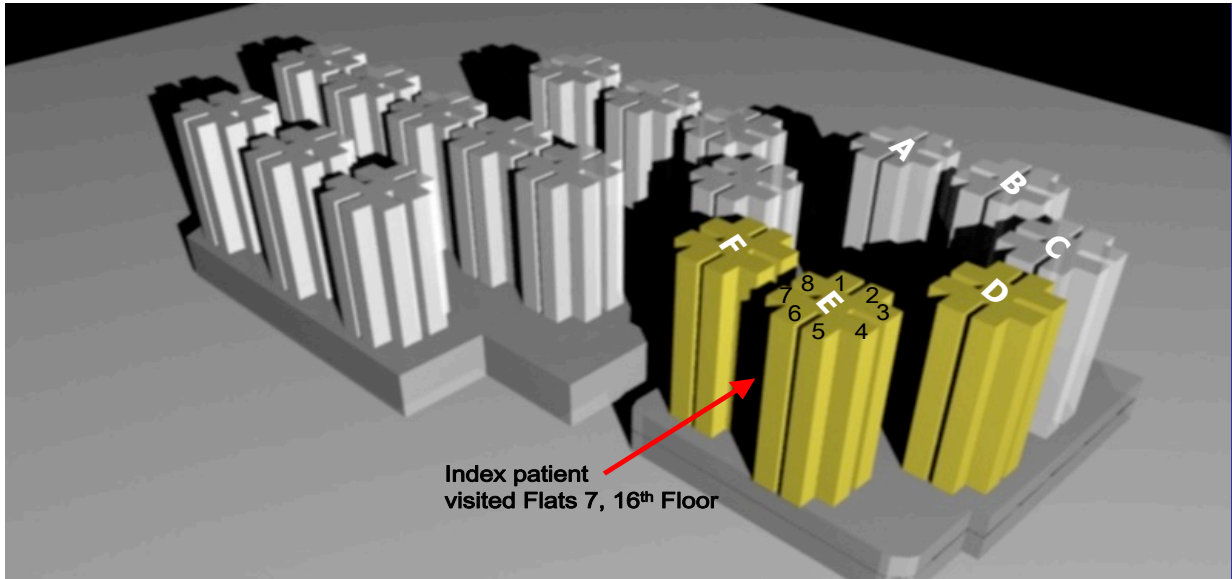
Relative Risk of Unit Infection
Middle levels (14-23/F) 5.1
High levels (24-36/F) 3.1



RR of Unit Infection
Highest in Ab (14.5) and Ad (3.9)

Yu et al. NEJM 2004





Lesson 5: Inequity of Healthcare Provision

Cases, Deaths, and Case-Fatality Rates from COVID-19 With and Without Adjustment for Population Size in 16 Countries / Regions as of April 24, 2020

Countries	Cases	Cases per million	Deaths	Deaths per million	Case-Fatality
United States	873,137	2,625.2	50,106	150.6	5.7%
Switzerland	28,677	3,413.9	1,578	187.9	5.5%
Sweden	17,567	1,722.3	2,152	211.0	12.3%
Spain	219,764	4,395.3	22,524	450.5	10.2%
France	185,023	2,729.0	21,889	322.8	11.8%
Germany	153,584	1,919.8	5,577	69.7	3.6%
Italy	189,973	3,044.4	25,549	409.4	13.4%
Netherlands	36,727	2,122.9	4,304	248.8	11.7%
Canada	43,407	1,154.4	2,250	59.8	5.2%
United Kingdom	144,632	2,199.4	19,559	297.4	13.5%
Hong Kong	1,035	142.8	4	0.6	0.4%
Singapore	12,075	1,947.6	12	1.9	0.1%
South Korea	10,708	206.7	240	4.6	2.2%
Taiwan	428	18.1	6	0.3	1.4%
Mainland China	82,805	59.6	4,632	3.3	5.6%
Japan	12,368	98.5	328	2.6	2.7%

1. Bloomberg. Mapping the Coronavirus Outbreak Across the World. https://www.bloomberg.com/graphics/2020-coronavirus-cases-world-map/?srnd=premium. Accessed April 24, 2020.
2. The United States Census Bureau. International Data Base. https://www.census.gov/data-tools/demo/idb/region.php?T=13&RT=0&A=both&Y=2019,2020&C=CA,CH,FR,GM,HK,IT,JA,KS,NL,SN,SP,SW,SZ,TW,UK,US&R=0. Accessed April 24, 2020.

Sung, Kaplan 2020

Disparity of Mortality: why?

- Evolution of case definition
- Testing, and accessibility of testing
- Demographics of patients
- Overwhelmed healthcare capacity

Effect of changing case definitions for COVID-19 on the epidemic curve and transmission parameters in mainland China: a modelling study

Tim K Tsang, Peng Wu, Yun Lin, Eric H Y Lau, Gabriel M Leung, Benjamin J Cowling

Summary

Background When a new infectious disease emerges, appropriate case definitions are important for clinical diagnosis and for public health surveillance. Tracking case numbers over time is important to establish the speed of spread and the effectiveness of interventions. We aimed to assess whether changes in case definitions affected inferences on the transmission dynamics of coronavirus disease 2019 (COVID-19) in China.

Methods We examined changes in the case definition for COVID-19 in mainland China during the first epidemic wave. We used exponential growth models to estimate how changes in the case definitions affected the number of cases reported each day. We then inferred how the epidemic curve would have appeared if the same case definition had been used throughout the epidemic.

Findings From Jan 15 to March 3, 2020, seven versions of the case definition for COVID-19 were issued by the National Health Commission in China. We estimated that when the case definitions were changed, the proportion of infections being detected as cases increased by 7·1 times (95% credible interval [CrI] 4·8–10·9) from version 1 to 2, 2·8 times (1·9–4·2) from version 2 to 4, and 4·2 times (2·6–7·3) from version 4 to 5. If the fifth version of the case definition had been applied throughout the outbreak with sufficient testing capacity, we estimated that by Feb 20, 2020, there would have been 232 000 (95% CrI 161 000–359 000) confirmed cases in China as opposed to the 55 508 confirmed cases reported.

Interpretation The case definition was initially narrow and was gradually broadened to allow detection of more cases as knowledge increased, particularly milder cases and those without epidemiological links to Wuhan, China, or other known cases. These changes should be taken into account when making inferences on epidemic growth rates and doubling times, and therefore on the reproductive number, to avoid bias.

Funding Health and Medical Research Fund, Hong Kong.

Lancet Public Health 2020; 5: e289–96

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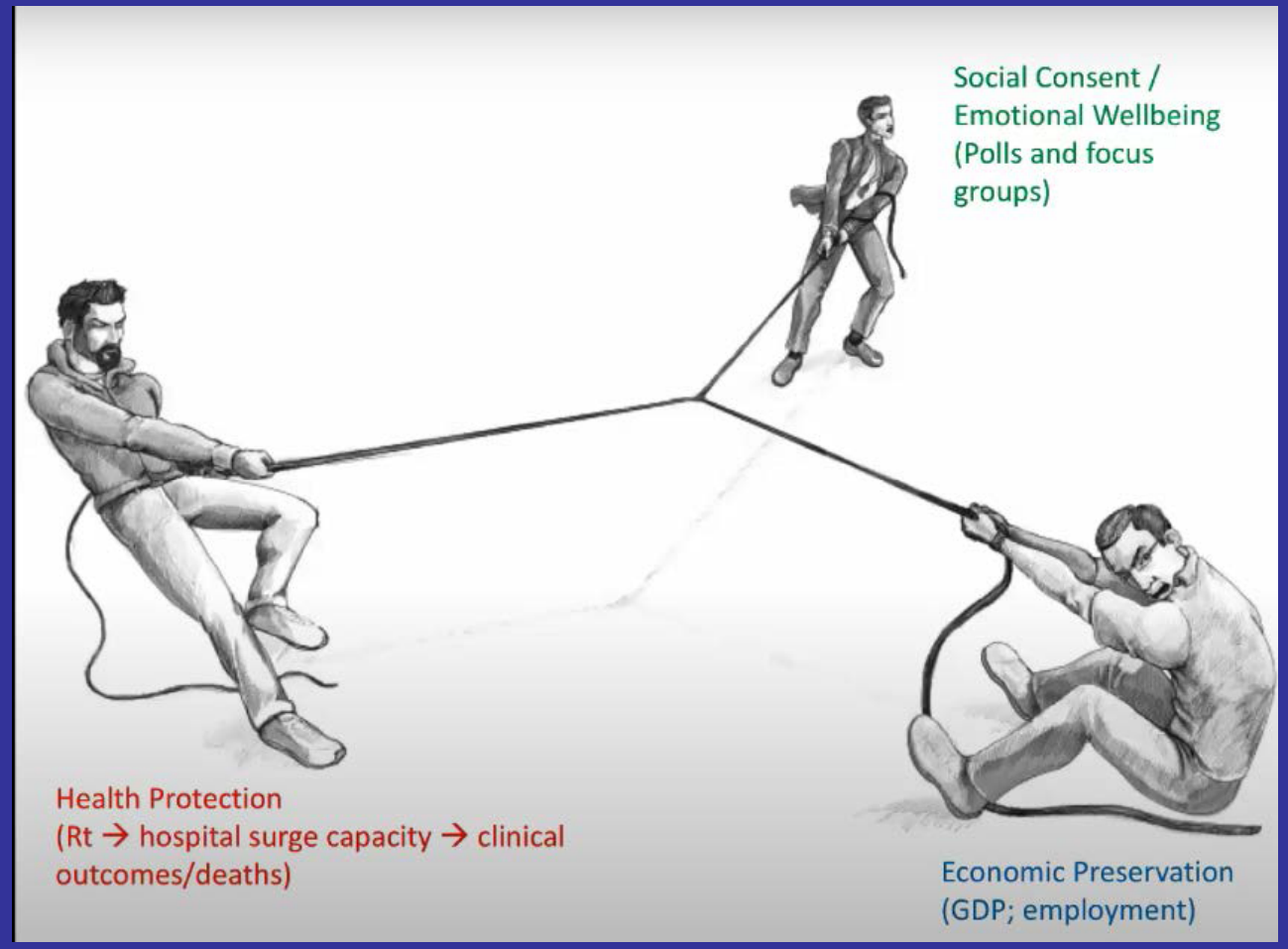
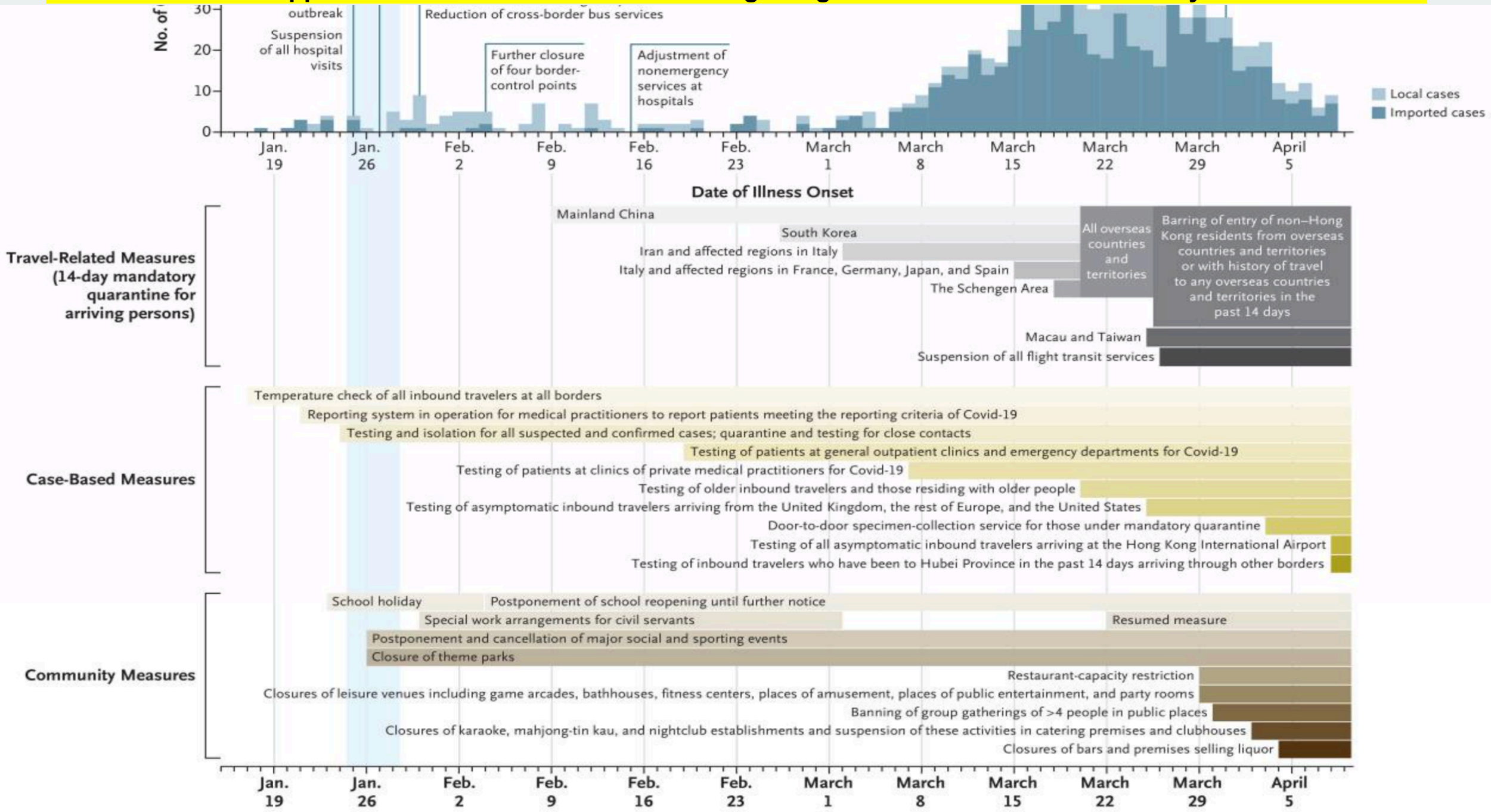
Correspondence to: Dr Peng Wu, School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China pengwu@hku.hk

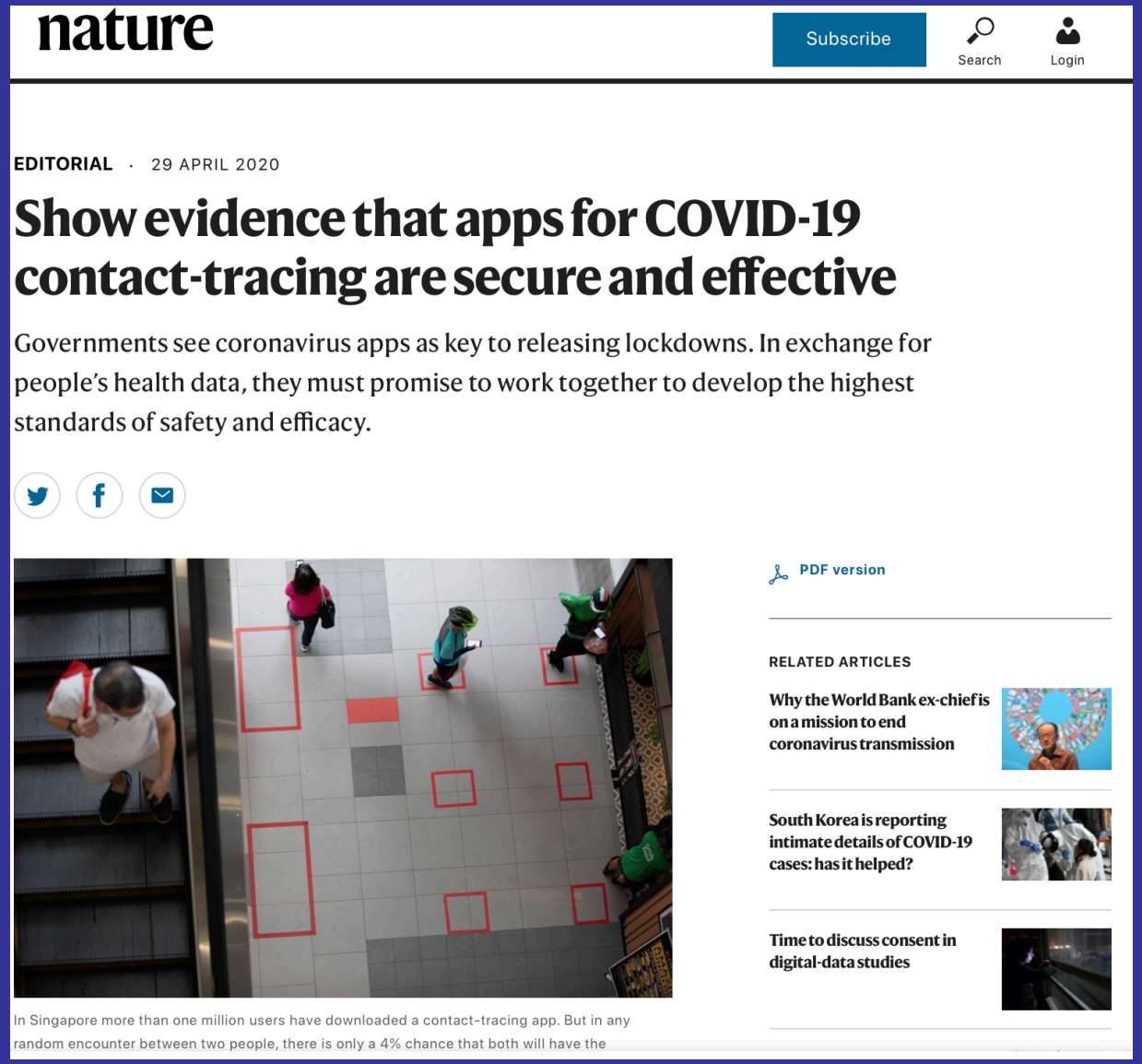
Lesson 6: Socio-economic aspects of infectious disease control not to be ignored



Actions Taken to Suppress Covid-19 Transmission in Hong Kong and Occurrence of Laboratory-Confirmed Cases.



Lesson 7: AI helps but needs to be careful



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EDITORIAL · 29 APRIL 2020

Show evidence that apps for COVID-19 contact-tracing are secure and effective

Governments see coronavirus apps as key to releasing lockdowns. In exchange for people's health data, they must promise to work together to develop the highest standards of safety and efficacy.

PDF version

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Why the World Bank ex-chief is on a mission to end coronavirus transmission

South Korea is reporting intimate details of COVID-19 cases: has it helped?

Time to discuss consent in digital-data studies

In Singapore more than one million users have downloaded a contact-tracing app. But in any random encounter between two people, there is only a 4% chance that both will have the

- SARS-CoV2 apps in smartphones can help contact tracing
- Create a log of who is nearby and who has been in contact with infected patients
- Will be contact by health officials if an app user that been in contact with an infected person

Lesson that we should learn : act fast

The world this week

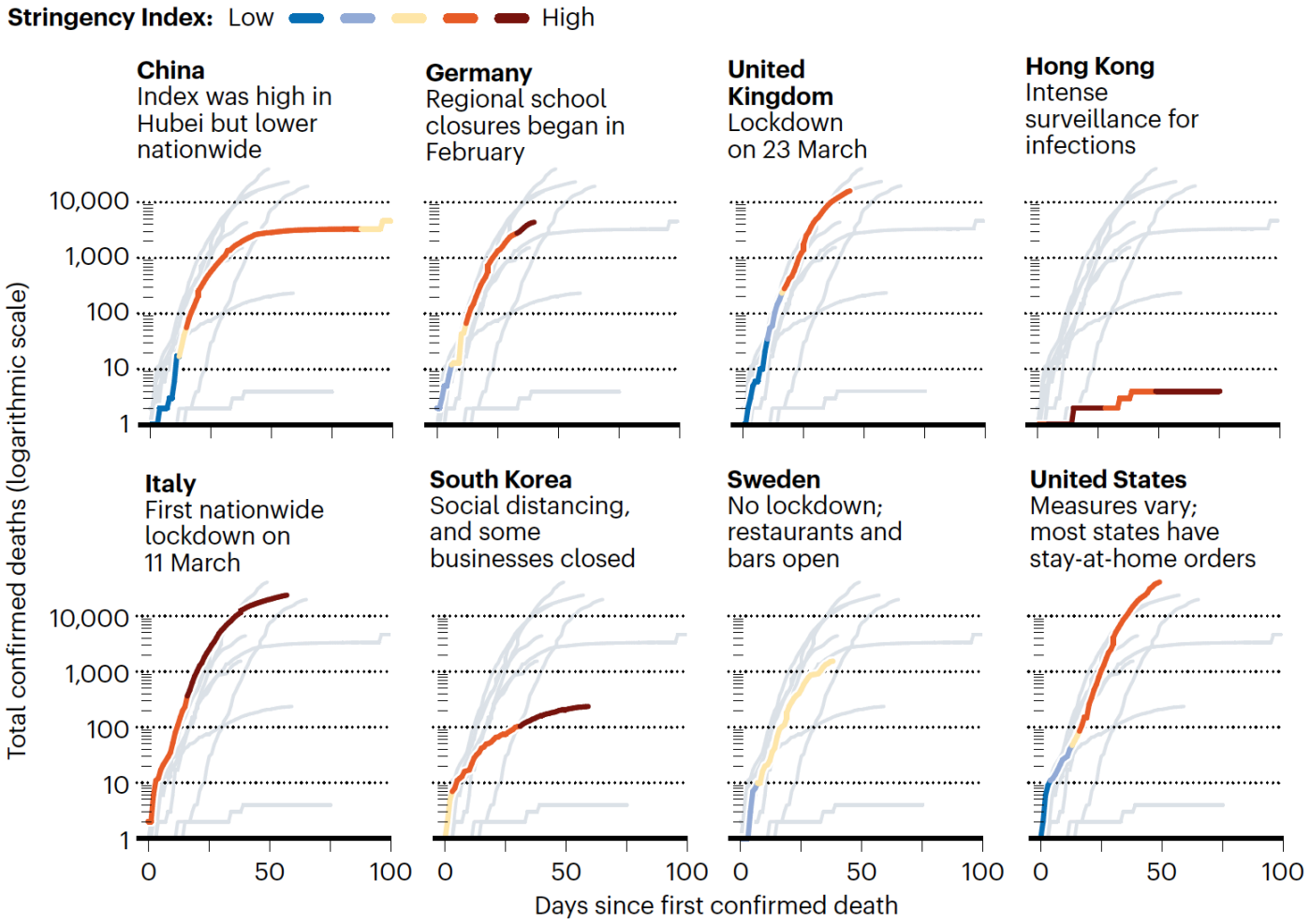
News in focus

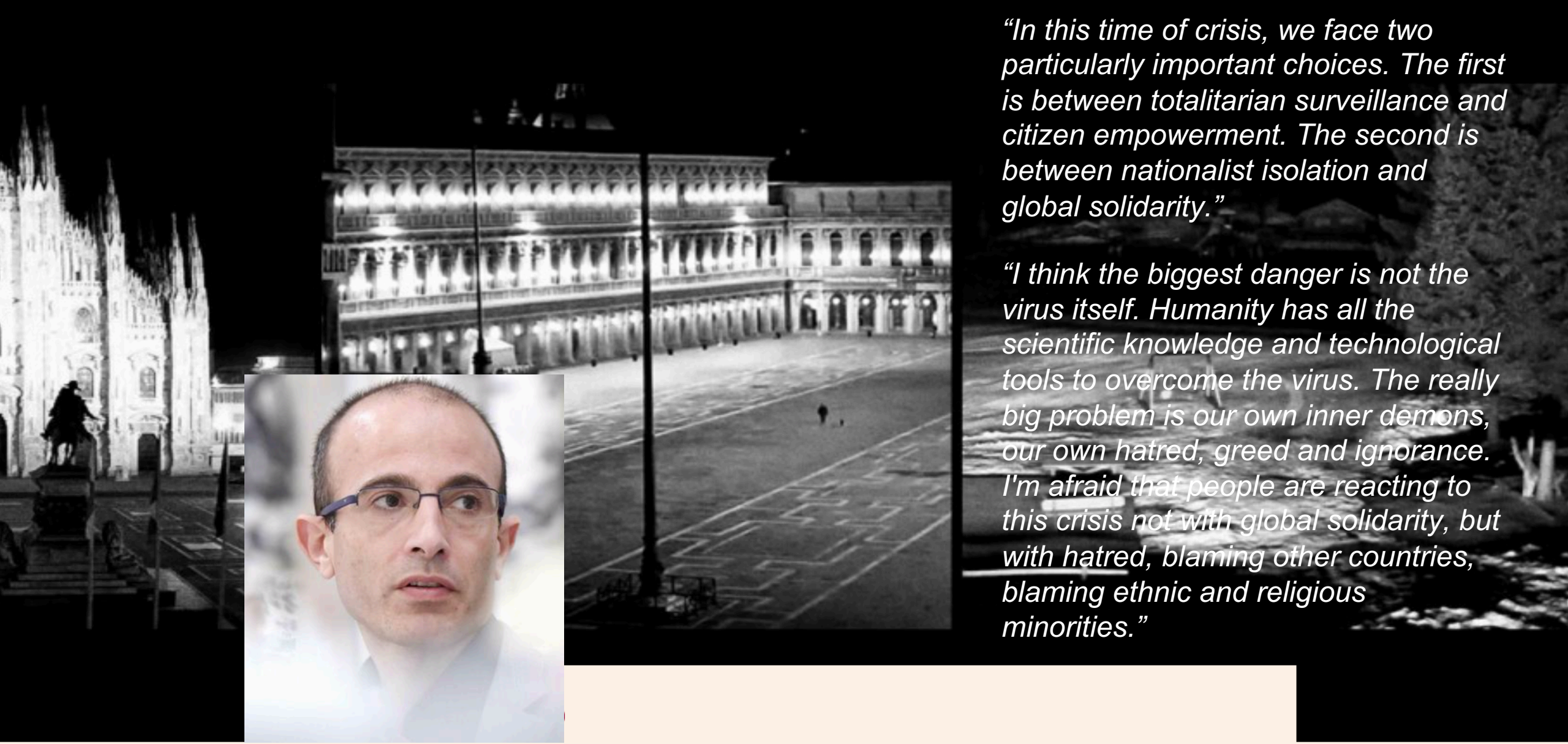
Lockdown in Italy: scientists are working out what effects specific measures, such as social distancing, have in slowing the spread of CO

WHOSE CORONAVIRUS STRATEGY WORKED BEST? SCIENTISTS HUNT MOST EFFECTIVE POLICIES

PANDEMIC PROTECTIONS

Researchers have created a 'stringency index' that describes the overall severity of a country's response to the coronavirus outbreak and allows responses to be compared. The index takes into account seven control measures, such as school closures and restrictions on people's movements.





“In this time of crisis, we face two particularly important choices. The first is between totalitarian surveillance and citizen empowerment. The second is between nationalist isolation and global solidarity.”

“I think the biggest danger is not the virus itself. Humanity has all the scientific knowledge and technological tools to overcome the virus. The really big problem is our own inner demons, our own hatred, greed and ignorance. I'm afraid that people are reacting to this crisis not with global solidarity, but with hatred, blaming other countries, blaming ethnic and religious minorities.”

Yuval Noah Harari: the world after coronavirus | Free to read

Stanford | MEDICINE
International COVID-19 Conference

COVID-19 Pandemics: Mortality among Asians

Zuo-Feng Zhang, MD, PhD
Professor of Epidemiology and Medicine
Associate Dean for Research
UCLA Fielding School of Public Health
May 15, 2020

UCLA FIELDING SCHOOL OF PUBLIC HEALTH

China

Coronavirus Cases:

82,929

Deaths:

4,633

Recovered:

78,195

WORLD

Coronavirus Cases:

4,478,565

view by country

Deaths:

300,220

Recovered:

1,682,872

United States

Coronavirus Cases:

1,436,535

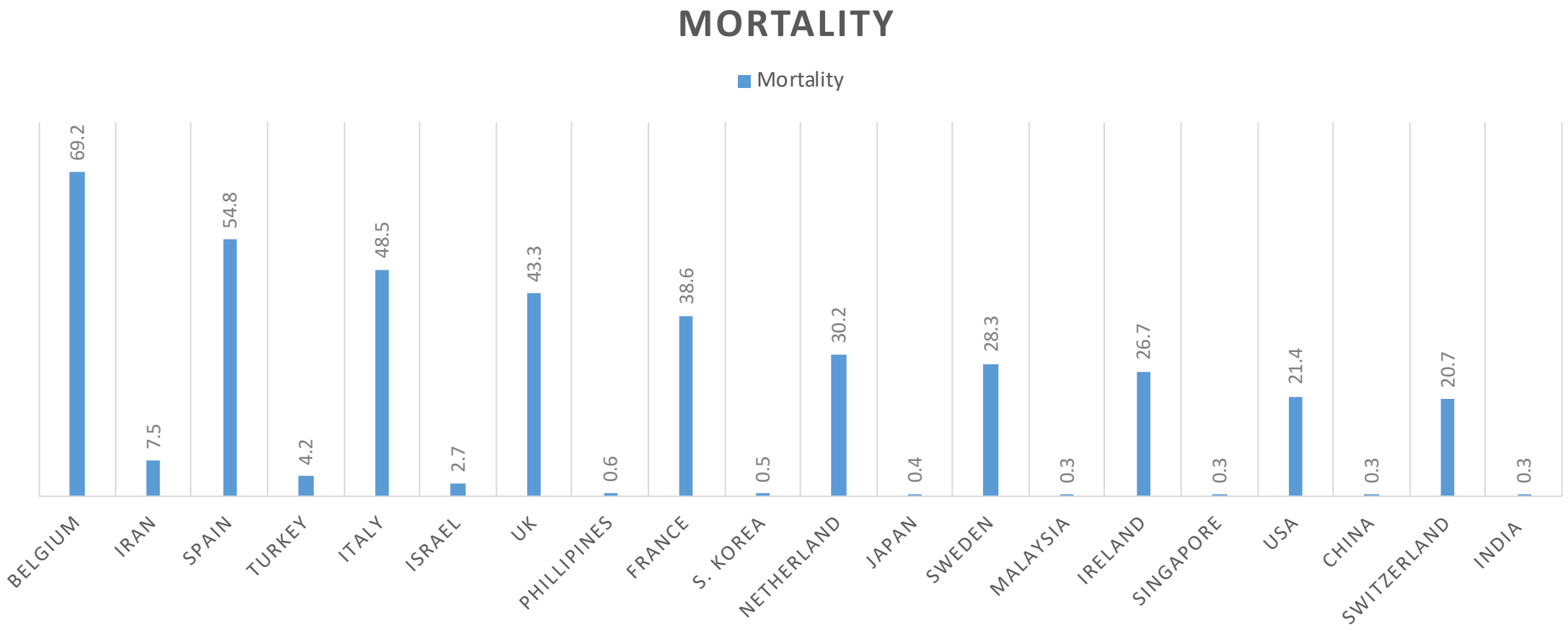
Deaths:

85,463

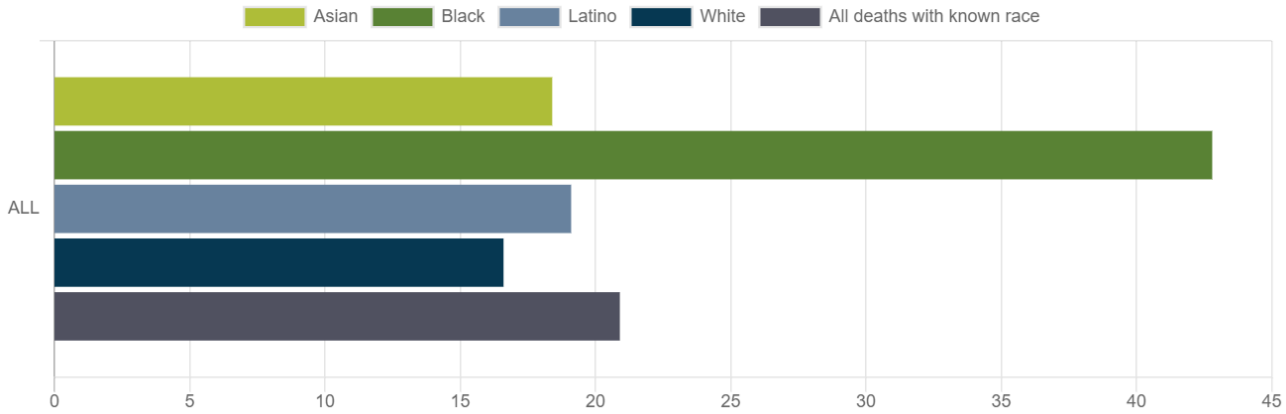
Recovered:

310,834

Mortality of COVID-19 Non-Asian and Asian Countries

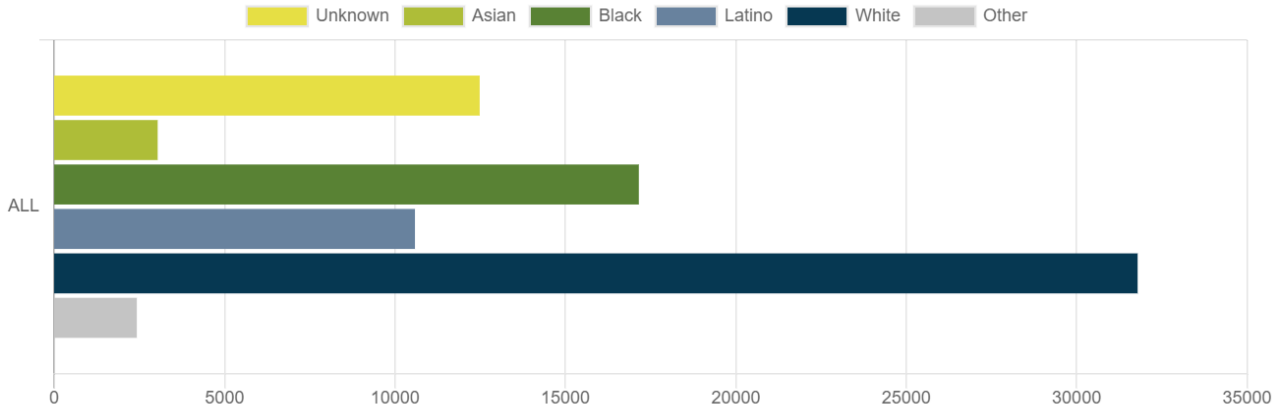


COVID-19 DEATHS PER 100,000 PEOPLE OF EACH GROUP, REPORTED THROUGH MAY 11, 2020

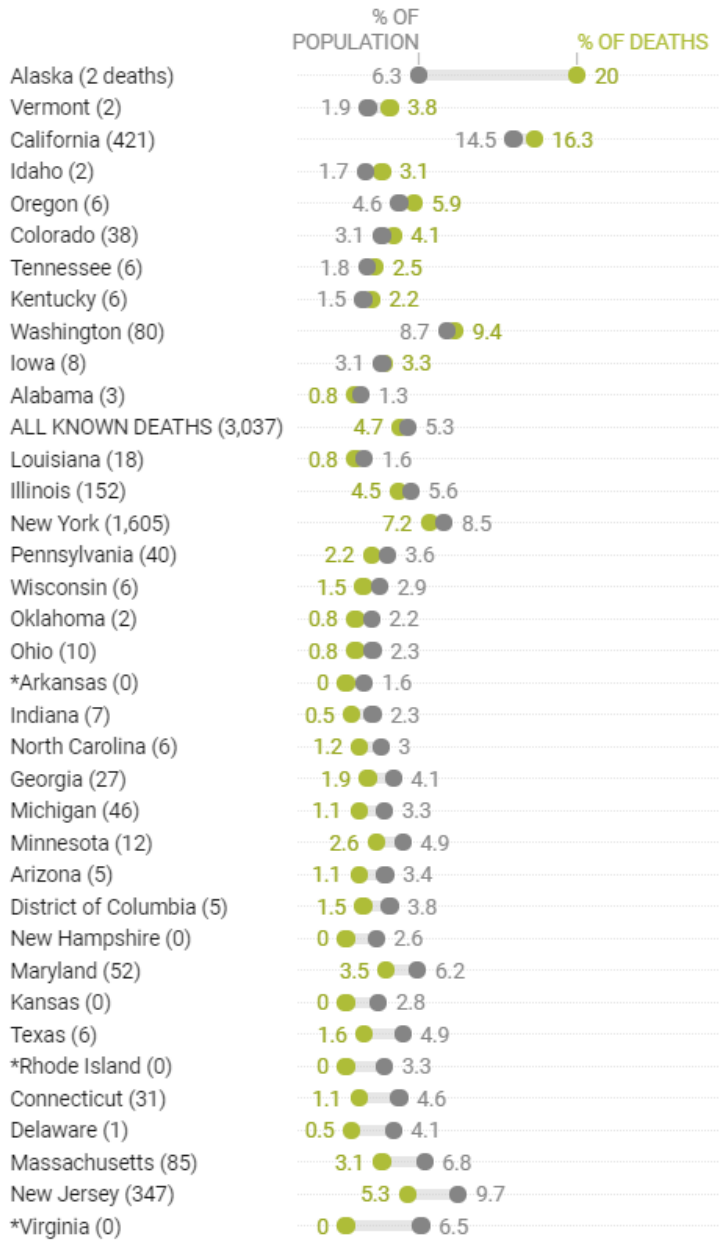


** Includes data from Washington, D.C., and the 39 states of Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington and Wisconsin. States employ varying collection methods regarding ethnicity data. Denominator is built from data aggregated from each state, aligned with their method.*

COVID-19 DEATHS BY RACE AND ETHNICITY, REPORTED THROUGH MAY 11, 2020



** Includes data from Washington, D.C., and the 39 states of Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington and Wisconsin. States employ varying collection methods regarding ethnicity data. Our sum is built from data aggregated from each state, aligned with their method.*



https://www.apmresearchlab.org/covid/deaths-by-race

Factors might contribute to mortality rates of COVID-19 in Asians

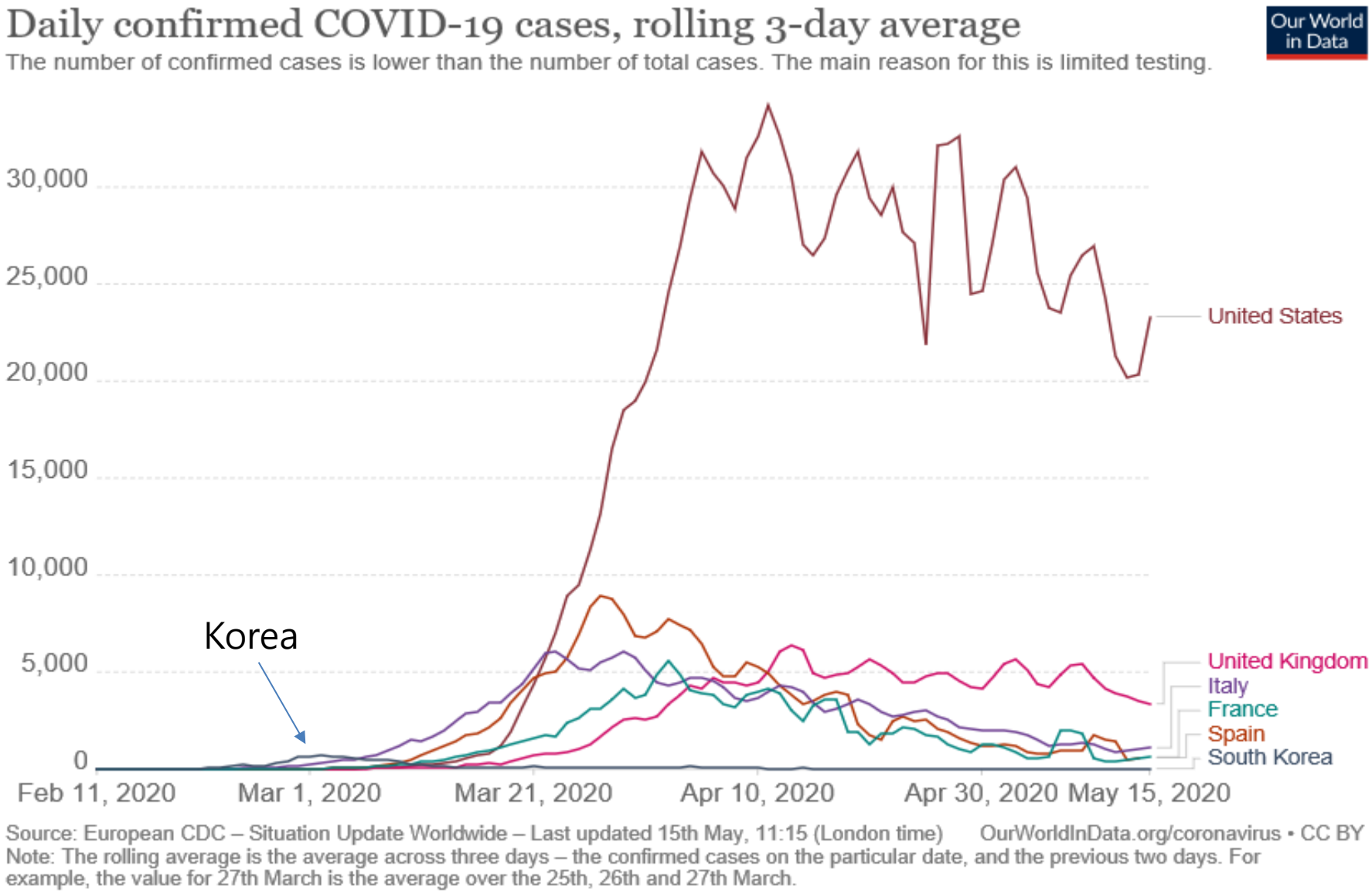
- Face Masks – low cost and might be effective protective measure
- Protection of BCG vaccine – waiting for results of a few clinical trials
- Co-morbidities, such as hypertension, obesity, diabetes, CVDs, cancer in Asians
- Sufficient tests for COVID-19 detections?
- Over and under-reporting issues

COVID-19 as a public health crisis and response strategy in Korea

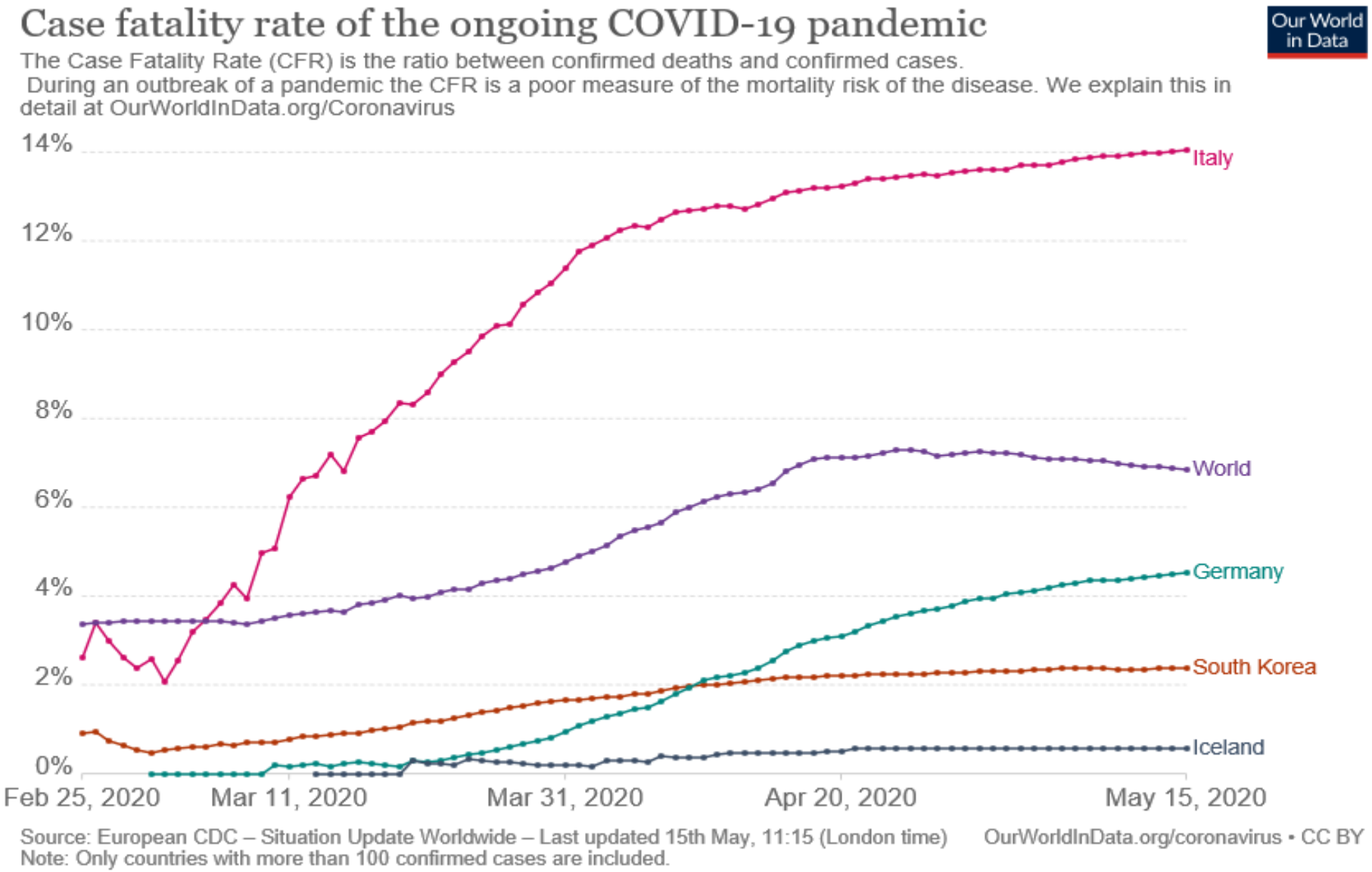
Dept. of Social and Preventive Medicine,
Hallym University College of Medicine

Dong-Hyun Kim, M.D., Ph.D.

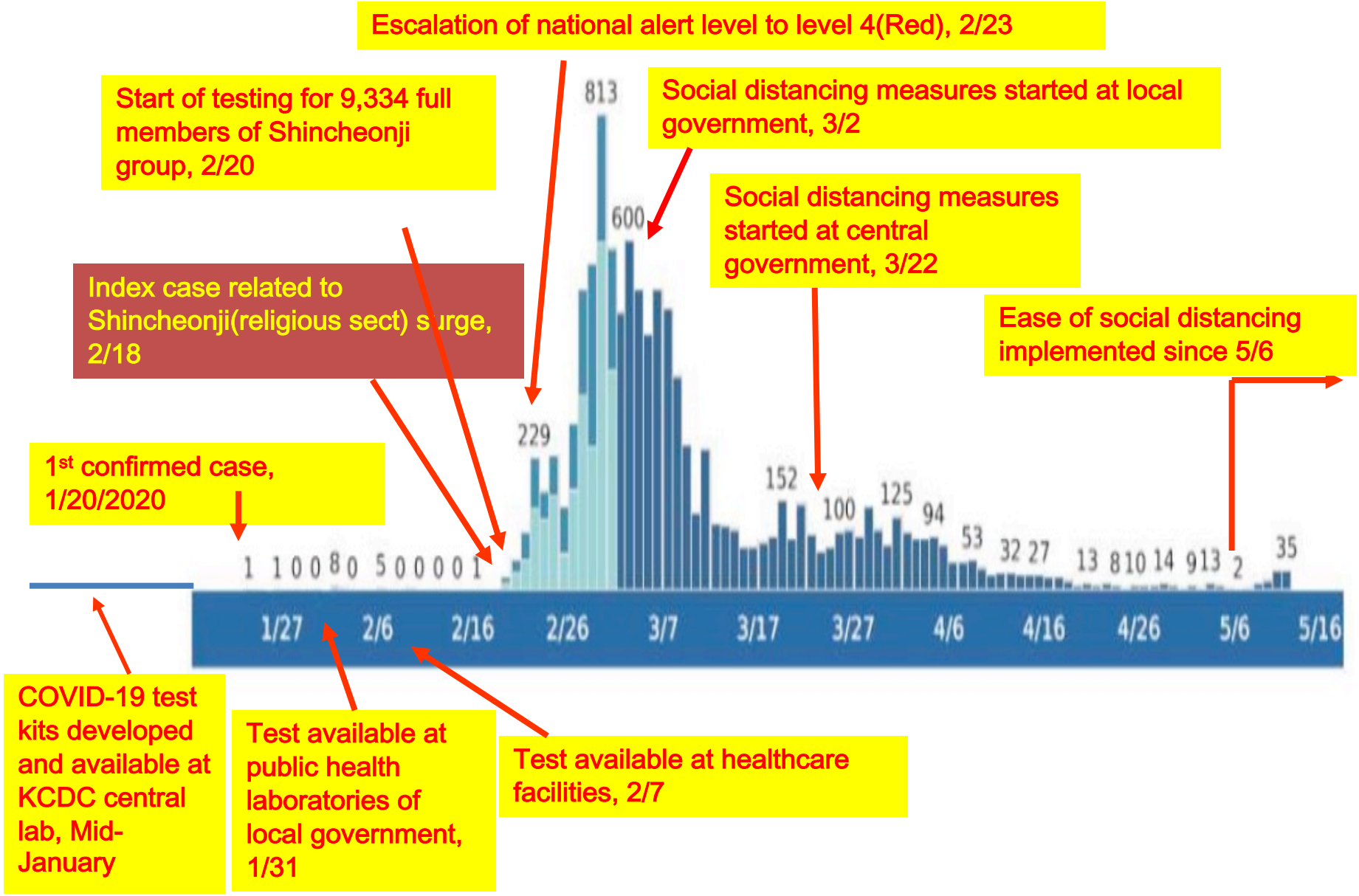
New daily confirmed cases due to COVID-19, as of 5/15/2020



Case fatality rates du to COVID-19, as of 5/15/2020



Response to COVID-19 epidemic in Korea, as of 10 May, 2020



Key factors contributing to control of COVID-19 outbreak in Korea

1. Public health response infrastructure

2. Early preparedness: mass Testing

3. Contact tracing → quarantine for 14 days

4. Efficient treatment !!!

5. Non-pharmaceutical Intervention(NPI) through civic participation

1. Public Health Infrastructure in Korea

- ~250 Public health centers in each county, universal health coverage

- Recruiting **Epidemic Intelligence Service(EIS) officials in central KCDC** and in the health department of local government as well
- Establishment of **Infectious Disease Control Center(IDCC) in most of the local governments** after MERS outbreak in 2015
- Year-round **FETP(Field Epidemiology Training Program) for public health officials working at the public health centers of all counties(~250)**, implemented with support of KCDC

- **TTX(Table Top Exercise) for disease X (pneumonia family of unknown origin) in mid-Dec, 2019 by KCDC**

2. Early preparedness for mass testing

- Corona test kits, developed and approved in Mid-January, before first case identified on 1/20 in Korea

  - ~120 locations: 23 public laboratories, 83 medical institutions, and 14 entrusted testing facilities - that provide diagnostic tests

- **Capacity :** Average ca. 12,000/day / Max. ca. 30,000/day
- **Turn Around Time:** 6 ~ 24hrs

- **Screening stations for sample collection:** ~600 sites nationwide, including drive through and walk-through clinics

K-CDC guideline for testing

○ **Suspected case**:
A person exhibiting fever (37.5 degrees or above) or respiratory symptoms (coughs, shortness of breath, etc.) within 14 days of contact with a confirmed COVID-19 patient during the confirmed patient's symptom-exhibiting period.

○ **Patient Under Investigation**(PUI):
(1) A person suspected of COVID-19 **according to a physician's opinion** for reasons such as pneumonia of an unknown cause;
(2) A person exhibiting fever (37.5 degrees or above) or respiratory symptoms (coughs, shortness of breath, etc.) **within 14 days of visiting a country with local transmission* of COVID-19**, e.g. China (including Hong Kong, Macau); or

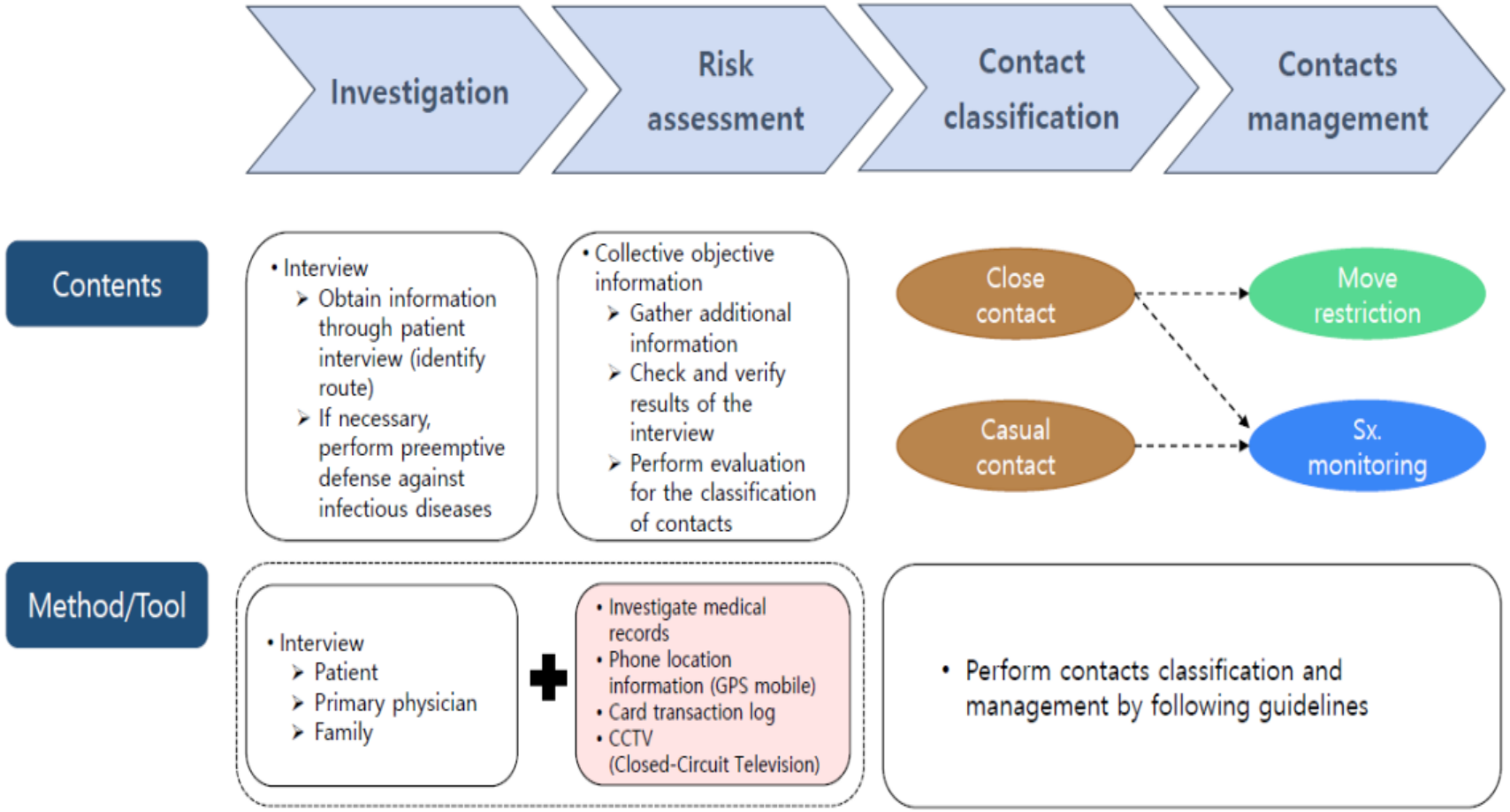
- Refer to WHO or KCDC website (COVID-19 □Situation reports □Local transmission classification)

(3) A person exhibiting fever (37.5 degrees or above) or respiratory symptoms (coughs, shortness of breath, etc.) **with an epidemiological link to a domestic COVID-19 cluster.**

* tested all persons **linked to certain major clusters** (i.e., Shincheonji, Guro-gu call center) regardless of clinical symptoms. We have also recently tested all persons in l**ong-term care facilities in Daegu City** regardless of clinical symptoms.

3. Active tracing and management for close contacts

Contact tracing strategy : stepwise approach



4. Efficient Treatment

- Triage cases and assign beds accordingly based on clinical severity (protocol) applied

  - ICU in tertiary hospitals
  - Isolated beds in (mainly public-sector) hospitals, nationwide
  - Community treatment center (isolated beds in recreation facilities, nationwide)

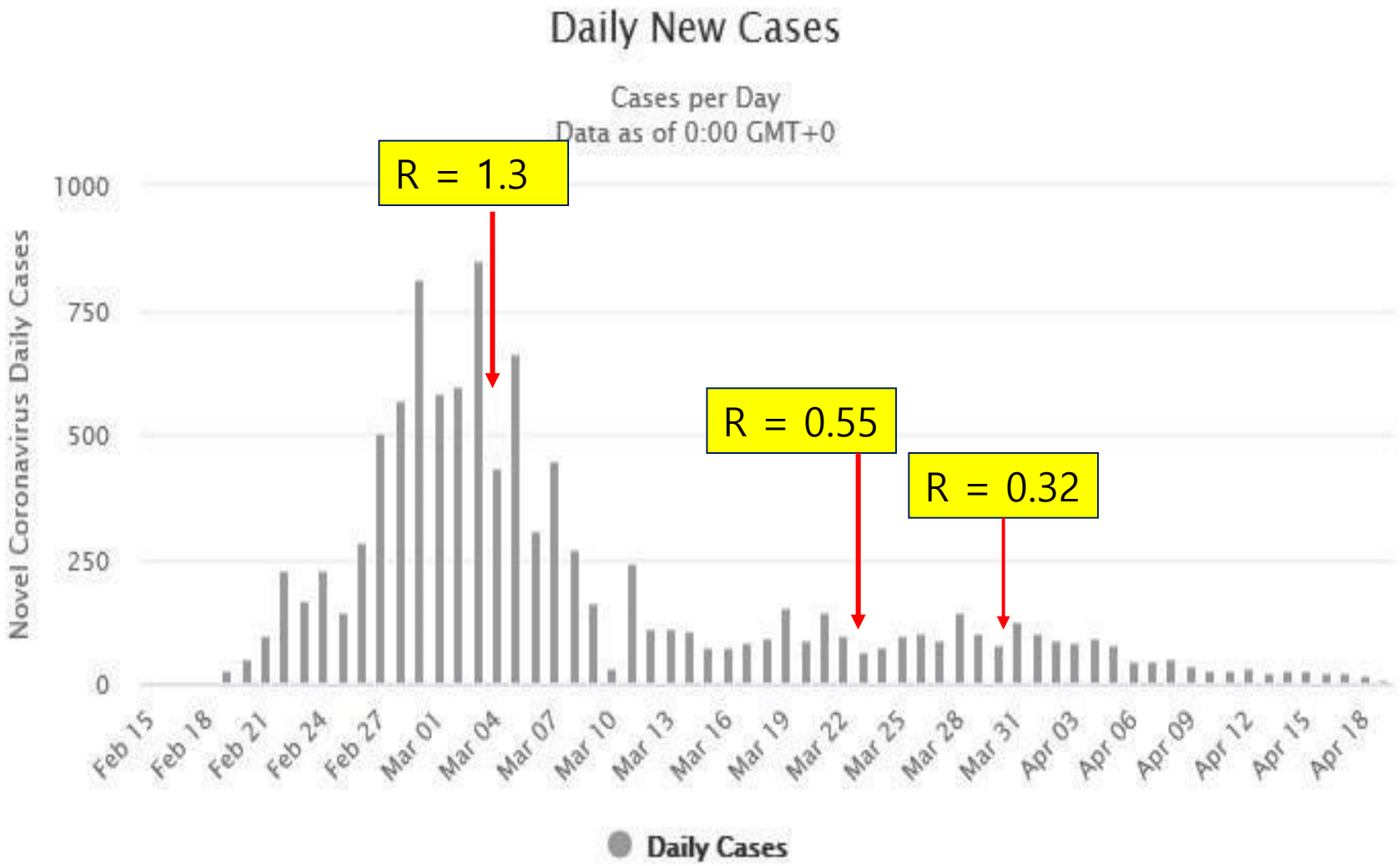
5. Non-pharmaceutical Intervention(NPI)

- Personal protective measures: **wearing masks**, washing hands,…

- **Social distancing since early epidemic phase**

: Soft physical distancing in most area of South Korea, without imposing draconian lockdown

R effective in Korea: Incidence Decay with Exponential Adjustment (IDEA) Model-Based Nearcasting



(AY Chun et al, 2020)

Time to normalize social life in Korea ?

- Preparing for the transition from moderate social distancing to sustainable and soft physical distancing.

- Recent surge in the several nightclubs in Seoul: easing too soon ???

It ain’t over until it is over

Time for Solidarity !!

(dhkims@hallym.ac.kr)

Covid-19 pandemic and response in the UK:

a non-communicable disease epidemiologist's perspective

Sarah Wild, Professor of Epidemiology
University of Edinburgh

STAY HOME › PROTECT THE NHS › SAVE LIVES

COBR
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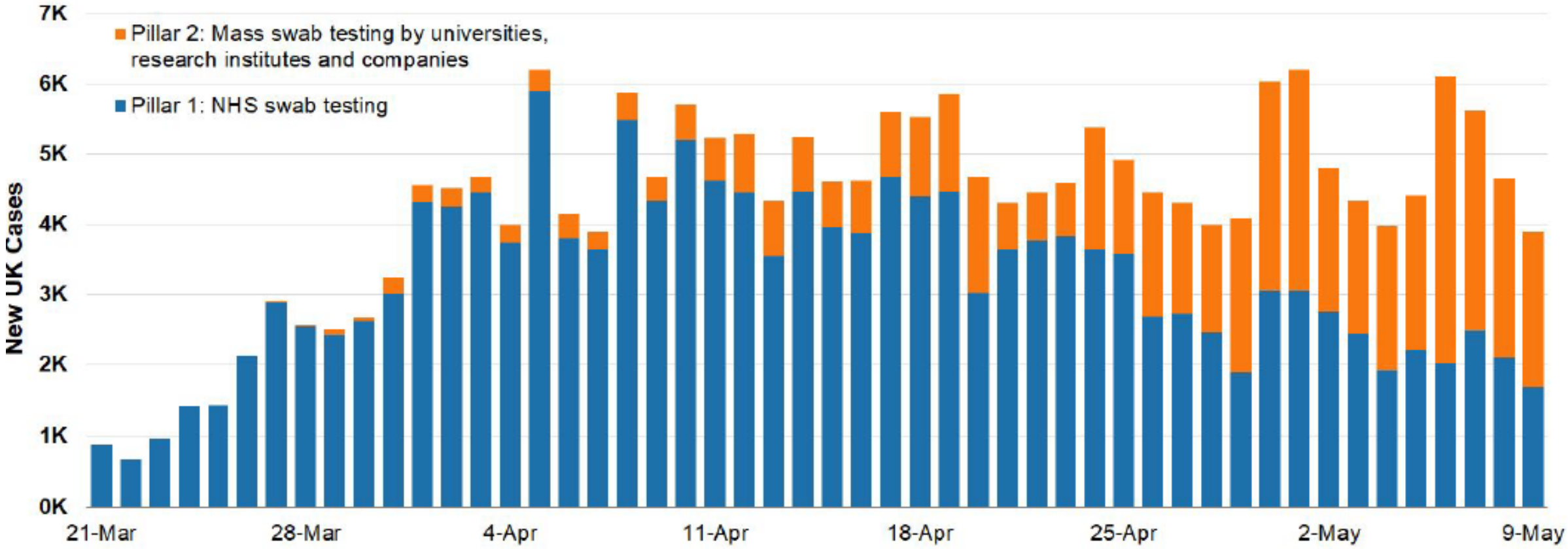
New Cases (UK)

On 9th May 3,896 new cases were recorded. There are likely to be more cases than recorded here.



Source: Department of Health and Social Care. Pillar 1: Swab testing in PHE labs and NHS hospitals for those with a clinical need and, health care workers. Pillar 2: Swab testing for essential workers and their households, as well as other groups that meet the eligibility criteria as set out in government guidance. Cases are reported when lab tests are completed. This may be a few days after initial testing. Chart date corresponds to the date tests were reported as of the 24 hours before 9am that day.

Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884010/2020-05-09_COVID-19_Press_Conference_Slides__7_.pdf

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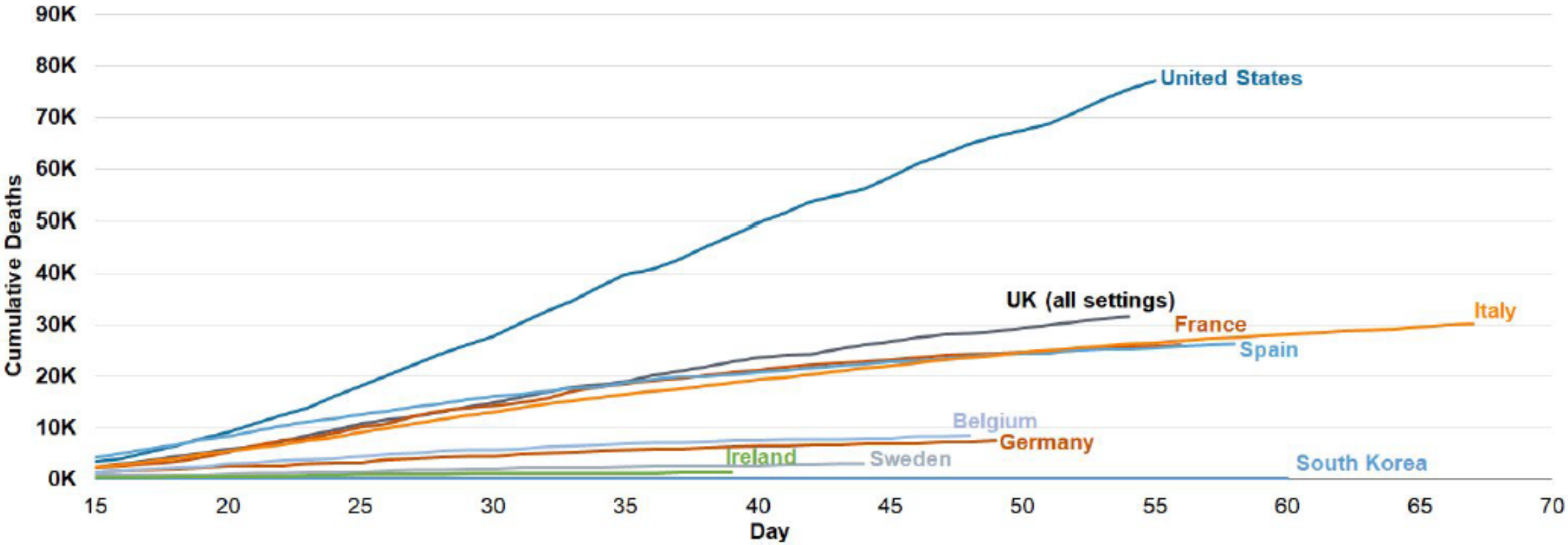
Global Death Comparison

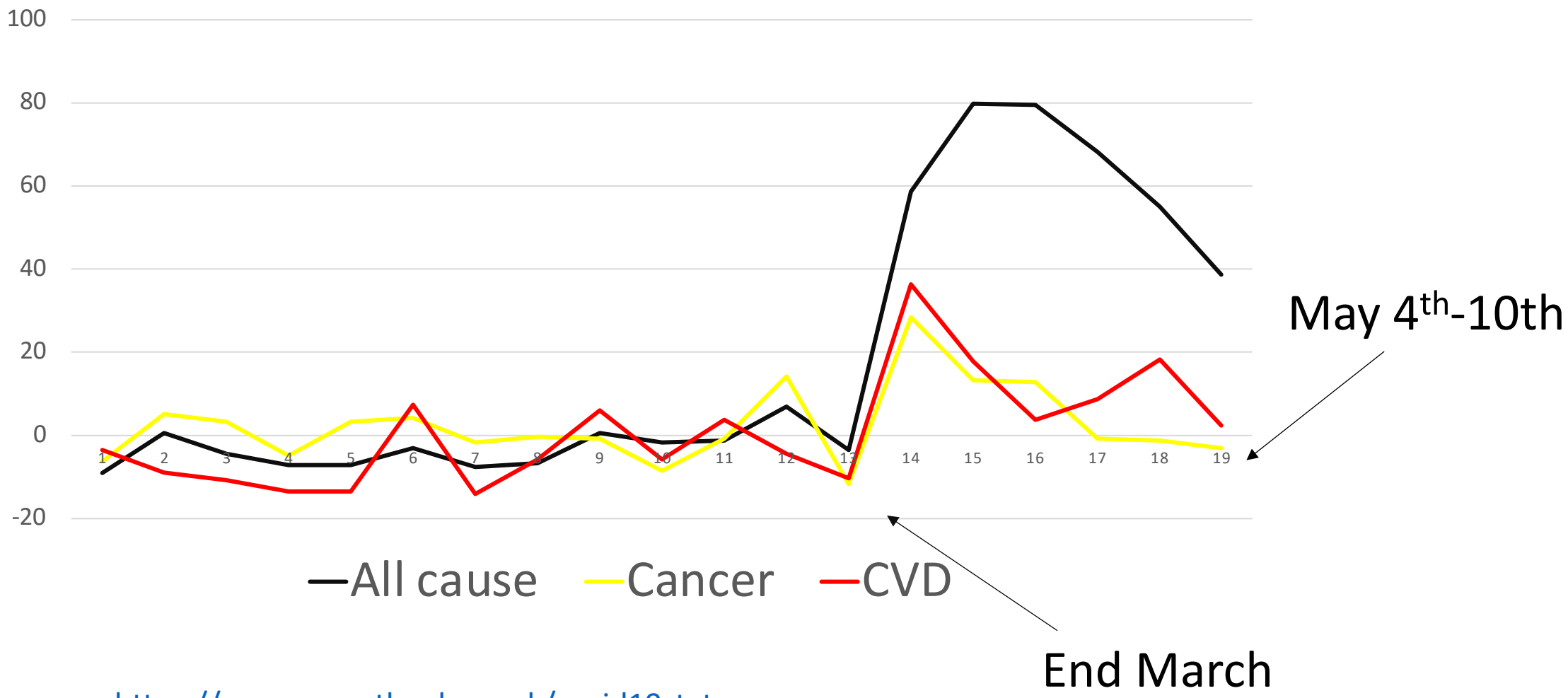
Different countries have different methods of counting COVID-19 deaths which means it is difficult to compare statistics across countries.



Source: Public Health England, UK devolved administrations, Johns Hopkins University. Country data is aligned by stage of the outbreak. Day 0 equals the first day **50 cumulative deaths were reported.** UK figures on deaths relate to those who have tests positive for COVID-19, whichever setting they died in. International reporting procedures and lags are unclear, so may not be comparing like-for-like.

Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884010/2020-05-09_COVID-19_Press_Conference_Slides__7_.pdf

Excess mortality by week of calendar year and cause: Scotland 2020 vs 2015-2019 average



Data source: https://www.nrscotland.gov.uk/covid19stats

Public health challenges in UK

- Lack of experience from SARS and MERS
- High density living in London/ other large cities
- Zero hours contracts for social care workers

- Initial plans to allow herd immunity to develop
- Delayed lockdown
- Creating hospital capacity
- Insufficient PPE and testing/tracing capacity
- Inequalities by age, sex, ethnicity, socio-economic status, occupation
- Major changes in routine health care
- Potential second wave as lockdown released

e do it for love

COVID-19 Response Sharing Taiwan Experience

Mei-Shang Ho, MD
President
Taiwan Health Corp
May 15, 2020

Stepwise aims and control measures

Aims / Control Measures

1. Limit entry and spread -
Boarder control;
Quarantine;
Contact tracing;
Mobile tracking

4. Reduce case fatality -
Health care facility

Society level
- Financial support
- Volunteers/ retired professional
- Social/ Mental support

Aims /Health Literacy

2. Reduce risk of exposure/infection
- Human behavior modification
- **Social distancing**
- **Hand hygiene**
- **Face masks**

3. Reduce risk of severe disease
- Lifestyle modification
- **Nutrition**
- **Exercise**
- **Mental health**

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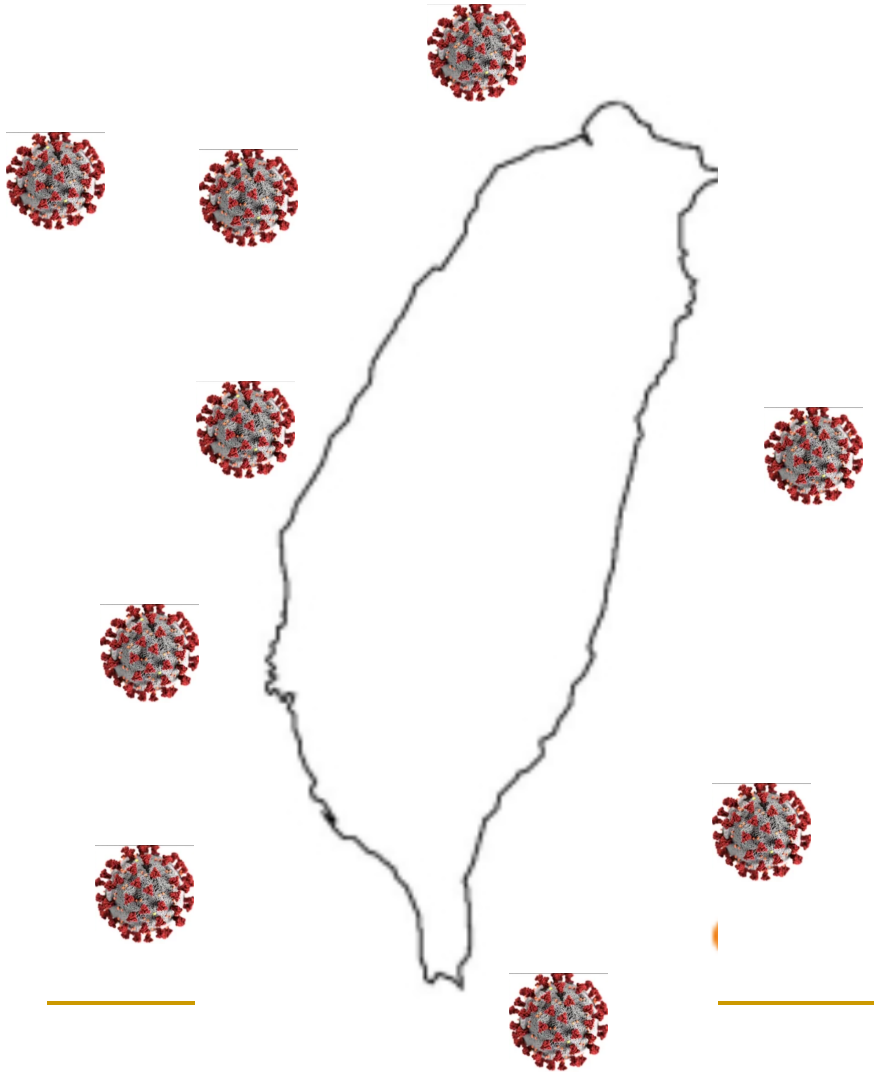
Taiwan experience – an example of deviation from WHO recommendation

Boarder Control – Very Early Action



Jan 21	first case COVId-19 from Wuhan
25-26	nonessential travel & direct flight to Wuhan banned prohibit entry of Chinese from Wuhan (canceling International Book Fair 2/4-9)
Feb 6	Prohibit entry of all Chinese from China Prohibit docking of cruise ship
Feb 7	Entry ban of anyone traveled to China in past 14 days
Feb 10	Stop all flights to China except for 5 airports
Mar 18	All inbound travelers regardless nationality, quarantined for 14 days with 1000 NT (35 USD) daily compensation

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Taiwan experience

Building Mutual Trust – public private partnership

Ex. Surgical Mask and Disinfectant Alcohol

- Prohibit exportation of Surgical Masks
- Government grant for private industry to increase production capacity
- Requisition of all domestically produced masks; sold at a set price; Ration the supply in a fair manner;
- App to indicate the stock of masks in the nearby drug store for convenience

Transparent policy to distribute insufficient supply fairly to build the sentiment that we are all in the same boat together.

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Taiwan experience – Trust building

Transparency & Information process

- Daily briefing to keep the public well informed
- Utilization of digital platform to counter fake news and misinformation and disinformation
  - Lots of private citizens/NGO also help to counter the fake news
- Tough penalties for dissemination of fake news or disinformation concerning the epidemic

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Taiwan experience

Relief Measures

- Compensate hard-hit local businesses (US$1.3 B and more)
- Subsidies to health care workers, being quarantined citizens & healthcare system (US$653 M and more)
- Delaying payment (tax or rent)
- State guaranteed loans
- Alternative means to boost local travel industry: Solicit motels on a voluntary basis to specifically serve travelers from the epidemic region or serve as quarantine facility

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Taiwan experience

Pending issues to be resolved

Legal ground

Privacy
Human right

Society level

- Contact tracing
- Quarantine
- Mobile tracking
- Web link of travel history to health care system

60

Before we get our immunity

- Eat healthy
- Keep physically active
- Stay distant
- Be merry and grateful

Thank you !!

PUBLIC HEALTH FOUNDATION OF INDIA

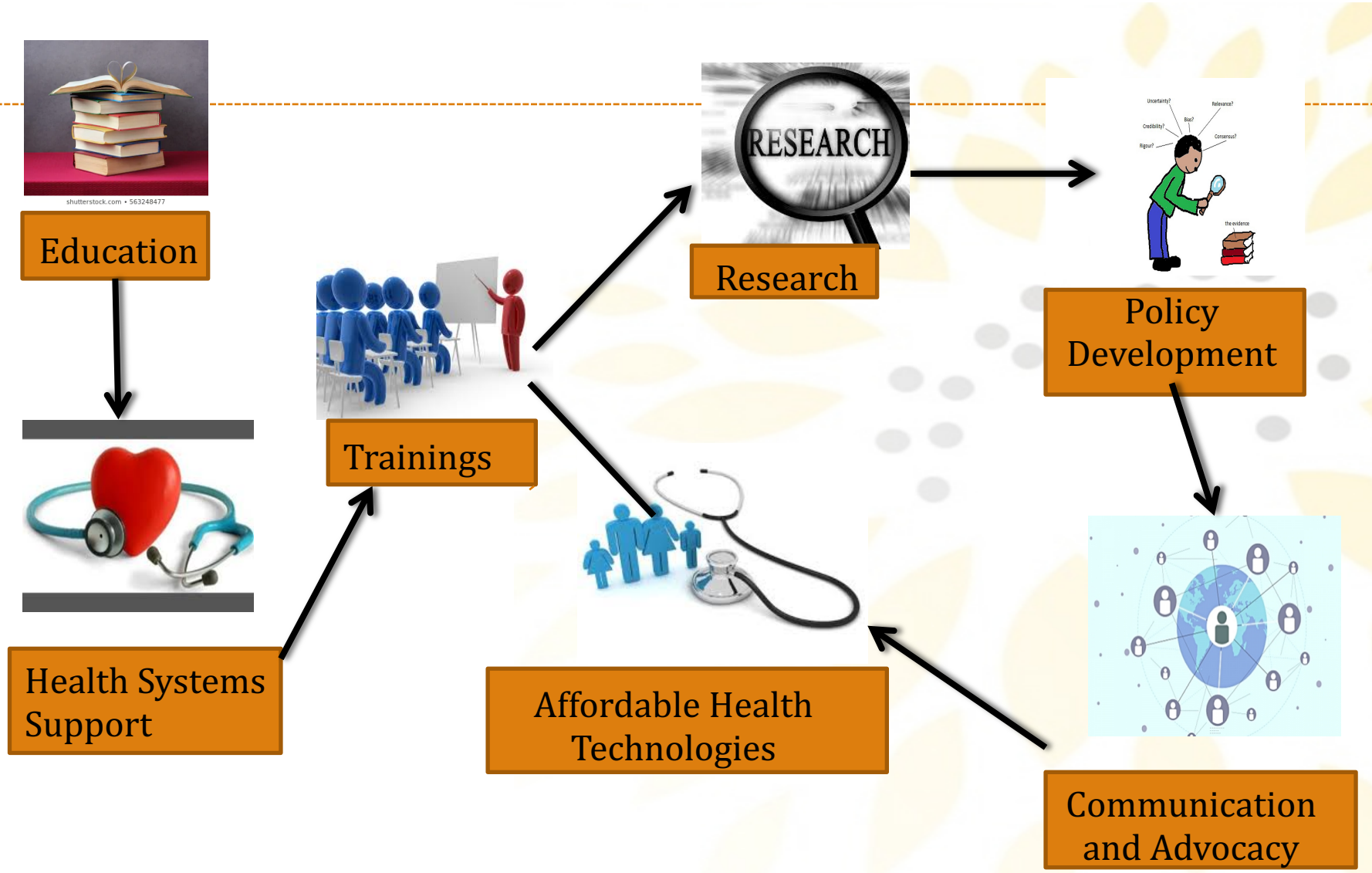
Strengthening Public Health Surveillance during covid19 crisis and beyond: A wake-up call

International COVID-19 Conference
Friday, May 15th 2020
7:45am-1:00 pm (Pacific Time)

Dr Giridhara R Babu

Professor, Head- Life course Epidemiology,
Indian Institute of Public Health
PHFI, Bangalore

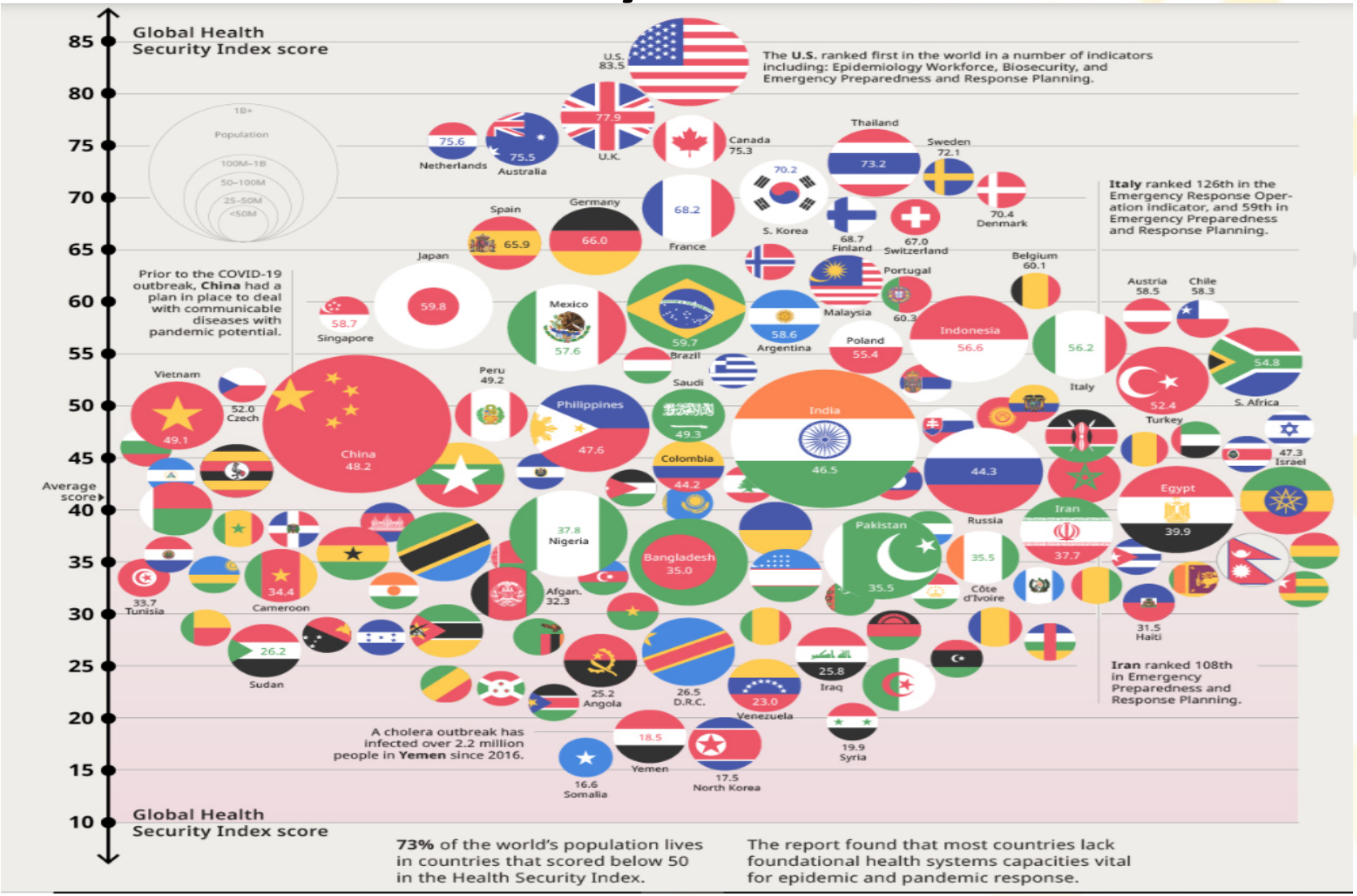
Activities of Public Health Foundation of India



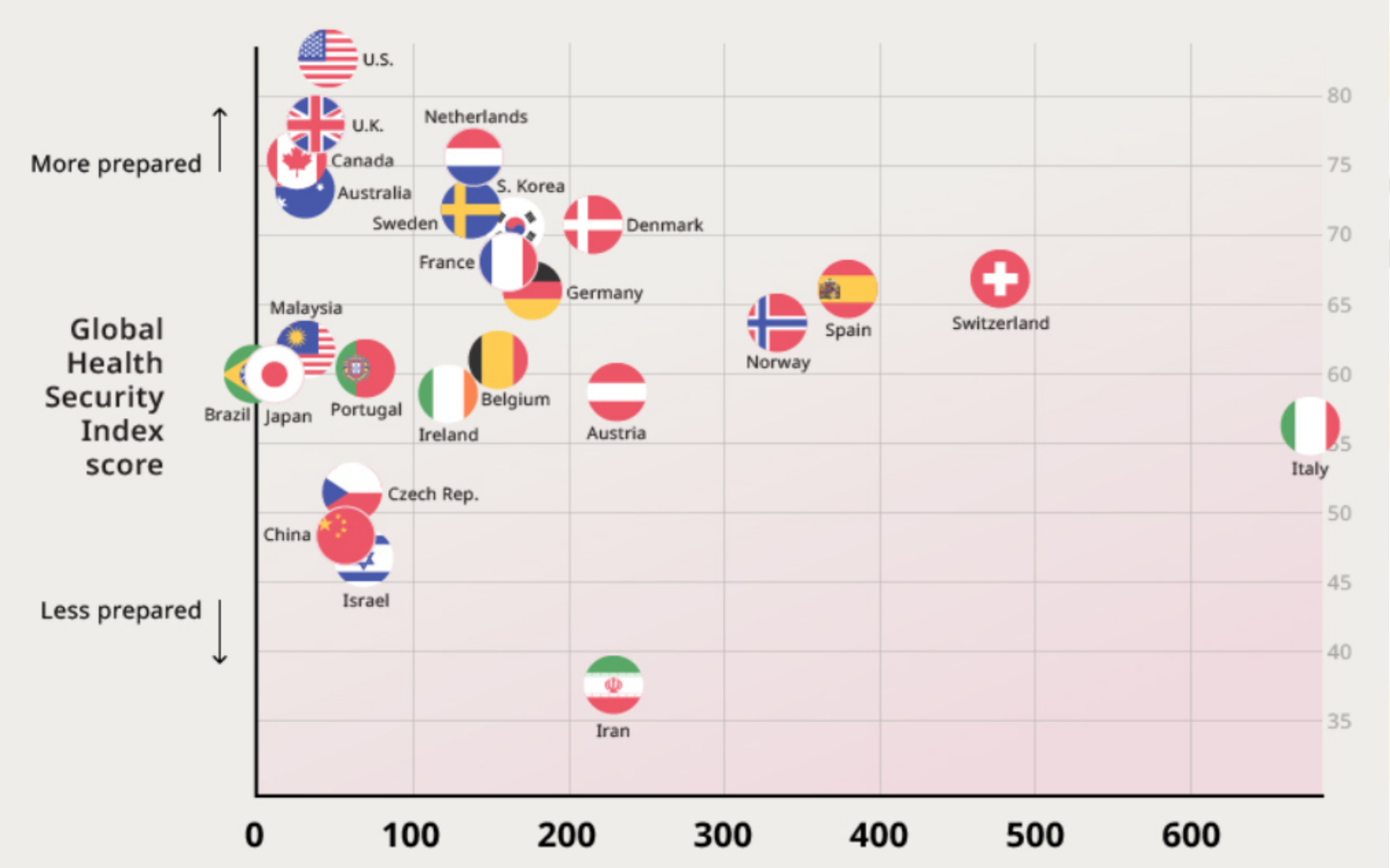
Global efforts in Public health surveillance

- **Outbreak Response**: create a highly functional surveillance system and interventions
- **Surveillance**: strengthen surveillance systems, especially in areas lacking adequate resources
- **Pathogen Discovery**: identify new and potentially threatening pathogens with cutting edge technology and research
- **Training**: the training of human resources to ensure proficient in field epidemiology and best practices in laboratory maintenance and management
- **Networking**: grow and reinforce, encouraging collaboration between agencies and governments and the pooling of resources
- **Enhancement** in data collection, data analysis and visualization, tools for information dissemination

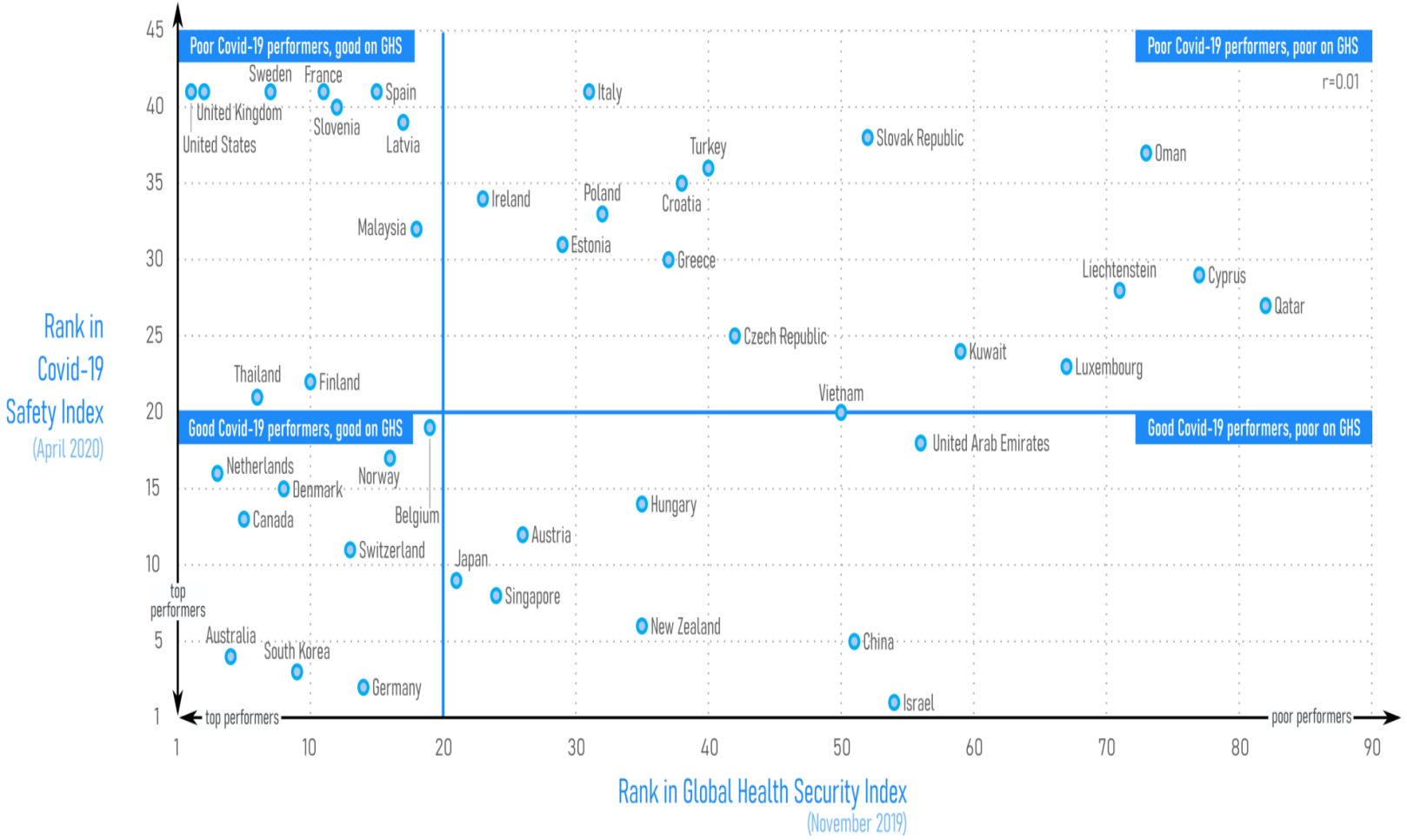
Global health security index score



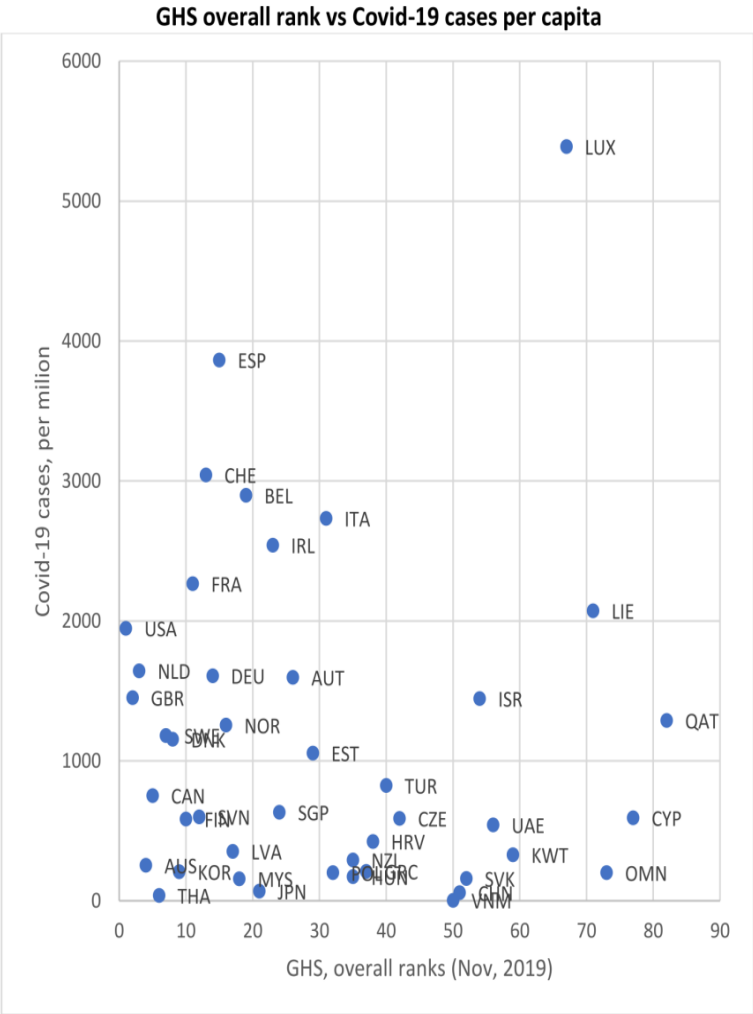
Confirmed COVID-19 cases per one million people

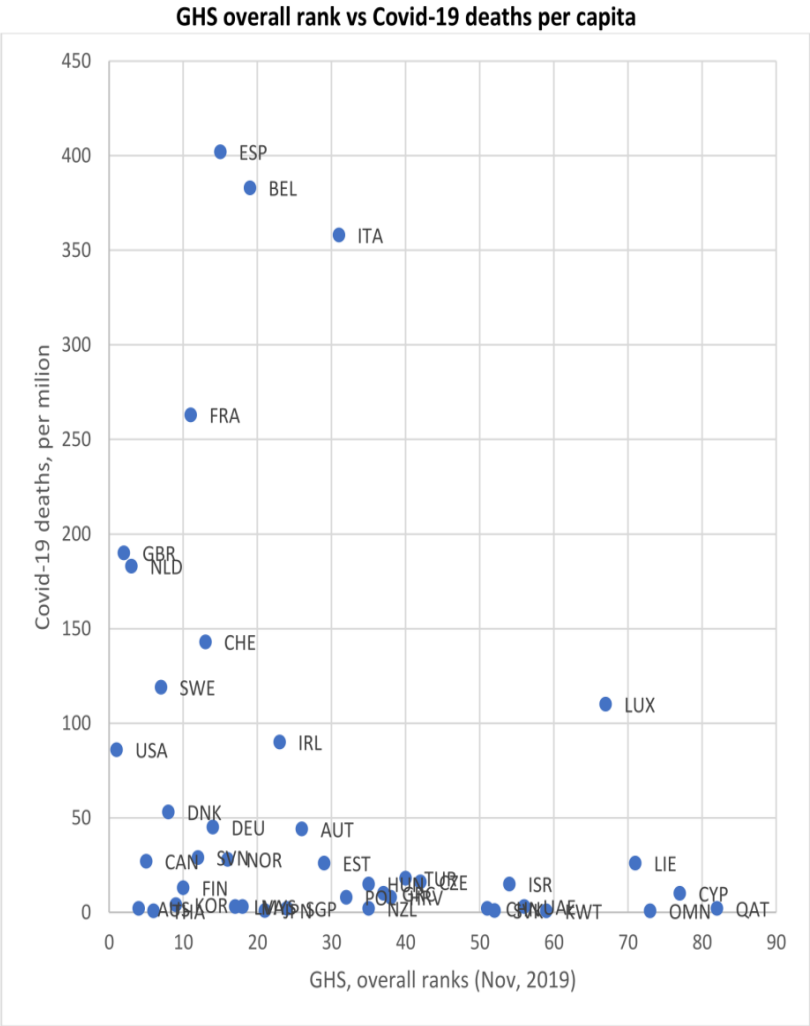


Rank in global health security index



Global health security index overall ranks and scores and incidence of and death rate due to COVID-19





Global health security index overall ranks and scores and incidence of and death rate due to COVID-19

PUBLIC HEALTH FOUNDATION OF INDIA

Fig 3 (continued): GHS overall score vs Covid-19 cases per capita

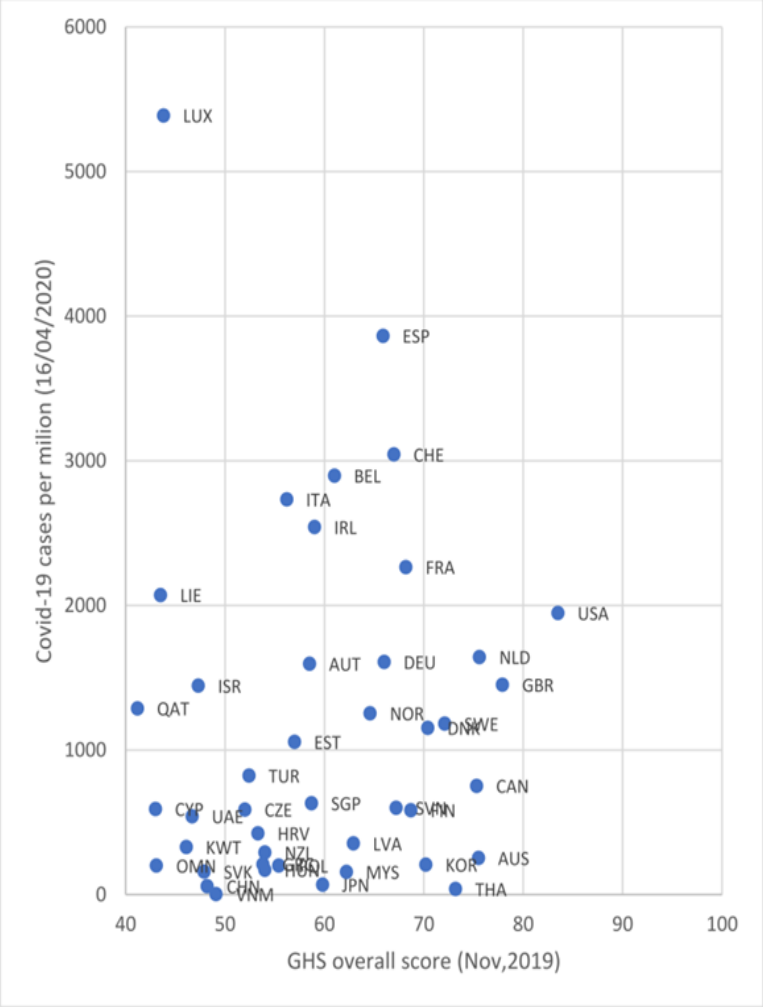
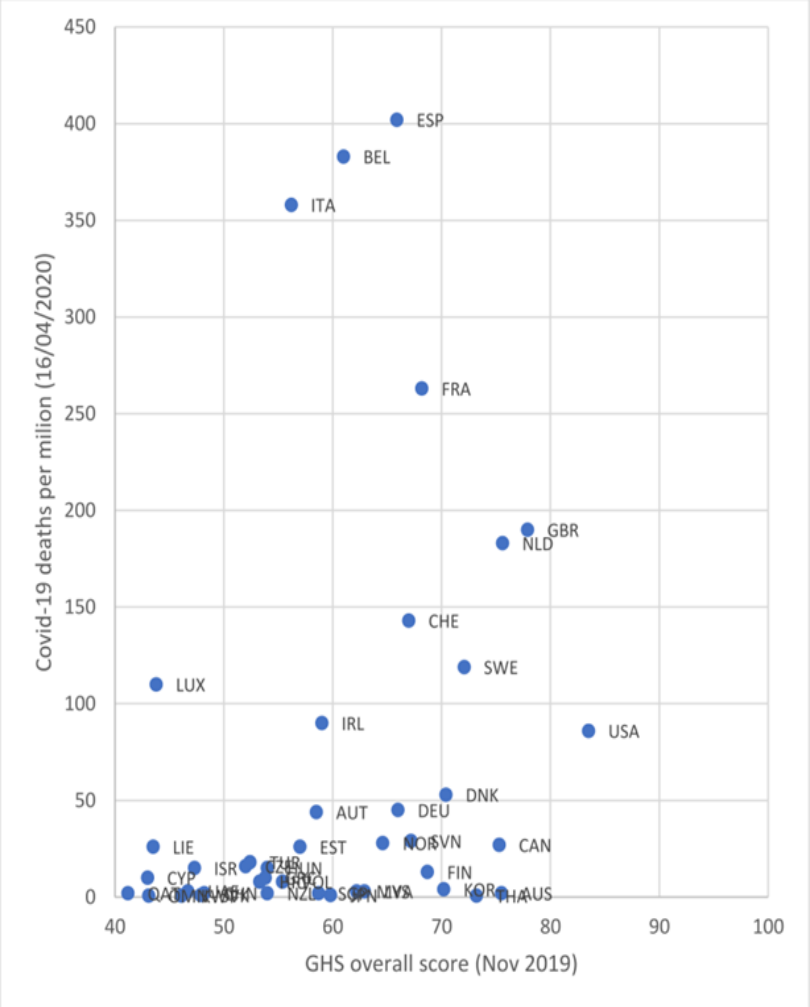
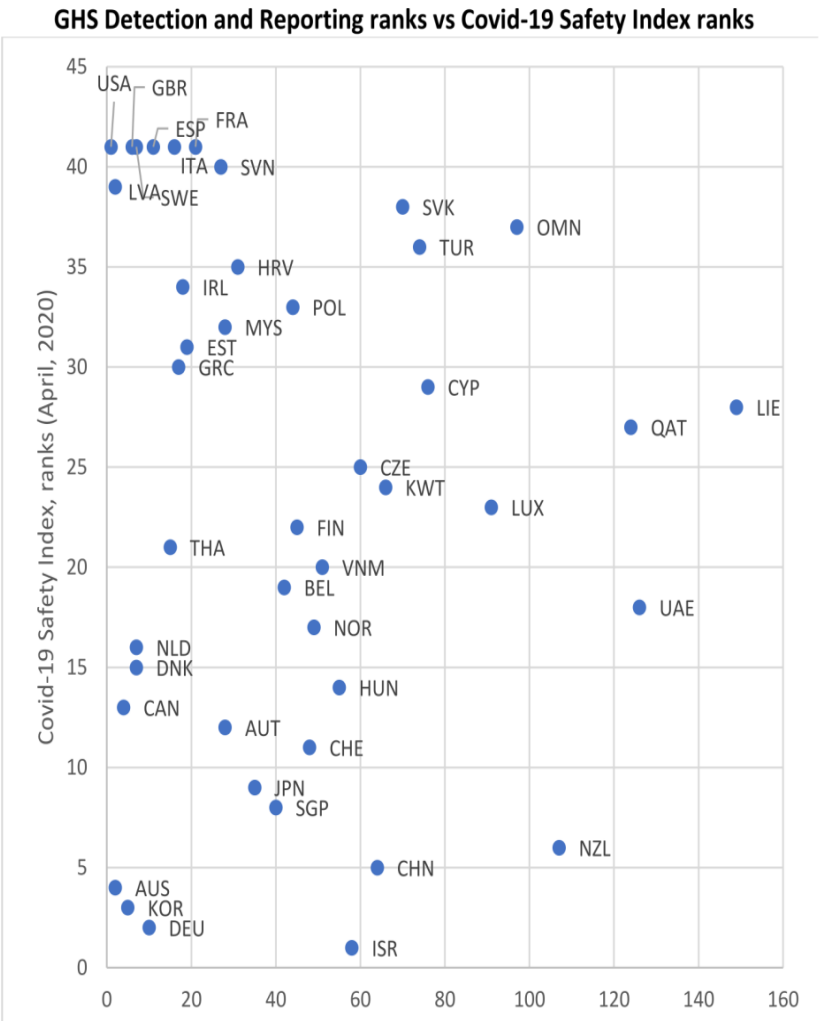
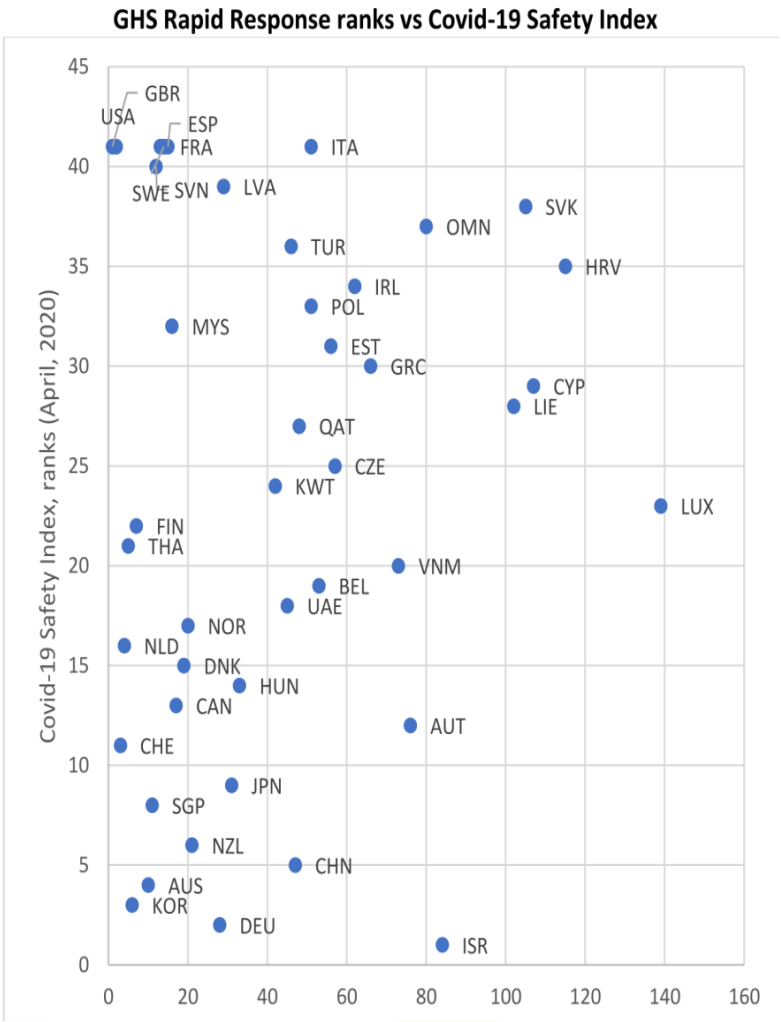


Fig 3 (continued): GHS overall score vs Covid-19 deaths per capita

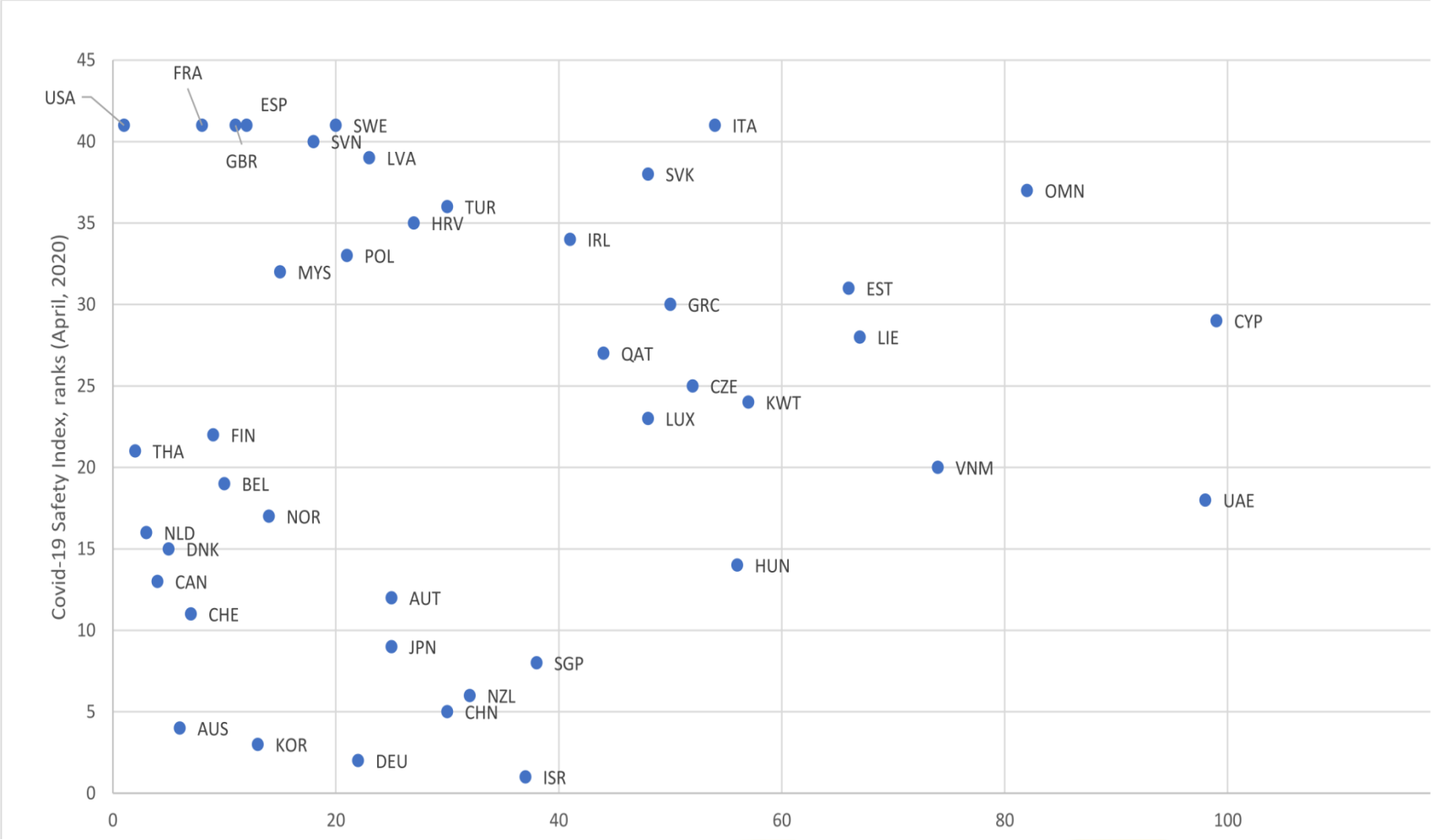


GHS Rank vs COVID-19 Rank

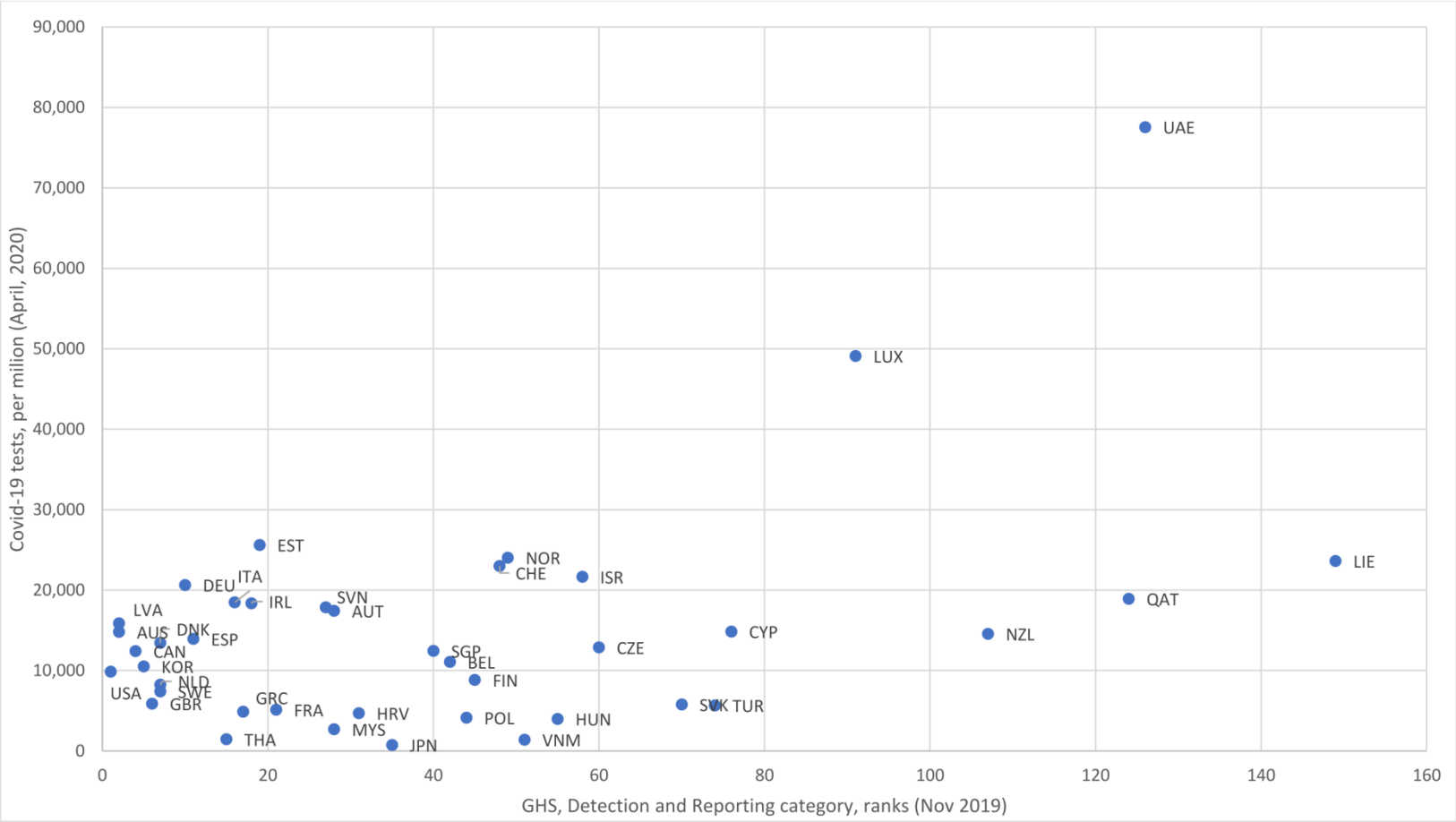




GHS health system vs COVID-19 Safety index



GHS Detection and Reporting ranks vs total COVID-19 tests conducted per capita



Challenges and opportunities

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AREAS	CHALLENGES	OPPORTUNITIES
Leadership	Lack of resources Finance and donor driven priorities LMICs	• CDC can provide crosscutting technical support to partner countries. • High income countries can dedicate resources to LMICs
Surveillance of Priority Conditions	Address the imbalance in coverage of surveillance systems for critical health problems.	Ensuring that surveillance systems result not only in enhanced health security for industrialized nations but also improved health of persons in the poorest countries is essential
Standardization and Interoperability	Surveillance systems often are set up without due diligence for the information system and surveillance architecture in which they need to operate.	Adoption of WHO standardized case definitions for surveillance, and the Health Metrics Network conceptual Technical Framework for Health Information System.

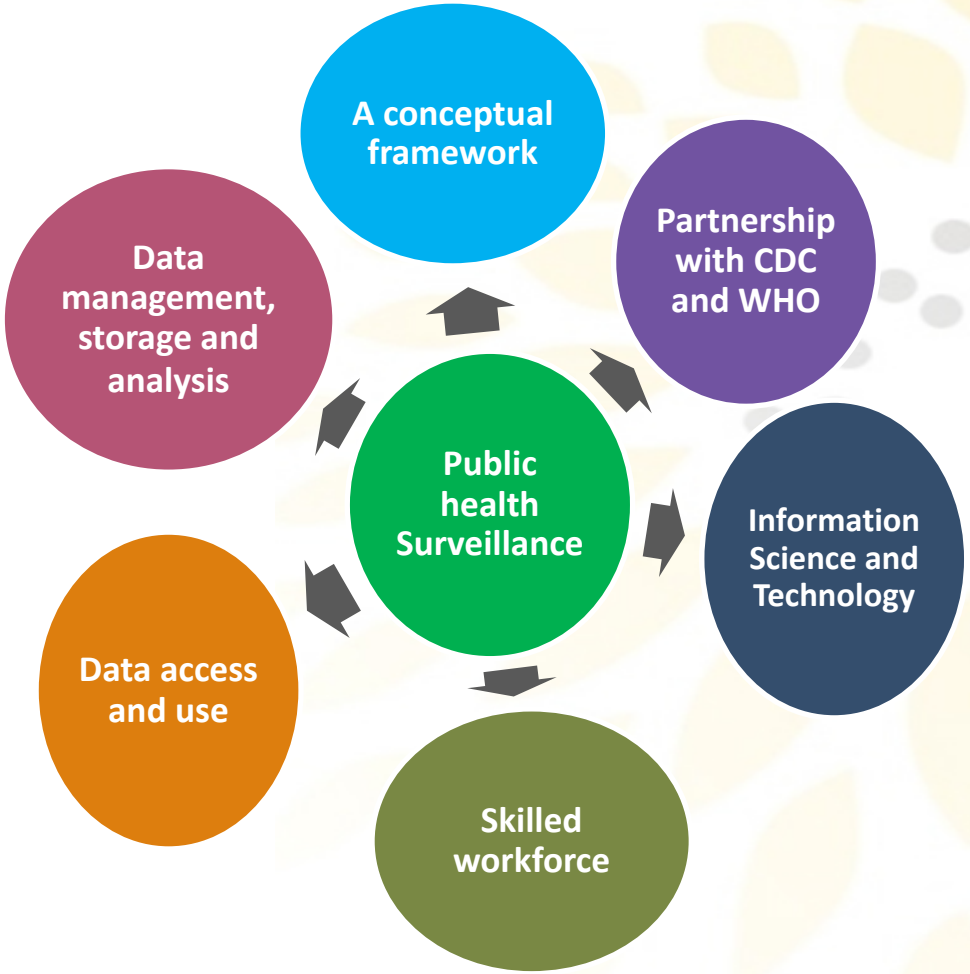
Challenges and opportunities

AREAS	CHALLENGES	OPPORTUNITIES
Technology	Lack of coordination and trusted curation needed to ensure efficient identification of best global practices, harmonization, and standardization	• Health surveys can be conducted on handheld computing devices with global positioning system capacity, which has resulted in improved accuracy, sampling, supervision, and timeliness of analysis and reporting
Partnerships and Resources	• Lack of partnership • Lack of resources required for the efficient and effective surveillance system	• WHO provides overall global leadership on public health surveillance. • Other United Nations agencies, the World Bank, and other international development banks also provide support to disease prevention programs in low-resource countries and increasingly underwrite surveillance activities

Effectiveness of surveillance: example from Singapore

- Singapore has implemented aggressive measures to contain local transmission of COVID-19
- Contact tracing detected 53% of COVID-19 patients.
- A significant difference was found in the percentage of cases detected by the various surveillance methods, depending on whether the cases were linked to another COVID-19 patient or by travel to China, compared with cases that could not be linked to another case ($p<0.001$).
- Among linked cases, the largest proportion (62.7%) was detected through contact tracing, whereas among unlinked cases, the largest proportion of cases (58.8%) was detected through enhanced surveillance.
- The mean interval from symptom onset to hospital isolation or quarantine was 5.6 days.
- The 7-day moving average of the interval from symptom onset to isolation declined significantly across the study period for both imported and local cases ($p<0.001$).
- Implication: A multipronged surveillance strategy could lead to enhanced case detection and reduced transmission of highly infectious diseases such as COVID-19.

How to Strengthen PHS



Milestones to reach towards a strong resilient PHS

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- Explore new frontiers
  - Enhance use of computer technology
  - Improve methods of epidemic investigations
- Improve Methods of data collection
  - Methods of epidemiologic and statistical analysis
  - Methods of information dissemination
- Use of surveillance information by decision makers
  - Best use of the lessons learnt from the past
  - Building capacity and enhancing global public health surveillance

Session 1: Public Health

May 15th, 2020

8:00 am – 9:00 am (Pacific Time)