



Meaning of science in the age of Covid-19

2020 NRF-Swedish Nobel Inspired Webinar Lecture, 8 October 2020

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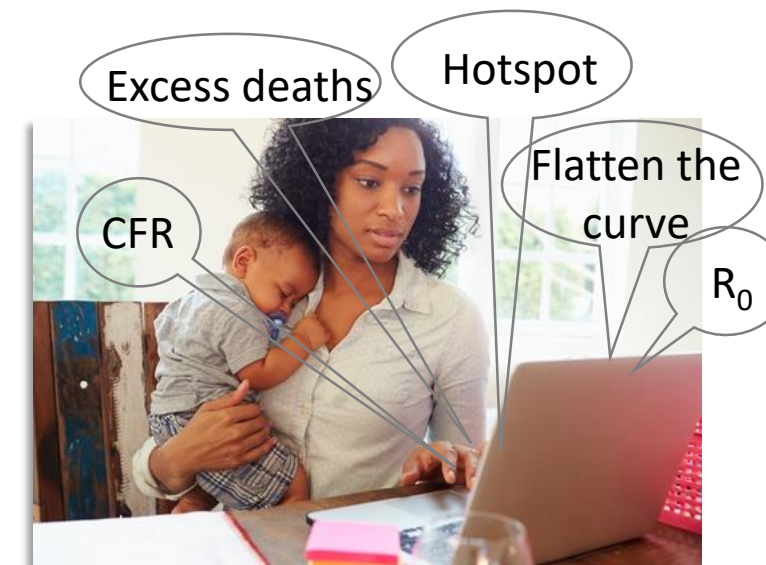
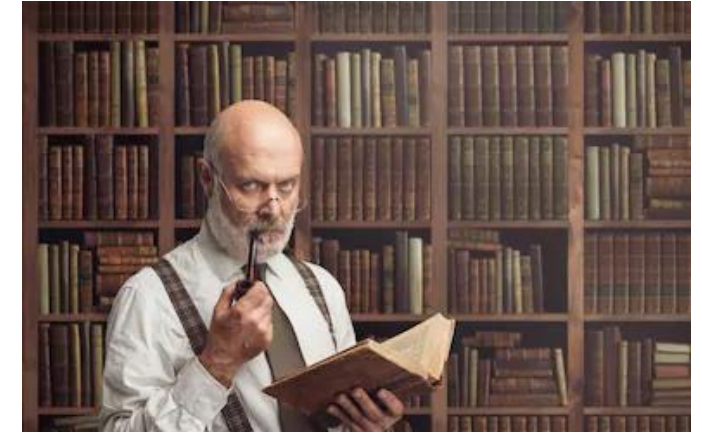
Outline

Exploring how the meaning of science has changed in the era of Covid-19 – **The Good, The Bad and The Complicated:**

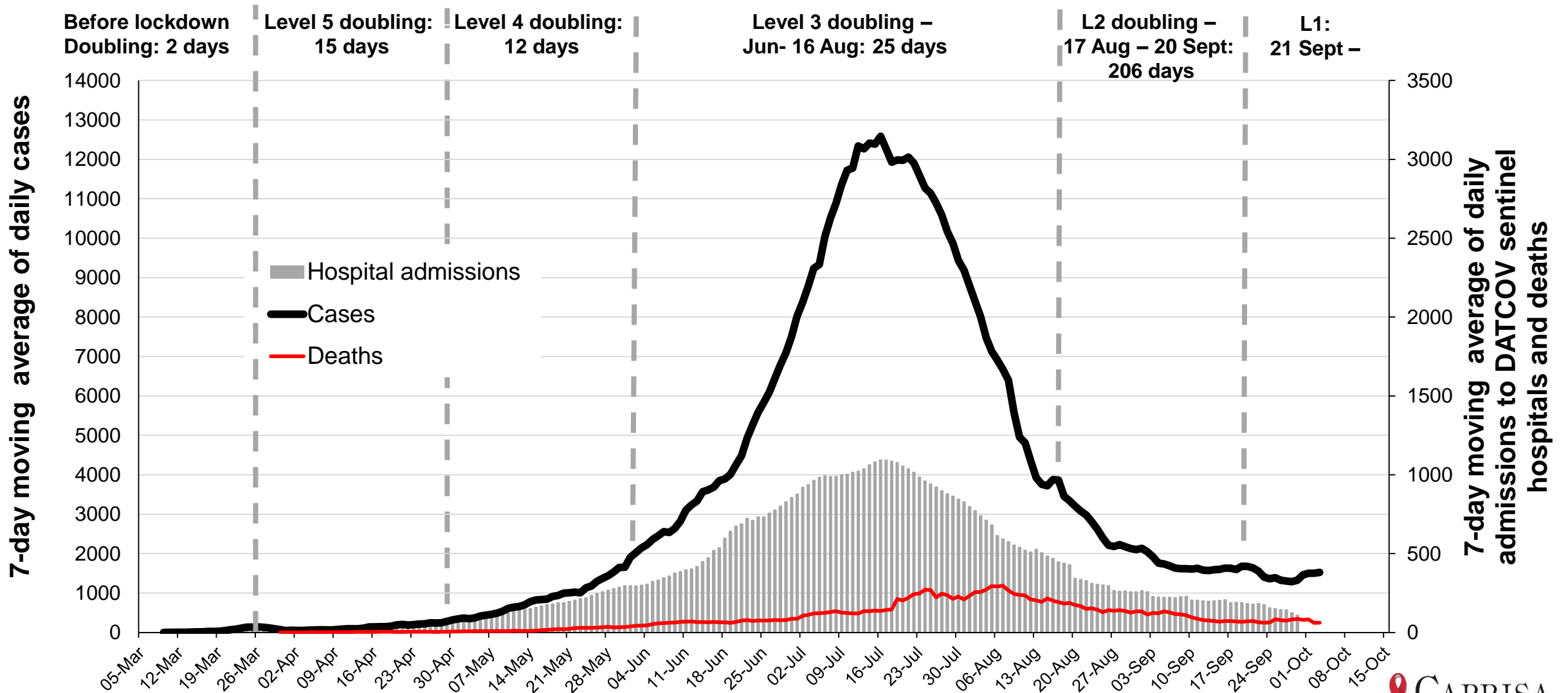
1. **Good:** The democratisation of science – accessibility to all
 - How science has become a common pastime - fast, transparent and open
2. **Bad:** Poor quality science promoting “Snake oil treatments”
 - How scientific evidence was eclipsed to promote unproven treatments and further politician’s views
3. **Complicated:** Elevated importance of “Follow the science”
 - How science has become the accepted basis to temporarily suspend fundamental rights to reduce viral transmission, without full appreciation of scientific uncertainty

Covid-19 has made science accessible to everyone

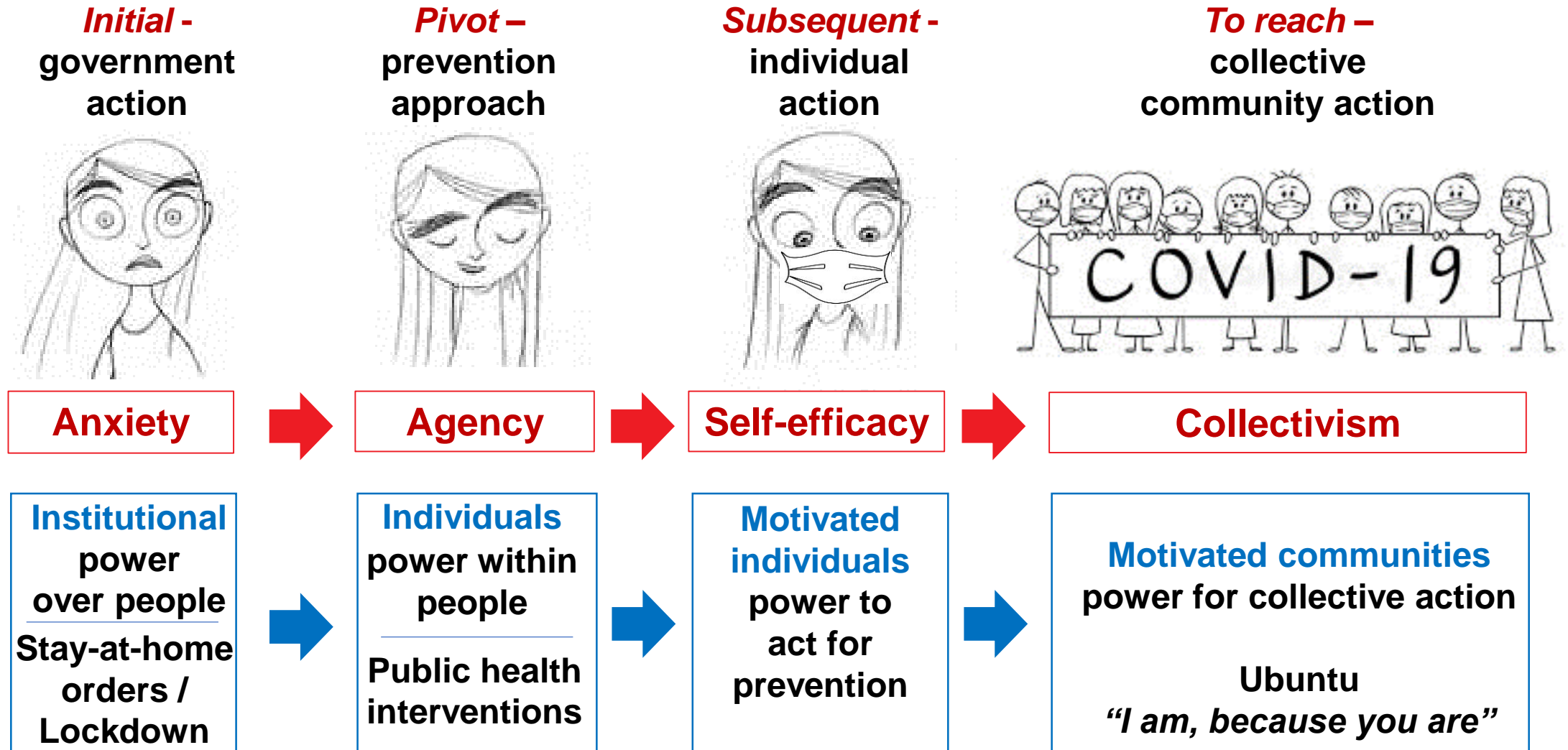
- Everyone has access to real time Covid-19 data worldwide (e.g., JHU dashboard & Our World in Data)
- Lay people are using epidemiological concepts to analyse each day's reported tests, cases & deaths
- Explosion of Covid-19 articles (62,054 in Pubmed)
- Rapid publication - 9,364 on pre-print servers
- Paywalls dropped – Covid-19 articles are mostly free
- Enhanced collaboration & multi-disciplinary research
- A new level of accessibility and immediacy



Covid-19 in South Africa: Cases, admissions and deaths to 6 October



Covid-19 in SA: Pivoting the prevention paradigm



In Covid-19, science is empowering through the democratisation of knowledge – ↑ accessibility

- Science no longer confined to ivory towers
- Language and idiom of epidemiology is now in everyday discussions & media
- Scientific evidence empowers people to understand the virus and how to prevent it
- Bulwark against the conspiracy theories, fake news and fear-mongers



The New York Times

Study Finds 'Single Largest Driver' of Coronavirus Misinformation: Trump

Cornell University researchers analysed 38 million English articles found 1.1 m have misinformation, mostly conspiracies.

Los Angeles Times
Was the coronavirus made in a Wuhan lab? Here's what the genetic

1. **BILL GATES, DAVID ICKE, 5G: HOW COVID-19 HAS RESHAPED CONSPIRACY THEORIES**

Miracle cures, New World Order and a Bill Gates plan: The most absurd Coronavirus conspiracy theories

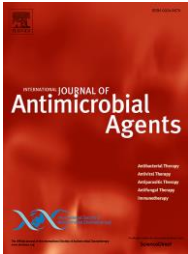


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Hazards of poorly designed research that is prematurely over-interpreted & politically championed



Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial[☆]

Philippe Gautret^{a,b,\$}, Jean-Christophe Lagier^{a,c,\$}, Philippe Parola^{a,b}, Van Thuan Hoang^{a,b,d}, Line Meddeb^a, Morgane Mailhe^a, Barbara Doudier^a, Johan Courjon^{e,f,g}, Valérie Giordanengo^h, Vera Esteves Vieira^a, Hervé Tissot Dupont^{a,c}, Stéphane Honoré^{i,j}, Philippe Colson^{a,c}, Eric Chabrière^{a,c}, Bernard La Scola^{a,c}, Jean-Marc Rolain^{a,c}, Philippe Brouqui^{a,c}, Didier Raoult^{a,c,*}

“...hydroxychloroquine treatment is significantly associated with viral load reduction / disappearance in COVID-19 patients....” March 2020



"We bought a tremendous amount of... hydroxychloroquine,And there are signs that it works on [coronavirus], some very strong signs," April 5

The Guardian

Vital drug for people with lupus running out after unproven Covid-19 link

Shortcuts in science can be dangerous: Rigour & standards essential for defining new treatments



A Randomized Trial of Hydroxychloroquine as Postexposure Prophylaxis for Covid-19

D.R. Boulware, M.F. Pullen, A.S. Bangdiwala, K.A. Pastick, S.M. Lofgren, E.C. Okafor, C.P. Skipper, A.A. Nascene, M.R. Nicol, M. Abassi, N.W. Engen, M.P. Cheng, D. LaBar, S.A. Lother, J.L. MacKenzie, G. Drobot, N. Marten

- 26% of 1,542 patients treated with hydroxychloroquine died
- 24% of 3,132 patients who received standard care died

“These data convincingly rule out any meaningful mortality benefit,” 5 June

- Subsequent studies showed that hydroxychloroquine is ineffective and could lead to life-threatening complications
- Highlights importance of rigour and repeatability across multiple studies in determining new treatments
- Beware the “snake oil” salesman – he flourishes when people are desperate and have little else to turn to

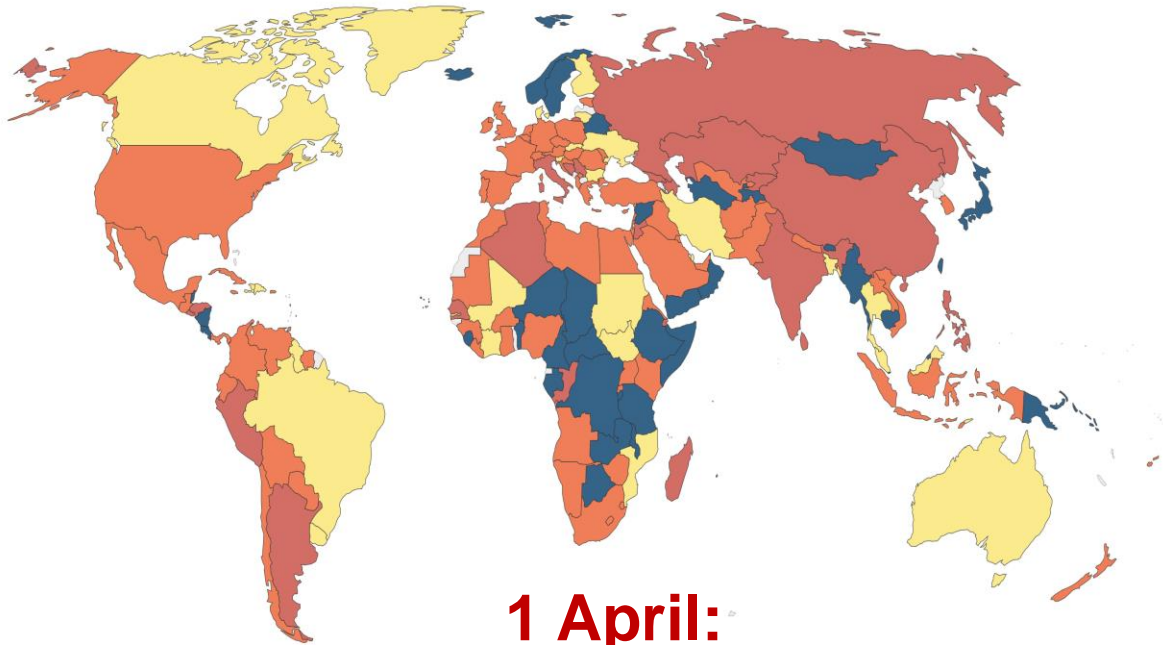


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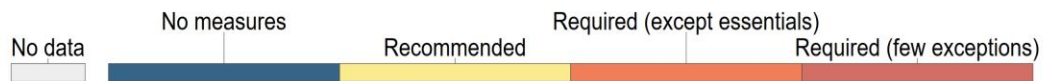
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“Follow the science” to temporarily suspend constitutional freedoms to reduce Covid-19 risk



1 April:

86 countries on national or sub national lockdown

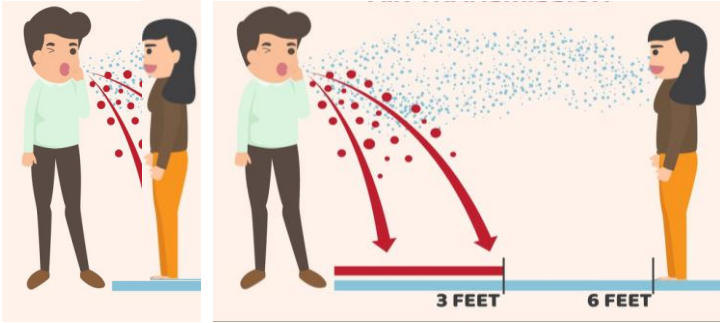


“We have now declared a national state of disaster.we are **imposing a travel ban** on foreign nationals from high-risk countries..... **Gatherings of more than 100 people will be prohibited.... Schools will be closed...**”
- President Cyril Ramaphosa, 15 March

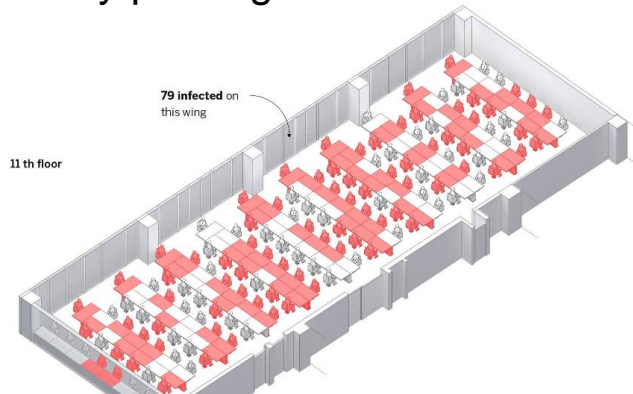
Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last Updated 10th June. OurWorldInData.org/coronavirus • CC BY

What is the scientific evidence to follow on risk?

Distance & masks - Person-to-person contact & droplets



South Korean call centre –
79/137 employees (58%) infected.
Spread by prolonged close contact



Hand hygiene - Infected droplet contamination

Virus can remain on surfaces for a few hours to days. In 1 patient's room – virus detected on: bed rail, chair, light switches behind the bed, stethoscope, air outlet fan, door handle and toilet bowl (JAMA)



Avoid poorly ventilated indoor events – Super-spreading



High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice — Skagit County, Washington, March 2020

Weekly / May 15, 2020 / 69(19):606-610

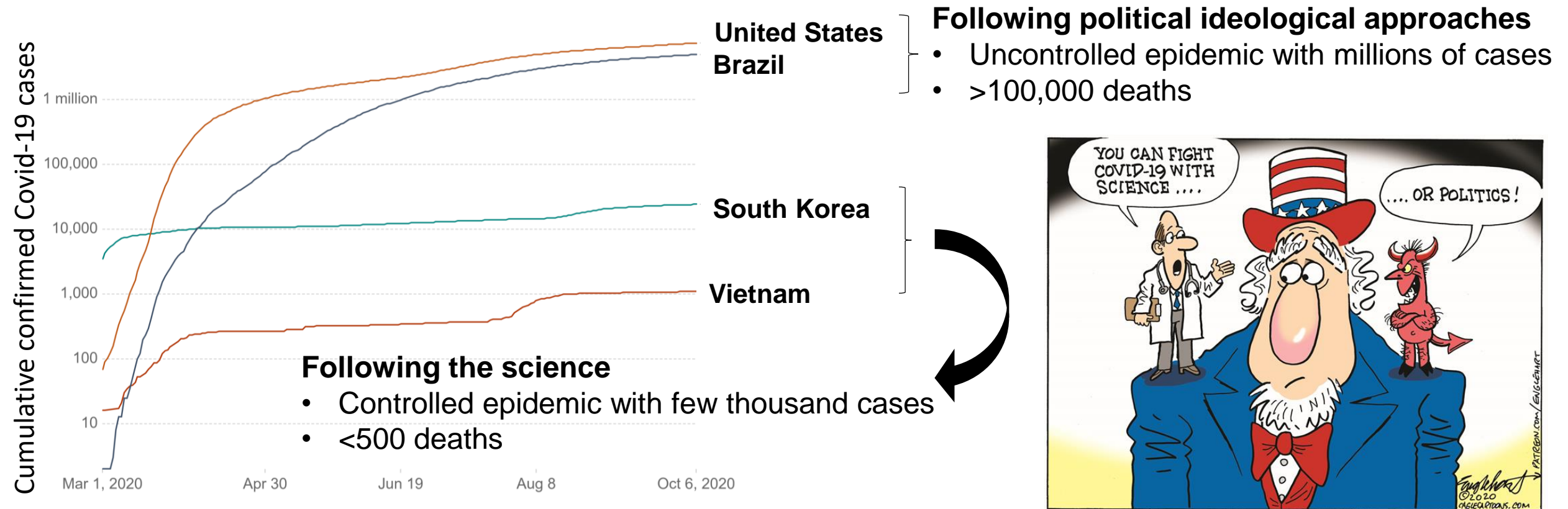
On May 12, 2020, this report was posted online as an MMWR Early Release.

Lea Hamner, MPH¹; Polly Dubbel, MPH¹; Ian Capron¹; Andy Ross, MPH¹; Amber Jordan, MPH¹; Russell¹; Dale Patrick¹; Howard Leibrand, MD¹ ([View author affiliations](#))



“Follow the science” placed science on a mantle to legitimate limiting individual freedoms

Country examples quoted to validate “Follow the science”



But what happens when the evidence is limited and the scientific uncertainty is high?

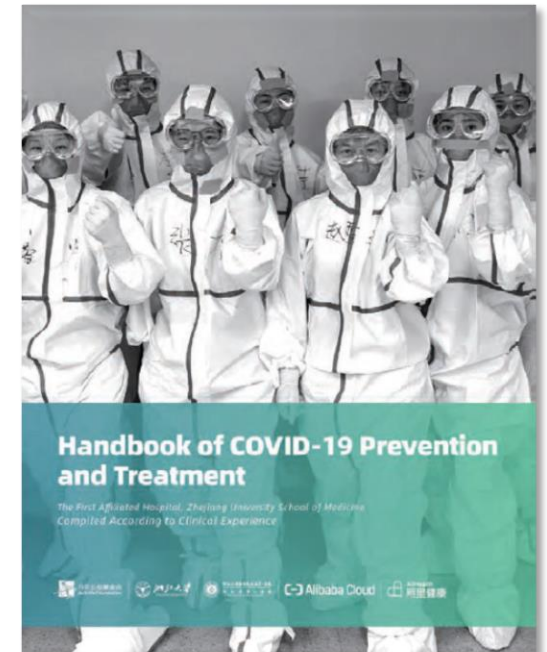
- Very little known about Covid-19 in February / March
- Is a lockdown necessary? How strict should it be? For how long? How should it be lifted? - I could find only 3 publications on lockdown then – no info on these issues
- **Major challenge** – *the SARS-CoV-2 epidemic changes rapidly needing a rapidly changing & evolving response*
- Evidence for major decisions was severely limited:
 - Do masks work? In March, the evidence was unclear – A Vietnam study showed cloth masks inferior to medical mask
 - In SA, we adopted universal cloth masks despite contradictory data - decision made 8 weeks before WHO recommended it



Swine flu: Mexico



Ebola epidemic in Sierra Leone:



Conclusion

- **In the age of covid-19, science changed (faster & open), defined what people can or cannot do & has a new importance in decision-making**
- **Through Covid-19 it has taken on many new meanings – a guiding light, demystifying what’s in store & a saviour in a pandemic response**
- **But science is about uncertainty amidst the data, the contestation of ideas, differing interpretations and is not necessarily value-free**
- **Scientific conclusions are often views / interpretations of the evidence with substantial uncertainty – shades of grey with little black or white**
- **So, we take the good, the bad and the complicated in science mainly because it seems more objective for decision-making than alternatives**