UNDERSTANDING ENDEMIC DISEASES: WILL COVID-19 ULTIMATELY BECOME ONE?

BOO SU-LYN

CODEBLUE EDITOR-IN-CHIEF

AUGUST 2021

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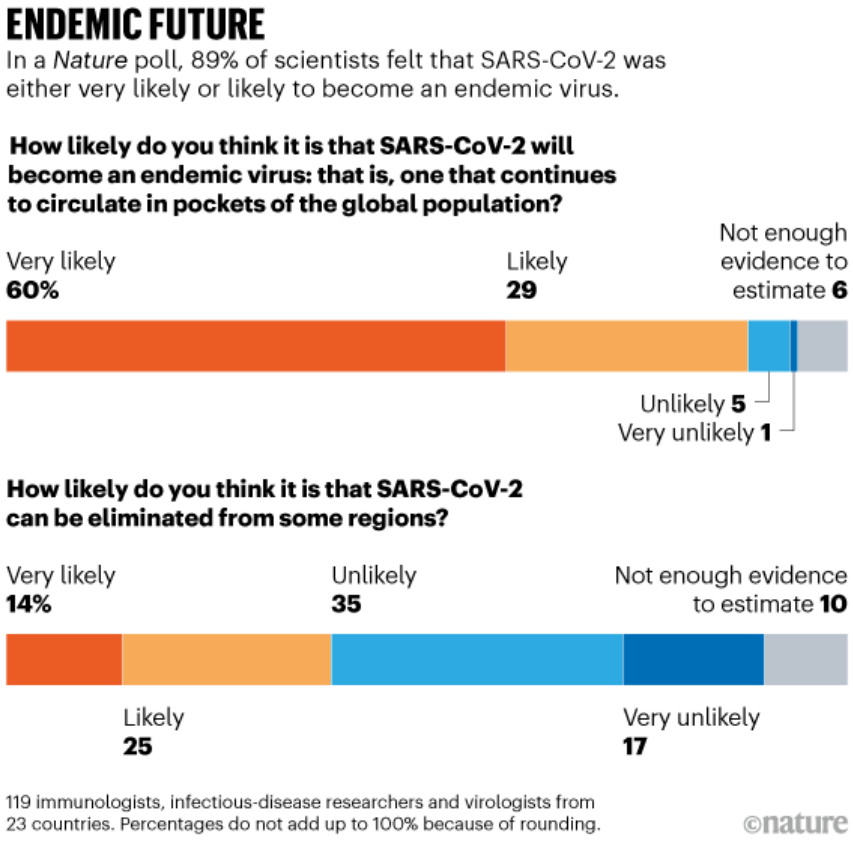
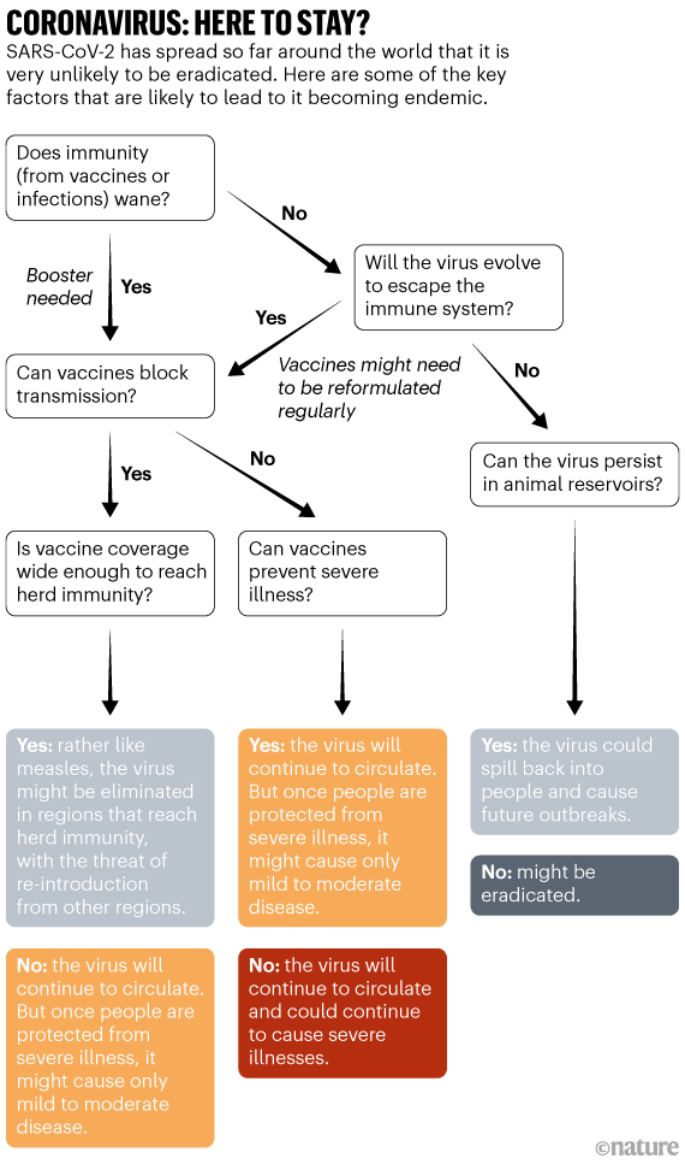
WHAT ARE ENDEMIC DISEASES?

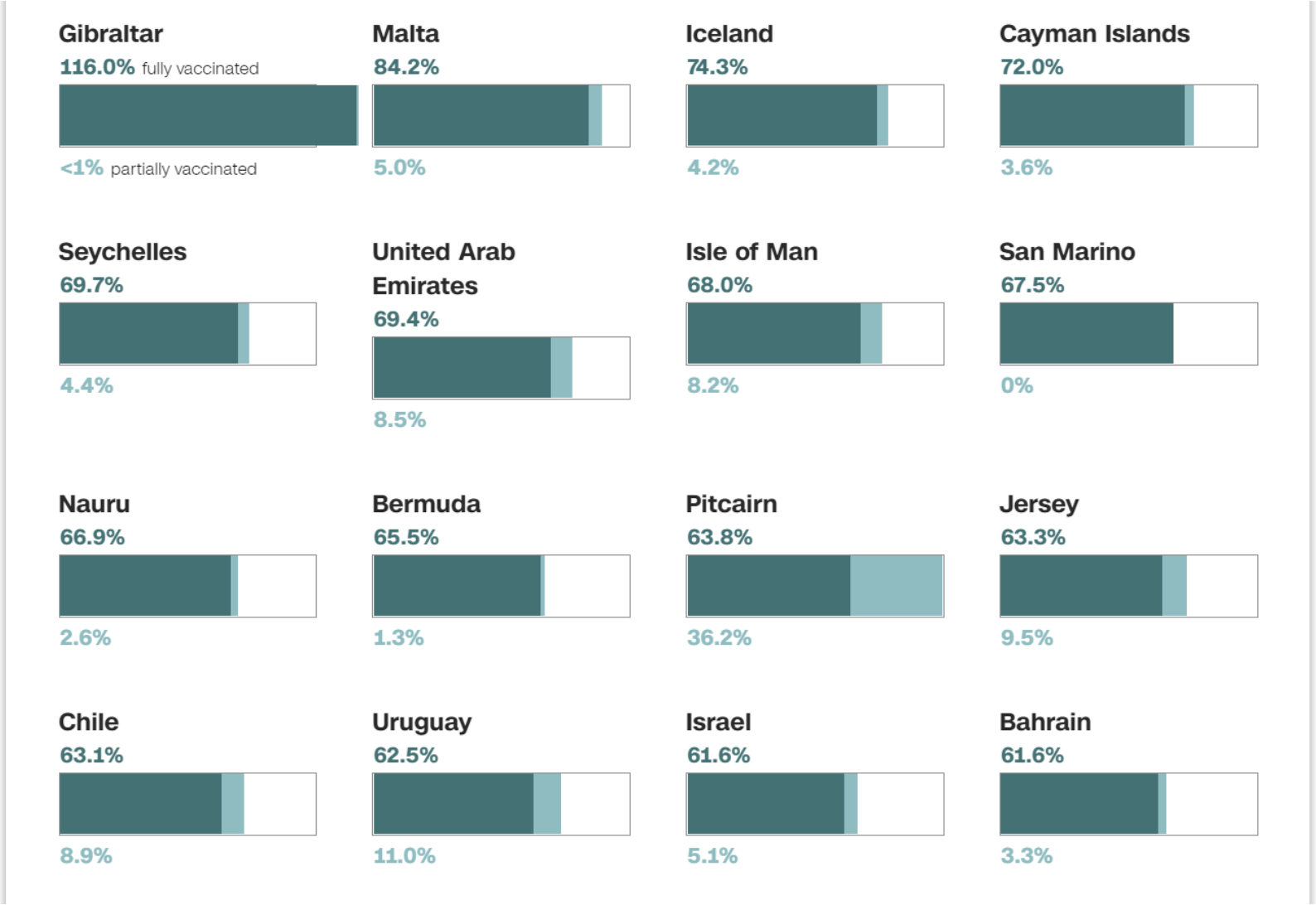
- Epidemic: An often sudden increase in the number of cases of a disease exceeding what is normally expected in that population in that area (not necessarily infectious disease, eg: diabetes/ obesity) [1]
- Pandemic: An epidemic that has spread over several countries or continents
- Endemic: A disease outbreak that is consistently present but limited to a particular region
  - Eg: Malaria (WHO African region reported 94% of all cases and deaths worldwide in 2019)
    - Towards malaria elimination: Eight E-2020 member countries reported zero indigenous cases of human malaria by end 2020: Algeria, Belize, Cabo Verde, China, El Salvador, the Islamic Republic of Iran, Malaysia and Paraguay [2]
    - Malaysia reported zero indigenous human malaria cases for 3 years, 2018-2020 [3]
      - Challenges with *P. knowlesi* parasite normally found in monkeys that infected about 2,600 people in 2020

WILL COVID-19 BECOME ENDEMIC?



- May end up like a childhood virus (mild)
- Seasonal flu
- Measles-like virus (if vaccines block infection and transmission for life)
- Animal reservoirs
- Likely endemic, but pattern hard to predict – Angela Rasmussun, virologist from Georgetown University [4]
- Expect smaller and less deadly outbreaks, but Covid-19 may remain a constant threat – Dr David Heymann, professor infectious disease epidemiology at London School of Hygiene and Tropical Medicine [5]





COUNTRIES WITH >60% FULLY VACCINATED POPULATIONS

CNN TRACKER, AS OF JULY 29, 2021 [6]

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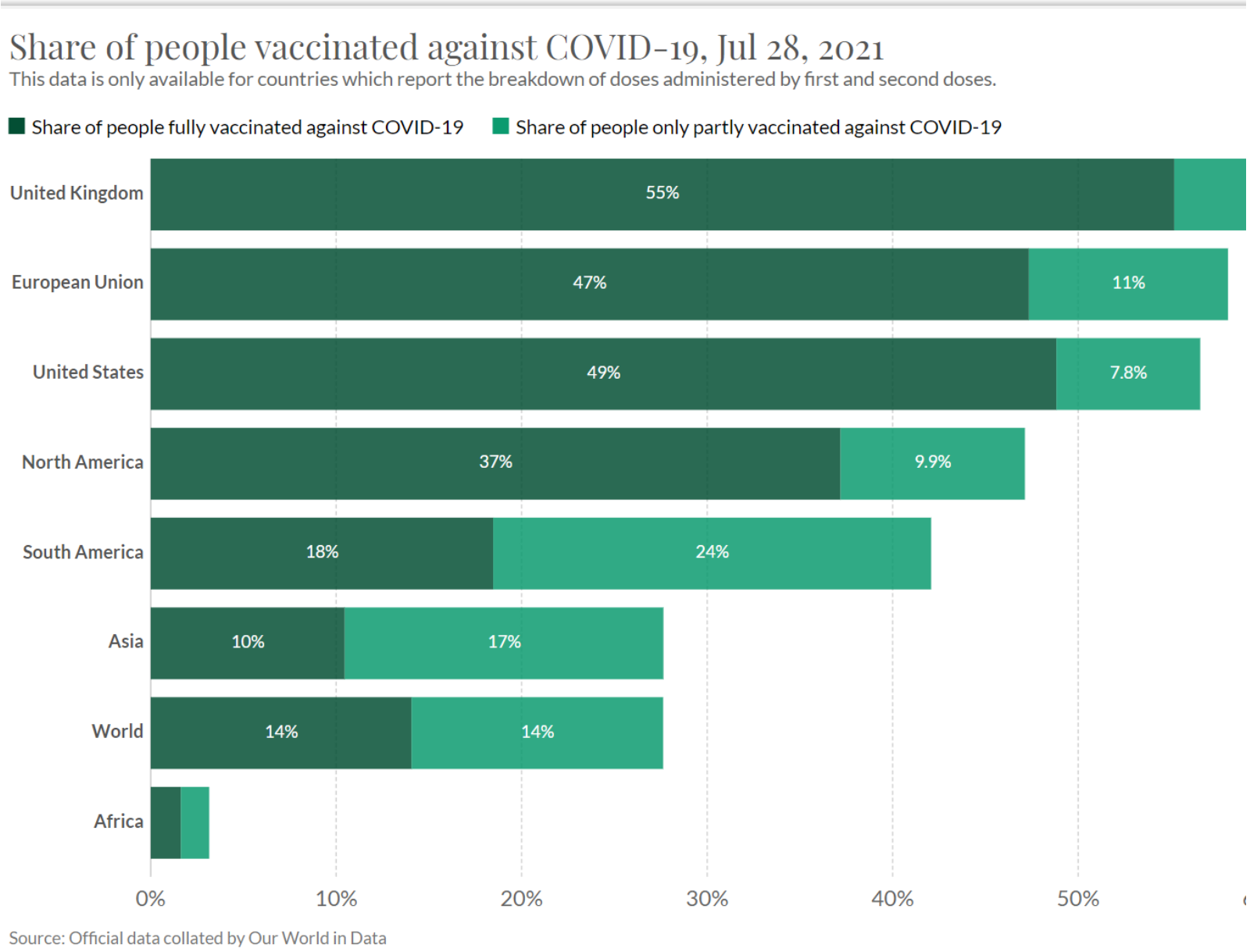

UNEQUAL COVID-19 VACCINATION

OUR WORLD IN DATA, AS OF JULY 28, 2021 [7]

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UNCERTAINTIES

- Don't know to what extent immunity wanes over time, degree to which vaccines prevent transmission, proportion of vaccinated population needed for herd immunity – Gavi [8]
- Possible for virus elimination in some regions with regular booster doses to prevent new variants from emerging, if vaccine coverage is high and if fully vaccinated don't transmit much virus
- Further variants may emerge that can better overcome protection from vaccination, the longer a large proportion of global population remains unvaccinated, and if infections rates in all countries remain high

NEW CDC FINDING: VACCINATED CAN SPREAD VIRUS

Summary

What is already known about this topic?

Variants of SARS-CoV-2 continue to emerge. The B.1.617.2 (Delta) variant is highly transmissible.

What is added by this report?

In July 2021, following multiple large public events in a Barnstable County, Massachusetts, town, 469 COVID-19 cases were identified among Massachusetts residents who had traveled to the town during July 3–17; 346 (74%) occurred in fully vaccinated persons. Testing identified the Delta variant in 90% of specimens from 133 patients. Cycle threshold values were similar among specimens from patients who were fully vaccinated and those who were not.

What are the implications for public health practice?

Jurisdictions might consider expanded prevention strategies, including universal masking in indoor public settings, particularly for large public gatherings that include travelers from many areas with differing levels of SARS-CoV-2 transmission.

CDC, July 30, 2021 [9]

NEW CDC FINDING: VACCINATED CAN SPREAD VIRUS

Next steps for CDC

- Communications
  - Acknowledge the war has changed
  - Improve public's understanding of breakthrough infections
  - Improve communications around individual risk among vaccinated
    - Risk of severe disease or death reduced **10-fold or greater** in vaccinated
    - Risk of infection reduced **3-fold** in vaccinated
- Prevention
  - Consider vaccine mandates for HCP to protect vulnerable populations
  - Universal masking for source control and prevention
  - Reconsider other community mitigation strategies

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CDC, July 29, 2021 [10]

NEW CDC FINDING: VACCINATED CAN SPREAD VIRUS

"I think the central issue is that vaccinated people are probably involved to a substantial extent in the transmission of delta," Jeffrey Shaman, a Columbia University epidemiologist, wrote in an email after reviewing the CDC slides. "In some sense, vaccination is now about personal protection — protecting oneself against severe disease. Herd immunity is not relevant as we are seeing plenty of evidence of repeat and breakthrough infections."

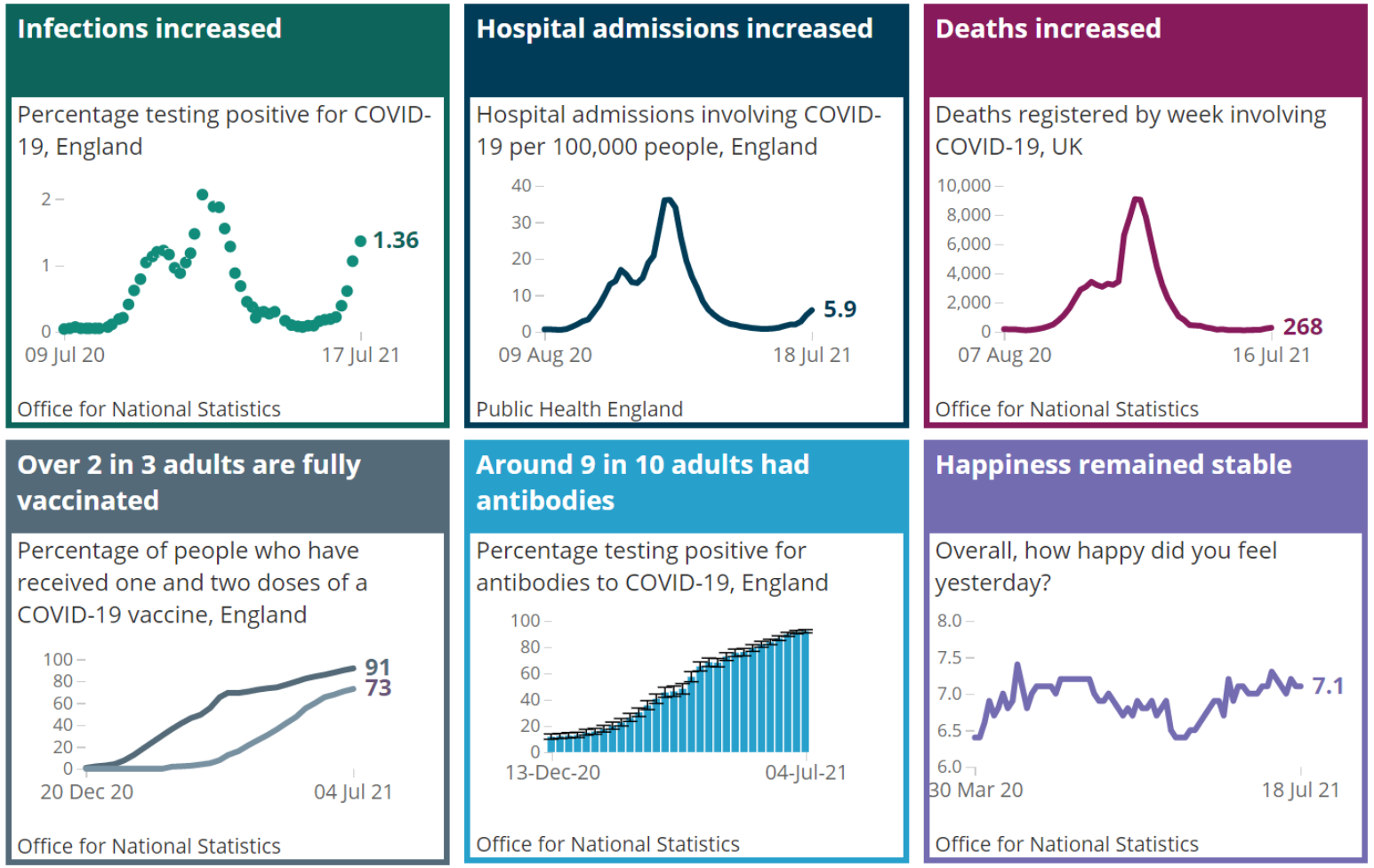
The Washington Post, July 29, 2021 [11]

EXERCISE

What's the difference between "epidemic" and "endemic"?

Is Covid-19 likely to become endemic or not?

UK: SLOWER INCREASE IN HOSPITALIZATION, DEATH



- UK OFFICE FOR NATIONAL STATISTICS [12]

SINGAPORE'S APPROACH TOWARDS LIVING NORMALLY WITH COVID-19: TEST, TRACE, VACCINATE

- Home recovery for infected who have been vaccinated [13]
- Regular testing with fast and easy tests. If positive, confirm with PCR and self-isolate
- Stop monitoring Covid-19 case numbers. Focus on hospitalization, ICU, ventilator rates (like influenza)
- Resume large gatherings, major events, no disruption to businesses
- Travel without quarantine, mutual recognition of vaccine certs

MANAGEMENT OF ENDEMIC VS EPIDEMIC DISEASE

Public Response	
Epidemic	**Endemic**
• Public, visible • Multisectoral response • Seemingly without resource constraints • Substantial public investment in vaccines/ treatments • Combine efforts of national and global public health institutions • "Public health paradox" – if successful, eventual impact of epidemic disease may have been less than opportunity cost of resources allocated to it from other health areas	• Responsibility shifts to the individual • Individuals encouraged to pay to manage own risk/ seek care • Global to national response • Investment becomes institutionalized in health sector (other social factors may be ignored) [eg: TB in South Africa, where combined health and social intervention being pioneered only in 2017] • Financing may stabilize/ diminish • Response resource increasingly based on known risks and benefits – "investment cases" for specific diseases • Interest groups formed • Compete for attention and resources with other endemic diseases

Science magazine, 2017 [14]

MANAGEMENT OF ENDEMIC VS EPIDEMIC DISEASE

Private Response	
Epidemic	**Endemic**
• Individual behavior with substantial social and economic costs and consequences (avoid work, skip school, minimize travel) • Individual ability to act constrained by economic and social circumstances • Stigma	• Belief that individuals can make informed choices, despite socioeconomic constraints • Public funding for treatment may still be available, but no universal access, leading to private care (eg: TB/ HIV) • Interest groups struggle to get political commitment to end disease

Science magazine, 2017 [14]

MANAGEMENT OF ENDEMIC VS EPIDEMIC DISEASE

Determinants of Risk	
Epidemic	**Endemic**
• High risk due to lack of effective treatment • Typically higher mortality and morbidity • As epidemics proceed, infection increasingly associated with socially defined groups (higher at risk, small proportion of the population) • Eg: HIV: individuals who frequently change sex partners more likely to be infected, transmit at higher rate • When HIV becomes more endemic, individuals with same behavior still at high risk, but majority transmission may come from people with fewer sexual partner change	• Reduced risk when effective prevention and treatment emerge => reduced political interest => diseases become entrenched in certain population groups => harder to control, eliminate, eradicate disease • Public funding needed may have to increase as effective treatment emerges • Increased costs to households from chronic, rather than acute illness • Reinforce cycles between risk and poverty • Inequalities in risk become entrenched over time • Disease continues to be endemic in specific population groups despite available interventions to reduce transmission (eg: condoms) and effective treatments

Science magazine, 2017 [14]

RACE/ ETHNICITY FACTORS FOR COVID-19 IN UNITED STATES

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non-Hispanic persons	Black or African American, Non-Hispanic persons	Hispanic or Latino persons
Cases[1]	1.7x	0.7x	1.1x	1.9x
Hospitalization[2]	3.4x	1.0x	2.8x	2.8x
Death[3]	2.4x	1.0x	2.0x	2.3x

Race and ethnicity are risk markers for other underlying conditions that affect health, including socioeconomic status, access to health care, and exposure to the virus related to occupation, e.g., frontline, essential, and critical infrastructure workers.

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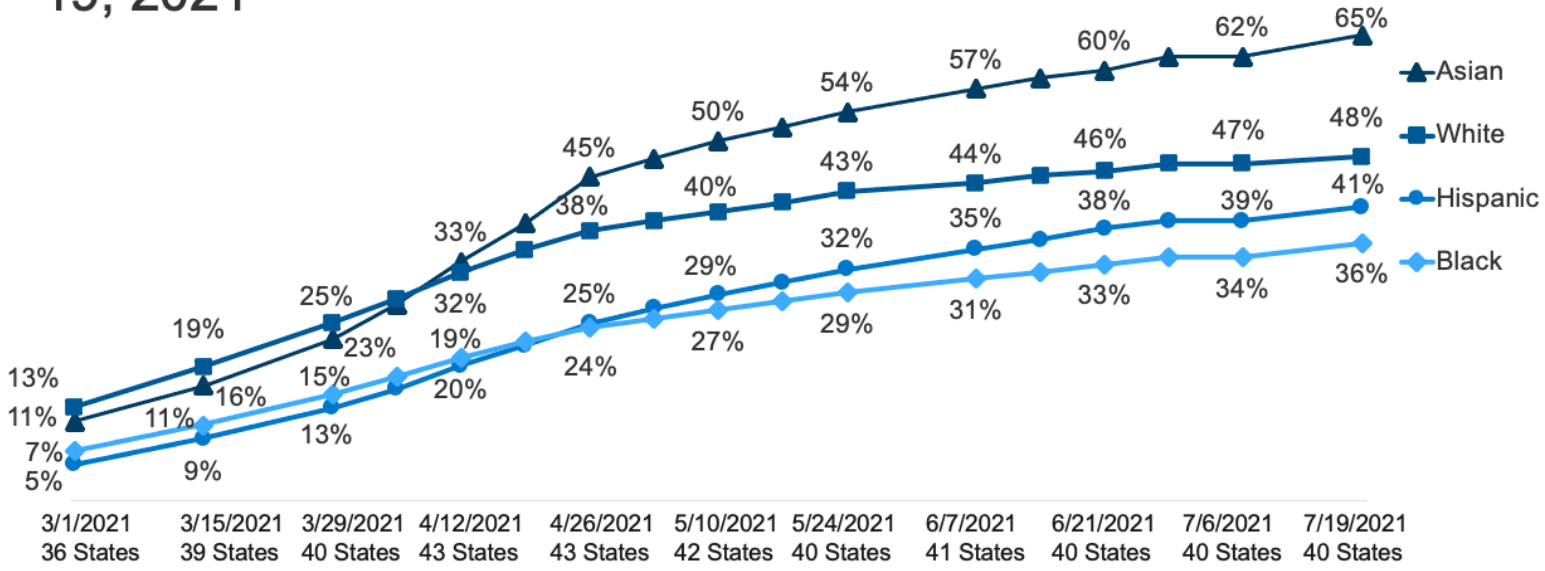
CDC, updated July 16, 2021 [15]

RACE/ ETHNICITY FACTORS FOR COVID-19 IN UNITED STATES

Figure 4

Percent of Total Population that Has Received at Least One COVID-19 Vaccine Dose by Race/Ethnicity, March 1 to July 19, 2021



NOTE: Persons of Hispanic origin may be of any race but are categorized as Hispanic; other groups are non-Hispanic.

SOURCE: Vaccination data based on KFF analysis of publicly available data on state websites; total population data used to calculate rates based on KFF analysis of 2019 American Community Survey data.

KFF

Kaiser Family Foundation [16]

MALAYSIA'S COVID-19 EXPERIENCE

- No race/ ethnicity data on Covid-19 cases/ hospitalization/ mortality/ vaccination
- Most lockdowns targeted at low-income communities

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DISPARITY IN VACCINE SUPPLY

Covid-19 Vaccine Delivery and Administration by State in Malaysia

Vaccine deliveries scheduled up to July 31, 2021; vaccine doses administered as of July 27, 2021

States	Total Doses To Be Delivered (as of July 31, 2021)	Total Doses Administered (as of July 27, 2021)	Total Doses Delivered Per 100 People (Total Population)	Total Doses Administered Per 100 People (Total Population)
Labuan	236,110	115,124	237	116
Sarawak	3,645,746	2,875,760	129	102
Klang Valley (KL, Selangor, Putrajaya)	9,086,903	6,943,642	108	82
N. Sembilan	1,024,268	766,865	91	68
Perlis	218,560	174,443	86	68
Penang	1,255,401	947,880	71	53
Melaka	623,366	456,490	67	49
Terengganu	795,790	488,974	63	39
Perak	1,437,079	1,093,092	57	44
Pahang	948,201	658,943	56	39
Johor	2,056,422	1,371,524	54	36
Kedah	1,113,638	788,139	51	36
Kelantan	914,800	627,257	48	33
Sabah	1,856,480	1,085,214	47	28
Total	**25,212,764**	**18,393,347**	**77**	**56**

Source: Data from the Special Committee on Ensuring Access to Covid-19 Vaccine Supply (JKJAV) | Graphic by CodeBlue

Note: The vaccine delivery figures exclude 418,860 doses scheduled for delivery to the Malaysian Armed Forces up to July 31, 2021.

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Dr. Lucky Tran
@luckytran

Experts should be careful to not conflate saying that Covid will likely be endemic, with saying that "we need to learn to live with the virus."

The latter is not a scientific message, it's a political one that suggests we should give up on all public health measures.

4:25 AM · Jul 15, 2021 · Twitter for iPhone

Even though the science tells us that COVID will likely be endemic, the science also tells us that in order to prevent the most deaths and suffering from acute and chronic illness, we need to use all the public health tools we have available to us.

3 32 183

Dr. Lucky Tran @luckytran · Jul 15

Doing everything we can to prevent as much suffering as possible is NOT "learning to live with the virus."

It's "taking long-term actions to prevent harm from the virus."

1 39 183

Dr. Lucky Tran @luckytran · Jul 15

We should not be giving up and "living with the virus."

We should be acting smarter so that we can all live while preventing the virus from causing more mass death and suffering.

DISCUSSION

WHAT WOULD IT BE LIKE MANAGING COVID-19 SHOULD IT BECOME ENDEMIC? WHAT ARE THE CHALLENGES?

REFERENCES

1. Centers for Disease Control and Prevention (2012). Lesson 1: Introduction to Epidemiology. Retrieved from https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section11.html
2. World Health Organization (2021). World Malaria Day: WHO launches effort to stamp out malaria in 25 more countries by 2025. Retrieved from https://www.who.int/news/item/21-04-2021-world-malaria-day-who-launches-effort-to-stamp-out-malaria-in-25-more-countries-by-2025
3. World Health Organization (2021). Zeroing in on malaria elimination: Final report of the E-2020 initiative. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/340881/9789240024359-eng.pdf
4. Phillips, N. (2021). The coronavirus is here to stay – here's what that means. Retrieved from https://www.nature.com/articles/d41586-021-00396-2
5. New York Times (2021). Covid-19: Hopes for 'herd immunity' fade as virus hurtles toward becoming endemic. Retrieved from https://www.nytimes.com/live/2021/05/09/world/covid-vaccine-coronavirus-cases
6. CNN (2021). Tracking Covid-19 vaccinations worldwide. Retrieved from https://edition.cnn.com/interactive/2021/health/global-covid-vaccinations/. Accessed July 29, 2021
7. Our World In Data (2021). Coronavirus (Covid-19) Vaccinations. Retrieved from https://ourworldindata.org/covid-vaccinations. Accessed July 28, 2021
8. Linda Geddes (2021). Is Covid-19 effectively already endemic? Retrieved from https://www.gavi.org/vaccineswork/covid-19-effectively-already-endemic
9. Centers for Disease Control and Prevention (2021). Outbreak of SARS-CoV-2 Infections, Including COVID-19 Vaccine Breakthrough Infections, Associated with Large Public Gatherings — Barnstable County, Massachusetts, July 2021. Retrieved from https://www.cdc.gov/mmwr/volumes/70/wr/mm7031e2.htm?s_cid=mm7031e2_w
10. McMorrow, M. (2021). Improving communications around vaccine breakthrough and vaccine effectiveness. Centers for Disease Control and Prevention.

REFERENCES

11. Abutaleb, Y., Johnson, C. Y., & Achenbach, J. (2021). 'The war has changed': Internal CDC document urges new messaging, warns delta infections likely more severe. Retrieved from https://www.washingtonpost.com/health/2021/07/29/cdc-mask-guidance/
12. Office for National Statistics (2021). Coronavirus (Covid-19) latest insights. Retrieved from https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/articles/coronaviruscovid19/latestinsights
13. Gan, K.Y., Wong, L. & Ong, Y.K. (2021). Living normally, with Covid-19: Task force ministers on how S'pore is drawing roadmap for new normal. Retrieved from https://www.straitstimes.com/opinion/living-normally-with-covid-19
14. Medley, G. F. & Vassall, A. (2017). When an emerging disease becomes endemic. Retrieved from https://science.sciencemag.org/content/357/6347/156
15. Centers for Disease Control and Prevention (2021). Risk for Covid-19 infection, hospitalization, and death by race/ ethnicity. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html
16. Kaiser Family Foundation (2021). Latest data on Covid-19 vaccinations by race/ ethnicity. Retrieved from https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-on-covid-19-vaccinations-race-ethnicity/
17. CodeBlue (2021). Sabah gets smallest Covid-19 vaccine supply per capita. Retrieved from https://codeblue.galencentre.org/2021/07/28/sabah-gets-smallest-covid-19-vaccine-supply-per-capita/
18. Lucky Tran (2021). Tweets retrieved from https://twitter.com/luckytran/status/1415407161069510659