The Cognitive Biases of COVID-19 Response

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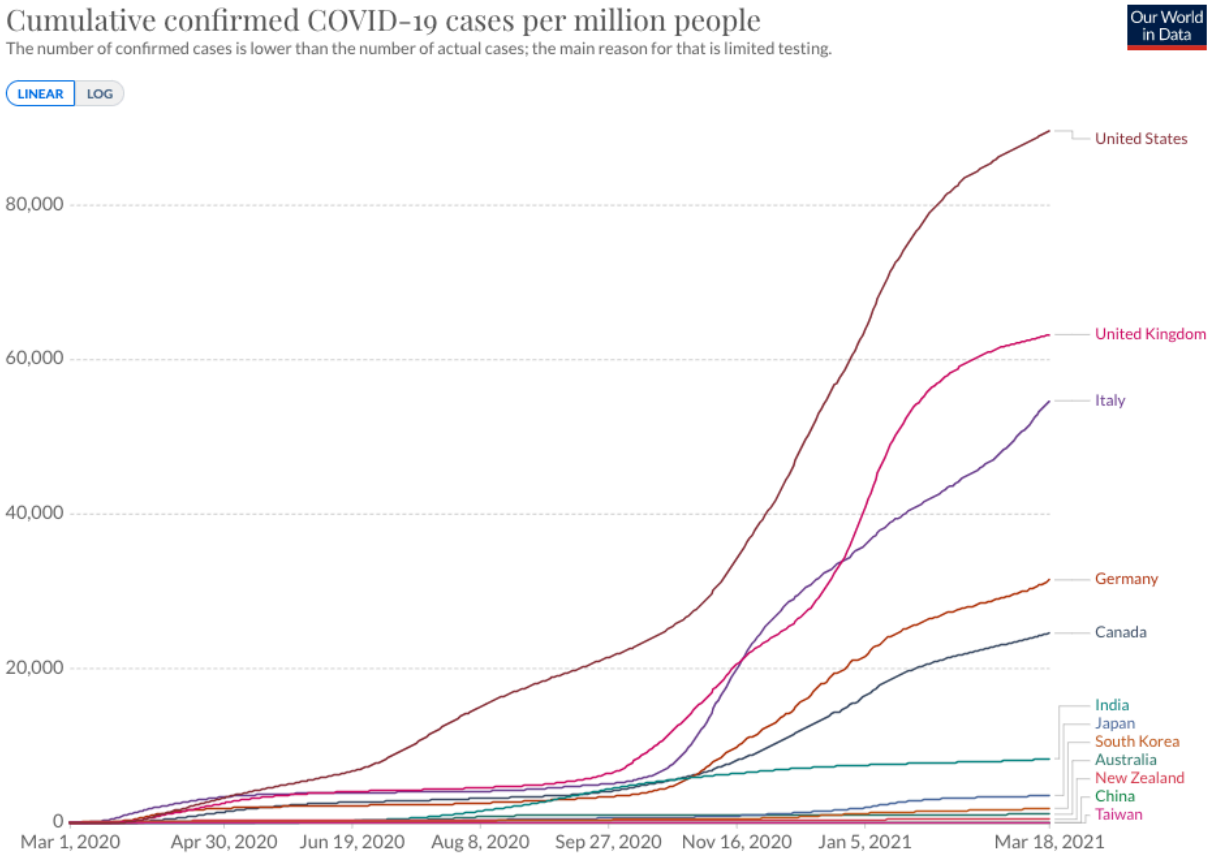
NYU Stern (@arpitrage)
March 24, 2021

Disclaimers

- I’m an economist, not an epidemiologist.
- My goal is not to say experts are “wrong” or discredit the public health field. Every issue I touch on is a live debate with experts on both sides.
- Instead — use the benefit of hindsight to look back and try to find general cognitive patterns and incentives which help explain why aspects of our response were insufficient.

First, Did Something Go Wrong?



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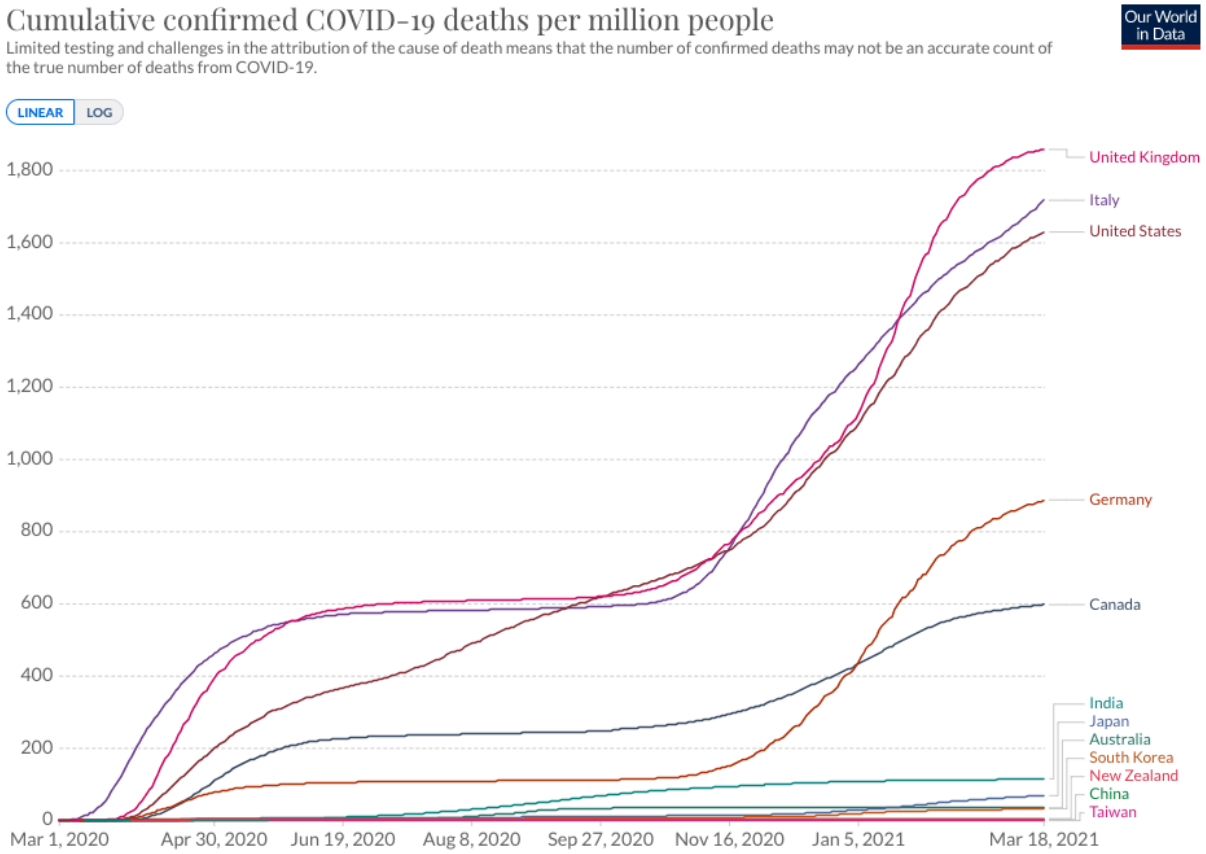

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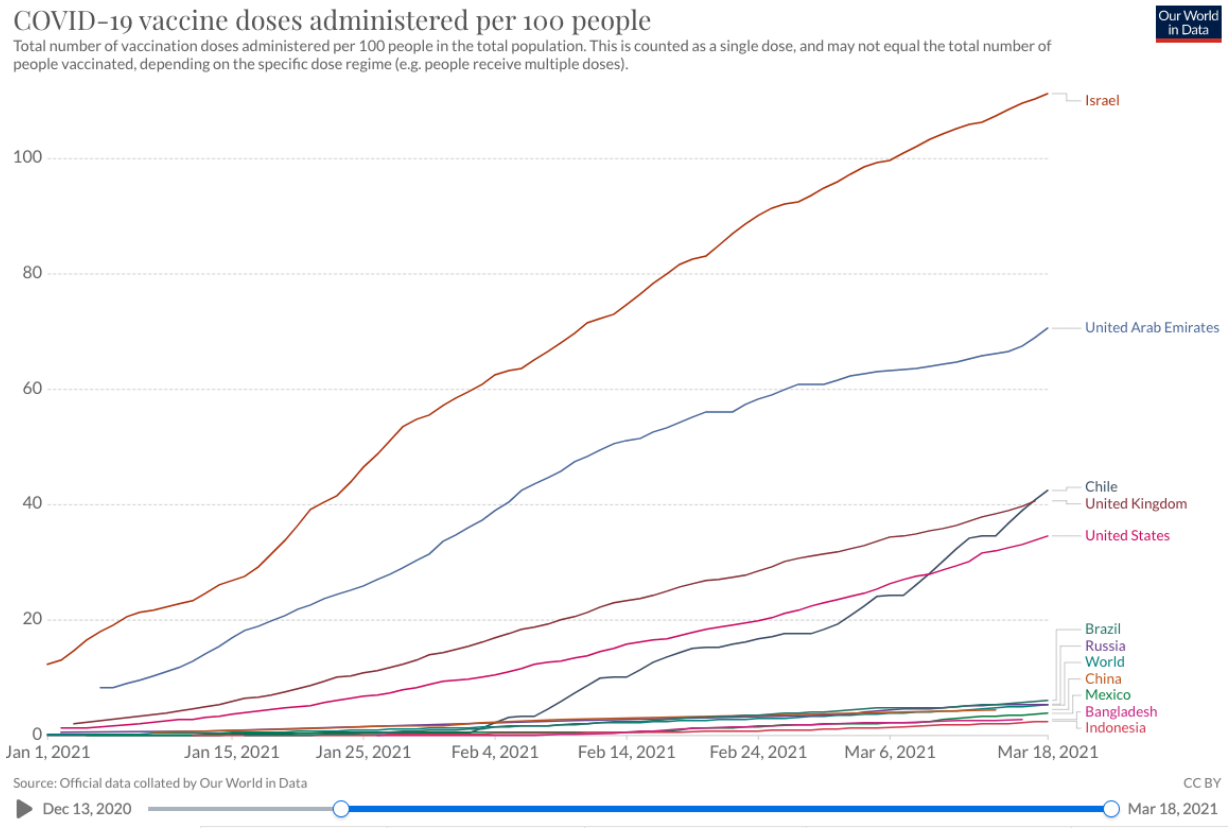


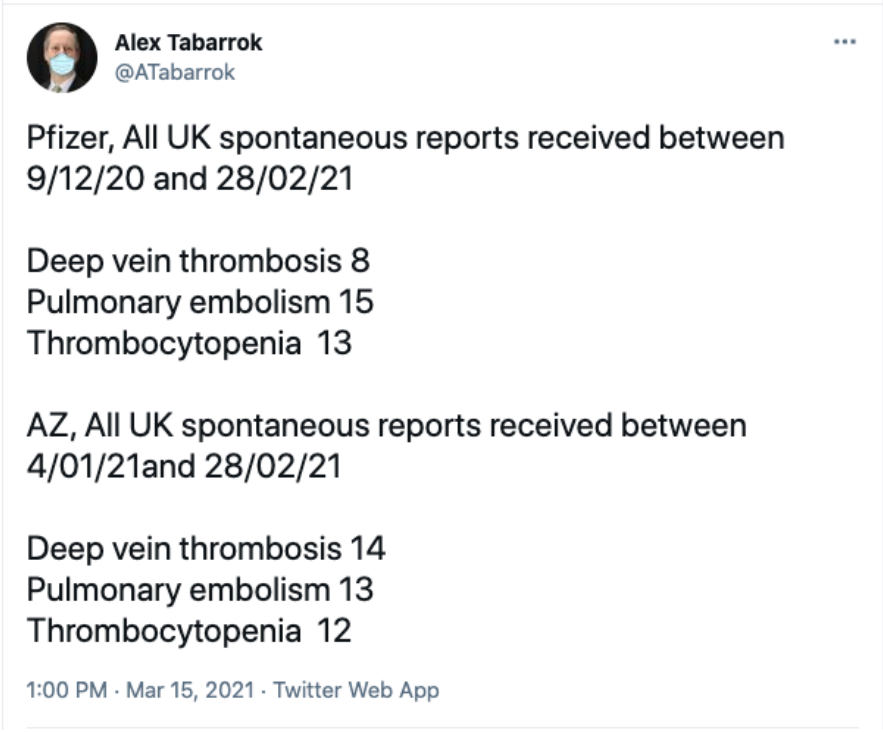
Why Did Things go Wrong?

1. Base Rate Neglect
2. Failure to Balance Risks
3. Over-emphasis on Peltzman Risk
4. Blank Slate Frequentism
5. Jawboning the public
6. Sticking to Guidance after Facts Change
7. Individual v. Population Health
8. Implications for Institutions

The Prosecutor's Fallacy

- R v T (EWCA Crim 2439):
  - Suspected murderer ("T") had pair of Nike trainers which matched shoeprint
  - What are the odds of this?
  - Frequentist calculation (judgement of initial arrest):
  - (relative frequency of pattern) x (relative frequency of size) x (relative amount of wear) x (relative amount of damage)
    - = 5 x 10 x 2 x <1 = 1/100 odds
- But Bayes' Theorem:
  - P(E|I): chance that evidence is damning though individual is innocent (false positive)
  - P(I|E): chance of innocence despite evidence
  - P(I|E) = P(E|I) x P(I)/P(E)
- Need to know "base rate" — how often is evidence found?
- In this example — underlying rate of Nike trainer purchases is common, case thrown out in appeal.

1. The Base Rate Fallacy



Alex Tabarrok
@ATabarrok

Pfizer, All UK spontaneous reports received between 9/12/20 and 28/02/21

Deep vein thrombosis 8
Pulmonary embolism 15
Thrombocytopenia 13

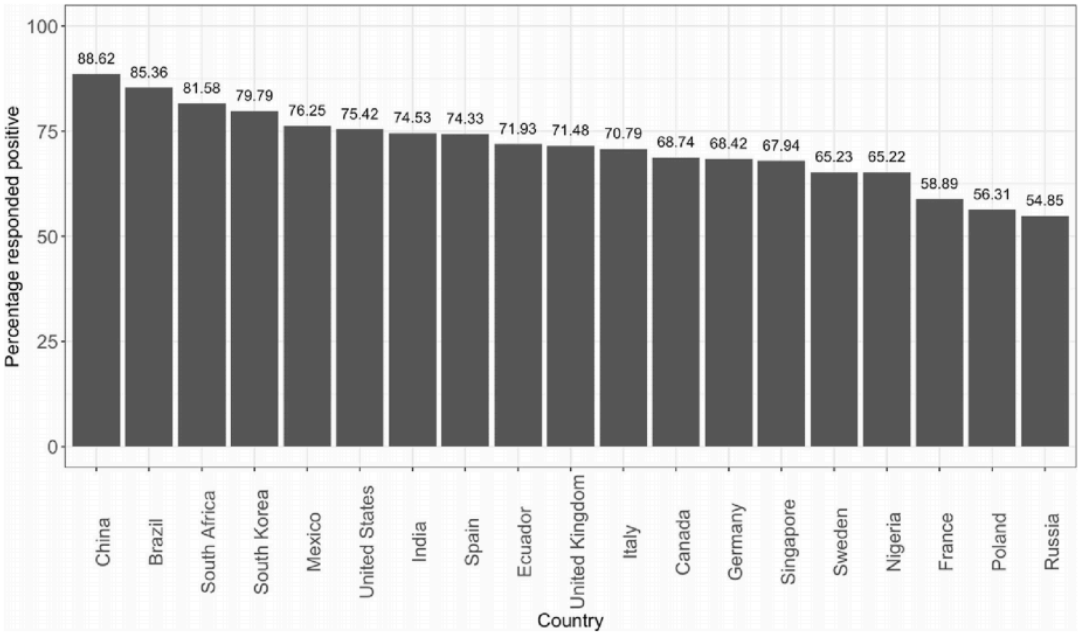
AZ, All UK spontaneous reports received between 4/01/21and 28/02/21

Deep vein thrombosis 14
Pulmonary embolism 13
Thrombocytopenia 12

1:00 PM · Mar 15, 2021 · Twitter Web App

- Not clear that AZ associated blood clots exceed base rate in population
  - At worst may reflect “bad batch”
- Yet many European countries halted vaccination
- ”Bonferroni Correction” — many symptoms under surveillance
- And even *if* they did; have to balance against risk of COVID

Reasons for EU Vaccine Slow Rollout



Extended Data Fig. 1 | 'If a COVID-19 vaccine is proven safe and effective and is available, I will take it'. Numbers above the bars represent the percent of respondents in each country who responded positively to the question 'If a COVID-19 vaccine is proven safe and effective and is available, I will take it'.

1. Europeans are globally vaccine-skeptical. If they have base rate fallacy; democratic leaders may follow.
2. Leaders themselves may also be biased.
3. Something about EU-wide incentives

2. Failure to Balance Risk

- Europe negotiated heavily with pharma companies to mitigate privacy, liability waivers, negotiate for better prices
  - Israel did not — vaccination first
- World's simplest cost-benefit calculation:
  savings billions on drug negotiations << trillions from reopened economy

> "Pricing has been important since the beginning," Sandra Gallina, the E.U.'s main vaccine negotiator, told lawmakers in February. "We are talking about taxpayers' money."

Precautionary Principle

European institutions are, by design, risk-averse. One of the founding tenets of the European Union is called the precautionary principle: The bloc errs on the side of caution when risks are unclear.

> "In Germany, there's a very great reluctance to countenance imposing affirmative harm on people in trade-off situations," Dr. Persad said. "It's a very strong emphasis on not causing harm, even if you allow much more harm through inaction."

"This idea of the precautionary principle plays a big role in E.U. policy," said Govind Persad, a University of Denver bioethicist. That principle calls for pausing any policy that might bring unforeseen harms in order to study those harms before proceeding. Imposing blind risk, however small, on unknowing citizens would be wrong.

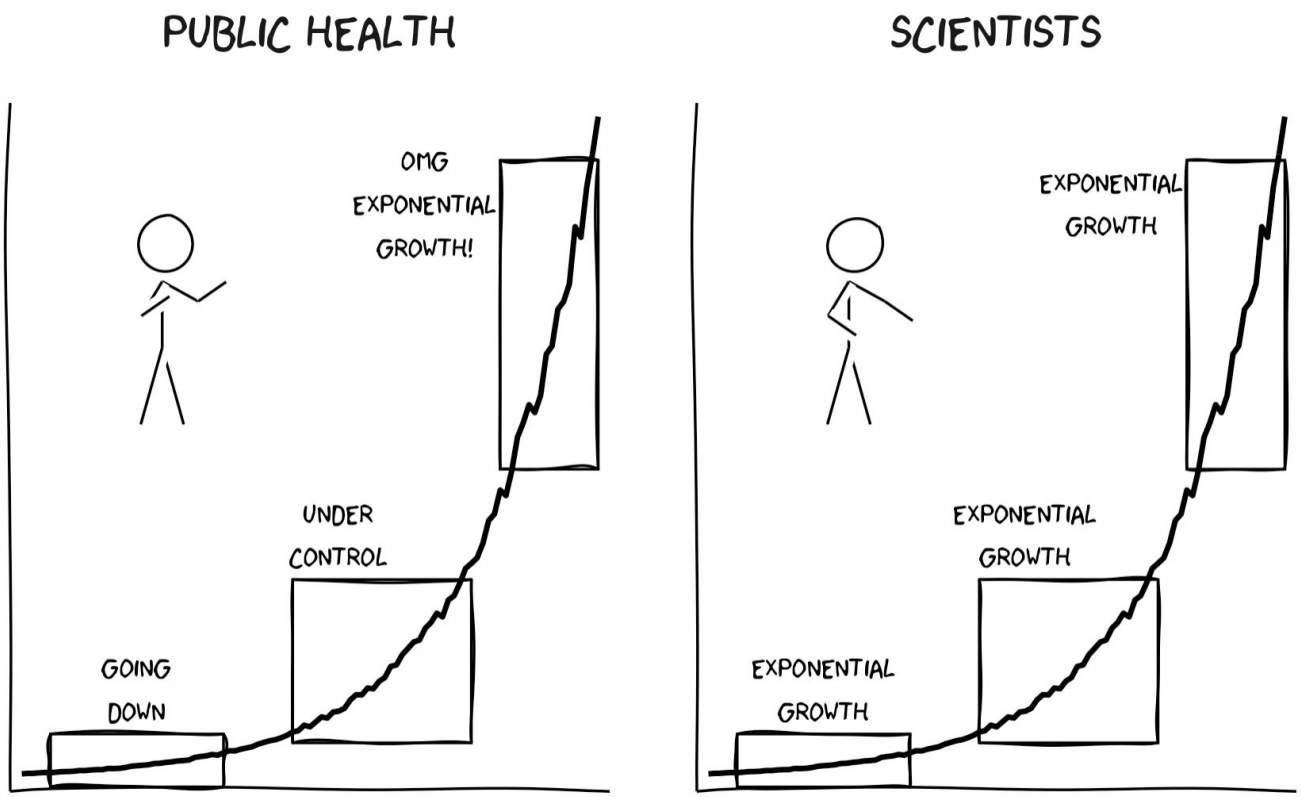
But Dr. Persad said that he had "never really been able to make sense of how you would apply that principle in a pandemic."

For one, even if vaccinations did carry some risk or uncertainty, the risk and uncertainty introduced by withholding them, therefore allowing cases to spread, was surely higher. It was not as if infections paused for bureaucratic process.

For another, vaccinations are voluntary.

"This is not a case where you're imposing risk on unconsenting people," Dr. Persad said, and therefore violating the precautionary principle. "You're allowing people to consensually protect themselves from a big risk by taking a very small one."

Difficulty of Grasping Exponential Spread



3. Peltzman Risk!

- “The NHTSA had volunteers drive a test track in cars with automatic lane departure correction, and then interviewed the drivers for their impressions…
  After [subject] praised the ability of the car to self-correct when she drifted from her lane, she noted that she would love to have this feature in her own car. Then, after a night of drinking in the city, she would not have to sleep at a friend’s house before returning to her rural home.
- Peltzman risk surely has *some* effect.
- But the general presumption should be that it is second order — should not be used to negate safety improvements

Bankshot Peltzman Risk: Lyme Disease

- 30,000 reported Lyme disease cases/year (maybe 300k total) in US
- FDA-approved vaccine in 1998: reduced adult infections adults 80%
  - Moderate and transient side effects in trials
- Media reports of side effects such as arthritis
- Class action lawsuit of 121 individuals reporting side-effects
- Base rate: same rate of arthritis for vaccinated and non-vaccinated
- GlaxoSmithKline pulled drug, though FDA panel did not, due to poor sales
- “The effects of vaccination on human behaviour presented yet another important uncertainty. Lyme vaccination, although it provides incomplete protection, may make individuals less likely to limit their exposure to ticks, which might actually increase their risk of Lyme and other tick-borne diseases (e.g. ehrlichiosis, babesiosis and Rocky Mountain spotted fever).”

Peltzman Risk: Testing

UNC health experts said they have the capacity to do [mass testing], but it wouldn't be productive and has drawbacks.

The virus has a 4-day incubation period, so a person could test negative today, but then test positive tomorrow and that could make things worse, said Dr. David Weber, medical director of UNC Hospitals' Departments of hospital epidemiology.

"Sometimes it gives people a false assurance of 'I'm negative so don't have to follow physical distancing or masking or other protective mechanisms' " Weber said.

Dr. Erica Pettigrew, medical director of the Orange County Health Department and the medical director of occupational Health at UNC Health Care, said the "testing everyone" strategy has given rise to some issues in hospitals.

"As we do more and more testing of patients, we see that people may get a little bit more lax in their PPE, in their masking or symptom monitoring," Pettigrew said."

False Sense of Security Used to Downplay Testing

Department of Health & Social Care

From the Lord Bethell
Parliamentary Under Secretary of State for Innovation

39 Victoria Street
London
SW1H 0EU

020 7210 4850

Your Ref: BW119340/AS
PO-1273464

[redacted] MP
By email to: [redacted]

11 December 2020

Dear [redacted]

Thank you for your correspondence of 16 November to Matt Hancock on behalf of your constituent, [redacted], about testing for the novel coronavirus (COVID-19).

From the beginning of the outbreak, our policies have been guided by the advice of the Scientific Advisory Group for Emergencies, which is led by the Chief Scientific Adviser and Chief Medical Officer for England, and the response is kept under constant review.

We are not currently planning mass asymptomatic testing; swab testing people with no symptoms is not an accurate way of screening the general population, as there is a real risk of giving false reassurance. Widespread asymptomatic testing could undermine the value of testing, as there is a risk of giving misleading results. Rather, only people with COVID-19 symptoms should get tested, as [redacted] suggests.

In some cases, a person who tests negative with an antigen test might test positive by P.C.R. — raising the risk that a negative antigen test could give someone a false sense of security en route to Thanksgiving dinner, said Paige Larkin, a clinical microbiologist at NorthShore University HealthSystem in Chicago, where she specializes in infectious disease diagnostics.

Mandatory face masks might lull people into taking more coronavirus risks

July 20, 2020 7.08am EDT

Masks are a crucial tool for stopping the pandemic – but don't let them give you a false sense of security. Patricia J. Garcinuno/Getty Images Entertainment via Getty Images Europe

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Governments all around the world are trying to contain the spread of the coronavirus. Making it mandatory for people to wear face masks is a policy that has gained favor among many national governments and state authorities in the United States.

Yet any policy that attempts to modify people's behavior – in this case, making mask-wearing a new norm – needs to take into account undesired behavioral adjustments that the policy may bring about. As behavioral economists, we know that without such consideration, the policy is bound to be less efficient than expected.

Face Mask Use and Physical Distancing Before and After Mandatory Masking: Evidence From Public Waiting Lines

31 Pages • Posted: 2 Jul 2020 • Last revised: 29 Oct 2020

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Date Written: July 9, 2020

Abstract

During the COVID-19 pandemic, the introduction of mandatory face mask usage was accompanied by heated debate. It is argued that community use of masks creates a false sense of security that could decrease physical distancing, thus making matters worse. We conducted a randomized field experiment in Berlin, Germany, to investigate whether masks lead to decreases in distancing and whether this mask effect interacts with the introduction of a mask mandate. Joining lines in front of stores, we measured the distance kept from the experimenter in two treatment conditions - the experimenter wore a mask in one and no face covering in the other - both before and after the introduction of mandatory mask use in stores. We find no evidence that mandatory masking has a negative effect on distance keeping. To the contrary, in our study masks significantly increase distancing and the effect does not differ between the two periods. However, we show that distances in the data collected after the mandate are shorter in locations where more stores, closed before the mandate, were allowed to open. These findings suggest that individuals take relaxations in the restrictions - that accompanied a general decrease in the severity of the pandemic - as an indication that they can also reduce other precautions, like keeping a safe distance.

Okay, but why was masking never recommended, even before COVID?

people trying to protect against COVID-19. “It seems kind of intuitively obvious that if you put something—whether it’s a scarf or a mask—in front of your nose and mouth, that will filter out some of these viruses that are floating around out there,” says Dr. William Schaffner, professor of medicine in the division of infectious diseases at Vanderbilt University. The only problem: that’s not effective against respiratory illnesses like the flu and COVID-19. If it were, “the CDC would have recommended it years ago,” he says. “It doesn’t, because it makes science-based recommendations.”

Unvaccinated Asymptomatic Persons, Including Those at High Risk for Influenza Complications

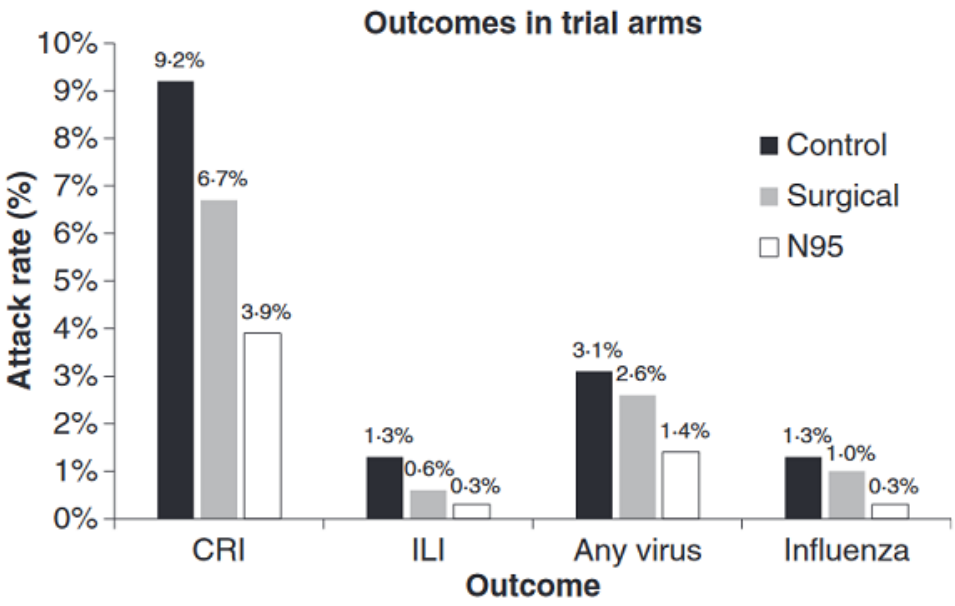
No recommendation can be made at this time for mask use in the community by asymptomatic persons, including those at high risk for complications, to prevent exposure to influenza viruses. If unvaccinated high-risk persons decide to wear masks during periods of increased respiratory illness activity in the community, it is likely they will need to wear them any time they are in a public place and when they are around other household members.

Historical State of Masking Evidence

Gralton & McLaws, 2010 reviews several studies of this type, mostly from the SARS epidemic of the early 2000s. A few are underpowered and find that neither surgical masks nor respirators prevent infection (probably not true). A few others show respirators prevent infection, but do not investigate surgical masks (probably right, but useless for our purposes). Two seem relevant to the question of whether surgical masks work:

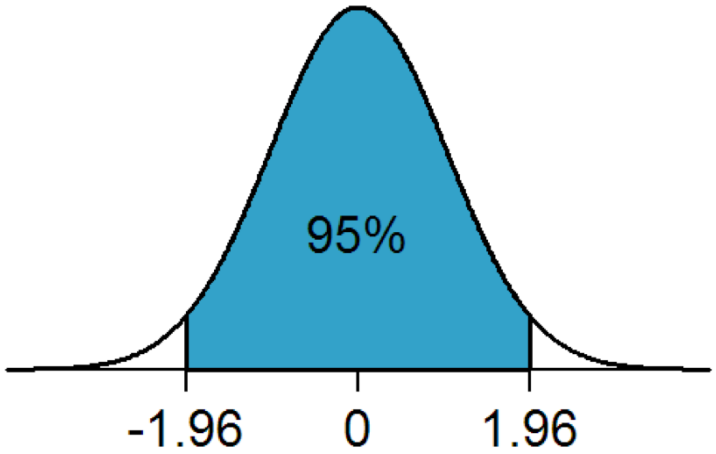
Rapid awareness and transmission of SARS in Hanoi French Hospital, Vietnam was conducted in a poor hospital that only had surgical masks, not respirators. In the latter stages of the epidemic, 4 workers got sick and 26 stayed healthy. It found that 3 of the 4 sick workers hadn't been wearing masks, but only 1 of the 26 healthy workers hadn't. This is a pretty dramatic result – subject to the above confounders, of course.

Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of SARS is larger and more prestigious, and looked at a cluster of five hospitals. Staff in these hospitals used a variety of mask types, including jury-rigged paper masks that no serious authority expects to work, surgical masks, and N95 respirators. It found that 7% of paper-mask-wearers got infected, compared to 0% of surgical-mask and respirator wearers. This seems to suggest that surgical masks are pretty good.

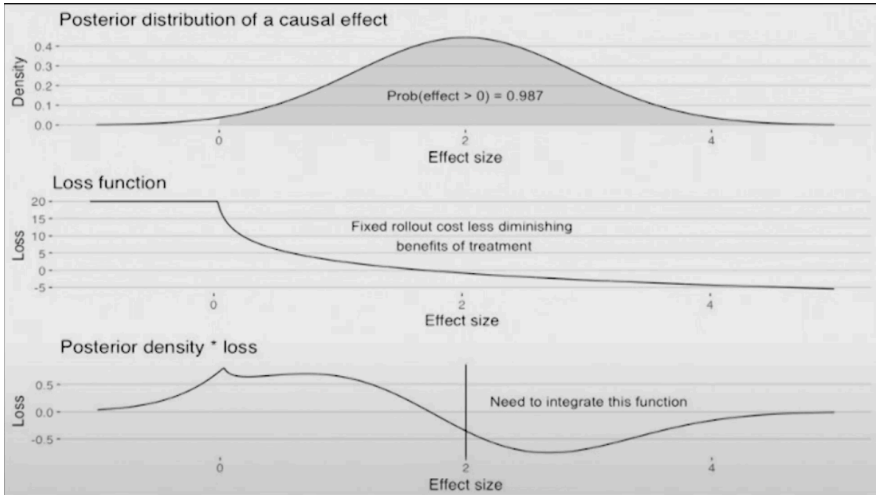


Differing Methods of Integrating Evidence

- Frequentist Analysis: Pick (arbitrarily) your prior, only change your view if there is sufficient evidence (ideally “gold standard” RCT)



- Always be Integrating Over Your Loss Function (ABIYLFOYP)



Perils of Underpowered Analysis

- The standard medical toolkit — stick with the prior until given strong evidence otherwise — probably works well in standard conditions
  - Current evidence base (ie prior) reasonably strong
  - Most new treatments are probably not worth it
- It fails badly in low-powered contexts when there is poor evidence in either direction, and you need to make a decision anyway.
- It misses evidence from theory (ie particulate evidence on masks)
- Also misses the cost of intervention (low in case of masks)
- Highlights importance of what null hypothesis is

Do Vaccines Lower Transmission?

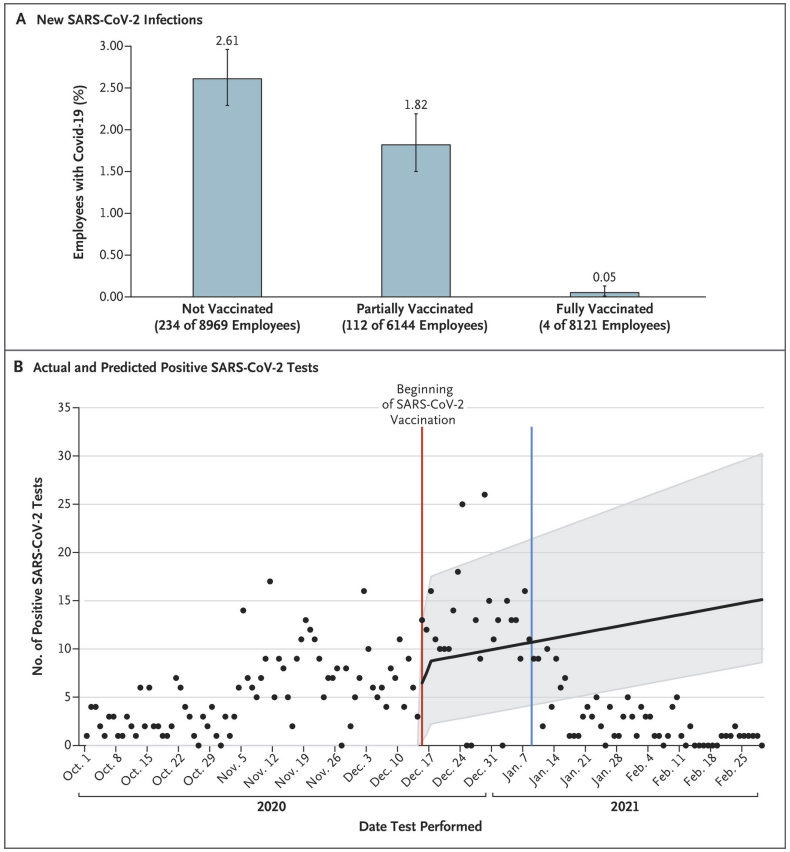
Most experts have been urging people to continue following public health guidelines, including masking and social distancing, even after they've been fully vaccinated with two doses of the Pfizer or Moderna vaccine or one dose of the Johnson & Johnson vaccine — and after enough time has passed for those vaccinations to have taken effect (generally two weeks).

The reason for this recommendation is because while the Pfizer and Moderna vaccines have been shown to have 95% efficacy against illness (and the Johnson & Johnson vaccine is 85% protective against severe disease), the clinical trials were not designed to test whether any of the trial participants contracted COVID-19 but showed no symptoms.

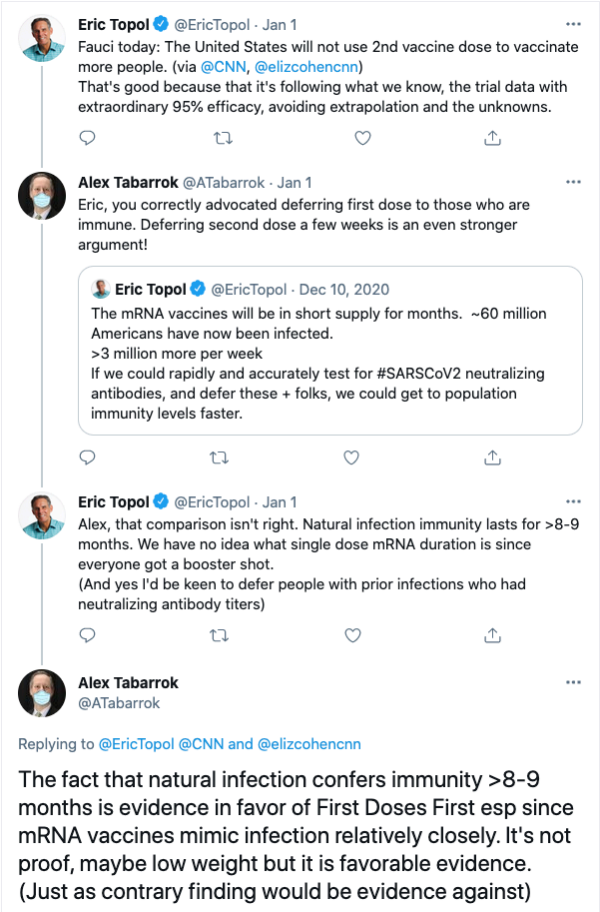
In absence of evidence on vaccines lowering transmission, what do you default to?

Many people: we *don't know* so should default to assuming *zero* transmission benefits

Others: most vaccines lower transmission as well, so this one probably does too



First Doses First?



Eric Topol @EricTopol · Jan 1

Fauci today: The United States will not use 2nd vaccine dose to vaccinate more people. (via @CNN, @elizcohencnn)
That's good because that it's following what we know, the trial data with extraordinary 95% efficacy, avoiding extrapolation and the unknowns.

Alex Tabarrok @ATabarrok · Jan 1

Eric, you correctly advocated deferring first dose to those who are immune. Deferring second dose a few weeks is an even stronger argument!

> **Eric Topol** @EricTopol · Dec 10, 2020
>
> The mRNA vaccines will be in short supply for months. ~60 million Americans have now been infected.
> >3 million more per week
> If we could rapidly and accurately test for #SARSCoV2 neutralizing antibodies, and defer these + folks, we could get to population immunity levels faster.

Eric Topol @EricTopol · Jan 1

Alex, that comparison isn't right. Natural infection immunity lasts for >8-9 months. We have no idea what single dose mRNA duration is since everyone got a booster shot.
(And yes I'd be keen to defer people with prior infections who had neutralizing antibody titers)

Alex Tabarrok
@ATabarrok

Replying to @EricTopol @CNN and @elizcohencnn

The fact that natural infection confers immunity >8-9 months is evidence in favor of First Doses First esp since mRNA vaccines mimic infection relatively closely. It's not proof, maybe low weight but it is favorable evidence. (Just as contrary finding would be evidence against)

Global Vaccination Campaign

Country	Doses administered ▾	Enough for % of people	% of population: given 1+ dose	% of population: fully vaccinated	Daily rate of doses administered
Global Total	*468,598,645*	–	–	–	*11,262,201*
U.S.	128,217,029	19.7	25.3	13.7	2,497,025
China	74,950,000	2.7	–	–	1,661,667
EU	59,671,733	6.7	9.1	4.0	1,142,204
India	50,075,162	1.8	3.1	0.6	2,173,688
U.K.	30,691,557	23.0	42.4	3.5	598,286
Brazil	16,968,908	4.0	6.0	2.1	419,659
Turkey	13,832,275	8.3	9.8	6.9	268,572
Germany	11,115,062	6.7	9.3	4.1	207,311
Russia	10,600,000	3.6	4.3	2.9	300,000
Israel	9,790,285	54.1	57.3	50.8	48,053
France	8,834,678	6.8	9.8	3.8	183,223
Chile	8,817,727	23.1	30.3	15.8	238,590
Indonesia	8,687,796	1.6	2.2	1.0	357,442
Italy	8,112,882	6.7	9.2	4.3	157,917
UAE	7,477,881	34.8	–	–	115,608
Morocco	6,858,400	9.6	12.0	7.3	94,431
Spain	6,409,196	6.9	9.1	4.6	95,282
Mexico	5,781,359	2.3	4.0	0.6	196,679
Poland	5,077,928	6.7	8.7	4.7	74,410

4. Blank Slate Frequentism

- In ordinary situations — slow accretion of evidence base can be fine.
- In pandemic: need to take extraordinary steps and decide on an action in either direction.
- Frequentist approach places high burden of proof on new actions:
  - Masking
  - Rapid/mass testing
  - Rely on vaccines to reduce transmission
  - First Dose Only
- In all cases — many people are reluctant to extrapolate at all from what trial data demonstrate; even what that commits them to beliefs unsupported by data
- In low powered contexts: no reason to privilege the null hypothesis

5. Jawboning the Public

Recently, a figure to whom millions of Americans look for guidance — Dr. Anthony S. Fauci, an adviser to both the Trump administration and the incoming Biden administration — has begun incrementally raising his herd-immunity estimate.

In the pandemic's early days, Dr. Fauci tended to cite the same 60 to 70 percent estimate that most experts did. About a month ago, he began saying "70, 75 percent" in television interviews. And last week, in an interview with CNBC News, he said "75, 80, 85 percent" and "75 to 80-plus percent."

In a telephone interview the next day, Dr. Fauci acknowledged that he had slowly but deliberately been moving the goal posts. He is doing so, he said, partly based on new science, and partly on his gut feeling that the country is finally ready to hear what he really thinks.

Fed-up nurse: "It's like they don't care"

Related Article: Is going to the beach OK? What about hiking?

A nurse in western Ohio said that, save for one specific unit where Covid-19 patients are supposed to be sent, nurses at the medical center are forbidden from wearing masks -- not just N95 masks, but surgical masks or any masks.

"My problem is, you don't know who's coming in or out," said the nurse, who asked not to be identified for fear of retaliation. "We know there are people who are asymptomatic...But we're not allowed to wear PPE; we were told it would give patients anxiety."

But she said the lack of a mask has filled her with anxiety.

"I don't want to bring anything home to my kids," she said. "I'm a single mom. I signed up to be a frontline worker, but I don't have the equipment to do it."

6. Sticking to Guidance After Facts Change

Public health records, scores of scientific studies and interviews with more than two dozen experts show the policy of unobstructed travel was never based on hard science. It was a political decision, recast as health advice, which emerged after a plague outbreak in India in the 1990s. By the time Covid-19 surfaced, it had become an article of faith.

"It's part of the religion of global health: Travel and trade restrictions are bad," said Lawrence O. Gostin, a professor of global health law at Georgetown University who helped write the global rules known as the International Health Regulations. "I'm one of the congregants."

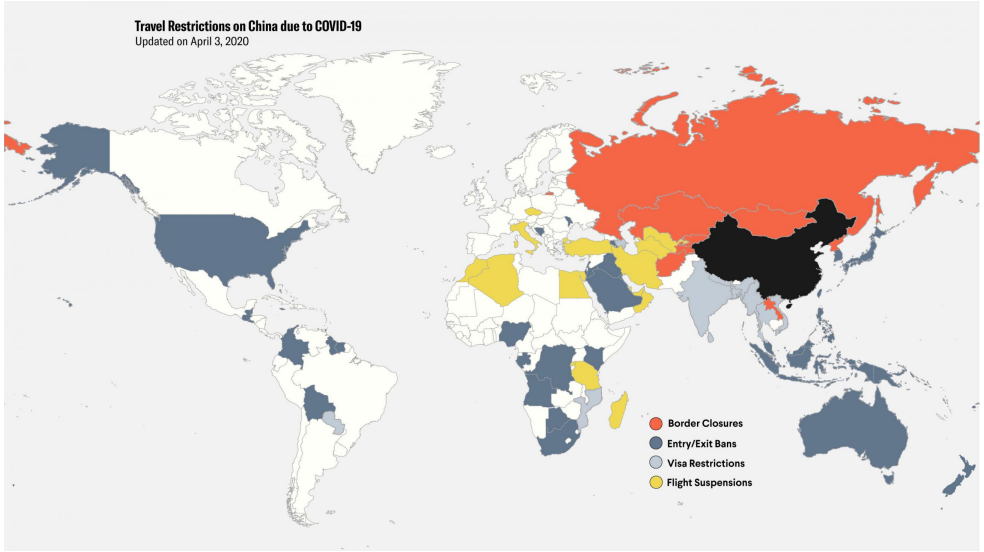
Covid-19 has shattered that faith. Before the pandemic, a few studies had demonstrated that travel restrictions delayed, but did not stop, the spread of SARS, pandemic flu and Ebola. Most, however, were based on mathematical models. No one had collected real-world data. The effect of travel restrictions on the spread of the latest coronavirus is still not understood.

> In the fall of 1994, a plague outbreak struck the Indian port city of Surat. Hysteria erupted, and countries quickly banned travel to India. Tourists abandoned their vacations. Airlines canceled flights. The United Arab Emirates banned Indian cargo, while Russia demanded quarantines on shipments.
>
> Plague is not uncommon, with small outbreaks every year, even in the United States, and Surat's outbreak turned out to be relatively mild, with just over 50 deaths. But the global panic devastated the city and cost India's economy an estimated $3 billion.

This time, the process was swift. In 2005, diplomats struck a compromise intended to balance public health needs with the economic consequences of "unnecessary interference" with travel and trade. While the new rules did not explicitly prohibit countries from closing borders or restricting trade, they made it clear that doing so should be a last resort.

But the rules were never based on a scientific body of evidence. There were reasonable assumptions — closed borders could slow the arrival of medicine and aid workers, for example. Yet, no one studied whether restricting travel might slow a fast-spreading disease, partly because there was no tradition of collecting data on such interventions.

Travel Restrictions with COVID



Urban Flight Seeded the COVID-19 Pandemic Across the United States

38 Pages • Posted: 20 Oct 2020

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Date Written: October 14, 2020

Abstract

We document large-scale urban flight in the United States in the wake of the COVID-19 pandemic. Populations that flee are disproportionately younger, whiter, and wealthier. Regions that saw migrant influx experience greater subsequent COVID-19 case growth, suggesting that urban flight was a vector of disease spread. Urban residents fled to socially connected areas, consistent with the notion that individuals were sheltering with friends and family or in second homes. The association of migration and subsequent case growth persists when instrumenting for migration with social networks, pointing to a causal association.

Slow to Change Guidance

- Travel restrictions appear quite successful in preventing spread of the disease overall and new variants (New Zealand, Australia); can be paired with ”quarantine hotels” or test on entry policies (Hawaii)
- Part of this is an “island” effect
  - Cost of imposing these restrictions is easier for islands
  - UK?
- Broader point is that new diseases call for rethinking why guidance rules are in place; and status quo bias can entrench these rules.

7. Individual v. Population Health

Medical vs. Population Health Model

Medical Model	Population Health Model

• Focus on Individual
• Diagnosis
• Evidence-based Treatment
	• Focus on Population
	• Access to care
	• Allocation of resources
	  • Between groups of patients
	  • Between primary and specialty care
	  • Between healthcare and other sectors of the economy
	• Disease prevention

Limited Adoption of Mass Asymptomatic Testing

Uma Karmarkar, a human behavior expert at the University of California, San Diego, said it's possible that compliance would be low for the fast-and-frequent approach. She pointed to the example of daily medications, like birth control pills, as well as spotty use of masks.

"Even when there's a vested interest, there's slippage," she said. With near-daily testing, even cheap products could add up to big bills, further disincentivizing use. (Dr. Mina said the federal government should foot the bill to avoid that issue.)

A subset of people might still adopt the fast-and-frequent approach with enthusiasm, Dr. Karmarkar said. But that could be a skewed sector of the population, such as those who are already more inclined to trust the medical system, and could exacerbate the pandemic's health inequities.

Until more data is gathered to support the fast-and-frequent approach, Dr. Samuel proposed a tentative middle ground. Schools, universities and workplaces may be good candidates for regular antigen testing, for example, whereas hospitals and other medical care settings would still prioritize PCR.

"The whole idea is to use the right test for the right patient at the right time," Dr. Babady said.

Dr. Mina agreed, noting that PCR remains crucial for diagnosing sick patients — a situation that calls for the most sensitive test, so the right treatments can be administered.

Still, he remains optimistic that the fast-and-frequent strategy could make a major dent in the nation's coronavirus catastrophe. That should be incentive enough, he said: "I truly believe people will want to use these tests."

Mass testing in UK

Now it has been revealed that as part of Boris Johnson's roadmap for easing lockdown, NHS test and trace is aiming to eventually send 400,000 rapid lateral flow tests by post to homes and workplaces every day. There will be a huge public information campaign to encourage asymptomatic testing.

The medicines regulator has previously expressed extreme caution about lateral flow tests being conducted by untrained people and it is unclear whether the government has formally sought its advice.

The government is in advanced talks with the hospitality and events industries about how testing can be part of the reopening plan. One day, a Beyoncé concert or a Champions League game could involve tens of thousands being tested on entry, providing vital data for monitoring infection rates.

Underlying Bureaucratic Problem

- Bureaucracies lack equity-aligned incentives. Instead, most commonly enter the news only when their actions *cause harm.*
  - As a result, lack upside exposure to results from actions
  - Bear full brunt of consequences of actions
- Generates “precautionary principle” of strong inaction bias
- Status quo rule bias, rather than using discretion, “common sense” or reacting to weak evidence in low-powered contexts
- Skews risk/return framework for reacting to pandemic:
  - We stick with flawed rules (surface cleaning, etc.) leftover from before
  - Compare Asian countries, which had more recent disease experiences (SARS, etc)
  - Fail to adapt new rules (speedy vaccine approval, mass testing, masks) absent extremely strong evidence

Bureaucratic Inaction

Bernard Woolley:
What if the Prime Minister insists we help them?

Sir Humphrey Appleby:
Then we follow the four-stage strategy.

Bernard Woolley:
What's that?

Sir Richard Wharton:
Standard Foreign Office response in a time of crisis.

Sir Richard Wharton:
In stage one we say nothing is going to happen.

Sir Humphrey Appleby:
Stage two, we say something may be about to happen, but we should do nothing about it.

Sir Richard Wharton:
In stage three, we say that maybe we should do something about it, but there's nothing we *can* do.

Sir Humphrey Appleby:
Stage four, we say maybe there was something we could have done, but it's too late now.

Grading the UK

- After an initially weak start ("herd immunity" approach), a difficult variant mix, and possibly not helpful policies (Eat Out to Help out), UK has done surprisingly well as a bureaucracy:
  - Speedy AZ approval
  - First Doses First
  - Rolling out Mass Testing
- Possible that democratic accountability provides incentives for action to counter bureaucratic inaction
  - Worry — this requires public to recognize and reward political actions. If public is also biased; may compound to political biases (ie, EMA supports AZ; democratic governments do not).