

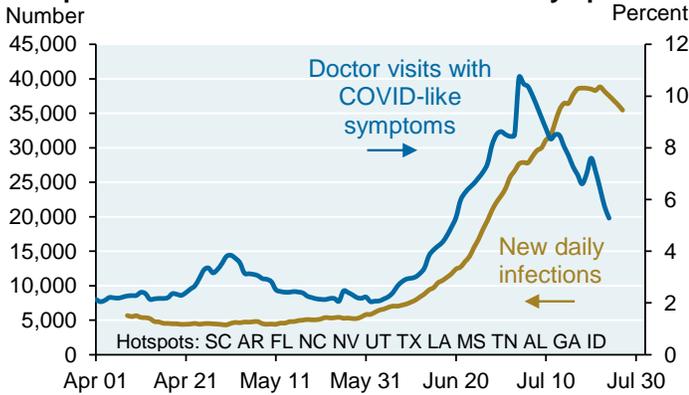


**COVID Charts of the Week: US Hotspot infection/symptom decline; Liz Cheney; Hong Kong’s reaction to a mini second wave; Phase I Oxford vaccine antibody response; US spending and hospitalization trends; Latin America; Government march-in rights and herd immunity**

US Hotspot state infections have now rolled over, and the percentage of doctor visits in these Hotspot states with patients reporting COVID-like symptoms has declined sharply, suggesting further infection declines ahead.

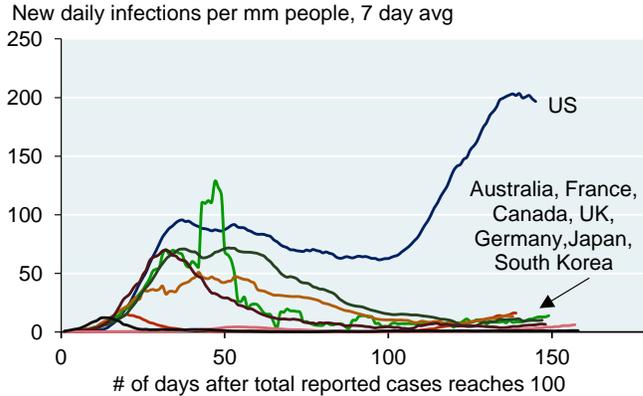
At a recent party conference meeting, GOP Representatives reportedly called on Liz Cheney (R-Wyo, who votes with Trump positions 97% of the time) to resign or be removed as House Republican Conference chair for simply supporting NIAID director Dr. Anthony Fauci in public. This [insert your own adjective here] anecdote may be as good an explanation for the US infection gap with the rest of the developed world as any data-driven analysis I have seen to date.

**Hotspots: rollover in infections and COVID symptoms**



Source: COVID Tracking Project, Carnegie Mellon University. July 27, 2020.

**The US infection gap**



Source: Johns Hopkins University, IMF, JPMAM. July 27, 2020

J.P. Morgan’s Technical Strategy group uses a three factor approach to measure “positive virus trajectories” for each US state. I’ve added it to our collection of charts. After peaking at almost 50% of the US population in mid-June, now only ~ 25% of the US population meets their positive virus trajectory test.

**US population share with positive epidemiological trajectory**

Cumulative case growth < 3%, testing rate < 10% and infection rate < 60% of peak



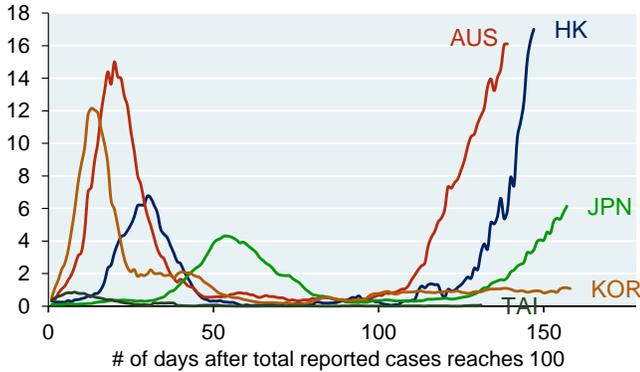
Source: Covidtracking, JPMAM, JPM CIB Technical Strategy. July 27, 2020.



Hong Kong is experiencing a second wave of infection, albeit at lower levels than those seen earlier in the West. While HK is not reimposing a complete lockdown per se, the government announced substantial mobility restrictions: schools will not reopen as planned in August; take-out dining only; all gatherings limited to 4 people (20 for weddings); mandatory face masks with HK\$ 5k fines for non-compliance; and mandatory quarantine for most foreign arrivals. **Compare these restrictions with much more modest ones in the US, a country with an infection rate that’s 10x higher.** The chart on the right compares Hong Kong’s second wave to higher ones elsewhere: Israel, Costa Rica, Romania, Spain and the US.

**Hong Kong's second wave**

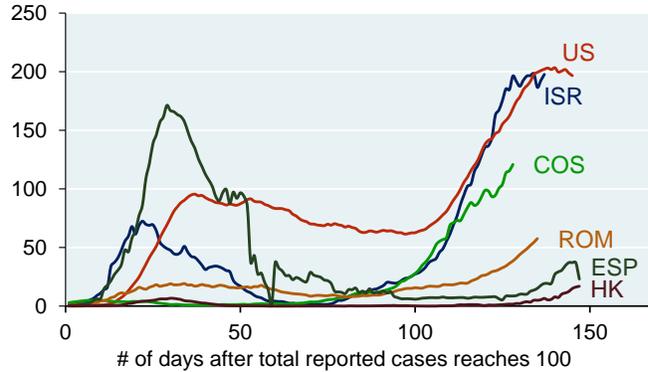
New daily infections per mm people, 7 day avg



Source: Johns Hopkins University, IMF, JPMAM. July 27, 2020

**Hong Kong second wave in context**

New daily infections per mm people, 7 day avg

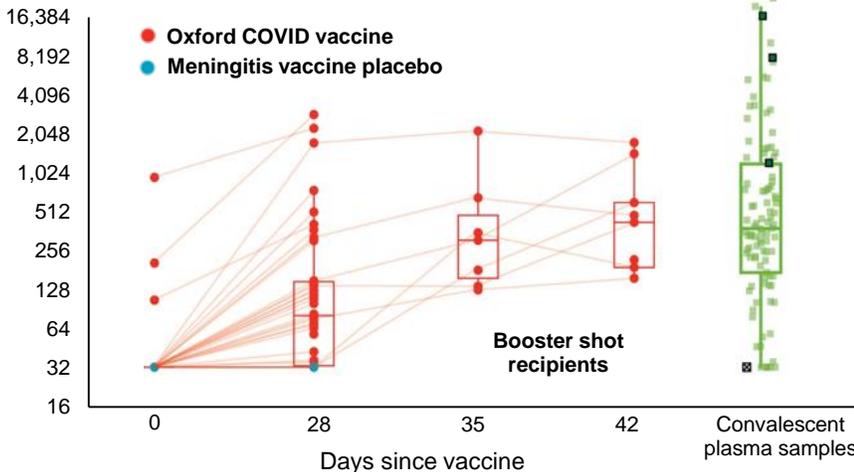


Source: Johns Hopkins University, IMF, JPMAM. July 27, 2020

Here’s an example of positive news from Phase I COVID vaccine trials. After a second booster shot on Day 28, the Oxford/AstraZeneca vaccine generated antibody response levels that were similar to convalescent plasma samples. The presence of a Phase I antibody response is the basis for proceeding to Phases II/III, and is not a proof statement of durable immunity. The wide range of antibodies found in vaccinated and convalesced patients illustrates the real life complexity of immune system responses and required herd immunity levels.

**Example of Phase I immunogenicity results: Oxford vaccine generated similar antibody response to convalescent plasma after booster shot**

Neutralizing antibody response (IC<sub>50</sub>), log scale



Source: Oxford University Jenner Institute, July 2020. IC<sub>50</sub> is a measure of the potency of antibodies in inhibiting a virus in an in vitro experimental system.



US virus severity (measured by the level of hospitalizations) has been closely linked to the US spending recovery. As soon as the former stopped falling, the latter stopped rising. If we're on the cusp of a decline in hospitalizations, we would expect in-person credit/debit card spending to start improving again.

**As soon as hospitalization stopped improving, in-person debit/credit card spending began to plateau**

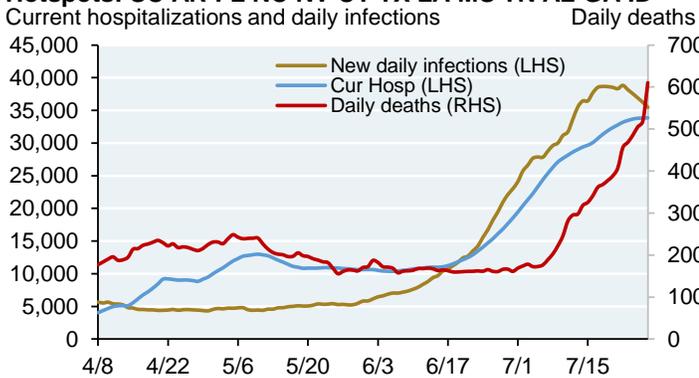


Source: Internal Chase data, COVID Tracking Project, JPMAM. July 27, 2020.

Hotspot state deaths (red line, right axis) have risen following the prior rise in infections and hospitalizations. The rollover in infections suggests that hospitalizations and deaths will follow.

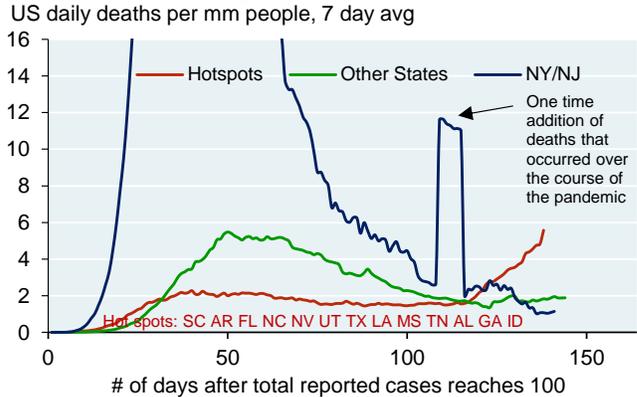
Hotspot mortality per capita is nowhere near the April surge in NY/NJ, but I'm not sure if that's the best benchmark given how unprepared the US was for the onset of the virus back in April. In any case, here's how the numbers compare.

**Hotspots: SC AR FL NC NV UT TX LA MS TN AL GA ID**



Source: COVID Tracking Project, JPMAM. 07/27/2020. 7 day avgs.

**Mortality by state category**



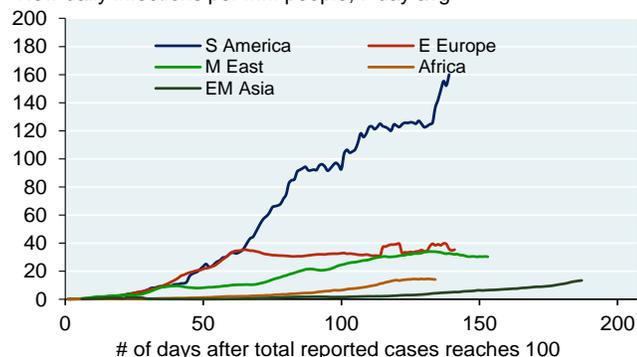
Source: Johns Hopkins University, IMF, JPMAM. July 27, 2020



Latin America has the most severe reported outbreak among EM regions. It's not just Brazil; Argentina, Colombia and Peru are running high rates of infection as well.

#### EM World infections

New daily infections per mm people, 7 day avg



Source: Johns Hopkins University, IMF, JPMAM. July 27, 2020

#### COVID news of the week: Government march-in rights and herd immunity

- The US Federal Government has “march-in” rights to directly produce any medications in government labs if private sector patents were produced with federal funds. In these cases, the government could also require licensing to third parties. According to NYU’s Technology Law & Policy Clinic, this would apply to the US government’s co-ownership of patents protecting the (mildly beneficial) drug Remdesivir. Note: Gilead plans to permit generic suppliers to sell Remdesivir in 127 low/middle income countries
- Separately, under 28 U.S.C. § 1498, the US Federal Government (via Health and Human Services) can take control of any industry-owned patents, manufacturing and distribution as long as “just compensation” is paid. During an anthrax scare in 2001, HHS used the threat of § 1498 to reduce the price of generic Cipro to below \$1 a tablet, and there were calls in 2018 for the government to use Section 1498 to break Gilead’s patent for hepatitis C drugs
- An emerging field in COVID research estimates the combined level of vaccination and prior exposure required for herd immunity. Original herd immunity estimates for COVID ranged from 60%-70%. Recent research analyzes “heterogeneity in susceptibility” due to differences in human interaction intensity based on age and other factors. Top-level finding: social network differences could lower herd immunity levels to 43%. However, this is an aggregate national level which requires immunity levels of 70% or more among younger, more active populations. I fully expect the 43% figure to go viral in the media and in independent research we receive without the proper clarifying context.

Sources:

*“House conservatives pile on Cheney at GOP conference meeting”*, Politico, July 21, 2020

*“Compulsory Patent Licensing During COVID-19 Crisis”*, Jones Day Law Firm

*“The U.S. Government’s Apparent Co-Ownership of Patents Protecting Remdesivir”*, Christopher Morten, NYU School of Law, May 2020

*“A mathematical model reveals the influence of population heterogeneity on herd immunity to SARS-CoV-2”*, Tom Britton, Stockholm University, Science Magazine, June 23, 2020



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