STANDARD DEVIATIONS: Less is More?

Greetings,

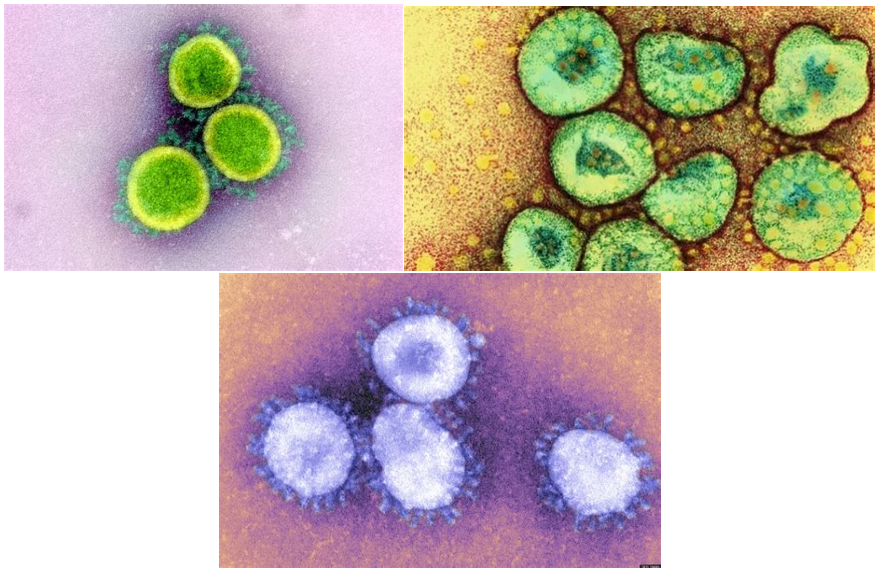
SARS-CoV2 is a big problem. Duh.

So, how come SARS and MERS didn't cause pandemics? They're both coronaviruses and show remarkable homology to SARS-CoV2 in their genomes, affinities, disease properties and transmission. Why is COVID-19 the one disease that's wreaking havoc?

Well, the earlier viruses were too damn good at killing people; that's why.

Viruses "work" better if they use a host without killing it. It's like having your Mom wash your clothes. As long as you don't show up every week, she'll keep doing them; overwork her and you find yourself at the laundromat. A virus that kills its host too efficiently loses the ability to propagate. Where SARS and MERS have been trapped by their case fatality rates (CFR), COVID-19, and its lower rates of death, keep SARS-CoV2 in business. By being less lethal, SARS-CoV2 is able to spread among more host carriers.

All three coronavirus can cause severe respiratory illness. That's their hallmark. One of them has found the "Goldilocks" spot between harmless and too dangerous for its own good.



{Yep, look-alikes. Top Left-SARS-COV2, Top R-SARS, Bottom-MERS}

SARS was first reported in Asia in February 2003 (though cases were later tracked back to November 2002). SARS quickly spread to 26 countries before being contained after only four months. More than 8,000 people fell ill from SARS and 774 died. Since 2004, there have been no reported SARS cases. Its **case fatality rate (CFR) was around 10%**.

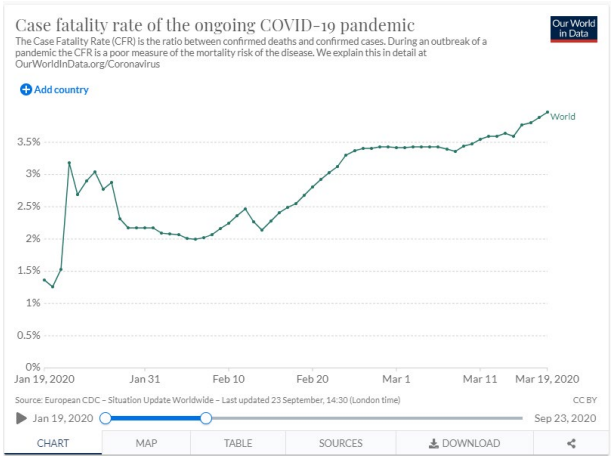
MERS is a viral respiratory disease that was first reported in Saudi Arabia in September 2012 and has since spread to 27 countries (WHO). From its emergence through January 2020, WHO confirmed 2,519 MERS cases and 866 deaths. Wow. That **translates to a CFR of 34%.**

Just for some perspective, here are a couple of other viral disease CFRs. Seasonal **influenza has an estimated CFR of 0.1-0.2%** (CDC and the U.S.). Ebola? The **CFR for Ebola stands at about 50%** (WHO, and pre-vaccine data). It was 40% in the major 2013-15 outbreak. Influenza is a world-wide phenomenon and problem; Ebola can't get off the ground in Africa because not enough people survive to infect others.

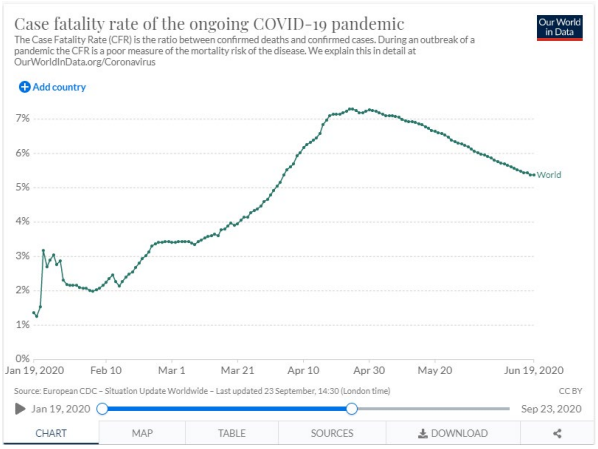
CFR is hard to understand in a dynamic sense. As long as a disease is still rampant, the data just don't tell the whole story. Until we understand just how far SARS-CoV2 has spread and how many actually succumb to viral disease, we can only guess at its CFR. That's why testing a whole bunch is better than just testing symptomatic cases. But, we can extrapolate to make a point.

If we simply take the number of cases and deaths reported so far, the CFR for SARS-CoV2 appears to be around 3% (32 M cases, 1 M deaths, WHO ballpark). But there are some caveats. Not everybody gets tested – we have no idea how many asymptomatic cases have occurred. Many deaths have occurred that are not attributed to COVID-19 - this pushes back the other direction. The world numbers are not compiled the same – this is an apples-to-oranges conundrum. Do deaths related to co-morbidities count (?) – this skews the data.

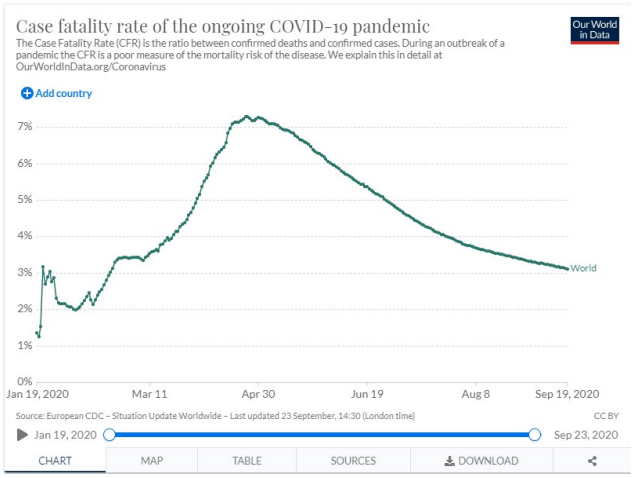
Here is an attempt to illustrate the difficulty in figuring the CFR, 3 snapshots of <u>the same graph</u> over the first 9 months of the pandemic:



{3 months in – CFR = 3.5%}



{6 months in – CFR = 5.5% after peaking above 7%}



{Now, 9 months in – CFR = 3%}

Most models have put the actual CFR for SARS-CoV2 at ~1-2% (just guessing at actual infections). Or, around 15 of every 1000 cases will result in death. Until we nail down specifics, this is all just guesswork, and until the disease runs its course the numbers will never be accurate.

What we can say, with confidence, is that the SARS-CoV2 case fatality rate will be in a range that ensures viral survival and transmission. Like influenza, this coronavirus seems to have found a sweet-spot that guarantees its existence, and, like flu, will continue to cause problems. Not as lethal initially as SARS or MERS, this virus has already proven far more deadly and successful.

Have a great week and be safe,

Bryan

p.s. And, of course, I tell this story in order to spring something else on you next time.