Twitter Thread by Dr. Angela Rasmussen

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This is a must-read article by @mlipsitch and @kesvelt and I strongly agree with the central points: we urgently need to step up genomic surveillance & get transmission down now in the US while these are rare.

But a couple things to expand on from a virology point of view.

> The article and the accompanying thread from @kakape are well worth a read https://t.co/32c8l66eTV
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> — Jason Kindrachuk, PhD (@KindrachukJason) January 9, 2021

The piece talks about the B117 variant as if it's not SARS-CoV-2, but it is. B117 is distinguished by 23 changes across the genome, but it's still fundamentally the same virus. It's a different variant (some are calling it a strain depending on how that's defined).

But 23 nucleotide changes aren't sufficient to make this a completely different virus. So we are still fighting SARS-CoV-2. Just a new and improved version. Improved how? Well it's more transmissible but the mechanism isn't yet known.

When viruses become more transmissible it can happen in a few different ways:
-virus can be more fit (replicate to higher titers, hence more shedding)
-virus can replicate more efficiently in specific tissues (like the nose)
-spike can bind the receptor more efficiently and...

...thus infect host cells more efficiently
-virus can get better at evading/antagonizing innate host antiviral defenses
-increased environmental stability
-people can shed virus for longer periods of time

These are just some of the possibilities. It could be one or a combination of these mechanisms and that research is underway. But it doesn't mean the virus is transmitted in fundamentally different ways/routes. It's a variant, not a new virus!

But what is important is that it is clearly more transmissible. If you are exposed to a person infected with B117 you have a much higher risk of being infected. We need to address this urgently while it's still rare.

And as the article points out, we need to increase genomic surveillance to monitor B117, and detect 501Y.V2 or any other worrisome variants that emerge, especially as vaccination ramps up.

As more people are vaccinated (and more people recover from COVID) there will be increased selection pressure for variants that can evade neutralizing antibodies against variants from earlier in the pandemic.

So far, preliminary data suggests that the most worrisome mutation in the B117 S receptor binding domain doesn't affect antibody neutralization from Pfizer-vaccinated sera but this needs more study.

But this is something we need to monitor, and we can't do that with S-dropout PCR. Only genomic surveillance coupled with robust epi as advocated in this piece will allow us to do that.

And it's worth repeating: variants result from mutation. Mutation occurs when the virus replicates. To prevent new variants from emerging or prevent variants like B117 from further adaptation, take away the virus' opportunity to replicate.

That means stop transmission to new hosts. Fewer new cases=less replication=less mutation=fewer variants emerging.

So, as the article says, we need to reduce community transmission, increase surveillance and test/trace capacity, and address this while still rare. We need to take this seriously BEFORE it becomes a huge problem in the US.

The good news is that it's not likely B117 has developed the ability to be transmitted by new, different routes. It's still transmitted by aerosols, droplets, and to a lesser degree fomites.

Mutation does not confer superpowers. Viruses can't evolve to transcend physical barriers like masks or walls. A coronavirus can figuratively sharpen its spikes, but it can't use them to defy the laws of physics.

For individual people, that means redouble your efforts to reduce exposure risk by implementing as many as possible:
-stay home
-avoid gatherings
-avoid crowds
-avoid shared air/enclosed spaces
-masks
-distance
-ventilate when possible
-wash hands
-disinfect high-touch surfaces

And this is going to be unpopular, but a circuit-breaker stay-home period would probably be the most effective way to address this in the short-term. That can only happen with substantial economic support. I urge the incoming Biden administration to consider that.