Twitter Thread by Eric Topol

Eric Topol
@EricTopol

On our new podcast, we interviewed @angie_rasmussen, one of the leading virologists, who has been a guiding light during the pandemic. Thread here to summarize, transcript and audio https://t.co/Q6CabBsKCM @cuttingforstone /1

Current status
"We're essentially experiencing the equivalent of a 9/11 every day in terms of number of deaths; our hospital systems are overburdened. ...We're going to be dealing w/ this for some time to come, even after people get the vaccine, certainly #LongCovid is real." /2

On her strong efforts for dispelling misinformation
"My philosophy about public health is that you can't have it without the engagement of the public. And my philosophy about communication is that information empowers people to decide for themselves" /3

The diagnosis of #SARSCoV2 reinfection is very challenging and Dr. Rasmussen provides the best and complete explanation for why that's the case. One dimension of that is being able to culture the virus in a BSL (biosafety level)-3 lab /4

Many are not familiar with what BSL-3 and 4 labs are all about. Great summary here from her extensive experience. More in podcast/transcript on her response in BSL-4./5

Rasmussen: Most of the pathogens, the viruses I work with are either BSL-3 or BSL-4, although if possible, we like to work at BSL-2 because it's just much easier. There are four levels of containment. BSL-1 is effectively working with pathogens that aren't infectious at all. BSL-2 involves the most common pathogens. I did my PhD, for example, on rhinovirus, which causes most common colds. That's an example of a BSL-2 pathogen. It's something that can infect people, but it doesn't cause severe disease. It's not a huge threat if it gets out, because rhinoviruses circulate in the human population during every cold season. When you work in BSL-2 you wear a lab coat, you have eye protection, and you work on viruses and cells in a biosafety cabinet, which is basically a hood that has airflow inside that keeps the virus from coming out. This is typically what you see when you see pictures of people working in a lab.

BSL-3 is where you would work on SARS coronavirus 2 (the severe acute respiratory syndrome coronavirus that causes COVID) and other pathogens that may or may not be select agents. The classic SARS coronavirus is a BSL-3 select agent, which means that the US government regulates it more tightly because of its potential to be used as a biological weapon or its potential to be a threat to national security. In BSL-3, the types of protective equipment you wear depend on the pathogen you're working with. In general, you'll either wear a powered air-purifying respirator (PAPR) or an N95 respirator, and eye protection. You'll also usually wear a Tyvek suit or some kind of protection for your body. There's usually also controlled entry and engineering controls; for example, there will be an autoclave for disinfecting used disposables before they ever come out of the lab. Sometimes there is a dunk tank where you dunk instruments, for example, in disinfectant according to a validated protocol before going out. Those labs are more tightly regulated, obviously, because those pathogens have the potential to cause epidemic disease and often have a higher mortality rate or cause more severe disease, and there may not be a vaccine or treatment available.

What about #LongCovid?
Angie reviewed parallels w/ ME/CFS
Because this is the 1st time we've had a pandemic w/ such broad effects on different organ systems ...try to understand how an acute viral infection can cause these complex, syndromic, long-term diseases like ME/CFS." /6

What about getting #SARSCoV2 from surfaces?
It's complicated. A master class here, starting with this, and will let you read on or listen to get the whole response, which gets into aerosols, too /7

Rasmussen: I think you probably can. One of the problems here, and this is something that has been quite difficult to communicate to the public in general, is that a lot of what you would think are basic questions about this virus are not so easy. What's the primary route of transmission? How long does the virus remain infectious? How many infectious viruses do you have to be exposed to in order to become infected? What are the variables determining that? Why can't we just look at all these super-spreading events and these epidemiologic reports and just figure it out? The reality is that in the real world, it's rare to get well-designed natural experiments or to have all the pieces fall into place.

What we do know is that the virus can certainly remain infectious on surfaces for periods of time that can last hours to sometimes days and even weeks, depending on the temperature and laboratory environmental conditions. But is that the case in the real world? Usually when people do environmental

Practical take away
"We needn't be bleaching everything in sight and disinfecting our produce, our groceries, and our mail and so forth. But we should still do good hand hygiene; we should still emphasize that we should disinfect common high-touch surfaces, such as doorknobs.../8

She's had so much experience w/ PAPR (picture) real deal fitted N95s working in BSL-3/4.
Translate:
"My feeling is that if risk reduction is additive, if all of these measures — masks, social distancing, and ventilation — add up and create the most exposure reduction possible"/9

PCR tests don't give back Cycle threshold (Ct) values. Should they? A great explanation of the intricacies and potential usefulness, just a bit of it here. And comments on rapid home tests /10

There are different PCR tests and depending on whether you're running that on a Roche instrument or one from some other manufacturer, you might have a different number of overall cycles in the PCR test. That's the PCR or cycle at which the fluorescence that's detected by the test exceeds a certain threshold. The earlier the cycle, the more starting material you had to reach that threshold. If you're running a 40-cycle PCR test and you have a Ct value of 35, that's not very much virus. If you have a 35-cycle PCR test, that's even less virus if you're at a Ct of 35. But it's not as little virus as if you were running a 40- or 45-cycle test. So there are some discrepancies between the different tests that are being used that make that information complicated, at least when it comes to looking at results in a standardized way across all these different tests.

We were lucky about rapidly developing successful #SARScoV2 vaccines but that was an outgrowth of considerable experience w/ other viruses, including MERS and Ebola. Watch out for Nipah (movie Contagion). How to get ready for the next pandemic /11

Dr. Rasmussen will soon be moving to @VIDOInterVac in Canada. She is a remarkable resource, not just because of her knowledge base, but exquisite ability to communicate for all. A real gem. We've been so fortunate to learn from her and look forward to much more in the future /f