# Coronavirus AKA COVID-19 - What Pathologists Need to Know Now

February 15, 2020

**Julie McDowell:**

The novel coronavirus, or COVID-19, is rooted in Wuhan, China, but has since arrived in the United States, stoking fears of a global pandemic. In this CAPcast interview, Dr. Michael Mina, who is the Associate Medical Director of Clinical Microbiology and Molecular Virology at Brigham and Women's Hospital, Department of Pathology in Boston, discusses the current outlook of the virus, and what pathologists need to know about their role in diagnosing and treating patients suspected to have contracted this virus. Dr. Mina, let's begin by getting your perspective on the outlook of this virus. How do you see the outbreak spreading, and what do you foresee as the public health impact in the US, and worldwide?

**Dr. Michael Mina:**

Sure, of course. It's a huge unknown at this point. Besides being in the hospital, I'm also... My research lab is in the Department of Epidemiology, and so our group has been working a lot on understanding where this might go, and what the public health impact might be. I think it's safe to say, that the greatest likelihood, is that this will really have global spread. The travel bans have probably delayed this spread to the United States, for example, and to the rest of the world. But I think it's fair to say that, this is going to be a virus that spreads globally. As soon as this virus gets into places like India or Bangladesh, or other countries where there's a very high density of people and relatively little ability to really stop the spread across borders, for example, at that point, I think it's going to end up everywhere in the world, impacting patients and labs. So I think from a laboratory perspective, I think now is the time to start getting the resources set up to start dealing with this virus for the foreseeable future.

**Julie McDowell:**

Okay. Let's talk about diagnosing COVID-19. What's the current testing protocol in place in the United States?

**Dr. Michael Mina:**

Sure. So to diagnose COVID-19, because it's such a novel infection, the major companies that clinical labs are used to working with, don't, of course, yet have assays that are up and running and built. And so the CDC and FDA have worked to produce a set of reagents, which are essentially just real-time PCR primers and probes, under an emergency use authorization that the FDA approved, are now distributing these assays. So the current testing protocol at this very moment, is actually for most assays to go to the CDC. But the CDC is also shipping out testing kits to state laboratories. And so the average clinical lab in hospitals would collect a sample, send it to the state lab, which would then send it to the CDC, if the state lab is not yet up and running with their own test kit.

But it's important to also know that the testing kits that the CDC has provided to state labs, are pretty limited supply right now. I think globally, they've now shipped out around 115 test kits total. A large majority of those have gone to US State labs, but each of those test kits actually only has 700 or 800 tests in them. So the testing capacity at the national level, and at the state level, is currently a bit restricted. And so there's not yet recommended by the CDC, but something that we're doing here at Brigham and Women's Hospital, for example, is essentially setting up our own assay, using the expertise of our molecular labs here, to essentially take the protocol from the CDC, and build an assay in-house, for our own use. But the actual official protocol is to send samples for testing at state labs, or CDC.

**Julie McDowell:**

Now, the CDC reported in mid-February, that there were some issues with some test kits that they sent to state laboratories. Can you explain what some of the issues are with some of those test kits?

**Dr. Michael Mina:**

Sure. Because this has been sort of a pretty quickly developed assay, it was never really vetted in the way that laboratory directors would like to see these types of assays vetted. And part of that comes down to the quality control and how these reagents are being produced. And so the CDC hasn't been entirely clear what exactly the issue was, but in short, there's three sets of primers and probes that the CDC test kit is being shipped with. And the third probe within the third set, the probe seemed to have some issues in some of the kits that were distributed both to state labs, and internationally. It's unclear to me if that was a problem that came about because of the actual sequences that were encoded for that probe, or if it was contamination. And I don't think that the CDC has entirely clarified what went wrong, but there was essentially quite a few labs that, during their validation steps, after receiving the kits, couldn't get the third primer probe set to work appropriately and give a positive result.

**Julie McDowell:**

So what role do you see pathologists in the US having, in not only diagnosing patients, but also treating patients diagnosed with COVID-19?

**Dr. Michael Mina:**

So pathologists have a very central role in helping, not just diagnosing patients, but because something in the order of 80% of medical decisions today, are being made by clinicians, based on the results of laboratory testing, the data that pathologists are giving back to the clinicians who are seeing the patients, is really crucial to just exactly what type of therapy or treatment or decision making that clinician is going to make for each individual patient. And so in the case here, with regard to COVID-19, it's really imperative that we are able, in a timely manner, to get the correct diagnosis. Whether a patient does or does not have, in this case, PCR confirmed coronavirus, this COVID-19 virus, is going to really be crucial for physicians who are seeing the patients, to decide, do they need to quarantine the patient?

Can they remove the patient from quarantine, and do they need to take extra precautions, not just with treating, but also to really monitor patients more closely? Are somebody's respiratory symptoms more a result of something like an adenovirus or another seasonal coronavirus, or a flu infection? And all of those will really have a big impact on exactly what the physician chooses to do.

**Julie McDowell:**

So getting back to a broader perspective on this virus, what are some of the unknowns that you are paying close attention to?

**Dr. Michael Mina:**

I think from a public health perspective, the unknowns are really just, how widely distributed is this virus, at this point in time? We don't really know the denominator at this point. And what I mean by that is, we don't know exactly how many people in the world have actually been exposed, and in particular, in China. So there's the official case reports, which today, are somewhere, probably around 60,000 or so, have been officially confirmed, both PCR or clinically, using CT scans. But many epidemiologists, including myself, believe that this is probably much more widespread than just those 60,000 who have been confirmed, and a number of others internationally. And so I think that's one of the most important crucial pieces to know at this point. And the reason why that's so important, is because it will really put into perspective what the real severity of this virus is.

If there have been potentially a million cases already transmitted to people across China, for example, then having a mortality rate of around 1000 or 1300 people dying out of a million, is a much different picture than 1300 people dying out of 60,000. And that will really change what our emergency response to this is going to look like for the future. And so I think we really need to do a good job at getting the underlying denominator. There's also the question of just, how exactly is it transmitting, and are there any things about the individual patients that are making them more or less susceptible to severe disease? We've seen this interesting pattern where children don't seem to be nearly as affected, in terms of severity, as adults. And is that something that we can leverage to maybe come up with new therapeutics, or treatment modalities for patients when they are severe?

Can we try to understand these differences, and why children are being protected? Then finally, the last unknowns are certainly, can we create directed treatments and therapies and antivirals, or create vaccines? And what exactly is the timeline going to look for that? And that's all of these things that are currently under investigation, and currently unknown at the moment.

**Julie McDowell:**

Finally, what's the best way for pathologists to stay current on developments related to COVID-19?

**Dr. Michael Mina:**

It's a little bit hard to say, depending on just how up to date you want to be. I think the WHO and CDC have done a good job at keeping their websites up to date on exactly what's going on in the world. In addition, Johns Hopkins University has a very in-depth website that they're keeping up to date on a very regular basis, as does Harvard and a number of other health institutions. If you really want to be very, very up to date, but I wouldn't necessarily recommend this for everyone, you can follow some of the researchers on Twitter and social media, and that's actually a way, in this epidemic, that a lot of news is being disseminated, besides the normal route of WHO and CDC, and the like. And then of course, the media is playing a really important part.

New York Times and Washington Post, and all these mainstream media outlets, are actually doing a good job on really covering this epidemic maybe in more detail than they need to sometimes. But from a pathology perspective, I think the CDC is probably the place to go to really understand what's happening, in terms of testing on the ground in the United States at the moment, and what are the current guidelines at any given time.

**Julie McDowell:**

Thank you, Dr. Mina. For updated information on the Coronavirus or COVID-19, please visit the CAP, at CAP.org, or the CDC, at cdc.gov. Thank you for listening to this CAPcast. Be sure to listen to our other CAPcasts from the CAP, on our SoundCloud channel, by downloading the SoundCloud app on your mobile device. And we're also on Apple Podcast and the Stitcher app. To find this podcast, search for the word CAPcast on these apps. Once you find our podcast, be sure to click the subscribe button so you don't miss new CAPcast episodes.