# The COVID Chronicles: The Epidemiology of the Pandemic
## Podcast Transcript

**Host: Satchit Balsari,** *Assistant Professor in emergency medicine at Harvard Medical School and Beth Israel Deaconess Medical Center*

**Guest: Sanjay Mehendale,** *Director of Research at P.D. Hinduja Hospital and Medical Research Centre*

## BEGIN TRANSCRIPT

**Satchit Balsari:** Hello and welcome to the 'Covid Chronicles,' part of the 'India in Focus' podcast. My name is Satchit Balsari.

India's response to the Covid-19 pandemic has been characterized by a pro-active public sector leadership and centralization of decision-making. The private sector and academics stepped up to the play in the early days in myriad ways, from wanting to boost testing capacity to providing models to forecast the spread of the disease. Few of these measures were effected in controlling the epidemic, many of the models did not have the data or the correct expertise truly to be helpful. One of the critiques of the response has been the lack of trained infectious disease epidemiologists at the decision-making table.

With India beginning its vaccination drives, there were again attempts by thinktanks to propose strategies for prioritizing allocation. Again, the lack of domain expertise in some of these conversations is striking.

Today we have joining us Dr. Sanjay Mehendale, Director of Research at PD Hinduja Hospital and Medical Research Centre. Hello, Dr. Mehendale.

**Sanjay Mehendale:** Hello Satchit. It's nice to be talking to you.

**Satchit Balsari:** Likewise. Dr. Mehendale is one of India's senior epidemiologists and has served at the Indian Council of Medical Research Director, last year's Director at the National Institute of Epidemiology. Dr. Mehendale, what is epidemiology?

**Sanjay Mehendale:** Well, epidemiology, if I have to give you and mention to you the definition per se, it's a science which talks about the distribution and determinants of disease and events as it happens or as it spreads or as it's seen in the community. So basically, it talks about the descriptive part, which is the time, place, and person — who are the people who are affected, where exactly is that particular event or disease happening and what are the time elements attached to that. And then we go for the analytical component, we try to figure out why this is happening and eventually the whole important takeaway from this has to be what can exactly be done to prevent and control that particular disease or condition.

Initially we used to just cover the epidemics or outbreaks as a part of epidemiology as a science, but now epidemiology as a science covers so many other areas like non-communicable diseases, accidents, suicides, and so many other aspects that can affect health.

**Satchit Balsari:** So Dr. Mehendale, in the early stage of the epidemic, based on what you said, how would we have calculated the burden of Covid-19? What kind of information would you have liked to figure out the spread of the disease? What would you do with the information that you would have had, what would have been the goal of the kind of information an epidemiologist would have needed, say in February, March, and April, of the pandemic?

**Sanjay Mehendale:** See, when we talk about any disease which strikes a particular society, something which is first important to understand is whether it is highly infectious and then how exactly it presents, in

terms of its clinical science and symptoms, and the third thing is, is there any associated mortality with that particular thing. So, first point about figuring it out is the organism which is responsible for that. Normally what happens is, depending on the presentation of any particular disease, it is possible to figure out how that disease might be transmitting from one person to another, and that narrows down the whole search as to what organism could be to certain specific groups and categories of organisms that one would have looked for. Say, for example, here primarily it was found that although it started with fever and common cold and sore throat kind of symptoms, people presented with severe pulmonary symptoms, respiratory symptoms and eventually most of them died. So, this kind of looked like a picture of a typical respiratory virus and so peoplFe started thinking on those lines of what respiratory virus it could be. And thanks to the development in science, it was possible to figure out what was happening.

So, the cause of that as a coronavirus was identified pretty soon. We had a history of similar to coronavirus infections which struck human beings in the recent past, including SARS virus, the Severe Acute Respiratory Syndrome, which was reported way back in 2016 and then MERS, which is Middle Eastern Respiratory Syndrome. So, this coronavirus is something similar to that and this as a cause was identified pretty early when this epidemic struck. But then what important thing one has to decipher or understand here in this scenario is if you see people around with certain signs or symptoms, are there commonalities or there are quite a few exceptions to this, the way a typical disease presents and what we were able to observe here, this became a global phenomenon and hence we started calling it as a pandemic, WHO declared it as a pandemic because all the continents of the world got affected. But generally, the clinical picture everywhere seemed to be consistent. The differences were observed in terms of who were the people who were affected, what was the, were death rates different in different population and so on.

But what is most important for an epidemiologist to understand is, in addition to all those patients who got identified themselves, it was equally important to find out would there be others who would be harboring this particular virus or agent but would not show up clinically. Some of them may not have any signs or symptoms, totally asymptomatic or some of them might be mildly symptomatic and what is the difference really? Those who are asymptomatic will never get picked up, that's the first thing. And those who are mildly symptomatic may be confused with other known infections like here in this particular case, a person would not reach the case of severe respiratory illness then it might be treated or it might be confused with a common cold, flu like condition and then might not get investigated for this particular infection. And for all this to happen, one critical tool which has to be available is a reliable diagnostic test. So one should have that to pick up infections.

And the second thing is, one has to understand as to if we want to find out what is the disease burden, which was your primary question that you asked here. The disease burden has to be decided in different sections of the society. Naturally what would happen is here the availability of the diagnostic tests, this and for all practical purposes, even today diagnostic test the gold standard is a polymerase chain reaction, reverse transcription based detection kit, which is called RT-PCR in acronym. But this is a pretty sophisticated test which requires a sophisticated laboratory setup, it cannot be typically called as a point of care test. So, the reason why this was a critical issue because this test took some time to develop, the production to a certain level which a country might require took a lot of time, and then you had to create infrastructure or the laboratories, which would cater to the need of the country.

**Satchit Balsari:** Dr. Mehendale, if I may, you said that a lot of these cases may be asymptomatic or would have mild symptoms. And from what we know of the epidemiological data, now looking back after all these months, it seems like the majority tend to be asymptomatic or have mild symptoms and only a few people get very sick, and there's a smaller number that requires more than oxygen and may need ventilatory support and you know many of them. So, the mortality is high in those who fall very sick. But if a lot of the asymptomatics or the mildly symptomatics are not going to be sick and if testing is going to be such a laborious process, can you explain whether the asymptomatics need to be tested, whether those with mild symptoms need to be tested and why?

**Sanjay Mehendale:** It's a great question, because you know this would always be a dilemma. See, if you just look at public health and what is really required to be done, ideally, what we must do eventually is to break the chain of transmission. So, there are people who are having or who are harboring the virus, they are either cases or they are asymptomatic individuals, mildly symptomatic individuals on the one hand there is a whole lot of other individuals who are susceptible to this infection. And by some means, if this

particular virus from those who are infected, and I'm not at all mentioning here whether they are symptomatic or asymptomatic, the virus gets transmitted to those who are susceptible, they may develop the disease.

So, in terms of public health, it makes a whole lot of sense to try and identify each and every person who probably would be infected with this particular virus. But is it possible? Practically, there are serious limitations to that because when we say that about 80 to 85 percent of the cases are symptomatic or mildly symptomatic, then first of all, even though you create a lot of awareness in the society, how many actually would get motivated eventually to come forward and get themselves tested becomes a big issue. So, that is from the beneficiary's point of view, and also provided this is what they would be interested in is to try and get as many people, wherever it is a clinical suspicion or there is an epidemiological suspicion, somebody who has been in contact with a case, to try and at least get them tested. That's a provider's view of looking at it.

But what could be happening if these people are tested who are either mildly symptomatic or asymptomatic or what would happen if they are not tested. There is a possibility, by which say every single individual eventually, if we are talking about a small place, which probably has a population of 100,000 and there is a technical possibility of testing say every single person there and that too not once but periodically and try to identify each and every person and then take appropriate measures as required, then potentially the transmission chain can be broken much earlier.

But it doesn't happen when we talk about large countries, large populations. See, doing this particular test on a large number of people becomes absolutely difficult and that's why you ought to go for strategies like targeted testing. But what's the other side of this particular story? What would these people be doing in fact of those who are either mildly symptomatic or asymptomatic? As we all know that these people for all practical purposes would essentially be also spreading this virus in a community to people who are likely to come in their contact and maybe many of them would be having absolutely no suspicion that they're getting exposed to such an infection just because this particular person is either asymptomatic or mildly symptomatic. What would then happen? This would start spreading the disease silently in the community and if we just plainly look at mathematical part of it, we do obviously know that there are some people who spread the virus much more compared to others who don't. There is also some evidence which says that those who are more symptomatic are more likely to transmit the virus compared to those who are less symptomatic. But nevertheless, whatever is the scenario, the virus definitely keeps spreading. So, this second school of thought definitely is of this type that if the virus keeps spreading here and if testing is not really targeted to this particular population, what would eventually happen is, the infection will keep spreading.

**Satchit Balsari:** I'm very glad you raised the various complexities with testing asymptomatic patients early on. It is easy for us, six months later, to critique that the asymptomatic patients were not tested and I have publicly written about this in newspapers asking that we rapidly expand testing for asymptomatics, but context is so important. During the early stages of the pandemic, you have very few tests available and you have to select who you are testing and who you are not. In my own practice in our emergency departments here in Boston we were several weeks ahead of the pandemic in terms of prevalence. We initially were of course testing folks that we suspected had Covid-19 or were known exposures to patients diagnosed with Covid-19 and then suddenly America ran out of Q-tips. We did not have the swabs we needed to test and had to be highly selective about who was being tested but interestingly the decision was to not test people with mild symptoms, the assumption was that in the middle of the pandemic if you present like you have the disease, then you probably have the disease and you should go home and isolate, and we reserve testing for the very sick to make sure that what was being treated was indeed Covid and other diagnosis were not being missed.

This, of course, requires a lot of consensus on the scientific and the clinical community and societal trust in these decisions, communicating to patients that we think that they have Covid but we will not test them is extremely difficult to do and not necessarily something that all patient population or societies would be comfortable with.

I think the concern, of course, in certain context, including in Mumbai was that the government officials, including heads of public hospitals and leaders at medical institutions were warning physicians not to test anyone other than those that had symptoms at a time when you said the asymptomatics, the

presymptomatics, and those with mild symptoms were likely spreading the infection in the community. Do you think that was a lost opportunity?

**Sanjay Mehendale:** Well, I don't think so because these decisions about public health interventions like whom to test and whom not to test have to be taken in the context of several things as far as country is concerned. First thing is, how quickly we can pick up the right kind of people who could be tested and what could be the relative advantage that we could get if they get tested positive, that would be one. Second thing, I think equally important would be the ability to continue this particular exercise in terms of availability of the kits and the availability of the infrastructure.

I suppose considering the then prevalent condition in India, it was absolutely clear that, and we are talking about population of 133 crore people here, such a huge number of people who are at risk of contracting this particular infection. So, merely in terms of numbers, if we have to even think of testing the mildly symptomatic individuals here, forget about asymptomatic people, we just can't do that, it would have run into crores of individuals at that time we didn't have the kits to do that.

**Satchit Balsari:**
Community based studies in India toward late 2020 showed high seroprevalence in many populations, especially among the urban slums. There is reasonable suspicion that some pockets may have reached herd immunity by now.

As you know, at this time it's a hot political topic around the world including the launch of the Barrington Declaration, where three scientists and many supporters came together to say exactly the point you raised is well, perhaps let the infection burn through the community and protect the vulnerable. Of course in the week that followed, the major scientific journals around the world, as well as the WHO, came out in strong opposition to the idea that herd immunity suggested that you let infection burn through the community and in fact it is a phrase that is more appropriately used for building immunity in the community through vaccination and not by making people sick.

The critique has been to this herd immunity approach that it is sort of impractical and how do you actually go about protecting the vulnerable and if you continued at the rate at which you find both severe morbidity and mortality in many of these countries that are debating herd immunity, you would end up with tens of thousands if not hundreds of thousands of more deaths. So, do you agree that herd immunity as public health strategy should really be about vaccinating the population and not letting the infection run through the population?

**Sanjay Mehendale:** Yeah, indeed I was going in that direction. Herd immunity, in general, is a very hugely debatable issue. I was just talking about silent spread of this particular infection and gradual build-up of immunity in the population, that's one way. The second way is all those people who are actually getting infected with Covid, they themselves immunity, that's the second way, and the third way is active immunization. Well, all said and done, at this point of time, these are the three ways in which the community is likely to build up immunity, among humans, against this particular infection. But there are still unanswered questions I would say because we do not know to what extent the antibodies, which get developed after the exposure or to active infection or to vaccinations, until what time these are likely to last, that's one. And the second is, would they essentially be protective?

**Satchit Balsari:** You know what is most worrisome from what you just said is the fact that we don't know how long this immunity lasts and there's so much hope, both societal and political on the arrival of this vaccine that it would be devastating to think about this disease not granting lifelong immunity. We know that diseases like measles and chicken pox, we've gotten lucky where the first bout of infection or vaccination confirms immunity for a very long time, people sometimes need boosters decades later but by and large if you've had it once or if you've been vaccinated once, immunity lasts for a long time as opposed to the seasonal flu, where because of the genetic mutation we need a vaccination program every year, and we just don't know which way this is likely to go.

**Sanjay Mehendale:** You are making an important point here. The issue is how far is the vaccine going to be efficacious and how far is the vaccine-induced immunity going to last. These are the questions of which we do not know the answers as of now, only the time is going to prove it. And while the phase three trials are planned to give those kind of answers, we do require three to five years to figure out what is

going to be happening, so these trials which have started in 2020 would have accrued follow ups of up to two years by 2022.

This would also provide an opportunity to study among those who have started building antibodies during their frequent follow-ups or periodic follow-ups, do the antibodies last for a period of time and for how long do they last. Are other kind of comorbidities and other kind of physical conditions people have in their own bodies, do they interfere with this particular process? We do not know. So, it is going to take time for sure and we will need that. Another important point, which again is not very clear, or evidence is not very clear today is you did talk about lifelong immunity to certain diseases, like you did talk about smallpox and measles. Yes, we were lucky, we must say, we don't know what's going to happen with Covid-19. I always say, and I always feel that what we are experiencing right now is, we are just in the process of learning. We are accumulating evidence, we are assimilating evidence and probably learning at every single step.

**Satchit Balsari:** You mentioned that we need to look at these data and one of the challenges with data in this pandemic in India, in particular, has been the massive centralization of information without data being available to local communities. You know all testing data, for example is reported to ICMR but is less easily available or at least was many, many months less easily available to local officials. You have directed the National Institute of Epidemiology, what is the state of data in India? What is the capacity to collect data, to archive data, and to share data with a wide range of shareholders in a manner that is privacy-preserving and that is responsible?

And I say this in the context of the contrast between a thriving computer science, data science ecosystem system in private sector in India and the lack thereof that we have all felt in both clinical medicine and in public health in India. What is the insider's view? What can we do better, what should we be focusing on or be where we need to be?

**Sanjay Mehendale:** Okay, see, as far as transfer of data is concerned, we have seen an example as a part of the national health system of India certain diseases, notifiable diseases. There has now been a very well set system by which is right from the peripheral primary health centers to this Ministry of Health, how the data gets passed on through a very well thought out and very well implemented system as to how does it flow from a primary health center to the district level, and from the district level to the state level and from the state level to the center, and there are absolutely timelines defined for that and that's exactly how this goes. And this includes cases on different kinds of mortalities, this includes cases related to various infectious diseases of public health significance and so on.

So, if we were able to set up that kind of a system, we certainly will be able to set up any kind of other system as well.

As far as various infectious disease which are notifiable enough for public health significance are concerned and other morbidities and mortality among children and women are concerned, a well-developed system has been set up for reporting that data, collecting that data from the peripheral level and bringing it to the central level, and producing periodic reports, dashboard indicators which become available for people to take immediate action.

**Satchit Balsari:** What is the time lag there between the collection of the data and the available data? Are we talking days, weeks, months, what is acceptable and what is the current situation?

**Sanjay Mehendale:** What I'm saying is, in terms of some infectious diseases it happens every month and there are set dates when this gets done. Say, for example, the IDSP, the Integrated Disease Surveillance Program of India, exactly goes this way, every month it gets updated. So, there is a possibility that this could be done. Now, as part as Covid was concerned, I think the testing centers were getting gradually extended, the laboratories were getting added in a very systematic manner through appropriate review via ICMR and probably with some thought the government of India might have sort of introduced this system of centralized data collection.

I think I would say, there are pluses ad minuses, advantages and disadvantages of this kind of a system. See, as all of us are aware, correct data falling into the wrong hands can be a problem, wrong data falling in intelligent hands again can be a problem, we don't want either of these things to happen. We really

want to have full confidence is what their data is all about, what are the quality checks, somebody has to look into the quality checks that have gone into that and the way the data has been generated, and the way the laboratory tests have been done, whether appropriate care has been taken, the laboratory has been consistent in coming up with the results, and so on and so forth. Probably, that was the reason why it was initially thought of restricting data to a centralized system where a lot of quality control exercise was happening, and probably once confidence started building in as far as the ability of conducting these particular tests in different parts of the country, this data started becoming available elsewhere.

Since this pandemic started, I have reviewed 30-35 manuscripts for Indian Journal of Medical Research, which were based on data collected and I'm just saying these were all based on various data collected from unreliable sources where I, myself, found as a reviewer so many gaps and problems here. So, having an authentic data source really makes a lot of sense as far as I am concerned.

**Satchit Balsari:** India's response to the pandemic cannot be critiqued for want of trying or involvement of the public sector, but six months later, it is evident that the aggressive centralization of the response, likely out of concern and fear of what the pandemic would to India, may have inadvertently failed to account for the vast heterogeneity in our population as well as in local societal capacity to respond to the pandemic. India lives in thousands of villages, towns, and cities that are very different from each other. The capacity of a megacity like Mumbai with its many private and public hospitals and the rich availability of physicians and nurses is very different from many small and mid-sized towns across India.

**Satchit Balsari:** I'm going to rephrase the question to which this would have been your response. The response to the Covid pandemic in India was highly centralized, there is recognition of course that a decentralized, customized, contextually intelligent response, like you suggest would be better, what prevented us from decentralizing the response?

**Sanjay Mehendale:** On this point of centralization and decentralization, I certainly would like to say that this is a process and we have to get down to this particular process, and we have to get down to this particular process in a systematic way. For example, if we just take an example of RNTCP, Revised National Tuberculosis Control Program, we now have brought this particular program up to the district level. You know that in India health is a state subject, so in general, both preventive as well as curative health is the responsibility of the states but center takes care of the national vertical program primarily. But generally, this decentralization, bringing it to the lowest particular level is an issue of great empowerment and capacity building at the lower tiers as well. That we have to keep in mind.

So, all these years, if we have handled all of our outbreaks or smaller epidemics in a very centralized kind of a manner, I certainly would also comment that doing this particular experiment during the Covid pandemic might not have been a very good idea. But now, what we should try is what we should very systematically try and capacity is to create such facilities so this local-level thinking, critical decision making and local-level responses can be made more easily and more effectively. So, that's what I would say. It would take time, but I suppose if we are committed to that, it would happen.

**Satchit Balsari:** You know this point your raised about unreliable data, this is something that scientific communities around the world have struggled with, especially with the advent of freely available mobility data dashboards that many large private technology companies made available, and again the lack of that intermediary of epidemiologists that would take this mobility data and help interpret it in the context of epidemiological modeling because simply a rise in mobility or a fall in mobility in one district or the other doesn't necessarily equate linearly to the spread of this disease. And this nuance was hard to capture especially in the early months when you had very good scientists, like you said, intelligent minds but working with the wrong data making these projections that try to influence policy.

One of the challenges that scientists have expressed about these early data, as you said Maharashtra was releasing data and so were other states and some of them were available on publicly observed dashboards, but the challenge was that the kind of information that was being released, for example, the number of tests were being released without a denominator. And scientists felt that it was largely because much of these data were being processed not by trained scientists but by consulting companies that departments held both state and the central level were working with.

What are your thoughts on how these relationships exist? We have seen through public health agencies around the country that consulting firms are playing a larger role in implementation and it certainly provides the government a highly skilled workforce that they are not otherwise easily able to access within the infrastructure. But is that the right kind of expertise? Are there enough epidemiologists in India to go around?

**Sanjay Mehendale:** I think I would say no, for sure. I mean the answer is pretty easy and straightforward. One really has to figure out in the longer run as to what would be the administrative unit where you would require an epidemiologist here. So, would it be the state epidemiologist? Is it enough to have a state epidemiologist, or would you, you earlier talked about granularity, so to have that kind of a granularity, you will have to come down to the level of a district in each state, to have a district level epidemiologist who is appropriately trained to do this kind of a job.

I think considering the population that we have and the huge administrative structure that we are handling as far as a big country here like India is concerned, we probably need a district level epidemiologist, which we do not have. But we are saying it is absolutely essential that we have those. One of the critically important points is that at the level of the state, the people who are at decision making positions, the top three or four people essentially will have to have a very clear understanding, knowledge, and possibly inclination towards public health and epidemiology as well, because hardcore clinicians possibly in absolutely top-level positions might not be able to understand the public health aspect truly well. And in that context, one point which I would like to make over here, which is being discussed in various forums in India is creating a separate cadre of public health in various healthcare systems. Say, as we have a Director of Health Services, we should also have a Director of Public Health Services as well in each states, and accordingly then we have to build up capacity right to the ground level to implement various public health programs, which would then also include public health diagnosis in the long run as well, and would also involve activities in situations like this.

As far as role of consultants is concerned, the question that you asked about them, we know that in the present circumstances there are a lot of such agencies that have become available which can lend their services on payment to various government agencies and governments are using them as well. But I believe here is where just getting the appropriate groundwork done or a plan prepared from an agency is acceptable but there should be a think tank that should be available at the level of every district, at the level of every state which should look through the nuances of this kind of action plan that has been developed. And finally, these are the people who should take decisions which are most appropriate for their own local, geographical area, because they know their area best, they know their people best and they know the strengths of their own programs also, weaknesses of their own programs also.

**Satchit Balsari:** Dr. Mehendale, you bring up important lessons. Local capacity is after all one of the most important pillars of any disaster response. Contextual intelligence is important to ensure that the solution being designed is not devoid of societal realities. I hope that the powers that be pay heed to your advice that we turn to the right kind of experts, and that one builds the required expertise locally, especially for a country as diverse and large as India. Thank you for your time today

**Sanjay Mehendale:** Thank you, Satchit and it was a pleasure talking to you.