Ramanan Laxminarayan

Good evening to all of you, and if you're somewhere in the South Asia region or later in the day or earlier. It's a real pleasure to be here to kick off the second webinar in CDDEP's ten conversations on global health. This webinar series was intended to celebrate the ten years of existence of CDDEP and to really draw the focus to areas that CDDEP has worked on but also areas that are particularly of importance to global health.

We're delighted to bring together a fantastic set of speakers for you today to talk about infectious disease challenges in the Southeast Asia region. Now this report that we're launching today, which is now available on our website at cddep.org, was basically intended to draw attention to the challenges of infectious diseases in Southeast Asia – the WHO region of Southeast Asia – which goes all the way from India, covers small places like the Maldives, all the way into Thailand and Indonesia. The purpose of this report was basically to say that, you know, there are challenges with infectious diseases and also to recognize that a lot of the avoidable burden of disease in this region continues to be infectious.

Although we know that non-communicable diseases form the majority of burden of disease, a lot of that is still not yet avoidable because it involves behavioral change, or it requires interventions that are not yet available to most people. But infectious diseases are actually avoidable to a large extent, whether it's malaria or HIV or tuberculosis, or, you know, to some extent, drug resistant infections. We've had a long experience with these in this region, and there are parts of the world where they are no longer a threat.

So in that context, I'd like to introduce our first speaker. We're delighted to have Dr. Soumya Swaminathan who's the chief scientist of the World Health Organization. She's obviously a star in the infectious disease domain, having worked in tuberculosis for many years in Chennai, and was the Director General of the Indian Council of Medical Research.

She's here to launch the report and then talk about the challenges of infectious diseases, particularly in the context of COVID-19, which has to some extent derailed our attention to many of the other important infections that continue to plague the populations in this region. Over to you Dr. Swaminathan.

Soumya Swaminathan

Thank you, thank you very much Ramanan, and greetings to everyone from Geneva – especially to the panelists of today's webinar. I think it's an important document that has been produced and that's being released today because of the fact that the region – the Southeast Asia region – still has a high burden of infectious diseases.

Of course, at the same time, we have the growing incidence of non-communicable diseases as well as of

accidents, injuries, and suicides. And so you really have a triple burden that countries have to deal with. This is in addition, of course, to all the maternal and newborn issues that are also very important. So the tendency, you know, always is that you go from one extreme to the other.

We've been focusing all these decades on infectious diseases, particularly the ones that were in the MDGs (the Millennium Development Goals), but I think it's time now to take a more broader approach to health, because the underlying causes of many of these infectious diseases end up being very similar. So what we call the social determinants of disease – the risk factors, and so on – and the solutions also need an approach, I think, which has commonalities.

Maybe from the experience of the past year, I'd like to touch on a few – and these are my own personal reflections – on a few areas where we need to start doing things a little bit differently. We also know that many of the infectious diseases have vertical control programs. I mean this is at the global level, but also at the regional and national levels. So if you look at malaria, if you look at TB, you look at HIV AIDS – these three in particular have multiple programs.

And then for many of the other diseases, there's the vector control disease program as well which now is moving to become much more integrated across different vector borne diseases. And then for the diarrheal illnesses and so on, there needs to be a focus on water sanitation, but also management at the primary health care level. So I think the first thing would be perhaps to really think about universal health coverage for people.

What does that actually involve? Where do the investments need to go? They need to go primarily to primary health care – to strengthening the primary health care system both in terms of having trained human resources there, whether they are nurses or community health workers but supported by physicians. It could be even remotely now that there are opportunities that have clearly been demonstrated for telehealth services.

You can actually provide better quality care even at the most peripheral level, which is, you know, the center – sub center – that will be catering to, you know, 5000 people or so. It goes further down as well to the village level because of the ability to support through telehealth. So the second thing is what are the components of universal health coverage. We often think about care delivery, diagnosis, and treatment, but we also need to think about prevention, health promotion, and attention to all the other risk factors and determinants of disease we talked about, you know what they are: nutrition, safe water, sanitation, housing, and quality of the air – both indoor and outdoor air pollution.

These are all the major risk factors for disease, and these can cut across multiple diseases. They contribute both to infections as well as non-communicable diseases, and that aspect has been neglected. The third area in community health care, I think, is the community engagement itself. I think there are good examples in the region of where this has really been done well.

And when we think about diseases like malaria and TB, it really needs solutions for diarrheal diseases as

well. For indoor air pollution, the solutions have to involve the community. Very often the solutions could come from the community. They need to be involved in the planning as well as implementation, and in the monitoring and evaluation of how well that's working.

So I am glad that the TB program is really now moving towards that in many countries, but I think a lot more needs to be done. I was involved in a project for malaria elimination in Madhya Pradesh, in Mandla District, which was really based on taking 1,200 villages and trying to eliminate malaria through a focus on, you know, community based solutions: really doing the surveillance, getting volunteers from the villages to do the house to house surveys, making sure everyone gets access to diagnosis and treatment. As well as, of course, the literacy itself – health literacy – and information about how to avoid malaria or how to detect it early. So that's one whole package of work, I think, which needs to be done.

It's the resources that are needed for universal health coverage and financial protection, but much more than that it's the organization of services and I think diagnostics are often neglected at that level. For COVID, we've seen now – in a matter of a few months – so many new diagnostics were developed starting of course with RT PCR, which needs a lab infrastructure, etc. But then, now you have paper based rapid diagnostic tests based on CRISPR and so on. We need to really start applying that to TB and of course, the issue of which antigen to select, etc, and the fact that in the past we haven't had great luck with either antigen or antibody detection TB. But I think this is an area where there's so much technology investment now that needs to be looked at.

Similarly, for the other diseases, we need point-of-care diagnostics to really have an impact. Then, I think, that's part of laboratory strengthening. The overall, you know, use of an expansion of digital tools and technologies, whether it's been in the area of contact tracing, mobile apps; whether it's been in the area of of telehealth in India, the eSanjeevani clinics, for example, where specialists can connect with a community health worker via chat in the village because people and patients were not able to travel to the health centers. This type of remote care can now also be taken to further innovations in that.

This needs to be studied, so I think telehealth is one area where they need more research and documentation of health outcomes. And I think that's something that we need to, almost it has to run across. I think the documentation of experiences, what we call implementation – science implementation – research is very important, particularly when new innovations are being introduced – you need to document. So again, involving researchers and academics, you know, in the delivery of services is very important.

So, for telehealth, there’s remote care, but there's also remote shared care – something that I was introduced to about a year ago. I've seen it in practice. It's basically involving one healthcare provider dealing with many patients at the same time. And one can do this for diseases where there are no confidentiality issues, where people are willing.

Let's say a group of diabetes patients interacting with the care provider remotely (so through tele) asking questions, getting advice, getting counseling on that particular ailment. So, this is something that can be

tried because it saves resources and, at the same time, it actually helps patient to patient learning – some people who may be very shy, not being able to communicate with their providers, may actually benefit from something like this. It's been tested for glaucoma by the Aravind Eye Hospital in Pondicherry, but we need to test it for more diseases. So that's digital.

There are other innovations as well. Lots and lots of innovations that are happening – solar powered oxygen concentrators are one example, diagnostics is another one. Lots of technology that's been developed for COVID, and we need to really leverage that to see how we can use it.

I mean, there's a great need really, in the area of safe drinking water, for example, and sanitation. Again, there's a lot of work going on in the region, but we need to ensure that this reaches people. And then I would say that the focus needs to be data-driven again.

You know, we had in COVID this whole debate between 'do you go into a lockdown or not', and in the early stages there was no other way – or when things get really out of hand. But the aim should be not to go into lockdown, but really to be able to tackle the problem by knowing where the disease is, by knowing where the infection is.

How is it spreading? Where is it spreading? Who's at risk? And taking action to focus your interventions in that area.

So I think data is really really important. Knowing where these diseases are – is it the urban slums? Is it rural areas? Is it tribal areas? And for each of these infectious diseases, you'd get a slightly different answer, but you'd see many of these diseases again, you know, clustering, same tribal areas, you would see that. Again, it's because of the social determinants that underlie.

So a data-driven approach where you invest more resources in those places where there is a maximum disease burden, and perhaps the least access to health, will bring more dividends. I think finally, I have to say that the whole model of research, the openness, the global collaboration, the kind of data, knowledge, genomic sequences – everything that we've seen during COVID – needs to get replicated.

It really pains me when a TB vaccine that's been shown to have a 50% reduction in incidence, several years ago, in a phase two trial study still hasn't found its way into a phase three trial. You know, 50% reduction in incidence would be huge for a TB vaccine, and yet, it hasn't happened whereas we've seen over 200 vaccines being developed for COVID – eight of them already out there being used within a year of a new pathogen – and lots more investments in clinical trials, new platform technologies.

We need to now leverage those platform technologies, like the mRNA and the viral vector platforms, in order to develop vaccines for TB, for malaria, etc – perhaps some of the other neglected tropical diseases as well. And that was possible through – of course you need funding and investment, but you also need this kind of a global solidarity and a single focus on the R&D but also then on the equitable distribution which is what we're doing through COVAX. So you need the R&D, you need the tool

procurement and distribution mechanism. You have global fund, of course, for the three big diseases. You have Gavi for vaccines.

We don't have anything globally for non-communicable diseases or the other communicable diseases. So, that's again something to think about for the future. But again, the countries that have a high disease – this could be at the regional level as well, it doesn't have to be only at the global level.

So for the Southeast Asia region, there could be a model of an R&D public-private partnership that focuses and invests in tools and technologies to tackle these infectious diseases. Thank you Ramanan, and back to you.

Ramanan Laxminarayan

Thank you Soumya, that was excellent. And I think, you know, a real key takeaway is the idea that COVID may have disrupted control of these diseases, but the urgency that COVID has brought to infectious diseases is a momentum that we should not lose. It's very clear that science is not the barrier to the control of infectious diseases. It's really the willingness to use that science and deploy it, as has been done for COVID.

If we can have 200 vaccine candidates for the coronavirus, why don't we have even a fraction of that for other priority pathogens is really a question that the world will ask now. And I hope that WHO will be able to leverage this moment to be able to do exactly that, which is to point out that, see tuberculosis actually kills more people than COVID and therefore we should be doing something about that as well. And maybe you have 20 vaccines for TB.

So thanks very much. That was an excellent opening and sets the stage very nicely for the conversation.

We're going to turn very briefly to a message from Dr. Poonam Kethrapal Singh who very kindly wrote the foreword for this report. This report actually grew out of conversations that we had had with Dr. Swarup Sarkar who is the director of communicable diseases at CRO, and this was also funded by the Gates Foundation.

I think it's all very timely now because it comes together in a context where COVID changed everything and now we have an understanding of what we should do post-COVID that's driven by a new urgency for infectious diseases. So let's just watch this very brief message from Dr. Poonam Kethrapal, who's the director of the Southeast Asia Regional Office of WHO.

Poonam Kethrapal Singh

A very good evening to all. It is a pleasure to join you to launch this very important and timely

publication.

For well over a year now, the region and the world have been battling the COVID-19 pandemic, which provides yet another example of the vast social and economic impact that communicable diseases can have. Throughout history, communicable diseases such as HIV AIDS, tuberculosis, malaria, neglected tropical diseases, and enteric pathogens have taken hundreds of millions of lives, deepened poverty and inequality, reduced productivity and stymied economic growth. They have impeded sustainable development and been a barrier to the right of all to good health and well-being.

Though the region bears the world's second highest mortality rate due to communicable diseases, progress against them has, in recent years, been strong: an observation that is well made in the publication being launched today, which provides a comprehensive survey of India's remarkable advances across a range of programmatic areas. Throughout the COVID-19 response, recovery, and beyond, WHO will continue to support India's onward journey against communicable diseases which must be defined by the conviction that all people should have access to the services they need without financial hardship. In other words, to achieving universal health coverage.

Now, more than ever, the old binary between vertical and horizontal programming must be done away with in favor of a smarter approach that is focused on integrating primary level services while staying in mission mode where we must. I am inspired that this is exactly the approach that India is taking and look forward to continued collaboration in pursuit of the region's flagship priorities, WHO'S triple billion targets, and sustainable development goal three. I wish you all the very best for the launch of this publication and incoming discussions which I look forward to being apprised of. Thank you.

Ramanan Laxminarayan

Wonderful, so same idea from Dr. Poonam Kethrapal Singh as well, which is that we really need to seize the day. And I think that's really going to be the theme for the conversations that go on for the rest of the hour.

It's my great privilege to introduce the four panelists – all four were co-authors of specific chapters of the report, and they contributed their time to be able to make this entire thing possible, along with many others. We have Dr. Nimalan Arinaminpathy who's going to talk about tuberculosis, Dr. Subhash Hira on HIV, Dr. Gagandeep Kang on enteric pathogens and typhoid, and Dr. Anita Kotwani on AMR. Their affiliations are in the invitation, so I won't go over their bios. They're all extremely well-known and internationally recognized experts in their domains. It's a real pleasure and honor to have them here today.

So what we'll do is I'll start with a few questions for the panelists, and following that we'll open it up for questions. You can post the questions on the question chat, and we'll pass them on to the panelists.

But, you know, first we'll start with some questions for the panelists, which is fundamentally how has COVID-19 affected disease prevalence and efforts in disease control in your particular area of expertise in the region? And if I may add to that, what does COVID now make possible which was not possible before because of the increased attention and awareness about infectious diseases. It could be anything from, you know, hand hygiene being more easy to implement because people understand it now or masking in particular situations, which might be easier to to get people to comply with now.

So the basic question is, how has COVID changed the landscape for these four sets of diseases? So we'll start with Nim on TB, and then we'll go through all of the panelists. So Nim, over to you.

Nimalan Arinaminpathy

Great, thank you very much Ramanan. And also thank you to the organizers for the opportunity to take part in this really great discussion.

So for tuberculosis, I would say that, at a theoretical level at least, control of TB is actually quite simple. I mean, basically what you need to do is to find active cases of tuberculosis and treat them as effectively as possible on the one hand. And on the other hand, for people who are already infected with TB that haven't yet developed active TB, the impetus is really to try and prevent those individuals from developing active TB (the dangerous, infectious form of TB).

And one of the clearest signs that we have seen from the COVID disruptions over the last year is the fact that patients are missing opportunities for diagnosis – to even access treatment in the first place. This is because of a range of factors. It might be to do with, for example, reduced access to care, reduced availability of primary care facilities, but also the patients themselves not being willing to come out and seek care in the first place because of lockdown conditions.

So one of the things that the India TB program has done, which is quite remarkable, is to make publicly available their data for reported TB cases. And so you can actually go on to the website and see, you know, how the reported TB cases have changed over the last year. It's striking to know that even now, at the time of speaking, the notified TB cases are 30% lower than what they were at their height just before the period of lockdown. India's lockdown, you know, obviously did not last that long.

And so the disruption that we're seeing to the numbers of cases being reported, and then initiating treatment, is lasting a lot longer than the period of disturbance itself. So that means more TB cases in the community, more transmission potentially, and so on. Just one thing to add to this. I mean, you could say that, perhaps this is something that applies to the rest of the world. And indeed it does.

I mean, we're seeing that these disruptions to TB programs are pretty widespread, but one particular thing in the Southeast Asian region that's quite relevant is the preponderance of the private healthcare sector. So if you think of a person at home with a cough that's been lasting for the last, you know, few

weeks or so. When they go to see your primary care provider, the vast majority of the time that will be a private healthcare provider. And we know that the private sector has been really badly affected by lockdown conditions, and also has not fully recovered back to normal as well.

So one of the really important challenges going forward is going to be for publicly funded, administered, and run TB programs to also assist the private care provision of TB to get back on its feet as quickly as possible.

Ramanan Laxminarayan

Thanks, Nim. Doctor Hira?

Subhash Hira

Okay thanks, Ramanan. I think it's Soumya who said very rightly that I think it is so timely to have brought up infectious diseases back onto the visibility area because of COVID having diverted all the attention – rightly of course.

But just to bring this up, what has happened to HIV AIDS and STIs as a result of the global pandemic that swept across is exactly what happened about five years ago. I was doing a look at the corona cousin, which was causing Ebola in the Central African and West African countries. I and Peter Piot, we did a very quick, in-depth study to look at what happened to the health system as a result of Ebola.

And all that we saw at that time is happening and repeating again, now on the global platform. We are looking at that, even if the prevalence of HIV AIDS across the globe remains, like across the United States remains at 0.8% among the COVID patients, the prevalence in Africa is about 20 to 25% of HIV people, but that's the usual general prevalence. So nothing really has changed much as far as HIV AIDS is concerned with incoming COVID infections.

What has doubled is the mortality – the mortality rates amongst dually infected (those who already have HIV-AIDS and have COVID now). The death rates have gone up and they are likely to go up, even when there are many more comorbidities, because there are many more comorbidities that we are seeing in dually-infected individuals. At the same time, we see what is moving more rapidly is the number of cases that are appearing.

And also at the moment as it is the antiretroviral therapy is continuing to show no major concern, but then we are anticipating that as we move along the antiretroviral treatment – both from the first line, second line, and third line – are likely to be facing more resistance. So in this case, just give me a second. I seem to have a battery problem. Okay, so I think if you were to spread it around, the fundamental issue here is the…

Ramanan Laxminarayan

Subhash, your mic is muted. Yeah, we can hear you now.

Subhash Hira

Okay. I'm sorry. So, I was talking about the fundamentals of 90-90-90: the target of HIV-AIDS. That has gotten disrupted, and there is a major concern globally that if this remains disrupted for too long, every three months of disruption in the first 90 (that means people start knowing that HIV status), the second 90 (people who are HIV positive and get treated), and the third 90 (where people are treated and remain virally suppressed).

Now, if this 90-90-90 becomes disrupted because people are not able to get to the hospitals to get their refills every month and then get the viral load testing done to know what's happening – whether they need to move from antiretroviral resistance to the next level – there is going to be an excess of half a million deaths in Africa. And Africa is already now counting that for those who are dually infected with AIDS and COVID and have not been able to go back for the refills to the hospitals, not been able to go back for the monitoring of the viral load, there are very high levels of deaths.

So I will stop here. There are major areas where we would be concerned that there are dual infections – HIV and COVID. Then there is the the triple whammy, and that is HIV, TB, and COVID. So I think we are sometimes now looking at so much permutation and combination. So great, I'll stop here.

Ramanan Laxminarayan

Thank you, thank you, Dr. Hira. Dr. Kang?

Gagandeep Kang

So if we think about enteric infections – and include typhoid in the enteric infections – these are not called neglected tropical diseases, but they are neglected among infectious diseases. Because if you look at what gets tested, and for what determinations are made of the burden of disease, I think respiratory infections are prioritized now way over diarrheal pathogens, particularly in countries like India and most of Southeast Asia.

It's so much easier to treat diarrhea or treat a fever than to figure out what actually causes the fever. So as researchers who work in this area, we spend a lot of time actually generating burden of disease estimates because that's the only way – doing these prospective studies is the only way that we're going to have answers about how important many of these pathogens are.

If we look at what has been happening with COVID, the one thing that has changed is the ability to do PCR in every part of the country. If we think about where PCR adds value, it really adds value to the detection of infections for which the cost of a PCR is less than the cost of treatment. So still no joy for diarrheal diseases, but possibly we could consider that maybe typhoid people would want to try it except that PCR is a really bad diagnostic for typhoid.

So in terms of moving forward our agenda of bringing diarrheal diseases and typhoid front and center, COVID has not helped at all. If we look at the strategies that can be used to control these infections which, while neglected, are still contributing quite significantly to the global burden of disease, there are some things that are tried and tested. Early breastfeeding and continued breastfeeding for six months continues to be emphasized.

You mentioned wash and the possibility that we could have better hand hygiene driving down enteric infections. That is a hypothesis that I would love to test because I'm not sure that the wash message has percolated to the places where we see the greatest morbidity and mortality due to enteric infections and typhoid.

One thing that we have been working very hard on – while we continue to work on water safety, on sanitation and hygiene as these are critical for changing what happens with enteric infections in the long term – has also been looking at vaccines. We've had a really successful program with the rotavirus vaccine, and we've been thinking about whether we should be talking to the government about cholera and typhoid vaccines.

The problem now is where will these find space in the budget given the amount of funding that is being spent by every country on COVID-19 vaccines. A few countries in the region – Nepal and Bangladesh – had begun to discuss the possibility of cholera and typhoid vaccines being rolled out in national programs and I'm really worried that these might be off the table if countries don't have enough budget for them. Certainly in places like India, since we are graduating from Gavi, while for Bangladesh and Nepal it might be a possibility that they will continue to consider.

The other area that I think is important to think about is AMR, particularly for typhoid. And this is an increasing concern in the region. We had the extensively drug resistant strains in Pakistan, and in the last year we have begun to see third generation cephalosporin resistance as well as azithro resistance in strains from India, which makes it even more urgent that we continue to track what is happening with typhoid and think about interventional strategies.

One area that infectious disease folks don't discuss very often, but WHO certainly does is food safety – the requirements for food safety and what it means for enteric infections and for typhoid. We have very few systems in India and in many parts of the region that have surveillance mechanisms looking for food contamination. There have been efforts recently with the regulatory authorities to build those out, but the kinds of quality laboratory systems that you need for such activities are not yet in place.

As with everything else, my biggest worry is that COVID is such a sinkhole of funding, resources, and energy that it's going to damage pretty much everything else and other infectious diseases will be the worst affected. We've seen, just like Nim said with the TB detection rates, the same thing is happening to vaccination programs. And I'm waiting to see what happens to children's nutritional status given that they've been out of school and the midday meal programs have been significantly disrupted for very long periods of time. So I'll stop there and thank you.

Ramanan Laxminarayan

Thanks... that was excellent and, you know, certainly a bit depressing. You're right – this is going to suck the oxygen out of the room for some time to come. And now we turn to Dr. Kotwani for her thoughts on AMR. You're still on mute.

Anita Kotwani

Thank you, Ramanan. And thanks a lot for giving this platform to AMR, at least, because AMR is not a typical infection or a disease which is known so well, and it has not been recognized by policymakers till recently.

AMR is actually a pandemic though it is a silent pandemic. But it is unnoticed by the general population and till very, very recently, even governments were not ready to accept that AMR is a real burden on governments and on infection or healthcare. But though they have realized very recently – they developed their national action plan in 2017 – but then came, as everybody said, 2020.

And everything, the attention of the world, was diverted to COVID-19. And the entire workforce, everything, was hijacked by COVID-19. And nobody was talking about AMR.

So the true picture of AMR during COVID-19 is still not very clear because it will be clear after a few months or years when the data is there. But we can really appreciate what went wrong on how antibiotics were overused during COVID 19 which could have favored the AMR. Like if we see the antibiotic use in hospitals – it is said that about 70% of people who are hospitalized with COVID 19 were given antibiotics.

COVID-19 Patients also received some broad spectrum antibiotics. And then there was so much use of azithromycin and teicoplanin, but later on it was realized that only 7% or 8% of COVID-19 patients developed bacterial or fungal infection – but the latest report says that 72% received antibiotics. In our part of the world, like in the Southeast Asian region, it would be somewhere more than 70% also, because there were no treatment guidelines. There was no access to experts, and even to culture reports.

So people were using right and left broad spectrum antibiotics and azithromycin was used in hospitals also. So this all favors an increasing AMR. Now there must even have been some lapses in infection prevention control in hospitals during COVID-19 because our healthcare workers were not so many in the Southeast Asian region, and they were not trained also. And then healthcare workers were more concerned about, and rightly so, for self protection – universal glove practices, etc – that maybe there was some cross transmission among patients. So that again would have given some rise in AMR in the hospital.

Similarly, in the community now, as we all know, for AMR the major driver is inappropriate use of antibiotics. In the community, in the Southeast Asian region, as such there is a lot of inappropriate use of antimicrobials. They are available over the counter – people can go to the retail pharmacies or any vendor and take antibiotics without a valid prescription and more so in COVID-19, especially immediately after lockdown. Because OPDs were not running, primary healthcare centers were not there, and people were reluctant to go to the hospitals, people bought all these antibiotics from their retail pharmacies. And retail pharmacies also – on their advice – who gave them a prescription.

When the report came up that azithromycin is used, in our part of the world, people started buying azithromycin and keeping it in their house. And with a slight symptom of any sore throat, azithromycin was popped by the patient. So as Dr. Kang said, already there is a lot of resistance to azithromycin. And if we are using one particular antibiotic in large quantities, definitely it is going to have an impact on the AMR especially for a particular bacteria.

So this is a cause of concern that during COVID-19, right and left antibiotics were used and there was no concern for AMR because the major attention was just to give anything to the patient. Then, in the community, there was a lot of use of sanitiser and some biocidal agents. Again, that will also go to the environment and that may have increased the AMR which we'll come to know later on.

Recently there is some data from India which says that the sales of azithromycin and some other antibiotics really were huge compared to 2019 and 2020, but this data needs to be published. Now coming to the other part a little bit, I will say that of what went wrong, which was not done during COVID-19 and must have impacted or affected AMR, one was the immunization program. That routine immunization program was again hijacked specially during lockdown period, and, after the opening of lockdown also, this was not 100% as it used to be. So that will also impact AMR.

And then as I said, very, very recently in 2017, all the Southeast Asian countries developed their national action plan on AMR and some countries had begun something. And all those activities are now on the backburner. So nobody is talking about the AMR activities, but are talking about COVID.

But that is a very good platform which we have started – the momentum of COVID-19 awareness, etc. I'll talk in the second part about how we can pick up from all those things which we have learnt during COVID-19. That's it from me. Thank you.

Ramanan Laxminarayan

Thank you so much, Anita. Very comprehensive, and certainly covers a lot of things that we really ought to do.

But I'm now going to go back to the panelists and ask you to just spend a minute, just a minute, on one question: If you had to offer advice to the ministers of health in countries in the region, what are the top three things they could or should focus on in order to be able to regain control of your specific infections (the ones that you're covering) over the next few years in their countries? What are the top three things they should immediately prioritize? So let's start again with Nim.

Nimalan Arinaminpathy

Thanks Ramanan. So for tuberculosis in particular, I mean, I'm particularly encouraged by the recognition that tuberculosis had even before COVID. We've touched a little bit on you know, the COVID train, as it were in terms of research, but also financing.

And just to elaborate on that, I think the important point will be not to lose sight of the long term priorities. Because, you know, if we were to look over the next year, two years, three years or so, I would tend to agree with folks who think that COVID-19 is probably not going to go away; that it's going to become more domesticated, and it wouldn't be the source of global mortality that we're seeing today. So, we will be looking at the kind of annual seasonal respiratory virus that we usually had to put up with and quite similar to the other human endemic coronaviruses, for example.

But when we talk about all the other diseases we're considering today – TB, HIV, diarrheal diseases, AMR – these are long, slow stains, you know, in terms of public health burden, that are going to persist regardless. And to some extent, you know, as we've heard in these various ways, have been exacerbated – they've not gone away. So I would urge first to maintain a few of those persisting priorities, as it were, over the next few years.

In terms of TB, as I mentioned, you know, perhaps the main problem that we're facing at the moment is this expanded pool of patients who have been denied opportunities for diagnosis. And so one of the really important things would be then to try and catch up on those missed opportunities for diagnosis. This may involve what in the field we call active case finding, which is going out into the community to actively try and diagnose TB cases.

But at the same time, it would also involve other measures; for example, to reduce the stigma around respiratory disease, which would have been particularly intense now with with the emergence of COVID. Basically, as many as many measures as we can bring to bear on the single goal of catching up on this misdiagnosis. And, of course, we're asking programs to do this at a time of severe programmatic stress and so it's going to be a very tough ask. So I think this, you know, is not going to be an ask just from the

health ministry but also from the finance ministry and from international donors that we need to maintain.

And this is again, you know, touching on something that Dr. Kang mentioned earlier: to avoid the COVID train in terms of the resources that are going to be available for our response to all of these other diseases.

Ramanan Laxminarayan

Alright, thanks, Nim. Dr. Hira, very briefly, what are the top three things that you would do if you had to advise the minister?

Subhash Hira

Yeah, I think this HIV AIDS basically is a lifelong infection. We don't have cure yet compared to what normally we have for tuberculosis and some of the other infectious diseases.

So what is important is that we have to make sure that, one, all the clinical services, the supplies, and the monitoring – everything – has to be put back in an easier paradigm for the patients. In a way that the patients have to either through telemedicine or otherwise get reconnected. Because this hesitancy that we saw in Ebola lasted for more than three years (with the hesitancy of going to healthcare services). Now COVID is not over yet, so we're still talking about a long way before most of our infectious disease patients on lifelong therapies would go back to the hospital.

So we are talking of more home based services. We are talking of an enormous level of mental health issues that they have in terms of depression, their financial difficulties, and things; so they will probably have to have counseling by home visits and some changes where people can go and get their point of care testing done. So three important things: one is services on telemedicine, two is counseling at home visits, and three is point of care drug supplies.

Ramanan Laxminarayan

Thank you so much, that was excellent. Dr. Kang?

Gagandeep Kang

So, given that enteric infections, and to some extent typhoid, are problems of the environment, I'd focus on the fact that a rising tide lifts all boats. So let's go with – I think for care, it has to be an emphasis on universal health coverage to make sure that we build stronger health systems that can provide near to

people the kind of care that they need for acute management of illness as well as preventive services.

The second is a focus on wash because I think wash is expensive, wash is long term, wash is a huge challenge, but we know what wash did in terms of changing the way people live in other parts of the world. And there's no reason why LMICs should not be emphasizing that. And then the third part of it, of course, is focus on vaccines because when you can prevent diseases, why have them?

Ramanan Laxminarayan

Excellent, good points. If we can get the money for the typhoid vaccine, that's certainly high on the priority list. Anita?

Anita Kotwani

Yeah, I would say that we need to pick up the momentum of COVID-19 for awareness programs, because the awareness program was COVID-19. At the end of the day, yes, it has picked up. There are multidisciplinary teams in it, there are celebrities. So we have to weave the AMR awareness along with COVID-19.

And there is strong evidence for a good awareness program, that is linked to the reduction in antibiotics and appropriate use of antibiotics. So I will say this time is an opportunity for AMR. So that the same program can talk about AMR also. And we should not use the word AMR when we are doing general population awareness – it could be antibiotic resistance. Because I have done a lot of studies in all Southeast Asian countries, where the general public pharmacist, generalist, they they are unable to understand what AMR is.

So in a simple, very local, contextualized way, some innovative and simple awareness program taking one health. I think the team are the same, with the Minister of Health and other intersectoral committees who are with COVID-19 and who are on the NAP-AMR so it can be woven together. So this is one awareness for general population.

Second could be strengthening of immunization – routine immunization along with other immunizations. And the third thing would be expanding primary healthcare service through telemedicine or increasing the timing.

Somewhere the access to primary health care needs to be increased in the coming years, because then patients will go to this primary health care rather than buying antibiotics or going to a pharmacist or informal dispenser from where they get lots of inappropriate antibiotics. So I think these three things will have an impact on AMR.

Ramanan Laxminarayan

Thank you so much. I certainly strongly agree with all of those. I don't know if we still have Dr. Soumya on the line? There are a couple of questions that are specific to you. Okay, but Nim maybe you can address this.

This comes from Dr. Saurabh Sarkar: the WHO framework of UHC does not recognize the need for early target reaching for communicable diseases in order to be able to reach the 2030 elimination goal, whereas UHC can be reached by incremental increase. How do you reconcile this?

Nimalan Arinaminpathy

Yes, thanks very much for the question, and it's a really, really important consideration. So, I'm going to say in short, UHC is going to be really important for that future TB response, but we can't wait for UFC to accelerate the TB response.

Exactly as the question suggests, there's going to have to be a lot of upfront investment in order to accelerate the current slow declines that we're seeing. And necessarily I think, in the short term at least, this would have to operate within, you know, the vertical programs that we're seeing.

On the other hand, a lot of the considerations that are prevalent in UHC, I think, are also going to be quite relevant for TB. So for example, for TB patients, one of the really pressing concerns at the moment in terms of how to improve TB control is the amount of catastrophic expenditure – the amount of the incidence of poverty that happens as a result of TB. And so, by addressing these issues over the next few years, perhaps TB and other similar diseases could also show the way for the implementation of UHC that may come later.

But what I hope to see is that eventually we start to see high quality TB services being delivered throughout the healthcare system rather than simply through our dedicated vertical programs right now, but that will be a long term convergence.

Ramanan Laxminarayan

Great. So another question which I direct to both Dr. Hira and to Dr. Kang: you know, in some sense, India and some countries in the region were able to do contact tracing in a strong way because of the experience with HIV and I guess possibly TB as well – I don't know how much contact tracing actually happens for tuberculosis.

How much do you think this capacity has helped in India, and how much does the COVID response itself help us with contact tracing backwards? Like again, you know, we've now had this capability in states like UP which I don't think did much contact tracing before. Are there state capacities that you think have

been built up that we can deploy for other infectious diseases referring to contact tracing?

Subhash Hira

Yeah, I think you're very right. The contact tracing that has happened with COVID is extremely great. I think multiple states have gone through it well and I think one can use it for HIV AIDS and strengthen it now because a lot of stigma around all these contact tracings have reduced, although it's not out of the blue. But people have to eventually get contact tracing to this more acceptable level.

Ramanan Laxminarayan

So actually, Dr. Kang, before you answer that question, I guess the real question which came from someone in the audience is: Are there efforts to map the spillover of emerging resistant pathogens between sectors of human activity and regions or countries?

So I think this is a good place to end the conversation, which is, you know, we constantly get asked – including for the ministries – what is it that we can do in the future to prevent the next outbreak. And, you know, there's obviously many things that can be done, but what do you see as critical things that can be done from a scientific and research capacity if someone was setting out to do a PhD or build a career on the COVID pandemic? What might you advise them to do, which is more cross pathogen rather than just about a single disease sort of a perspective.

Gagandeep Kang

Well obviously it has to be surveillance, because if you don't know that you have a problem, it's very easy to ignore it. So if you have surveillance that tells you about the extent of AMR, what kinds of pathogens are circulating in your people, in your animals, in your environment, then you have a better sense of what you need to be working on.

It's the basic principle of, you know, if you measure something, it matters, and you can monitor it. If you don't measure it, it's not there.

Ramanan Laxminarayan

Right. Well, with that I'd like to thank all of the panelists and also Dr. Soumya and Dr. Poonam Kethrapal Singh for joining us today. That was an excellent discussion, and, you know, the whole thing will be available on Facebook Live as well as a recorded feed after this.

We'll be back with a webinar in March on the topic of vaccines and AMR, and then after that, a few more

– you can see April is nutrition and long term economic consequences, May is international cooperation in addressing AMR, and June is on vaccines and long term economic consequences. So stay tuned – we hope you're able to join us for the remaining webinars as well.

Thank you all very much for joining and for your questions, and thank you again to the speakers who joined us today. Have a wonderful evening.