Erta Kalanxhi

Hello. Welcome, everybody. Good morning, good afternoon, and good evening. Thank you for joining us today.

This is CDDEP's sixth webinar in the conversation series which we launched earlier this year to celebrate the 10 year anniversary. My name is Erta Kalanxhi, a researcher at CDDEP, and I will be moderating the webinar today. Today's theme will be on One Health Surveillance in the context of the post-COVID era. We are very thrilled to have a panel of experts today with us to discuss different aspects of this theme.

From the United States, we have Professor Amy Pruden from the Department of Civil and Environmental Engineering at Virginia Tech. From India, we have Professor Uma Ramakrishnan from the National Center for Biological Sciences and from South Africa, we have Professor Sabiha Essack from the antimicrobial research unit at the University of KwaZulu Natala.

Following a discussion with the speakers, we'll have some time at the end of the session to address any of your questions, so please enter them in the Q&A section. For those of you who are following live on Facebook, you can also enter questions under the video in the comment section. We'll open today with a brief introduction from CDDEP Director Dr. Ramanan Laxminarayan. Thank you, Ramanan, over to you.

Ramanan Laxminarayan

Thank you, Erta. It's a real pleasure to have you all back for the sixth webinar and we promised 10 for our 10th year anniversary, so there will be four more. This particular webinar has a lot of reference to where CDDEP is going next as the One Health Trust as we discussed last time. One of the things we're doing is investing significantly in one health surveillance, mostly focused in India but looking to see how to move these ideas around the world.

And one health surveillance has been one of these concepts that has been around for a while, but no one is really quite sure what it means. We define it as helping to understand the drivers, reservoirs, and pathways for the emergence and spread of resistant pathogens. I think it's been stuck in a space I would call stage one: we're tracking resistance and presumed drivers of resistance in different domains, whether it's wildlife or animals or humans, but we haven't really done a huge amount in terms of making the connections between them.

We have done some, but the stage one is where we really are at, which is tracking resistance, which itself is a huge challenge because data on resistance is still not available, even in high income countries, from environmental samples at the scale that one would expect by the time we've reached to this stage of the problem. I think the second stage is to correlate resistance in different one health domains.

This is more challenging to do because we had to be ecological. We have evidence from sewage samples, which can mimic what is going on in the hospitals by tracking resistome in the samples. There's a lot of opportunity to be able to see what those correlation patterns really look like.

I think the third stage is to build evidence on the drivers of resistance, which is between the domains. Correlation then has to lead to causality. This is even more challenging because we might have to do

these through well designed experiments or using natural experiments. It's a range of questions which also relate to things like climate: how is climate related to driving resistance, emergence of gram negative infections, emergence of fungal pathogens, etc.

Again, work happening here, but so much less than then one would like to see. I think the last thing, which is really where we try to get to, is eventually the surveillance is all towards designing and testing one health intervention. I'm personally interested in understanding what infection control in a one health sense really means.

How do we really actually prevent spillovers? We know that increased deforestation or any place where there's impingement of human activity on wildlife or animals, does create potential spillover, but these are very broad brush kinds of recommendations. Are there more specific recommendations that we can use to prevent spillover with the fine readiness that we know and have for infection control within healthcare facilities?

I'm sure that's coming down the road, but we have to understand what that really would entail going further. As COVID has demonstrated, and as we've always known, all health is really one health and the separation between the domains, in terms of understanding drivers, has always been rather artificial. Fortunately, now we have more people who understand the importance of one health and I definitely see greater investment in one health surveillance as we go down further.

It's incumbent on us, as a community that's thinking about this, to define what one health surveillance really looks like. Obviously, we have a great set of speakers who know a lot about this subject. I'll hand back to Erta to take you through the panel. Thank you.

Erta Kalanxhi

Thank you, Ramanan. We are going to start with Professor Amy from Virginia Tech.

The first question that we'd like to explore is some of the lessons that we consider as important from this period, which we can carry on in the immediate future. This is when it comes to adopting a one health perspective for surveillance of various diseases. Thank you, Amy, over to you.

Amy Pruden

Thank you, Erta and thank you, Ramanan for the opportunity to be here. Certainly, I think we all know there are infinite lessons to be learned from the current COVID 19 pandemic and the devastation that we're witnessing, in terms of loss of human life. I think we all know loved ones that have succumbed to COVID-19.

There’s also the economic loss, the pain and suffering psychologically, socially, politically, and the unrest. Clearly, we want to avoid this kind of thing in the future. We've also seen the interconnectedness: it's been astonishing how quickly COVID-19 spread to every corner of the earth - Pacific islands, everywhere, no place was spared.

I think the interconnectedness, though, also highlights the need to work together. Not only the importance of public health and global health, but if we are going to prevent this kind of devastation in the future, we're going to need coordination. I think one health really illustrates that interconnectedness. You've got people, animals, and the environment and obviously with COVID-19, we had the zoonotic connection with bats and other animals are also susceptible to COVID.

We see in surveillance, as Ramanan talked about, we're kind of in stage one where we monitor food and we have a decent clinical surveillance in some parts of the world. The environment part of one health really needs some catching up. With COVID-19, we saw how important the environment is to transmission. It's spreading through the air, that's the environment, and there's a difference if you're indoors or outdoors or if you're six feet apart. I think we're also learning about humidity, temperature, things like climate for sure will play a role.

There's also, of course, disparities in terms of people that are more vulnerable to exposure because of where they live and what their job description entails. We need one health surveillance: we've seen that with COVID and that's going to be true for any disease, certainly for antibiotic resistance. That can help us to contain future pandemics, prevent them, and mobilize resources.

With COVID, we've seen another environmental connection with surveillance. We've seen sewage surveillance as something that's really taking off as maybe an integrated target that can help us to get our minds and hands around future pandemics.

Erta Kalanxhi

Thank you, Amy, very much for these relevant opening remarks to today's discussion. The next question is a little bit more specific.

Are there any technologies or initiatives from this period that we can leverage to actually improve surveillance of the other silent pandemic? We are talking here about antibiotic resistance or antimicrobial resistance. Thank you.

Amy Pruden

Absolutely. With antimicrobial resistance, it's a different beast than your typical pathogen because with COVID-19, as complex as it is, we have one virus or variants of that virus and we generally know what the genome is and we're trying to track it. With antimicrobial resistance, you have numerous pathogens that can pick that up.

With antibiotic resistance, we're specifically dealing with bacteria, numerous bacteria that can carry antibiotic resistance and numerous genes. There's 1000s of antibiotic resistance genes that can be carried and shared among bacteria and we also worry about new ones that can evolve. These antibiotic resistance genes are what give bacteria the ability to fight antibiotics. What we're worried about is the general trend that when we need these life saving drugs, that they're not going to work because the bacteria have evolved or acquired the ability to resist them.

As I mentioned with COVID-19, the sewage surveillance is something that really got traction and it was very encouraging to see. There was early work out of the Netherlands, but spontaneously all over the world, these networks emerged, coordinated, and shared data looking at excretion of the virus and feces and seeing when it shows up at the wastewater treatment plant. We've seen that you get one or two weeks early warning. You can see in a community that COVID is headed this way, so let's mobilize resources, let's be prepared.

Although antimicrobial resistance is much more complex, the sewage surveillance really has a great deal of potential to do the same thing for antibiotic resistance. Right now with food or clinical surveillance it's challenging, we're doing isolette by isolette. It's a lot of work to collect that data and coordinate it and compare it.

With sewage surveillance, you can also do the isolates - you can look at *E. coli* or entero caucus or pseudomonas, whatever your target is. But you can also directly extract DNA. You can do shotgun meta genomic sequencing and you can get a full profile of those 1000s of antibiotic resistance genes that are present and gain some information into the bacteria microbes that might be carrying them.

It's much more economical and efficient, so I think there's a great deal of potential there. We built the infrastructure with the COVID sewage monitoring. In the Virginia Tech campus, like many universities in the US, we started monitoring it in our university campus sewage. We were able to devote our testing resources to where we thought there was infection.

Similarly, with antimicrobial resistance, we could see in a community that these are the antibiotic resistance genes circulating. Here's where we have a problem, so we can integrate it with healthcare surveillance, and doctors could have an app and say, okay, here are the antibiotics that are most likely to work. They can also see other diseases and see what's circulating and have an idea of how to optimize treatment of infection.

I'm hopeful at this moment that there's lessons learned and that there's technologies that are being established. We really have a key opportunity at this moment in history, to really be prepared for controlling future spread of disease and especially antimicrobial resistance.

Erta Kalanxhi

Thank you so much, Amy. I really hope that this infrastructure is used more for antibiotic resistance in the coming years and hopefully close the gap on the knowledge we have about the AMR burden across the world.

Thank you, and this is a good transition to our next question, which is molecular surveillance. It's directed towards Professor Uma from India. The question we had is on the current status of molecular crosspieces surveillance, and what does it promise for pandemic preparedness in the future?

Uma Ramakrishnan

I think that's an important question and I think that, as Ramanan said in the beginning, going towards understanding the drivers is something which hopefully we can move towards post-pandemic. The thing

we have on our side, also, as Amy brought up, is the genomic technology available in the last 10 or so years have really exploded.

In some sense, the pandemic has forced many countries and labs across the world to equip themselves with the ability to sequence CoV-2 genomes, which basically allows them to do other kinds of surveillance. The meta genomic approaches that Amy brought up can potentially be used in the context that you were suggesting, where you try to look across species to see basically, what is there?

What is common? What do we know about? When you do something like meta genomics, you just sequence whatever is there. Some of it may be things you know about, some of it may be things you don't know about, and things which are shared could be candidates for spillover, and so on.

I think that a lot of it will have to be very exploratory in the beginning, but it will require a lot of collaboration because these data on their own don't mean anything. If I do meta genomics from a rectal swab of a bat, I have to be able to compare it to such data from bats from other parts of Asia, and that's when it becomes much more meaningful to sort out pattern - this is commonly occurring Coronavirus across paths across Asia or something like that, versus something which is different or new. I think with cross species approaches a lot of the approaches exist, and they are relatively easy to actually implement.

They are not very easy but the equipment or lab infrastructure required is not very, very out of reach of most labs in the world - many labs in the world, not most. The interpretation of the results and what they mean is something which we all need to work more on together to come up with some kind of common frameworks and ways to share data, and ways to make suggestions based on the data beyond just academic research.

Erta Kalanxhi

Thank you so much for pointing out that data collection is only one part of the answer and analysis, it's what's gonna make it bring it into context.

When it comes to these technologies that you just mentioned, specifically the genomic survey surveillance technologies, what do you think are the challenges with implementing them in low and middle income countries or low resource settings?

Uma Ramakrishnan

One of the big challenges is reagents. It sounds almost silly, but basically, having been part of COVID sequencing efforts for variants, the day to day just takes very long to get these reagents. That's not just true about a COVID sequencing. The currency of this work, which is the reagents, is the same in my lab research, whether we're looking at endangered species and conservation projects, or we're looking at sewage surveillance, or we're working on unknown viruses in bats and unknown bacterial pathogens in rodents.

The currency of these experiments are these reagents, often marketed by single companies - very good companies, excellent products - but being in some countries the import and all kinds of restrictions like

that causes it to take very long to get them. The timelines are like months: if I place an order today, if I was in the US, I might get it in a week or so, but if I'm in India, it takes three months. This is specifically true, even more true, for non standard things.

For example, there are now various companies which are using new capture based approaches where you try and specifically pull out respiratory viruses or something like that. These companies are very innovative. They're doing some nice things, but for low resource settings, to try something different is also very hard.

This is standard stuff, and getting the constant flow of standard stuff: If you need 10 things, you have eight but you don't have the ninth and 10th. The inventory flow is something which is pretty challenging. I think that the capacity for analysis, synthesis, and deeper collaboration and analysis is something which we haven't really thought about sharing so much before.

I think this pandemic has really thrown open this need to share data like never before. We did it but it was almost like when it's required. The first impulse is to not share, but how do we change that ethos to first share and let everyone throw their ideas in.

What does this mean? Can we work together and maybe use this new virtual world - which, of course, was always there but we didn't leverage it as much - to really ramp up our ability to understand, because there's a lot of patterns which will emerge. But what does that mean?

What are the drivers in terms of process and things like that? I think it'll be really nice to be able to just jump that learning curve, not to go really slowly but actually jump up higher. I don't know whether that makes sense.

Erta Kalanxhi

It does. It does. Thank you so much for sharing. I guess this is very much based on your experience that you have with your work in India, so thank you very much for sharing this with us.

I will now move on to Professor Sabiha Essack from the Antimicrobial Research Unit at the University of KwaZulu Natala. The question that I have is about collaboration, moving on from what you were just talking about Uma.

One health surveillance requires multi sector and interdisciplinary collaboration, but this needs to happen at the national and global level for it to actually make sense. What is the progress of our in achieving this and what do you consider as challenges that we need to overcome?

Sabiha Essack

Thank you for that question, but let me start by congratulating CDDEP for a decade of seminal work in antimicrobial resistance, happy 10th anniversary.

The teacher in me wants to start with the definition, and I want to begin answering the question by reminding us all of the definition of one health that was updated by the One Health Commission in 2019.

The Commission defines one health as a collaborative, multisectoral and transdisciplinary approach, working at local, regional, national and global levels to achieve optimal health and well being outcomes, recognizing the interconnections between people, animals, plants, and the shared environment. Ramanan spoke about the interconnection and I want to emphasize the word interconnections here.

Taking a one health approach to mitigating AMR is based on the prevalence and the transmission of AMR within and between humans, animals and the environment. It is premised on the fluidity and mobilization of drug resistant bacteria, micro organisms, and to microbial resistance genes and the mobile genetic elements carrying these genes within and across the One Health trial. Going back to the definition, the one health approach focuses on the interfaces and the AMR risks to and the AMR risks by or from each of the human, animal, and environmental components. I'm going to stop from my teaching role there and ten speak to the challenges.

I agree that we are in stage one: I contend that the current global and national surveillance efforts have not taken a true one health approach and I say that for three reasons. Firstly, surveillance is still really undertaken in silos with minimal integration and triangulation of AMR, AMU, and microbial use trends. Even in countries with well established surveillance systems in humans, food, and animals, the trends are reported separately and there's minimal analysis of the interfaces.

It's really at the global level: the quality partite one health alliance of the WHO, FAO, OIE and the United Nations Environmental Program has really developed sector specific AMR surveillance guidelines and data sharing platforms. That’s the first aspect: AMR surveillance is undertaken in silos with minimal integration.

Secondly, the integration and triangulation are confounded by the fact that we investigate pathogens in humans but common cells in food animals. If we include occupationally exposed workers, we do see aspects of zoonotic transmission, but not necessarily zoonotic disease. The transmission pathways are not really elucidated.

Thirdly and most importantly, we have not answered the “so what?” question. Several genomic studies have shown the prevalence of similar bacterial species or strains or sequence types, similar and resistance genes and similar mobile genetic elements in two or more compartments of the one health trial. However, we are yet to adequately equivocally establish transmission dynamics and the risks associated with a near prevalence of AMR in the interfaces.

In terms of the progress, I want to speak a little bit about the WHO tricycle project, which is an example of how to conduct integrated one health surveillance, albeit with limitations. Many of you will know that the tricycle project focuses on a single indicator organism ESBL producing E. coli, and it uses that indicator for integrated multi sectoral surveillance. The protocol includes standard methodologies for surveillance in humans, the food chain and environment, and taking cognizance of low resource settings.

There is, however, an absence of guidance on integrated analysis of the results. We again see sector silos and gaps related to interface analysis, transmission dynamics, and the “so what?” question that links transmission dynamics to risk. In a nutshell, there is a need for standardized one health surveillance protocol.

The protocol should have a minimum sampling framework, powered sample size, sample sources, sample frequency, standard operating procedures for quality assured sampling and laboratory

investigations, both culture dependent and culture independent, but most importantly, and I can't emphasize this more, integrated and triangulating analytics. Thank you Erta.

Erta Kalanxhi

Thank you very much.

Our last question for today, which is also one of the reasons why we're having this webinar, is how can we actually improve awareness and knowledge on one health and one health surveillance?

Sabiha Essack

Let me start by saying that knowledge and awareness of AMR, as the quintessential one health issue as it is commonly known, is really critical for investment in one health surveillance system by policymakers - this is the top down approach. It is also critical for serviceability informed decision making by human, animal, and environmental health practitioners and this is bottom up.

For this we need evidence on the clinical, food safety, and economic impacts of AMR - those are just three aspects that I can think of but there are several, several more. This evidence is generated from, you guessed it, surveillance: robust representative quality assured one health surveillance systems to understand the causes, as well as the consequences, of AMR at the interfaces. Such surveillance is essential to inform evidence based intervention, for policy as well as practice levels. Herein lies the conundrum: to need surveillance is to make an investment case for surveillance.

We need integrated and triangulated AMR surveillance data to make an economic case for investment in the one health surveillance of AMR. You also need to improve mortality statistics. Death registers seldom record drug resistant infection as the cause of death, and loss in food animal productivity is seldom measured due to drug resistant infections.

Other speakers have already highlighted the fact that conventional laboratory based surveillance is expensive. It is invasive, and it's biased to hospitals and intensive food production systems in urban areas. We know that the AMR burden is not quantified, especially in low and middle income countries where surveillance systems may not be well developed or well resourced and where multi multi-sectoral collaboration is still in its infancy. We also know that AMR surveillance, certainly in my country, was deprioritized as laboratories were dedicated to COVID testing and tracing.

Let's look at the proxies and the common thread in all of our presentations is the Global Sewage Monitoring Project. Amy and Uma have mentioned that this project takes a meta genomic approach and quantifies the abundance and diversity of antimicrobial resistance genes in sewage, and this project has extended to more than 100 countries. They've also mentioned that it was used to monitor COVID-19 at population level.

What this monitoring project has shown is that there are systematic differences in antibiotic resistance gene profiles between countries and continents, with low and middle income countries showing highest sewage levels of resistance genes. When it was expanded to a culture based approach, there was some correlation between the *E. coli* from sewage to urinary *E. coli* isolates from primary health care level.

While such population data is not likely to inform treatment guidelines, it does have the potential to monitor AMR trends and serve as an early warning system for emerging or escalating resistance to inform interventions. Expanding the global sewage product to include AMR surveillance in food animals will provide proof of concept for a cost effective, non-invasive, representative one health surveillance system. This may be adequate to make an investment case for more sophisticated one health surveillance.

Finally, I would be remiss if I didn't leverage COVID in this conversation. We should really leverage COVID-19 pandemic to reinstate AMR as a priority on the global public health agenda. We should build on the existing knowledge and awareness on pandemics, and present AMR as the silent pandemic that is a big adversely affecting humans, animals, plants, the environments, and the various interfaces and ecologies.

AMR is a One Health pandemic and its impact is so much more far reaching than COVID-19. AMR adversely affects the food we eat, the water we drink, healthcare and food safety and food security as we know it. Investing in one health surveillance of AMR is really not negotiable. Thank you Erta.

Erta Kalanxhi

Thank you very much Sabiha. At this point, we actually are ready to answer some of the questions that our audience has sent. The first one is directed to all of the panelists.

Do you think that global surveillance in AMR can be harnessed the same way as COVID-19? Data was collected then shared from different parts of the world in the COVID-19 case, but can this be done for AMR, since AMR surveillance tends to occur in pockets or silence, almost disjointed?

Amy Pruden

The short answer is yes, but the long answer is it's complicated, and I think Sabiha did a really nice job of outlining some of the specifics that need to be thought through. One aspect with COVID that I think is really a game changer is the public facing dashboards. I think in the past there's been this hesitancy: you want to communicate to the public, you want them to be informed about public health, but you don't want to scare people.

The art of communication is very important to consider, but COVID was all out there. People knew it was happening, they had loved ones that were sick. Now you open the newspaper and every day you see the Epi curve, you see local, national, international.

This can be a game changer because people now are awakened, that the importance of public health, that it's all interconnected, and they're more used to data - we're in the age of information - and so our aim needs to be to provide good quality data and take advantage of the success of these public facing dashboards. People can see the trends for themselves and that can help engage people, but it can also help for public health and the authorities to address the spread of antimicrobial resistance.

Sabiha Essack

If I may, I think that leveraging the pandemic, as I spoke about earlier, is one of the aspects. We hear about the face of COVID because it's so out there in your face, but AMR is really not understood because, as I mentioned, we don't really know whether the person died because of the resistant infection or there was loss of animals because of resistant infection.

Optimizing those kinds of databases will assist. I know that there are a number of initiatives in different regions; the Fleming Fund, for example, is looking at data sharing platforms and trying to ensure that whatever data is generated from public funds is going to be made available and accessible. But remember that this also requires a political will, and also the ramifications on the economic and other fronts if scary AMR data is suddenly made publicly available - that this country really has really high levels of resistance. It has an economic impact.

Therefore, there has to be some sort of circumspection to make sure first of all, that the data is actually representative and that it is presented in a way that is not a disadvantage to economic growth and development as well as other aspects within the country. I think it has to be packaged and messaged in a way such that all the people concerned take the relevant precautions to prevent, contain, and mitigate and not have an adverse effect on other aspects.

Erta Kalanxhhi

Thank you so much, to both of you. We have another question and it's about funding.

There's no more funding for stopping future pandemics including stop spillovers in the US. How can we leverage these for AMR one health surveillance and what would your top three funding priorities be?

Uma Ramakrishnan

I can jump in. First, with a comment on the last question, I think that communication is something which is really key as well. Amy mentioned the dashboards, I think that's really important. But I also think that in countries like India, there's often language barriers, knowledge barriers, all kinds of barriers.

I don't know the answer, but somehow ways to be to make sure that this communication, not just to a certain part of society, but more broadly, is something which we have to really think about and there, Sabiha's point of will really comes in because there should be a will to communicate to everyone and the will to disseminate knowledge. I think that's really important.

In terms of funding priorities, this may sound silly, but ways to actually encourage collaboration and not just data generation, but translation. First of all, multisectorial but also translation of that data and interaction of those scientists and the data with policymakers and impacts on the ground are priorities. There's a lot of gaps between scientists and people who are actually public health workers who are actually doing things on the ground and changing things on the ground.

Scientists have very different goals. Somehow encouraging that would be one very high priority area and also, maybe collection of case studies and ways for such groups of people to work together to leverage

from the experiences they have had with antimicrobial resistance. Communication itself is something which is really important in the context of all of this, not just research, data, case studies, and examples.

Actually talking about this and interfacing with the public to really communicate what these things mean are very complex interactions. How do you actually present complex interactions without either reducing the complexity or saying “Oh, it's so complex, you don't answer anything” ?

Erta Kalanxhi

Thank you. I think we have a question here that sort of brings together another important point, which is related to data sharing and collaboration.

What about data standardization? Could any of you comment on what needs to be done and what is available out there to allow us to bring all this data together?

Amy Pruden

That was exactly going to be my point with the previous question. It's great to see interest in investing money and research, but I think standardization is going to be essential here. For that to happen, we'll need some sort of involvement like the World Health Organization quadripartite.

If you leave it just up to researchers, they play a very important role in innovation and new ideas and let's try this, but we need standardization, especially with meta genomics, for example. How deep do we sequence? What platform? What are the algorithms for identifying antibiotic resistance genes or emerging ones?

A lot of things to think about with the culture, the WHO tricycle protocol has really been an exemplar of that kind of coordination that we need and it's across the one health spectrum. Picking a target like E. coli that's relevant across the one health spectrum and coordinating and testing it and different types of matrices that are food, environment, and clinically relevant. That's just the tip of the iceberg of what needs to be done, so I'd really like to see an international body that coordinates surveillance.

That can also help with some of the issues we've talked about, like we want to avoid finger pointing. With surveillance, flags will rise and there can be that tendency to finger point, but I think we need to abandon that mindset and take on one. We're all in this together. Like with COVID, it spreads so rapidly, we all played a role. We need to play as a team here.

Sabiha Essack

Just to add to that, I think that standard operating procedures, guidelines that can be adapted to any kind of country context, and I really want to push the low and middle income country context, and the resource constraints that we have, is becoming really, really important to be able to have quality assurance.

When you're comparing the data within regions, or even globally, you are really comparing like with like, and there hasn't been any technical issues that have falsely elevated or decreased levels, etc. The technical component of surveillance is really important.

Erta Kalanxhi

Another question has to do again with funding: do we know who might find this work on correlation, identification of drivers, and intervention design in each of your countries where you work?

Sabiha Essack

I think most countries have developed national action plans, and key to any national action plan is a Multi-sectoral Coordinating Committee. This coordinating committee has representation from human health, animal health, and environmental affairs, and various other departments or divisions within each of the big ministries.

We almost require the people that are from the ministries to take a step back, and maybe compromise a little bit in terms of their sector mandates, to have a mobilization around the greater good of containing antimicrobial resistance. Most countries will have this multi-sectoral coordination group and they would be the best place to set up one health surveillance within a country. That's where I would place it.

In most countries it is generally the Ministry of Health, sometimes the Ministry of Agriculture, that takes the lead. Ministers are all on the same level, so you need to almost have one level up above the ministries and have this disciplinary chance sectoral approach to it, such that everybody contributes and works towards the common goal of AMR containment. People need to see that the sector does not exist in a silo, and that what happens in human health affects animal health and vice versa and both affect environmental health.

If we have this understanding of the interdependence on each other and how AMR in one sector really affects every other sector, I think there'll be more willing to work together towards the common goal. Thank you.

Amy Pruden

Related to that, we see that there are some common goals across sectors. We have to get out of our silos. One example would be the strategic development goals. If we address those, we will also be addressing antimicrobial resistance.

An obvious one is poverty. We see hotspots for spread of antimicrobial resistance also happen to be in areas of poverty and that socio economics might be the biggest driver, according to some studies. That's just one example.

For funding, we need the political will. One example is the JPIMR initiative that several countries have joined and they chip in. I hope the United States will be one of those countries and there's others that

aren't yet on the list. There's reason to be hopeful here and we're taking baby steps, but we need to take much bigger steps.

Uma Ramakrishnan

I'll present a slightly more pessimistic view. There's absolutely no doubt that there's a need to break out of these silos. I hope that that's possible.

My experience has suggested that it's quite difficult. I hope that that will change.

Erta Kalanxhi

We have a couple of more questions that we can cover quickly before we close our session for today.

There are two questions that I will combine into one on the role of social media in conveying the message on one health surveillance. Are there any cases where this has been done?

Sabiha Essack

Not that I am personally aware of, Erta. I think social media has been used well and also not so well when it came to COVID-19 - any kind of media that is used to send the message out.

AMR is the whole of society's problem, and it requires everybody to play a role from civil society through to the policymakers and the healthcare professionals, etc. The messaging, as someone mentioned, becomes really important because we need to make sure that we send the same consistent message to different sectors of the population. It really has to be repurposed so that it is aligned with the health literacy levels in different countries and in different populations.

It is really important to make it understandable without fear mongering, but really send the message to say it's your responsibility and this is how you can prevent it - this is how you can ensure that antimicrobials are going to be available for your children and your grandchildren. I don't think using huge numbers like 10 billion or 28 million people in poverty brings the message home.

Those are really good statistics and they're really good for economists and the global political leaders, but if we need to make sure that everybody's going to play their role, we need to just repurpose messages such that it is applicable, and people are going to buy in and implement them.

Erta Kalanxhi

Thank you very much. The last question I was gonna ask is what is the message that should go through to the layman on the importance of the silent pandemic in the post COVID era? How can we communicate this to people at the community level?

Sabiha Essack

I can start. By making the examples really real to them, something that you can relate to within your own individual and small circle into that context. We've used comics and movies and podcasts and art.

We really need to think of using all of these kinds of media to relate to the very people that we need to take all of the interventions going forward. It's just being creative and innovative - saying the same thing in different ways so that it aligns to the health literacy and the age group or understanding of the people that we're trying to reach.

Uma Ramakrishnan

This is just my naive impression, but I think that in countries like India, where 70% of the population is below 35 or 40, there needs to be - especially in terms of things like communication - we really need to also think of how to communicate, like Sabiha mentioned, to different age groups. I don't feel like we are doing that effectively at all.

I think that the other methods you mentioned, other media tools, some of which, at least someone like me, who's on the other side doesn't even know the names of, I think will be really important to first get people aware and really thinking about this. That's the first step, as people aren't even cognizant of it so much.

The first step is to build awareness, and then bring in the if you do this, this may happen and if you do this, that may happen, and this is why that is important. I think first awareness is the most important thing.

Amy Pruden

With the COVID-19 pandemic, people had to be aware. If they were awake and living and breathing, they were aware. With antimicrobial resistance, people don't realize how much we depend on antibiotics and antimicrobials.

The standard of living that we do have and that life expectancy is longer than it was in the past, and we don't have to worry as much about minor infections. This is all because of antibiotics and it can easily go away. It is going away for many types of infections and contexts.

Building appreciation for the value of antibiotics as a precious resource, and understanding that it's one that we have to be good stewards of. Then the next step is, as Uma said, is then asking what we can do about it and we all play a role at many levels.

From basic hygiene, factors like water sanitation hygiene are a big aspect of stemming the spread of antimicrobial resistance. Then to prudent use in agriculture, choosing products that don't require the use of antimicrobials and antibiotics is beneficial.

Educating healthcare folks too, as they're not always as aware as you would think. This will help so that doctors and clinicians don't rush to use antibiotics when they're not necessarily necessary and use the correct ones for the right situation.

Erta Kalanxhi

Thank you very much, Amy, Uma, and Sabiha for today. Thank you for joining us on this very important discussion. I think it's time to close our session for today. Thank you to everybody who joined and interacted with us with their questions.

The recording of this webinar will be on CDDEP's website, so you can access it there, and you might also get an email from us with the recording. Please stay tuned for the next four webinars in our series that are coming up soon on antimicrobial resistance and COVID-19.

Thank you and have a great rest of the day for everybody still early in their day. Take care.