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PERSONS LIVING WITH HIV: TAILORING THE GLOBAL RESPONSE TO THEIR NEEDS

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Persons Living with HIV: Tailoring the Global Response to Their Needs

[video transcript]

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Welcome to Physicians' Research Network. I'm Jim Braun, the course director of the monthly meetings of PRN in New York City. Since our beginning in 1990, PRN has been committed to enhancing the skills of our members in the diagnosis, management, and prevention of HIV disease as well as its co-infections and complications.

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We hope this recording of Wafaa El-Sadr's presentation Persons Living with HIV: Tailoring the Global Response to Their Needs will be helpful to you in your daily practice and invite you to join us in New York City for our live meetings in the future.

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PRN is a not for profit organization dedicated to peer support and education for physicians, nurse practitioners, and physician assistants. Membership is open to all interested clinicians nationwide at our website prn.org. Now allow me to introduce Wafaa El-Sadr, Director of the International Center for AIDS Care and Treatment programs at Columbia University and the Global Health Initiative and university professor of epidemiology and medicine at Columbia University in New York City.

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Okay well, good evening everyone. I'm thrilled to be here again. And really wonderful also to listen to [00:01:08] so as. [0.5] I've learned so much this evening, so thank you. I'm going to now this is something completely different. We're going to go from the local to the global. And we know that global and local are interconnected.

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What I'm going to talk to you about today is persons living with HIV and how there's a movement to see what can be done to tailor the global response to their individual needs. This is just a brief outline of my presentation but let me go ahead. So, when I started getting involved in the global epidemic which was sort of early 2000s, there was a huge disparity at that point in time. And you can see it here on this slide.

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This is here in high income countries and in black are the people who had access to antiretroviral therapy and in orange were the people who died from HIV/AIDS. And then if you contrast that at that point in time to these two bars here which are people which are from sub-Saharan Africa where there were the most numbers of people living with HIV in sub-Saharan Africa but also the fewest that had access to treatment. And of course, at that time as well in many of these countries their health system was in a crisis.

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So, these are real pictures from real clinics that I've seen and we work with. And you can see of course they're overcrowded clinics, overcrowded hospitals, very dilapidated facilities and almost, you can see the pharmacies with just boxes of medications. Many of them may have expired as well. So, this was the reality in the early 2000s when the global community kind of realized all of a sudden we have a problem and we need to do something about providing access to treatment, lifesaving medications to the people who need it most around the world. And what happened thereafter has been rather remarkable.

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And this is probably one of the most successful public health endeavors in the history of humanity. And you can see here starting in 2003, the number of people who had access to who were on antiretroviral therapy. And you can see over the past decade and a half, and this is by the end of 2016, now at that time actually, at that time it was about 18 million or so. Now it's about 19 and a half million people have access to antiretroviral therapy. And what's even more surprising is that the majority of these individuals were in some of the poorest countries in the world in sub-Saharan Africa. So, this was a huge, amazing, global response to the epidemic and I think it's a testimonial to both the investments from wealthy countries like the U.S. and others but also of course the investments by the people within the countries themselves in terms of trying to tackle their own epidemic. So, what has been the impact? I mean, so yes you can increase treatment but what's been the impact on people's lives?

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This figure here shows the decline in AIDS deaths that occurred with the scale up. And if you can imagine the scale up more or less started around 2004 or so, you can see the decrease in the numbers of deaths, of AIDS-related deaths, globally. But still even this last year, there were more than a million HIV or AIDS-related deaths globally. So, it's still a huge problem. The problem is not going away it's just getting a little bit better. And this manifested itself not only in terms of degrees in AIDS-related death but actually in improvement in life expectancy.

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And on the y axis here, vertical axis is age of individuals and then from 1960 all the way to 2015. And you can see life expectancy here at birth in some select countries in sub-Saharan Africa. And you can see that these countries were actually making really good progress in terms of expanding life expectancy over these several decades since the 1960s. And then tragically with the advent of the epidemic in the 1990s and 2000s, you can see that some of these countries, the life expectancy of their populations actually dropped substantially as manifested here. But then what we're seeing now with the expansion of treatment is actually life expectancy is going up again. So, this is again a remarkable measure of the impact on the lives of populations in these countries.

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Now, in addition to survival, which is very important, there's also been a decrease in standardized HIV disability adjusted life years. And this means that actually and this red line here is in southern sub-Saharan Africa. You can see that with the advent of the epidemic, increase in disability adjusted life years substantially but then with treatment, again, it's decreasing remarkably. So, the quality of life is improving and people are living longer. Now, there's more good news with the scale up of treatment. And as we all know in this room, treatment is prevention.

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So, you can see that there's also been with the scale up of treatment in the same time period, there's also been a decrease in the numbers of new infections. But nonetheless we still have a major problem with about 1.8 million new infections that were reported last year. So, there's been remarkably good news overall on the global platform although of course this remains a huge epidemic overall. So, that kind of was a very quick report on the progress. Now what are the challenges ahead? I'm going to focus my talk on the challenges ahead in terms of three areas.

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One is coverage and the second is quality of care and the third one in terms of efficiency of the services that are being provided.

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Let's talk about coverage first. So, when you look at the numbers of people that need to be-- now with the WHO just recently about a year ago adopted treat all policy. So, while the recommendations in the U.S. were to treat everybody with HIV irrespective of CD4 cell count, WHO only adopted this about a year or so ago. So, now everyone who is living with HIV should get treatment. And it's estimated that about 30 million people living with HIV around the world and therefore we need to reach by 2020, the goal is to reach 30 million people should access treatment. So, it looks by looking at this curve here in this figure that actually the world, the global community is on track to reach 30 million people accessing treatment. So, that's the optimistic view of things and I'll tell you a little bit about the details behind this very optimistic view.

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When you think about that that means there's a huge coverage gap. Currently, I told you about, as of July, 19.5 million on the right side who are on treatment. And then you can see that there needs to be almost a doubling of the number of people to access treatment over a short period of time. This is by 2030. So, this is a huge and you can try to put that in the context of the US where we're a very wealthy country, we have about a little bit over a million individuals living with HIV, and we're sort of struggling to find these individuals and to get them on treatment, keep them on treatment, maintain viral suppression, et cetera et cetera. So, you can imagine the challenge for some of the countries that don't have the resources we have. This is an enormous challenge.

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Now what about quality?

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One of the many of you in this room will know about what's called the 90-90-90 targets. And these are UNAIDS targets that were established about two or three years ago and the goal behind these targets are as follows. These are global targets to be reached hopefully by 2020. In the global community we're all supposed to be working towards these targets. The first 90 is that 90 percent of all people living with HIV will know their HIV status. So, that's a huge challenge in and of itself. And then the second 90 which is that 90 percent of all the people who know their HIV positive status will actually receive antiretroviral therapy. And then the third 90 here is that of all the people, of all HIV-infected individuals who are on into retroviral therapy, they will have durable suppression. So, these are very, very ambitious targets. These are not just the 90 percent of people who come to our clinics, who come to our hospitals. It's the 90 percent of everybody living with HIV even those who are unaware of their status obviously. So, these are real targets that are now kind of measuring the success of countries and communities in terms of tackling the epidemic. So, if you look at where is the global community now and these are some of the quality, that's why I'm talking about quality. Where are we at in terms of reaching the 90-90-90?

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It's estimated that actually only about 70 percent of people living with HIV know their HIV positive status. And that's an optimistic percent because the range, as you can see here, from as low as 50 percent to as high as 84 percent. So, there's a huge gap in terms of knowledge of status. Then of people living with HIV, this is the second 90, now only about half of them have access to antiretroviral therapy. So, that means that there's a huge gap also in trying to get the other half to be on treatment. And then when you look at viral suppression and this is truly an estimate because viral load has not been available in many of these countries. So, I personally don't know where these numbers are coming from because many of these countries actually just adopted viral load and were very involved in scale up of viral load. But for whatever reason, they indicate UNAIDS that 44 percent of individuals who are on antiretroviral therapy are virally suppressed. I think that's a very, very, very optimistic number. But I think these gaps tell us a couple of things. They get at both the coverage, this the first one is the coverage of testing, the second one is the coverage in terms of access into retroviral therapy, and the third one is achieving viral suppression. Each of them, of course, implicit within it is the quality of the programs themselves. But another measure of quality that's important is retention in care.

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And these are data from several countries in different parts of the world and in blue is Africa, for example. And this is retention for patients on antiretroviral therapy after initiation of therapy and you can see that by 48 months after initiation of ART, you can see that only about 60 percent, less than 60 percent, are retained in care in care and on antiretroviral therapy. So, obviously there are a lot of individuals on ART who are either not retained, meaning they are lost to followup or they may have died. So, that's obviously a very important quality measure and that obviously is very critical to achieving the whole purpose of scale up of treatment. One of the most important things is as we think about the scale up is you have to think about the population that you are dealing with.

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Whether it's a general population or a key population. Many of you I hope are aware the term key population globally means usually means men have sex with men, people who inject drugs, and sex workers. And also they use the term priority populations often used as well and that sometimes involves migrants or others. But ultimately, in order to achieve the coverage and quality, one has to identify all the HIV-positive people within this population and you can imagine in a generalized epidemic like many of the countries in sub-Saharan Africa, it means that you have to literally test everybody. And then you have to test them and those who are positive of course need to initiate antiretroviral therapy, be retained on treatment, and then achieve durable undetectable viral load. Now, another challenge that's facing the global community is how do you achieve this? And it's very difficult.

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And if you look at this figure here it shows the overseas development assistance and in billions of dollars, in 2015 U.S. dollars. And if you look at HIV in this-- what is this color? Teal? Green here, teal here, green here at the bottom here, you can see that over the past decade or so, there's been a plateauing in terms of the overseas investments in HIV. Not only in HIV but there's been actually plateauing in investments for many, many other global health threats: maternal/child health, malaria, TB, and so on. So, we're very worried about decreasing in global health investments but actually it's worse than this. It's been plateauing for about a decade now so it can certainly get worse. But it's not been good especially with the magnitude of the problems and the ambitious targets ahead. So, now I'm going to shift this to so what do we do? So, this is the dilemma, all these individuals have to be reached with services, with high quality services, essentially was less money, with less resources.

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I'm going to tell you about differentiated service delivery or DSD. When people think about how was this able, this huge scale up was able to be achieved in poor countries largely in Africa or in Southeast Asia.

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It's often attributed to, what got us here is attributed to what's called the public health approach. And how many of you know what the public health approach is in this room? Okay, I'll tell you about it. So, it was not very early on like in early 2000s realizing that we can't tackle the numbers, the millions of people, the hundreds of thousands of people who need treatment if we utilize the way we do medicine here, for example, in New York City. So the decision was made is to adopt what's called a public health approach and what that means is you have a consistent package of uniform ART regimens. So, there's one first line regimen and one second line regimen and that's recommended for everybody. And that's procured-- that means the pharmacy or the medication that's procured is exactly that one regimen. And it's a fixed dose combination so that's very nice. And it's often with one pill a day. So, having a uniform ART regimen is very critical and also a uniform monitoring approach. So, that means that the same lab test, the minimum number of lab tests, the same follow number of visits. Everything was uniform. And this was very important.

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And this was made into an algorithmic approach which made it very simple so that every patient was really to be treated in a very systematic, similar way and to follow an algorithmic approach. It made it very easy to train healthcare workers on the approach and to train hundreds of thousands of healthcare workers very quickly at scale. And it also allowed what I have here is task shifting and task sharing and that means that these many countries have very few physicians. So, they don't have the luxury of having many of you in this room I think are physicians, I believe, and probably the physicians in this room are about the number of physicians in some countries where I work. So, it's rather remarkable how few-- in some countries there are two physicians per 100,000 population. So, in order to really respond to the HIV epidemic, you have to task shift or task share to nurses and also to clinical assistants and so on. So, having a uniform approach, an algorithmic approach made it easy to treat large numbers of healthcare workers and also to do task sharing. The other thing was decentralization of services, meaning to go away from centers of excellence and actually to go as deep as possible to be able to reach the population. In brief, the public health approach is really the reason for the success thus far. This approach enabled getting treatment to millions. Without doing that I think there would have been not a chance. The few privileged people maybe would have had access to treatment.

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But I think the bottom line is that, this is actually the title of a book, is what got us here won't get us there because we have in addition we accomplished this much now but we have so much more to accomplish. So, what do we need to do next to be able to reach those huge numbers, achieve quality and efficiency? I think for a lot of people I've been trying to do some analytics. So, looking at, for example, what are the reasons for people stopping care. I showed you the retention rates were really not optimal although I always say that in many of our own practices we don't really have retention rates. So, we can easily point fingers at other people. But retention rates are low.

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But when you look at the reasons, they ask patients why are you stopping care? And the reasons are here. Some in yellow are structural reasons, some in red are psychosocial, and some are clinic factors in green. So, these patients said things like for example I need to come and pick up the medicine interferes with my work. Transportation is too difficult, too expensive. I feel well and I don't know why I should take my medicines. Attending the clinic risks disclosing to somebody else. And then there are some like, for example, it's taken me too long to start antiretroviral therapy. I have family obligations. You know, whatever. There are many, many reasons. I spend too much time in clinic. And these are real issues because if you have clinics that see in a day 500 HIV-infected patients, obviously a lot of people wait for a long time. They can spend the whole 12 hours waiting to be seen by a clinician to get a refill for their medication. So, these were the kind of realization that while the scale up has been successful, there are all these impediments and we have to do something about those impediments and deal with some of the impediments both in terms of the quality as well as patient satisfaction.

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Then people discovered DSD, which is called Differentiated Service Delivery. And what this approach is about that's now promulgated very widely around the world is it's a client centered approach that tries to simplify and adapt the HIV services so they are adapted to the preferences and the expectations of various groups of patients and also at the same time, to try to reduce the burden on the health system so that the health system can see more people. So, this is going away from thinking that everybody gets exactly the same thing. This is now thinking can we group patients into different groups and then provide the services to such groups of patients in a specific way? Particularly if we can enhance their satisfaction and make it get them maybe not to come to the clinic as often so we can decompress clinics and be able to increase the number of people who can increase more people can come to the clinics.

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What this putting the people living with HIV at the center means, it means you have to think about these levers. And by levers are to think about which laptops are absolutely critical? How often should these services be done? Who should be providing these services? Does it have to be a clinician? Does it have to be a nurse? Could it be a community health worker? Where should the services be done? Do people really have to come to the clinic, to our facility, or can we go out to them? So, it's really kind of reshaping completely the way we've thought about HIV care which is facility-based, very frequent contact with the system. At the core of this DSD, differentiated service delivery, are these questions. The which, the when, the who, and the where.

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And I think by manipulating these levers here, and I list them here, so service frequency can be now there's some models of care where they're seeing the patients for example every year, stable patients every year. The service intensity, again, is really shaped by the needs of the individual. Locations-- some of the care now is provided completely in the community, even initiation of treatment in the community, so actually people never come to a health facility. And lastly, trying to diversify the providers, utilizing pharmacists, families, peers and so on. So, what are some of the models that really have been tested over the past several years? And these have been largely for what in the nomenclature globally are called stable patients and this is not nomenclature that actually patients like but I'll just use it tonight.

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What do we mean by stable patients? So, any groups of these are groups of patients who have received ART sometimes for six months or a year at least, no adverse reaction. No concurrent illness or pregnancy. They have good understanding of the need for lifelong adherence and they have evidence of response to treatment either they're very adherent, they have undetectable viral load or they have a good response to CD4 response. And different models have been tried that I'll touch on [00:22:50] based on [0.5] a couple of them. So, some have been called adherence clubs.

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And these adherence clubs have been tried in South Africa and they've really enormously increased so what happens in these adherence clubs like from 2011 to 2015, 32,000 patients enrolled in 1300 adherence clubs at 55 facilities. And these adherence clubs are groups of patients that are grouped together and then they actually come to the clinic together one day and they, not very often, and they get a health talk, adherence counseling, and so on as a group and then they pick up their medicine. So again, it's utilizing, they don't have to come as often and that also helps the healthcare workers because they know to expect and they come together and they prepare the medicines for them together and they get the adherence advice and so on and they go home together. So, adherence clubs have been growing enormously in South Africa.

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The data, and you probably can see this, but the data are quite encouraging that through these adherence clubs is that retention is pretty good. There's no difference between men and women although in this figure here at the bottom left, you can see that retention is worse amongst the youth, young people versus older people.

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Then another interesting model is in Mozambique is called Community ART groups. And this is actually where a group of patients who live in a certain region or a certain community they decide to form a group. And therefore what they do is they send one of their members of the group to the clinic to pick up the medicine for everybody. And when that person, if I'm selected and I'm part of your group and I'm selected to go to a clinic today, I get my clinical assessment today and I pick up the medicine for everybody and then I report on everybody. So, there's a symptom checklist. I tell everybody's okay, they're doing well or I say somebody's sick so somebody can go out and get them and so on. So, it's kind of self-management. It promotes self-management and it also promotes as well a sense of ownership by these patients and responsibility. And these groups have increased. There are thousands of these groups in Mozambique now and these community ART groups are now expanding to other parts, other countries. We have been helping support them in Swaziland and Mozambique and now they're growing elsewhere. So, it's very novel ideas of getting the care out of the clinics so these patients don't have to come to clinic and hopefully they free up space for more patients to be seen. At the same time, it avoids the cost they pay for the transportation, which transportation is one of the major impediments, and also increases their sense of satisfaction. These are ideas and innovations that I think are really wonderful and some things that we can learn from in our country.

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The same thing has been done thinking about this for postpartum women is giving them choice. And they ask postpartum women who are often lost, HIV-positive postpartum women. They're often lost to followup after they have their baby. So, they ask them do you want to be followed in an adherence club or do you want to be followed in a primary care clinic? And you can see here that most of them, 65 percent, said no I want to be followed in the adherence club but only 35 percent say I want to be followed in my clinic. And here are some of the reasons why. I mentioned some of the reasons for the adherence clubs. I prefer to receive care outside the health facility, fewer appointments, visits are short, and I'm happy to receive my care rom a counselor. And at six months postpartum, there was no difference in viral suppression between the two groups. So, these are novel ideas for again, groups of patients. Think groups, not individuals, groups of patients.

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So, do the patients, the recipients of the care, and the providers like these models? And that's very important because what's driving this is obviously trying to enhance quality.

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These are some qualitative research that was done. And here's a female community ART group member. "The group is good, it is like a family, doing things together, understanding each other." And here's a medical assistant saying, "At first, I had lots of patients and ,instead of having time for them, I was busy looking at how many patients were left outside..." How many of you have had a busy clinic and have been thinking about how many more patients I have waiting outside? Everybody in this room. So, you can imagine these settings. It's not eight patients, it's not 10 patients. It's 200 patients waiting to be seen. You can imagine what that feels like. Then there's also now. So, I talked about the stable patients but I think if we [00:27:37] believe and if I get [1.2] in particular, there are many other groups of patients that have not received this much attention that do need special attention. And going through differentiated service delivery offers us the opportunity. If you decompress the clinics, some patients really don't need to be seen that often. Maybe others can get better care.

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And these include patients at high risk for disease progression. Those are very low CD4 count. Men are a challenge to retain. Adolescents. Older persons living with HIV, often neglected in many of these settings. Those with more with comorbid conditions. Migrant, mobile populations and key populations.

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Very quickly to focus on those at high risk for disease progression because that's been of particular importance to us. And you know, they're defined as people either who are newly initiating ART who have advanced disease, meaning they have very low CD4 cell count, or they've been on ART for more than a year, have unsuppressed viral load or low CD4 cell count or co-morbidities.

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Actually, when you look at the median CD4 count at ART initiation, the good news in several of these countries here you can see most Africans, some Vietnam and Haiti, non-African countries obviously, over the years the median CD4 cell count at initiation of ART is going up which is good news. But still the median is about 300. That's the median. So, a lot of people are initiating antiretroviral therapy with very low CD4.

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And we know that those who we are initiating at very low CD4 cell count, approximately 60 percent of the death on ART in sub-Saharan Africa occurs in the first few months and those deaths are amongst those with advanced HIV disease.

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So, WHO has come up with guidelines and we've put together a call to action to try to identify models that are particularly [00:29:35] adept [0.3] for these very advanced patients who now are lost in the crowd. So, they don't get the attention they need. They don't have a model of care that's suited for them, so that's a very important priority. Now, men are another challenge. These are data that show just in three countries that show the 90-90-90. So, if you look at men in blue and women in green here aware of HIV status, on ART or viral load suppression, you notice immediately that blue is lower than the green, that the men lag behind in every step of 90-90-90. So, they need-- they're a big challenge globally in terms of finding them and engaging them and getting them to stay on treatment. Another challenge is youth.

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And by youth here, I mean people who are between, if you look at the 90-90-90, even in this country that had pretty good 90-90, 70 percent aware of their status, 87 percent of those on ART, and 88 percent of viral suppression amongst those people on ART, which is really fantastic and better than the US numbers. If you contrast that to the youth in the same countries, you'll see that only 46 percent of the youth are aware of their status, 82 percent of them were on ART, and 79 percent were suppressed. So, you can see here the big challenge is finding them actually. It is the first 90. So, there's been another DSD model that was developed for these youth and it's called, these are teen clubs and they're very similar to the community ART groups. These are self-established by the teens themselves and they've been studied particularly in Malawi.

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And you can see here the retention up to six years after ART initiation and those in the teen clubs are in red here, so much higher retention and those are the teens that are not in teen clubs, much lower retention. So, it looks like these DSD models are really doing something that's been very difficult to achieve. They're responding to specific needs of these groups of patients. Another challenge are key populations. This is a huge issue.

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And I'm just showing you here examples of the 90-90-90. For example, gay men who have sex with men in Moscow, 13 percent are aware of their HIV-positive status and only 36 percent of those are on treatment and 64 percent are virally suppressed so it's catastrophic. And similarly, for people who inject drugs and other gay men from India, these are also situations where we need to shape programs to meet the needs of these populations so that we can actually overcome these enormous challenges and get them the care that they need.

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What about efficiency? I mentioned there's been a plateau in funding so what do we do?

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When you look at the cost of care, at the facility-based cost of care, in many of the countries of sub-Saharan Africa, the right hand this is the Republic of South Africa, Zambia, Rwanda, Ethiopia, and Malawi. In red is the cost of antiretroviral therapy. So, it's a major chunk of the cost of antiretroviral therapy. And then in blue the cost of personnel. Those two are the main costs of care. So, if you want to achieve efficiencies we have to somehow decrease the cost so you can spread the money further and try to tackle these costs. So, there's been attempts done to do that.

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Again, looking at visit spacing in Zambia. And what they've done is they had 16 facilities either control or intervention facilities randomized to either or. And this is the intervention here. And you can see that they increased the proportion of patients on three-month refills. Now, in many of these countries, believe it or not, patients used to get every month, they had to go to the health facility to get medication every month. That's very, very difficult. You can see that in the intervention clinics, they were able to increase the three-month refills from 44 percent to 70 percent. But very importantly, the average change in visits per day [00:33:53] inside [0.4] decreased substantially. This is very important because that clears up the visits that can then be engaged more patients.

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And this is another effort in Kenya and Uganda where they did an intervention again that involved nurse triage, three-month refills, and consolidation of services all at one visit. And you can see they had a 25 percent decline in hours lost from work for the patients themselves, 30 percent reductions in hospitalization, and almost 50 percent reduction in healthcare expenditures. So, thinking about these models also not only how quality and patient satisfaction and so on and coverage but also it will save some money and allow for expansion of the services.

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Now I'll end by talking a bit about the way forward and some conclusions.

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As I mentioned to you, differentiated service delivery is about what's here in this box. It's about the how. The frequency of the visit, the service intensity, the location, and the provider type. But at the same time, to be able to achieve what we want to achieve we have to not only focus on the how, how the services are provided, but also on the what. So, the huge need for finding more affordable, better tolerated medications for ART but also for OIs, ways to support people better, and then healthcare systems with skilled staff that are able to deliver these services. We've been funded by the Gates Foundation to establishing this network.

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We call it the CQUIN network: coverage, quality, and impact network. And these are the countries that are participating now in this network. And the goal behind this network is how can we scale up these differentiated service delivery models. There's such an imperative to do it because these are the problems that stand in the way of scale up. So, we're working with these countries with the ministries of health to see how we can scale up these new models of care.

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The elements of the work are doing a knowledge exchange, a joint learning network, as well as also to try innovative new models that I mentioned earlier to you.

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So, we have a website. You're welcome to visit it. Webinars, journal clubs, we do workshops in countries and visits between teams between different countries.

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And most importantly, we're doing these catalytic small projects to try to figure out new models of DSD. There's a male engagement project in Zimbabwe. There's in Kenya we're looking at adolescent preferences for DSD models. In Swaziland we're looking at the feasibility of self marketing a blood pressure. If a patient has both HIV and hypertension, hypertension is very common about 30 percent of the population are hypertensive. So, you can imagine you're getting DSD for HIV, you need to come only every six months every year but then you have to go and get your blood pressure medicine every month. Guess what's going to happen? Nobody will get their blood pressure medicine. So, we're trying to also think of DSD models not just for HIV but for comorbidities. And lastly in Ethiopia we're doing an assessment of some of the providers and their own perspectives. In reality some of the providers are very happy because it decompresses, decreases their workload. But on the other hand, some of them are worried because they feel that maybe it means they're not needed. The fear that if the community health worker can do this, if the patient can manage themselves, maybe I'll lose my job. So, there's a balancing between both the pros and the cons.

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Ultimately, I think we're all about achieving impact and I believe that in order to do that impact on the epidemic, the global epidemic, is we have to expand coverage. We have to enhance quality and we have to also enhance the efficiency of the services.

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In conclusion, a few conclusions. I hope you'll agree that much has been accomplished in confronting the HIV epidemic globally but much remains to be seen, to be done. More than a million deaths per year is unacceptable. Only half, only about half of the people who need treatment getting access to treatment. And the idea is that differentiated service delivery offers a promise, a way for achieving what you need to achieve in those three domains. However, I think of course all of the care models whether they include in these DSD models, they all need to be of course responsive to the perceptions and expectations of the recipients of the care. There are many research questions that remain.

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I think numerous studies are needed to be done. What's the optimal design for these models for different subpopulations? A lot of unanswered questions. Can we develop a streamlined monitoring and evaluation system for these models? What's the impact of these models in terms of the perspectives of the patient, perspectives of providers? What are the costs associated with these models and are they cost effective? And then lastly and very importantly, how can successful DSD pilot programs be scaled up?

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I'm going to end by acknowledging my colleagues at ICAP and ICAP around the world, the communities of people living with HIV work with, and our funders. Thank you very much.

[Video End]