

**Newsmaker Interviews:  
Melinda Moree, Ph.D.  
Fourth MIM Pan-African Malaria Conference And RBM Forum V  
Yaounde, Cameroon  
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**JILL BRADEN BALDERAS:** Melinda Moree, director of PATH Malaria Vaccine Initiative. Thank you so much for joining us today here in Cameroon. Can you start by telling us why finding a vaccine for malaria is so difficult?

**MELINDA MOREE, Ph.D.:** Well, I guess part of it is, I would say it has been so difficult, years ago when we started our effort, many people thought that it was an impossible quest, sort of the holy grail to be able to make a malaria vaccine and honestly, some of my friends were like, "What are you doing? What are you taking on?" And it is a difficult thing to do, scientifically. It's difficult because many companies aren't working on it because it's only a product that poor people in poor countries would buy and so we've had to overcome both these market barriers as well as the scientific barriers. The good news is is that we're making great progress in that. One of the reasons why it's hard to make a vaccine is because malaria is caused by a parasite. And we have vaccines against bacteria and we have vaccines against viruses but we don't have any human vaccines against parasites. So, scientifically, it's a much more difficult thing to do.

What we're trying to do in vaccines is to intervene in how the parasite actually affects the body. So malaria is transmitted by mosquitoes. Mosquitoes bite people and within

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10 minutes, these parasites have gone through the bloodstream and go to the liver. So you have about 10 minutes, if you want to try and capture this particular form of the malaria parasite, which is a very, very difficult thing to try and make a vaccine for. But if you could do that, you could prevent people from getting sick at all. Right? But so that's something that would work for travelers and for other people. Once a vaccine goes into the liver, then it sits there and it just starts multiplying and making more and more of the parasites. But still a person isn't sick. And so it's possible that we can still make a vaccine that would get to that stage of the parasite in the liver and then would keep people from getting sick. Once a parasite gets out of the liver, it goes into the bloodstream, and that's when you start getting the symptoms of malaria that many people are familiar with - sort of the chills and the fevers and people shaking with malaria, and that's because the parasites are going into the red blood cells and then multiplying and they're breaking those open. So kids can get very anemic because of the loss of their red blood cells, they can get cerebral malaria and die in maybe as short as 12 hours. So when we're trying to look at a parasite, each of those different stages the parasite looks completely different to our immune system. And so if we try and make a vaccine against malaria, we've got this parasite

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that's growing like crazy and we've got each form of it is completely different to try and make an immune response against. So many people felt like we had to get some part of the parasite against all of those stages and put it all together and make a vaccine and so that's kind of what we've been kind of trying to do but that's obviously very difficult because there's lots of different targets and we don't know exactly what to pick.

And so the good news is that in just taking some of these vaccines that have been tried previously, and maybe in adults that are in the U.S. who have taken these through our program into testing in Africa, and the good news is by, I guess, you'd call it "scientific good luck," that we've actually found that at least one of these vaccines, the RTS,S Vaccine, made by GlaxoSmithKline, is able to protect kids against malaria. So it's something that we thought was incredibly hard to do but yet just in the past year, we've made enormous progress, and that's a really exciting thing.

**JILL BRADEN BALDERAS:** So tell us a little bit more about the RTS,S Vaccine from the announcement that was made yesterday.

**MELINDA MOREE, Ph.D.:** Well it's an interesting prospect because this vaccine has been worked on for more than 20 years by Glaxo Smith-Kline and the problem was that it was

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really worked on more as a research project. And so we joined into a partnership with them in the year 2000 to take the vaccine and say, "All right. Let's see if this vaccine can work in kids in malaria-endemic countries." So we joined together and we did a series of clinical trials and the last one was in Mozambique. And last year, what we reported out, was that the vaccine was to protect about almost 60 percent of the kids from severe malaria. And most of these kids with severe malaria are very, very sick and many of them would go on to die. So that's a pretty outstanding outcome from this vaccine and it also protected about 30 percent from clinical disease.

Now, we had only looked at that for six months, though, so this was just a small trial to look at this for six months, what we just announced yesterday, was that, again, I guess, a little bit to our surprise is that the vaccine lasts actually for 18 months and so at the end of 18 months we still have 50 percent protection against severe malaria. So just a few years ago, something that we thought was impossible, now we're to the point where we have a vaccine in trials that's protecting about half the kids for 18 months. So sometimes, people will say, "Well, but that's not a hundred percent," and that's true but no one's ever been able to do this before so now we know it's absolutely possible to make a malaria vaccine and as we find

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out more about this vaccine, it shows more potential to actually be one that could have an impact on more than a million kids a year that die of malaria.

**FEMALE SPEAKER #1:** Are there other types of vaccines in the pipeline?

**MELINDA MOREE, Ph.D.:** There absolutely are. We're working on 15 different vaccines actually just within our program and some of those are pieces that could be put together into one vaccine to have a greater effect and some of them are just very different ways of being able to vaccinate. So some of them are using viable [misspelled?] factors. Some of them are using different technologies to try and get to the same end but that maybe target different pieces of the immune system. So it's vitally important because we know so little about malaria. It's really important that we try these different approaches because from our perspective, we don't care which one wins, we just want a vaccine that's going to protect kids against malaria. So we're kind of hedging our bets and taking some risk by moving several things forward in parallel but we think that the urgency of doing something about malaria actually warrants taking that risk.

**JILL BRADEN BALDERAS:** Now funding is always an issue, especially for diseases like malaria. How does lack of funding affect vaccine research?

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**MELINDA MOREE, Ph.D.:** Well, last year, about \$65 million was spent on malaria vaccine research around the globe. And at first, people would say, "Well, it's \$65 million," but when we compare that to just the national instance of how they spent \$450 million on HIV vaccine-development. And so we should be spending that to develop an HIV vaccine because we need it but it gives a comparison that says not very much money is being spent on a malaria vaccine. There was also a funding study which just done to look at how much money goes into malaria research and development as a whole - vaccines, drugs, diagnostics and implementation research. And what it found was about \$323 million a year go in. Now if you compare that to how much we spend on average for diseases that affect rich people, and if you kind of apply that to malaria, we'd be spending \$3 billion. So we have a problem where we have a disease that's primarily affecting poor people who don't control those resources and so they're really not going to try and invent new tools to combat malaria. At the same time, there's not enough money going for the existing intervention. So, malaria as a whole is just largely underfunded and that means that we've not been able to have the impact on the disease that we really need to be having.

**JILL BRADEN BALDERAS:** Your focus on public/private partnerships I would imagine is trying to improve that funding,

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so can you talk about the importance of public/private partnerships that you are establishing or have established?

**MELINDA MOREE, Ph.D.:** Well, I think the issue is one of those where we need is in the public sector and the ability to do something about it in terms of new products is in the private sector. And so—but there's not that market return for the private sector. So what we tried to do is to come together in partnership and everybody share the risk. So we put some funding into these partnerships. We also help to make connections with clinical trial sites in Africa and work on the policy environments in these other pieces to make it sort of an easier thing for companies to work on malaria vaccines. And then, in return, what we get are companies that know how to make vaccines, have excellent scientists that know how to turn them into products and to manufacture these at large scale. They're not working on products for poor people. And so from my perspective this is working. And we've been able in just five short years to go from a place where we thought something was impossible to being able to have just extraordinary progress in making a malaria vaccine and we're now, across a community, it's just amazing. People are like, "This is possible!" Now we need to keep moving and get there faster because while we're working on this, the kids just keep dying of malaria so we really need to get there as fast as we can.

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**JILL BRADEN BALDERAS:** Vaccines are obviously a huge part of the fight against malaria but can you describe what you would see as a complete picture to combat malaria?

**MELINDA MOREE, Ph.D.:** Well, it's a great question because I'm very aware that if the most advanced malaria vaccine and development right now, that it's still going to take another four or five years if all successful to have that vaccine out and in use. And in that time another four to five million kids are going to die of malaria and they don't need to. So we have bed nets, we have drugs that work, we have vector-control methods and we could be using those today but they're not being applied to the extent that they need to be. So really an overall strategy is scaling those up and getting them into use so we can stop kids dying today but at the same time, invest in new tools that we need to make a difference.

Vaccines are the most cost-effective, public health interventions that we have. And to make a lasting impact on malaria, we need one. But it doesn't mean we have to wait for it and it doesn't mean we can't do things today. So it's really looking at this as an overall strategy to both solve some of the problems of today, create new and better tools for the future and there shouldn't be this discussion of, "Which one do we do? Is it this or that?" We should really be working on all of this. It's a million kids a year that are

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dying of malaria, and if these were kids in the U.S. or Europe, we wouldn't be talking about, "Do we invest in a vaccine or do we buy bed nets today?" We wouldn't be having that discussion. We'd do everything that we could because our kids would be dying and I guess all that we're trying to do is to make that the same situation for Africa, as we would do for our own kids.

**JILL BRADEN BALDERAS:** One more question. What do you hope to see come out of the [inaudible]?

**MELINDA MOREE, Ph.D.:** Why, that's a [laughter] big one. It sounds a little bit cheesy. I mean, I'm a hard-core scientist, right, and so it's actually it's being able to link up these people who work in their own little worlds and being able to link them up altogether so that we're really looking at what's the part of this big piece that we play in trying to do something about malaria. And it's just too easy to kind of say your little part, "Everything's fine here. We're making progress on a vaccine." And forget about the part that we need to be making progress on doing something about the kids that are dying and so it might hopefully be that everyone could just take a little step back and can look at how their piece fits into the bigger puzzle. And that none of us would really feel successful until we have an impact on malaria.

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**JILL BRADEN BALDERAS:** Melinda Moree, director of PATH  
Malaria Vaccine Initiative. Thank you so much for joining us  
today.

**MELINDA MOREE, Ph.D.:** Thank you.

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