I'm Dan Colley, and it's my pleasure to welcome you to the third lecture in the 2008 series Global Diseases, Voices from the Vanguard. As most of you know, this is a joint effort between the Center For Tropical and Emerging Global Diseases, and the Knight Chair in Health and Medical Journalism. AKA, Pat Thomas, and a group of others who make this happen. This series brings together those with widespread interests in global health, from across the breadth of the UGA campus and to some extent people out in town. And I thank each of you for coming this evening. Today we have an excellent speaker. Someone who both mans the front lines and knows the inner workings of global health. Dr. Frank Richards. Frank is at the Carter Center, but before I introduce Dr. Richards I'd like to mention the remaining Voices from the Vanguard lecture for this semester. On April 15, yeah, tax day, we're pleased to have Dr. Anne De Groot from Brown University and EpiVax as our speaker. And after hearing today's lecture I hope you will want to come back next month and hear Dr. De Groot. One other announcement. As usual after these lectures there will be a reception next door in Demosthenian Hall. So right after the lecture, out and to the left. So this evening's speaker was born in Bitburg, Germany, but we still think we could run for president because he was born in
the U.S. Air Force base in Bitburg.<br/>
He doesn't remember much about Germany,<br/>
but that international flavor must have rubbed off somehow, because after being raised in St. Louis, graduating from Williams College and Cornell University Medical College,<br/>he has since worked in more than 15 countries and lived for 5 years in Guatemala.<br/>
Dr. Frank Richards is a board certified pediatrician who has spent his entire career focused on global health.<br/>After house staff training at Children's Hospital in Los Angeles,<br/>he joined the commission corps of the United States Public Health Service at the CDC and his calling has been almost entirely centered on tropical disease control,<br/>elimination, and eradication programs in the Americas and in Africa.<br/>As you will hear, both at CDC and more recently at the Carter Center,<br/>Dr. Richards has championed and led control programs against some of the world's worst scourges in some of the world's most challenging places.<br/>He is a world leader in creating new ways forward in the difficult area of tackling multiple diseases in a coordinated manner.<br/>Dr. Richards has been honored nationally and internationally for his work.<br/>He exemplifies the breadth and depth of what I think a public health physician, medical epidemiologist can bring to the global health challenge.<br/>And I'm very pleased to present him to you this evening, as our March 2008 Voices lecture.
Thanks, Dan, for that introduction. I think Dan didn't mention that he was my boss for five, six, seven years when he was the director of the division of parasitic diseases at the Centers for Disease Control. And he was a great boss and very supportive of what I was trying to do, and I thank you for that. And I thank you all for coming tonight.

My topic tonight is: Bundling Grass Root Services to Battle Neglected Diseases in Africa: A Journey to Nigeria. It's kind of hard to live up to the flyers that I have seen here on what I'm supposed to be. I'm supposed to be one of four charismatic scientists who are inviting you to help me defeat infectious diseases that thrive in poverty and kill millions of people worldwide. So I'm the third charismatic scientist to be with you. I hope I can live up to that billing.

I want to review very quickly what Dan just said to let you know sort of who I am and what my orientation is. And I usually use the P's to do that, to explain to people what I do and what my interests are. The first is pediatrics. I'm trained in pediatrics. The second is I have a passion for parasites, and in particular, my passion for parasites relates to worms. The second is I have a passion for parasites, and in particular, my passion for parasites relates to worms. So the poor is an important element in what I do. And I'm not a clinician.
I'm trained in clinical medicine, but my interest is preventing disease in public health. And it's not just in public health, it's in programs. So I don't really think of myself as a scientist, per se. I really think of myself more as a program person. Pills is the next P. I'm involved with tablets, with passing out pills. I'm sort of a pill roller, if you will, with collaborators around the world. And these tablets are tablets which have been developed really in the last 30 years, remarkably safe, that can have dramatic impact on people's lives. And I called these the poor man's vaccines. You don't need needles to distribute these, you don't need refrigerators or what we call cold chains. So it's really a great opportunity, a new technology, that is even more germane to fighting diseases in the poor because we have what we call public private partnerships, where industry, big pharma, is donating these medicines and asking others to come together around a donation to help find the resources and the logistics and the mechanisms to treat people who are in very remote communities. Any time you talk about public private partnerships or any time you talk about public health you're really talking about power relationships and politics. And so I'm very lucky to work with President Carter, who is a politician par excellence who is very concerned with the poor, very concerned with equity, and as you all know, won a peace prize. President Carter, and this is what the Nobel Peace Prize looks like, aside from the medal, which he won in 2002.
And here I am with President Carter in Ethiopia about a year ago discussing one of these interventions related to public health -- public private public health partnerships involving pills and politics. Now I really like this statement by President Carter at the award of his Nobel Peace Prize. He said I was asked to discuss here in Oslo the greatest challenge that the world faces. Among all the possible choices I decided that the most serious and universal problem is the growing chasm between the richest and poorest people on earth. The separation is increasing every year. The results of this disparity are the root causes of most of the world's unresolved problems.

So when we talk about today in the next 45 or 50 minutes or so, diseases of poverty, forgotten diseases and forgotten people, and neglected diseases of the tropics, we're really not only talking about public health and international or global health, we're also talking, in my opinion, about global peace. If you visited the Carter Center in Atlanta, and I hope you will, you'll know it's a very beautiful place, beautiful grounds. And on those grounds is what I call my statue. It is a statue of a young boy leading his blinded father out to the fields for another day of scratching in the dry earth to earn a living, a way to survive. These are diseases at the end of the road. And this little boy is holding a tablet which we must deliver to the end of the road to try and prevent these conditions and help people. So what I'm going to be talking about are community-based, integrated MDA,
which stands for Mass Drug Administration programs.

And I'm going speak about it particularly in Nigeria.

And here's the structure of my talk.

I've already given you the introduction.

Now I want to talk a little bit about a few important public health concepts that will permeate some of the things I'm going to talk about.

Then I'm going talk about three neglected tropical diseases. RV, which is river blindness, LF, which is lymphatic filariasis, and Schisto, which is schistosomiasis.

All three are worms, all parasites.

And we're going to talk, then, about Nigeria, and talk about future challenges for 2008 and beyond.

So first, let's go to concepts. And the two concepts I want to talk about are control versus elimination strategies.

Sometimes they use the word eradication here.

And vertical versus horizontal public health systems.

So control versus elimination strategies.

Control strategy is one that never ends. It starts here at the dot and it continues indefinitely into time.

Now that's sort of like our influenza programs.

Every year we should think about getting our influenza shot.

And we're not imagining a time when we're not going to be getting an influenza shot.

So that's a control program.

It goes on indefinitely.

An elimination program is one that has a beginning and it has an end.

A termination point.

I guess the quintessential elimination or eradication program is small pox.

But we can also think about
the effort against polio,<br/>
the effort against guinea worm, et cetera.<br/>
Next concept.<br/>
Vertical versus horizontal<br/>
So a vertical idea is basically a top-down silo driven program.<br/>
It's focused, it's controlled, the inputs are only dedicated to that program.<br/>
If you buy a vehicle, that vehicle works on that program.<br/>
It doesn't work on anything else.<br/>
And the out puts are specifically related to the disease or condition that you're after.<br/>
And the donors love those kinds of programs.<br/>
They also love eradication programs because there's a beginning and an end<br/>
and what they call an exit strategy.<br/>
Now the horizontal program is more of a polyvalent program.<br/>
It's a basket-type program.<br/>
It's not a basket case, but it's a basket-type program in the sense that all of the money goes into one common fund and then there's a decentralized process usually at a district level where people think about how to spend those monies on priorities.<br/>
And the idea is if those programs are sustainable they need to continue through time,<br/>
where the vertical programs usually are more focused and often time-limited.<br/>
All of these little arrows indicate the little interventions that you can have in the process of having a polyvalent horizontal public health program.<br/>
Immunizations, malaria control, river blindness control, et cetera.<br/>
All working through the same structure and the same vehicle, in this case, for example,<br/>
would serve a number of different things being sort of a pool or a basket vehicle.<br/>Now if you get to that horizontal condition, what Dr. Hans Remy [Assumed spelling]
at the World Health Organization's tropical disease program says is that integration of programs means integration of problems. And some of what I'm going talk about today is how bringing some of these programs together results in problems and issues. Okay, so those are the concepts. Let me move on to talking in a bit of detail about the three neglected tropical parasitic diseases of the day. Onchocerciasis, or river blindness, lymphatic filariasis or LF, and schistosomiasis, which I'll also call schisto. All three can be controlled by annual dosing of a safe and effective medication. Along with that annual dosing, it's important that there be health education so people are on board with understanding what this is all about, have buy-in, and indeed participation in the activities. Now the World Health Organization has called 13 diseases neglected tropical diseases. But gratefully, I'm not going to talk about 13. The ones that are circled here are the conditions which can be managed by preventive chemotherapy, or what I call MDA -- mass drug administration. And of these, I'm only going to speak about a few. Lymphatic filariasis, onchocerciasis, and schistosomiasis. Now just a plug for the University of Georgia's Center For Tropical and Emerging Global Diseases, all of the list here that have an asterisk next to them are neglected tropical diseases, and the ones that I underlined, lymphatic filariasis that are worked on here. I'm going mention tonight, and I will
also mention a little bit about malaria.

Now economists -- health economists have a way of measuring diseases so they can compare those diseases that kill people with those diseases that maim people. And the neglected tropical diseases really don't do a lot of killing. They cause more chronic infections, more debilitating infections.

And when you use what they call, what the economists call DALYs, which are Disability Adjusted Lost Years, you can compare mortal conditions with chronic conditions using this scale that I have here. And what you can see is going from the lowest to the highest, we have some real big players here.

We have tuberculosis, we have malaria, diarrheal, HIV AIDS, and LRI, which are pneumonias, lower respiratory infections. And you can see that if you put all the treatable neglected tropical diseases together, those that can be treated through a mass drug administration program, you can see that these conditions, as far as their DALYs, rank just above malaria and just below diarrheal diseases. So these conditions are in fact quite important in terms of people's lives and in terms of global morbidity.

Now let's go back to our concept of control versus elimination. In this slide we can see that river blindness, onchocerciasis, is a control program. It goes on basically forever. Lymphatic filariasis is an elimination program. It has an effort to treat and then reach a point where treatments will end. Schistosomiasis is a control program.
trachoma is an elimination program.
And each one of these conditions has its own expert committee that looks on what they're trying to do based on the intricacies of the diseases and come up with all these series of guidelines that seem to relate when you're talking about a vertical program, but then become very difficult to integrate when you try to bring these conditions together.

Let's talk about river blindness. Here's an old African proverb, nearness to rivers can eat the eyes. Here's a geographic distribution of river blindness. Mainly in Africa, but transplanted to the Americas by the slave trade.

So there are programs both in Africa and in the Americas to battle this condition. It's transmitted by a small black fly that breeds in rapidly flowing streams. So you find a lot of black flies where the streams have rapids, because the black flies need highly oxygenated water. Where you find the black flies, you find the infection. Now this gentleman is suffering from onchocerciasis, river blindness. You'll see immediately that he has a lump on his forehead, and that is a nodule. Then you'll notice he is squinting and his eyes are tearing a bit. The bright light is affecting him, and he's suffering from a condition that's actually coming from that nodule.

If I were to take this nodule out and cut it, I would find a worm in it. This worm is called onchocerca volvulus, and it produces males and females are living in this nodule, they produce smaller worms called microfilaria. You might be able to make out this
microfilaria under the microscope here.<br/>
You can see here in this cartoon.<br/>
And it also gets into the eyes.<br/>
You see little dots here in this person's cornea, and that's an inflammatory reaction<br/>
around the microfilaria that have gotten into the eye and are causing problems.<br/>
Now I don't know if you can make this out, but over here we're using a blade to take a little piece of skin out of this person's arm.<br/>
That is placed on a microscopic slide and some fluid.<br/>
And from that skin will emerge these little worms.<br/>
Here you can see one microfilaria, here you can see many. The more microfilaria you have the worse, the more likely these are able to get into the eye or cause inflammation such as this.<br/>
And what you can see in these eyes, here is white, here at the 6 o'clock position, where we have what's called sclerosing ceratitis as the inflammation is getting worse.<br/>
Here's a microfilaria in the eye. <br/>
And in this case, you can see the eye is completely opacified due to the inflammation. <br/>
This young man is blind from river blindness. <br/>
Well, 90 million people are at risk of this condition. <br/>
It's estimated that 34 million are infected in 37 countries -- 30 of those in Africa. <br/>
Some 800,000 people are either blind or severely visually handicapped. <br/>
But it's rarely fatal. The manifestations not only include blindness and visual loss but terrible skin rashes and awful itching.
The itching is like total body poison ivy.

Here is a young boy leading both a blinded woman and a blinded man through a street by the stick.

Similar to that statue that I showed you that is at the Carter Center.

And here you see an individual who has depigmentation of his shins, what we call leopard skin, due to years and years of chronic inflammation from having these parasites in his skin.

Here is an individual who is both blinded and I think you can make out the shiny shins here that represents another manifestation of river blindness.

Now Merck and Company developed a medicine called Ivermectin, brand name Mectizan, which kills the microfilaria.

Unfortunately, it does not kill the adult worms in those nodules.

So it is not a curative treatment, but it is a treatment that reduces the number of microfilaria in someone's skin.

If given annually, you basically prevent anyone from going blind and get rid of the itching and the skin rashes.

So for people who are suffering from these conditions, it's a really great medicine and people are very, very excited to get it.

President Carter has been involved in this distribution program from the beginning.

Here he is with Roy Vagulos, the chief executive officer of Merck around the time when the decision for the donation was made.

Here on a visit to Chad.

And this graph shows the growth of the donation program since 1988 through the year 2006.

Now about 60 million people are being treated per year throughout the world.
with this medicine. The green bar here shows where we need to go. This is what we call our ultimate treatment goal. If everyone on the planet was being treated who needs to be treated with Mectizan, we would need to treat about 90 million people. The difficulty in moving from these red bars to the final green bar now really relates to failed states in Africa, places where it's difficult to go because of war or population displacement, and failed states. Just quickly, what the Carter Center does is it works in 11 countries. Six in the Americas, shown here, and five in Africa. And of course we're going to be focusing our discussion on Nigeria, and really this little red dot right there. Here's the Carter Center treatment's curve. Since the Carter Center began its activities in 1996, for the last five years we've been treating roughly 10 million people a year with our partners, the Lions and the ministries of health in the countries where we work. And in November of 2007 we had a real big milestone where we celebrated 100 million accumulative treatments with Mectizan for river blindness, with Ivermectin. If you're interested, the cost per treatment in Carter Center-assisted programs is about $0.50. If ranges depending on where we're working, on the infrastructure, and the challenges. Ranging from about $0.10 per treatment to about $1.50 the value of a dose of the medicine is about $3. That is what Merck has contributed to this effort. What I want to show you here is a little bit of impact. What we have is a cohort or a group of 411 persons in southern Nigeria followed
over an eight-year period, and here's what the impact has looked like. We've seen nodule rates in this cohort dropping from 60% to under 20%. Visual impairment dropping from about 17% to about 1%. And the dermatitis, the itchy rash dropping from about 15% to about 3%. Very little change in the permanent condition of the leopard skin, but a dramatic impact. This is a tailor who's reporting to us one of the great stories that before he started taking medicine he was unable to thread his needles, and now he's able to do so. Okay, that's river blindness. Let me jump to another condition. This is a tailor who's reporting to us one of the great stories that before he started taking medicine he was unable to thread his needles, and now he's able to do so. Okay, that's river blindness. Let me jump to another condition. Lymphatic filariasis. Much more widely spread than river blindness. It's a disease of rural as well as peri-urban poverty. Over a billion at risk, 120 million people in the world infected in 80 countries. It is a leading cause of disability. Some estimates have said the second or third leading cause, globally, of disability. It is again, like a neglected tropical disease, rarely fatal. You've all heard of elephantiasis, swollen legs, this is what causes elephantiasis. A very similar worm to the one that causes river blindness. Generating microfilaria. These circulate in the blood. Here's a microfilaria in the blood. The adult worms, rather than living in nodules under the skin live in the lymphatics, and therefore obstruct flow of lymphatic fluid and cause swollen extremities like you see here. Mosquitos transmit this infection. They bite, they suck blood, they pick up the parasite, it develops in the mosquitos, and they transmit it to other people.
Here's an individual with a large leg.

You can see here an ulcer.

Very often these large legs become traumatized, get infected, people suffer from fevers.

And here's a picture from the front of your pamphlet, Nigeria.

Another individual suffering from Nigeria.

Now one thing that's very rarely mentioned but as a matter of fact is even more common than the large legs is male urogenital disease.

And this individual has fluid in his scrotum, which we call hydrocele.

Can you imagine, guys, carrying that around in the field all day, working in an agricultural area.

You can also imagine the impact on sexual function and relationships in the family.

And speaking about the female side, here's a young woman who has the face of lymphatic filariasis, a very sad face.

Because she is unable to be married because of this foot.

And you can see her swollen ankle, and you can also see all of the small incisions made by traditional healers, local witch doctors.

Trying to remove the fluid unsuccessfully from her foot.

Paid for by her mother and her grandmother who really dread the fact that she may never be able to get married in this traditional society.

There is an effort to completely eliminate this condition.

It's been done in China, it's been almost done in the South Pacific, and the idea is to use mass drug administration to stop mosquitos from getting infected so that ultimately no one will have the infection and you can stop treatments.

The treatment is a combination of
Mectizan which I showed you before. You might recognize this box down here. That's the Mectizan box. Donated by Merck.

Another medicine called Albendazole which is donated by another large pharmaceutical company, Glaxo Smith Kline, GSK. These two medicines also happen to be the absolute best medicines that you can give in combination to knock off intestinal worms. So what we call S T Hs -- soil transmitted helminths which is just these big round worms that you can see here on this map, on this photograph. These medicines are great for purging people of these worms and helping with that condition as well. That's an ancillary benefit. Health education, washing the legs, another key component. Health education is key for whatever we do. Now the third disease I want to tell you about, the third worm, is Schistosomiasis. There are several different kinds of schistosomiasis. In Africa there two to consider, particularly here in Nigeria. And one is called urinary schistosomiasis, and the other is called intestinal schistosomiasis. Again, schisto is a disease of rural and peri-urban poverty. Over 650 million people are at risk, 200 million infected, 76 countries. It has both major and subtle morbidity, and again, rarely fatal. Here are the worms. There's a male worm and a female worm. The female worm produces eggs. And these worms actually live in the blood stream, they live in the veins and small veins. And the egg -- here is an egg here -- has to move across the vein wall, across tissues, to then exit the body in either urine or feces.
Based on whether you have urinary schisto or intestinal schisto.

Once the egg gets into fresh water it will hatch, and this little thing will come out of it and it will swim around.

It's called a miracidium. It will invade a snail. Inside of the snail it will proliferate, and what you see coming out of this snail are a number of little dots which we call cercariae.

They look something like this if you can see it. And those burrow into the skin of the next person when they go swimming or when they are in the water and cause the infection.

Here is a urine microscopic examination of a kid in Mali who has a very, very heavy urinary schistosomiasis infection. And here are a bunch of kids in Nigeria all showing little vials containing their urine, which is very bloody as a result of these eggs coming out in their bladder.

As they come out they cause bleeding. There are a lot of organ damage that occurs from these eggs, because not all come out. Some stay in the tissues, like in the bladder, in the kidneys of the case of urinary schistosomiasis. In the intestine and in the liver and spleen in the case of intestinal schistosomiasis.

And this causes a lot of issues and a lot of problems and a lot of chronic disease. This child has a very large abdomen because of his large liver and spleen resulting from schistosomiasis. Water contact, everyday activities, of washing, kids swimming. Because kids in the tropics spend a lot of time in the water kids tend to be most heavily infected with schisto.
And here is a big tent of the medicine Praziquantel.

A third medicine -- I've told you about Ivermectin, Mectizan, I've told you about Albendazole.

The third one is Praziquantel. And this one is being used to treat this kid.

The important thing about Praziquantel is it is a medicine that has not been donated.

So we have to find money to provide treatment for schisto.

At least up until recently.

Here's a child taking her dose of Praziquantel.

Recommended to take the medicine once per year.

We're really talking about annual doses of these medicines to prevent these conditions.

So onchocerciasis is control, lymphatic filariasis is elimination.

Schistosomiasis, control. Control programs you have to dose people pretty much from now to eternity.

The lymphatic filariais program is aiming to eliminate, so at some point we can stop treating.

Okay, that's my background on the three diseases.

Now let's go to a, let's journey to Nigeria and talk a bit about Nigerian programs.

In case you don't know where Nigeria is, here's Africa, there's Nigeria.

West Africa, and here's the capital Abuja, and we're talking about work that's going on around the city of Jos on the central plateau in the country.

I've worked in Nigeria since 1992. Had great experiences in Nigeria. People always hear Nigeria and get freaked out. But actually in my time there it's been very, very profitable, great people, great opportunities.

And lots of parasitic diseases.

Here's central Nigeria where our integrated program is ongoing.
And so now let's go into talking a little bit about bundling.

We talked about the neglected diseases.

I'm going to talk about bundling of treatment services.

Why Nigeria.

Nigeria has the most river blindness in the world.

27 million people in need of treatment.

And it also has the best Mectizan distribution program for river blindness in the world.

A perfect thing, perfect logistical system to start bringing these other conditions in on top of, because you already have a system that's functioning to integrate with.

Nigeria has the most lymphatic filariasis in Africa.

22% of Nigerians are infected with this parasite.

Nigeria is third globally, after India and Indonesia for this condition.

And for schistosomiasis, Nigeria has the greatest Praziquantel tablet need of any country in the world.

Including China.

So Nigeria has a lot of parasites and it also has a lot of other diseases like intestinal worms and trachoma and malaria.

As a matter of fact, with malaria more children, you know, a million children are estimated to die a year of malaria, and 300,000 of those are Nigerian.

More Nigerian children die a year of malaria than any other nationality.

Here I am in northern Nigeria, outside of the Emir's Palace with people in their traditional dress.

Now we published this work back in 2002 and have continued to build on the notion of lymphatic filariasis elimination, schistosomiasis control.
in combination with onchocerciasis control.<br/>
So river blindness, lymphatic filariasis, and schistosomiasis through mass drug administration.<br/>
Here's a picture of Dr. Abel Eigege who is the director of the activities in plateau and the Nasarawa states. And this is how we integrated these three mass drug administration programs at the district or what we call local government area. First we built on the river blindness drug administration platform. First we had to determine what the conditions were that warranted treatment. In other words, we had to do something called mapping. We had to do epidemiological mapping in accord with guidelines of the World Health Organization to determine where the medicines needed to be given. We then tailored our distribution training and logistics based on the results of these mapping exercises, and we implemented community-based treatment and health education where it was appropriate. Again, per guidelines. And we evaluated the impact. So the concept here in mapping and spacial epidemiology is that you start off with one platform. Based on the epi, you build on another disease and another disease, and even more focal activities across what you find in your disease assessment activities. Frequently using geographic information systems to help us sort these things out. So when we started in 1998 our disease mapping for river blindness in these two states gave us this kind of picture. Each one of these little segments
is a local government area. This is the equivalent of a county. And these areas require treatment for river blindness or onchocerciasis, and these areas did not. Based on the WHO threshold of having 20% of people in communities having nodules or not. If you're above 20% you get mass treatment. If you don't, you don't get mass treatment. This graphic shows the impact between 1992 when we started the program, a 52% prevalence in these areas. Dropping to 2.9% by the year 2000 due to the impact of medicine and the treatment. Now you might have trouble making some of this out, but I just want you to take a look at this mapping exercise for lymphatic filariasis in the same area which we conducted around the year 1999. And the point is that the threshold for mass treatment for lymphatic filariasis is 1%. And you can see just looking next to these names of villages that all of these numbers are over 1%. As a matter of fact, there's only one 0 here in this entire map. Which basically told us that unlike oncho, we had to treat state-wide in all of the 30 local government areas for lymphatic filariasis and the program had to expand. So the map looks like this now, after the mapping. These areas are both oncho and LF, and these areas are LF alone. And this is how it looked. We started out with mass treatment in 1992 treating about half a million people per year. In 2000, we launched the program in a few local government areas to add Albendazole for lymphatic filariasis.
in combination treatment.<br/>
<time begin="00:38:18.66"/>Now you're hitting two diseases.<br/>
<time begin="00:38:20.76"/>We grew to the entire oncho area by 2001,<br/>
<time begin="00:38:25.01"/>and then expanded up to 3 million treatments per<br/>
year to reach everyone for lymphatic filariasis<br/>
<time begin="00:38:31.37"/>in those other districts by the year 2003.<br/>
<time begin="00:38:35.77"/>And what happened was we moved from an<br/>
oncho platform to now a much broader,<br/>
<time begin="00:38:42.49"/>by the year 2003, lymphatic<br/>
filariasis platform.<br/>
<time begin="00:38:47.14"/>And LF became our platform program<br/>
with which to hang other activities.<br/>
<time begin="00:38:53.50"/>This is just a graphic which shows<br/>
how our treatments look through 2007.<br/>
<time begin="00:38:58.50"/>Combined LF and oncho treatments<br/>
<time begin="00:39:02.54"/>with Ivermectin and Albendazole.<br/>
<time begin="00:39:05.65"/>That was really pretty easy.<br/>
<time begin="00:39:07.90"/>Integration of lymphatic filariasis<br/>
with river blindness was fast and easy.<br/>
<time begin="00:39:12.85"/>And what we're trying to do, however,<br/>
is to eliminate lymphatic filariasis.<br/>
<time begin="00:39:19.72"/>The impact has been great.<br/>
<time begin="00:39:21.18"/>These are showing between the year 2000 and<br/>
the year 2004, the drop in our antigen tests,<br/>
<time begin="00:39:27.91"/>our infection rates in humans from 45% to 10%.<br/>
<time begin="00:39:32.03"/>Our infection rate of the parasite<br/>
in mosquitos, from 5% to 1%.<br/>
<time begin="00:39:36.76"/>An analysis last year showed<br/>
this has gone down even further<br/>
to about half a percent infection rate in<br/>mosquitos and 5% infection rates in people.<br/>
<time begin="00:39:44.85"/>We're getting close to eliminating<br/>
this infection.<br/>
<time begin="00:39:48.88"/>And to come back to that original<br/>graphic, if you recall here's our oncho control arrow<br/>
<time begin="00:39:54.45"/>up at the the top which needs to go<br/>on forever.<br/>
<time begin="00:39:57.57"/>That's the red bar treatments that seem<br/>to have to keep marching on ad infinitum.
And here is our lymphatic filariasis platform which we hope will be able to stop our treatments in 2008 or 2009. And so when we talk about integrating programs we have to think about in two or three years what happened to our platform that we're integrating into. So a lot of people like to talk about the lymphatic filariasis and the onchocerciasis program since they both use this medicine Ivermectin as the twin programs, and they're easy to integrate. But actually when you think about one being an elimination program and one being a control program it gets a little bit more difficult. My daughter Alex is in the audience. She's a freshman at the UGA. This is a snail drawing she did when she was about 8. Let's talk a little bit about schistosomiasis. I think she wants to be an art major here at UGA. You can use that in your portfolio. I know you're getting together. Really, schistosomiasis is like Thing 1 and Thing 2. They're really quite different programs compared to what I have been showing you. Even though in 2007 we celebrated 1 million treatments with Praziquantel. Remember, we have to find money to buy these treatments. And it costs about $0.20 to treat a child with this medicine. And when you start talking about treating a million people, that becomes real money. So the integration of schisto with Praziquantel to the lymphatic filariasis and river blindness programs with Ivermectin/Albendazole has been problematic and it's been slow.
Getting at these kids is difficult. Now urinary schistosomiasis, our approach to urinary schistosomiasis has been relatively easy compared to the other form of schistosomiasis that occurs in Nigeria, intestinal schistosomiasis. In urinary schistosomiasis we can use what we call reagent dip stick. You just dip it into someone's urine, and even if it's not grossly bloody it will turn colors to indicate there's blood in the urine, which in this case is basically synonymous with infection with schistosomiasis. So we can use this to map. We also can use this to evaluate the program, and we know that within two years of treating kids with Praziquantel the blood in the urine drops dramatically. Take a look at these two sentinal villages. Mungkohot and Timjim, which started off here in Timjim with about 50% of kids infected or with blood in their urine. Here in Mungkohot, 80% with blood in their urine. These are the 95% confidence intervals. And within two years these numbers had dropped to well below 10%. Dramatic impact. But intestinal schistosomiasis is much more difficult. Because to get at that, to be able to map that we have to collect stools. You have to go and ask kids to go defecate and bring their feces back to you. Then you have to carry them back to the lab in a short period of time. You go through a very smelly procedure of preparing what we call a Kato-Katz test, and then you have to look at these under the microscope a few inches from your nose.
Now a big development last year was the first big donation by another Merck, E. Merck, of Praziquantel. And this was a really big development where E. Merck said they would give the World Health Organization 200 million tablets over a 10-year period to promote the use or the control of schistosomiasis. And at our Nigeria program review in 2007, the World Health representative here at the opening session pledged 1.5 million tablets of Praziquantel to Carter Center assisted programs in Nigeria, beginning this year. It's to be targeted at school-age kids. And the tablets are now in the Port of Lagos and we're working to get them out and start our activities. So that's a real breakthrough. Back in the year 2006 I wrote an article with colleagues about how difficult it was to integrate schistosomiasis with other mass drug programs. And the three points in that article were the challenges were the cost of Praziquantel, the cost of extra treatment rounds because at that point in time we could not give the Praziquantel together with the other medicines, so we had to make another trip to the villages for treatment. And then the cost of mapping. Well the cost of Praziquantel now in our situation in these areas has been solved. The cost of extra treatment rounds has also had a major development. There have been some studies looking at the pharmacological-kinetics, the drug-drug interaction of Praziquantel with the other medicines Ivermectin and Albendazole, and it's been discovered that these medicines can be given together. There's no danger in giving
these medicines together.

And just in 2008 there’s a report of what we call triple drug administration,

triple co-administration of these three drugs in Zanzibar.

Over 700,000 people safely treated.

And indeed in Nigeria last year, we did a smaller study, in 5,000 people, safely administering three drugs without any problems.

That study is now in press.

So we can treat all three diseases at the same time.

It’s a lot of pills.

These are the tablets that a tall individual would have to take.

What you're seeing here is you would have to swallow five Praziquantel tablets,

four Mectizan tablets, and one Albendazole tablet.

It's a handful of medicines.

But it is solving our issue of extra treatment rounds.

What about the costs of mapping.

Well, the WHO approach to mapping uses children as what we call indicator groups to decide what you need to do.

In other words, you would go to a village, you’d go to a school,

you get a bunch of kids together, and you would test them for either urinary or intestinal schistosomiasis.

And if 50% of the kids were infected you would need to go and treat the entire population.

And if 20 to 49% of those kids that tested were infected you would only need to treat all the school-age kids in that community.

If less than 20% were infected you would not do a mass drug administration in that program.

Imagine, one out of five kids infected you wouldn’t do a mass drug administration.

But those were the guidelines.

And this is a graphic that summarized
testing of 22,000 kids in 747 villages.<br/>
A big effort to look at dip sticks in the urine.<br/>
How many kids had blood in the urine, how many communities would warrant treatment.<br/>
And it works out like this.<br/>
Of 747 communities tested, about half of those require some sort of mass treatment with Praziquantel.<br/>
And of that group, two-thirds required just treating school children and one-third require us treating the entire community.<br/>
It becomes very complicated and when you start mapping this out on top of our platforms, as I showed you before, the map gets even more complicated. As we try and move this program along, But what kept me up at night was wondering about intestinal schistosomiasis which we can't test for.<br/>
And we're running around and we've said, oh, well half of the villages don't need Praziquantel because they don't have urinary schistosomiasis.<br/>
And the question was, well, how many of those villages we're not treating really should be treated with Praziquantel?<br/>
because they have the other form of schistosomiasis.<br/>
So in a very important study we did in 2006 done by Dr. Julie Gutman an infectious disease fellow at Emory,<br/>
she looked at what we called missed treatment opportunities for intestinal schistosomiasis, which we call schistosomiasis mansoni.<br/>
And this is what she did.<br/>
She looked at the group of communities circled here which we'd been to, we assessed,<br/>
and we said they don't need schisto treatment because they don't have urinary schistosomiasis.<br/>
And she sampled a number of villages from this group.<br/>
And she tested 924 kids. Here are some kids coming, carrying
their stool<br/>
specimens on their heads from the night before.<br/>
<time begin="00:48:38.56">And lo and behold, she found that 25%</time><br/>
<time begin="00:48:41.03">of these kids had intestinal<br/>
schistosomiasis that were not being treated.<br/>
<time begin="00:48:45.02">And if we looked by WHO guidelines<br/>
the community level using these kids<br/>
<time begin="00:48:50.33">as an indicator group, of the 50%<br/>
of communities not needing treatment<br/>
<time begin="00:48:54.90">for urinary schistosomiasis,<br/>
over half of those needed<br/>
<time begin="00:48:58.50">to be treated for intestinal<br/>
schistosomiasis.<br/>
<time begin="00:49:00.58">So we're running around doing all this mapping,<br/>
which overall 80% of the communities needed<br/>
<time begin="00:49:05.39">to be treated for some form of<br/>
schistosomiasis.<br/>
<time begin="00:49:08.14">And my question is why are we spending<br/>
this money and why are we doing this.<br/>
<time begin="00:49:11.19">Why don't we just treat everybody.<br/>
<time begin="00:49:13.78">So the cost of mapping is<br/>
also falling off of our list<br/>
<time begin="00:49:17.44">and we're moving toward a much broader<br/>
treatment program for schistosomiasis.<br/>
<time begin="00:49:21.98">And we've got new ideas now for new<br/>
in 2008, or to quote Ralph Waldo Emerson,<br/>
<time begin="00:49:28.70">we need to simplify, simplify, simplify.<br/>
<time begin="00:49:32.28">So we're using our new donation this<br/>
year to treat all school-age kids<br/>
<time begin="00:49:37.65">in plateau and Nasarawa.<br/>
<time begin="00:49:39.82">We're going to use triple drug<br/>
administration.<br/>
<time begin="00:49:42.87">That means we'll give all<br/>
three medicines at once.<br/>
<time begin="00:49:45.29">But only to the school-age kids<br/>
will they get Praziquantel.<br/>
<time begin="00:49:48.20">So they won't have too much of a<br/>
handful.<br/>
<time begin="00:49:49.91">It will be two extra tablets.<br/>
<time begin="00:49:53.04">We'll get it done in a single round,<br/>
we'll be less focused on mapping results,<br/>
<time begin="00:49:57.38">and we'll forgo community-wide<br/>
treatment with Praziquantel.<br/>
<time begin="00:50:00.62">Now we're only focusing on kids<br/>
in our mass treatment program.<br/>
<time begin="00:50:06.01">This is a curve of how our<br/>
have looked since 1999 with Praziquantel.<br/>
<time begin="00:50:11.71">At most 200,000 treatments per year.
And this is what we're going to do this year. We're aiming to treat a million, and this is a big challenge.

The medicine's in the port, and we're going start doing this very soon.

Let me conclude on my Nigeria piece.

Integrating LF and river blindness programs at the district level was comparatively easy. LF took over from the river blindness as a platform program due to its size. But this elimination strategy will mean we'll lose the platform sometime in 2008, and what will we do, woe is us if that happens.

Conclusions related to river blindness.

Well, the integration was difficult because Praziquantel was not donated, it cost a lot of money. We had to do a lot of assessments. The mapping took a long time. Some communities were don't treat, some were treat everyone, some were treat just school-age children.

It really complicated our lives. And the delivery of Praziquantel had to be as a separate dose. And now we've gotten around all of that and we're going for 1 million treatments in 2008.

Let me try to wind up with some of the future challenges. We talked a lot about bundling and neglected diseases, but grass roots services is a key element that I didn't talk about. And I wanted to point out the way we do this is through fostering partnerships at the community level and using community volunteers in these programs. It is those volunteers who are responsible for picking the medicine up at a central location and getting it to the end of the
This mobile distribution business is not sustainable. What's sustainable is a community volunteer with a Chinese bicycle. And I think you can imagine that when infrastructure looks like this and your pergero stops at that bridge, you can imagine the volunteer, he or she picking up her bicycle and foraging that stream, getting on and carrying on with the tablets for the community. That means people really have to understand what this is about. They not only have to buy in but they have to understand how to direct these programs and get the medicines out in a safe and effective manner. This is community-based, not facility-based. We're not looking for outreach from local health centers. Community people are doing this. And to quote Mark Twain, that's the difference between government and individuals. Governments don't care, individuals do. And our focus has been on the very strong traditional kinship clan system to distribute medicines to family and blood relatives. This is something that in these traditional systems is an obligation when people are convinced that this is important to their health. It's a joyful obligation. And I've worked a lot with an anthropologist from Uganda Dr. Moses Katabarwa in developing this distribution system where we found very closely that the communities that tended to succeed in distribution of these medicines are those based on blood relationships and blood distribution systems. And the ones that don't are the ones that don't take advantage of those great African systems. Well now we're in the midst of a new Bill and
Melinda Gates Foundation grant on integration.<br/>
The Bill and Melinda Gates Foundation<br/>wants us to cost all of this out.<br/>That whole DALY thing.<br/>They're very interested in this hypothesis.<br/>Community-based disease control programs<br/>increase the effectiveness and reduce cost.<br/>Easing the strain on these horizontal public health systems of the African countries.<br/>Integration will improve health of as many people as possible at a cost that can be sustained for as long as necessary.<br/>Kind of a tough, testable hypothesis, but that's what we're in the midst of doing right now<br/>in collaboration with CDC and Emory economists.<br/>And we're also involved in using the same system to distribute long-lasting insecticidal bed nets because they are an injunctive tool to use against lymphatic filariasis as we try<br/>because mosquitos transmit that parasite.<br/>So treating as well as providing bed nets gives us two tools against that condition.<br/>The last thing we're going to look in to is<br/>going to be another drug donation program<br/>against trachoma, a blinding disease.<br/>This is a bacterium so I'm not going to talk about it.<br/>But Pfizer is donating a medicine called Azithromycin, which can in three rounds,<br/>three annual treatments if done right can probably eliminate blinding trachoma<br/>in these places.<br/>Well, so I've talked about bundling, I've talked about grass roots services, and we have journeyed to Africa.<br/>I want to thank a bunch of people, government, villages, University of Jos, CDC, Emory,
companies, Merck, GSK, and I hope soon E. Merck<br/>

When we get the medicine out of Lagos.<br/>

Praziquantel, Izumi, the Lions, the World Bank,<br/>

APOC, The African Programme for Oncho Control, APOC,<br/>

and I just wanted to give one,<br/>

two reflections for the students here about tropical diseases<br/>

as you climb the mountain toward your career.<br/>

Very important person in my medical school career, Dr. Ben Kean.<br/>

Great American tropical disease specialist said the following<br/>

in his article "Never Go Back the Way You Came.":<br/>

"When a student asks me today about going into<br/>
tropical medicine, I tell him or her this.<br/>

Decide what field you want to<br/>
go into, master the specialty.<br/>

Then when you go to the tropics you<br/>
can bring special knowledge with you.<br/>

The basis for eventual success in<br/>
tropical medicine is temporary restraint<br/>
of your enthusiasm."<br/>

We all know that you guys are very enthusiastic.<br/>

So to quote from another great<br/>
public health figure,<br/>

Dr. William Foege,<br/>

former director of CDC.<br/>

I encourage you all while you're tempering your enthusiasms in studying<br/>

to don't forget to be globalists.<br/>

Be activists.<br/>

If you're looking at science,<br/>

try to be practical scientists.<br/>

Look for simple solutions.<br/>

Be confident and be focused.<br/>

It has great rewards, like these chickens that I routinely get in Nigeria.<br/>

So it was a great pleasure to come here.<br/>

I'm really pleased that my daughter is a bulldog and maybe I'm a bulldog, too.<br/>

And congratulations, and thank you very much.<br/>

[ Applause ]