



Transcript provided by kaisernetwork.org, a free service of the Kaiser Family Foundation¹
(Tip: Click on the binocular icon to search this document)

**38th Union World Conference on Lung Health
Plenary Session 2: Strengthening Laboratory Services for
Today and Tomorrow
November 11, 2007**

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

[START RECORDING]

MARIA FREIRE, PH.D.: There's plenty of seats up here in the front so if you would just—very well. Why don't we go ahead and get started then. Good morning ladies and gentlemen and I'm pleased to welcome you to this symposium. My name is Maria Freire and I'm the CEO of the Global Alliance for TB Drug Development. And I chair the working group on new drugs for the Stop TB Partnership.

It is my honor to introduce to you today, our keynote speaker, Doctor Peter Small. His presentation is entitled Strengthening Laboratory Services for Today and Tomorrow. Doctor Small is a Senior Program Officer for Tuberculosis at the Bill and Melinda Gates Foundation. In this role he is responsible for the development and implementation of the foundations tuberculosis activities. He received is Bachelor Degree in Chemistry from Princeton University, his Medical Doctor Degree from the University of Florida and trained in internal medicine at the University of California in San Francisco.

Prior to coming to the Bill and Melinda Gates Foundation, Doctor Small was in the faculty of Stanford University in the Division of Infectious Disease and Geographic Medicine. In this post he was actively involved in research, teaching and on patient care. For over a decade the central theme of his research has been the nature and consequences of

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

genetic variability within microbacteria in tuberculosis. Doctor Small's original research has taken him to Africa, Asia, Latin America and Europe and has given him the opportunity to bring together teams of basic scientists, public health officials and clinicians. His work couples new molecular biology tools with epidemiology allowing him to address pragmatic questions about tuberculosis control.

Some of you may not know that Peter is an accomplished scuba diver. And I'd like to think that this is a good analogy for the way he addresses problems. You see, Peter likes to go beneath the surface and get a different perspective. I guess, Peter, we can say that you like to take an in-depth perspective to things. In doing so, he challenges some, unsettles others but inevitably he helps us to find clever ways to chart new innovative paths. This is evident in his work at the Gates Foundation. From this perch, he has been instrumental in garnering a \$900 million commitment for the tuberculosis program, an unprecedented sum of money to develop new diagnostics, prophylactics and therapeutics for TB.

Peter has a keen interest in the translation of scientific advances into tools that can improve human health. Those who have worked with Peter know that he's a meticulous thinker, a systematic scientist and a committed colleague in the fight against tuberculosis. Ladies and gentlemen, please join me in welcoming Doctor Peter Small. [Applause]

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

PETER SMALL, M.D.: Thank you Maria. I've attended this conference many times but the last time the I gave the Plenary Address was about nine years ago in my past life as a scientist. It's a funny activity to look back on your own words with the perspective of time. Predictions are particularly dangerous. For example I predicted that in the time between this year, that year and today that DNA microrays would identify microbacterial genes of diagnostic utility that industrial partners would capitalize on this knowledge to design new reagents and that a salivary dipstick would replace the tuberculin skin test. I also predicted that latency would be understood as a distinct spore-like condition leading to rational advances in drug design and candidate drugs that would rapidly kill latent bacilli. And I predicted that scientific and political consensus would be reached that eradication is achievable.

The impression one gets in reviewing these predictions is one of naivety. How hopeful and wide-eyed I was. So should the substantial failure of any of these predictions to become reality embarrass me? No. It should embarrass all of us because everyday that we fail to realize these and many other sought after advances is the day in which we lose more ground to disease that infects someone every second, kills four people every minute. In the hour that we'll spend in this session

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

more than 200 people will die of tuberculosis. There is no more compelling measure of the urgency of our work.

The root of this epidemic is at its core, a failure to diagnose. In his Nobel lecture delivered in 1905, Robert Koch spoke of the need to know who had the disease. And his words, "The starting-point in the fight against all contagious diseases is the obligation to report because without this most cases of the disease remain unknown... it is not just a question of considerations applying to the sick here but also of the protection of the healthy..." Robert Koch got it. You can't protect the health of the public if you can't diagnose the disease.

But Koch went beyond that. Though his fame came in identifying the bacterium much of his Nobel lecture was not about the pathogen but what our understanding of the biology demanded of society. He called for, and I quote, "...the establishment of centers where the patient's sputum is examined without cost for tubercle bacilli. These could exist independently, or, what is perhaps more practical, in association with hospitals, policlinics, or with social-welfare centers...". And I would argue that in that sense Doctor Koch was an early proponent of health system strengthening.

In the 100 years between then and now our understanding of the disease has advanced to point that tuberculosis is now preventable and curable. But this voice from 100 years ago

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

makes completely clear our challenge today. We need to strengthen health systems so they may diagnose and treat tuberculosis. This disarmingly simple formula presents a formidable challenge because the reality is that our dysfunctional health systems labor with antiquated and inadequate diagnostic tests. The facts are familiar to all of you. We still rely on the microscopic examination of sputum, a 125 year old method that detects roughly half of the cases in the best of circumstances. Even fewer of those infected with HIV and is fundamentally worthless for diagnosing children. Of the 22 countries with the highest TB burden, most have fewer than three laboratories in their entire national lab systems that can perform drug susceptibility testing.

So as a result of these inadequate tools and systems, only a quarter of the TB cases in the world are ever really diagnosed and reported. And fewer than five percent of those with drug resistant disease are ever identified. The sad reality is that delayed and erroneous diagnosis is the rule, not the exception. Certainly we all understand that from a programmatic perspective there is great peril in initiating therapy if we can't assure treatment completion. But somehow that legitimate and understandable concern has gotten perverted into an illegitimate and incomprehensive complacency about not diagnosing patients. And there is no downside to an accurate

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

diagnosis. As I'll mention in a moment, the only risk is that we'll see that we have further to go than we'd like to admit.

Reducing the diagnostic uncertainty that plagues our world requires that we develop better diagnostic technologies and strengthen our health systems to get existing tools to those who need them. Weak health systems are the pathogens greatest ally. But what makes for a strong health system? It's actually fairly easy to articulate. It has been done by the strategic and technical advisory group. It is only six things.

First of all, strong systems start with strong leadership in governments. That means having a strong capacity for health policy analysis and coordination between the entities that are responsible for planning, implementation, regulation and enforcement. Two, strong systems need real financing, especially financing that helps to eliminate access barriers and it comes with genuine accountability. Strong systems need a strong work force. That means a well-trained, well-supervised and fairly compensated universe of health care workers. Four, strong systems have appropriate technologies. They have the ability to procure and distribute essential drugs, diagnostics tests, reagents and equipment. Five, strong systems operate off of good information. This means having systems in place to collect vital statistics, having data on disease burden, patterns of health care utilization and the

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

ability to analyze these data. And finally, strong systems have mechanisms for health service delivery. Just as physicians were once admonished to heal thyself too few health systems know thyself. Strong health systems need to know the number, the expertise and the geographical distribution of their health providers.

Practice health system strengthening, it's a complicated task and it's one where it's not easy to wrap our minds or our budgets around specifically what needs to be done. However I would argue that in strengthening a health system, the lab system is an ideal point of entry. Lab systems and the diagnostic role they play make up a small percentage of health system's budgets, approximately three percent overall. But that three percent guides the vast majority of spending so that strengthening lab systems is a good investment and a great first step. If we do not make progress in strengthening health and laboratory systems our progress against tuberculosis will stall. In fact, there's evidence that tuberculosis control is already stalling.

Consider the all too typical scenario in the cycle of delayed diagnosis and disease propagation. A young woman begins coughing in any one of a dozen countries. It's just a cough and she's pretty far from a medical clinic so she does nothing or goes to a local pharmacist. When the symptoms continue she finally goes to a medical clinic where she's

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

probably misdiagnosed and treated for bronchitis or malaria. If she persists she will eventually be asked to submit three sputum specimens. Stated differently, she will have been ill for months before getting a test that may well be wrong.

In Malawi more than a third of smear-negative patients make more than six visits to a health center before being started on therapy. If this one's HIV positive, she may die before she ever gets her diagnosis. Again, in Malawi fully half of TB suspects in whom a diagnosis was not readily made died under investigation. And, Tony, I'm not just picking on Malawi here. Autopsy studies from South Africa, Ivory Coast, Botswana, the Democratic Republic of Congo, Kenya and India have all revealed tuberculosis as the leading cause of death in patients dying with HIV infection. The tragic reality for these people is that in the context of HIV the failure to be diagnosed rapidly is all too often a death sentence.

However even in the best case scenario, a correct diagnosis leading to treatment, it will generally have been months, months since the coughing began. And by the time treatment renders her non-infectious she will have already infected friends, coworkers, neighbors and loved ones. We actually have an expression for this in the United States. It's called closing the barn door after the horses are out.

This scenario or one like it is repeated millions of times each year. From this perspective is it any surprise that

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

we're seeing increasing evidence that TB control is stalling? There are numerous examples of stalling TB control. One is Vietnam, a country with one of the world's best tuberculosis control programs. They have exceeded the targets for case detection and treatment for nearly a decade and yet they have seen no improvement in case notification rates. The same is true for several states in India.

The tuberculosis community is a polite one. We rightfully brag about treating 26 million people with DOTS between 1994 and 2005. We focus on the observation that the global incidence rate is declining. However we would prefer not to mention that prevalence and mortality are not being reduced quickly enough to meet the millennium development goals by 2015. And virtually none of us acknowledge that this slow rate in decline of TB is swamped by the rate of growth in the human population so that the actual number of people with tuberculosis, the only statistic that really matters, is increasing year after year after year.

Creastist consortium of investigators, health care providers, government industry and policy makers are conducting large-scale community randomized TB trials in South Africa and Zambia. It's a multi-year trial to see whether they can truly provide a package of diagnostics and intervention that promptly identifies those with disease and prevents disease in those who are infected. Although it's in the early stages I was shocked

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

to learn that in some of the communities they are surveying that the TB prevalence rates are two percent. Again the only risk of improved diagnosis is that we'll know in better detail the extent of the challenges we face.

We are polite and thought it may be considered impolite to point out shortcomings, I contend that how far we have come means little without a candid assessment of how much farther we have to go.

A hallmark of the global efforts to control tuberculosis is therapeutic rigor. Now more than ever we need a culture of diagnostic certainty. A clear diagnosis empowers health ministers to allocate resources effectively, health care practitioners to deliver care and patients to demand the life saving therapy they deserve. Misdiagnosis results in misallocation, malpractice and death. This is especially true when it comes to tuberculosis, tuberculosis HIV and multi-drug and extensively drug resistant tuberculosis.

A couple of years ago several colleagues and I conducted a modeling exercise that showed the theoretical gains assuming zero advances in treatment that could come from improved diagnostics. We concluded that a rapid diagnostic test for TB requiring no laboratory infrastructure with 97 percent specificity and at least 85 percent sensitivity could save roughly 400,000 lives annually or reduce the global TB mortality by one fifth. That's what we could do in the future

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

with a better test. And fortunately there's some exciting advances coming down the pipeline. Already the WHO has endorsed the use of liquid cultures in reference labs which is much more sensitive than microscopy and quicker than conventional solid media.

For the peripheral lab we're close to having light emitting diode fluorescent microscopes. This incremental improvement will cost no more than a light microscope and enables the same people in the same labs to improve their diagnostic accuracy by 10 percent and significantly increases their throughput. If the fluorescent microscope is an incremental improvement, the transformation improvement is the potential for DNA detection such as the lamp technology being developed by Find and Ichen [misspelled?].

Robert Koch stunned onlookers by using staining reagents to allow people to look through a microscope and see tuberculosis. Reports from the time were that his audience were left stunned and silent looking at the face of this killer. With DNA detection, we'll go beyond seeing the face of the killer. We'll actually be able to read its playbook. And in observing the language of life itself we'll have a dramatic new opportunity to save lives.

The pipeline for point of care diagnostics is less promising. And the cause of this thin pipeline is a lack of fundamental biological understanding. Here is where we need

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

partnerships between basic researchers and clinicians to find answers to questions that have lingered for decades. What are the host a pathogen markers of infection, active disease, cure and protection? Answering these questions requires a higher degree of collaboration than ever before. The best scientists with the most sophisticated laboratories working hand in hand with astute clinicians in endemic field sites. We need an entire globalized network of such connections from the bench to the bush and back again.

An equally important result of the modeling paper that we wrote a couple of years ago was what it says about the progress that could be made by strengthening health systems to deliver existing diagnostic tests. The model showed that truly universal access to AFB microscopy would save about 133,000 lives annually. Stated another way if our health systems could really deliver the tools that we have today we would cut TB mortality by eight percent. I can think of no more compelling argument for laboratory capacity strengthening.

Better systems could save 133,000 lives next year. Better technology could save 400,000 lives each year in the future. To some that statement may seem as if it requires a decision. Which path do we take? And what is Peter saying? A decade ago he was here talking about better tests. Now he's here advocating for stronger health systems to deploy existing diagnostics.

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

What I'm saying is that false dichotomy. These two needs are not in competition with one another. They are totally synergistic. If we do a better job at delivering the existing tools we will save lives. That is certain. In so doing we will also be putting in place the infrastructure that is essential for the rapid adoption of the improved diagnostics of tomorrow. But to really use the tools we have better and to actually strengthen the health systems in advance of the introduction of new tools will require a shift in our thinking.

I'm sure that some of you are familiar with William Easterly's book, The White Man's Burden. In it he talks about the tragedy of third world poverty and notes that the fate of the world's poor is due as much to the ineffective efforts of those who care as it is to the inaction by those who are indifferent. He particularly takes aim at those he calls planners, the people who set goals, make regulations and envision systems. He reserves high praise for those he calls searchers, those who respond to actual needs, are driven by results and are accountable for what they accomplish.

Ours is traditionally a community of planners. DOTS as a classic planner approach to TB, it's centrally driven, Geneva driven, Paris driven, the Hague driven, Washington D.C. driven, dare I say Seattle, Washington driven. It told us the five things we needed to do to control tuberculosis.

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

I'm not nearly as down on planners as Easterly. Especially when it comes to TB, planning has set the standard. DOTS has successfully treated more than 26 million individuals worldwide and in places where it is done well TB rates are drifting down and we don't see high rates of drug resistance. And there is a clear role for standards in scaling up lab strengthening.

But planning is not the only path forward. DOTS has established what is essential but not what is sufficient. It is now clear that our current approach to TB control has its limitations, especially among people living with AIDS, those with MDRTB, migrants, nomads and isolated populations. To address these kind of problems we need to continue to reach out to searchers for DOT searching strategy ourselves. We need to realize that the big answer is that there is no big answer. To restate the obvious one size does not fit all. We need to be open to innovation, to embracing an attitude that's based less on protocols and more of anything that works, works for us.

Let me share an example of what that means in practice. Many of you know Mario Raviglione. Recently Mario visited a mission belonging to the Arch Diocese of the Bishop of Swaziland. It's in the middle of the low-val, the arid bush of the eastern part of the country about 100 kilometers from the nearest city, the last 25 of which are down a rutted dirt road. Using funds provided by parishioners in the United States and

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

Australia, they provide HIV and TB treatment. In administering care they provide drugs in weekly amounts or for those who need daily visits or are just starting on their anti-retrovirals the sisters' travel to their homes. When you see Mario's photos—I'm sure I'll show them to you if you ask—you realize that this is one of the many frontiers on which our battle is fought, rural places with widely dispersed populations. And you see that what works here are programs that recognize and react with realities on the ground. Service integration isn't a policy, it's a necessity. Faith based TB and HIV communities are one in the same. There is no distinction between community and home-based care. And by recognizing the necessities and the opportunities, these sisters are achieving the types of results in that one place that we need to achieve every place.

Health systems are more than the pyramid of publicly owned facilities. It's a complicated network of private, informal and faith-based institutions. All of these organizations and the effected communities themselves need to be engaged and strengthened so that we can save 133,000 more lives next year and 400,000 lives each year in the future.

There is incredible knowledge and promise in this room and here at this conference. How much that promise translates into progress depends on the mindset we adopt as we leave. I began my remarks by mentioning my past life as an academic. And it's lessons from that past life that I believe can offer

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

some guidance as we face our present challenges. I became involved in TB research during it's resurgence in the United States in the early 1990s. The prevailing wisdom was that the epidemiology was driven by HIV induced reactivation of latent infections that had been acquired in some other city or country, in short, transmission that occurred on somebody else's watch.

From molecular epidemiologic studies I and others showed that in some places that resurgence was due to unrecognized ongoing disease transmission among the medically underserved in the United States. We faced skepticism but ultimately we were able to reenergize and refocus TB control on this new set of facts, helping to turn the tides so that in the United States today TB rates are at historical lows.

There are two lessons that I took from that. The first is that you must face up to the realities of the problem and accept that they are likely to differ from place to place. The second was that getting to an effective response didn't stem from being complacent with a conventional wisdom about what was essential but rather embracing innovation to seek local solutions that are truly sufficient. Just as the sisters Mario visited in Swaziland recognized the realities they faced would dictate the care they delivered, this thinking should guide all of us, whatever our role in fighting TB. Whether we're here representing governments, non-governmental organizations,

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

product developers, effective communities, funders or implementers we all face the same challenge, to not simply do what has been done before but to ask if we would gain from doing more, to simultaneously be planners and searchers, to encourage innovation around you and to be open to it when you see it. For some of you that means seeking ways to get today's tools to more people. For others it means working to develop tools for tomorrow. And for all of us it means making sure health systems are strong enough to accommodate both. Above all we need to be willing to judge our own efforts and the efforts of others to encourage ambitious innovation, measure it's impact, be brave enough to abandon what doesn't work and aggressive enough to amplify what does.

Should I be embarrassed about the failure of my predictions in that keynote address I delivered nine years ago? No because more than reputations are at stake here, lives are. What is the message we are sending to our patients when we say we aspire to diagnose 70-percent of cases? It says you're a statistic. We'd like to increase the odds that you're a good statistic but we'll accept it if you're a bad one. I'm deeply proud to be working for a foundation whose sole guiding principle is that every life regardless of where that life is lived is of equal worth.

If I may paraphrase one of my bosses, Melinda Gates, when she spoke to the Malaria community recently, she argued

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

that low aspirations "...is just far too timid a goal for the age we're in. It's a waste of world's talent and intelligence and it is wrong and unfair to the people who are suffering from the disease." I'm also proud to be part of this community that has done an immense amount of good for a great many people and is dedicated to doing more. I'll be prouder still when we fulfill our true potential and in heeding Robert Koch's call of a century ago, leave it for scientists a century hence to look back on our work from the vantage point of a world without tuberculosis. Creating that world will require today's tools in more hands, tomorrow's in more still and a continued commitment to innovative thinking and pioneering action.

We are no longer voices in the wilderness as many of us once were. The world is becoming aware of tuberculosis, its prevalence and the toll it takes. Political will, popular desire for action, funding mechanisms, they are all in places never before. In this room is the power to harness that energy or stifle it. If we succeed in harnessing this energy we can make more progress than every before, perhaps even more than we ever thought possible. Thank you.

[Applause]

MARIA FREIRE, PH.D.: Thank you. Thank you very much Peter. Would anybody like to comment or ask a question of Doctor Small? He's kindly agreed to take some questions. And

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

if you do would you please come to the microscopes that are positioned in the middle of the [laughter].

RUTH MCNERNY: I'm based at Livingston Hygiene Topical Medicine. I doubt if most people are aware about this meeting that the Stop TB Working Group, the partnership on new diagnostics has a new structure and is now a subgroup on point of care diagnostics. I'm sorry. I'm getting a terrible echo. Can you hear me?

PETER SMALL, M.D.: Yes, I hear you.

RUTH MCNERNY: Good. And so this is just an ad basically. It's a partnership we want it to be broad. We know there's some very exciting new technologies out there but we need more funding. And I see one of the most important group roles of the partnership is to lever more funding. So I'm asking the help of everyone in this room. Let's go to NIH, let's go to the fund booths who've been funding beautiful academic research but don't really yet fund translational research. Please could we shift the money in the direction? This is risky. Some of the technologies may not work but we only need a few that do and we'll make progress. So please get in touch, build networks for everyone. Start nagging the funders. Start nagging your governments. Let's put the money to where it's going to make best use. Thank you.

PETER SMALL, M.D.: Ruth I think it's beautifully said and I would only make one minor modification and I think that

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

the issue with funders is not about shifting resources, it's about growing the pot. It's not that we can afford with the meager funding that we have for basic research to shift that into something else. It's time that research for all of the activities that are essential for our mission to be fully funded. I totally support that.

MARIA FREIRE, PH.D.: Absolutely. I couldn't echo that better. Peter you talked about innovation and the mindset that it will take. It seems to me that that's easier said than done. How do you transform? How do you create transformation while you're trying to get to patients, get care, make your unit survive? It's a hard thing to do.

PETER SMALL, M.D.: I'm sure it is and I'm quite sure that I can't make it happen. But I think that it's the people in this room that can make it happen because it's really this decentralized innovation of trying new things, measuring their impact and then amplifying what does that is really the opportunity of such a large and diverse group as is brought together at this meeting.

JOHN: Hi Peter, it's John. One I'd like to thank you for your support of laboratory system strengthening. Many people may have heard at this meeting the laboratory, or formerly known as the subgroup, we are proposing a global laboratory initiative. This is really a big challenge. Some of us still have to be planners to make this work. And this

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

really is trying to focus on how can we do this in an integrated way? What is that series of activities that really will try to meet this challenge of strengthening laboratories? But I'd like to thank you for stating this so eloquently.

PETER SMALL, M.D.: Thank you.

ALEX PINN: Alex Pinn, South Africa. Peter, can you share your predictions for nine years time with us now?

[Laughter]

PETER SMALL, M.D.: Well one thing I've learned in the last nine years is to be cautious about one's predictions. No. I haven't any idea. I think that it is so dependant on what the people in this room and who share the vision of the people in this room do that it's absolutely impossible for me to make predictions about nine years hence. I think what's clearly going to happen is that there's ground swell of attention that global health and TB is getting is going to fundamentally change the trajectory of our accomplishments to date. I think that there are lots of tactical strategic issues along the way in terms of how we articulate and how we achieve those goals. But I'm also quite confident that the predictions I made nine years ago will in fact come true because I have a profound faith in the power of science and technology to change our lives.

PETER DAVIS: Peter Davis. I'm looking through this microscope but I can't see any bugs at the end. That was a

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

lovely manor prop, thanks Maria for that. Peter, that was a wonderful talk but there was one quote right at the beginning which really summed it all up and that was you said something like the cause or the root cause of this epidemic is a failure in diagnosis. Would that be fair?

PETER SMALL, M.D.: That's true.

PETER DAVIS: Because I've always been thinking, well maybe it's a failure of treatment. Maybe it's a failure of society to equip people with enough immunology-immunity through better housing and so on. But you've come right down and said its diagnostics which we've got to be spending our money on in the next decade or so. Does that mean that you want to divert from new drugs, from vaccines because we can't do everything all at once?

PETER SMALL, M.D.: Why? [Applause]

PETER DAVIS: Could we do everything all at once?

PETER SMALL, M.D.: I think we have to. I think that this gets to the ambition issue. Why are we sitting in this room talking about what program are we going to cut so that we can actually go to scale with a program that's important? I think it's time that we all just change our ambitions and our attitudes and say that we actually absolutely, definitely need a new drug, a new diagnostic, a new vaccine, stronger lab health systems. We need to better deliver all the care. It's all of this stuff that needs to happen and I don't know why we

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

should settle for less than enough resources to do it all because that's what it's going to take.[Applause]

PETER DAVIS: I quite agree. I just wanted you to say that. Thanks. [Laughter]

MARK BERGEN: Hi this is Mark Bergen from Find. I'd like to take up the challenge of making some predictions for nine years hence. I predict that we will have microscopy methods that will be simpler and more sensitive than existing microscopy methods. They will have molecular methods that can diagnose TB quickly and relatively easily exist at levels of the health system that are substantially than we can currently do molecular testing, even at the microscopy level. And that we will have—be easily able to detect drug resistance with molecular methods that do not require DSL three or other safety level training conditions. And that these technologies will all be developed, evaluated and of proven efficacy and be available for use.

Now what I can't predict is whether or not the partnerships that we are forming now will be strong enough that those technologies will be rolled out and available for people all around the world and accessible in new ways that will make these 400,000 lives savable and the short-term. And that's what we need to focus on.

PETER SMALL, M.D.: Thank you.

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

MARIA FREIRE, PH.D.: Peter I want to push maybe not a prediction but I'm going to take the last few minutes to ask if you if you could draw the picture if I'm a patient in 2018, how would I be treated? Where would I go? How would diagnostics be different and what would I do about my children? Paint me a picture. Paint me a picture.

PETER SMALL, M.D.: [Interposing] well you know, I don't think, yes, I don't think I can paint a picture because what we're really talking about is embracing the full diversity of the world so that we have to I think get beyond thinking of a patient, a test and start recognizing that we're talking about nine million patients in equally many different settings. And that if that patient is in an urban setting that they will have a very different experience than if they're in a Vetoin [misspelled?] Tribe. But regardless the common theme for all of them will be that the same sense of therapeutic rigor that they can get now when they're at a DOTS center would extend to a sense of diagnostic certainty so that they know that when they leave that health setting that if they're told that it's not TB it in fact is not TB. And if they're told that it is TB they'll know that it's drug sensitive or resistant and they'll be on the right therapy. So I think the only common theme that I'd like to harp on is this issue of diagnostic certainty.

MARIA FREIRE, PH.D.: Perfect, any other questions or thoughts? Thank you Peter very, very much. [Applause]

¹ kaisernetwork.org makes every effort to ensure the accuracy of written transcripts, but due to the nature of transcribing recorded material and the deadlines involved, they may contain errors or incomplete content. We apologize for any inaccuracies.

[END RECORDING]