



Transcript provided by kaisernetwork.org, a free service of the Kaiser Family Foundation<sup>1</sup>  
(Tip: Click on the binocular icon to search this document)

---

**4th IAS Conference on  
HIV Pathogenesis, Treatment and Prevention  
Official Daily Press Conference  
International AIDS Society and  
Australasian Society for HIV Medicine  
July 25, 2007**

---

<sup>1</sup> 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]

**CRAIG MCCLURE:** Good morning everyone. And just as a reminder again, please silence your phones for the duration of the press conference. I'm Craig McClure, Executive Director of IAS. And on behalf of IAS and our local partner, ASHM, welcome to today's plenary press conference. This is the final but full day of IAS 2007. It's been an amazing conference, notable for a number of scientific developments across the three tracks that include of course new treatments that will offer people living with HIV/AIDS and their clinicians greater options now and in the future. At today's plenary and later in an oral abstract session, we'll specifically about developments in the area of pediatric AIDS treatments that I think we all hope can help to change the way treatment in infants is handled. We've heard about current and forthcoming biomedical prevention strategies that we hope will add to the arsenal of tools that are currently available. And we've heard about latest developments in virology and pathogenesis; the cutting edge of gene therapy to develop new treatments. And finally, what's extremely exciting to me is that during our time over the last few days in Sydney, the IAS has received broad international support for the Sydney Declaration among scientists, clinicians, policy makers, and community advocates and leaders. And we really look forward to taking the declaration forward

<sup>1</sup> 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.

because a declaration is obviously just a piece of paper and what's important is to mobilize support and then to change the way that research is incorporated into HIV planning and human resources for research and the infrastructure for research can be scaled up in conjunction with scaling up existing treatments and prevention intervention.

I'm not trying to take away from today's full day of sessions. I just want to bring to your attention three special sessions today where late breaking research will be presented. We actually had to add two additional late breaking sessions to the program just a month ago at the last minute because there was so much exciting new data. And that will all be presented today.

This morning I'm pleased to introduce today's plenary speakers. First of all, Dr. Annette Sohn, who's Assistant Professor in the Division of Pediatric Infectious Diseases at the University of California San Francisco, but who is based in Ho Chi Min City, Vietnam, where she directs the Pediatric HIV Research Program in collaboration with local partners. I'll turn to you Dr. Sohn.

**ANNETTE SOHN, M.D.:** Thank you. I've prepared a few comments based on my presentation this morning. So for those of you who were there, this will be a little bit of a repeat. But we'll emphasis the important, what I call, single

<sup>1</sup> 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.

overriding communications objectives [laughter] of my presentation. So of the approximately 2.3 million children with HIV around the world, 780,000 are in need of antiretroviral treatment. But only 15-percent of pediatric treatment need is being met. This is about half of overall global treatment coverage, which is about 28-percent. And the greatest disparity is in sub-Saharan Africa where children represent 14-percent of those who need ART but are only six-percent of those who receive it. For multi-center studies in Africa, we know that children under treatment there are older, sicker, and more likely to die than their adult counterparts. This is largely because we are not identifying more HIV positive women during pregnancy and we lack the ability to diagnose their infants. And so we don't know that they're infected until they're already very sick. By that time, it often is too late to prevent opportunistic infections and maximize the treatment benefits of antiretroviral therapy. Research presented at this and other recent conferences have increasingly proven that we are waiting too long to treat HIV positive children in resource limited settings. When we have the capacity to treat children, we are still splitting adult tablets into child size pieces. Although this has been effective, it is not optimal. Children need a wider variety of potent and well tolerated first and second line antiretroviral

<sup>1</sup> 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.

formulations. And they must be affordable for national programs to procure. We have limited data on antiretroviral resistance among children in resource limited settings. But what we see is concerning. If we want children to have the chance at a lifetime of treatment, pediatric providers need better access to laboratory monitoring tests, including viral load in order to effectively manage children. The parallel to these clinical efforts, we should recognize the impact that poverty, death, orphanhood, stigma, and violence have on a family's ability to care for their children. Providing social support for a child's family is as much a priority as the clinical interventions that we offer.

Finally, I would like to emphasize the importance of pediatric HIV research. Our prevention of mother to child transmission programs and pediatric antiretroviral therapy strategies have all been based on the results of studies and clinical trials. Research funding to develop the capacity of local investigators and build research infrastructures is urgently needed to help us provide the best possible care and treatment to children with HIV. Thank you.

**CRAIG MCCLURE:** Thank you, Dr. Sohn. Our second plenary speaker this morning is Dr. Ben Berkhout, Head of the laboratory of Experimental Virology at the University of Amsterdam. Dr. Berkhout is editor for the Journal of

<sup>1</sup> 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.

Biomedical Science, Retro Virology, and Journal of General Virology, and Associate Editor for several other journals. He's published over 250 peer reviewed manuscripts on diverse topics concerning HIV-1 replication, virus evolution, virus discover, new antiviral therapeutic strategies, and HIV-1 vaccine design. Dr. Berkhout.

**BEN BERKHOUT, PH.D.:** Yes, what I presented today is in part the work that we have built in Amsterdam and that's basically a very basic molecular theology research package in which we use virus evolution as a research strategy to caps new knowledge on mechanism of virus replication. And of course once you know these new mechanisms, but of course that takes many years time, you may think of new therapeutic strategies. So it's very fascinating to use virus evolution in that sense to really correct [inaudible]. One thing that I presented today is a study in which we discovered the in patients in the therapy and patients that fail on therapy, the virus is not only able to become resistant to the drugs that we use in the patients but actually another sort of striking and unexpected phenotype sometimes, this may a unique case, sometimes the virus becomes dependent on the drugs. So that's a little mindboggling. We have come further to actually work out how this works mechanistically, how does the virus become dependent on this work? And we know how that looks like in molecular

<sup>1</sup> 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.

details, which may not be interested in that. So that's about it.

**CRAIG MCCLURE:** Thank you. Dr. Nancy Padian, our third plenary presenter this morning is Director of the University of California, San Francisco Women's Global Health Imperative and Director of International Programs at the UCSF AIDS Research Institute. Dr. Padian's an internationally recognized expert in heterosexual transmission of HIV, only heterosexual, [laughter] I think transmission of HIV across the board, and has spent the last 17 years developing and directing a range of domestic and international research and intervention projects on sexually transmitted infections, HIV, and contraception in high risk populations. Welcome Dr. Padian.

**NANCY PADIAN, PH.D.:** Thanks. Thanks Craig. Craig actually did a very good job highlighting one of the first parts of my talk and that is simply going through a fairly quick review of various biomedical strategies that are on the horizon and whose results we should have soon. So we're excited about looking at the results of herpes suppressive therapy to prevent HIV. And two trials will be coming up with those results in the next couple of years. There's also about four or five trials of ongoing microbicides, where we'll be getting results in a similar timeframe. They're second generation microbicides that focus more on antiretrovirals or

<sup>1</sup> 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.

sort of vaginal prep if you will. Also, the prep studies that will be coming out, pre-exposure prophylactics, four or five trials there whose results we can be expecting in the next few years. I also wanted to put in a pitch that we can't forget the female condom, although there are no trials that I know of that are in the planning for that, nevertheless, there's some new interesting female condoms that I think really bear evaluation.

I then gave results of my own trial, which was one to look at the effect of diaphragms and lubricant in addition to male condoms versus male condoms alone. And both groups received intensive counseling, STD diagnosis and treatment, and condom promotion. So it's a very effective, what we knew best would work for prevention and then with the addition of the diaphragm. And sadly we did not see that the diaphragm conferred additional protection. I then spent some time in my talk, I'm an epidemiologist, so I'm always trying to figure out what's going behind the numbers, why that would be the case. And I think one of the major challenges is that it's hard to detect an effect of a modest intervention over and above a very effective prevention package. So one of the punch lines is that you need to promote that effective prevention package beyond the length of the trial. That's said, for the women who are most at risk, and that effective prevention package

<sup>1</sup> 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.

includes male condoms, who cannot get their male partners to use male condoms, it's still difficult to find a method that we are confident will work for them.

Another challenge in this research, all of prevention research is that we really I think have to stop thinking about the biomedical research and the behavioral research, behavior is integrally bound us in biomedical prevention technologies. And unless we do a better job understanding behavior, issues related to adherence, sexual behavior, and how you measure it, I think it's going to be difficult to really understand what's going on with biomedical prevention technologies. I ended with a plea, which I will also share with you. Not only should behavioral strategies be integrated with biomedical, but we can't forget other low tech strategies, for example, ones that look at gender empowerment, keeping girls in school, micro-financing, we need to have the funds and to prioritize that so we can evaluate those programs well because if those programs work, they will be ready tomorrow, whereas that's not the case for most research on vaccines and microbicides for example.

**CRAIG MCCLURE:** Thank you Dr. Padian. Okay, we'll open up for questions again. Please state your name and organization before your question.

**FEMALE SPEAKER:** Hi. I'm [inaudible] Grey. I'm a freelance writer. My question is for Dr. Padian; actually I

<sup>1</sup> 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.

have a couple of them. First of all, I'm not quite clear, what's the actual theoretical mechanism behind diaphragms as preventing transmission?

**NANCY PADIAN, PH.D.:** Great, great question. I mentioned briefly in my talk that there are actually characteristics that the cervix has in common with the foreskin. First of all there's more target receptors for HIV in cervix compared to the vagina. The cervix has a much thinner epithelium than the vagina. And it has what's called – it has epithelium that's easier to erode than the vagina. And most, I think it's fair to say, that most HIV virologists think that the primary site of entry for infection is the cervix. That is not to say that there is no infection in the vagina. But we were looking to see whether the diaphragm covering that could be protective. Now again, one of the points I made is that just because our results were null, we did not find that effect, I don't think we were able to adequately assess to verify whether in fact the cervix is the initial site of infection. But there's very good data to assume that it is.

**FEMALE SPEAKER:** So you haven't given up on that at this point?

**NANCY PADIAN, PH.D.:** I haven't.

**FEMALE SPEAKER:** Sorry, my second question is, of all of the biomedical techniques that you've mentioned, which do

<sup>1</sup> 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.

you personally think is the best bet at this point in time knowing what we know?

**NANCY PADIAN, PH.D.:** Do I have to answer it [laughter]?

**FEMALE SPEAKER:** Or which are your favorites?

**NANCY PADIAN, PH.D.:** I guess I would – it's hard for me to extricate that prep could be vaginal or oral. So if you think of it sort of generically as some sort of antiretroviral before exposure, either orally or vaginally, I have to say I think is the most helpful. But we have to sort out these issues of it. We will still be in a very difficult position to evaluate those unless we sort out these issues related to adherence. If people aren't going to use it, we won't know.

**INGRID BROWN:** Good morning. Ingrid Brown [misspelled?] from Jamaica. This question is for Dr. Padian. We're hearing some issues with the female condom. They're too large and uncomfortable. Can you expound a bit about the new female condoms.

**NANCY PADIAN, PH.D.:** Newer ones? Yes. The newer ones aren't as big and they aren't as noisy. And in fact one of them is sort like a capsule that you insert and then it sort of unfolds. They're easier to insert and they are smaller. So I think that as I say, I think they're worth – we have no choice. We have to pay attention to anything that can potentially

<sup>1</sup> 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.

prevent HIV. One point thought that cumbersome one, you know, some women do like that. So I mean, just because it does have a bad reputation, it will work for some women.

**INGRID BROWN:** I'm sorry; could you speak to the cost and the accessibility of the new ones?

**NANCY PADIAN, PH.D.:** You know, I don't know. The newer ones are really some of them are in very, very early stages of development. They're definitely are some acceptability studies with some of the newer products. And unfortunately I don't know those data. Sorry.

**NATE BRON:** Nate Bron [misspelled?], BBC. Can I just ask a follow-up on the diaphragm questions? Why is it do you think that the results haven't been as successful as you'd hope they would be?

**NANCY PADIAN, PH.D.:** I think, well there's sever hypotheses. One is it doesn't work. And maybe even though we feel confident that the cervix is really a hotspot for HIV, maybe that's wrong. Maybe we underestimated the significance of the vagina. I mean I think infection probably occurs at most site. Maybe we just were hedging our bets too much that so much occurred at the cervix. The other is, I think we had a difficult time – adherence was less than we had hoped for. But that may mean, not that mean, if that is the case and women aren't going to use it, then it's no good. Also as I said

<sup>1</sup> 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.

before, we did look at it in the context of a very effective prevention package that in and of itself I think had a significant effect. We did not anticipate that our condom use, we would have such high condom uptake. And we didn't anticipate we would have such low, not miserable low, but our adherence for the diaphragm was less than we expected. So it's a range of things from it just could not work and maybe we should never look at it again to trying to sort out what was really going on with the trial.

**CRAIG MCCLURE:** Just a follow-up to that, Nancy, I wonder if you could comment, we talk about the fact that HIV is already 100-percent or virtually 100-percent preventable with the tools that we have. And yet, there are many new, potential new prevention technologies. Can you comment about the huge challenges in doing new prevention technologies for [interposing]?

**NANCY PADIAN, PH.D.:** Well what I thought you were going to say, which I think is an excellent point that I myself get tripped up about, and that is on the one hand you have these amazing challenges with biomedical technologies, right? And there are many trials coming up with flat effects. On the other hand you're right, we know it works. And we know that counseling work, knowing your HIV status, condom promotion. So there's a little bit of a – it's too sort of, not extremes, but

<sup>1</sup> 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.

at two ends of the spectrum I'd say. So I think that we need to do better promoting what works. But we also need to be looking for these new methods because no one thing is going to be 100-percent. So even though we know those things work, they won't work for everyone. I mean some people can't get their male partner to negotiate male condoms. And I think certainly everyone would love to have a vaccine, which would be a slam dunk. So it's just, and I'm not sure if this - I may not have answered your question, Craig, but I think there are definitely methodological challenges in the biomedical. But meanwhile, we simultaneously have to be promoting what we know works and we can't wait to have the perfect biomedical solution.

**CRAIG MCCLURE:** Dr. Sohn, and please stand up if you have another question, otherwise I'll keep asking some [laughter]. Dr. Sohn, you outlined so eloquently and it's been a buzz at this conference and in the last couple of years, Toronto as well, the catastrophe, the shocking failure of us as a global community in delivering treatment and care to children. You mentioned that while there are many fixed dose simple combinations of drugs both brand name and generic drugs available now for adults that there are shockingly few for children. Can you comment a little bit more on that and what do you think is currently being done to address that problem and what needs to be done?

<sup>1</sup> 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.

**ANNETTE SOHN, M.D.:** So actually Charlie Jilts [misspelled?] of the WHO came up to me after the presentation and said that they are about to release a report, sometime in the next month I believe, that is based on the abstract that was presented at this conference by Shavon Crawlle [misspelled?] talking about different formulations, fixed dose combinations of two drugs for example, and lower dosages of certain antiretrovirals. And by presenting this report, saying that these are the optimal doses, they've actually been in contact with pharmaceutical manufactures in order to encourage them to develop drugs of that concentration or that fixed dose. And so he's quite hopeful that by releasing this report, more manufactures will follow suit. Some of you may know that Abbott just announced just a few days ago that they're submitting for marketing approval a lower dose of their drug Kaletra, the lopinavir/ritonavir combination. And because Kaletra cannot be crushed, it needs to be swallowed whole, small children cannot swallow the adult size of Kaletra. So by producing a half-size dose, small children will find that easier to swallow. It's also heat stable, so it doesn't need to be refrigerated. And that's the kind of drug that we need generic manufacturers to develop because although as you have also heard at this conference, there are pricing issues with how Abbott markets their product globally. And so we need more

<sup>1</sup> 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.

of the generic versions of the appropriate dose drugs. And hopefully we will start to see that in the coming years.

**CRAIG MCCLURE:** Okay, please.

**PATMA:** I'm Patma [misspelled?] from Science and Development Network in India. My question is for Dr. Sohn. Have there been any specific studies that address the issue of low birth weight and persistent malnutrition in babies in many parts of Asia and Africa? And how this would interact with these ART dose, I mean whether they would reduce the effects and whether the doses that are being recommended or fixed have factored this also?

**ANNETTE SOHN, M.D.:** Great. So this is an important issue. I think that the data that I presented from the Chapus-1 [misspelled?] sub-study in Zambia where they looked at the use of the sipla [misspelled?] product pedimmune [misspelled?] baby pedimmune junior or doing pharmacokinetic studies looking at toxicity outcomes as well. They were able to provide that drug to children as small as three kilograms. And those kids were moderate to severely malnourished. But the investigators mentioned as well that we only have a small proportion of the overall group of 64 kids was in that really the smallest weight range. They emphasized the need to continue observational studies on the children who have growth stunting for example or are very small. And we don't have yet any kind of a fixed dose

<sup>1</sup> 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.

combination for extremely small infants. This was part of the issue that for those small infants, for example under two kilos who need postnatal antiretrovirals, we still need to use syrup. And so not a lot of people have syrups, they have a pill that they crush. And so I think that we have a limitation both with the tools that we have, the antiretrovirals that we have as well as a lack of data. The WHO CD4H related thresholds are based on children over 12 months of age. And that's not an accident. Under 12 months of age, CD4 varies quite a bit. And those children are the most likely to progress and to die. So I think that we need to continue monitoring that carefully and doing more operational data on the programs that are in place.

**MEGAN:** Sorry, Megan [misspelled?]. Is there any long term data, and I know when you're talking about HIV/AIDS in infants, as you said, there's a huge mortality before age two. But is there actually any long term data on long term use of antiretroviral drugs in terms of impact on growth, development of immune system? Has there been any sort of field evidence, observational evidence, trial evidence on what it actually does when you put a child starting that young and how long their on it for?

**ANNETTE SOHN, M.D.:** Sure. I think that the data that looks at long term metabolic effects for example of antiretrovirals; we have a lot more data on that from the UK

<sup>1</sup> 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.

and the US. And we are seeing problems with osteoporosis and osteopenia in late teens and early twenties. But please remember, we've only had the – we've been living with the epidemic for about 25 years now. And we haven't had a – we didn't have antiretrovirals for a few years into that. So the children who have survived into that cohort, there's a small number of them, but they are alive, having their own children for example. There are reports on following this cohort. And the other thing to remember is that children are not a static group of patients. As they grow older, their adherence changes. They're needs change. So when you hit adolescence, we face a major, major problem with adherence in the United States and the UK, countries that have had more experience with those drugs.

**CRAIG MCCLURE:** You talked about in your talk this morning that shocked me was the occurring sort of durability, time period of durability of second line regimens, only a few months in infants. And yet I remember in Toronto at the closing ceremony, a young American woman who was born with HIV and been treated effectively and is now I think 18. So how would you interpret those really poor results that you've been seeing in lower income countries with the success in the developed world in the last 15 years and how we could shift one to the other.

<sup>1</sup> 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.

**ANNETTE SOHN, M.D.:** There was a poster by MSF during this conference, it's probably still up downstairs. And what shocked me was looking at the virologic suppression of the kids on treatment in their cohort compared to a poster sort of two doors down from Thailand. And so virologic suppression in this Uganda and MSF cohort at 12 months was about 60-percent. And it went down to about 30-percent or 33-percent at 24 months. And it was double that at 24 months in the Thai cohort. Why is that? And I think that many of us in this room know that there are a lot of issues related to social stability, poverty, war, gender, violence, civil war. You know, I think that these are important things that we have to consider that children do not again exist in a vacuum. They're not static in space and time. They are – the instability of their community, their family reflects directly upon them. And so in addition to not having the necessary drugs and tools, we're dealing with communities that have far more important priorities that they face than the health of the child in their family who generally is the least valuable member because they can't work. They can't generate income.

**CRAIG MCCLURE:** Go ahead.

**MALE SPEAKER:** Can I ask a question to Ben Berkhout? You said something that struck me as rather alarming; the virus becomes dependent on the drugs. A, is that as alarming as it

<sup>1</sup> 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.

sounds and B, what are the implications of that in terms of trying to create a vaccine?

**BEN BERKHOUT, PH.D.:** Well no it's too early to say that it's alarming. We have seen this in advance patients and effective if you think about it; of course it has some clinical elements because if you know that the virus is dependent on the drugs, the doctor may as well decide to stop the therapy or to switch to another therapy. Actually, if you think about it, at the population level, there is an interesting twist to this because if you know that drugs [inaudible] danger is of the worldwide use of drugs is that you will see the start of spreading of drug resistant viruses. Now a drug dependent virus, at least in theory, we haven't tested that of course would not be possible because the virus will not start in the recipient because the recipient is not using the antiviral drug. So that will be acute theoretical side effect of the drug dependent virus. Of course, if it's - the doctor would know that there is a drug dependent virus in the patient and he would stop the therapy, that virus variant will immediately stop replicating, but other archive viruses will commit again. So it's a difficult issue. But at a population level, it actually may have a positive twist. For vaccine development, I don't think it has an impact on that.

<sup>1</sup> 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.

**CRAIG MCCLURE:** Dr. Berkhout, you also talked about the kind of two step process that the virus undergoes to develop genetic mutations under pressure from antiretrovirals. Could you talk a little bit more about that and the potential implications?

**BEN BERKHOUT, PH.D.:** Yes, it's basically actually what Darwin proposed quite some time ago, even though in those days we didn't know about DNA interim [misspelled?]. But he proposed that evolution is driven by two things. Step one is the generation of variants and step two, the selection of the most fit variants. And those two principles, they also apply on the HIV-1 evolution. So sometimes there may be a virus variant that is super resistant and whatever. But if it is too difficult to make, you will not see it in a patient. Basically, but we have learned that in the practice of course, basically this underlies the success of the combination therapy because if you hit the virus with three drugs, you know, if it's one drug, it can probably become resistant to one drug because it needs only one or two mutations. If you use three drugs at the same time, the virus has to come out immediately with six or seven or eight mutations. And it simply cannot do that. So that's why combination therapy in most of the cases is durable and successful. And so this applies to the regular, to the drugs that are now regularly used in the clinic. It

<sup>1</sup> 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.

will also apply these principles to new therapies. So for instance, yesterday we heard about the gene therapy that is being developed by John Hossey [misspelled?], the RNA interference gene therapy. There the same principle holds. You can [inaudible] inhibition with one inhibitor. But then the virus will escape. So if you do this, you have to immediately come in with a mix of multiple inhibitors. And then you get durable inhibition at no escape.

**CRAIG MCCLURE:** Any further questions this morning?

Okay, before we finish, first of all I want to thank our plenary presenters from this morning. And before we finish, though it is a very full and final day today and there's a lot of exciting new data to be presented, this is the last official press conference that I'll be chairing. And I just wanted to take this opportunity to thank all of you for your engagement in the conference, all of you in the media. We've worked extremely hard in the last couple of years at the IAS to build up bigger and broader communications tools, both through the media, through our new website launched last month, the new IAS website, through our partnerships with Kaiser Network to webcast many more sessions than ever before, with clinical care options to follow and analyze the clinical session. Our abstracts now are entirely searchable going back to 2001 from every conference. We are really trying to move beyond one of

<sup>1</sup> 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.

three or five day conferences to a continuous cycle of sharing information and supporting people to access information about the science and about the other aspects of the response to HIV that are presented at our conferences. So please take advantage of those. Who did not – well I would like to thank Karen Bennett [misspelled?], our Communications Manager, who's run the media center this week along with the support of Michael Kessler [misspelled?] and Regina Aragorn [misspelled?], and Malory Smutz [misspelled?] and many, many others, the many volunteers in the media center, and so please join me in giving Karen a round of applause [applause]. Thank you.

[END RECORDING]