Evidence that Demands Action

Comparing Risk Avoidance and Risk Reduction Strategies for HIV Prevention

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TheMedicalInstitute

The Medical Institute for Sexual Health is a nonprofit medical, educational and policy-shaping organization founded in 1992 to confront the global epidemics of nonmarital pregnancy and sexually transmitted disease, including HIV/AIDS, with incisive healthcare data to dramatically improve the welfare of individuals and society.

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Executive Summary

Evidence That Demands Action: Comparing Risk Avoidance and Risk Reduction Strategies for HIV Prevention

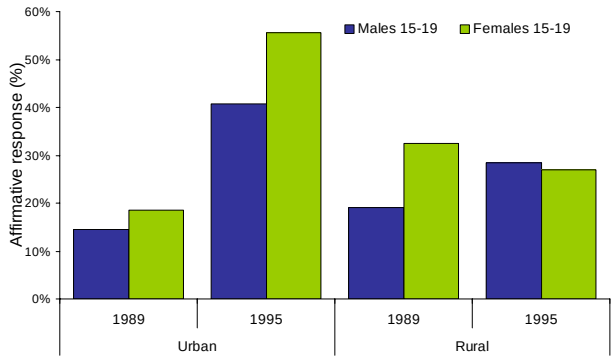
The Medical Institute for Sexual Health hosted a briefing for the Honorable Randall Tobias, Global AIDS Coordinator, Department of State, in Washington, DC on January 8, 2004. In this briefing, entitled "Scientific Evidence for ABC: Addressing the HIV/AIDS Pandemic," three world-renowned AIDS researchers ─ Edward C. Green, PhD; Rand Stoneburner, MD, MPH; and Norm Hearst, MD, MPH ─ presented evidence on the effectiveness of several HIV prevention strategies, including the "**ABC**" model developed in Uganda. **ABC** stands for **A**bstain, **B**e faithful, or use **C**ondoms if **A** and **B** are not practiced. All three presenters compared the **ABC** intervention to those based on condom promotion and distribution. Their findings have been adapted and are now available in a scientific monograph published by The Medical Institute – *Evidence That Demands Action: Comparing Risk Avoidance and Risk Reduction Strategies for HIV Prevention* (www.medinstitute.org). This monograph provides compelling evidence for the value of HIV prevention strategies based primarily on risk avoidance and secondarily on risk reduction for the areas of the world most severely affected by the HIV pandemic.

Background

Sub-Saharan Africa, with only 10% of the world's population, accounts for more than 50% of the world's HIV-infected people. Of the 20 million people who have died from AIDS so far worldwide, more than 14 million were Africans. Of the 14 million AIDS orphans in the world, 12 million are Africans. Early in the African pandemic, Uganda's epidemic was notably worse than that in most other countries. For instance, through mid-1987, when 41 African countries had reported a little over 4,500 AIDS cases to the World Health Organization ─ one-half were from either Uganda or Tanzania. By the mid- to late-1980s the picture in Uganda could hardly have appeared more bleak ─ 2/3 of female prostitutes, 2/3 of barmaids, 1/3 of truck drivers, 1/3 of male blood donors, and 1/6 of female blood donors in Uganda were HIV positive. To date, one million Ugandans have died of AIDS ─ leaving behind nearly 2 million orphans.

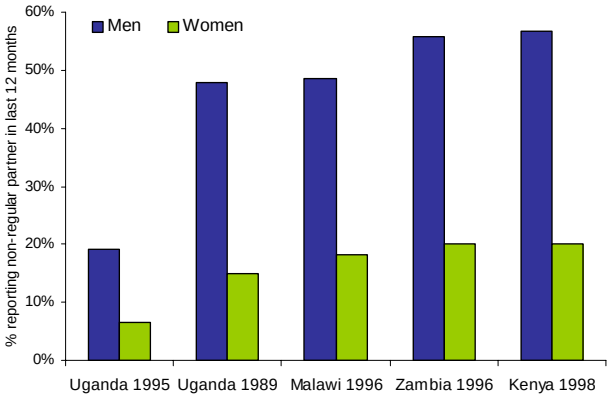
Then something unexpected and totally without precedent occurred. From the early to the late 1990s, HIV seroprevalence rates in Uganda dropped by two-thirds ─ from nearly 30% in 1990 to less than 10% in 1998 in pregnant women, from nearly 25% in 1990 to 14% in the mid-1990s in military conscripts, and from 22% in 1991 to 6% in 1999 in the general population. This dramatic decline occurred less than a decade after Uganda's First Couple, President Yoweri and Janet Musevini, implemented and led a low cost **ABC** HIV/AIDS prevention program. This **risk avoidance** intervention encourages youth and adults to refrain from nonmarital sex. Information about HIV/AIDS prevention reaches individuals through community networks, and HIV/AIDS education begins early – starting in primary school. Faith-based organizations play an integral role in the national response by promoting abstinence and faithfulness. Stigma and discrimination are addressed through discussion about the HIV epidemic at and among all levels of government and society.

Figure 1: Abstinence in persons aged 15 – 19 years, Uganda, 1989 & 1995



Source: Ministries of Health Republic of Uganda, World Health Organization, Global Program on AIDS

Figure 2: Persons reporting casual sex – Uganda, Zambia, Malawi, and Kenya

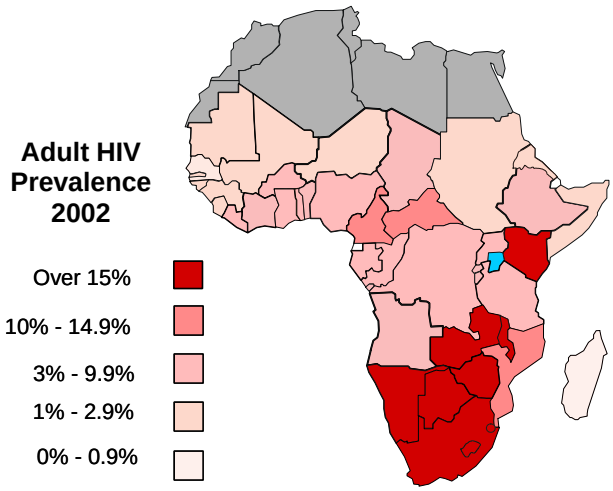


Source: Demographic and Health Surveys, (Macro) Calverton, MD

And when encouraged (repeatedly) by their leaders to avoid risk through behavior change, Ugandans did so. The proportion of males aged 15–19 years in Uganda who were abstinent increased from 31% to 52% from 1989 through 1995 **(Figure 1),** and exceeded the proportion of abstinent young males in Malawi (32%), Zambia (43%), and Kenya (44%) for the mid-1990s **(Figure 2)**. Although condom use with nonregular partners did increase in Uganda from 1989 to 1995, as of 1995 condom use was similar for both males and females in Uganda and the comparison countries of Malawi, Zambia, and Kenya.

In contrast, **risk reduction** strategies that were originally developed in the United States for HIV epidemics concentrated in homosexual males and injecting drug users focus primarily on condom promotion and distribution and/or needle exchange. Unfortunately, the risk reduction strategy of condom promotion has been adopted as the global standard and exported en bloc to developing countries. This strategy has had no appreciable impact on reducing HIV prevalence in Africa **(Figure 3)**, where most HIV transmission occurs through heterosexual sex and where condom availability is limited.

Figure 3: HIV epidemic pattern in Africa.



Source: Report on the global HIV/AIDS epidemic. UNAIDS, July 2002; DHS; UN. Hill K, et al. Estimates of maternal mortality for 1995, Bulletin of the World Health Organization 79(3), WHO 2001: 182-193.

Evidence that condoms can play a role in reducing but not eliminating the risk of HIV transmission in concentrated HIV epidemics comes from studies on prostitutes and their clients. While condom use in focal groups at high risk for HIV infection appears to be moderately effective, it is important that condom messages targeting generalized at-risk populations support rather than undermine risk avoidance strategies.

Partner reduction, rather than condom use, has had the most significant impact on reducing HIV prevalence in Africa. To date, **there are no clear examples of a country that has turned back a generalized epidemic primarily through condom promotion**. Research demonstrates that the Uganda **ABC** model, with more than 15 years of success, is the most effective, least expensive HIV/AIDS prevention strategy. The annual cost of the **ABC** program in Uganda was less than $1 per person aged 15 and above. Had the **ABC** program been implemented throughout sub-Saharan Africa by 1996, today 6 million fewer persons would have been infected with HIV and 4 million fewer children would have been orphaned.

Summary of presentations

Dr. Edward C. Green, of the Harvard Center for Population and Development Studies, who serves on the President's Advisory Council for HIV/AIDS, presented "Moving Toward Evidence-based AIDS Prevention." Dr. Green, whose research has focused on the impact of a broad-based strategy for HIV prevention in Africa, identified the two basic approaches to disease prevention – risk avoidance and risk reduction. Dr. Green describes these interventions: risk avoidance corresponds to the **A** and **B** in the **ABC** model; while risk reduction corresponds to the **C**. Although most HIV prevention methods developed for concentrated HIV epidemics have stressed risk reduction (condoms) to the exclusion of risk avoidance (abstinence and faithfulness), Dr. Green argues that higher rates of condom promotion and availability in Africa have not led to lower HIV prevalence rates. One explanation he presents is that condom promotion efforts may actually "backfire" and result in disinhibition. People who are "disinhibited" may feel safer than they should when using condoms, and therefore engage in riskier behaviors (such as having several sex partners) than they would were they using no "protection (ie, condoms)."

A notable exception to the almost exclusive risk reduction strategy for HIV prevention in Africa is the Ugandan **ABC** program, which has successfully combined risk avoidance with risk reduction interventions. While the standard "off the shelf" HIV prevention approach favors condoms over other interventions, programs developed *in* Africa *for* Africans emphasize **A** and **B**. According to Dr. Green, risk-avoidance measures developed locally are successful for two reasons: 1) because they are culturally and linguistically appropriate for each country, they are superior to imported programs that were developed elsewhere for focal epidemics, and 2) because they focus on behavior change. Dr. Green concluded that effective HIV prevention strategies for generalized HIV epidemics, such as those in Africa, must include elements of both risk avoidance and risk reduction. Risk avoidance being the dominant effort, it must never be undermined or obscured by risk reduction.

Dr. Rand L. Stoneburner, of the Cambridge University Health Population Evaluation Unit, gave a talk entitled "AIDS and Behavioral Risk in Uganda: Evidence for an Effective Social Vaccine

and Challenges to Its Replication." Dr. Stoneburner's research has focused on the decline in HIV prevalence in Uganda and how Uganda's success can be replicated in other African countries. He compared data on rates of primary abstinence, number of sexual partners, and rates of casual sex for residents of Uganda, Kenya, Malawi, South Africa, and Zambia. In addition, Dr. Stoneburner examined patterns of communication and general knowledge regarding HIV and AIDS. When people in Uganda were asked if they personally knew someone with AIDS, approximately 90% responded affirmatively – compared to about 70% of people in the neighboring countries of Malawi, Kenya, and Zambia. In most countries, communication about AIDS occurs through channels such as pamphlets and brochures. In contrast to residents of neighboring countries, Ugandans mentioned personal networks as their primary source of AIDS information. This personalized perception of risk so prevalent in Uganda appears to be associated with the adoption of risk avoidance behaviors.

These data suggest that the approach taken in Uganda─an approach that couples open and frank discussion regarding AIDS at all levels of society with a strong risk avoidance message ─ is responsible for the widespread modifications in behavior and the dramatic decline in HIV prevalence. Dr. Stoneburner concludes that if Uganda's success is to be replicated, health professionals and policy makers must be willing to implement programs that incorporate a broad-based **ABC** strategy.

Dr. Norman Hearst, the Director of the International Program for AIDS Prevention Studies at the University of California San Francisco, gave a talk entitled "Condom Promotion for AIDS Prevention in the Developing World: Is it Working?" Dr. Hearst's research has focused on condom efficacy (how well condoms work in theory) vs. condom effectiveness (how well condoms typically work in practice, given the reality of inconsistent and incorrect usage) and implications for condom promotion in Africa. While condoms have high theoretical efficacy in preventing HIV transmission, their distribution does not appear to have been effective in African countries with generalized (ie, heterosexual) HIV epidemics. Dr. Hearst attributes this to inconsistent condom use. His evaluation of data from several African countries suggests that simply increasing the availability of condoms has not resulted in the expected decreases in HIV prevalence. In contrast, evaluation of data from Thailand and other countries shows that in high-risk situations, such as commercial sex worker encounters with clients, condom promotion and use may lead to declines in HIV transmission.

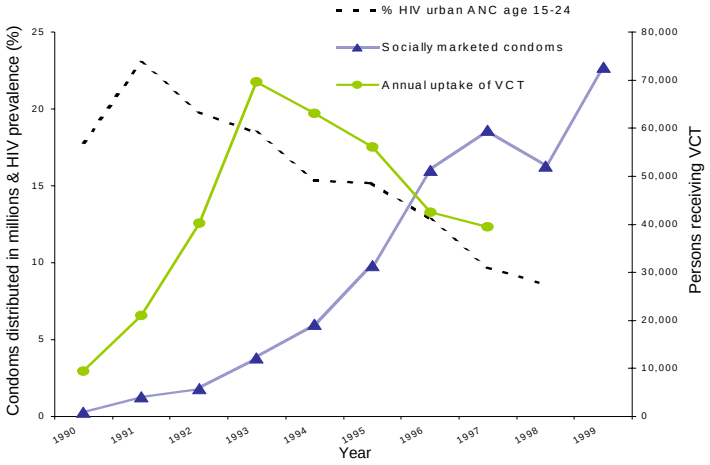
In many studies of the general population, HIV infection rates are higher for people who"sometimes" use condoms than for those who "never" use condoms. Thus people who use condoms only some of the time do not appear to be very well protected from infection with HIV. One possible explanation for this apparent contradiction is that, compared to consistent condom users, "sometimes" users in the general population may indulge in more high-risk behaviors (such as drug or alcohol use) or may have more casual partners – perhaps because they believe that "sometimes" using condoms will protect them. Dr. Hearst concluded that while condom promotion can be very effective when targeted to epidemics in specific high-risk groups, it is relatively ineffective for generalized epidemics, such as those in many African countries. He recommended that African countries consider adopting the successful ABC strategy, which emphasizes abstinence and fidelity to partners and indicates a minor role for condoms.

Conclusions

The President's Emergency Program for AIDS Relief (PEPFAR) is a bold and compassionate response to the global HIV pandemic. This initiative, announced in the 2003 State of the Union address (http://www.whitehouse.gov/news/releases/2003/01/20030129-1.html), capitalizes on recent advances in antiretroviral (ARV) treatment. Life-prolonging drugs will be provided to millions of HIV-infected people in Africa and the Caribbean. Funding has also been allocated for care and support of HIV-infected individuals and orphans and for voluntary counseling and testing (VCT) – the entry point to treatment.

Although many experts believe that behavior change will not occur unless people know their infection status, the majority of behavior change in Uganda occurred prior to widespread access to VCT and condom use. By 2000 **(Figure 4)**, only 10% of Ugandans had been tested for HIV. Although there is no clear evidence that VCT leads to behavior change and HIV prevalence decline, such evidence does exist for the **ABC** approach. Similarly, the success of the Uganda **ABC** program occurred before any condom social marketing strategy was implemented.

Figure 4: HIV prevalence – pregnant women aged 15 – 19, and VCT and condom distribution, Uganda 1990 - 1999



Source: Ministry of Health Republic of Uganda

As compassionate and necessary as treatment is, prevention offers the only chance of halting this deadly epidemic. The evidence for risk avoidance is so compelling that is has been designated as a key element in PEPFAR, which will provide $15 billion to fight AIDS over the next 5 years. Approaches that focus on behavior change, such as those that encourage abstinence and faithfulness, have a proven track record and will be expanded.

Recently many global and domestic AIDS experts have grown quite negative and defeatist about AIDS prevention, dismissing it as complicated and asserting that behavior is difficult to change. One reason for the experts' defeatist attitude may be that we have not been doing prevention the right way. Generalized epidemics have never in the past been ameliorated by the social marketing of condoms, and they are unlikely to yield to this strategy in the future. Likewise, if

the counseling element of VCT is exclusively condom promotion, then VCT is unlikely to have the desired impact on HIV transmission. But if we do AIDS prevention ***right***, if we base our policies on sound evidence of effectiveness and follow the Uganda ABC model, then we have every reason to expect that we can achieve Uganda-like results in the 14 countries targeted by PEPFAR. Effective prevention is needed ***now more than ever*** **–** and the proven prevention approach is **ABC**.

All truth passes though three stages.
First, it is ridiculed.
Second, it is violently opposed.
Third, it is accepted as being self-evident.

— *Arthur Schopenhauer*

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Moving Toward Evidence-Based AIDS Prevention
Edward C. Green, PhD

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AIDS and Behavioral Risk Avoidance in Uganda: Evidence for an Effective Social Vaccine and Challenges to its Replication
Rand L. Stoneburner, MD and Daniel Low-Beer, PhD

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Condom Promotion for AIDS Prevention in the Developing World: Is it Working?
Norman Hearst, MD, MPH and Sanny Chen, MHS

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The Medical Institute for Sexual Health

MI staff deserve special recognition for their contributions to this monograph. Shawna Peays contributed her considerable talent to the layout and Nancy-Ann Donwerth skillfully converted the slides in the authors' original PowerPoint presentations to the tables and figures.

Introduction

This monograph is the result of a briefing entitled "Scientific Evidence for ABC: Addressing the HIV/AIDS Pandemic" for the Honorable Randall Tobias, Global AIDS Coordinator, Department of State that was hosted by the Medical Institute in Washington, DC, on January 8, 2004, It provides compelling evidence for the value of HIV prevention strategies based on risk reduction for the areas of the world most severely affected by the HIV pandemic.

Sub-Saharan Africa, with only 10% of the world's population, accounts for more than 50% of the world's HIV-infected people. Of the 20 million people who have died from AIDS so far, more than 14 million were Africans. Of the 14 million AIDS orphans in the world, 12 million are Africans. Early in the African pandemic, Uganda's epidemic was notably worse than that in most other countries. For instance, through mid-1987, 41 African countries had reported 4,583 AIDS cases to the World Health Organization ─ one-half were from either Uganda or Tanzania.[1] By the mid- to late-1980s , 2/3 of female prostitutes[2], 2/3 of barmaids, 1/3 of truck drivers, 1/3 of male blood donors, and 1/6 of female blood donors[3] in Uganda were HIV seropositive. In a country of 23 million people, 40,000 babies are born with HIV every year. One million Ugandans have died of AIDS ─ leaving behind nearly 2 million orphans.

Within a decade of implementing the low cost **ABC** HIV/AIDS prevention program under President Museveni's leadership, **HIV infection rates in Uganda were cut by two-thirds.** "**ABC**" stands for **A**bstain, **B**e faithful, or use **C**ondoms if **A** and **B** are not practiced. The declines of HIV in Uganda are linked to behavior change, including a two-thirds decline in casual sex. This risk avoidance intervention encourages youth and adults to refrain from sex outside marriage. Information about HIV/AIDS prevention reaches individuals through community networks, and HIV/AIDS education begins early – starting in primary school. Faith-based organizations play an integral role in the national response by promoting abstinence and faithfulness. Stigma and discrimination are addressed through discussion about the HIV epidemic at and among all levels of government and society.

In contrast, risk reduction strategies that were originally developed for HIV epidemics concentrated in homosexual males and injecting drug users focus primarily on condom promotion and distribution. These strategies have had little impact on reducing HIV prevalence in Africa, where most HIV transmission occurs through heterosexual sex and condom availability is limited. Evidence that condoms can play a role in reducing but not eliminating the risk of HIV transmission in concentrated HIV epidemics comes from studies on prostitutes and their clients. It is important that condom messages targeting at-risk populations support rather than undermine risk avoidance strategies.
Partner reduction, rather than condom use, has had the most significant impact on reducing HIV prevalence in Africa. To date, **there are no clear examples of a country that has turned back a generalized epidemic primarily through condom promotion**. The Uganda **ABC** model is the most effective, least expensive HIV/AIDS prevention strategy, with more than 15 years of success. The annual cost of the **ABC** program in Uganda was less than $1 per person aged 15

[1] Lancet. 1987 Jul 25;2(8522):192-4).
[2] Biomed Pharmacother. 1988;42(5):309-20
[3] AIDS. 1987 Dec;1(4): 223-7

and above. If the **ABC** program had been implemented throughout sub-Saharan Africa by 1996, today there would be 6 million fewer persons infected with HIV and 4 million fewer AIDS orphans.

The evidence for risk avoidance is so compelling that is has been designated as a key element in the President's Emergency Program for AIDS Relief, which will provide $15 billion to fight AIDS over the next 5 years. Approaches that focus on behavior change, such as those that encourage abstinence and faithfulness, have a proven track record and will be expanded.

Preliminary remarks

Joe McIlhaney, Jr, MD, Founder and Chairman, The Medical Institute for Sexual Health: I am pleased that each one of you is here. I believe it will be very worth your time. I'd like to brief you about the Medical Institute. We started the organization in 1992. It's a nonprofit, scientific, professional organization founded to confront the worldwide epidemics of STD, HIV, and nonmarital pregnancy with credible and incisive healthcare data. Our goal is to see people make healthy decisions. We focus on risk avoidance over risk reduction and believe that avoidance is the answer to many of the problems we'll be talking about this morning.

I know from my personal association with most of you that you're here because you have a heart for helping people to have better lives. So now I'd like to outline the purpose of this meeting.

Biotechnology could not have designed a more perfect killer of human beings than the human immunodeficiency virus. In a country as sophisticated as the United States it's already killed over half a million people – more Americans than died in the Second World War. Last year alone, worldwide three million people died of HIV; another 40 million are currently infected and most of these will die of their disease. Despite this, I believe that there is a window of hope right now, that the genie is not yet out of the bottle.

And I would say that I think there's hope for two reasons, one is because of the President of the United States, who I got to know when he was Governor of Texas. I feel I know his heart and I think many of you do too because you're close to him. He has the commitment and the understanding and the intuition to know the right thing to do. And most of us here follow him and believe passionately in his leadership.

The second reason for hope is that we have a country, a small African country where something is different. The first time I attended the Presidential Advisory Council on HIV/AIDS (PACHA), the person from USAID was providing us an overview of HIV in the world. He was going across the map of the world, and it was just bleak from the far East across to Africa. But when he came to Uganda, he said, "What's happening in Uganda is almost a miracle." And then he just went on. I wanted to say, "Stop! If there's one country anywhere that's had a dramatic change, we need to understand that country!" These are the two reasons I think that we can seize the day and reverse this pandemic. The first is because of the leadership of our President and his appointees, and second, because there is a place that has actually reversed its epidemic and provided us a roadmap for what we can do worldwide to turn the tide.

Now, I'd like to say this. I think that it's going to require some changes in programs and in funding and I think this administration will undergo great criticism. I told Ambassador Tobias that when we visited his office. People don't like change and it's going to be difficult, and I think he'll be personally criticized.

What makes me so excited about this meeting is the fact that after today all of you will know what the data clearly say so that when the administration gets criticized you'll know you have scientific support for new initiatives regarding funding and program directions. I'd like to give you one very brief example where the medical and political community let the public down.

Back in the mid-1800s, there was an infection called childbed fever. Of women going into obstetric hospitals all over Europe, one of five died from this hospital-acquired infection. Ignaz Semelweiss, a doctor in a hospital in Vienna, found that if doctors washed their hands after examining corpses and before examining women in labor – they didn't use gloves in those days – that the infection rate and the death rate was cut to four percent, an incredibly dramatic change. Unfortunately politics got involved. His boss was on the opposite side, and he refused to allow Semmelweiss to share the science. So Semmelweiss did it on his own; he went out lecturing all over Europe. Nobody paid any attention to him. It was years later that the medical and political communities finally said, "You know, he was right." Well, during that time, when people wouldn't pay attention to the clear facts, hundreds of thousands of women died.

We cannot let the same thing happen with this issue. The presenters today are highly qualified scientists who are presenting to you the most reliable data about what happened in Uganda. I think none of the three would have given the same message to you if they had been asked to give these talks a few years ago. But because they're objective scientists with integrity, they have been willing to take an honest look at the data and present their findings.

It's my privilege to introduce Secretary Thompson to you. I was at his office almost immediately after he arrived at HHC. He was already in the middle of all sorts of budget throes. I said to him, "Are you glad you took this job? And he said, "I think if I'd known what I was going to go through, I wouldn't have done it."

We, however, are glad that you stayed on the job Secretary Thompson. We thank you for your leadership. We thank you for going to Africa. We thank you for what you've done in the past and what you're doing now.

The Honorable Tommy Thompson, Secretary, US Department of Health and Human Services: I want to tell you what a tremendous trip we recently had to Africa. A large group of individuals, 103 in all, went to five countries–Cameroon , Zambia, Rwanda, Kenya, and Uganda. Going on that trip really made me a better person and it was a transforming experience for me and for everybody else who went.

In Uganda President Museveni and his wife are doing a wonderful job. It takes a good deal of foresight and leadership to stand up and say, "We can do something about AIDS." The HIV prevalence in Uganda was 21 percent a few years ago. Now it's all the way down to six percent because they're practicing ABC.

We are making headway not only in Uganda, which is the primary role model for all of us to emulate, but also for the first time, with health ministers all over Africa. I'm on the World Health Organization Board of Directors and when I met with them two years ago, there was no hope or optimism. Then President Bush talked to them about our helping our brothers and sisters in Africa and about the $15 billion initiative. I talked to the health ministers in Geneva last May about the President's commitment, his passion, and his ability to lead and get this job done, and you could sense the change of attitude from pessimism to optimism.

During our trip through Africa, we went to a village four hours away from Kampala where there's a clinic and a regional hospital that serves two states. We spent four hours to get there, then we got in four-wheel vehicles to go even farther, and finally we got on motorcycles to deliver medicines out to the individuals.

And I'd just like to tell you about the two families that I visited in their homes. At the first home I visited there was a woman named Rosemary who had four children. Her husband died from AIDS and she's been HIV positive since 1994. Her brother died in 1995 from AIDS, leaving her with his three children to raise, so now she has seven children. She lives in a mud hut where the children sleep on the floor and she has a little bed. This lady was optimistic and hopeful. She was appreciative and she told me that she makes $70 a year and raises 7 kids, grows the food on her two acres of land. She was upbeat and she wanted to thank the United States of America for giving her the medicine, and giving her the opportunity to live and to raise her children so they would not end up being orphans.

And then we went on to another village where I met Sampson, who works as a farmer and a carpenter. He uses wood from the swamp to make little tables that he sells for $1 to $2 apiece, for which he earns about $100 to $120 a year. I sat in his front yard where his wife's grave is. She died from AIDS and he's HIV positive. He receives antiretroviral medication from CDC and from the Department of Health and Human Services. And Sampson, who has never seen a television or heard a radio, said, "Would you please go back and thank President Bush for giving me the opportunity to live."

I don't tell you these stories to make you depressed; I tell you these stories because there's hope, there's opportunity, and there's a tremendous chance for America to lead.

And we have an opportunity, ladies and gentlemen, to emulate ABC, to transfer that throughout the continent of Africa and at the same time, with the President's new funding initiative, countries across this continent will have the opportunity to provide the medicine to treat those people who need to be treated, to prevent new individuals from being infected with HIV/AIDS, and also to help the orphans.

And we're going to continue to fight this fight and as Chairman of Global Fund, I'm going to also try to inculcate the ABC doctrine and our mission statements and then our programs at Global Fund. I know that's what Ambassador Tobias wants to do and that that's in the President's initiative. And I want everybody to know that the Department of Health and Human Services is joined at the hip with Randy Tobias. We've pledged our support. We're going to give him every bit of support we possibly can to make him successful because if we make him successful, the programs will be successful and we will actually have an opportunity to start turning this insidious disease around and giving people hope and opportunity to live. I think we're at the dawn of a new day, a new day of opportunity that's going to make America very proud and we're going to show the world how compassionate and how visionary, not only our President, but our country truly is.

Julie Louise Gerberding, MD, Director, Centers for Disease Control and Prevention:
I was proud to be a part of the delegation to Africa because we saw much of the good work the CDC teams are doing in the field in various countries. I was absolutely astonished how so few people are accomplishing so much work. I was also incredibly proud to be part of Secretary Thompson's department. The Department of Health and Human Services has an extraordinary leader. I'm not sure, despite all of the activities I've been working on with the Secretary over the past couple of years, that I appreciated his passion and his leadership in quite the same way that I did after spending those days in Africa. He is an extraordinary person, and he has brought a large number of people together who have a strong bearing on the outcome of the scope and face of AIDS in the world in ways that are unprecedented. And I'm certainly very proud to be part of President Bush's Emergency Plan for AIDS Relief team, working with Ambassador Tobias and others, to prevent HIV infection and treat and care for the millions of people living with HIV and AIDS. This is something that is important to me in my role at CDC, but it's also something that harkens back over my entire career in medicine.

As an intern, I took care of the first AIDS patients at San Francisco General Hospital, and so I "grew up" with AIDS in my medical career. We went through confusion about what it was and what was making people sick, and each new day brought a new discovery about the disease and its consequences. It was a long time before we understood how it was transmitted, or even that it was an infectious disease. Along with everybody else, I went through that evolutionary process, and obviously it shaped me in many very profound ways. At some point, I recognized that this wasn't a disease of "those people over there." This was a disease that could affect anyone, any time – and we all had to adjust our thinking and our behavior and emphasize prevention, because there wasn't going to be a cure for a long, long while. And now, 23 years later, we still find that primary and secondary prevention are the critical paths to controlling this pandemic.

I was awed on this trip by how enormous the problem is, and, at the same time, encouraged by the possibility of creating solutions. But I was also saddened, because I was in Uganda about 10 years ago, when the epidemic was beginning to accelerate. We knew then where that would lead. And while we celebrate today the incredible improvements that have been made across Africa and particularly in Uganda, the crisis is a long way from being over, and it is way too soon to celebrate success. Programs and ideas introduced more than a decade ago are just now beginning to change the paradigm and the picture of the AIDS epidemic. There is much more work to do.

We visited an orphanage in Zambia where a little girl was learning to count using bottle caps, because that was the only thing they had. If you take that girl's face and multiply it a thousand times, that's the memory I bring home from Africa: the children, the faces of the children, their asking "Why are so many of our parents dying?" One little girl asked me, "I need drugs – could you take me to America?"

Africa is a continent full of faces, of hope, of pride, of resolve, but also great sadness. We were particularly struck by a family in a village we visited. When we asked, "How do you educate your sons to keep them from getting HIV infection?", the mother told us that she walks out the back door to where her husband is buried and she makes the point

that her husband died of HIV infection and that her sons needed to be aware that this could happen to them if they don't abstain from sex.

African people are just as capable of benefiting from interventions that we have here in the United States, not only prevention interventions but also treatment interventions. Our work has just begun; there is much to do, and it is indeed an emergency.

When we think about successful prevention models, "ABC" comes to mind. However, at this point in the epidemic, other letters must also come to mind. Most HIV transmission can be explained with a simple model: infected people who don't know they are infected have risky sex with uninfected people. Both here and in Africa, studies bear out that most of the people transmitting HIV are unaware of their infection status. When people know they are infected, they usually take steps to protect the others with whom they have contact. So let's add the letter "D" for "Diagnosis" to "ABC." Ensuring that infected people are diagnosed has two benefits – first, they can access life-saving medical treatments, and second, they can adopt behaviors that protect their partners. We must ensure that all infected people have access to diagnostic HIV testing. In fact, improving our capacity to diagnose those who are already infected and promoting comprehensive prevention strategies for uninfected people and those who are already infected are the cornerstones of our new domestic HIV prevention strategy.

Voluntary testing must become a routine part of medical care in all countries, including ours. Barriers to testing must be removed from healthcare settings, including the requirement for comprehensive prevention counseling as a condition for getting tested. Many infected patients are not diagnosed because their clinicians lack the time, knowledge, or skill to provide pre-test prevention counseling. Of course prevention counseling is important, but it does not always have to be temporally linked to diagnostic testing. A new model for expanding access to routine voluntary testing in medical settings and linking infected patients to prevention, treatment, and care services is being evaluated and appears promising. Already many people appear to have been diagnosed much earlier than they otherwise would have been and benefiting from treatment and prevention services. So "ABCD" is a concept that I would like to put out on the table.

Although there are many other letters we could talk about, there's one more letter that we need to stress – "R," for "Responsibility." Every time we talk about AIDS, we must use the word "responsibility," and make it very clear that personal sexual responsibility is a very important part of AIDS prevention. Sadly, for many people around the world, especially women and girls, sexual violence is a cause of HIV infection. Responsibility must extend to ensuring that sexual violence and exploitation are not tolerated in any society.

When we have a prevention model that works, it only makes sense to learn why it is successful, scale it up, and disseminate it as rapidly as possible. So I'm certainly committing everything that I can from the position of CDC, and I know that Secretary Thompson is doing everything he can from the Department, to be supportive. I'm very proud that our President has had the vision and courage to create the Emergency Plan for AIDS Relief, and I'm proud to be part of the team that will make it happen, as I know each of you will be. Thank you very much.

Ambassador Randall Tobias, Global AIDS Coordinator: President Bush has given me the daunting responsibility of leading his emergency plan for AIDS relief – an unprecedented five-year, $15 billion effort to combat global AIDS. The President's plan represents the largest commitment of a single nation for any international health initiative.

In 2002 three million people died from complications of AIDS, leaving behind anguished loved ones, abandoned children, and ravaged communities. At the same time, five million more people became newly infected, bringing the total to about 40 million people infected worldwide. Just do the math – we are losing the war. But the President's plan can change that. This initiative brings hope through the commitment of unprecedented resources. More importantly, it provides the opportunity to stop doing business as usual. And in that regard, I would simply like to make two points.

The first is that a fundamental principle of the overall plan is to develop sustainable and integrated prevention, care, and treatment programs. We need to develop some new paradigms, take a fresh look at what has worked and what has not worked in the countries, communities, and populations that will be served by these programs, and then make decisions based on scientific evidence. The second point is that an important aspect of the President's plan is "ABC," the promotion of Abstinence, of Being faithful, and, when appropriate, the consistent and correct use of Condoms. ABC is a strategic approach to broad populations, not a multiple-choice strategy for individuals.

When this approach is correctly understood and successfully implemented as it was first in Uganda, it is a powerful tool against the spread of HIV. The approach begins by delivering effective age-appropriate messages about abstinence to young people. On my recent trip to Africa I saw the Ugandan program. They have assemblies in primary schools twice a month to teach kids about HIV/AIDS and abstinence. Their program is simple, effective, and it works. It is a model to be emulated.

The President's plan includes a billion dollars in contributions to the Global Fund, bringing the US total to $1.6 billion – more than a third of all pledges to date. It includes $5 billion to continue US Government bilateral programs in over 100 countries, and $9 billion in anticipated new funding to be directed to the 15 focus countries; countries that represent over 50 percent of the world's population of people living with HIV/AIDS. While much attention has been directed toward these focus countries, the President's initiative encompasses all HIV-related US Government activities worldwide – activities in the 15 so-called focus countries, the over 100 countries where we have existing programs, and other countries where our leadership can make a difference in attitudes toward and attention to this issue.

This global perspective is reflected in the goals of the President's Emergency Plan. Across the world, we will encourage bold leadership at every level to fight HIV/AIDS; apply best practices within our bilateral HIV/AIDS programs, in concert with host governments' strategies; and encourage partners, including multilateral organizations, to coordinate activities and strengthen management practices. In the focus countries, our

goals over the five years of the President's Emergency Plan are to provide treatment to at least two million HIV-positive individuals, prevent seven million new infections, and provide care for 10 million people infected and affected by HIV/AIDS, including orphans and other vulnerable children.

I have visited seven African countries since my confirmation in October; I have seen firsthand the urgent need to rapidly scale up our HIV/AIDS response. This plan begins in FY2004 with over $2 billion, steadily increasing as capacity is scaled up until the total of $15 billion is reached in five years.

Mechanisms are now in place for the rapid expansion of existing, effective, accountable, and sustainable prevention, care, and treatment programs. Proposals from experienced organizations that have demonstrated both an international capacity as well as results are being reviewed so we can rapidly fund and expand their existing activities in five "fast track" areas

- Abstinence and behavior change for youth
- Antiretroviral therapy programs for HIV-infected persons
- Safe national blood transfusion programs
- Programs for orphans and vulnerable children
- Programs to reduce transmission by unsafe medical practices, particularly the promotion of safe medical injections

Concurrently, we are also establishing plans for longer-term, more diversified programs. These new programs will involve current partners, but will also focus on attracting and identifying additional partners, including those in the faith-based community.

There is no doubt that HIV/AIDS represents one of the greatest challenges of all time. Experts predict that, without intervention, 100 million people could lose their lives to AIDS by the year 2020. Think what your reaction would be if you heard that during the preceding 24 hours, 20 fully loaded Boeing 747s had crashed killing everyone on board – 8,000 people. And then think about hearing that same thing was happening every single day of the year, because that is exactly what is happening today in terms of people dying from HIV/AIDS around the world. The President declared this an emergency in the 2003 State of the Union Address. So we all need to look for new ways, new processes, new approaches as we get this effort launched because there is so much to do. Thank you very much.

Moving Toward Evidence-Based AIDS Prevention

Edward C. Green, PhD*

Abstract

Background: Uganda provides strong evidence that risk avoidance programs (those that encourage youth to refrain from sex outside marriage and stress faithfulness and monogamy) can be promoted and can have significant impact on HIV prevalence. Uganda pioneered the ABC approach (Abstain, Be faithful, and Use Condoms if A and B are not practiced) and experienced a 66% reduction in national HIV infection rates within a decade of initiating this intervention. Important elements of Uganda's successful HIV/AIDS program include political leadership, emphasis on the A and B components, implementation of AIDS prevention education in primary schools, stigma reduction, face-to-face education, empowerment of women, and the support and involvement of faith-based leaders and groups.

In contrast, the standard or global AIDS prevention model is based on risk reduction strategies, such as condom promotion and STI treatment. This approach was developed in the US to address an HIV epidemic initially focused in two high-risk populations – homosexual men and injecting drug users. Risk reduction interventions had impact in the US and Asia when applied to high-risk populations – e.g., sex workers and their clients. Risk reduction strategies have not (yet) demonstrated impact at the population level in generalized epidemics, such as those found in sub-Saharan Africa and the Caribbean.

Methods: Findings from surveys and studies from USAID (including Demographic and Health Surveys), UNAIDS, WHO, Uganda Ministry of Health, and others are analyzed and discussed.

Results: The low-cost ABC AIDS prevention program that emphasized primary behavior change, along with some other supporting elements, dramatically impacted HIV prevalence in a country with a generalized epidemic – Uganda. This program encouraged youth to remain abstinent and couples to be faithful, while urging everyone else to reduce the number of sexual partners and use condoms for high-risk situations. The ABC approach, with its emphasis on risk avoidance, was promoted in an atmosphere of open and honest discussion of AIDS and sexual behavior at all levels of society – government, schools, communities, and villages – with the collaboration and support of faith-based organizations. Unfortunately, this indigenous response to AIDS has become diluted in recent years because foreign donors have diverted attention, energy, and funding away from primary behavior change interventions.

Conclusions: Uganda, the country with the greatest degree of HIV prevalence decline, achieved this dramatic success through ABC interventions, with special emphasis on risk avoidance through primary behavior change. There is no reason to expect that such an approach would not be effective in other countries, especially in those with generalized HIV epidemics, such as the countries in Africa and the Caribbean currently targeted in the President's Emergency Plan for AIDS Relief (PEPFAR).

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HIV epidemiology

Most HIV is transmitted through sexual intercourse. Since having multiple sexual partners drives HIV epidemics, if people did not have multiple sexual partners, then epidemics would not develop. Or if they did develop, they could not be sustained. If an infected person does not, on average, infect more than one other person, an epidemic cannot grow. This is reflected in the epidemiological concept known as the reproductive rate of infection. The reproductive number R_0 is the number of secondary infections caused by one infectious individual in an entirely susceptible population. When $R_0 > 1$, an epidemic occurs. When $R_0 < 1$, there is no significant epidemic. Modeling studies, as well as the actual experience of Uganda and a handful of other countries, demonstrate that reductions in casual sex result in decreased HIV incidence at the population level, as measured by numbers of nonregular partners in the past year.[1,2]

HIV prevention strategies: risk avoidance vs. risk reduction

There are two basic ways to prevent disease: risk avoidance and risk reduction. To use an analogy from cigarette smoking, risk avoidance would be not starting to smoke in the first place, or stopping smoking if one has already started. Risk reduction would be smoking filtered cigarettes or only those with low tar or nicotine levels, or cutting down the number of cigarettes per day. In AIDS prevention, risk avoidance approaches include abstinence or mutual faithfulness with an uninfected partner. Risk reduction approaches include using condoms or treating curable STIs with antibiotics.

Astounding as it may seem, virtually all AIDS prevention resources to date have been devoted to risk reduction rather than to risk avoidance efforts. Consider the folly of a multibillion dollar global program to combat lung cancer that failed to advise people either to abstain from smoking or to quit if they had already started smoking.

The sexual transmission of HIV can be prevented in three basic ways

A	Avoid exposure	**A**bstinence
B	Reduce exposure	**B**e faithful
C	Block exposure efficiency	**C**ondom use

The genius of the **ABC** strategy is that it promotes behaviors that address all three means of prevention. These means of prevention also address the "proximate determinants" of HIV transmission, the immediate causes of infection. Other interventions, such as increasing involvement of political leaders, reducing stigma, improving the status of women, and reducing poverty, address more "distal" causes of HIV transmission. Interventions that address only distal causes can be implemented without necessarily having an effect on HIV prevalence. To impact HIV infection rates, something has to occur at the level of sexual intercourse: **A**, **B**, or **C** behaviors.

Although it is not clear who first formulated the ABC approach, it seems to have been disseminated by the World Health Organization (WHO) in African countries, including Uganda by the latter 1980s. What makes ABC different in Uganda is that the Ugandan government officials were serious about implementing the A and B components. This in fact is where the emphasis lay.

Exported western prevention strategies

The model of AIDS prevention supported by major bilateral and multilateral organizations everywhere was developed in the United States for a type of HIV epidemic considerably different from the one in Uganda. During the early 1980s, HIV infections in the US were generally found among men who have sex with men (MSM) and injecting drug users. It was believed that attempts to change behavior among gay men would just drive away the very people that prevention programs needed to reach. It was also believed that drug users were incapable of, or undesirous of, changing their behavior. So prevention became a matter of providing condoms, treating STIs, and, where legal, providing clean syringes, or at least advice about sterilizing syringes. The resulting risk-reduction (or harm-reduction) model was exported to Africa and to the rest of the world with little recognition of – or modification for – either local cultures or even epidemiological patterns.

In contrast to the US where most HIV infections occur in high-risk subpopulations, most HIV infections in Africa occur in the general population. African HIV epidemics are *generalized* rather than *concentrated*. This difference in epidemiological pattern alone calls for different approaches to AIDS in the US and in Africa. It should not be surprising that prevention efforts developed for concentrated epidemics have proved less than successful in Africa.

Classic public health tenets call for prevention measures to be tailored to and targeted toward populations based on their prevailing risk behaviors and sociocultural patterns. Despite this, the current *standard global AIDS prevention package* consists of condom promotion and provision (especially through the approach known as social marketing), voluntary counseling and testing (VCT), treatment of STIs, and, if funds are available, prevention of mother to child transmission (PMTCT; based on the drug nevirapine). All the emphasis is on drugs and medical devices, with little or no consideration for behavior, let alone cultural differences.

Risk avoidance interventions (the A and B of ABC), have for the most part been excluded from major donor funding, or left to religious groups. The majority of AIDS "experts" from the wealthier countries simply have not believed that A and B interventions work.

Failure of risk reduction

It is useful to summarize several important recent studies that demonstrate the failure of prevention based ***on risk reduction alone***. Hearst and Chen conducted a review of condom effectiveness studies for UNAIDS. Among their findings were that "***Inconsistent*** condom use does not protect against HIV infection."[3] Unfortunately, most condom use in Africa, and everywhere else, is inconsistent. Another of their findings is "There are no definite examples yet of generalized epidemics that have been turned back by prevention programs based primarily on condom promotion." A similar conclusion was reached in a 2003 USAID-supported study – no decline in national HIV infection rates has been achieved through condoms ***alone***.[4] It is necessary to have both **A** and **B** behavior changes to effect changes in HIV prevalence at the population or national level.

Condoms and HIV infection

The premise that condoms have "close to 100% effectiveness" was discredited by a 2000 NIH work group which concluded that

consistent condom use decreases the risk of HIV transmission by 85%.[5] The assertion that condom use is an effective strategy for preventing HIV transmission has also been challenged in several recent studies carried out in Africa. A 2002 UNAIDS multisite study sought to identify the factors that explain widely differing rates of infection in four African countries.[6] Results and analysis showed that lack of male circumcision and evidence of genital herpes (HSV-2) seemed to be the main determinants. The only behavior factors that appeared determinative were early age of sexual debut and cross-generational sex. Levels of condom use were ***not*** found to be determinative.[7] In a reanalysis that controlled for male circumcision, a second highly significant behavioral factor emerged: ***the lifetime number of sexual partners***.[8]

Moreover, a recent meta-analysis of condom effectiveness[9] suggests that when condoms are used consistently, they reduce HIV infection rates by only 80%, not 98% or 99%, as is widely believed and often cited. And as a final example, Shelton and Johnston determined the average number of condoms available in several African countries per male aged 15–49 years, per year, computing the average over a 10-year period. During the unprecedented decline of HIV in Uganda from 1989 through 2000, only 4 condoms were available per male, per year.[10] **Table 1** depicts recent condom availability by country. We see in this table that condom availability in Africa is still very low, largely because of low demand. Yet there are differences in availability. Zimbabwe, Botswana, and South Africa have the highest rates of condom availability and also among the highest rates of HIV

Table 1: Average number of condoms per male, aged 15–49 years, in African countries for which data are available, 1989–2000

Country	Avg annual condoms 1989–2000	Males 15–49 1995 (in thousands)	Avg condoms per yr/male 15-49	HIV Prevalence (%)
Benin	4,065,408	1,263	3	2
Botswana	2,436,232	356	7	36
Cameroon	10,378,900	3,280	3	8
Ghana	9,901,068	4,424	2	4
Kenya	42,391,034	6,666	6	14
Senegal	5,513,517	2,091	3	1
South Africa	76,284,892	11,645	7	20
Tanzania	27,217,215	7,603	4	16
Uganda	16,702,846	4,740	4	6
Zambia	12,131,695	2,280	5	20
Zimbabwe	29,149,405	2,826	10	25

Source: DKT International (condom manufacturer)

infection. Although there may be no causal connection between the availability of condoms and levels of HIV infection, we can conclude from this and the other studies just outlined that 20 years into the HIV pandemic, there is no evidence ***at the national level in Africa*** that more condoms have resulted in less AIDS. In fact, several studies show a relationship between an individual's inconsistent use of condoms (the norm rather than the exception) and being HIV-infected.[11,12,13]

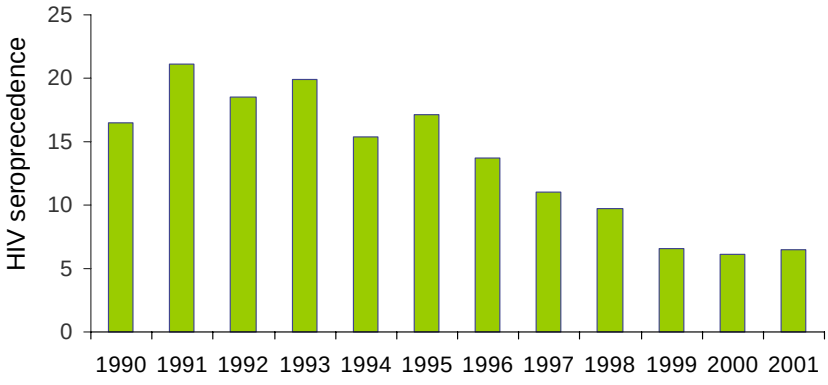
What is unique about the Ugandan message/approach?

When I first went to Uganda in 1993 it was clear that something different was going on in this country. In fact, something was occurring there that was considered impossible at the time: HIV prevalence was declining, as were infection rates for standard STIs. Uganda's HIV prevalence peaked in 1991 at about 21% and then declined to about 6% in 2002 **(Figure 1**).

Distinguishing features of Uganda's ABC program, which emphasized risk avoidance

- Political leadership at the highest level, treating AIDS as a national emergency
- Involvement of religious leaders
- AIDS preventive education in primary schools, reaching children before they become sexually active
- Involvement of persons living with HIV/AIDS (PLWHAs) in AIDS prevention
- Fear arousal, meant to engender risk perception/behavioral change
- Face-to-face, open discussion about AIDS
- Community involvement
- Major involvement and "advancement" of women and youth
- Fight against AIDS-associated stigma

Figure 1: Decline in national HIV seroprevalence in Uganda, based on 15 sentinel surveillance sites



Source: Testimony, Edward Green, US House of Representatives March 30, 2003

The period 1986–1991 is particularly noteworthy, since HIV incidence and prevalence peaked then. This apparent decline was met with a great deal of skepticism on the part of outside experts. As a result, sentinel surveillance in Uganda was subjected to far more scrutiny than surveillance in other countries.

Uganda's national response to AIDS began in 1986 under the bold leadership of President Museveni. The emphasis of this response was on primary behavior change, which in Uganda at that time primarily referred to delay of sexual debut for youth, and faithfulness to one partner for adults.

Condom social marketing introduced by western "experts" did not actually take off until the mid-1990s. Though there was some condom promotion from the very beginning, this approach was not favored by the President. As President Museveni said in a 1991 speech: "Just as we were offered the "magic bullet" [of antibiotics for STDs] in the early 1940s, we are now being offered the condom for "safe sex." We are being told that only a thin piece of rubber stands between us and the death of our continent. I feel that condoms have a role to play as a means of protection, especially in couples who are HIV-positive, but they cannot become the main means of stemming the tide of AIDS…In countries like ours, where a mother often has to walk twenty miles to get an aspirin for her sick child, or five miles to get any water at all, the question of getting a constant supply of condoms may never be resolved.

Uganda's approach between 1986 and 1991 was to get the message out through all means possible and to attempt nothing less than changing peoples' sexual behavior. President Museveni encouraged youth to delay sex until they were married, and urged those already sexually active to be faithful to one partner only (this and fidelity within polygamous marriages are called "zero-grazing"). President Museveni recalled these days in a recent BBC interview, "When I had a chance, I would shout at them 'you are going to die if you don't stop this [risky sexual behavior]. You are going to die!'"

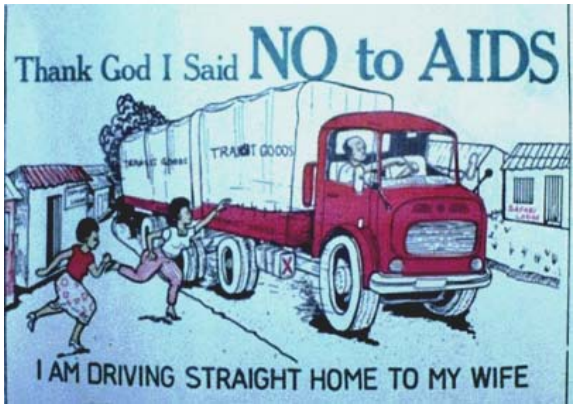
An important yet overlooked point about Uganda's early program is that there was a ***deliberate strategy of fear arousal***. Fear was the weapon used to break through denial. But after arousing fear, people were given clear behavioral options for avoiding the feared outcome: A, B, or C. The message was that "you really have to go out looking for AIDS, it is not all that infectious. It is not caused by witchcraft or by God's will. You have to almost seek it deliberately through promiscuity."[14]

In the western model of AIDS prevention, we do not deliberately arouse fear, we would never use a word like promiscuity, nor do we really address sexual behavior, let alone promote abstinence or faithfulness.

What Posters Illustrate

It's useful to look at a few representative Ugandan AIDS education posters used during the period 1986–1991. The first shows a skull and crossbones and proclaims the message: "My quick pleasure led to a slow, painful death." **(Illustration 1)** Contrary to the belief of most AIDS experts, fear ***is*** an effective motivator of behavior change. A recent meta-analysis exploring the role of fear arousal in behavioral change shows that Uganda was on the right track. According to Witte and Allen, "It appears that strong fear appeals and high-efficacy messages produce the greatest behavior change, whereas strong fear appeals with

low-efficacy messages produce the greatest levels of defensive responses."[15] These authors also emphasize that low-fear appeals are universally ineffective. It is instructive to compare USAID-funded Zambian radio and television spots regarding premarital sex to homegrown Ugandan messages.



Zambia: "It's not worth the trouble" and "Stay focused [on schoolwork]"

Uganda: "Practice ABC or you will D-for Die!" and "***Change*** your behavior or you're going to ***die***!"

Ugandan messages even targeted cross-generational sex and long-distance truck drivers. One Ugandan poster **(Illustration 2)** shows two schoolgirls pulling a friend away from a well-dressed middle-aged male with money in his hand (ie, a "Sugar Daddy").

Another Ugandan poster **(Illustration 3)** depicts a long-distance truck driver pulling out of a roadside stop while two young women run after him. In any other country, the caption would have something to do with not leaving home without your condoms. In Uganda, the caption was, "I am driving straight home to my wife." This poster shows that even those at high risk, usually thought to be beyond the reach of a "Be faithful" message, were considered capable of changing their sexual behavior.

Did behaviors change in Uganda?

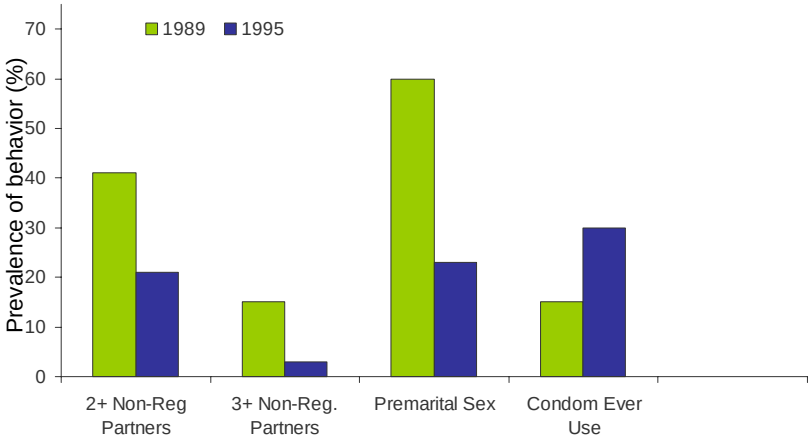
What impact on sexual behavior did Uganda's unique approach to AIDS prevention actually have?

WHO surveys in 1989 and 1995 show that the proportion of males aged 15–24 years reporting premarital sex decreased from 60% in 1989 to 23% in 1995 **(Figure 2).** For females, the decline was from 53% to 16% **(Figure 3).** Looking at all age groups, 41% of males had more than one sex partner in 1989. This declined to 21% by 1995. For females, the decline was from 23% to 9%. Furthermore, the proportion of males reporting three or more sex partners fell from 15% to 3% from 1989 to 1995.

One of the conclusions of the Phase I Report of the USAID-supported ABC Study is: "Regarding the important 'core transmitter' group of men reporting three or more non-regular partners in the previous year, there was a very large decline in Uganda [in the GPA surveys, from 15% in 1989 to 3% in 1995]. This figure remained low (2%) at the end of the decade…"[16]

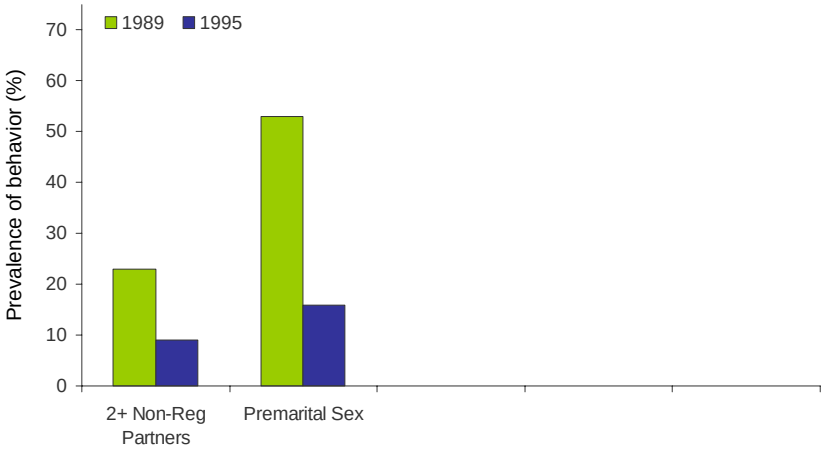
The same USAID report notes Demographic and Behavioral Health Survey (DHS) findings that support WHO survey findings of a decline in premarital sex. The proportion of never-married 15- to 24-year-old women who report having had sex in the past year declined from 35% to 22% (data for males unavailable).

Figure 2: Changes in sexual behavior among males aged 15 –24 years, Uganda



Source: WHO/GPA surveys, 1989 and 1995

Figure 3: Changes in sexual behavior among females aged 15–24 years, Uganda



Source: WHO/GPA Surveys, 1989 and 1995

Table 2: Types of reported behavior change in Uganda

Marital status/ gender	Delayed first or stopped sex	Restricted sex to one partner	Began using condoms	Did not change behavior
Never Married				
% Male	29	27	17	15
% Female	38	29	3	29
Married				
% Male	-	66	5	11
% Female	-	58	1	38

Source: Demographic and health Surveys, Uganda

Tables 2 and 3 summarize findings of two different surveys in Uganda. Never married people were asked (Table 2), "Have you changed your behavior as a result of AIDS? If so, in what way?" Males (29%) and females (38%) answered that they abstained or delayed sex. Almost as many answered "restricted sex to one partner." Nearly two-thirds of married persons also answered "restricted sex to one partner." A more recent survey by the Ugandan Ministry of Health **(Table 3**), has two response categories that suggest monogamy – being faithful, or "sticking to one partner." These two answers were by far the most common ones given to the behavior change questions.

Table 3: Types of reported behavior change, three Ugandan districts, 2000–2001

District	(*N*)	Abstained	Faithful	Stuck with one partner	Used condoms
Mbarara	1,354	14	34	39	8
Masindi	1,314	11	29	50	7
Mukono	1,377	13	16	50	15

Source: Ugandan Ministry of Health

Role of condoms in Uganda

Despite overwhelming evidence that abstinence ("**A**") and faithfulness ("**B**e faithful") were the primary behaviors adopted, another behavioral change intervention – condom use ("**C**") – is often credited for Uganda's success. For example, the authors of a 1999 issue of *Population Reports* assert, "In Uganda condom use increased and HIV prevalence decreased following a national AIDS prevention and condom promotion effort."[17] Studies crediting condoms with Uganda's success continue to appear, including one from the Alan Guttmacher Institute published in December 2003.[18] Although many of these papers give no credit to primary behavior change, a few very recent papers, including another one by the Guttmacher Institute, have started to acknowledge its contribution, while still overestimating the contribution of condoms.

Media reports, which shape perceptions in the general public, are similarly dismissive of the role of primary behavior change in Uganda's success in turning the tide of the HIV epidemic. A 2000 news magazine cover story about AIDS in Africa points out that there is at least one success story to learn from – Uganda. Newsweek told its readers, "In Uganda…health workers turned Protector condoms into must-have fashion accessories, simply by introducing a flashy new package and a marketing slogan ('So strong, so smooth')."[19] No other method of prevention was even mentioned. Of course, reporters only know what AIDS experts tell them.

What was the actual contribution of condoms in Uganda? It is impossible to know, because most condom use is inconsistent, and there is no evidence that inconsistent condom use actually protects against HIV infection. Paradoxically, most major behavioral surveys such as the DHS do not even ask a question about consistent condom use. At least we know what proportion of Ugandans report other types of condom use. According to the DHS, about 6% of sexually active Ugandans reported

condom use during last intercourse with any category of partner. Concurrently 95% of Ugandans were exhibiting **A** or **B** behaviors.[20] By 2000, condom use had risen to 11% in sexually active Ugandans, or 8% of all Ugandans. On the other hand, condom use in Uganda has become quite high among those who need them most, namely those relatively few who are still having multiple partners (eg, as of the mid-1990s, condom use was reported to be over 95% among commercial sex workers and their clients).[21] Yet we still do not know about consistency of condom use.

Conclusions

Some general conclusions can be made about AIDS prevention in countries with generalized epidemics. All three **ABC** behavioral changes are probably necessary for optimal impact on HIV prevalence at a national level.[22] Nevertheless, it is unrealistic to expect high levels of condom use in the general population in Africa or anywhere else. Not only may condom promotion efforts prove wasteful, they may actually "backfire" and result in disinhibition, the phenomenon where people feel safer than they ought to when using condoms, and therefore engage in higher risk behavior than they would if they were not using condoms at all. This phenomenon is also referred to as risk compensation.[23]

Contrary to what most western experts believed until recently, people ***can*** change their sexual behavior. And they seem more likely to do this when **A** and **B** programs are implemented in the Uganda manner – young people are reached with the abstinence or delay message before they become sexually active, and those who are already sexually active are provided the clear, consistent, fear-arousal message that engaging in sex with multiple partners leads to death from AIDS, while sticking to one partner (zero grazing) prevents this outcome. Findings from Senegal, Jamaica, the Dominican Republic, and Thailand demonstrate that attempts to influence sexual behavior can lead to primary behavior change across multiple cultures.[24]

Promotion of abstinence and faithfulness are not as difficult as many in the donor community think. Nothing mysterious, complicated, or especially technical was found in programs that have successfully promoted interventions of this sort.[25] To the contrary, "A and B" programs seem to enjoy certain advantages over condom programs. The main advantage is that abstinence and faithfulness are in accord with prevailing cultural and religious norms and ethics. On the donor side we sometimes forget that most Africans are rural, religious, and traditional. If we would not send dancing girls to toss condoms to teenagers from a pickup truck broadcasting rock and roll in rural America, why would we think this is a good approach in an African village?

On a positive note, the President's Emergency Plan for AIDS relief (PEPFAR), an initiative to combat the global HIV pandemic, was announced in the 2003 State of the Union address (http://www.whitehouse.gov/news/releases/2003/01/20030129-1.html). Capitalizing on recent advances in antiretroviral (ARV) treatment, life-prolonging drugs will be provided to millions of HIV-infected people in Africa and the Caribbean. Funding has also been allocated for voluntary counseling and testing (VCT) – the entry point to treatment – and for care and support of HIV-infected individuals and orphans.

Although western authorities often proclaim that we cannot expect behavior change unless people know their infection status, it

must be pointed out that the majority of behavior change in Uganda, Senegal, and elsewhere occurred prior to widespread access to VCT (for instance, by 2000, only 10% of Ugandans have been tested for HIV). Moreover, although there is no clear evidence that VCT leads to behavior change and HIV prevalence decline, such evidence does exist for the ABC approach.

Recently many global and domestic AIDS experts have grown quite negative and defeatist about AIDS prevention, dismissing it as complicated and complaining that "it's extremely hard to change behavior." The reason most experts have become defeatist about AIDS prevention may simply be that we on the donor side have not been doing prevention the right way. Generalized epidemics have not yet been ameliorated by the social marketing of condoms, and this is unlikely to change. If the counseling or "C" element of VCT is based exclusively on condom promotion, then VCT is unlikely to have much the desired impact on HIV prevalence rates. But if we do AIDS prevention ***right***, if we follow the Uganda **ABC** model, there is no reason to expect that Uganda-like results cannot be achieved in the 14 countries targeted by PEPFAR. Effective prevention is needed ***now more than ever*** **–** and the best prevention approach seems to be **ABC**.

Uganda post-script

Unfortunately, AIDS prevention efforts in Uganda today are similar to those in neighboring countries with high HIV prevalence rates. This is because most major donors have funded risk reduction interventions and neglected risk avoidance. This may not bode well for Uganda's future. On the bright side, both USAID and the $15 billion President's Emergency Plan for AIDS Relief (PEPFAR) have recently adopted the Uganda ABC model for generalized epidemics. Amendments to the 2003 AIDS Bill require funds to be spent on abstinence programs and encourage the participation of faith-based organizations in AIDS prevention efforts.

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AIDS and Behavioral Risk Avoidance in Uganda: Evidence for an Effective Social Vaccine and Challenges to its Replication

Rand L. Stoneburner, MD* and Daniel Low-Beer, PhD

Abstract

Background: HIV prevalence in pregnant women in Uganda decreased from approximately 30% to less than 6% from 1990–2000. Similar data were observed for the general population and military conscripts. Uganda is the only country in the world where HIV prevalence in a heterosexual population has undergone such a dramatic and sustained decline.

Methods: HIV data from surveillance, antenatal clinic surveillance data, other collateral sources of HIV surveillance data, and behavioral data from demographic and health surveys and other population-based behavioral surveys were analyzed. Data from Uganda and other sub-Saharan African countries as well as for Thailand were analyzed. Determinants of behavior change, including risk avoidance, partner reduction, condom use, and abstinence, are examined and factors associated with the Ugandan social communication process are discussed.

Results: HIV spread by consensual sexual intercourse is preventable if populations are activated to avoid risk behaviors. Uganda provides the best example of this strategy, where HIV prevalence in a generalized heterosexual epidemic declined nearly 70% since the early 1990s and was associated with a 60% reduction in casual sex. The Uganda HIV prevention approach appears to be associated with greater communications about HIV/AIDS and people with AIDS through social networks. In contrast, despite substantial condom use, voluntary counseling and testing, and treatment of bacterial sexually transmitted infections, other African countries have not experienced similar HIV declines or behavioral responses. HIV prevalence declines in Uganda suggest a social process preceded behavioral risk avoidance at the population level. The Uganda approach may be more effective and economical than other strategies, including a potential medical vaccine. Analyses of HIV and behavioral data in Uganda and neighboring African countries, as well as the challenges to the maintenance and propagation of this effective intervention, are discussed.

Conclusions: The Uganda HIV/AIDS prevention program provides a model for a behavioral risk avoidance strategy in a population affected by a generalized HIV epidemic. This model is notable for its low cost and its effectiveness in reducing HIV incidence. A comparison of the Ugandan HIV epidemic and behavioral dynamics with those in other African countries allows distinctive elements in the Ugandan situation to be identified. Identification and elucidation of these elements could facilitate the transfer of the Ugandan intervention success to other countries with generalized HIV epidemics. It appears that the crucial element of social communication has not yet evolved in other high HIV-prevalence countries in Africa. Replication of this common-sense intervention success will require diligence and changes to the usual HIV/AIDS intervention approaches and their evaluation.

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Introduction

When I first began looking at Uganda's situation in 1995 and comparing it to that of neighboring countries, I really believed that the HIV declines observed in Uganda would naturally diffuse elsewhere. Classic epidemic theory teaches that epidemics often rise and crest before they decline. This dictum was reinforced for me in the early 1980s in New York City when I observed that strong warning messages led to behavior change and later to HIV prevalence declines in gay men.

So in the mid-1990s, I suspected that this might also happen in Uganda and that behavioral interventions would be involved. HIV declines in Uganda did, in fact, follow behavioral interventions, and I expected that the same phenomenon would also occur in neighboring countries. Over time it became clear that Uganda was different from its equally resource-challenged neighbors. What was Uganda doing differently? They raised the alarm and they fought with the resources at hand. It is not yet an entire win, but they are certainly on the road to solving this huge problem. In contrast, other countries have not responded so well, they have remained silent, and in those countries we still see significant growth of the HIV epidemic.

Methods

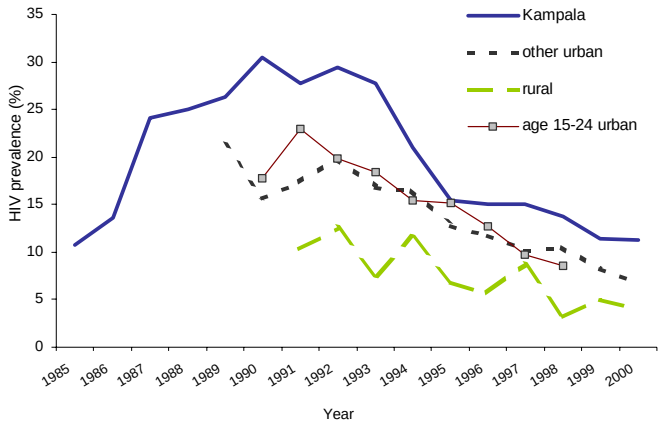
This work involved comparative analyses of HIV and behavioral data in Uganda and Kenya, Malawi, and Zambia for 1989 through 2001. HIV surveillance data from antenatal clinics and other collateral sources and population-based behavioral data from demographic and health surveys and other behavioral surveys were analyzed. Sexual behaviors and communication elements in these surveys and also collected some interviews and diaries regarding AIDS-related topics from individuals in South Africa were reviewed and analyzed.

Antenatal HIV prevalence trends in Uganda and neighboring countries

Over the period 1986–1996, HIV prevalence in pregnant women attending antenatal clinics declined from nearly 30% to less than 10% in both urban and rural areas of Uganda **(Figure 1)**. HIV prevalence in Kampala crested in 1991, then steadily declined thereafter. There was a 54% decrease in HIV prevalence in all age groups, with a 75% decline in 15–19-year-olds and a 60% decline in 20–24-year-olds. The particularly striking declines in the younger cohorts are key to what happened in Uganda. Prevalence trends in these groups best reflect incidence (new infections). In contrast, trends in antenatal HIV prevalence in neighboring countries for 1994 and 1998 demonstrate slight increases in Kenya (from 18% to 20%) and slight decreases in Malawi (from 17% to 14%) and Zambia (from 13% to 11%). Antenatal HIV prevalence in South Africa continued to increase over the period 1991–2001, and may now be leveling off at 25% **(Figure 2)**.

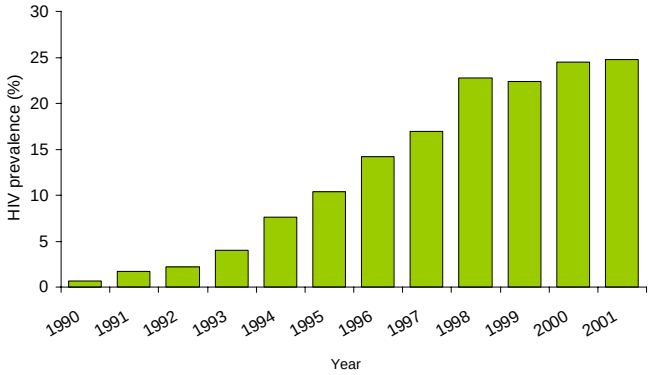
Although the intervention in Zambia is often compared favorably to that of Uganda, the HIV trends are markedly different **(Figure 3)**. While the epidemic began around the same time in these two countries, the precipitous decline in HIV since the early 1990s in both urban and rural Uganda is not evident in Zambia. In Lusaka, Zambia, HIV prevalence has remained consistently greater than 25% since 1990, while no significant decreasing trend is apparent through 2002.

Figure 1: HIV prevalence – pregnant women, Uganda 1985 – 2000.



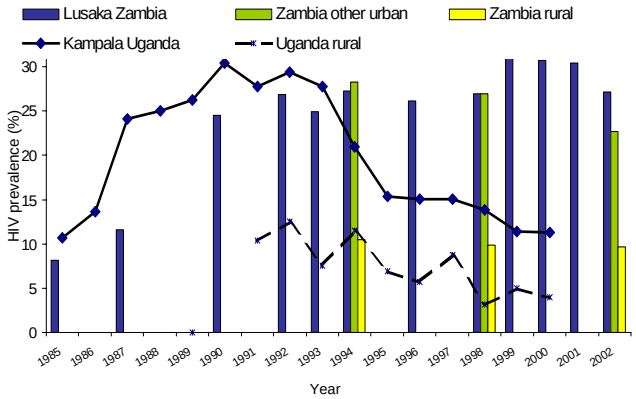
Source: Ministry of Health Republic of Uganda, U.S. Dept. of Commerce Bureau of Census

Figure 2: HIV prevalence – pregnant women, South Africa, 1990 - 2001



Source: Ministry of Health Republic of South Africa (2001)

Figure 3: HIV prevalence – pregnant women, Zambia and Uganda, 1985 - 2002



Source: Ministries of Health of the Republic of Uganda and Zambia

HIV prevalence trends in other population groups

HIV test results across a wide variety of populations in Uganda have demonstrated declines of the same order of magnitude since 1991. Surveillance data included results from blood donors, sexually transmitted disease clinic attendees, military recruits, and numerous other data sources, including population-based cohort studies.[1]

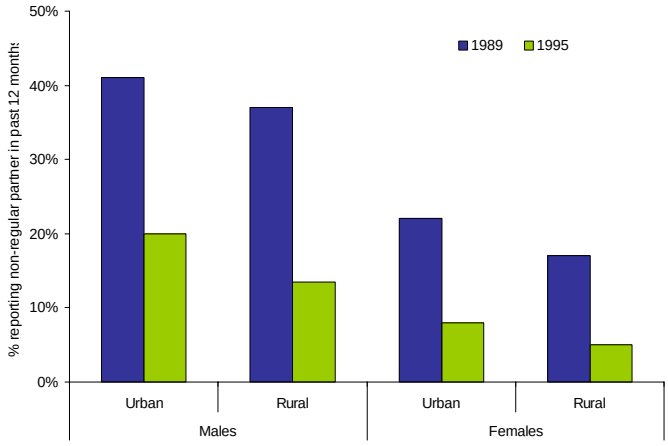
Behavioral response to generalized HIV epidemics in Uganda and other African countries

Starting in the mid 1980s, the "**ABC**" approaches of **A**bstinence/delay of sexual debut, **B**eing faithful/partner reduction, and **C**ondom use with nonregular partners were implemented in Uganda's HIV/AIDS prevention programs.

There is evidence that declines in HIV incidence in Uganda were linked to the promotion and adoption of risk avoidance behaviors within a social context of open communication regarding HIV/AIDS. This appears to be a more effective and economical HIV intervention than others that have been promoted, including potential medical vaccines of high efficacy. The distinctive factors in Uganda include primary risk avoidance, a 60% decline in casual sex from 1989 through 1995 – and notably – a unique social communication process.[2,3] The paucity of evidence for similar processes evolving in other regions of Africa is disturbing.

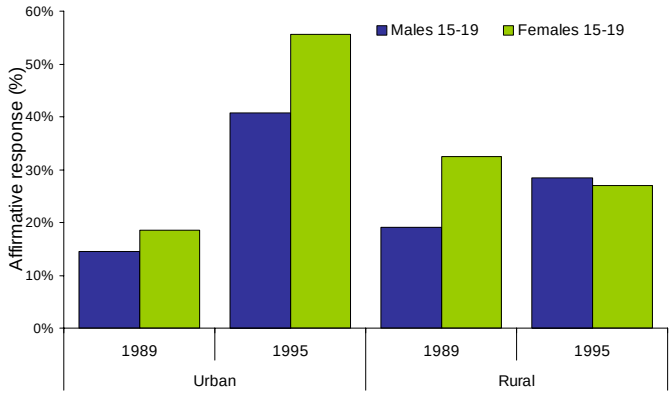
In Uganda from 1989 through 1995 there were marked decreases in casual sex with nonregular sex partners and increases in abstinence among 15- to 19-year-olds in urban populations and in rural males **(Figures 4 and 5)**. A comparison of casual

Figure 4: Casual sex in sexually active persons, Uganda, 1989 & 1995



Source: Ministries of Health Republic of Uganda, World Health Organization, Global Program on AIDS

Figure 5: Abstinence in persons aged 15 – 19 years, Uganda, 1989 & 1995

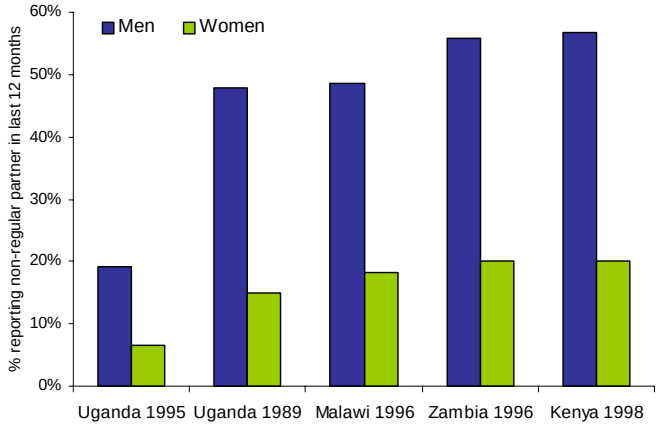


Source: Ministries of Health Republic of Uganda, World Health Organization, Global Program on AIDS

sex and condom use in Uganda, Zambia, Malawi, and Kenya during the mid-1990s shows that the proportion of Ugandans engaging in casual sex dropped substantially from 1989 and differed dramatically from the proportions in other countries; condom use, however, was similar in Uganda and the comparison countries **(Figure 6)**.

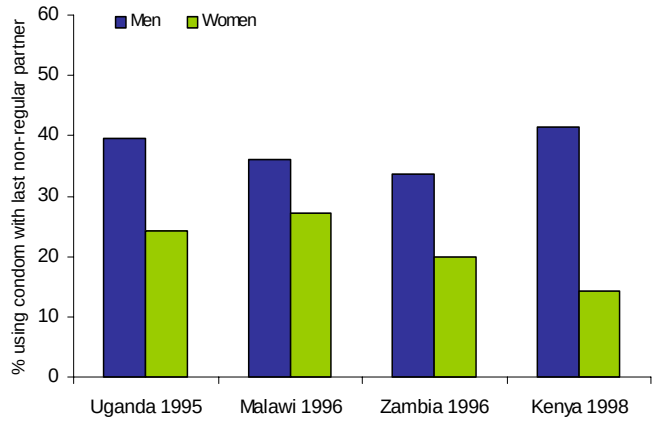
In the mid- to late-1990s, the proportion of Zambian, Kenyan, and Malawian males reporting casual sex was two to three times

Figure 6a: Persons reporting casual sex – Uganda, Zambia, Malawi, and Kenya



Source: Demographic and Health Surveys, (Macro) Calverton, MD

Figure 6b: Condom use with non-regular partners – Uganda, Zambia, Malawi, and Kenya



Source: Demographic and Health Surveys, (Macro) Calverton, MD

as great as the proportion of Ugandan males reporting casual sex. During the same time frame, the proportion of Zambian, Kenyan, and Malawian females reporting casual sex was four to five times as great as the proportion of Ugandan females reporting casual sex.

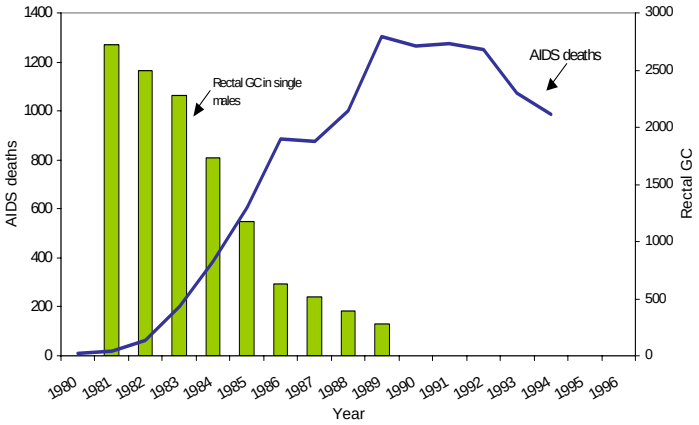
Though condom use with nonregular partners increased in Uganda from 1989 to 1995, by 1995 it was similar for both males and females in Uganda and comparison countries.

In contrast, the proportion of males aged 15–19 years in Uganda who were abstinent increased from 31% to 52% from 1989 through 1995, and exceeded the proportion of abstinent young males in Malawi (32%), Zambia (43%), and Kenya (44%).

Risk avoidance interventions in other situations

Risk avoidance interventions appear to have been successfully implemented in homosexual male and intravenous drug user populations during the early to mid-1980s in the United States and Western Europe. Local government and community groups voiced clear warning and risk avoidance messages in New York City during the 1980s. Shortly thereafter, precipitous declines in rectal gonorrhea were recorded among white males in New York City. This occurred around the same time that the first five AIDS deaths were reported **(Figure 7)**. These decreases in rectal gonorrhea and HIV have been attributed to primary risk avoidance (partner reduction) and to risk reduction (condom use). Even before the causative agent for AIDS was identified, a 1984 article described the effect of modifying sexual behaviors (partner

Figure 7: Rectal gonorrhea in white males and AIDS mortality trends in MSM; NYC, 1980 - 1995

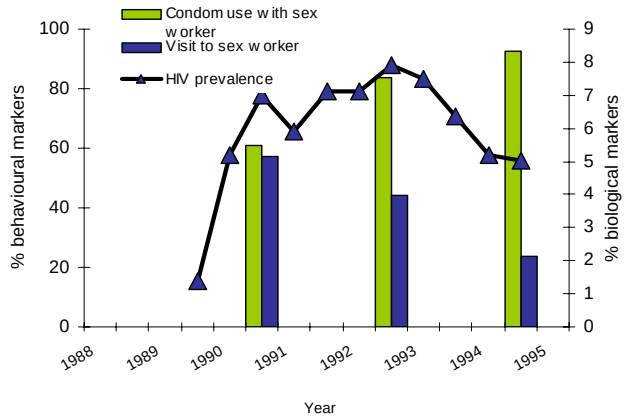


Source: New York City Department of Health

reduction and condom use) on the decline in AIDS cases in New York City and elsewhere in the United States.[4] Approximately 10 years later – prior to the arrival of antiretroviral therapy – the HIV mortality rate crested and began to decline; from 1988 through 1993 HIV prevalence declined by 64% decline among white men having sex with men (MSM).[5]

A similar phenomenon was observed in the early 1990s for heterosexual male clients of commercial sex workers (CSWs) in Thailand, where the government disseminated risk avoidance messages. Thailand's 100% condom use policy for CSWs and their clients often receives sole credit for the general population declines in STIs and HIV incidence and prevalence observed after its implementation (**Figure 8**). It should, however, be noted that another behavior change – a 60% decline in visits to sex workers was concomitantly observed. With fewer people visiting sex workers, exposure to and exposure of a "core transmitter" group was significantly decreased. In addition, the proportion of men reporting casual sex during the past 12 months declined 46%, from 28% in 1990 to 15% in 1993.[5]

Figure 8: HIV prevalence and male visits to sex workers and condom use; Thailand, early 1990s



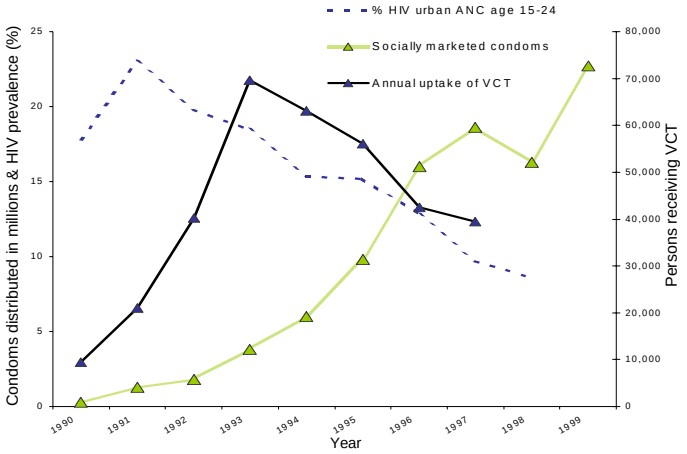
Source: Low-Beer D, Stoneburner R. African Journal of AIDS Research. 2003;2:9.

Alternative data representations and interpretations

Though many of these seroprevalence and behavioral data were available by the mid-1990s, how did they escape international notice? Why did it take until the 21st century for the multiple sources of confirming data to receive due attention? Some of the confusion regarding the interpretation of Uganda's intervention success can be attributed to reasonable caution in interpreting the complexities of HIV epidemiological and behavioral dynamics. However, much of the confusion can be attributed to a 1997 UN publication that understated the magnitude of the decline in casual sex from 1989 to 1995 by a factor of 7.[6] The propagation of this longstanding inaccuracy led to widespread disagreement on the impact of interventions in Uganda. For example, a 2002 *Lancet* article entitled "The Ugandan success story? Evidence and claims of HIV-1 prevention"[7] suggested that the success of Uganda's ABC program had been overstated. The catchy title and content were later echoed in an article entitled "Was the Uganda miracle faked?" in *The Economist*.[8]

Others have suggested that the prevalence decline was real but was caused by other interventions such as condoms, testing, or counseling. The data, however, belie such claims. **Figure 9** shows the temporal relationship of the prevalence decline in Uganda. The dotted line depicts the HIV decline in 15–24-year-olds attending ante-natal clinics in Kampala. The other two lines show annual number of persons receiving voluntary testing and counseling and annual distribution of socially marketed condoms. HIV prevalence began to decline *before* these other interventions began, strongly suggesting that risk reduction behaviors had been adopted *previously*.

Figure 9: HIV prevalence – pregnant women aged 15 – 19, and VCT and condom distribution, Uganda 1990 - 1999



Source: Ministry of Health Republic of Uganda

Conversation with a taxi driver in Uganda

Since I'm not trained as a social scientist, I usually don't try to decipher social processes. I was observing this communication process just as I would observe an outbreak to try to understand its cause. There was something palpably different about the Ugandan communication process. How did it come about?

When I first went to Uganda in 1996, I was educated by a taxi driver when I asked him about AIDS. Between Entebbe and Kampala, he couldn't stop talking about AIDS. I couldn't fit in a word. He told me all about the politics. He told me about his family members. He told me about everything in the village, and it just struck me. I'm an epidemiologist and I'm not too keen on touchy-feely, social science things and communication, but here was a member of the public who was teaching me.

And so I tested the hypothesis when I went to Malawi and Zambia and asked people about AIDS in their community. And I couldn't get them to talk, I just couldn't get anyone to talk. My reflections on this incident led to the hypothesis that something unique was occurring in Uganda, so we went to look for empirical evidence.

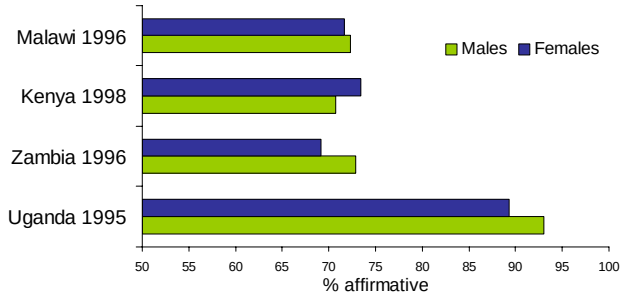
AIDS communication channels in Uganda and other sub-Saharan countries

So why did Ugandans, particularly males, respond differently? Was AIDS risk communicated differently? Did this communication more effectively personalize risk to change behaviors? Communications I had with Ugandans during the mid-1990s indicated that there was something quite different about the way they openly discussed AIDS, as contrasted with other countries.

When people in Uganda were asked if they knew someone with AIDS in their community, approximately 90% responded affirmatively – compared to about 70% of people in the neighboring countries of Malawi, Kenya, and Zambia **(Figure 10).** We also examined how people communicated about AIDS. In most countries, communication about AIDS occurs through channels such as pamphlets and brochures. In contrast, in Uganda, personal networks were reported as the primary source of AIDS information, with women (80%) being more likely to report this source than men (70%) **(Figure 11).** Somewhere in the process of transference of

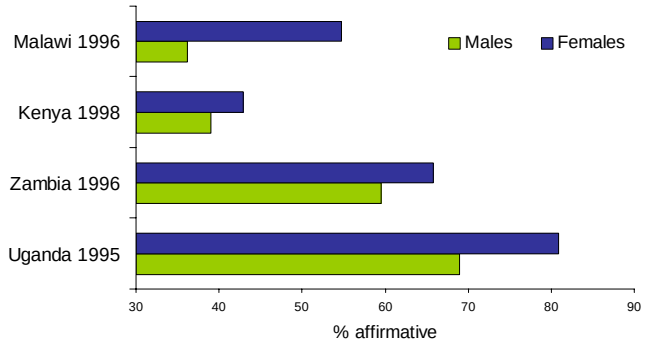
AIDS information from impersonal and mass media to community and personal levels, the information attained a higher value. There was something different about the process of the Ugandan experience which we think personalized risk and increased the adoption of risk avoidance behaviors.

Figure 10: Personal knowledge of someone who has AIDS



Source: Demographic and Health Surveys, (Macro) Calverton, MD

Figure 11: AIDS information via personal (friends and relatives) networks



Source: Demographic and Health Surveys, (Macro) Calverton, MD

In summary, there appears to be something unique about the social communication process in Uganda that is lacking elsewhere. Ugandans were allowed a social and political space to openly address and respond to the crisis at hand. In contrast, in other countries these types of communications were suppressed. The lack of transparency about the consequences of AIDS and its effect on communications is illustrated by a conversation among relatives and friends after a funeral of a young women in Soweto, South Africa in April of 2002.

Informant's recollection of a conversation after a funeral for a young woman in Soweto, South Africa, April 2002

My mother-in-law was visited by a neighbor who had just attended a funeral for a young woman. She asked the neighbor, "How did the funeral go?"
"It went well."
"What did she die from?"
"She had piles."
"Ah, shame she had piles. Why didn't she consult a doctor?"

Then, as the neighbor left the house, my mother-in-law said to herself, "AIDS is killing our children."

A diagnosis of piles was not credible. Everybody knew that "piles" really meant AIDS, but nobody could talk about it in the community. In a recent South African population survey in which people were asked whether they believed in a connection between HIV and AIDS, a quarter of the population said they didn't believe it. The reluctance of government leaders to provide an early unambiguous warning about AIDS has resulted in a situation in which the community response to AIDS has been stifled. This is evident in South Africa as well as in other countries in the region.

In contrast, Uganda's response included a clear warning by government and it comprised real community involvement coupled with a unique social communication process characterized by trust, honesty, and

confrontation. At a national level, this triggered an emotional response which translated to the behavioral outcomes of risk avoidance (**A** and **B**) and risk reduction (**C**) – the triad of **ABC**.

Transference obstacles and opportunities

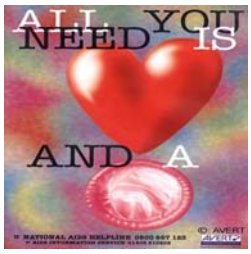
The Ugandan risk avoidance/ABC intervention model resulted in an 80% reduction in HIV incidence (new infections) among youth from 1991 to 1993 – the resulting decline in HIV is equivalent to a vaccine of high efficacy. The social process that catalyzed this response stems back to the late 1980s and preceded the widespread use of western interventions such as condoms and HIV testing services.

When considering the transference of this intervention, it is first necessary to understand why the knowledge that Uganda created did not naturally diffuse to neighboring countries. Was the diffusion of this Ugandan innovation hampered by local culture and politics or by broader health and development policy? How was the momentum lost and can it now be rekindled over a decade later? Given the availability of the data, health policy should have been better informed and the ABC intervention approach should have been more transparently debated during the late 1990s.

Aside from shortcomings in epidemiological intelligence, there are other potential obstacles to transference of this intervention. The Uganda response was based on fear-based reality engendered by the mounting death toll. More modern approaches soften the serious reality of the epidemic. Ted Green's paper discusses how perceived risk (ie, fear) is integral to risk avoidance – the Uganda fear models, the reality of the epidemic. **Illustration 1** shows UK posters from the late 1990s. "All you need is a heart and a condom, enjoy safer sex." And then from South Africa in 2002, the "LoveLife" ad is targeted to 12–17-year-olds. What messages are we sending youth about the reality of HIV? How do we sustain the level of alarm particularly now when there is a growing perception that AIDS therapies are curative?

Illustration 1: HIV Risk Reduction posters, United Kingdom and South Africa

UK, late 1990s



"LoveLife"
South Africa, 2002

It is also important to appreciate that ABC comprises a triad of behavioral outcomes triggered by emotional responses to the Ugandan risk avoidance intervention. How do we trigger the emotional response? What are the political and social barriers to the process that governments and communities need to overcome? The ABC risk avoidance intervention is not a prescriptive product that can be easily programmed or conveniently taken off the shelf, like voluntary testing and counseling (VCT), condoms, or drugs.

Implementation of the Ugandan intervention was relatively inexpensive, costing around $27 million between 1986 and 1990, or a

little less than $1 per year for each person aged 15–64 years living in Uganda.[9] Its epidemiological elements – risk avoidance, reduction in sexual partners, fidelity, and associated abstinence – were translated into the **ABC** policy. But how can this policy be translated into a "program?" We need to understand how to rekindle this catalytic emotional response to see further successes like those in Uganda – the costs of not doing so are catastrophic.

According to UN projections, more than 13 million persons in sub-Saharan Africa have been infected with HIV since 1995, for a total of nearly 30 million on the African subcontinent today. We can use these figures to calculate the hypothetical impact of a Ugandan-style intervention implemented and transferred successfully to other African countries. If an ABC intervention had been implemented in 1996, today 6 million fewer people would be infected with HIV.[9]

Finally, the role of political leadership is critical for achieving an intervention effect like that of Uganda's. Extraordinary political action is often inspired by bold leadership. President Museveni saw AIDS as a security threat to his country – a threat as severe as any posed by an invading force. However, the strategy was different – he needed to mobilize communities to protect themselves and bring about drastic changes in social norms related to sexual behaviors. Many have asked, "Can it be done without a Museveni?" I think it can. African political leaders, institutions, and communities can rise to the occasion and respond similarly if there is appropriate support.

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Condom Promotion for AIDS Prevention in the Developing World: Is it Working?

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Abstract

Background: The issue of condom effectiveness for the prevention of AIDS and other STDs has recently garnered much attention. Two decades of experience have provided new insights into the role of condoms for AIDS prevention in the developing world.

Methods: This literature review and synthesis included computerized searches of the scientific literature and review of conference presentations, publications of national and international organizations, and lay media.

Results: When used correctly and consistently, condoms are about 90% effective for preventing HIV transmission. Although condom use has produced substantial benefit in countries like Thailand, where both HIV transmission and condom promotion are focused on commercial sex workers and their customers, the public health benefit of condom promotion in countries with generalized HIV epidemics (ie, those with widespread heterosexual transmission) remains to be established. In Uganda, a country where a generalized HIV epidemic has been curbed, partner reduction appears to have been more important than condom use. While condom use has recently grown rapidly in many African countries, these same countries often continue to have high levels of HIV transmission. The impact of condoms is limited by inconsistent use, which provides little protection, low use in high-risk groups, and negative interactions with other risk reduction strategies, such as partner reduction.

Conclusions: There is no known example of a country that has turned back a generalized heterosexual epidemic of HIV primarily through condom promotion. Condom promotion is an appropriate strategy for high risk groups, along with counseling regarding risk avoidance. Realistic information about condom effectiveness should be provided whenever condoms are promoted. Rigorous research is needed to measure the impact of condom promotion and to determine how best to promote condoms (a risk reduction message) in a manner that reinforces risk avoidance messages.

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Introduction

As HIV prevention enters its third decade, it is appropriate to reassess what we have learned. This is especially true regarding condoms, the controversial mainstay of many AIDS prevention programs. Although opinions about condoms are not always based on evidence, evidence has, nevertheless, continued to accumulate. While many questions remain about condoms as a public health strategy for AIDS prevention, we now know a great deal more than we did two decades ago.

For condoms to work, they must be effective and people must use them. Many other factors, including who uses them with what partners and how consistently and correctly they are used, contribute to their public health impact, as does the effect of condom promotion on other behaviors. Fortunately, we can now move beyond debating how well condom promotion *might* work to examining how well it *has* worked. Countries with successful AIDS control efforts and the role of condoms in these efforts are especially instructive, as are some less successful examples.

Methods

This presentation is based on a review of condom promotion for AIDS prevention in the developing world that was conducted for the Joint United Nations Program on AIDS (UNAIDS). Sources include computerized searches of peer-reviewed scientific literature, publications of UNAIDS and other international organizations, conference presentations, and national AIDS control program documents. Where appropriate, information from the lay press and internet was also reviewed. Data presented were selected based on reliability and relevance, with priority placed on rigorous scientific studies and public health examples with sufficient documentation to determine the impact of condoms. Interpretations and recommendations are the author's and do not necessarily reflect the views of UNAIDS.

How effective are condoms?

Efficacy ("theoretical effectiveness" or "method effectiveness") is how well an intervention treats or prevents a condition when used perfectly; in contrast, *effectiveness* ("use effectiveness") is how well an intervention works in practice.[1,2] In the hypothetical case, if HIV transmission without condoms were, say, 10%, and with perfect use (as in a laboratory setting) transmission was reduced to 1/100 of the rate without condoms (from 10% down to 0.1 %), then *method effectiveness* (efficacy) would be (10−0.1)/10, or 99%. However, if in actual practice, condoms reduced HIV transmission by only 1/10, then transmission would be reduced from 10% down to 1%. Hence, *use effectiveness* would be (10-1)/10, or 90%.

Regarding condom efficacy, people quote figures to say that if condoms are used perfectly, they're 98%, 99%, or even 100% effective. You actually hear people say this all the time – that you can only get HIV through "unsafe" sex, which implies that condoms are 100% effective if you use them. I have no idea of the source of data on which people are basing these numbers, and it's not because I haven't looked. As far as I can tell, they just quote each other.

The truth is, we don't know the efficacy of condoms in *perfect* use and we never will know. Fortunately, we don't really need to know efficacy in perfect use since all that matters from a public health point of view is how effective they are in *actual* use. That's

not easy to measure, but at least it is measurable. Our most reliable data on this topic come from studies of discordant couples – couples who come to medical attention in which one partner is positive and one is negative, who are then followed longitudinally to see whether HIV transmission occurs (ie, whether the uninfected partner gets infected or not). A number of such studies have been performed worldwide **(Table 1)**, although maybe not as many as people might guess or imagine.

Condom effectiveness is determined in these discordant couple studies by comparing the proportion of "always" user-couples in which the HIV(-) persons seroconvert to the proportion of "never" user-couples in which the HIV(-) persons seroconvert. It should be noted that all couples are urged to use condoms throughout these studies. "Never" users are different in many ways from "always" users; couples who don't use condoms use more drugs and alcohol [3,4] have more additional partners,[4] and may be younger or engage more in practices like anal sex that facilitate HIV transmission.[5,6]

Estimates of condom effectiveness from individual studies vary widely.[3,7,8] Differences may be due to random variation, how correctly condoms were used and how their use was ascertained, and other confounding factors. Several meta-analyses have attempted to combine the available data.[3,7,9,10] The most rigorous of these estimated condom effectiveness to be 94%.[10] Two other recent meta-analyses yielded effectiveness estimates of 87% and 80%, but lumped all couples together in the analysis rather than stratifying by study.[1,3,7,11,12]

Table 1. Seroconversion rates in cohort studies of HIV transmission within discordant couples

Study	Year	Site	Direction of Transmission	Condom Use		
				Always	Some	Never
Fischl	1987	USA	Not specified	1/10	-	12/14
Goedert	1987	USA	M+ F-	0/6		4/18*
Peterman	1988	USA	M+ F-	-	0/4	10/51
			M- F+	-	0/2	2/23
Roumelioutou	1988	Greece	M+ F-	0/37		12/16*
Johnson	1989	England	M+ F-	0/4		15/74
Laurian	1989	France	M+ F-	0/14	-	-
van der Ende	1988	Netherlands	M+ F-	0/2	0/3	0/8
Henry	1991	USA	M+ F-	-	-	1/1
Kamenga	1991	Zaire	M+ F-	1/50	1/10	-
			M- F+	3/56	1/1	-
Allen	1992	Rwanda	M+ F-	0/4	2/16	4/10
			M- F+	0/5	0/15	2/3
European	1992	5 European	M+ F-	0/83	8/74	74/314
Study Group		Countries	M- F+	0/41	4/47	15/104
Siddiqui	1992	USA	Not specified	0/7	0/6	0/9
Saracco	1993	Italy	M+ F-	3/171	8/55	8/79
Musicco	1994	Italy	M+ F-	5/243	-	-
O'Brien	1994	USA	Not specified	-	0/4	0/2
Deschamps	1996	Haiti	Not specified	1/42	6/45	13/90
Hira	1997	Zambia	M+ F-	0/30	5/49	-
Total				14/805	35/331	172/816

M+ F- indicates transmission from an infected man to a female partner
M- F+ indicates transmission from an infected woman to a male partner
Source: Weller S et al., Pinkerton SD et al., Davis KR et al.

Given the conflicting numbers and methodological difficulties, it seems reasonable to conclude that condoms are roughly 90% effective, a figure close to their effectiveness for contraception.[3,13] Although condoms may very rarely be permeable to virus-size particles, leakage through latex accounts for only a tiny fraction of condom failure.[14,15,16,17,18,19] Most failure results from "flow" factors, such as breakage, slippage, and improper use.[20] This being the case, it is not surprising that effectiveness (risk reduction) is similar whether condoms are being used for HIV infection or pregnancy.

What often gets skipped over in discussions of discordant couple studies is the proportion of people who fall outside of the "always" use columns (59% for the studies in Table 1). So even over the course of a relatively short-term study in which both persons *know their serostatus* and are being *regularly counseled* to use condoms and are being *given condoms*, far less than half manage to use them always. It just makes me shudder when I hear people say, "If we just get everyone in for testing, that would solve the problem." Forget it.

Another very important thing to note regarding these studies is that there is a "some[times]" group of condom users. Data regarding the folks who fall into this middle column haven't received as much attention as they should. There appears to be a difference in whether "some[times]" condom use provides any protection, depending on whether one looks at discordant couples or the general population. For discordant couples **(Table 1)**, seroconversion rates are often lower in "some[times]" users than in "never" users. In contrast, seroconversion rates in the general population are often higher in "some[times]" users than in "never" users.

In many studies,[14,21,22,23,24,25] "some[times]" use of condoms appears to confer little protection in the general population. One possible explanation for this apparent contradiction is that "some[times]" users in the general population may indulge in more high-risk behaviors (such as drug or alcohol use) or may have more casual partners – perhaps because they believe that "some[times]" condom use will protect them. It is interesting to note that mathematical models suggest that a small number of people using condoms consistently can have more impact on an AIDS epidemic than a larger number of people using them inconsistently.[26] These conflicting results for discordant couples and the general population show that we need to be very careful about generalizing prevention approaches/messages from one group to the other, especially from discordant couples to the general population.

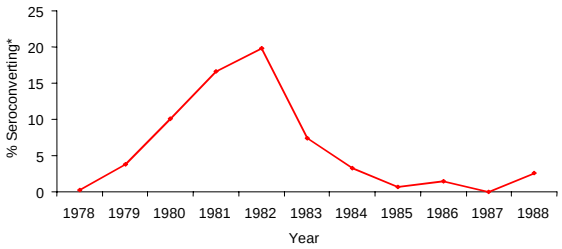
Can people be convinced to use condoms?

Going back to our original scientific question "Are condoms effective for individuals?" I think the answer is "Yes." We could debate about whether 90% is good or bad, but yes, they're definitely effective. The next question however is a public health question – in other words it concerns the general population rather than just individuals. Condoms are effective for individuals, but can you ever get enough people to use them to be effective for the general population?

Some of the first data suggesting that people can be persuaded to use condoms came from the gay community in my hometown, San Francisco. **Figure 1** shows HIV incidence for men who have sex with men (MSM) in San Francisco.[27] We don't know for sure how much of the dramatic reduction in

incidence that took place in the 1980s was due to use of condoms and how much to factors such as reduction in the number of partners. But almost everyone would agree that condom use played a significant role.

Figure 1: HIV incidence among men who have sex with men in San Francisco, 1978–1988

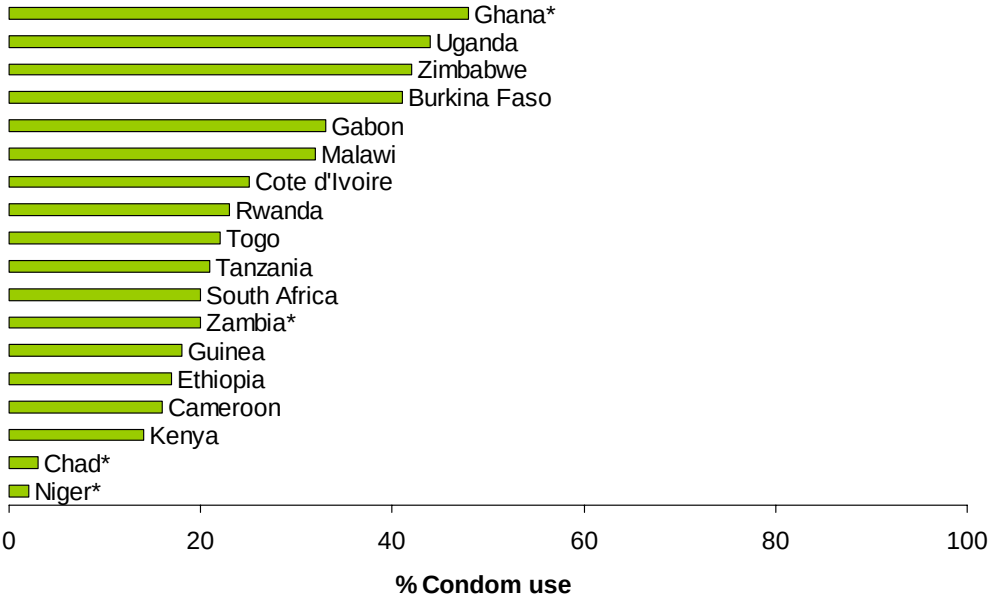


*The denominator is men beginning each year seronegative.

Source: Hessol N et al. Am J Epidemiol 1994

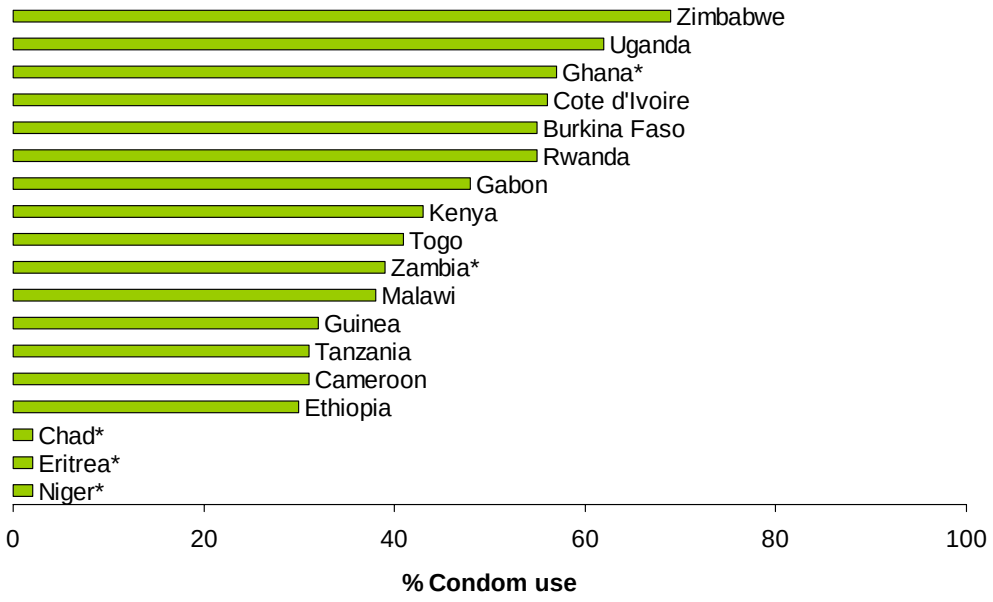
Promoting condoms for the general public is more difficult. Many governments, non-governmental organizations, and donors have tackled this challenge energetically. Measuring success is not simple. Counting the numbers of condoms distributed or sold can indicate the scope of effort but it does not indicate the proportion of high risk people who are using them. The Demographic and Health Surveys conducted in many countries routinely ask respondents if they had a noncohabiting sexual partner in the past year and whether they used a condom at last intercourse with that partner. The resulting indicator is often used to approximate condom use in high-risk sex. **Figures 2a** and **2b** show results for condom use at last high-risk sex encounter in 19 African countries for young males and females, a particularly important group epidemiologically in terms of risk for HIV infection and behaviorally in terms of establishing patterns that may last a lifetime.

Figure 2a: Condom use at last high-risk sex in past year among 15-24 year old females in Africa, 2001



Source: Human Development Reports, United78 Nations Development Program

Figure 2b: Condom use at last high-risk sex in past year among 15–24 year old males in Africa, 2001



Source: Human Development Reports, United Nations Development Program

People looking at this particular indicator (condom use at last sex with a noncohabiting partner) often forget that much of this indicator's impact at the population level is determined by the proportion of persons having multiple partners, and that this proportion varies quite dramatically by country. For example, by the late 1990s, only 6% of Ugandan females reported more than 2 sexual partners in the past 6 months as compared to Kenya (18%) and Cameroon (30%).[28] It is also unfortunate that this indicator makes no distinction between, for example, "always" use (100%) by 50% of people versus "sometimes" use (50%) by 100% of people. Although both would produce a value of 50% for the indicator, the former would have a much greater potential impact on HIV transmission than the latter.

During the 1990s condom distribution increased by 10- to 100-fold in many developing countries.[29,30,31,32] Despite this, current numbers of condoms in these countries are sufficient to cover only a small proportion of sexual encounters. Few people use condoms in steady relationships. In Nigeria, for example, 2% of respondents report always using condoms with a spouse or "concubine," compared to 33% for boyfriends and girlfriends and 67% for casual partners.[33] If condom use is high in casual sex but low with steady partners, the potential impact of condoms will depend a great deal on how much transmission is taking place within each of these types of partnerships.

What else is necessary?

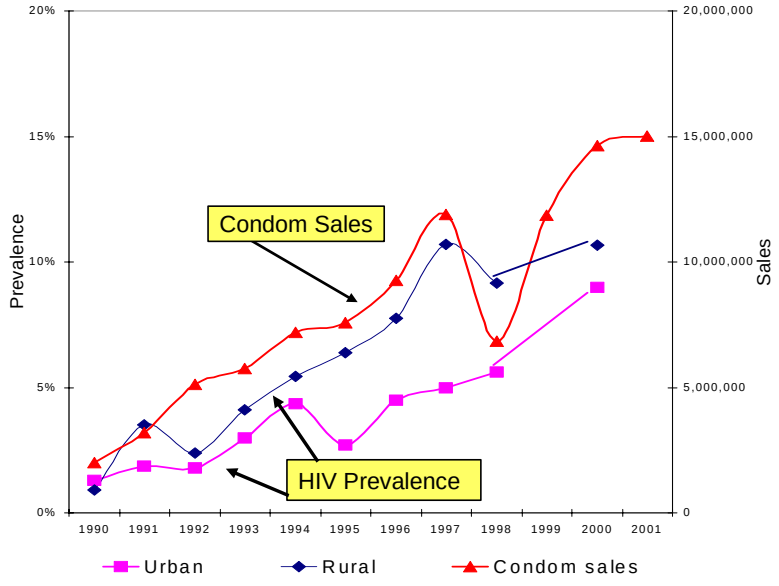
If condoms are effective and many people will use them, then condom use might seem to be the ideal strategy for AIDS prevention. Unfortunately, it is not so simple. While these are necessary conditions for condoms to be a successful public health strategy against the spread of HIV, they are not

sufficient. In many sub-Saharan African countries, high HIV transmission continues alongside high condom use.

Contrary to popular belief, there is little evidence to show that all this condom promotion we've been doing all these years in African countries with generalized epidemics has made any difference. In Cameroon **(Figure 3**), condom sales have gone way up, about 7-fold in a decade. Unfortunately, both urban and rural HIV prevalence have gone up right along with condom sales. Condom sales increased from six million in 1993 to fifteen million in 2001 while HIV prevalence rose from 3% to 9%.[34] We see this same phenomenon in Kenya **(Figure 4).** Condom sales are way up, about 20-fold in a decade. Meanwhile, urban and rural HIV prevalence have more than doubled. Botswana shows a similar picture, except it's even worse **(Figure 5)**. Condom sales have gone up, but prevalence has just continued going right on up to levels higher than many of us thought possible. In Botswana, condom sales rose from one million in 1993 to three million in 2001 while HIV prevalence in urban pregnant women rose from 27% to 45%. In some cities in Botswana, more than half of all pregnant women are HIV positive.

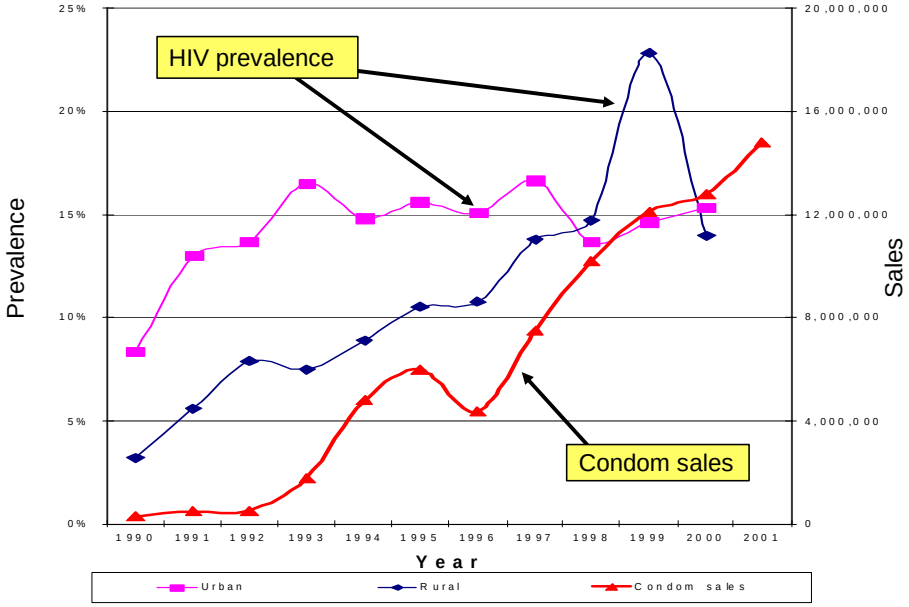
So what's going on? Condoms are effective. Their sales are going up, yet HIV prevalence doesn't seem to be impacted. We have to admit that, to date, **there are no clear examples of a country that has turned back a generalized epidemic primarily through condom promotion**. I'd caution folks against implying cause and effect from the data shown in these figures. It's very possible that prevalence would have gone up even faster had no one used condoms. But one thing is certain – a country can absorb a lot of condoms, but if the highest risk people aren't using them consistently, condoms won't do much good.

Figure 3: Condom Sales and HIV Prevalence Cameroon, 1990-2001



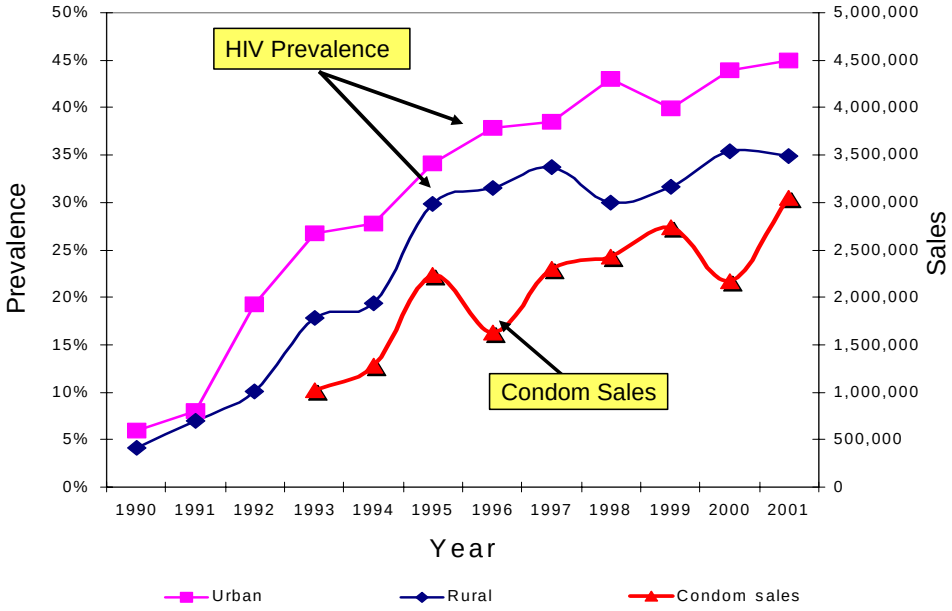
Source: PSI/ AIDSMARK

Figure 4: Condom Sales and HIV Prevalence
Kenya, 1990-2001



Source: PSI/ AIDSMARK

Figure 5: Condom Sales and HIV Prevalence
Botswana, 1990-2001



Source: PSI/ AIDSMARK

Reliable access is probably also a significant issue – particularly in countries where the population often lack basic needs.[35] As President Museveni of Uganda stated, "In countries like ours, where a mother often has to walk twenty miles to get an aspirin for her sick child or five miles to get any water at all, the question of getting a constant supply of condoms may never be resolved."[36]

Learning from success

In contrast to the discouraging global trend just described, countries like Thailand and Uganda have achieved notable success in AIDS prevention.[37] In Thailand, HIV began with a burst of transmission among injecting drug users, but transmission became overwhelmingly (90%) heterosexual shortly thereafter.[38,39] Public health officials quickly realized that commercial sex in the country's large sex industry was the focus of HIV transmission and responded with a "100% Condom Program" that mandates brothel owners to enforce condom use in every paid sex act.[37] The government did not directly discourage commercial sex, but mandatory condom use and awareness of risk appears to have dissuaded many men from frequenting brothels. While condom use exceeded 90%,[37] equally dramatic was the change in the proportion of men visiting sex workers – a 50% decrease.[40,41,42,43] Thai men also reduced the number of unpaid casual partners.[42] Rates of STIs fell rapidly,[44] and HIV incidence and prevalence are declining among both young men and pregnant women.[43, 45,46,47] Nevertheless, many sex workers continue to acquire HIV infection despite high condom use.[48]

In Thailand, HIV is focused in a core transmission group, a clear high-risk group, much like it is in San Francisco where the epidemic is concentrated among men who have sex with men. These are the places where we've seen big impacts with condoms – specific settings where you can get very high rates of use.

Unlike Thailand and San Francisco, Uganda's HIV epidemic spread in the general heterosexual population. In the 1980s, when Uganda had among the world's highest AIDS rates, they responded with a determined approach involving all sectors of society. More than 700 Ugandan groups, ranging from churches to nongovernmental organizations (NGOs) to the military, work on AIDS prevention. An active support group for persons with HIV encourages many Ugandans to come forward with their HIV status. Consequently, more Ugandans know someone with HIV than do other Africans [49] – a strong predictor of behavior change.[50] Since peaking in the late 1980s, HIV incidence has fallen substantially,[48,51] as demonstrated by surveillance among pregnant women,[52] military recruits, and the general population.[53]

Condoms were not central to the initial (ie, pre-donor) response to the AIDS epidemic in Uganda. Messages focused on delaying sexual debut, abstinence, being faithful to a single partner (called "zero grazing"), and condoms, roughly in that order.[41,48] Large-scale condom social marketing did not begin until the arrival of the foreign donors in the mid-1990s.[54] In fact, as late as 1995, only 6% of Ugandan women and 16% of Ugandan men had *ever* used a condom, with consistent use being much lower.[48] Although Ugandans now use more condoms, particularly with casual partners, these recent condom use rates cannot be credited for what happened earlier.[51]

Instead, the main cause of the falling HIV incidence was a substantial drop in numbers of casual partners, going from rates typical of the region to rates that are now much

lower.[48,55,56,57,58,59] For example, in 1995, only about 12% of Ugandan males and 5% of Ugandan females aged 15–19 years reported sex with a nonregular partner during the past 12 months, compared to about 50% and 30% respectively in neighboring countries.[60] This is the same young age group in which incidence and prevalence have fallen the most in Uganda.

Fortunately for Uganda, there weren't a lot of foreign experts there telling them how to do things in the late 1980s and early 1990s. So they did things their own way – that's when Museveni was going around with his bullhorn telling people about "zero grazing," and in the circles I travel in (the so-called AIDS experts), everybody thought he was a clown, a buffoon. Everybody made fun of him. Well, it turns out he was exactly right and we were all wrong. That's what got results. Ironically, after the Ugandans had turned their epidemic around, the foreign donors and experts started coming in about the mid-1990s, and they told the Ugandans, "You are doing a terrible job. You've got it all wrong. You don't have condom sales or use rates anywhere near as high as we have in successful countries like South Africa and Botswana. You've got to do this our way." That's when condom social marketing took off in Uganda, in the mid 1990s.

And right about the late 1990s is when I think Uganda had the best of both worlds. They had partner reduction and at the same time they had high condom use rates in casual sex. Although there wasn't a lot of casual sex going on – only 5% of the sexually active population – when it did go on, those involved had high condom use rates. And per capita condom consumption was low, because they didn't need as many condoms. Unfortunately though, there's been backsliding now. Many young people in Uganda today have never heard of "zero grazing" or, if they have, they think that's something for their parents. Ugandans have listened to the foreign experts too much and gotten the idea that modern AIDS prevention is just using condoms. While condom use continues to go up, casual sex is also going up, and in the last couple of years, after years of steady decline, HIV prevalence may be starting to tick up again. I'm worried about the future of the Uganda success story – the story we've so belatedly recognized.

Interactions with other prevention strategies

Interventions designed to change one behavior may also change others. Such interactions can be positive or negative and to date they have received far less attention than they deserve. For instance, Thailand's 100% Condom Use Policy appears to have had the unexpected side effect of dissuading many men from patronizing commercial sex workers.[42] Interactions also can be negative. A recent rise in STIs (including HIV) among MSM in many communities may have resulted, in part, from decreased perceived severity of HIV infection.[61] In theory, antiretroviral treatment should prevent HIV transmission by reducing viral load and infectivity.[62] Unfortunately, this benefit may have been outweighed by a negative interaction between treatment and sexual behavior.

Recommendations

So now I've gone through some of the questions we tried to answer. Are condoms effective? Yes. Can you get people to use them? Yes, you can, at least some of the time. But there are other questions. Can a generalized epidemic be overcome primarily through condoms? We have no clear examples of this yet. How can condom

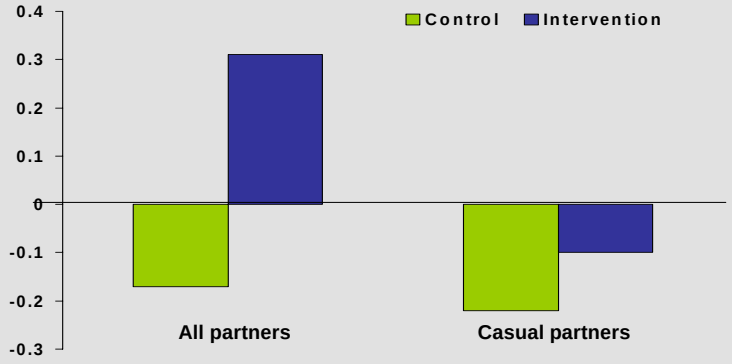
A cautionary note: unexpected side effects of a condom promotion program in Uganda

Figure 6 shows the results of some of our own research in Uganda, where I spent years involved in projects that tried to get people to use condoms. This study was a state-of-the-art condom promotion program for young men. The intervention group of 18–30-year-olds was strongly encouraged to use condoms and a similar control group was only given general AIDS information. Both groups were given coupons for free condoms. Sure enough, we found that the intervention group redeemed far more condom coupons than the control group. So the program was clearly successful in increasing condom uptake.

Unfortunately, at follow up, the intervention group also reported significantly *more* partners than the control group. In fact, in our intervention group the number of partners went up while in our control group the number of partners went down. And although the number of casual partners went down in both groups, it went down more in the control group. When you put both of these factors together, it actually turned out that our intervention group was at higher risk than our control group, even though they had higher condom use. Had we not gone back and looked at the data this way (as opposed to only looking at condom uptake, as we had originally planned to do), we would have reported a nice "success story" of another condom intervention in Uganda.

Figure 6: Condom Use in Uganda

Mean change in number of sex partners in the last 6 months: young men in peri-urban Kampala, Uganda, 2001–2002



promotion best be integrated into multifaceted HIV prevention? I think that's maybe the most important question.

Condom promotion programs must measure their impact better. It is not sufficient to simply report numbers of condoms distributed. Better measures would include rates of consistent use by type of partner. Programs aimed at the general public should also monitor numbers of partners, especially casual partners, particularly among youth. Fortunately, the need for better indicators to measure success in condom promotion is now receiving more attention.[63]

All interventions must avoid doing harm. While condoms are not harmful *per se*, condom promotion can do harm if it takes resources from better uses or, worse yet, undercuts more effectives strategies such as partner reduction or delay of sexual onset. It might also do harm if not accompanied by a steady and affordable supply of condoms. Anything less could encourage inconsistent condom use – certainly not an effective HIV prevention strategy.

Avoiding harm also means telling the truth: condoms are safe and effective, but not 100% effective. The common practices of telling people they can get HIV only through unprotected sex is simply not accurate. Avoiding overstatements about condoms may go a long way toward eliminating any possible conflicts between promoting condoms (to reduce transmission in high-risk situations) and promoting strategies that may prevent risk altogether: abstinence and not having multiple partners. Remember that the rates of condom use in Africa, including rates in places like Botswana, where people are reporting 60% or 70% condom use in casual sex, have yet to really put a dent in the HIV epidemic.

Condoms, when used consistently, are effective, but certainly not 100% effective. Condom promotion is proven to be effective among certain core transmission groups, such as commercial sex workers and men who have sex with men. But condom promotion for the general population has not yet produced the expected benefits. Sexual behavior change, on the other hand, is possible and can make a big difference in the epidemic. We don't really know how to do **ABC** like we know how to do **C**. We're Americans. We can sell things. We know how to sell items like toothpaste. We can sell condoms if the price is low enough.

But we don't really know how to go in and do **ABC**. The Ugandans did it for themselves, but we don't have a ready-made package to take off the shelf and use. We need to learn how to do this. What strategies work best? Do you know how much research has been done on this? Almost zero. Nobody has been studying this. It's really a shame. How can **A** and **B** be done so as not to discourage **C**? How can **C** be done so as not to discourage **A** and **B**?

We've got to get away from looking at condom sales and distribution – an indicator that is only important to condom manufacturers. Maybe Museveni had the whole thing just right when he went around telling people, "What you really need to do is A and B," and then under his breath, sort of spit out at the end "…and if you're really going to do something stupid anyway, at least use a condom."

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