

Written Statement for Testimony before the Subcommittee on Research and Science Education, House Committee on Science and Technology, hearing on "The Role of Social Sciences in Public Health"

Rayburn House, Office Building, Room 2318  
September 10, 2008

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- 1. Please describe your work to prevent the spread of HIV/AIDS among urban youth and other populations. What social and behavioral theories underlie your research? How do you apply those theories to design and test interventions that may reduce risky behaviors in your target populations? What are your measures of success?**

My colleagues and I have been conducting a program of HIV/STD risk-reduction research in urban populations. Our research program has several objectives. First, we seek to identify the social psychological factors that underlie HIV/STD risk behavior. Second, we seek to identify theory-based strategies that are culturally and developmentally appropriate. Third, we evaluate the efficacy of those strategies using scientifically sound methodology. This usually involves the use of a randomized controlled trial in which participants are randomly assigned to receive the intervention or to a control condition. A randomized controlled trial provides the most scientifically valid evidence for the efficacy of an intervention. Fourth, we address practical questions about the best way to implement HIV/STD risk-reduction interventions. For instance, we have examined whether the efficacy of an intervention varies depending on the race of the facilitator, the gender of the facilitator, whether the facilitator is a peer or an adult, and whether the intervention is implemented in single-gender or mixed gender groups. Finally, if an intervention is found to be efficacious, we seek to disseminate it so that it is available to providers who can employ it to curb the spread of HIV among their clients. This also leads additional research questions regarding the adaptation of evidence-based interventions to new settings and populations, factors affecting the adoption of interventions by service providers, and factors affecting the effectiveness of interventions when implemented by service providers and in new settings or populations.

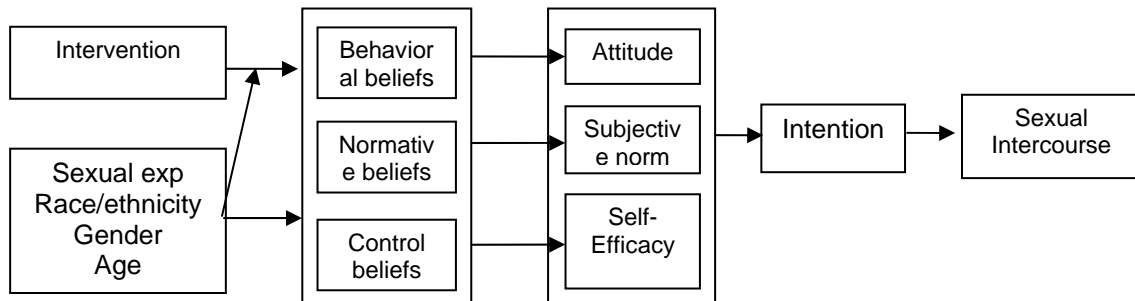
Our research has been funded since 1988 by the National Institute of Mental Health (NIMH), the National Institute of Child Health and Human Development (NICHD), the National Institute of Nursing Research (NINR), the Centers for Disease Control and Prevention (CDC), and the American Foundation for AIDS Research. We have conducted research with a diversity of populations, including inner-city African American adolescents, African American parents and their adolescent children, African American women clinic attendees, African American and Latino adolescent female clinic attendees, African American HIV serodiscordant couples where one partner has HIV and the other does not, African American men who have sex with men (MSM), middle class White college students, English-speaking and Spanish-speaking Latino adolescents, Xhosa-speaking South African adolescents, and Xhosa-speaking South African men. We have conducted our studies in a variety of settings, including schools, churches, universities, adolescent medicine clinics, women's health clinics, community-based organizations, low-income housing developments, and neighborhoods/communities.

To address the problem of HIV/STD in any society requires an array of interventions that can be implemented in a variety of venues by different kinds of facilitators. Accordingly our research has developed many different types of interventions. A contentious debate in the area of HIV education and sex education for adolescents has revolved around the extent to which interventions should emphasize sexual abstinence as opposed to condom use. We have developed safer-sex interventions emphasizing condom use, abstinence-only interventions, and comprehensive interventions stressing both abstinence and condom use. Another issue has been whether peer educators are more effective than adult facilitators in changing adolescents' sexual behavior. We have developed both peer-led and adult-led interventions. Most of our interventions have involved small groups of participants led by a facilitator or a pair of co-facilitators. However, we have also developed one-on-one individual interventions for certain circumstances: for instance, nurses serving women in a hospital clinic or service providers to African American MSM who may conceal their involvement with men and consequently would be unwilling to attend a small group intervention. We have identified several efficacious interventions, including Be Proud! Be Responsible!, Making Proud Choices—a Safer Sex Intervention, Making a Difference—an Abstinence Based Approach, Cuidate, which is a Latino-tailored adaptation of Be Proud! Be Responsible!, Sister to Sister, which is an intervention for African American women in clinical settings, Sisters Saving Sisters, which is an intervention for African American and Latino adolescent girls, and Let Us Protect Our Future, which is an intervention for South African adolescents. Of these interventions, Be Proud! Be Responsible!, Making Proud Choices, Making a Difference, Cuidate, and Sister to Sister have been included in dissemination initiatives of the CDC.

Our experiences in this area teach that two key characteristics of effective HIV/STD risk-reduction interventions are (a) grounding in behavior change theory and (b) tailoring to the population or culture served. The social and behavior theories that we have employed include the social cognitive theory and the reasoned action approach, which includes the theory of reasoned action and its extension the theory of planned behavior. We use social cognitive theory to suggest intervention strategies to achieve behavior

change, including skill building, modeling, reinforcement, and activities to build self-efficacy. We use the reasoned action approach to help identify beliefs that should be targeted by the interventions to achieve behavior change. We selected the reasoned action approach because it can be tailored to a variety of populations and cultures, which facilitates the development of contextually appropriate interventions.

Consider the theory of planned behavior. Briefly, according to the theory, the best predictor of a specific behavior is an intention or plan to engage in the behavior. Although it is understood that people do not always live up to their intentions, if a person does not plan to engage in a behavior, then it is highly unlikely that he or she will engage in the behavior. Research has demonstrated a strong longitudinal relationship between intention and sexual behaviors, including condom use and abstinence. The theory also suggests that a behavioral intention is determined by attitude, subjective norm, and perceived behavioral control or self-efficacy regarding the behavior. Thus, people should intend to use condoms if they evaluate condom use positively, if they believe significant others think they should use condoms, and if they feel confident in their ability to use condoms.



**Figure 1. Theoretical model of individual-level mediation and moderation of intervention effects on sexual intercourse. It illustrates that external variables, including the intervention and the moderators, influence behavioral beliefs, normative beliefs, and/or control beliefs. An arrow from the moderators intercepts the arrow from the intervention to the beliefs, indicating that the moderators influence the effect of the intervention on these beliefs.**

A valuable feature of the theory of planned behavior is that it directs attention to why people hold specific attitudes, subjective norms, and perceived behavioral control or self-efficacy. Behavioral beliefs about the consequences of engaging in the behavior determine attitude toward using them. For instance, adolescents may believe that sexual involvement may interfere with their ability to achieve their educational goals. With regard to condoms, people may believe that if they use a condom, their risk of sexually transmitted HIV infection or pregnancy will be reduced. On the other hand, they may believe that using a condom would interfere with sexual enjoyment. If I perceive that the consequences of a behavior are good, then I am more likely to engage

in the behavior than if I perceive that the consequences are bad. Normative beliefs about important referents' approval or disapproval of the behavior determine subjective norm. These significant referents might include peers, parents, other relatives, church members, or sexual partners. Adolescents might be less likely to initiate sexual involvement if they understand that their parents would strongly disapprove of their having sexual intercourse. On the other hand, it may be difficult for adolescents to practice sexual abstinence if they believe that all of their friends approve of their having sexual intercourse. Control beliefs about factors that facilitate or inhibit condom use determine perceived behavioral control or self-efficacy. This might include beliefs about the availability of condoms. If people are embarrassed to purchase or carry condoms they may not have them available when they need to use them. Impulse control beliefs concern people's confidence that they can control themselves enough to use condoms when sexually excited. Perhaps most emphasized in HIV prevention research are negotiation beliefs, which concern the people's confidence that they can persuade their sexual partners to practice sexual abstinence or to use condoms. Technical skill beliefs concern the people's ability to use condoms correctly and without ruining the mood.

Several other factors may affect people's sexual risk behavior, including prior sexual experiences, race/ethnicity, gender, age, poverty, gender-role beliefs, parental monitoring and supervision, parent-child communication, religiosity, and alcohol and drugs use. According to the theory these are external variables. The effects on intention and behavior of variables external to the theory are seen as mediated by their effects on the attitudinal component, the normative component, the perceived control component, or all three. In other words, external variables, including an intervention, may affect variables that are a part of the theory and through a mediation chain, influence behavior. For instance, gender-role beliefs may influence a woman's confidence that she can negotiate condom use with her partner and may thereby affect condom-use intention and condom use. External variables may also moderate an intervention's efficacy. For instance, girls initiate sex at an older age than do boys, and girls have less power over the use of condoms than do boys. Accordingly, gender may both predict sexual debut and moderate the intervention's efficacy in increasing condom use.

Given the way in which the theory explains the impact of external variables, the theory offers a clear prescription for the development of an intervention. We could design interventions to affect behavioral, normative, and control beliefs and through a mediation process influence intention and the targeted behavior. The theory also suggested a strategy for identifying the relevant beliefs: namely, target the salient behavioral, normative, and control beliefs in the specific population. Researchers can use qualitative research methods, including focus groups, key informant interviews, and elicitation studies, with the population to identify the salient beliefs. By targeting salient beliefs, an intervention may change attitude, subjective norm, and perceived self-efficacy, which would change intention, which, in turn, would change behavior. Identifying the population-specific salient beliefs serves to make the theory and the resulting intervention appropriate for the population. Perhaps most important, the theory suggested that the relative predictive power of the attitudinal, normative, and

control components of the theory could vary from population to population. Thus, the prediction of a behavioral intention might be different in middle-class white college students as compared with low-income African American women as compared with African American MSM, but the theory might have predictive value in each of these populations.

In developing our interventions we have conducted several phases of research. First, we conduct qualitative research with the population or culture, not only to identify the salient behavior, normative, and control beliefs regarding the behaviors we seek to change, but also to identify the contexts in which the behaviors occurs. An understanding of the context is essential to developing an intervention that is appropriate to the population. For example, knowing that adolescents are more likely to have sex when they are home can help researchers develop role-play scenarios regarding refusal to have sex that seem authentic to the participants. The second phase of research is to develop and employ a questionnaire to confirm that the salient beliefs identified are, in fact, related to the behaviors of interest. The third phase is to use the information from the first two phases to develop an intervention. In other words, the qualitative information about the culture or population and the quantitative information from the survey are integrated with the theoretical framework to create an intervention that is both grounded in the theory and tailored to the population or culture. The fourth phase is to pilot test the intervention, collect comments and criticisms from the participants and facilitators, and then design the final version of the intervention. The fifth phase is to test the efficacy of the intervention.

Randomized controlled trials provide the most scientifically sound evidence for the efficacy of an intervention. We measure the success of our efforts to develop efficacious interventions by examining the quantitative and qualitative results of the randomized controlled trials. We typically have three specific aims in testing the efficacy of the intervention. First, we examine whether the intervention significantly improved sexual behavior outcomes, including abstinence, condom use, unprotected sexual intercourse, and multiple sexual partners. In some studies, we also examine whether the intervention influenced biological outcomes, that is, reduced the incidence of sexually transmitted infections. A focus on STI is important because it provides an outcome measure that is objective and less likely to be influenced by a socially desirable responding by research participants. In addition, it provides an actual health outcome for the intervention. Typically, our second aim concerns moderators of intervention efficacy: namely, whether the intervention is more effective with some participants as compared with others. For example, does the intervention have a better effect on adolescent boys as compared with girls, virgins as compared with sexually experienced adolescents, or single people as opposed to those in committed relationships? Or perhaps the intervention has a better effect when implemented in single-gender groups as compared with mixed gender groups or when the facilitator is the same gender as the participant. A third aim of our research is to test the mediation of the effects of the intervention on behavior: namely, if it changes behavior, why did it changed behavior, and if it did not change behavior, why it failed to change behavior. This is very important to future research to improve the intervention. This involves

examining the theoretical mediators, that is, the beliefs the intervention targeted. Did the intervention actually have an impact on the beliefs it was designed to change? Were the beliefs related to the behavior we sought to change? By conducting this kind of mediation analysis a better understanding of why the intervention worked or did not work will emerge. Thus, we measure our success by examining whether the intervention changed behavior, whether it was more efficacious with some participants or under certain circumstances, and why it was or was not efficacious.

Here are some examples of studies we have conducted. In each study, we followed the five phases mentioned earlier in developing and testing the interventions. One randomized controlled trial tested the efficacy of clinic based HIV/STD interventions. African American and Latina adolescent girls at the adolescent medicine clinic of a children's hospital were randomized to one of three interventions focused on HIV/STD information, HIV/STD behavioral skill building, or general health promotion among, with 89% retained at 12-month follow-up (Jemmott, Jemmott, Braverman, and Fong, 2005). The skills building intervention participants reported less frequent unprotected intercourse and fewer sexual partners and were less likely to test positive for an STD at 12-month follow up, as compared with the health-promotion control intervention. The efficacy of the intervention did not differ between the Latino as compared with the African American girls. We developed the "Sister to Sister" HIV/STD risk-reduction curriculum and evaluated it in a randomized controlled trial with Black adult women at a women's health clinic in Newark, NJ (Jemmott, Jemmott, & O'Leary, 2008). Among the 86.9% that returned for 12-month follow-up, those in the Sister-to-Sister intervention had reduced unprotected sexual intercourse and biologically confirmed STD rates as compared with those in the health control group.

In another randomized controlled trial, Jemmott, Jemmott, and Fong (1998) assigned 659 African American adolescents to an abstinence intervention, a safer sex intervention, or a health-promotion control intervention. About 98% attended all sessions of the 2-session interventions, and 93% returned for the 12-month follow-up. The safer sex intervention significantly increased condom use compared with the control group at 3-, 6-, and 12-month follow-ups. The abstinence intervention significantly reduced self-reported intercourse at 3-month follow-up compared with the control group. This was the first randomized controlled trial demonstrating that an abstinence intervention was efficacious in reducing sexual involvement. The interventions were equally efficacious when implemented by peer co-facilitators as compared with adult facilitators.

Finally, we recently completed a randomized controlled trial developing and testing the efficacy of an HIV/STD risk-reduction intervention for young South African adolescents, "Let Us Protect Our Future" (Jemmott, Jemmott, O'Leary, Ngwane et al., 2008). We randomly selected nine matched pairs of schools and randomly allocated schools to either a HIV/STD risk-reduction intervention or a health promotion control intervention. Grade 6 students completed baseline, post-intervention, 3-, 6-, and 12-month follow-up surveys written in Xhosa following translation and back-translation from English. We found that a significantly smaller percentage of students in the HIV/STD risk-reduction

intervention reported having vaginal intercourse, unprotected vaginal intercourse, and multiple sexual partners, as compared with their counterparts in the health-promotion control intervention. The intervention's efficacy did not differ significantly between girls and boys. Thus, our intervention approach, which integrates qualitative information about a population with behavior change theory, can be applied successfully not only to diverse populations in the United States, but also to populations in sub-Saharan Africa where HIV is exacting its most devastating toll.

## **2. How might successful programs in behavioral interventions for AIDS prevention be scaled up, applied to other public health challenges, or otherwise used to better inform public policy?**

Considerable evidence from studies here in the United States and abroad documents that HIV/STD risk-reduction interventions can reduce sexual risk behaviors in a wide range of populations, including adolescents, women, men who have sex with men (MSM), substance users, patients in clinic settings, and other persons at risk. To have the most impact on the HIV/AIDS epidemic, these successful preventive interventions must be scaled up. We would argue that interventions would be easier to scale up if the intervention developers consider the likely end-users of the intervention during the process of development. In this way, they are more likely to develop an intervention that can be widely used than if practical questions are not considered from the very beginning. For example, if we are to develop an intervention for a broad range of African American MSM, we should consider not only whether it will be most efficacious when implemented by African American MSM facilitators, but also how realistic is it to scale up an intervention for African American MSM that must be implemented by African American MSM facilitators. If we know that women are the most common case managers for African American MSM, it might be more practical to examine whether women could successfully serve as facilitators of an intervention for the population. Clearly, an intervention that could be implemented by either women or African American MSM would be easier to scale up than one that must be implemented by African American MSM. This is just one example; the point is that efforts to scale up may be most successful if scaling up is considered from the beginning.

Certainly, in the early years of HIV/STD risk-reduction research, the emphasis was appropriately on discovering interventions that could successfully change behavior. Now, that we know we can develop interventions to change behavior it is appropriate to shift the emphasis and focus on the development of interventions that can be scaled up. Several issues need to be considered when we focus on scaling up, among them are adaptation, adoption, and effectiveness of interventions.

Research is needed on the how to adapt evidence-based interventions to meet the needs of different communities. This is important because to adapt is to change, and change may mean creating a new intervention that may or may not retain the efficacy of the evidence-based intervention. Research is needed to understand how to adapt interventions for new populations or settings while retaining the qualities that made the

interventions efficacious. In this connection, a distinction is sometimes drawn between core elements of an intervention and key characteristics of an intervention. Core elements are aspects of an intervention that are considered essential to its efficacy and therefore should not be changed, whereas key characteristics are not essential to achieve efficacy and therefore can be modified. More research is needed to more fully understand which aspects of interventions are truly core elements and which are merely key characteristics.

Research is needed on why evidenced-based interventions are or are not adopted. Although successful interventions are published in scientific, medical, and public health journals and therefore brought to the attention of researchers, academics, and professionals, the majority of service providers who work closely with populations at risk may remain unaware of the interventions. Thus, efforts must be made to disseminate successful interventions to likely end-users. The question then becomes whether these service providers decide to adopt the evidence-based intervention. The fact that service providers know that an intervention successfully changed behavior in a study does not necessarily mean that service providers will immediately adopt it. Other considerations figure in the decisions of service providers to use a given intervention. Research is needed into these decisions in order to devise effective strategies to encourage the adoption of evidence-based interventions. This may include research into ways to train service providers to implement the intervention, identifying and providing appropriate kinds of technical assistance, identifying barriers to adopting the intervention among all relevant constituencies. Examples of such barriers are funding, reasonable salaries for talented staff, high rates of turnover, organizational mission, and inadequate organizational capacity or infrastructure.

A third type of research needed concerns the effectiveness of evidenced-based interventions when they are disseminated. Such studies are sometimes called Phase IV trials and distinguished from Phase III trials designed to test the efficacy of interventions. Although carefully controlled Phase III studies employing well trained and monitored facilitators who adhere to the intervention protocol strictly may demonstrate that an intervention is efficacious, it does not necessarily mean it will be effective when implemented under less controlled real world circumstances. Thus, Phase IV trials are needed to identify factors that affect the effectiveness of interventions when implemented by service providers with their client populations in their settings. These factors could then be taken into account both in the development of future interventions that can be more successfully scaled up and in the training of providers in the use of interventions. Examples of factors that might affect the effectiveness of an intervention are characteristics of the organization, including organizational mission, the type of training the service providers receive, technical assistance, supervision of staff, and staff turnover.

Here is an example of a Phase IV effectiveness trial. After conducting several Phase III trials of the efficacy of the Be Proud! Be Responsible! intervention, we conducted a Phase IV trial of its effectiveness when implemented by service providers at community-based organizations (CBOs) serving African American adolescents 13 to 18 years of



age. We randomized 86 CBOs to implement "Be Proud! Be Responsible!" or a control health promotion intervention on diet and physical activity. In addition, we randomly assigned the CBOs to receive three different amounts of training. Each CBO implemented its assigned intervention with 6 groups of adolescents (N = 3,448), and we randomly selected 3 of the 6 to complete 3-, 6-, and 12-month follow-up surveys (N = 1,707). We found that adolescents who received the HIV/STD intervention were more likely to report consistent condom use than were those who received the health-promotion control intervention. In addition, the effectiveness of the intervention did not improve significantly when the CBOs were given more expensive and labor-consuming training. This finding suggests that an HIV/STD risk-reduction intervention whose efficacy has been established can be effective when implemented by CBOs, which play a critical role in the delivery of HIV/STD prevention services worldwide. Moreover, the training of the CBOs need not be especially expensive or labor-intensive to achieve desirable outcomes.

The findings from research on behavioral interventions to prevent HIV can be applied to other public health challenges. The leading causes of morbidity and mortality in the United States and in most parts of the world are health problems that are either caused by or affected by behavior and whose treatment or course are influenced by behavior. National health organizations throughout the world as well as international organizations all offer similar behavioral guidelines on how to reduce the risk of leading causes of premature death. These include guidelines regarding not only sexual behavior but also cigarette smoking, healthful diet, physical activity, alcohol consumption, and other use of other substances, screening behaviors, and treatment adherence. Given the focus on behavior, the same type of focus on behavior change theory and tailoring to the population is likely to be successful in efforts to address these other pressing public health issues.

We can say this with confidence because although we are primarily HIV/STD risk-reduction researchers, in all of our studies we also include a control group that receives an intervention. A common control group intervention is a health promotion intervention that focuses on how chronic diseases can be prevented by engaging healthful behavior. This usually involves focusing on fruit and vegetable consumption and physical activity as a means to reduce the risk of hypertension, heart disease, obesity, and certain types of cancer. In developing these chronic disease prevention strategies we employ the same phases of research as in developing the HIV/STD interventions. Thus, we conduct qualitative research to identify salient behavioral, normative, and control beliefs and the context of the behaviors and then integrate the information with our theoretical framework to develop the intervention. An example of the success of this approach is the trial we recently completed in South Africa with grade 6 students. Our health promotion intervention was efficacious. Students who received the health promotion intervention reported more fruit and vegetable consumption and more physical activity over the 12-month follow-up period than did those who received the HIV/STD risk-reduction intervention.

**3. Please provide an overview of the range of topics addressed by the Behavioral and Social Sciences division of the Penn Center for AIDS Research. What is the nature of the relationship between your division and the Center's other divisions in biological sciences and clinical research? How might social and behavioral research be used more effectively to guide or take advantage of biomedical research and vice versa? Given the potential for behavioral interventions to prevent the spread of HIV/AIDS and many other diseases, is the federal government investment in behavioral research reasonable relative to its total investment in research to prevent and treat these diseases?**

The Behavioral and Social Sciences (BSS) Core of the Penn Center for AIDS Research (CFAR) focuses on studies of risk behavior and outcome research as well as studies of epidemiologic, economic, and bioethical aspects of AIDS. Additional goals of this group are to develop strong linkages with the academic community of the University outside the Medical Center in order to establish a broad-based and comprehensive program in AIDS research. More specifically, the BSS Core services are guided by and designed to promote the following set of scientific priorities and principals: 1) Contextual circumstances (social, sexual, and drug using networks; community; geography) within which HIV transmission occurs and infection exists are crucial factors to understanding and responding to risk of infection, access and adherence to treatment; 2) Behavioral sciences have a critical role to play in the design and evaluation of clinical trials of both behavioral and biomedical interventions (microbicides, vaccines, and therapeutics); 3) Linkages between investigators (behavioral, clinical and basic), locally, domestically, and internationally is critical to the development of sustainable programs of innovative and meaningful AIDS research.

Members of the BSS Core have an impressive history of productivity over the past 20 years and continue to be active in the behavioral and social science aspects of AIDS. The work of these faculty include the development of important and widely applied theory, the design and implementation of theoretically based prevention interventions, and leadership and participation in multi-site clinical trials of behavioral and biomedical interventions. The BSS Program has a rich portfolio of active AIDS research characterized by close collaborations among program members and between CFAR programs. The following provides a brief overview of the current work of the program with particular emphasis on those studies that the CFAR has been instrumental in facilitating.

### **International HIV Prevention Research**

BSS program members have been actively involved in an expanding international research agenda. In collaboration with Penn investigators, the University of Botswana was recently awarded a capacity building grant by NICHD. Botswana has the second highest rate of HIV/AIDS in the world. A limited capacity and infrastructure for rigorous HIV/STD prevention research has hampered efforts to curb the spread of sexually transmitted HIV infection among adolescents in Botswana. Accordingly, the broad long-term objective of the grant is to build capacity and infrastructure to develop, implement,

and evaluate culturally competent, developmentally appropriate, sustainable interventions suitable for implementation in a variety of settings to dissuade Botswana adolescents from engaging in behaviors that increase their risk for sexually transmitted diseases (STDs), including HIV. This grant is a collaborative effort of a multidisciplinary team of researchers at the University of Botswana and the University of Pennsylvania to build such capacity and infrastructure at the University of Botswana. It is directed by Bagele Chilisa at the University of Botswana and John Jemmott at the University of Pennsylvania. The capacity building is organized around three cores. Qualitative and Quantitative Methodology Core, Social and Behavioral Intervention Core, and the Administrative Core. In addition, three research projects that draw upon the cores to address adolescents in different settings were proposed: School-Based HIV/STD Prevention, Church-Based HIV/STD Prevention, and HIV/STD Prevention for Adolescents Living with HIV. The Principal Investigator of each core and research project is a University of Botswana faculty member and the Co-Principal Investigator is a University of Pennsylvania faculty member. Penn BSS Core faculty involved in the Botswana project include J. Jemmott, L. Jemmott, Metzger, Fishbein, Blank, Heeren, Teitelman, Coleman, and Stevenson. In addition to the University of Botswana collaboration, Jemmott and Jemmott are implementing an NIMH funded school-based prevention program in South Africa and an NICHD-funded cluster-randomized controlled to test the efficacy of a HIV/STD risk-reduciton intervention among adult men in 48 randomly selected neighborhoods in Eastern Cape Province, South Africa.

George Woody's work evaluating naltrexone treatment for high risk heroin injectors in St. Petersburg has led to currently funded studies of naltrexone implants in St. Petersburg and methadone treatment among HIV positive heroin users in Ukraine. Woody is conducting a NIDA supported randomized trial examining the efficacy of oral naltrexone (an opiate antagonist) with and without fluoxetine for relapse prevention to heroin addiction in St. Petersburg, Russia. This study is being done in collaboration with investigators from the Pavlov State Medical University and the Leningrad Regional Center for Addiction Treatment. An important component of this research is the measurement of HIV risk behavior since intravenous drug use is the primary route of HIV transmission in St. Petersburg. The findings thus far suggest significant reduction of heroin use and injection related risk behaviors among those receiving naltrexone. Adherence rates for naltrexone are also substantially higher than those found in prior studies of naltrexone. A supplement to the Penn CFAR has extended the St. Petersburg work to study co-morbidities between alcoholism, heroin addiction, TB, hepatitis and HIV. These projects have laid the groundwork for a CIPRA application to fund an HIV education, treatment, prevention and research center at Pavlov. Woody has an ongoing collaboration with researchers at the University of Rio Grande do Sul in Porto Alegre, Brazil. This group recently reported the results of a sero-incidence study modeled after the longitudinal work being conducted in Philadelphia, among cocaine users in Porto Alegre. The study estimates an HIV sero-incidence rate of 5.03/100person years of follow-up. The findings of the work have formed the basis further prevention initiatives in Porto Alegre including the recent submission of a CIPRA application to establish a collaborative HIV research center. David Metzger is the protocol Chair for the HPTN 058, the first randomized trial of drug

treatment (suboxone) using sero-incidence as an endpoint. He is also an investigator on a NIDA supplement (Richard Schottenfield PI; Yale University) to evaluate Behavioral and Drug Risk Counseling in methadone treatment in Wuhan, China. The work in Wuhan has evolved from an earlier collaboration with WenZhe Ho and investigators from the Chinese CDC, which examined changes in immune function during detoxification at a detoxification center in Wuhan. Metzger has also completed research on ACASI risk assessments with Brazilian collaborators during the funding period. Metzger has been collaborating on several projects designed to develop assessments of HIV risk behaviors in Brazil. In Porto Alegre, the Risk Assessment Battery was adapted and evaluated for validity and reliability and in Rio De Janeiro an ACASI risk assessment has been developed and evaluated for use with drug using populations entering treatment.

Toorjo "TJ" Ghose, is a new investigator in the School of Social Policy and Practice, having joined the Penn faculty in 2007 after completing post-doctoral training at the Center for Interdisciplinary Research on AIDS (CIRA) at Yale University. He has recently been funded as part of the Penn CFAR Pilot study program to conduct a project entitled "Implementing PATH India: Reducing HIV risk among the dually-diagnosed in India", building on the work done domestically by Blank. This research examines HIV risk among treatment seekers at the All India Institute of Medical Sciences (AIIMS) in New Dehli who have been dually diagnosed with a mental health and substance use disorder. The pilot study comprises two phases, a first phase in which knowledge, attitudes, and risk behaviors are assessed for 200 persons, and a second phase in which PATH is translated and pilot tested for 20 persons in a randomized pilot study. Collaborators at AIIMS have been working with Ghose, an Indian native, for several years and have been full partners in the development of the pilot study.

Hans-Peter Kohler, a sociologist, Susan Watkins, a sociologist, and Jere Behrman, an economist, of the Population Studies Center, are leading an investigation of partnership patterns among couples in Malawi. This work, which received CFAR developmental funding initially and is now supported with NICHD funds, is built upon a longstanding social network research initiative Kenya. The goal of this project is to examine the role of networks in changing attitudes and behavior regarding family size, family planning, and HIV/AIDS in Malawi. The project focuses on two key empirical questions: the roles of social interactions in (1) the acceptance (or rejection) of modern contraceptive methods and of smaller ideal family size; and (2) the diffusion of knowledge of AIDS symptoms and transmission mechanisms and the evaluation of acceptable strategies of protection against AIDS (69-72). Behrman also has grant support from NICHD to examine how economic transfers that provide support for dependent children and elderly are affected in a context in which HIV/AIDS and poor health has weakened traditional support networks. Tukufu Zuberi, a sociologist and demographer in Penn's Population Research Center, directs the African Census Analysis Project in collaboration with social scientists, demographers, and public health specialists in 14 African countries. This project provides CFAR investigators working in Africa with access to university resources including survey research resources and public health populations and HIV testing facilities. An important focus of the Census project is the

demographic impact of the HIV epidemic in Africa. Mark Pauly, professor of economics at the Wharton School, is funded by a Fogarty award to collaborate with colleagues at the University of Natal in Durban, South Africa to assess the impact of poor health and HIV/AIDS on small businesses and the local economies where they are located in South Africa.

## **Health Services and Policy Research**

Although much of the work described above has important implications for HIV policy regarding prevention and care, a number of faculty have been involved in policy specific research. Policy related investigations by BSS program members have focused on access to care for HIV positive individuals and the structure of health care delivery. Dr. Barbara Turner's work has documented substantial deficiencies in the care of HIV+ persons nationally. Linda Aiken's research group has made important contributions to the development and evaluation of AIDS prognostic staging measures for use in controlling for severity of illness in the evaluation of treatment effects, in understanding the impact of organization of AIDS services on outcomes of care, and assessing racial disparities in AIDS health services and outcomes. Dennis Culhane of the School of Social Work, the Population Studies Center, and the Center for Mental Health Policy Research has examined the relationship between AIDS and homelessness in Philadelphia by integrating the City's administrative data bases for AIDS surveillance and public shelter utilization. Martin Fishbein has had a major influence on HIV prevention through the development and application of the Theory of Reasoned Action which he co-developed. He has been very active in research designed to test this theory in community trials including "Project Respect" which has greatly influenced HIV counseling strategies both domestically and internationally. He has continued to urge HIV behavioral research to recognize the important role theory in prevention and the need to integrate behavioral and biological measures in a rational manner. Currently he is leading a five year research effort designed to examine the link between exposure to sexual content in the media and sexual risk behaviors among adolescents.

The BSS program includes several key faculty who have been important in the national and international response to the AIDS epidemic and who, although their work is not currently centered on AIDS research, are important resources to the program. Robert Boruch, a social statistician in the Graduate School of Education, chaired the National Research Council (NRC) Committee on AIDS Research and the Behavioral, Social, and Statistical Sciences's Panel on the Evaluation of AIDS Interventions. Boruch co-edited the NRC volume, *Evaluating AIDS Prevention Programs*. He is Director of the Campbell collaborative and a major voice in the public policy research, design and analyses. Robert Hornik, a noted social scientist in mass media communication and behavior change at Penn's Annenberg School of Communications, was a central participant in the AIDS Public Health Communications Program (AIDSCOM), and evaluated mass media interventions to prevent the spread of AIDS in Uganda, Zambia, Ghana, and Dominican Republic. Hornik has evaluated AIDS education and communication programs for WHO's Global Program on AIDS. Hornik and Fishbein, at Annenberg, have evaluated the impact of the mass media anti-drug campaign

supported by the White House Office on Drug Control Policy.

### **Intervention Development and Testing with Adolescents**

John Jemmott's work has made significant contributions to HIV prevention theory and practice among high-risk African American adolescents in community-based settings. He is currently directing a very active program of prevention research. As the director of the Center for Behavior and Health Communications Research, Department of Psychiatry, School of Medicine, Jemmott and his group are leading a randomized controlled trial investigating the efficacy of abstinence and safer sex interventions with inner-city grade 6 and 7 African American adolescents. One important result of that study was that a theory-based culturally tailored abstinence-only intervention reduced sexually intercourse during a 24-month follow-up period as compared with a health promotion control group. This is the first study to document an efficacious abstinence-only intervention over a 2 year follow-up.

Loretta Sweet Jemmott continues to conduct research focused on identifying modifiable psychological factors that underlie behaviors that lead to risk for sexually transmitted HIV infection among urban African Americans, and on designing and testing theory-based, culturally sensitive, developmentally appropriate interventions to reduce those risks. She has also conducted a number of theory-based descriptive studies that use theoretical frameworks to predict risky sexual behaviors among adolescents. She has been funded by the NINR to coordinate a partnership with the Hampton University School of Nursing designed to develop and evaluate strategies intended to narrow the gap in health disparities between American citizens of different ethnic and racial origins. Sweet Jemmott is leading a randomized trial of a theory based an abstinence-only intervention with parents and their adolescent children identified through black churches in Philadelphia.

Subsequent to pilot funding through the Developmental Core, Anne Teitelman was successful in securing a K01. This Career Development Award will to establish a rigorous academic foundation for a research career devoted to developing and testing novel interventions for reducing HIV risk for adolescents. Thematically, the K01 will address the social context of HIV risk by integrating effective theory-based adolescent HIV prevention with promising partner abuse prevention strategies, emphasizing promotion of healthy relationships. It uses family planning clinics as a venue for providing a skill-based, culturally-tailored HIV and partner abuse prevention educational and advocacy program for African American girls living in economically disadvantaged circumstances. Partner abuse, which significantly increases risk for HIV, disproportionately affects low income African-American adolescent girls, as does HIV. Critical to this project is the candidate's demonstrated ability to conduct HIV/STD research in partnership with minority communities, a long term engagement in interdisciplinary scholarship aimed at improving health and a 20- year history as a primary care provider. The research plan is divided into two phases, both guided by social cognitive and gender theory. In phase 1 she will conduct focus groups and individual interviews in order to develop and tailor the HIV/partner abuse intervention for

adolescent girls and in phase 2 she will evaluate the initial acceptability and feasibility of this intervention in a limited RCT. Dr. Tetitelman's mentors on this project include BSS program members L. Jemmott and J. Jemmott.

### **Intervention Development and Testing with Couples**

J. Jemmott and his group are leading a major NIMH funded four-city multisite cluster-randomized intervention trial on sexually active HIV serodiscordant African American couples. Couples in which one person has HIV and the other does not are randomly assigned to a sexual risk reduction intervention or a chronic disease prevention control intervention. Participants provide biological specimens for STD assays and complete ACASI at baseline, immediately post-intervention, and 6 and 12 months post-intervention. Thus far, the study has achieved very high retention rates in this high risk population, over 90% have completed the 12-month follow-up assessment. The project involves BSS program members as co-investigators (Metzger, L. Jemmott, and Maslankowski) and receives services from the Clinical Core and the BSS Core in recruitment and assessment support. The data coordinating center for this multi-site trial is being directed by J. Richard Landis of the Biostatistics Core.

### **Intervention Development and Testing for Persons with Mental Illnesses**

Michael Blank examines mental health and substance abuse and relationships with HIV risk. His previous research with the SMI population has demonstrated high rates of both psychiatric and general medical comorbidity. Likewise, the HIV positive population has dramatically elevated rates of mental illness and other physical co-morbidities. Blank's work has been substantially impacted by the Penn CFAR resulting in two R01 awards, and R13 to support three national scientific meetings of the SBSRN, and a U18 from the CDC in collaboration with investigators from the University of Maryland to examine implementation of HIV testing in community mental health settings. This work has evolved with investigators from the Center for Mental Health Policy Research and the Center for Health Outcomes and Policy Research at the School of Nursing (Aiken). These projects evolved from analyses of Medicaid claims data that found that the relative risk of HIV/AIDS is at least five times greater in persons with serious mental illness (SMI) relative to the general Medicaid population in Philadelphia and over seven times greater for those also treated for substance abuse. A cost study linked to these data showed that SMI with HIV had much higher health care costs than non-SMI persons with HIV and non-HIV persons with SMI. Based in part on these findings, and with co-investigators Aiken, Hines, Fishbein, Gross, Rothbard, and TenHave, Blank has been conducting an NINR funded investigation to study the effectiveness of integrating advanced practice nursing into ongoing Targeted Case Management (TCM) to enhance adherence to treatment regimens among persons with serious mental illness (SMI) who are also HIV positive. The work is built around a Public-Academic Liaison (PAL) model involving mental health services researchers from a number of specialized research centers at the University of Pennsylvania, with the public health and mental health programs in the City of Philadelphia.

Blank has also been conducting a randomized community trial of a preventive intervention delivered by mental health case managers in a one-on-one format for persons with SMI who also abuse substances. The intervention entitled, Preventing AIDS Through Health (PATH) is an evidence-based intervention that integrates features from the CDC project Respect to encourage safer sexual practices and promote condom use with aspect of the NIDA Community-based Outreach Model to reduce risk of blood-borne infections resulting from substance abuse. Co-investigators for this work include Fishbein, Metzger, Hadley, Solomon, Rothbard, and Ten Have.

Blank has also been directing a multi-site U18 project from CDC to increase HIV testing and improve linkage to care for HIV-infected in community mental health settings with large numbers of numbers of African Americans. Using a six-month longitudinal design, he will be enrolling participants who meet inclusion criteria for assessment, counseling, and Rapid HIV Testing at baseline. These participants will be interviewed again at 6 months post intervention. The study is designed to evaluate changes in HIV risk behaviors, linkages to HIV care, and subsequent use of mental health services. As the primary coordinating institution, the Penn research team will be collaborating with a mix of three types of facilities in Philadelphia and Baltimore, through our collaborators at the University of Maryland. Target facilities in both cities include university-based inpatient psychiatric units, Community Mental Health Centers (CMHCs), and Assertive Community Treatment (ACT) programs.

### **Intervention Development and Testing for Persons who Abuse Substances**

L. Jemmott is leading a randomized trial of a theory based sexual risk reduction intervention targeting African American women in drug detoxification. BSS program members who serve as co-investigators include J. Jemmott and Metzger. The intervention will be evaluated using STD incidence and self-reported sexual behavior as measured via ACASI.

Philippe Bourgeois joined Penn and the CFAR BSS Program in 2007 as the fifth Penn Integrates Knowledge (PIK) Professor. PIK Professorships are awarded to exceptional scholars whose research and teaching exemplify the integration of knowledge across academic disciplines. Dr. Bourgeois has earned international acclaim for his ethnographic research with drug abusers. He has devoted much of his recent research to the prevalence of violence and disease among homeless drug abusers in San Francisco. Bourgeois's books include *In Search of Respect: Selling Crack in El Barrio*, which received the 1996 C. Wright Mills Prize from the Society for the Study of Social Problems of the American Sociological Association and the 1997 Margaret Mead Award from the American Anthropological Association and the Society for Applied Anthropology. Bourgeois is currently funded to examine the HIV and HCV risk implications of the growing phenomenon in the United States of prematurely geriatric substance abusers by examining the aging process among both young and older injectors. He is contributing to a socio-culturally contextualized understanding of variance in HIV and HCV infection rates among differentially vulnerable profiles of street based IDUs that is informed theoretically at the macro-structural level. A cross-



generational and multi gender ethnographic team will collect qualitative data inside the shooting/sleeping encampments and income generating territory of two overlapping social networks of injectors (core N= 25-40 at any given time; peripheral N=50-70). The project extends its ongoing collaboration with epidemiologists to clinical researchers and researchers and caregivers who work with comparable data sets of injectors in San Francisco in order to engage a multi-method dialogue. An immediate applied goal is to promote communication across the research/service interface. We will offer providers of health care, outreach and treatment an indigenous perspective on the effectiveness of their services among substance abusers by age cohort through our comparative study of: 1) injectors from the baby boom generation who are advancing from mid-life to old age with rapidly deteriorating health and ongoing HIV risk; and 2) homeless youth injectors (many of whom are the children of middle-aged substance abusers) who engage in risky injection and sexual practices.

Charles Dackis, MD, an experienced researcher in substance abuse treatment has recently been supported by NIDA to conduct a trial to evaluate the efficacy of modafinil as a treatment for cocaine dependence in women, and as a means of reducing high-risk behavior (HRB) that increases the likelihood of HIV seroconversion. Modafinil, a wake-promoting medication that is approved for narcolepsy, has a low abuse potential despite its alerting effect. Modafinil also blocks cocaine-induced euphoria under controlled conditions [2, 3] and may reverse clinically significant cocaine-induced neuroadaptations. An effective pharmacological treatment for cocaine dependence should also reduce HIV seroconversion by diminishing unsafe sexual practices that often accompany cocaine procurement. Cocaine enhances sexual arousal and increases reckless sexual activity, including trading sex for cocaine with multiple partners. Cocaine-addicted women who engage in this dangerous practice are particularly vulnerable to HIV seroconversion and in need of effective treatment. Needle sharing by intravenous cocaine users is another avenue of HIV transmission that could be targeted by effective treatment.

### **Intervention Development and Testing using Media Communications**

Martin Fishbein is Harry C. Coles Jr. Distinguished Professor in Communication at the Annenberg School and is internationally recognized for his theoretical work in behavior change theory and relationships to risk behavior such as HIV. He is currently funded to examine media influences on risk behavior among adolescents. The media is a pervasive institutional structure in all modern societies. It has often been argued that the media industry encourages unsafe sex by irresponsibly portraying sexual behaviors. As a result, it is widely claimed that youth are negatively influenced by what they see, hear, and read in the media. There is, however, very little evidence to either support or refute this hypothesis. Historically, sexual portrayals in the media, like violence, have raised the ire of advocates, policymakers, and parents dating back to the first mass media marketed to children. Today, the issue remains an important agenda item and has led to public health policy interventions such as V-chip ratings and technology legislation, movie ratings, and video game advisories. Yet few studies of the "effects" of mass media on specific behaviors are done due to theoretical, logistic, design, and cost

considerations. One specific reason for this is that much "media influence" is designed to shape and perpetuate consumer preferences and is therefore not targeted to behaviorally-defined groups but rather to the mass consumer public. But other kinds of media effects predicated on the principles of social learning theory and other theories can be predicted for specific "audiences" and specific behaviors. This application focuses on the media's role in presenting sexual content, implying sexual norms, modeling sexual decision making ("self-efficacy"), and displaying the outcomes of sexual behaviors in relation to young adolescents, a group whose attitudes, norms, self-efficacy, and decision-making skills are all in flux and development. This five-year research project is the first to combine behavioral theory, communication theory, and a state of the art content analytic approach to investigate the relationship between exposure to sex in the media and early initiation of sexual intercourse and other sexual behaviors. Using this approach, the project will develop both objective (i.e., content analytic) and subjective, theory-based measures of (a) the quantity and content of adolescent's exposure to sexual media and (b) adolescents' sexual behavior and its underlying psychosocial determinants (i.e. beliefs, attitudes, norms, self-efficacy and intention). These measures will be tested for their reliability and validity, and they will take developmental, gender and ethnic differences into account. Based on this formative research, the project comprises a three-wave longitudinal proof of concept study to investigate the empirical link between exposure to sexual content in a broad variety of media (i.e., television, movies, music CDs, the Internet, video games, and magazines) and sexual behavior. In summary, this research uses a theoretically grounded, methodologically sound approach to more fully examine the relationships between media exposure and AIDS-related sexual behavior.

### **Intervention Development and Testing with MSM**

John Jemmott is currently conducting an NIMH funded study to develop, implement, and evaluate the efficacy of an HIV/STD risk reduction intervention for African American MSM. This is a collaborative effort by HIV/STI university-based researchers and Blacks Educating Blacks About Sexual Health Issues (BEBASHI), the oldest community-based organization (CBO) in the City of Philadelphia that has addressed HIV in the African American community, including MSM. The participants will be 594 African American MSM who will be randomized to a one-on-one sexual risk reduction intervention, "Being Responsible for Ourselves (BRO)" or a one-on-one health promotion intervention that will serve as the control condition. This study will provide an urgently needed intervention to reduce the risk of HIV and other STIs in one of the highest risk populations in the United States. Christopher Coleman, who holds a joint appointment with the School of Nursing and the Medical School, is a co-investigator on John Jemmott's MSM intervention study, has a longstanding research interest in HIV positive MSM.

William Holmes' research has focused on modeling the relationship between childhood abuse and risk behaviors among MSM populations. More men with than men without childhood sexual abuse (CSA) histories report sexual behavior that has high risk for HIV transmission. His work has found that co-morbid posttraumatic stress disorder (PTSD)

and depression acts as both a mediator and a moderator of the association between CSA and sexual risk behavior. In his current NIMH funded study entitled, "Interaction of abuse, PTSD, depression on men's sex risk", data from a cross sectional, random-digital (HDD) survey of 1,200 men from high AIDS prevalence areas of Philadelphia County will be used to test the model he has developed to explain the mediating/moderating pathway between CSA and lifetime sexual risk behavior in men. From this model, multidimensional HIV risk reduction interventions can be built.

### **Integrated Biomedical and Behavioral Trials**

David Metzger is the PI of the Penn Prevention Clinical Trials Unit, funded by NIAID and a research site for the HIV Vaccine Trials Network (HVTN), the Microbicide Trials Network (MTN) and the Prevention Trials Network (HPTN). This award in 2006 was built upon its successful involvement as a site for the HIV Network of Prevention Trials (HIVNET) and subsequently, the HIV Prevention Trials Network (HPTN). The Penn Prevention Clinical Trials Unit is one of 60 international and domestic trials units selected to develop and test behavioral and biomedical prevention interventions. The Penn Prevention CTU includes co-investigators from the School of Nursing (Loretta Sweet Jemmott), the Infectious Diseases Division of the School of Medicine (Ian Frank), the Department of Immunology of the Children's Hospital of Philadelphia (Steven Douglas), and the Annenberg School of Communication (John Jemmott). The Penn Prevention CTU and its predecessor, the HPTU have made significant contributions to the research agenda of the HIV Clinical Trials Network and is currently involved in three active protocols: 1) the HVTN 502, the "STEP" study testing the ; 2) HVTN 070, and 3) HPTN 035, a large international Phase IIb trial of Pro2000 (entry inhibiting gel), and Buffer Gel (a buffering gel which inactivates virus). Penn's work in testing vaginal microbicides is led by Lisa Maslankowski. David Metzger, the PI of the Penn Prevention CTU also serves as the Chair of HPTN 058, a randomized trial of suboxone treatment for opiate addiction as HIV prevention taking place in Thailand and China.

Courtney Schrieber received a developmental award to study pregnancy during clinical trials using a nested case-control method and a point-of-care questionnaire. This area of inquiry is unique and important because incident pregnancies are significant and a somewhat unexpected finding in NIH supported Phase II and III vaginal microbicide and vaccine trials that can serve a biomarker of risk behavior. Further, because the teratogenicity of investigatory vaccines and microbicides are unknown, thus pregnant women are disenrolled from these studies which may introduce bias in the studies as those at greater risk may be disenrolled more frequently. Reducing pregnancy rates during trial participation will help avoid the associated methodological complications and potential health risks. Schrieber seeks to explore the risk factors for pregnancy among trial participants in order to inform efforts to both identify characteristics of women who are likely to become pregnant during the study and to prevent pregnancy for trial enrollees.

## **Relation Between the Behavioral and Social Science (BSS) Core and Other CFAR Programs: Building Research Collaborations**

The BSS Program has encouraged collaborations among program members and between CFAR programs. This was evidenced in many of the projects already described that are led by members of the core. In addition, BSS Core members in conjunction with members of the immunology program (Douglas and Ho) are currently investigating the role of host factors on viral activity HIV and HCV infected individuals. This work, facilitated by the Penn CFAR, perhaps best exemplifies the program goal of cross discipline collaborations and have developed a productive program of research over the past five years. Dwight Evans' research involving HIV infected men prior to the advent of HAART, provided the first indication that stress was not only predictive of early HIV disease progression but was associated with alterations in immunity, suggesting that stress influences disease progression by altering key aspects of cellular immunity. His study of HIV infected women conducted in collaboration with Steven Douglas and David Metzger extended the understanding of these relationships and provided the first evidence that depression may alter the function of killer lymphocytes in HIV infected women. Evans' recently completed grant entitled "HIV in Women: Depression and Immunity" further explored these relationships and the ex-vivo impact of anti depressants among HIV infected women with depression. Metzger's research group had responsibility for screening, recruitment, and specimen collection and Douglas's lab conducted immunologic assays. This work demonstrated that resolution of depression is associated with restoration of NK cytotoxicity in HIV and found that ex vivo treatment of lymphocytes with an SSRI enhances NK cytolytic activity. These findings were the basis of a recent NIMH award to Evans. This new study is designed to test whether depression is associated with non-cytolytic, chemokine and cytokine, functional alterations of killer lymphocytes, as well as chemokine receptor sensitivity of macrophages and T-cells that are relevant to HIV-infectivity. The potential for impact of alcohol and opiates on HIV viral activity has also led to investigations of the mediating role of substance use on immune function among well characterized HIV infected individuals with Douglas and Ho. NIDA funded work on the relationships among opiates, substance P and HIV viral activity have found that methadone in vitro enhances infection of immune cells. With supplemental funds from NIDA this work was extended to examine factors associated with HCV activity. Using this model of collaborative research where behavioral scientist identify and assess well defined subject characteristics and deliver specimens for intensive and innovative analyses, Metzger's group is working with Douglas to examine the impact of alcohol abuse and dependence on viral activity and immune function.

The collaborative capacity building project between the University of Botswana and the University of Pennsylvania is organized around three cores. Qualitative and Quantitative Methodology Core, Social and Behavioral Intervention Core, and the Administrative Core. The project draws upon members of the CFAR Biostatistics Core, including Dr. Susan Ellenberg and the CFAR Administrative Core, including Dr. James Hoxie. This partnership is committed to developing a creative, comprehensive and interdisciplinary HIV/STD prevention research program on adolescents that is fully integrated within the

research and education mission of the University Botswana and dedicated to addressing the urgent need to stem the devastating impact of HIV on one of the highest risk adolescent populations in the world.

## **Effective Use of Social and Behavioral Research**

HIV/AIDS remains the most important public health problem facing our global community. Since the first cases of AIDS were reported in 1981, infection with HIV has grown to pandemic proportions, with an estimated 65 million infections and 25 million deaths. To be sure, we now have effective treatment of HIV infection with highly active antiretroviral therapy (HAART) even in countries with limited resources. Still, these treatments do not reach all who need them, especially in low-resource countries and prevention is more cost effective than is treatment. Accordingly, there is a great need for effective behavioral strategies to reach and serve all persons who could benefit from treatment and prevention services.

As with many health problems today, behaviors—for instance, practicing abstinence, limiting sexual partners, using condoms, using clean IDU equipment, and adhering to treatment regimens—are central to the spread of HIV and to the efficacy of treatment. Accordingly, an approach that integrates the lessons from behavioral and biomedical science is likely to be most effective in stemming the HIV pandemic. As biomedical advances are made, social and behavioral science contributions will be required to ensure the success of new biomedical prevention technologies and treatments, including microbicides and vaccines. For example, social and behavioral science research would contribute to an understanding of whether the technologies and treatments are acceptable to populations, whether new behaviors will be adopted, and the facilitators and barriers to optimal treatment adherence.

## **Adequacy of Federal Funding**

The federal government's investment in behavioral research on HIV has not been sufficient. Although the CDC has a number of dissemination initiatives, not enough funding has been allocated to result in the widespread use of interventions that we know are efficacious. If these interventions are effective when disseminated and if they were widely disseminated then we would not be witnessing the high rates of HIV that we are still seeing in the United States. Second, there are still important gaps in the portfolio of intervention strategies. African American MSM have the highest rates of HIV in the United States. Indeed, the rates of HIV among African American MSM rivals those seen in countries in sub-Saharan Africa, the region with the highest rate of HIV in the world. The CDC still does not have interventions for African American MSM with evidence of efficacy in reducing risk behavior and STD from randomized controlled trials to offer service providers who work with this population. Thus, additional funding is needed urgently for behavioral research on dissemination of efficacious interventions, including the adaptation, adoption, and effectiveness of those interventions. In addition, funding is also needed for interventions for populations, including African American

MSM, where efficacious interventions are lacking.

The present funding environment for behavioral research on HIV is tough. It is extremely difficult for investigators to receive funding for scientifically meritorious proposals when insufficient funds are available and strong proposals must be set aside unfunded. This is a problem for established researchers who may have to dismantle their research teams and lose their infrastructure because of a lack of funds. It is especially damaging for young scientists who are unable to secure the funding needed to launch their careers and may have to seek other careers because they are unable to produce the body of research required to earn tenure at leading universities.