LINDA A. FOGARTY, PHD ■ CHARLES M. HEILIG, PHD ■ KAY ARMSTRONG, MS ■ REBECCA CABRAL, PHD ■ CHRISTINE GALAVOTTI, PHD
ANDREA C. GIELEN, SCD ■ BRIAN M. GREEN, MS

Long-Term Effectiveness of a Peer-Based Intervention to Promote Condom and Contraceptive Use among HIV-Positive and At-Risk Women

Dr. Fogarty and Dr. Gielen are with the Division of Social and Behavioral Sciences, Department of Health Policy and Management, Johns Hopkins University Bloomberg School of Public Health. Dr. Fogarty is an Assistant Research Professor, Dr. Gielen is a Professor. Drs. Heilig, Cabral, and Galavotti are with the Division of Reproductive Health, US Centers for Disease Control and Prevention, Atlanta, Georgia. Dr. Heilig is a Mathematical Statistician. Dr. Cabral and Dr. Galavotti are Research Psychologists. Ms. Armstrong and Mr. Green are with the Family Planning Council Inc., Philadelphia, Pennsylvania. Ms. Armstrong is Director of Research, Mr. Green is a Research Manager.

SYNOPSIS

Objective. The authors used data from a larger study to evaluate the long-term effects of a peer advocate intervention on condom and contraceptive use among HIV-infected women and women at high risk for HIV infection.

Methods. HIV-infected women in one study and women at high risk for HIV infection in a second study were selected from the Women and Infants Demonstration Project and assigned to a standard or an enhanced HIV prevention treatment group. The enhanced intervention included support groups and one-on-one contacts with peer advocates tailored to clients' needs. The authors interviewed women at baseline and at 6-, 12- and 18-months, and measured changes in consistency of condom and contraceptive use and in self-efficacy and perceived advantages and disadvantages of condom and contraceptive use.

Results. Of HIV-infected women, the enhanced group had improved consistency in condom use, increased perceived advantages of condom use, and increased level of self-efficacy compared with the standard group. Of women at risk, the enhanced intervention group at six months maintained consistent condom use with a main partner and perceived more benefit of condom use compared with the standard group. These differences diminished at 12 months.

Conclusions. The enhanced intervention was generally effective in the HIV+ study. In the at-risk study, however, intervention effects were minimal and short-lived. Factors related to the theory, intervention design, and sample characteristics help explain these differences.

Address correspondence to:
Dr. Fogarty, Johns Hopkins Univ., Bloomberg School of Public Health, 624 N. Broadway, Baltimore MD 21205; tel. 410-614-1382; fax 410-955-7241; e-mail <lfogarty@jhsph.edu>.

The incidence of HIV is increasing among women, who now account for 32% of all adult HIV cases in the US.[1] Minority women, women of childbearing age, and women in urban centers are at particular risk both for acquiring HIV infection and for passing the virus to their children during pregnancy and childbirth.[1] Early in the AIDS epidemic, intravenous (IV) drug use was responsible for the majority of HIV transmission to women, but now increasing numbers of women are infected via heterosexual transmission.[1] Prevention programs aimed toward women at high risk for HIV infection must focus on increasing male and female condom use to prevent HIV transmission to and from sex partners and, among women who are HIV-positive, to avoid pregnancy, thereby preventing risk of verticle transmission.

HIV interventions for women. Many interventions have been developed and tested to address the changing trends of HIV transmission among women, with only varied success in influencing women's risk behaviors.[2] Some prevention strategies, however, seem to work better than others. Most effective are theory-driven programs using multiple small-group discussions, outreach to high-risk populations, peer advocates or educators, and programs that target women specifically.[3-5]

Relapses to baseline levels of behavior are common,[2] and published intervention evaluations typically do not assess program effectiveness beyond a 6-month follow-up.[6-10] More long-term follow-up is necessary to determine if program effects are being sustained and, if so, which specific program features enhance long-term success.[3,4,11]

Changing patterns of condom use is a complex task for women who must first perceive some degree of personal risk and be motivated to reduce that risk. Next, perceived disadvantages of the preventive behavior must not outweigh the perceived advantages. Finally, a woman must believe she can get her partner to use condoms and must know how to use them herself, which may require higher self-efficacy and skills training. Most interventions have focused on these important mediators to change behavior in use of condoms.[2,12] But the use of a male condom is ultimately not in the woman's control. Rather, she often must negotiate with her partner under vulnerable, intimate conditions. The success of these negotiations will depend on a host of interpersonal factors such as length of relationship,[13] emotional closeness of the partners,[14] effect of the request on the level of trust between partners, and interpersonal dynamics, such as power and dependence.[3,15-17] Social contexts of economic dependence, substance addiction, homelessness and, for those who are HIV positive, disease stigmatization,[15] can play parts in the negotiation. These factors vary widely from individual to individual.

Tailoring interventions. The complexity of sexual risk reduction typically is not reflected in HIV prevention programs to reduce sexual risk for women. Many programs are "one size fits all." Regardless of a woman's personal risk behavior history, experience, need and ability, she receives the same intervention as all other women. Although recent interventions for women are increasingly sophisticated and target distinct populations with culturally appropriate materials,[2,4] condom use continues to vary widely. Even a targeted population, such as women at high risk, may not be well served by a single intervention. In contrast, some strategies within intervention programs for other health risk behaviors, such as smoking and obesity,[18,19] that are tailored to fit individual needs may be effective when applied to programs for increasing the use of condoms. Our intervention incorporated strategies known to be effective in HIV prevention, targeting both risk reduction behaviors and psychological outcomes (self-efficacy and balancing the advantages and disadvantages of a health behavior, for example), but it also tailored health messages to individual women's needs.

Women at highest risk for HIV—intravenous drug users or partners of IVDUs, women who are homeless, and women who trade sex for money or drugs—are likely to have needs more pressing than the risk of HIV infection, but typical HIV prevention interventions do not address them.[20] Our intervention identified barriers to change and added a program component to address individual women's current needs, including help in finding a home, enrolling in a GED program, or accessing needed services. We also provided services at sites where women received drug rehabilitation, shelter and medical care.

Published evaluations or reviews of HIV and STD prevention services seldom discuss integrating disease prevention and family planning messages for efficiency and effectiveness.[21-23] By concurrently targeting both pregnancy prevention and condom use (to prevent pregnancy and disease) behaviors with main and other partners, our intervention acknowledged both the reproductive and disease prevention contexts in which women decide to change behaviors. We supported women in the prevention of HIV and STDs and unplanned pregnancies by offering intervention services appropriate for each set of behaviors. This made the evaluation more complex,

but also made the intervention more relevant to the reality of women's lives.[24]

The transtheoretical model of behavior change is a popular stage-based theory that has been used successfully with diverse health behaviors[19] through different intervention modalities[25] and with different populations. It guided both the development and evaluation of this intervention.[18] According to the theory, behavior change does not occur continuously but in five stages ranging from "pre-contemplation," in which the person is not considering the new health behavior, to "maintenance," in which the person has mastered and sustained the new behavior. Relapse to a previous stage can occur. Intermediate psychosocial variables, such as balancing the perceived advantages and disadvantages of a health behavior, and perceived self-efficacy, or one's confidence in one's ability to perform a behavior, play a central role in behavior change. Interventions employing this theory typically aim to move an individual forward in stage (or prevent relapse to a previous stage) by first identifying the person's stage of behavior and then tailoring the intervention to meet her needs at that stage. Different "processes" or intervention strategies are thought to be effective at different stages. For example, consciousness raising and awareness are more useful techniques in precontemplation than in maintenance, when modeling and reinforcement are more effective.

The data we report here are part of the Women and Infants Demonstration Project (WIDP). The Centers for Disease Control and Prevention (CDC) funded WIDP from October 1991 to September 1997 to promote women's reproductive health through community- and facility-based approaches using a common conceptual model. Results of the community-based component have been published elsewhere.[25] Here we present results from the facility-based trial in Philadelphia and Baltimore. Our goals were to develop a single theory-driven intervention for HIV prevention among multiple target populations of women, and to test and compare the intervention's effectiveness in two separate populations: women infected with HIV (subsequently referred to as *HIV+*) and women who were HIV-negative but at risk (subsequently referred to as *at-risk*).[26] WIDP employed many of the strategies identified in previous reviews as most effective, such as the use of group support, peer advocacy, multiple sessions, tailored education messages and theory. The initial six-month outcomes for condom use with a main sex partner have been reported previously.[27] Here we report evaluation results for additional behavioral and psychological outcomes and present longitudinal analyses covering a longer follow-up period.

The specific outcomes we assess are (*a*) stages of change for condom use for disease prevention with main partner, (*b*) stages of change for condom use for disease prevention with an other partner, (*c*) contraceptive use (including condoms), and (*d*) psychosocial correlates (self-efficacy and perceived advantages and disadvantages) of condom and contraceptive use.

We hypothesized that in both studies women assigned to the enhanced intervention group would have both greater stage progress and less relapse in the three staged target behaviors, and greater improvement in psychosocial correlates of behavior change than women in the standard intervention group. We also hypothesized that we would see the greatest changes at 6 months, with gradual leveling off at 12 and 18 months.

METHODS

Both the HIV+ and at-risk studies had the same interventions, measures and interviewing protocols. The studies differed in some features related to participant selection and study research design (Table 1). The two studies are reported in one paper because our goal was to construct and test an intervention that might be useful among multiple target populations of women.

Settings and participants. While both studies were conducted in urban areas, participants were drawn from a variety of individual settings.

HIV+ Study. Baltimore, Maryland, is an urban center with high HIV infection rates and one of 10 areas in the US with the highest numbers of adult and adolescent AIDS cases.[1] From April 1993 to June 1995, we recruited 322 HIV-infected women from four Baltimore settings: (*a*) a hospital-based outpatient HIV clinic (213 women, 66%); (*b*) a hospital-based pediatric HIV clinic (59 women, 18%); (*c*) a community-based primary HIV care facility (11 women, 3%); and (*d*) through informal referrals by project participants and outreach workers (39 women, 12%).

We were unable to calculate an accurate participation refusal rate because, to protect clients' confidentiality, the names of those approached were not recorded and nonparticipants may have been approached more than once. Interviewers estimated that more than 9 of 10 women approached were willing to participate. Further, our sample was demographically similar to women being treated at the hospital-based outpatient HIV clinic from which most of our women were recruited.[27]

Table 1. Comparison of features of studies of HIV-positive and at-risk women, Baltimore and Philadelphia, 1993–1995

Settings	HIV+ study: 4 sites, Baltimore				At-risk study: 10 facilities, Philadelphia			
Facility types								
Hospital-based adult outpatient HIV clinic	213				—			
Hospital-based pediatric HIV clinic	59				—			
Community-based HIV primary care	11				—			
Informal referrals, outreach	39				—			
Drug treatment facility	—				488			
Homeless shelter	—				656			
Public housing development	—				145			
Randomization	Individual level				Facility level			
Number of women enrolled	322				1289			
HIV-risk status	Confirmed HIV-positive				At-risk per recruitment facility			
Age range (years)	18–44				15–44			
Number in standard condition	158				566			
Number in enhanced condition	164				723			
	Standard		Enhanced		Standard		Enhanced	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Follow-up rates								
6 month	95	60	104	63	396	70	550	76
12 month	92	58	103	63	396	70	548	76
18 month	125	79	117	71	413	73	559	77

Women ages 18 through 44 who were HIV-positive, not currently pregnant, and judged by the health care provider to be mentally and physically healthy enough to participate were eligible for the study. The HIV status of all participants was confirmed by medical records. Women whose records were unavailable were tested for HIV.

A total of 158 women were randomly assigned to the standard group and 164 to the enhanced group. Overall, 199 women, or 62% (60% for standard, 63% for enhanced), returned for a 6-month follow-up interview, 195 or 61% (58% for standard, 63% for enhanced) for a 12-month interview, and 242 women, or 75% (79% for standard, 71% for enhanced), for a final interview at 18 months. The most common reasons for missing an interview were death of the participant (35%), drug-related issues (18%), sickness or hospitalization (14%), and scheduling conflicts due to work or school (10%).

At-Risk Study. Philadelphia, Pennsylvania, also is among the top 10 US cities in numbers of adult and adolescent AIDS cases.[1] We chose facilities there with access to women at particular risk for HIV infection (such as women who were IV drug users, partners of IV drug users, and women who exchanged sex). We recruited 1289 women between March 1993 and September 1995 from 10 facilities in three different settings: (*a*) five drug treatment facilities (488 women, 38%); (*b*) three homeless shelters (656 women, 51%); and (*c*) two public housing developments (145 women, 11%).

As with the HIV+ group, some women in the at-risk category may have been approached multiple times, as their names were not recorded to protect their confidentiality. Interviewers estimated that from 80% to 95% of women who were approached agreed to participate, depending on the site. Most eligible women from each facility were enrolled in the study but because facilities

did not keep records of residents' demographic characteristics, data to determine representativeness of the sample were unavailable.

Non-pregnant women ages 15 to 44 who accessed services at participating drug treatment facilities or homeless shelters, or who lived in participating public housing developments, were eligible for the study.

Five sites offered the standard group services to 566 women and five sites offered the enhanced group services to 723 women. A total of 949 (74%) women at risk (70% for standard, 76% for enhanced) completed the 6-month interview, 73% (70% for standard, 76% for enhanced) completed the 12-month interview, and 76% (73% for standard and 77% for enhanced) completed the 18-month follow-up interview. The most common reasons for missing an interview were that women were contacted but did not schedule an appointment or did not show up for their scheduled appointment (69%), could not be contacted (14%), could not be interviewed because of issues related to drugs (5%), were too sick (4%), or had died (2%). We did not interview the remaining 6% of women for reasons including incarceration, moves out of state, and formal requests to be dropped from the study. As reported elsewhere in more detail,[27] the characteristics of respondents and non-respondents for both enhanced and standard groups were very similar.

Study designs. A randomized control group design was used to randomly assign HIV+ women to the enhanced or standard treatment group at the time of study enrollment.

We could not randomly assign at-risk women to treatment conditions within facilities without risking contamination due to the shared living spaces and on-site delivery of intervention. Therefore, we used a quasi-experimental comparison group design. We randomly assigned the 10 recruitment sites to intervention type within strata (3 homeless shelters, 2 housing developments, 5 drug treatment programs) so at least one facility of each type was represented in both the enhanced and standard treatment conditions. Thus, each facility served as either an enhanced or a standard treatment site.

Procedures. An interviewer from the WIDP approached women in the waiting rooms of recruitment sites and screened women for study eligibility. Interested women signed consent forms and completed a baseline interview. Interviewers scheduled and conducted 6-, 12-, and 18-month follow-up interviews. Before each follow-up interview, an interviewer reminded a woman of her appointment with a letter and phone call. Women were interviewed in private areas either at the recruitment sites or in study offices. Each interview lasted approximately 40 to 90 minutes, depending on skip patterns for responses. For each interview, women were reimbursed $20 in cash or in coupons for manicures. The study protocol was approved by the institutional review boards (IRBs) from CDC, Johns Hopkins University School of Medicine, Jefferson University Hospital, the City of Philadelphia, and the Family Planning Council's Research Review Panel.

Both studies used the same baseline and follow-up interviews, which included an array of questions about women's reproductive health and HIV. The measures used in the current analysis are described below. Instruments to assess stage of behavior of condom and contraceptive use, self-efficacy, and advantages and disadvantages of condom and contraceptive use were developed for these studies and pilot tested and validated in a separate group of 296 women at high risk before they were used in these studies.[28-30]

Measures. Five measures were used in both studies.

Demographic and risk data. In the baseline interview we asked women their age, "racial background," years of education, number of children in the household, current childbearing intentions, and sources of income. We asked about personal risk variables such as history of sexually transmitted diseases, history of injection drug use, and sex work. We gathered information about women's partners, such as length of relationship with the main male partner, and the number of other male sexual partners in the past 30 days. To assess risk of main partner, we asked women if their main partners had ever used IV drugs, had ever been in jail for more than one day, were HIV+, had male sex partners with whom they did not use condoms consistently, or had other female sex partners with whom they did not use condoms consistently. A "perceived partner risk index" was created based on the answers to these items on main partner risk; we assigned "0" for no partner risk and added "1" for each pertinent partner risk out of the five possible partner risks described above. The index, then, had a possible range from 0 (no risky partner behavior) to 5 (partner risky on all 5 behaviors).

Behavioral outcomes: stage of change (SOC). We focused on three behavioral outcomes: (*a*) change in stage of behavior for condom use with a main male partner, (*b*) condom use with other male partners, and (*c*) contraceptive use. We assessed a participant's stage for all relevant

target behaviors at the time of each interview using the questions and algorithms in the Figure. Women who reported consistently (every time they had sex) practicing the target behavior for more than six months were considered to be in "maintenance" stage. [*Note: Labels for stages of change are taken from Prochaska's theory of five stages of change.*[19]] Those practicing consistently for less than six months were in "action" stage. Those who intended to be consistent in the next month were in "ready for action" stage. Those who intended to be consistent within the next six months were in "contemplation" stage, and those who did not intend to perform the behavior consistently were in "pre-contemplation" stage.

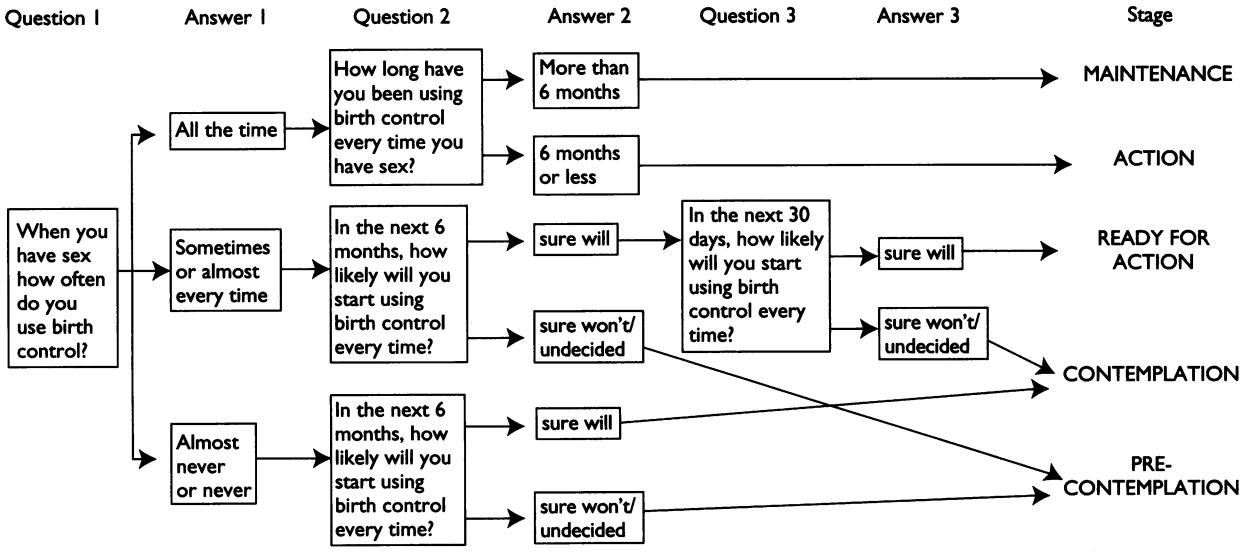
We constructed two dependent variables for each target behavior based on change in stage assignments. *Progress* is a dichotomous variable defined as moving up one or more stages or remaining in maintenance from the time of one interview to the next. Similarly, *relapse* is a dichotomous variable defined as moving down one or more stages or remaining in precontemplation from the time of one interview to the next.

Only women for whom the behavior was relevant were assigned a stage on a target behavior and included in analyses related to stage. Women without a main partner, therefore, were not "staged" for condom use with a main partner; women who had not had sex in the past six months or who were sterile were not staged on contraceptive use; and women without a second male partner were not staged for condom use with other partners.

Self-efficacy. Three two-part questions assessed a woman's self-efficacy for each of the three target behaviors. For example, we asked women if they thought they could use condoms every time they had sex with their main partner in the face of potential barriers (such as, if they had been using alcohol or drugs), and how sure they were about their ability: Very sure or somewhat sure? For each pair of questions a number was assigned from 1 to 5 to reflect self-efficacy; 1 for those very sure they could *not* perform the behavior, 2 for those somewhat sure they could *not* perform the behavior, 3 for those unsure of whether they could perform the behavior, 4 for those somewhat sure they *could* perform the behavior, and 5 for those very sure they *could* perform the behavior. We calculated average self-efficacy scores by adding scores of each of the 3 item pairs and dividing by 3 for each target behavior. Finally, we calculated a dichotomous variable to reflect any increase in total self-efficacy score from the time of one interview to the next. We assigned "1" for either an increase in self-efficacy or remaining at "5" (the highest possible self-efficacy score) and assigned "0" for all others.

Perceived advantages. Three 2-part questions assessed perceptions about advantages of each of the three target behaviors. For example, in the first part we asked women if they thought using a condom every time they had sex with their main partner made them safer from sexually transmitted diseases. If a woman answered yes she was

Figure. Staging algorithm for birth control use



asked the second part, which assessed the importance of this protection in deciding to use condoms with her main partner: not at all, somewhat, or very important. In this way, for each question pair, a respondent was assigned "0" if she answered "no," "1" if she answered "yes" (but it was not at all important in her decision to use condoms), 2 if yes (and it was somewhat important in her decision), and 3 if yes (and it was very important in her decision). We calculated an average score by summing across the assigned scores for each of the three sets of questions. As with self-efficacy, we calculated a dichotomous variable to reflect an increase in total perceived advantages from one interview to the next. We assigned "1" for either an increase in perceived advantages or remaining at "3" (the highest possible advantages score); otherwise, we assigned "0."

Perceived disadvantages. Similarly, we assessed perceptions about disadvantages of the three target behaviors by using three 2-part questions for each target behavior. For example, women were asked "Do you think that using condoms every time you have sex with your main partner is too much trouble?" We asked those who answered "yes" how important this was in deciding about using condoms. Those who answered "no" were assigned 0 for that question. Those answering yes, but who said it was not important in their decision to use condoms were assigned 1 for that question pair. Those who said "yes" and it was somewhat important were assigned a 2, and those who said "yes" and it was very important were assigned a 3. We summed across the assigned scores for the three question pairs and divided by 3 to produce an average disadvantage score. Finally, we created a dichotomous variable that reflected decreases in total perceived disadvantages from the time of one interview to the next. We assigned "1" for either an increase in perceived disadvantages or remaining at "3" (the highest possible disadvantages score) and assigned a "0" for all others.

Intervention. The standard intervention was enhanced with peer advocate services.

Standard services group. Women assigned to the standard intervention group had access to Title X comprehensive reproductive health services throughout the study. These services included visits to a health care professional for routine check-ups, acute problems, screening and treatment of STDs, supplies such as birth control pills, and reproductive health education and counseling on topics that included optional methods of contraception.[27] Counseling topics overlapped those provided by advocates in the enhanced services group somewhat, such as contraception alternatives and the importance of condom use. However, these messages were not theory-based, were presented didactically, included no activities tailored to the patient's needs and were not provided by a peer advocate.

Enhanced services group. Women assigned to the enhanced intervention group had access to both the comprehensive reproductive health services provided by a health care professional described above, and to peer advocate services. Trained peer advocates worked with women individually and in groups on one or more of three target behaviors: (*a*) condom use with a main male partner; (*b*) condom use with an "other" male partner; and (*c*) contraceptive use. Advocates provided three types of individual sessions according to participants' needs: "warm-up" encounters, or rapport-building sessions; stage of change encounters, in which advocates counseled on a specific target behavior; or non-SOC encounters, in which advocates addressed some other urgent need of the woman, such as child custody or housing. There was no limit on the number of 1 on 1 sessions possible during the 6-month intervention period, and support groups were available one time per week.

Although all advocate services were designed to facilitate health behavior change, most of the intensive theory-driven work on condoms and contraception was done in the SOC encounters. During a stage of change encounter, an advocate first determined the appropriate target behavior most in need of work, assessed the client's stage in that target behavior, consulted the intervention manual to determine activities appropriate for the behavior and stage, and implemented the activity with the client. Advocates also facilitated the weekly drop-in support groups, which were open to any woman in the enhanced group. Groups were designed to provide both information and support. For example, clients discussed barriers to using a condom, identified potential strategies to overcome barriers, and practiced new skills, such as condom negotiations, using role-play. Women were free to choose whether to attend the enhanced services. We discuss advocate services in more detail elsewhere.[26,27]

Hypotheses. We hypothesized that in both studies and for each of the three target behaviors (condom use with a main male partner, condom use with other male partners and contraceptive use), women assigned to the enhanced treatment condition would show more progress, self-efficacy, and perceived advantages, and less relapse and perceived

disadvantages, compared to women in the standard treatment condition. We also hypothesized that the enhanced treatment condition effect would diminish over time, but still would be noticeable at the 18-month follow-up.

Statistical Methods. We used three types of statistical analyses in both studies.

Sample used for regression analysis. In order to make inferences about changes over time, we used a 6-month interval between interviews, referred to as a "transition." Table 2a shows the total number of women included in analyses for each variable at each transition. Table 2b conveys the number and distribution of observations each woman contributed to the main "overall" analyses. Observations were included in the analyses only if we had data for that variable at two consecutive interviews. As a result of missed interviews or not being staged, each woman contributed from zero to three observations. For example, 51 women with HIV, or 16% of those enrolled, contributed one observation, 18 (6%) contributed two observations, and 37 (11%) contributed three observations to the analysis of condom use with main partner.

Intention to treat logistic regression models. We assumed that observations from different women are statistically independent and are correlated from the same woman over time. This is handled through a generalized estimating equation (GEE) algorithm.[31] SAS version 7, PROC GENMOD, was used to analyze the data. We treated the working correlation as unstructured and based our inferences on the empirical estimates of standard errors. Transitions excluded from analysis are assumed to be missing at random.

We calculated descriptive statistics for baseline demographic and risk characteristics for women included

Table 2a. Number of women in each transition included in any analysis for each target behavior

	1st transition (baseline to 6 months)		2nd transition (6 to 12 months)		3rd transition (12 to 18 months)	
Target behaviors	*Standard*	*Enhanced*	*Standard*	*Enhanced*	*Standard*	*Enhanced*
HIV+ (N = 322)						
Condom use with main partner	30	40	31	32	30	35
Condom use with other partner	4	7	1	8	2	4
Contraceptive use	20	35	20	24	16	25
At-risk (N = 1289)						
Condom use with main partner	214	257	185	265	189	269
Condom use with other partner	65	113	49	92	48	77
Contraceptive use	191	260	148	215	142	215

Table 2b. Number of observations per participant that contributed to analysis of each target behavior

	HIV+ N = 322						At-Risk N = 1289					
	Condom with main partner		Condom with other partner		Contraception		Condom with main partner		Condom with other partner		Contraception	
Number of observations contributing to analyses	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
3	37	11	2	1	23	7	275	21	53	4	274	21
2	18	6	3	1	16	5	153	12	66	5	85	7
1	51	16	14	4	39	12	248	19	153	12	179	14
0[a]	216	67	303	94	244	76	613	48	1017	79	751	58

[a]Observations were missing if a woman was not interviewed or not staged at two consecutive times for a target behavior.

in any analysis of the three target behaviors. For each of the three target behaviors we conducted regression analyses to evaluate each of the five outcome variables (progress, relapse, self-efficacy, perceived advantages, and perceived disadvantages) at each transition and average across all transitions over time in each study. Specifically, we used logistic regression to compare the probabilities that women in the enhanced group progressed, relapsed, or changed in self-efficacy, perceived advantages or perceived disadvantages versus the standard group. To account for the sampling design used for at-risk women, we included the variable "type of recruitment site" in all regression analyses. Because our hypotheses stated that we expected findings in a certain direction, we chose $P \leq 0.10$ as our standard of statistical significance.

Net improvement. In order to estimate net improvement over the course of the study, we compared women's reported consistency of condom use from the first visit at which they reported a main partner with their reported consistency of use at the last visit at which they reported a main partner. These descriptive statistics were stratified by treatment condition.

RESULTS

Table 3 lists characteristics for women in both groups who were included in any of the analyses for the three target behaviors. Women in both studies were similar in age, education, length of time with main partner, proportion with a history of STD, and history of ever exchanging sex for money or drugs. More women in the HIV+ group were African American, had a history of injecting drugs, had only one sex partner, and had a partner who was HIV-positive.

For all behaviors at baseline (Table 4), the largest percentage of women in the HIV+ study were in maintenance. Most women in the at-risk study were in earlier stages of change.

Women in both studies used enhanced intervention services at similar rates (Table 5). In both the HIV+ and at-risk studies, 74% of women had at least one individual contact with an advocate, and 40% of HIV+ women and 35% of at-risk women attended a support group at least once.

HIV+ STUDY

Condom use with main partner. At the first transition, women in the enhanced group had 2.8 times the odds of progressing and less than half the odds of relapsing in their use of condoms with main partner than did women in the standard group. This trend continued throughout the study, although behavior changes were not statistically different between groups at the second and third transitions (Table 6a).

Overall, women in the enhanced group were more likely than those in the standard group to perceive the advantages of condom use with a main partner, but these differences were not significant at the transitions. The groups did not differ at any transition for perceptions of disadvantages of using condoms. Overall and at the second transition, women in the enhanced group had significantly greater increases in self-efficacy for condom use than women in the standard group.

Because only 19 women with HIV had an other partner at any transition, we could not conduct longitudinal analyses for this target behavior.

Contraceptive use. Overall, women in the enhanced treatment group were more likely to show progress and less likely to relapse in their use of contraceptives than women in the standard group. Although the direction of the results is consistent over time, the two groups showed significant differences only at the final transition for both progress and relapse (see Table 6a). Women in the enhanced group had 3.7 times the odds of exhibiting positive change in perceived advantages of contraceptive use at the third transition than the standard group. The groups differed in perceived disadvantages of contraceptive use at the second transition, but surprisingly women in the enhanced treatment group perceived more disadvantages than did those in the standard group.

The self-efficacy results are not presented due to numerical instability. The analytic sample size did not support this type of analysis.

Net improvement. In Baltimore, there were 128 women with HIV for whom we could assess consistency of condom use with main partner at least twice. For these 128 women, we examined the first and final response regarding consistent condom use with a main partner. In the standard treatment group, 23% of women initially staged as non-consistent users of condoms were ultimately staged as consistent users; 73% of initially consistent users remained consistent users, and 27% did not. The enhanced treatment group showed more improvement among non-consistent users, with 47% of initially non-consistent users consistent at final interview, but the difference in improvement was less dramatic among initially consistent users, with 79% who remained consistent, and 21% who did not.

Table 3. Sample characteristics at baseline for women included in any analysis, by study

	HIV+ (n = 124)[a]		At risk (n = 843)[a]	
Demographics	*Number*	*Percent*	*Number*	*Percent*
Education				
Less than high school education	61	49	472	56
Graduated from high school (or GED)	45	36	289	34
More than high school education	18	15	81	10
Race/Ethnicity				
African American	113	91	749	89
White	7	6	67	8
Hispanic	1	1	24	3
American Indian	1	1	2	<1
Asian	0	0	1	<1
Other	2	2	0	0
Surgically sterile	38	31	256	20
	Mean		*Mean*	
Age (years)	32		30	
Length of time with main partner (years)[b]	4.6		4.7	
Number of children in household	1.3		1.7	
Sexual and drug related risk behavior	*Number*	*Percent*	*Number*	*Percent*
Ever had STD	82	67	514	61
Ever injected drugs	69	56	152	18
Ever exchanged sex	43	35	349	41
>1 sex partner	15	12	297	35
Main partner HIV+[c]	37	43	10	2
	Mean		*Mean*	
Perceived main partner risk index[d,e]	2.4		1.9	

[a]Actual data available varied by question but were missing for fewer than 4 people per characteristic unless otherwise noted.

[b]Characteristic pertains only to women with a main partner. For HIV+ study, 99 observations were available. For the at-risk study, 613 observations were available.

[c]Characteristic pertains only to women with a main partner for whom they knew, and would reveal, HIV status. For HIV+ study, 87 observations were available. For the at-risk study, 408 observations were available.

[d]The index of perceived partner risk includes the following partner behaviors: inject drugs, sex with men without consistent condom use, sex with other women without consistent condom use, time in jail, and living with HIV infection. Each of the 5 partner risk behaviors were scored "0" (does not have risk) or "1" (does have risk). The index reflects a sum across all 5 risks, giving the index score a possible range of 0 to 5.

[e]Characteristic pertains only to women with a main partner. For HIV+ study, 91observations were available. For the at-risk study, 605 observations were available.

AT-RISK STUDY

Condom use with main partner. No overall differences were found between the enhanced and standard treatment groups in progress and relapse (Table 6b). However, women in the enhanced group were less likely to relapse at the first transition compared to women in the standard treatment. We were surprised to find less progress among the enhanced treatment group than the standard group in condom use during the second transition. Women in the enhanced group were more likely to report increased advantages of condom use overall and at the second transition, and trended in the same direction at the first and

Table 4. Distribution of behavior stage and perceptions of behaviors at baseline of women included in analyses of target behaviors, by study

Dependent variable	HIV+						At-Risk					
	Condom use main partner (n = 85)		Condom use other partner (n = 12)		Contraceptive use (n = 66)		Condom use main partner (n = 534)		Condom use other partner (n = 217)		Contraceptive use (n = 508)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Women in stages of change												
Pre-contemplation	17	20.0	3	25.0	12	18.2	290	54.3	34	15.7	125	24.6
Contemplation	5	5.9	2	16.7	7	10.6	75	14.0	34	15.7	83	16.3
Ready for action	15	17.6	3	25.0	5	7.6	92	17.2	84	38.7	107	21.1
Action	7	8.2	0	0	3	4.5	27	5.1	21	9.7	52	10.2
Maintenance	41	48.2	4	33.3	39	59.1	50	9.4	44	20.3	141	27.8
	Mean scores											
Perceived Advantages[a]	2.5		2.6		2.1		2.5		2.7		2.3	
Perceived Disadvantages[b]	1.5		1.9		1.4		1.7		1.5		1.4	
Self-efficacy[c]	3.9		3.8		4.0		3.2		3.8		3.8	

[a]Average across responses to 3 pairs of questions assessing degree of perceived advantages of performing the target behavior. Each question pair has a possible range from 0 (no perceived advantages) to 3 (high perceived advantages).

[b]Average across responses to 3 pairs of questions assessing degree of perceived disadvantages of performing the target behavior. Each question pair has a possible range from 0 (no perceived disadvantages) to 3 (high perceived disadvantages).

[c]Average across responses to 3 pairs of questions assessing degree of self-efficacy in performing target behavior. Each question has possible range from 1 (low self-efficacy) to 5 (high self-efficacy).

third transitions. No differences were found between the groups in reported disadvantages of condom use.

Surprisingly, women in the enhanced group were less likely than the standard group to increase self-efficacy in condom use with main partner overall and at the second and third transitions.

Condom use with other partner. No overall differences in condom use with other partner were found between the enhanced and standard treatment groups. Surprisingly, the enhanced group was less likely than the standard group to increase self-efficacy at the second transition.

Table 5. Number of women allocated to enhanced condition using each intervention type

Intervention Type	HIV+ n = 72		At risk n = 489	
	Frequency	Percent	Frequency	Percent
Warm-up encounter	53	74	361	74
Non-SOC encounter	30	42	200	41
SOC encounter	36	50	258	53
Support groups	29	40	169	35

NOTE: Service use data are presented for only those women in the enhanced group who contributed at least one transition to the stage-based analyses.

Contraceptive use. Three overall differences were found between the enhanced and standard groups for contraceptive use but only one in the hypothesized direction. Overall, the enhanced group was less likely than the standard group to perceive increased disadvantages of contraceptive use, but was also less likely to perceive increased advantages or to increase self-efficacy. In the second transition, the enhanced group also showed less positive change in contraceptive use self-efficacy, and was less likely to perceive increased disadvantages of contraceptive use.

Facility effect. Facility type was included in each regression (see Table 6b). Facility type was significant in all models with outcomes related to condom use with a main partner and contraceptive use (using a Type 3 test on 2 degrees of freedom). Although the study was not designed to compare the intervention's effectiveness across facilities, and consequently the sample sizes are small for cross-facility comparisons, we can say that, in general, results were most favorable in housing projects and least favorable in drug treatment facilities (data not shown).

Net improvement. There were 776 women in Philadelphia for whom we could assess consistency of condom use for at least two interviews, and these were used to determine net improvement in condom use with main partner. Twenty percent of women in the standard treatment group who were initially staged as non-consistent in condom use were ultimately staged as consistent users; 45% of initially consistent users were consistent at the final interview. In the enhanced condition, too, 20% of initially non-consistent users of condoms were ultimately consistent, and 54% of initially consistent users were consistent at the final interview.

DISCUSSION

Intervention effects for HIV+ women. Using an intention-to-treat analysis, we found that the enhanced intervention improved risk behaviors for the HIV+ women, particularly condom use with a main partner. Women in the enhanced treatment group made more progress toward long-term consistent condom use, and relapsed into risky behaviors less than women in the standard services group. The enhanced intervention also influenced psychological outcomes that had been found in other studies to be related to condom use,[12,13] specifically the perceived advantages and self-efficacy of condom use. For the HIV+ women, the advantage of being in the enhanced treatment group peaked after the 6-month intervention period, and a trend of consistent positive behavior change continued compared with the standard group at the 12-month and 18-month follow-up interviews. This suggests that additional treatment services of longer than six months duration might be needed to help women maintain behavioral progress.

Regardless of stage of change, we found that more HIV+ women in the enhanced treatment group were consistently using condoms at their last interview. In fact, looking only at women who had not consistently used condoms before their initial assessments, 24% more women in the enhanced group ultimately used condoms consistently compared with the standard group.

Overall, the enhanced intervention appeared promising for effecting changes in HIV+ women's behavior for contraceptives as well, with the largest effect emerging at the 18-month follow-up. However, it is likely that perceived need for contraceptives to prevent pregnancy was not high among women with HIV because most were already using condoms to prevent disease transmission, and 31% were sterile.

It is clear from previous research that the likelihood of using a condom depends on whether the sexual partner is casual or a main partner.[14,32] Consequently, consistent use of condoms with an "other" partner was one of our three target behaviors. These data do not show the effectiveness of the intervention for HIV+ women for condom use with casual partners. In our study, only 12% of women with HIV currently had a casual partner, compared with 35% for the women at risk. Although small numbers (15) limit our interpretation, it may be important to note that the rate of consistent use of condoms with casual partners among HIV+ women (33%) appeared lower than with main partners (52%), a trend found in one other study of women with HIV.[16] This is contrary to the trend found in the literature generally, and opposite the rates found in our study of women at risk (30% use of condom with casual partner versus 15% use of condom with main partner). For HIV-infected women, who presumably are highly motivated to use condoms, it is possible that a desire not to disclose HIV status acts as a barrier to using condoms with casual partners. It is possible also that among HIV-discordant main partner couples, an HIV+ woman's desire to not infect her main partner may motivate higher use of condoms, increasing the rate among main partners. More research is needed to determine if this relationship actually exists and to determine the implications for behavioral interventions.

Table 6a. *HIV+ study*. Longitudinal regression results comparing enhanced and standard groups on behavioral and psychological outcomes overall and at each transition

	Overall		1st transition baseline–6 months		2nd transition 6–12 months		3rd transition 12–18 months	
Outcome variables	*Odds ratio*	*P*	*Odds ratio*	*P*	*Odds ratio*	*P*	*Odds ratio*	*P*
Condom use with main partner								
Progress	2.30	0.02	2.84	0.04	1.95	0.19	2.13	0.13
Relapse	0.40	0.01	0.32	0.03	0.38	0.10	0.47	0.15
Advantages	1.92	0.05	1.68	0.36	2.16	0.14	1.73	0.29
Disadvantages	0.80	0.46	0.57	0.27	1.00	1.00	0.91	0.85
Self-efficacy	2.01	0.01	0.60	0.33	7.36	0.00	1.64	0.33
Contraceptive use								
Progress	2.07	0.08	1.15	0.85	1.29	0.70	4.13	0.04
Relapse	0.43	0.03	0.77	0.70	0.53	0.39	0.24	0.04
Advantages	1.88	0.12	0.66	0.45	2.75	0.10	3.69	0.05
Disadvantages	1.48	0.29	1.29	0.67	4.06	0.05	0.58	0.49

Table 6b. *At-risk study*. Longitudinal regression results comparing enhanced and standard groups on behavioral and psychological outcomes overall and at each transition

	Overall		1st transition baseline–6 months		2nd transition 6–12 months		3rd transition 12–18 months	
Outcome variables	*Odds ratio*	*P*	*Odds ratio*	*P*	*Odds ratio*	*P*	*Odds ratio*	*P*
Condom use with main partner								
Progress	0.94	0.61	1.19	0.36	0.69	0.09	0.97	0.87
Relapse	0.93	0.57	0.66	0.02	1.23	0.29	1.00	0.99
Advantages	1.35	0.02	1.30	0.19	1.42	0.09	1.34	0.15
Disadvantages	0.98	0.87	0.84	0.37	1.11	0.58	1.01	0.96
Self-efficacy	0.81	0.04	1.53	0.03	0.38	0.00	0.95	0.80
Condom use with other partner								
Progress	0.84	0.38	0.75	0.37	0.84	0.62	1.04	0.91
Relapse	1.14	0.54	1.04	0.90	1.90	0.10	0.64	0.31
Advantages	1.40	0.16	1.51	0.29	1.54	0.30	1.18	0.68
Disadvantages	1.24	0.31	1.38	0.33	1.19	0.63	1.10	0.80
Self-efficacy	0.83	0.30	0.94	0.86	0.48	0.05	1.35	0.42
Contraceptive use								
Progress	0.86	0.29	1.04	0.85	0.76	0.21	0.73	0.17
Relapse	1.16	0.33	1.03	0.89	1.31	0.23	1.20	0.44
Advantages	0.79	0.09	0.74	0.17	0.85	0.48	0.81	0.36
Disadvantages	0.79	0.09	0.92	0.71	0.62	0.05	0.81	0.40
Self-efficacy	0.76	0.07	0.95	0.82	0.49	0.01	0.99	0.96

NOTE: For the at-risk study analyses, each logistic regression included type of facility (drug treatment, housing project, or homeless shelter).

Intervention effects for at-risk women. Intervention effects were mixed for women at risk. In general, our data showed no consistent sustained advantage to women who received enhanced treatment, for either the three target behaviors or any psychological outcomes.

Why the differences in results? Of 13 significant findings, 7 were in a direction opposite our hypotheses for women at risk, as compared to 1 of 13 in the HIV+ study. Although relapse to baseline following behavioral interventions for HIV risk reduction is not uncommon,[2] we must question why the intervention worked well in one population but had no clear long-term positive effects in the other? Differences in effectiveness may be related to differences in baseline stage distribution. Nearly half of the HIV+ women were already in maintenance for condom use with a main partner, whereas more than half of the women at risk were still in pre-contemplation.

Understanding effects of the intervention on psychological outcomes may also help us understand the difference in behavioral effects in the two populations. Both groups of women had similar increases in perceived advantages of condom use overall, but the intervention affected self-efficacy differently in the two groups. In the HIV+ study, self-efficacy increased at 12 months and behavior changes were sustained, whereas in the at-risk study, the decline in self-efficacy coincided with the reversal of program effects at 12 months. This trend of a negative intervention effect on self-efficacy appeared in some degree for all three target behaviors among at-risk women.

For the HIV+ women, most progress that occurred in the first two transitions was in the later action stages, when self-efficacy would be expected to be high. These women were highly motivated and were likely to have more social and health network support for use of condoms. In contrast, 70% of the women at risk started in pre-contemplation or contemplation and were likely to make progress only up to intention to use condoms consistently. Therefore, while many of the at-risk women developed specific plans to use condoms, they never used condoms consistently. The difference in results, then, may be attributable to the different life circumstances and motivational structures between the two populations. For example, the HIV- infected women were enrolled in care services for their disease that may have provided a more stable lifestyle than that of the at-risk women, many of whom were in temporary living arrangements and struggling with ongoing substance abuse. In addition, women with HIV may have stronger motivations than at-risk women to use contraceptives and condoms, and may have more supportive partners who want to avoid exposing themselves to the virus.

In contrast, women in drug treatment facilities and homeless shelters, from which most of the women in the at-risk study came and where the intervention was least effective, have very transitional lives. Some of these sites retained women for only six months. After leaving the facilities, some women's lives may have become even more unsettled and, combined with discontinuation of peer services, may have led to greater negative study results. It is possible that some women in the enhanced group became dependent on peer advocates whose loss to them upon completion of the intervention would make the post-intervention period even more difficult.

It is worth noting that at-risk women did believe in the advantages of consistent use of condoms with a main partner. For example, women in the treatment group perceived more advantages overall to use of condoms, and we saw a consistent trend in increased perception of advantages at follow-up interviews. In general, however, the women at risk felt unable to make the changes they believed were good. Advocates were adept[26] at selecting and working on processes of change and exercises designed to raise participant awareness of HIV risk, but it is possible that some activities raised anxiety among clients about their abilities to get their partners to use condoms. This might explain relapses at the second transition.

Another possible reason the intervention was less effective among women at risk may be that the standard counseling is most like the enhanced counseling in the early stages of intervention. Counseling activities that focus on awareness, significance to self and others, and cost benefit consideration should be provided in a standard Title X counseling session for HIV/STD prevention. Counseling activities for ready-for-action and later stages are more complex and involve modeling activities that are not included in a standard Title X session. Because our comparison condition includes some prevention counseling, and the majority of women at risk were either pre-contemplative or contemplative, it is possible that the interventions for both enhanced and standard groups were somewhat similar, at least in content. However, women came to the enhanced treatment services knowing they would receive information about condoms and contraception from an advocate, not to get medical care. In addition, in the reproductive health visits clinicians typically limited "counseling" to self breast exam, condom for disease prevention, or alternative contraception types.

Limitations. Although a strength of the program was its complexity in targeting multiple behaviors in a variety of ways, this complexity limits analyses in several ways. The longitudinal analysis required that clients be assessed in consecutive interviews in order to be included in an analysis. However, changes in participants' needs, behav-

iors, and partner status over time severely limited the number of women who could contribute to the analyses at any given transition. For example, a woman might have a main partner at baseline and at 12 months, but not at 6 months and 18 months. Consequently, she would not be factored into the stage-based analysis for condom use with a main partner. This limited the number of participants in the analysis as well as our ability to generalize some of the findings.

Attrition also may have compromised the generalizability of these findings. Women in these two populations are particularly difficult to follow. Some women at risk did not have homes, or were unable to participate because of their drug addictions. Many HIV+ women or their children were sick, and many participants died during the study. Despite these problems, very few differences were found between women whose assessments were included in the study and those who were not (data not shown).

The numbers for the HIV+ study were too small to analyze all of the target behaviors as we had hoped. This is partly due to the constraints of the theory-driven analyses and longitudinal design. In addition, fewer HIV+ women were available to us at some sites than we had anticipated and, therefore, we fell short of our recruiting goals.

In the at-risk study, we used a convenience sampling strategy to identify women who were likely to be at increased risk for HIV-infection by identifying sites, such as drug treatment facilities and homeless shelters, that are likely to serve women at increased individual risk. Women targeted in this way may or may not be representative of the population of women at high risk for HIV-infection, the women we as public health professionals most want to reach. Therefore our findings can only be generalized to women seeking services at facilities like the ones used in this study.

Similarly, women in the HIV+ study may not be representative of all women with HIV. The women we recruited were currently seeking medical care at an HIV outpatient clinic and may have had more resources available to them. Therefore, they may have progressed further in their acceptance of and adjustment to their disease compared with women who either had not begun to seek medical care, or who had stopped seeking it.

Finally, from the perspective of testing intervention effectiveness, measuring behavior-related outcomes in terms of "stages" or degrees of attaining the final behavioral goal–in this case consistent condom or contraceptive use–gives "credit" to an individual's progress that falls short of the actual desired behavior. For example, someone who is thinking about using a condom, but who was not considering it before the intervention, is counted as a success, even though her behavior is no safer. Some might argue that this is a limitation of the outcome measure because one has still failed to improve the public's health. However, if individual behavior change depends on these step-like degrees of commitment and intention, we believe measuring success in this way is the only thing that does make sense, particularly if designing the next effective health message depends on understanding a client's current stage, which the theory suggests.

Implications for public health. The enhanced intervention's success among HIV+ women suggests it should be considered among the tools public health professionals use to encourage condom use among HIV+ women receiving primary HIV care. We believe the intervention was successful among this group for four main reasons. First, based on our formative research we knew that HIV+ women preferred health advocates who also were HIV+. However, project managers need to be especially sensitive to the physical and emotional demands that come with being an advocate, and must include opportunities for advocates to debrief and obtain support. Second, although the lives of the HIV+ women were generally more stable than those of the at-risk women, there was still a great need for supportive services to help participants find housing, work on child custody issues, manage drug abuse, obtain work, or enroll in GED classes. Our intervention was designed to address these needs through close collaboration with social workers and community referral agencies. Third, the ability to tailor health messages for each woman based on her current motivations, intentions, and characteristics of sexual partners, was essential to meet the needs of the largest number of women. Finally, most of the HIV-infected women in our sample were receiving HIV primary care services. These services most likely reinforced our intervention's messages about consistent condom use for disease prevention and consistent contraceptive use. It is likely that interventions such as this work best when messages are supported in multiple settings and where use and promotion of condom use is the norm rather than the exception.

Implications of our study in relation to women at high risk for HIV- infection, for whom the intervention did not have clear positive effects, are less obvious. In the midst of grappling with chaotic life situations such as homelessness, drug treatment, and unstable child custody situations, taking the next steps to actually obtain and negoti-

ate use of condoms with their partners could have seemed overwhelming or unimportant to many women in the at-risk study. At the very least, research is needed to assess perceived need for and barriers to condom and contraceptive use behavior change among this group. It is possible that our intervention is more effective with women in later stages of behavior change, or that women in early stages require a longer intervention period to support the more difficult steps to initial progress. Longer intervention periods in combination with interventions that also support changes in women's competing life challenges may be more effective than either strategy alone.

Very few studies have provided long-term assessment of HIV prevention intervention program effects, a neglect that may skew findings. For example, had we not continued to follow women past the 6-month intervention period, we would have assumed this intervention was successful among at-risk women for condom use with main partners. In fact, condom use at 6 months with main partners doubled, from 15% to 31% among this group, and we found clear effects in preventing relapse and increasing self-efficacy. However, the longer-term data showed this assumption to be wrong, as self-efficacy decreased among women in the enhanced group and differences in behavioral stage progress between the groups disappeared. Examples such as this highlight the need for long-term follow-up evaluations in HIV prevention research.

This project involved collaboration among a federal agency, several private health service facilities and research institutions. Each perspective has strengthened the resulting work. CDC's perspective on the interests of public constituents throughout the country not only helped to keep a focus on the need for practical interventions that could be disseminated, but it also facilitated the consistent application of the research protocols across sites. State and local health departments, family planning and other public health agencies, and community-based organizations hold a keen interest in the lessons learned from such demonstration projects. The collaborative nature of the project offers the opportunity to move beyond a focus on implementation and evaluation in an individual site to develop a project that addresses more broadly the prevention issues of the larger public health practice community.

CONCLUSIONS

There remains a great need for HIV prevention efforts among women, for those at risk of infection and those already infected with HIV. Our results suggest that for HIV+ women, a stage-based, peer-delivered intervention can be effective in increasing consistent use of condoms for HIV prevention and, to a lesser extent, contraceptives for birth control. Although a substantial number of interventions have been used to reduce HIV risk among women at risk for HIV, very few interventions that seek to increase both condom and contraceptive use for HIV+ women have been published. We know that advocates can successfully implement this intervention according to the transtheoretical model,[26] and that the intervention was well received by women in the HIV outpatient clinic in which it was offered.

We believe this intervention is particularly appropriate for one-on-one interventions in a facility setting, such as an outpatient clinic. The manual is a handy portable tool that is thoroughly indexed and therefore easy to use to find stage-tailored health promotion messages appropriate for the needs and concerns of the client. It can be taken off the shelf when needed—when the client is available—and does not require scheduling a series of groups. Peer advocates are cost-efficient as service providers and, according to our formative research, are preferred by women in our target group.

For women at risk of HIV infection, many of whom were in early stages for use of condoms, the intervention was not effective in the long run. The women at risk—living in public housing or homeless shelters, receiving drug treatment—showed some initial gains in stage for use of condoms, but those early intervention effects were not maintained. Further work is needed to help the public health community understand how we can support early commitments to consistent use of condoms among women at high risk for HIV infection, and how to move women from commitment to actual behavior change. Understanding how to increase self-efficacy during these early stages also may be helpful in preparing women for behavior change.

This intervention was tailored to patients' needs and provided support for life challenges as well as behaviors for condom and contraceptive use. The participants in our studies had many competing life issues, from drug addiction, homelessness and HIV-infected children to poverty and illiteracy. In the end, the appropriate measure for overall program effect may not be stage of condom use or self-efficacy of birth control use. It is possible that a more general quality of life assessment[33,34] would reflect the broader impact of the intervention on women's lives.

This study was supported by Grants #UU65/CCU306934 and #U88/CCU312355 from the Centers for Disease Control and Prevention, and by

an Outpatient General Clinical Research Center Grant #RR00722 from the National Center for Research Resources, National Institutes of Health.

The authors wish to acknowledge the following collaborators on this project for their assistance and support: Bobby Milstein, Linda Watkinson, Ruth Faden, Abigail Cohen, Kathy Lupton, Brian Morrow, Paul Gargiullo, and John Sheridan. We would also like to thank the women who participated in the study, their health care providers and advocates for making this work possible.

References

1. Centers for Disease Control and Prevention, National Center for HIV, STD and TB Prevention, Division of HIV/AIDS Prevention (US). US HIV and AIDS cases reported through June 2000. HIV/AIDS Surveillance Report, 2000. Atlanta: Department of Health and Human Services; 2000;(12):1.
2. Kalilchman SC, Carey MP, Blair TJ. Prevention of sexually transmitted HIV infection: a meta-analytic review of the behavioral outcome literature. Ann Behav Med 1996;18:6-15.
3. Ickovics JR, Yoshikawa H. Preventive interventions to reduce heterosexual HIV risk for women: current perspectives, future directions. AIDS 1998;12:S197-S208.
4. Wingood, GM & DiClemente, RJ. HIV sexual risk reduction interventions for women: a review. Am J Prev Med 1996;12:209-17.
5. Exner TM, Seal DW, Ehrhardt AA. A review of HIV interventions for at-risk women. AIDS Behav 1997;1:93-124.
6. Carey MP, Braaten LS, Maisto SA, Gleason JR, Forsyth AD, Durant LE, et al. Using information, motivational enhancement, and skills training to reduce the risk of HIV infection for low-income urban women: a second randomized clinical trial. Health Psychol 2000;19:3-11.
7. DiClemente RJ, Wingood GM. A randomized controlled trial of an HIV sexual risk-reducing intervention for young African-American women. JAMA 1995;274:1271-6.
8. Hobfoll SE, Jackson AP, Lavin J, Britton PJ, Shepherd JB. Reducing inner-city women's AIDS risk activities: a study of single, pregnant women. Health Psychol 1994;13:397-403.
9. Kalichman SC, Williams E, Nachimson D. Brief behavioural skills building intervention for female controlled methods of STD-HIV prevention: outcomes of a randomized clinical field trial. Int J STD AIDS 1999;10:174-81.
10. Kelly JA, Murphy DA, Washington CD, Wilson TS, Koob JJ, Davis DR, et al. The effects of HIV/AIDS intervention groups for high-risk women in urban clinics. Am J Public Health 1994;84:1918-22.
11. National Institute of Mental Health Multisite HIV Prevention Trial Group. The NIMH multisite HIV prevention trial: reducing HIV sexual risk behavior. Science 1998;280:1889-94.
12. Gillespie CC. Women's HIV risk reduction efforts and traditional models of health behavior: a review and critique. Women's Health 1997; 3:1-30.
13. Polacsek M, Celentano DD, O'Campo P, Santelli J. Correlates of condom use stage of change: implications for intervention. AIDS Educ Prev 1999;11:38-52.
14. Santelli JS, Kouzis AC, Hoover DR, Polacsek M, Burwell LG, Celentano DD. Stage of behavior change for condom use: the influence of partner type, relationship and pregnancy factors. Fam Plann Perspect 1996; 28:101-7.
15. Bedimo AL, Bennett M, Kissinger P, Clark RA. Understanding barriers to condom usage among HIV-infected African American women. J Assoc Nurs AIDS Care 1998;9:48-58.
16. Clark RA, Kissinger P, Bedimo AL, Dunn P, Albertin H. Determination of factors associated with condom use among women infected with human immunodeficiency virus. Int J STD AIDS 1997;8:229-33.
17. Kline A, VanLandingham M. HIV-infected women and sexual risk reduction: the relevance of existing models of behavior change. AIDS Educ Prev 1994;6:390-402.
18. Prochaska JO. In search of how people change: applications to addictive behaviors. Am Psychol 1992;47:1102-14.
19. Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. In: Hersen M, Eisler RM, Miller PM, editors. Progress in behavior modification. Vol. 28. Sycamore (IL): Sycamore Publishing Co; 1992. p. 183-218.
20. Gilliam A, Scott M, Troup J. AIDS education and risk reduction for homeless women and children: implications for health education. Health Educ 1989;20:44-7.
21. Stein Z. Family planning, sexually transmitted diseases, and the prevention of AIDS—divided we fail? [editorial]. Am J Public Health 1996;86:783-4.
22. Chavkin W, Breitbart V, Elman D. The availability of HIV services at different types of clinics: a survey [letter to editor]. Am J Public Health 1996;87:790-1.
23. Sable M. The need for integrated government funding and services [letter to editor]. Am J Public Health 1996;87:791-2.
24. Amaro H. Love, sex and power: considering women's realities in HIV prevention. Am Psychol 1995;50:437-47.
25. Lauby JL, Smith PJ, Stark M, Person B, Adams JA. Community-level HIV prevention intervention for inner-city women: results of the Women and Infants Demonstration Projects. Am J Public Health 2000;90:216-22.
26. Cabral R, Galavotti C, Gargiullo P, Armstrong K, Cohen A, Gielen AC, et al. Paraprofessional delivery of a theory-based HIV prevention counseling intervention for women. Public Health Rep 1996;3:75-82.
27. Gielen AC, Fogarty LA, Cabral R, Armstrong K, Cohen A. Promoting Condom Use with Main Partners: a behavioral intervention trial for women. AIDS Behav. In press 2001
28. Grimley DM, Prochaska GE, Prochaska JO, Velicer WF, Galavotti C, et al. Cross validation of measures assessing decisional balance and self-efficacy for condom use. Am J Health Behav Educ Prom, 1996;20:406-16.
29. Galavotti C, Cabral R, Lansky A, Grimley D, Riley GE, Prochaska JO. Validation of measures of condom and other contraceptive use among women at high risk for HIV infection and unintended pregnancy. Health Psychol 1995;14(6):570-8.
30. Lauby J, Semaan S, Cohen A, Leviton L, Gielen A, Pulley L, et al. Self-efficacy, decisional balance and stages of change for condom use among women at high-risk for HIV infection. Health Educ Res: Theory Pract, 1998;13:343-56.
31. Diggle PJ, Liang K, Zeger SL. Analysis of longitudinal data. Oxford Statistical Science Series no. 13. New York: Oxford University Press; 1996.
32. Stark M, Tesselaar H, Fleming D, O'Connell A, Armstrong K. Contraceptive method and condom use among women at risk for HIV infection and other sexually transmitted diseases—selected US Sites 1993-1994. MMWR Morb Mortal Wkly Rep 1996;45;820-3.
33. Gielen AC, McDonnell KA, Wu AW, O'Campo P, Faden R, Quality of life among women living with HIV: the importance of violence, social support, and self care behavior. Soc Sci Med 2001;52:315-22.
34. McDonnell KA, Gielen AC, Wu AW, O'Campo P, Faden R. Measuring health related quality of life among women living with HIV. Qual Life Res. In press 2001. ■