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The STEP into Action study: a peer-based, personal risk network focused HIV prevention intervention with injection drug users in Baltimore, Maryland

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Abstract

Aims—To assess the effectiveness of a peer-based, personal risk network focused HIV prevention intervention to 1) train IDUs to reduce injection and sex risk behaviors, 2) conduct outreach to behaviorally risky individuals in their personal social networks (called Risk Network Members), and 3) reduce RNM HIV risk behaviors.

Design—Randomized controlled trial with prospective data collection at 6, 12, and 18 months. Intervention condition consisted of 5 group-sessions, one individual session and one session with Index and the RNM.

Setting—This study was conducted in Baltimore, Maryland from March of 2004 to March of 2006.

Participants—1) Index participants were aged ≥ 18 years and self-reported injection drug use in the prior 6 months and 2) their RNMs who were aged ≥ 18 years and drug users or sex partners of Index.

Measurements—Outcomes included: 1) injection risk based on sharing needles, cookers and cotton for injection and drug splitting, 2) sex risk based on number of sex partners, condom use and exchanging sex and 3) Index HIV outreach behaviors.

Findings—A total of $n=227$ Index participants recruited $n=366$ RNMs. Retention of Index at 18-month follow-up exceeded 85%. Findings suggest the experimental condition was efficacious at 18-months in reducing Index participant injection risk (OR=0.38; 95% CI=0.18-0.77), drug splitting risk (OR=0.46; 95% CI=0.25-0.88), and sex risk among Index (OR=0.53; 95% CI=0.34-0.86). Significant intervention effect on increased condom use among female RNM was observed (OR=0.34; 95% CI=0.18-0.62).

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The authors have no conflicts of interest to declare.

Clinical Registration: This registered with ClinicalTrials.gov through the National Institutes of Health under: A Network & Dyad HIV Prevention Intervention for IDU's.

Conclusions—Training active IDU to promote HIV prevention with behaviorally risky individuals in their networks is feasible, efficacious and sustainable.

Keywords

HIV prevention intervention; social network; injection drug user; peer-oriented; randomized controlled trial

Introduction

Injection drug use accounts for 36% of the HIV incidence in Baltimore, Maryland.¹ Temporal trends in the United States suggest a decline in certain injection related risk behaviors, such as sharing needles.^{2,3} Yet drug splitting behaviors (e.g. using a contaminated container and syringe to prepare and divide the drugs) contribute to the perpetuation of both HIV and hepatitis C (HCV) epidemics.⁴⁻⁸ Sexual transmission among injection drug users is also a major source of new infections.

Prior peer-based social-network oriented interventions have demonstrated success in training drug users to promote HIV risk reduction to other drug users⁹⁻¹². These interventions are based on social influence theories, whereby individuals are recognized as an agent of influence on their network and thus able to alter behaviors within the personal network¹³. One advantage of this approach is the potential to reach risky individuals who are reluctant to seek prevention services directly. By having a peer serve as an agent to diffuse information and risk reduction skills to their network within the actual social environments where risk may be taking place¹⁴⁻¹⁶, the salience of the message is increased and potentially sustained. The STEP into Action intervention sought to train *active* injection drug users (referred to as Index participants) to be Health Educators and focus outreach specifically to individuals in their personal social network who inject and/or are sexual partners (referred to as Risk Network Members – RNMs). This approach aimed to increase the prominence of HIV prevention in the personal social network and change behavior and risk norms of both Health Educator and the individuals in their personal risk network. For evaluation purposes, the Indexes were asked to invite up to 5 RNMs into the study to enable assessment of diffusion of the intervention content to these specific members of the personal risk network. At least one RNM was required to enroll in order for the Index to be eligible for the randomization to (intervention (I) or control (C) condition). This manuscript reports the results of the STEP into Action intervention on:

1. Index injection and sex risk behaviors,
2. Index outreach to personal risk networks,
3. Risk network member injection and/or sex risk behavior,

Methods

Study Population and Recruitment

Recruitment for the study was conducted from March of 2004 to March of 2006. Two types of study participants were recruited: Index and Risk Network Members (RNMs). Inclusion criteria for Index participants were: 1) 18 years old or older, 2) self-reported injection drug use within the prior 6 months, and 3) willingness to invite a RNM into the study and talk about HIV prevention. HIV status was not an exclusion criteria. Recruitment methods for Index included: street-based outreach, word of mouth, advertisements and referrals from community agencies. During the Index's baseline interview, a list of RNMs who were potentially eligible was generated from a social network inventory. The Social Network

inventory was administered face-to-face by a study interviewer and consisted of a section where participants identified people in their personal network based on various roles and functions (e.g. provide social support, sex partner, drug partner). Once this list was generated participants describe various characteristics about each individual listed, such as gender, age, race, emotional closeness, and frequency of contact. Criteria for Risk Network Members were being 18 years old or older, report by the Index that the RNM had used drugs (heroin, cocaine or crack), regardless of route and/or was a sex partner of the Index in the prior 90 days. Index received \$10 for each RNM who enrolled (see Figure 1).

Baseline visit procedures for both Index and RNM consisted of a written informed consent process, interviewer administered survey on demographics, health status, drug and alcohol use, frequency of communication about HIV topics and social network inventory. Injection and sexual behavioral risk was assessed using Audio Computer-Assisted Self Interview (ACASI). All participants were offered an HIV antibody test using the Orasure specimen collection system. Participants were also asked to self-report their HIV status. There were 25 (11%) of the total Index sample who declined the Orasure. Of these, 10 (40%) self-reported HIV positive status. All study procedures were conducted at a research clinic. All participants received \$30 for completing the baseline visit. This research was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Randomization

Randomization was conducted using a computerized program using a block size of four that stratified by gender to achieve equal numbers of men and women in each condition. Of 600 Index participants who were eligible and enrolled into the study, 50% (n=297) recruited at least one RNM. A total of 227 Indexes were randomized (n=114 experimental condition, n=113 control group).

The Intervention Condition

The intervention condition focused on promoting risk reduction with personal risk network and consisted of 5 group-based, one individual and one session with the Index participant and their enrolled RNM (dyad session). Group size ranged from 4-10 participants. Content of the group sessions focused on increasing knowledge and skills to reduce injection, drug splitting, and sex risk and communication skills to conduct outreach to personal risk networks. The intervention introduced safer drug splitting techniques such as using a needle-less syringe to split liquid drugs and laminated sheets to be used as a surface for splitting drugs in a dry form. The individual session included goal setting for HIV risk reduction and outreach. The dyad session included an opportunity for the Index to teach the RNM about HIV risk reduction options and goal setting for risk reduction.

Eighty-seven percent of the participants attended at least 4 of 7 intervention sessions; 36% attended all sessions, and 64% completed the dyad session. All sessions were audio-recorded. To assess fidelity to the intervention, sessions were randomly selected and independently reviewed by two trained research assistants for adherence to content and procedures (0=inadequate; 1=adequate). Adherence to the curriculum was high (over 90% of session rated as adequate adherence).

Control condition

The control consisted of 5 group-based sessions that addressed injection drug-use related topics (e.g. HIV testing, hepatitis C, and drug overdose). The sessions were informational and did not include skills training. The control was co-facilitated by the same facilitators of the intervention condition. Eighty-five percent attended at least 3 of 5 sessions. Sessions

were audio-recorded and quality assurance procedures monitored for contamination of intervention messages. Participants in both conditions received \$20 for each session.

Follow-up Data Collection

Outcomes were assessed on Index and RNM of both the intervention (I) and control (C) conditions. Follow-up periods were at 6, 12 and 18 month (T2, T3, and T4, respectively) after the last session of the intervention or control condition. The follow-up visits entailed a behavioral risk assessment using (ACASI), an interviewer administered survey and social network inventory. Interviewers were blinded to the study condition of the participant. Participants received \$35 for each follow-up. Retention rates for Index exceeded 85% at each time point (see Figure 1). White participants (Index and RNM) and Index participants who were incarcerated in the 6 months prior to baseline were more likely to be lost at any time points. However, these attritions did not differ between conditions.

Measures

Injection and Drug Splitting risk—The intervention was designed to reduce the use of unclean needle, cooker and cotton for injection and splitting drugs. All participants (Index and RNM) were asked regarding frequency of use of these paraphernalia in the prior 6 months. Distribution of responses was not normal and injection risk behavior was operationalized as any use (versus never) of any unclean paraphernalia.

Drug splitting risk was based on having shared a cooker when preparing drugs versus not in the prior 6 months. The number of different people with whom the participants had shared cookers or needles in the past 30 days were also examined. These responses were categorized as “none,” “one person,” and “two or more people.”

Sex risk—All participants (Index and RNM) reported the total number and type (main versus non-main) of sex partners in the prior 90 days. A dichotomous variable was created based on the frequency of condom use for anal or vaginal sex with any type of sex partner defined as 100% condom use for both vaginal and anal or less than 100% for either.

Engaging in sex risk behavior was operationalized as: 1) two or more sex partners in the past 90 days, 2) having sex in exchange for money, drugs, food or shelter; or 3) less than 100% condom use for either vaginal or anal sex with any type of sex partners. A dichotomous variable was constructed to indicate engaging in at least one of the sex risk behaviors versus not.

HIV Outreach Behaviors—A central component of the intervention was training Index participants as Health Educators to conduct HIV outreach to their personal risk network. Index participants were taught simple communication strategies and were encouraged to have frequent conversations about HIV prevention. We examined four topics of communication with drug buddies within the prior month: 1) cleaning needles with bleach, 2) risks of sharing needles, 3) using condoms and 4) getting tested for HIV ($\alpha = 0.86$). The number of topics was summed for a total possible score of 4, which indicated communicating about all topics in the past month. The summed score had high responses at the extremes and was dichotomized at the median (e.g. talked with drug buddies about three or more of these topics in the past month versus less than three topics).

In session 2, intervention Index participants were provided with needle-less syringes that could be used to split liquid drugs. As a measure of diffusion, we assessed if Index had ever showed the needleless syringe to others. The control condition content heavily focused on

health education about hepatitis C and opiate overdose prevention. At follow-up we assessed if the Index participants had talked about hepatitis and overdose.

Potential covariates—Socio-demographic characteristics included age, race/ethnicity, education, homelessness, incarceration in the prior 6 months and current employment status. HIV status was based on Orasure antibody testing results.

Statistical Analyses

Chi-square tests for categorical and t-tests for continuous variables were used to compare baseline demographics of Index participants (Table 1) and RNM by randomization assignment (Table 3).

Logistic generalized estimating equation (GEE) models, that take into account within-subject correlations was conducted¹⁷ to examine the intervention effect on Index behavior over the 18 month period. An exchangeable correlation structure was assumed, and standard error was calculated using the Huber/White/sandwich estimator to caution against the correlation misspecification. An indicator variable for the four time points was included as a covariate to account for any unaccounted temporal effect¹⁸. Individuals who did not report sexual or injection risk behavior at follow-up because either they did not engage in sexual behavior or have stopped injecting drugs were coded as not engaging in sex or injection risk behaviors. All analyses were based on the intent-to-treat assumption regardless of number of sessions attended. These analyses were conducted using Stata 10¹⁹

For the Indexes, significant interaction between time and intervention status was noted for several outcomes, suggesting that the intervention effect varied across time. These results were also presented in Table 4. All GEE analyses were also conducted adjusting for baseline demographic variables hypothesized to be potential confounders, such as gender, HIV status, and race. The inferences and estimates were similar to the unadjusted models; the more parsimonious unadjusted was preferred and were presented in Tables 4 and 5.

Results

Sample Characteristics of Index Participants

Table 1 presents the demographic and risk behavior characteristics of 227 randomized Index participants. There were no differences between the intervention and control on baseline demographics, injection or sex risk variables.

Table 2 presents the characteristics of the 336 RNMs recruited (and enrolled) by the 227 randomized Indexes.

Table 3 presents characteristics of the RNMs, as reported by the RNM. RNM of intervention Indexes were slightly more likely to engage in risky injection behaviors than the RNM of control Indexes at the baseline.

Effect of the Intervention on Index Participant HIV risk behavior

As presented in Figure 2 and 3, both Index intervention and control condition reduced injection and sex risk behaviors over 18 months. Table 4 presents results from overall (T1-T4) and time specific GEE logistic regression modeling of the intervention effect among the Index participants. Although the overall GEE model without the time-interaction term did not show a significant effect for injection risk behaviors, the effect significantly varied across time. At T3, intervention condition Index had reduced odds of injection risk

(OR=0.47; 95%CI=0.23-0.97), and having two or more people with whom they shared cookers or needles (OR=0.39; 95%CI=0.18-0.87) as compared to the control Index.

At T4, the intervention condition Index had significantly lower odds of injection risk (OR=0.38; 95%CI=0.18-0.77), using an unclean cooker for splitting drugs (OR=0.46; 95%CI=0.25-0.88) having two or more people to share needles or cookers (OR=0.31; 95%CI=0.14-0.71) and injecting drugs (OR=0.49; 95%CI=0.28-0.86), as compared to control Index. Reductions in sex risk were observed in the overall model (OR=0.53; 95%CI=0.34-0.86). The intervention effect did not vary by gender for Index participants.

Effect of the Intervention on Index HIV prevention outreach behaviors

Intervention condition was significantly associated with Index having conversations with others about HIV-related topics at all follow-up time points (T2-T4) and showing others the needle-less syringe as compared to the controls. At T2, the control condition was significantly associated with conversations about overdose as compared to intervention. This effect was not observed at T3 or T4.

Diffusion of Intervention effect to RNM

Among sexually active RNM at T1, those whose Index was in the intervention condition were less likely to report any sex risk over time (OR=0.63; 95% CI=0.42-0.94)(Table 5). No differences were observed between conditions on injection risk behaviors; RNM of the intervention condition were more likely to report showing a needle-less syringe to others, as compared to control RNM (OR=3.25; 95%CI=1.79-5.88). There were significant gender differences among RNM for injection and sex risk. Male intervention RNM were more likely to report injection risk over time than male control RNM. However, female intervention RNM had reduced odds of reporting sex risk over time than female control RNM.

Discussion

One of the challenges to developing effective behavioral interventions for marginalized and resource-limited populations, such as injection drug users, is the ability to sustain the effect of the skills training beyond 6 months²⁰. Decay of intervention effects may occur because of lack of contact with program and interruptions to practice and use of skills. Results from an 18 month follow-up period indicate that the STEP intro Action intervention was efficacious for Index participants in 1) sustaining reductions in injection risk and sharing a cooker to split drugs, 2) reducing sex risk behaviors and 3) increasing communication about HIV prevention.

A novel aspect of the current study is that Health Educators were trained to focus on HIV risk reduction conversations with individuals in their personal risk network, as opposed to general peer-based outreach. The intervention was designed to integrate behavior change into daily activities and conversations within natural social settings as a method to enhance sustainability of the intervention. Furthermore, salience and credibility of the risk reduction message is increased because it is delivered by a similar other²¹ within the personal network.

Drawing from Social Identity theory²², this intervention sought to establish the role of Health Educator in which norms for personal risk reduction was emphasized. We found that intervention condition Indexes were more likely to have HIV prevention conversations as compared to control. The repeated conversations about HIV prevention may serve to reinforce the identity of peer Health Educator which then influenced behavior to be consistent with their conversations¹⁶. Intervention condition was significantly more likely

to reduce risks associated with sharing a cooker to split drugs and to talk with their risk network about the needle-less syringe as an option for splitting liquid drugs more safely. This result has implications for addressing hepatitis C transmission, especially to individuals who are initiating drug use, which has been identified as a critical time for hepatitis C infection²³. Future interventions for IDUs should increase knowledge about risks associated with splitting drugs in a liquid form and alternative methods for safer splitting.

We report evidence of intervention effect on sex risk of female RNM. Nearly one-third of the RNMs recruited and enrolled were named by the Index as a sex partner. Drug users are often enmeshed in dense social networks that contain a diversity of ties ranging from kin to drug-using associates and multiplex risk relationships such as having a network who is both an injection and sex partner. The dyad session was developed to enable the Health Educator to continue to practice their skills with a specific RNM and to facilitate conversations that focus on risk reduction goals of the pair. As conversations about risk behavior can be uncomfortable, providing a safe setting where these conversations are perceived as normative can alleviate reluctance to participate. As few interventions have shown a reduction in sexual risk behaviors among injectors¹⁹ this finding is promising and suggests feasibility in recruiting sex partners of injectors for inclusion in intervention activities.

We observed a strong effect of the control condition on conversations about overdose which suggests that there are additional health topics that are salient for injection drug users. It is important to remember the broader context of injection drug users lives²², to acknowledge that HIV prevention may not be the priority for all IDUs, and to examine drug-related risk behaviors beyond HIV risks^{22,23}. Developing programs that are flexible to a range of drug users will increase the potential audience for any intervention, thus increasing exposure to prevention information. The control condition also decreased sex and injection risk behaviors possibly due to HIV testing and pre and post-test counseling provided in accordance with the CDC guidelines which have been found to be effective in reducing risk behaviors.

Limitations should be noted. The sample for this study were older and primarily heroin injectors, which limits the generalizability of the findings. Additional trials are needed to determine whether the peer outreach training would be effective in reducing risk for younger injectors or crack and methamphetamine smokers, who do not inject. Despite having research staff contact and remind Index participants about network recruitment, only 50% of those behaviorally eligible participants were successful in recruiting a network to enroll into the study. Barriers to network recruitment that were documented by staff included : networks not being interested in enrolling, Index able to contact network to discuss, network intended to contact the study but never did. For CBOs and NGO who want to implement a similar program, they would not necessarily need to recruit Risk Networks Members prior to the implementation of the intervention sessions, which was conducted as a way to test diffusion. However, ensuring that CBOs have capacity to conduct intervention sessions with a Risk Network Member should be determined during the pre-implementation phase, is advisable.

These limitations notwithstanding, results from the STEP into Action intervention indicate sustained efficacy on reduction of HIV risk behaviors and diffusion of this effect to risk network members. Future research is needed to investigate the settings and context in which HIV prevention conversations occur and the types of risk network members who are present at these settings. This could be used to inform where to place interventions and maximize exposure of risk reduction messages and resources to high-risk networks.

Acknowledgments

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Figure 1. Flow of Index and Risk Network Members (RNM) study participants; the STEP into Action study, Baltimore MD.

Figure 2.
Comparisons of Index Participants Intervention versus Control condition on changes in injection drug risk over 18 months – The STEP Into Action Study, Baltimore Maryland.

Figure 3. Comparisons of Index Participants Intervention versus Control condition on changes in sex risk over 18 months – The STEP Into Action Study, Baltimore Maryland.

Table 1

Baseline Sample Characteristics of Index Randomized Participants, STEP n (%)

	Total Indexes (n=455)	Control Condition (n=113)	Intervention Condition (n=114)
Male	257 (56)	61 (54)	63 (55)
Age	43.4 (7.9)	43.0 (7.4)	43.9 (7.8)
African American	389 (85)	98 (87)	96 (84)
Have main sexual partner	289 (64)	75 (66)	75 (66)
GED or higher	263 (58)	69 (61)	65 (57)
Orasure seropositive HIV status	25 (14)	16 (16)	12 (12)
Homeless in the past 6 months	174 (38)	42 (37)	43 (38)
Prison in the past 6 months	122 (27)	31 (27)	27 (24)
Unemployed in the past 6 months	420 (92)	101 (89)	106 (93)
Daily injection	109 (48)	51 (46)	58 (51)
Using an unclean needle	94 (41)	49 (43)	45 (40)
Using an unclean cotton or cooker	147 (65)	73 (65)	74 (65)
Two or more sex partners *	78 (34)	41 (36)	37 (33)
Less than 100% vaginal or anal condom use *	149 (67)	78 (70)	71 (63)
Exchange sex *	44 (19)	20 (18)	24 (21)

*
among sexually active

Table 2

Baseline Index Described Characteristics of Risk Network Members Recruited n (%)

	Total Networks (n=336)	Networks of Control Indexes (n=163)	Networks of Intervention Indexes (n=173)
Reported by Index as a drug using network	291 (87)	143 (88)	148 (86)
Reported by Index as a network who Index does drugs with	253 (75)	129 (79)	124 (72)
Reported by Index as a sex network	94 (28)	48 (29)	46 (27)
Reported by Index as both drug-using and sex network	63 (19)	33 (20)	30 (17)
Reported by Index as kin	43 (13)	22 (14)	21 (12)

Table 3

Baseline Risk Network Members self-reported socio-demographic and HIV risk characteristics, n (%)

	Total Networks (n=336)	Networks of N=113 Control Indexes (n=163)	Networks of n=114 Intervention Indexes (n=173)
Male *	197 (59)	85 (52)	112 (65)
Age	43.8 (7.5)	43.3 (7.5)	44.4 (7.6)
African American	291 (87)	144 (88)	147 (85)
Married or committed relationship	207 (62)	106 (65)	101 (58)
GED or higher	199 (59)	104 (64)	95 (55)
Self-report HIV	51 (15)	23 (14)	28 (16)
Homeless in the past 6 months	84 (25)	45 (28)	39 (23)
Prison in the past 6 months	66 (20)	35 (21)	31 (18)
Unemployed in the past 6 months	301 (90)	145 (89)	156 (90)
Injection in the past 6 months	184 (55)	88 (54)	96 (56)
Using an unclean needle *	79 (43)	36 (41)	43 (45)
Using an cotton or cooker*	127 (69)	57 (65)	70 (73)
Two or more sex partners among sexually active	97 (36)	47 (35)	50 (37)
Less than 100% vaginal or anal condom use among sexually active	207 (77)	109 (81)	98 (72)
Exchange sex among sexually active	33 (12)	19 (14)	14 (10)

*
p<0.05

Table 4

Overall and Time-Specific Intervention Effect on HIV Risk Behaviors of Index Intervention Participants as compared to the Control Participants, STEP study¹

	Overall (T1-T4)	Time Specific (T2)	Time Specific (T3)	Time Specific (T4)
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
<i>HIV-related risk behaviors</i>				
Any injection risk				
Monthly vs. never	0.72 (0.46-1.15)	0.93 (0.46-1.86)	0.47 (0.23-0.97) *	0.38 (0.18-0.77) **
Less than monthly vs. never	0.91 (0.55-1.51)	1.47 (0.68-3.17)	0.53 (0.21-1.34)	0.46 (0.16-1.27)
Split drugs wet	1.01 (0.67-1.51)	1.29 (0.74-2.26)	0.68 (0.38-1.24)	0.63 (0.34-1.17)
Shared cooker when preparing drugs	0.69 (0.43-1.09) [§]	1.07 (0.60-1.91)	0.56 (0.30-1.03) [§]	0.46 (0.25-0.88) *
Number of needle or cooker sharers				
2 or more vs. None	0.98 (0.591-62)	0.74 (0.34-1.62)	0.39 (0.18-0.87) *	0.31 (0.14-0.71) **
1 vs. none	1.54 (0.91-2.60)	1.63 (0.76-3.49)	1.43 (0.57-3.62)	1.02 (0.35-2.93)
Injecting drugs	0.72 (0.45-1.13)	1.24 (0.71-2.17)	0.62 (0.36-1.09) [§]	0.49 (0.28-0.86) *
Engaged in sex	0.89 (0.55-1.45)	0.75 (0.39-1.43)	1.02 (0.51-2.01)	1.06 (0.56-2.01)
Any sex risk	0.53 (0.34-0.86) *	0.51 (0.27-0.99) *	0.54 (0.28-1.04) [§]	0.59 (0.32-1.09) [§]
Any sex risk (without exchange)	0.58 (0.37-0.92) *	0.52 (0.27-1.01) §	0.62 (0.32-1.18)	0.63 (0.34-1.16)
<i>HIV outreach behaviors</i>				
Talked about HIV related topics in the past month with drug buddies	1.80 (1.22-2.65) **	3.27 (1.65-6.49) **	2.40 (1.29-4.48) **	2.52 (1.32-4.82) **
Showed a needleless syringe to drug buddies	20.70 (12.15-35.27) ***	22.55 (10.85-46.87) ***	27.69 (12.74-60.20) ***	20.39 (10.02-41.52) ***
Talked about hepatitis to drug buddies ²	2.29 (1.41-3.73) **	0.94 (0.14-6.31)	1.84 (1.01-3.35) *	2.82 (1.56-5.09) **
Talked about responding to overdose to drug buddies ²	0.71 (0.47-1.09) [§]	0.08 (0.02-0.31) ***	0.90 (0.51-1.60)	0.92 (0.52-1.61)

p<0.10;

* p<0.05;

** p<.01;

*** p<0.001

¹ Significant interaction effect with time at p<0.05 noted for all outcomes except sex risk (p>0.1) and injection risk (p<0.1)

² Outcome assessed from Time 2 to Time 4

Table 5

Overall Diffusion of Intervention Effect to Risk Network Members of Intervention Index as compared to Risk Network Members of Control Index for HIV Risk Behaviors and HIV-related Communication, STEP study^{1,2}

	Overall (T1-T4) OR (95% CI)	Male (T1-T4) OR (95% CI)	Female (T1-T4) OR (95% CI)
<i>HIV-related risk behaviors</i>			
Any injection risk			
Monthly vs. never	1.14 (0.67-1.96)	1.61 (0.83-3.11)	0.46 (0.17-1.27)
Less than monthly vs. never	1.97 (1.08-3.62) *		
Split drugs wet in the past 6 months	1.22 (0.74-2.00)	2.00 (1.06-3.76) *	0.50 (0.22-1.14)
Shared cooker when preparing drugs in the past 6 months	1.13 (0.65-1.98)	1.87 (0.92-3.88) §	0.39 (0.14-1.11) §
Number of needle or cooker sharers	0.98 (0.60-1.58)		
2 or more vs. None	1.09 (0.63-1.89)		
1 vs. none	0.83 (0.47-1.48)		
Injected drugs in the past 6 months	1.30 (0.75-2.26)	2.23 (1.11-4.47) *	0.45 (0.17-1.18)
Engaged in sex	0.82 (0.53-1.26)		
Any sex risk	0.63 (0.42-0.94) *	0.99 (0.58-1.68)	0.34 (0.18-0.62) ***
Sex risk without exchange	0.65 (0.43-0.96) *	0.99 (0.58-1.68)	0.35 (0.19-0.65) **
Less than 100% Vaginal or anal condom use	0.61 (0.42-0.89) *	0.89 (0.54-1.46)	0.35 (0.19-0.65) **
<i>HIV-related communication</i>			
Showed a needleless syringe to drug buddies	3.25 (1.79-5.88) ***		

¹ No interaction effect with study time found for all outcomes

² Interaction effect at p<0.05 with gender for the following variables: monthly versus never injection risk, split drugs wet, shared cooker, injecting drugs, any sex risks

p<0.10;

* p<0.05;

** p<.01;

*** p<0.001