Published in final edited form as:
Am J Community Psychol. 2009 June ; 43(3-4): 330–344. doi:10.1007/s10464-009-9234-z.

Changing Drug Users' Risk Environments: Peer Health Advocates as Multi-level Community Change Agents

Margaret R. Weeks, Ph.D.*
Institute for Community Research 2 Hartford Square West, Suite 100 Hartford, CT 06106
860-278-2044 x229

Mark Convey, M.A., **Julia Dickson-Gomez, Ph.D.**, **Jianghong Li, M.D.**, **Kim Radda, RN, M.A.**, **Maria Martinez**, and **Eduardo Robles**
Institute for Community Research

Abstract

Peer delivered, social oriented HIV prevention intervention designs are increasingly popular for addressing broader contexts of health risk beyond a focus on individual factors. Such interventions have the potential to affect multiple social levels of risk and change, including at the individual, network, and community levels, and reflect social ecological principles of interaction across social levels over time. The iterative and feedback dynamic generated by this multi-level effect increases the likelihood for sustained health improvement initiated by those trained to deliver the peer intervention. The Risk Avoidance Partnership (RAP), conducted with heroin and cocaine/crack users in Hartford, Connecticut, exemplified this intervention design and illustrated the multi-level effect on drug users' risk and harm reduction at the individual level, the social network level, and the larger community level. Implications of the RAP program for designing effective prevention programs and for analyzing long-term change to reduce HIV transmission among high-risk groups are discussed from this ecological and multi-level intervention perspective.

Keywords

substance abuse; HIV/AIDS; peer intervention; multi-level intervention; diffusion; social networks

INTRODUCTION

The significance of social context and the dynamics of social processes for understanding and creating responses to public health concerns like the threat of epidemics are increasingly of interest to social scientists, health providers, and advocates (DiClemente, Crosby, & Wingood, 2005; Fuller et al., 2007; Manhart & Holmes, 2005; Rhodes, Stimson, & Quirk, 1996; Rotheram-Borus & Duan, 2003; Trickett & Pequegnat, 2005). Individual behaviors, often the focus of interventions to curb risks and transmission of infectious diseases, are defined and shaped by social relationships and occur within a broader social environment. Recognition of this impels development of a conceptual framework and intervention approaches that incorporate social and contextual influences on multiple levels in the change process. Approaches that advance concepts of social structural transformation (Blankenship, Bray, & Merson, 2000; Blankenship, Friedman, Dworkin, & Mantell, 2006), community empowerment and participation (Brown, 1991; Israel, Eng, Schulz, Parker, & Satcher, 2005; Minkler, 1989;

*Direct correspondence to: Margaret R. Weeks, Ph.D., Executive Director, Institute for Community Research, 2 Hartford Square West, Suite 100, Hartford, CT 06106, mweeks@icrweb.org..

Minkler & Wallerstein, 2003; Robertson & Minkler, 1994), social network and peer influences (Broadhead et al., 1998; Friedman, Curtis, Neaigus, Jose, & Des Jarlais, 1999; Latkin, 1998; Weeks, Clair, Borgatti, Radda, & Schensul, 2002), and advocacy (Treno & Holder, 1997) are designed to create responses beyond individual behavioral modification to affect the broader social context (DiClemente et al., 2005; Rapkin & Trickett, 2005; Trickett, 2005). An explicit goal of social-level, community empowerment, and participatory models is also to increase the relevance and sustainability of beneficial intervention effects and efforts by taking advantage of the strength and influence of indigenous social and cultural frameworks and patterns of social interaction as part of the change process (Altman, 1995; Barnett, 1997; Jana, Basu, Rotheram-Borus, & Newman, 2004; Schensul, 2005).

Framing social dynamic, community-level or multi-level intervention models theoretically and designing, implementing and testing them create many challenges. Theories of change at the level of individual behavior (e.g., Bandura, 1977; Fishbein & Ajzen, 1975; Prochaska, Redding, & Evers, 1996) or at the level of networks or social groups, such as the theory of innovation diffusion (Rogers, 1995), effectively provide a conceptual framework for understanding processes at that level. A growing body of literature focused on a social-ecological framework also offers promise for conceptualizing the interconnectedness of different levels of social change, and the iterative and multiple influences on the social context of change at different levels simultaneously (Bronfenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988; Trickett, 2002, 2005). Such an approach represents a significant shift from a focus on individuals and the dynamics of individual-level change to one that situates the individual within the context of an interactive process engaging the whole network group or community.

Trickett provides an ecological framework that incorporates four dynamic concepts, analogous to similar constructs in environmental ecology, with relevance to social dynamic processes that interrelate multiple social levels (Trickett, 2005). These concepts include: 1) the *adaptation* principle regarding the interaction of individuals with their environment, which emphasizes the need to explore the social context of a problem and how people respond within that context, changing both themselves and the context in the process; 2) the *cycling of resources*, building on the importance of community members as resources for change, thus emphasizing capacity building to enhance that resource; 3) *interdependence*, emphasizing the need to understand how relevant aspects of the community fit together and influence each other in order to construct an integrated response to affect the direction of change; and 4) the principle of *succession*, which recognizes community history and future trends, and that relevance of responses within that process and dynamic leads to sustainability of the change response over time.

Likewise, social empowerment models of community transformation focus on building change from within the social context of the community in which the problem exists (Brown, 1991; Minkler, 1989; Robertson & Minkler, 1994). The mid-1980s movement in the field of health promotion, in critique of overly medicalized and individualized conceptions of disease, illness, health, and wellness (McIntyre, 1992; Robertson & Minkler, 1994; WHO, 1984), refocused the field on empowered individuals and communities as a strategy for health enhancement. The movement advocated for community participation in addressing health problems, and for augmenting individual strategies with social and political ones to address the contextual and structural factors that either directly cause harm or indirectly reduce or eliminate options for prevention and harm reduction (Brown, 1991; Labonte, 1994; Minkler, 1989; Rhodes & Hartnoll, 1996). On both the individual and community level, empowerment refers to “people having power to take action to control and enhance their own lives, and the processes of enabling them to do so” (Grace, 1991, p. 330). Advocacy in this sense moves beyond the provision of support and assistance to individual cases (as the term is commonly used in the

relationship between service providers and their case management clients) (Kirby et al., 1999; McCarty, LaPrade, & Botticelli, 1996) to mean instead the mutual efforts to change conditions that negatively affect these community members as individuals and as a group (Mosher, 1999; Treno & Holder, 1997).

This and similar approaches that focus on social contextual dynamics and processes call on us to rethink our understanding of the "risk reduction" change process. Efforts are needed to continue to develop and apply this paradigm shift from a focus on the individual to one that models determinants of health risks on multiple levels (e.g., national/state, community, social network, as well as individual), and on the social whole, that incorporates community input into the definition of the problems and engages them in their solutions, and that recognizes the necessity for building or mobilizing community capacity for action to address social concerns (Freire, 1970; Fuller et al., 2007; Gollub & Metzger, 1999; Lurie et al., 1993; Rhodes & Hartnoll, 1996; Schensul, Verma, & Nastasi, 2004; Trickett & Pequegnat, 2005).

The Risk Avoidance Partnership (RAP) project was designed applying such a model. The RAP project developed and tested an intervention to change the social context of risk for exposure to transmissible diseases among heroin and cocaine users in an urban context. The project provided an intensive training to drug users to become "Peer/Public Health Advocates" (PHAs) and to deliver a prevention modeling intervention to their drug-using and non-drug using network members and others in the city (Dickson-Gomez, Weeks, Martinez, & Convey, 2006; Weeks et al., 2006; Weeks et al., in press). RAP incorporated principles of community empowerment (Brown, 1991; Minkler, 1989; Robertson & Minkler, 1994), diffusion of innovations (Rogers, 1995), dynamic social impact theory (DSIT) (Nowak, Szamrej, & Latane, 1990) and social network dynamics (Granovetter, 1973; Maguire, 1983; Marsden & Lin, 1982; Mitchell, 1969; Neaigus et al., 1994; Wasserman & Klovdahl, 1994), as well as social learning principles of behavior change (Bandura, 1977, 1994), in the design of a multi-level prevention intervention intended to change risky practices and increase prevention efforts in the population of drug users in Hartford, Connecticut, and more broadly in the community in which they live and move.

Several key concepts in this set of related theories explicate and allow the operationalization of the social ecological dynamic constructs. For example, DSIT posits that strength of ties to a meaningful change agent (also a key component of diffusion theory) and number of close contacts engaged in an action increase the social influence on the individual to change as well, modeling the process of cycling of resources within a group and the interrelatedness principles in social ecology. The reinforcement of health improvement through the influence of a deeply embedded, empowered set of key individuals within a social network or community sets in motion a dynamic designed to generate change over time that builds on the community's or group's internal resources and that allows adaptation to their specific social context.

In this article, we lay out the general approach used to design and implement the RAP project, and illustrate aspects of it that reflect key factors of change on multiple levels using social ecological and community empowerment frameworks. We will discuss how the project was theoretically designed to address individual, peer network, and community levels, with specific theories framing each, and to set into motion an interactive feedback process to reinforce and expand the intervention effects in the whole community over time. We also indicate the significance of this approach for broadening the scope and influence of disease prevention and public health promotion efforts with populations and communities at high risk.

RAP AS MULTI-LEVEL CHANGE MODEL

Study Design and Participant Groups

The RAP study used an intensive observational design in a single study site (Hartford, Connecticut), with mixed method formative research, an ethnographic process evaluation, a longitudinal mixed method outcome evaluation, and a cross-sectional drug-use community assessment to measure impacts of the RAP interventions on different social levels over time. Intensive formative research to understand the dynamics of drug user social networks and drug use sites was conducted in a separate study completed just prior to initiation of RAP, which included a pilot of the RAP intervention with 10 participants.[i] We conducted a baseline survey of a set of heroin and cocaine users in the city regarding their drug use, and their HIV risk and prevention behaviors and attitudes. It also included measures of participants' social networks and network member characteristics. This survey was repeated six months after the baseline with all participants relocated for follow-up, adding measures of exposure to RAP and other prevention interventions in the community during the study period. We also conducted in-depth interviews with study participants during and after their engagement in the RAP intervention activities and conducted extensive observations in the community and of the intervention delivery sessions to document the intervention processes and outcomes.

Recruitment of study participants began in December 2002 and continued through July 2004. Two primary groups were recruited into the RAP study. The first were staff-recruited participants invited to enter a 10-session program to train them to become Peer Health Advocates (PHAs), to learn how to deliver the modular HIV/STI/hepatitis prevention RAP Peer-delivered Intervention to other drug users in their networks and others in their community. The first four sessions of the RAP PHA training curriculum were conducted with small groups in our community institute offices; the other six were conducted in one-on-one staff/PHA dyads in the community in various settings.

The second group of study participants was PHA-referred members of their drug-using networks, called Contact Referrals (CRs). Each participant recruited as a PHA was asked to refer two or three CRs into the study. We expected that upon completion of the PHA training program, the PHAs would provide the RAP Peer-delivered Intervention to other drug users in their social networks, including those they referred into the study as CRs. In this way, the CRs would receive direct intervention from the PHA, who would follow project-defined guidelines and protocols for providing prevention information and materials and demonstrating their proper use (as described more fully below).

Thus, RAP was designed as a two-stage process. In the first stage, staff provided risk/harm reduction and health enhancement intervention directly to the PHA during the training program. In the second stage, PHAs delivered similar risk/harm reduction and health promotion intervention to their drug-using peers, others in their personal networks, and more broadly in the community. Through this process they disseminated the intervention beyond the direct reach of project staff at times when staff members were not available, in places staff members could not access, and in ways project staff could not achieve because of their greater social distance from active drug users (Dickson-Gomez et al., 2006; Weeks et al., 2006; Weeks et al., in press). Emphasis on the concept of fostering advocates during PHA training supported trainees' self concept as capable of action to influence the broader community context of risk and prevention.

[i]The Study of High Risk Drug Use Settings for HIV Prevention, Project 3 of the Center for Interdisciplinary Research on AIDS (CIRA) program project (P01 MH/DA56826) was conducted in Hartford from 1997–2000 with funds from the National Institute on Drug Abuse and the National Institute of Mental Health.

During the study recruitment period, 131 participants received between one and ten of the 2-hour RAP PHA training sessions in one of the 28 small-group training cycles of 3–7 participants each. (Fifty-five others (26.1%) recruited to be PHAs never initiated the training, but were eligible to return for the follow-up assessment.) The curriculum focused on risk/harm reduction knowledge and skills, communication skills needed to deliver harm reduction information, materials, and demonstrations to drug using peers and other community members, and the concept of advocacy that included active engagement with others to promote health in their personal networks and in the broader community. Participants who completed five or more of the ten training sessions (n=112) were certified as trained RAP PHAs. An additional 19 participants recruited to the training initiated it, but dropped out before completing Session 5 and therefore were not considered fully trained PHAs. Prior to training, PHAs referred a total of 347 CRs into the study for baseline assessments. Because of the close network connections among Hartford drug users (Weeks et al., 2002) and our hypotheses regarding dynamic interaction processes expected to result in the diffusion of intervention effect, we measured exposure to RAP Peer-delivered Intervention among all study participants, regardless of how or why they were recruited into the study.

Of those who received a baseline survey, 367 PHAs and CRs (70.2%) returned for the follow-up assessment. (Those who did not return included 10 incarcerated, 11 who moved away permanently, 2 in residential drug treatment, and 2 who had died; the rest were lost to follow-up for unknown reasons.) Additionally, during the course of the 4-year study, 26 trained PHAs, 4 PHAs who did not complete the training, 13 CRs, and 20 drug users who were not otherwise a part of the study were recruited for an in-depth qualitative interview regarding the RAP interventions and the community context. Participants in the qualitative component of the study were chosen to reflect demographic diversity and included both injectors and crack users. We also conducted in-depth interviews with PHAs who were active health advocates and those who were not to gain insight into their reasons, and interviewed their CRs and non-CR drug users in order to look at diffusion of the intervention and barriers to implementation of risk reduction strategies. Project researchers also conducted 98 training session observations (33 in-office sessions and 65 partnered sessions in the community) in order to document the process of trainee implementation of the intervention components and their adaptation of the intervention to their social context. In-depth analyses of the RAP peer-intervention delivery process (Dickson-Gomez et al., 2006), of the short-term effects of training on the PHAs (Weeks et al., 2006), and of risk reduction outcomes indicated by the baseline/6-month comparison (Weeks et al., in press) have demonstrated extensive reach of the PHA intervention and significant reductions in risky practices among all study participant groups associated with RAP intervention exposure. The following discussion will examine the multi-level nature of the RAP interventions and the interactive processes of RAP influence across social levels over time.

Individual Level RAP Intervention Components and Effects

For both the PHAs and their CRs, the RAP interventions included a focus on the *individual level*. At this level, social learning theory (Bandura, 1977, 1994) framed the approach. This involved provision of information and opportunities to increase skills to make behavioral change through practice and by way of observing “models” like the recipient who are also engaging in the desired practice (Bandura, 1977). The goal of the RAP interventions at the individual level was to bring about behavioral risk reduction in each person in high-risk drug use and sexual situations. Project staff provided individual level intervention to the PHAs during the RAP PHA training sessions (first stage), and PHAs promoted individual level risk reduction with CRs and other drug users, including other PHAs when they implemented the RAP Peer-delivered Intervention in the community (second stage).

Components of the RAP interventions that applied social learning principles at both stages included provision of: 1) information on disease, transmission, risk and effective prevention practices, including messages about reduction or cessation of drug use when possible, otherwise, use of harm/risk reduction methods; 2) the tools to prevent transmission (specifically, bleach for syringe sterilization, rubber tips for crack pipe stems to reduce lip ulcerations, and male condoms, female condoms and dental dams for protection during sex); 3) opportunities to practice risk/harm reduction skills and to use the information and tools to engage in preventive efforts in a non-threatening situation; and 4) increased sense of efficacy to engage in these risk reduction efforts in increasingly risky situations as a result of this practice and by observing people like themselves modeling or demonstrating the desired behaviors. For example, the first four sessions of the PHA training curriculum included components designed specifically to enhance trainees' knowledge of the primary transmissible diseases that heroin and cocaine or crack users are often at risk of contracting, including HIV, various sexually transmitted diseases (STDs), TB, hepatitis, and other common ailments associated with injection or non-injection drug use. Training focused on common transmission routes, disease characteristics, symptoms, and prevention options. The training also included demonstration by staff (several of whom were former drug users themselves) of how to use the prevention tools, and the opportunity to practice using these materials in a non-threatening environment (i.e., project offices) to ensure participants' comfort and skill in their use in everyday practice.

Another major component of the PHA training curriculum during the first four sessions was to encourage them to see themselves as health advocates and activists with the capacity to influence others, and to change the conditions of risk in the broader environment that affect them and their peers. For this purpose, sessions included skills building in effective ways to communicate with and convince their peers, family members, and community members to engage in risk avoidance and harm reduction in daily practice. These activities were designed to enhance their sense of efficacy to be successful “peer health advocates.” Additionally, sessions 5–10 of the PHA training, conducted in the community in staff/PHA dyads, allowed PHAs the opportunity to practice delivering intervention to their friends, acquaintances, family, and even strangers in their neighborhoods and drug-use gathering locations. Active engagement in health advocacy with others has been demonstrated to sustain one's own healthy behavior and to maintain one's own reduced risk (Ramirez-Valles, 2002). Thus, trained PHAs' community outreach activity became a mechanism to support their own individual level behavioral and even life style changes to reduce their drug use and their exposure to multiple health risks in their environment (Dickson-Gomez et al., 2006).

In conducting the RAP Peer-delivered Intervention PHAs were required to include at least two out of three intervention components at each of three separate encounters with a contact for it to be considered a “full intervention.” These components again reflected the key concepts in social learning behavioral change theory. They included: 1) information (on diseases, transmission/prevention, symptoms, using project slogans, etc.), 2) materials (bleach, condoms, crack health kits), and/or 3) demonstration of proper use of the prevention materials, particularly in real world contexts. PHAs were given a field manual (the RAP “Flip-book”) to maintain fidelity to the intervention protocol in the field, which provided examples and guidelines for the provision of these three key components. At both stages of the RAP intervention, prevention practices were modeled by “like” (homophilous) individuals with whom the recipient could identify; this is hypothesized in social learning theory to increase the recipient's sense of efficacy to mimic the practice in their own life contexts, thereby increasing the likelihood that they will do so.

PHA recruits readily participated in the first five sessions of the RAP training curriculum during which the individual level intervention, and preparation for network dissemination, was delivered. Of those who initiated the PHA training, 86% completed five required sessions to

become a trained PHA, and 80% completed at least two additional PHA/staff partnered sessions in the community, while just over half completed all ten sessions (Weeks et al., 2006). Thus, the vast majority received the staff-delivered individual level components of the RAP PHA training focused both on risk/harm reduction and on enhancing efficacy to engage in peer health advocacy. Any exposure of CRs and untrained PHAs to individual-level RAP intervention would have come in the form of direct contact with trained PHAs, as the latter implemented the RAP Peer-delivered Intervention during dedicated outreach sessions or in the course of their own routine activities after completion of the training program. Further, because provision of the PHA-delivered intervention occurred in natural settings as well as in planned training sessions, and because PHAs are also members of each other's networks, it was both possible and likely that PHAs received direct RAP intervention from other PHAs, in addition to that received in the training program. As indicated below, this exposure for many PHAs and CRs was both substantial and influential.

Ethnographic observations, in-depth interviews, and post-training surveys documented that PHAs delivered prevention materials and messages to peers in the community for a significant period of time after completion of the training program, including in the absence of project staff. While it was not possible to have an exact measure of how much RAP intervention exposure CRs and others had from the PHAs, we developed indirect measures indicating PHA advocacy exposure. For example, data from the 6-month follow-up surveys indicated significant recognition of RAP intervention materials and concepts (e.g., the RAP “Flip-book,” the project's crack health kits, project slogans, and so on). These surveys also document that the majority of RAP participants received prevention materials either from “someone in the RAP project” (71.9%) or “an active drug user” (51.8%), both of which indicate potential RAP peer health advocacy exposure (Weeks et al., in press). These indicators and others suggest significant and repeated exposure to the RAP interventions in formal and informal settings. Analyses reported elsewhere have demonstrated a strong association between risk avoidance or harm reduction, as well as improved PHA-efficacy beliefs, and exposure to RAP intervention (Weeks et al., in press). These findings also support the assumption that PHAs delivered intervention to each other, to their CRs, and to others in the drug using community.

Through the combination of the RAP curriculum, by which staff trained PHAs in risk/harm reduction, and the RAP Peer-delivered Intervention, by which the PHAs provided messages and material support to their contacts, we expected that comparison of intake and 6-month follow-up assessments would demonstrate significant individual-level risk reduction behavior changes. We also expected increased positive beliefs about the ability of drug users to bring about change in their communities to support health promotion and enhancement (i.e., PHA efficacy).

Indeed, we found strong evidence for these in the significant changes in RAP study participants' reported risk behaviors and prevention and efficacy attitudes between the two assessments (Weeks et al., in press). Table 1 indicates the improvement in key measures of individual-level risk and harm reduction practices among two groups of study participants: 1) PHAs who received five or more sessions of the RAP PHA training curriculum from project staff, and 2) all CRs and the PHAs recruited into the study who did not attend any of the small group or staff-partnered training sessions. (We excluded the 10 PHA candidates who received 1–4 training sessions and returned for the follow-up, because of the indistinguishable affects of the partial RAP training vs. exposure to PHAs in the community.) While the CRs and untrained PHAs did not receive any direct intervention from project staff, they (as well as all PHAs who did receive intervention from staff) may have been exposed to PHA-delivered intervention in the community in one or more encounters in different contexts. These data reveal significant reduction in the percent of both groups of study participants between baseline and follow-up assessments who reported injection drug use, crack use, non-injection heroin or cocaine use,

sharing injection equipment, and engaging in sexual risk practices. They also show significantly increased belief across study groups in the efficacy of drug users to be effective peer health advocates in their communities and with their peers. While the project was designed to support risk reduction efforts even in the context of continued drug use in PHAs and their contacts, reduction and cessation of drug use, in fact, proved to be a significant outcome of participating in or being exposed to the RAP interventions. Intensive, multi-method assessments indicate that these reductions were not associated with other local prevention services or program efforts in the community during the study period (Weeks et al., in press).

Findings from the ethnographic component of the study supported and complemented those of the surveys in demonstrating several of the key principles of individual-level behavioral and attitudinal changes associated with the RAP interventions. In the in-depth interviews, PHAs were asked to describe in their own words how PHA work affected them personally, what PHA outreach meant to them, and how others perceived their PHA outreach. They also were asked to describe positive and negative experiences associated with PHA work. Very few reported negative experiences (Weeks et al., 2006), and many PHAs found their work rewarding, as reflected in reports like this of a 51 year old African American woman:

> I feel like my [PHA work has been successful]. I don't know where I'd be without my PHA training. My PHA work was like, that's my security. It keeps me sane because when I'm talking to somebody, I'm talking to myself. And I'm being honest and being real and when I step out there with my blue bag [project-provided backpack for carrying prevention supplies], I remember hearing [lessons from the training] in my mind over and over again.

During the training sessions, PHAs frequently repeated that “being real” and “being honest” were the best ways to do outreach to peers. Many PHAs reported that merely engaging in PHA work enhanced their lives and fortified their resolutions to make positive personal changes. Some PHAs began to see themselves as role models, as this same participant explained:

> I hope that I am [a role model]. I hope that I am. I don't try to be conceited or think I'm better than nobody because I know for a fact that I'm not. If I can help one person, I'm happy. And there comes a time, I don't know if it happens with other PHAs, but there's a time when you just know you reached that person 'cause they thank you.

PHAs were encouraged to integrate the basics of effective communication techniques, learned during the training sessions, with their own styles and the methods of communication they used on a daily basis. This allowed PHAs to deliver harm reduction information in ways that were most comfortable to them and recognizable to their peers. One 56 year old African American male PHA described the following style of communication he used with his peers:

> I'm always thinking positive now, you know. I see how people are putting themselves at risk, their health. I tell them how to change. I don't bother people to death with it though; you know what I mean? You know, 'cause you could be like a minister…, and start preaching to people, you know. (Laughs) So I don't do that, you know. Generally I'm doing it on a casual basis.

As each PHA became more familiar with doing outreach, he or she grew more comfortable and confident. As the project progressed over time, the chances of seeing a PHA in action in the community also grew. Contact Referrals not only received prevention interventions, they also witnessed their PHA friends educating others. In the following, a 55 year old white male describes the outreach techniques of his friend, a 59 year old African American male:

> Ethnographer: Did you ever have the opportunity to see Tim in action talking to someone else besides yourself?
>
> Participant: Oh, yeah.

E: What was that like?

P: I thought it was very positive. It was very straight forward. You know, it was something like, `you wanna learn a little bit about how to protect yourself?' Always he got the answer, `yeah, what's up, man?' You know, that kind of thing. He used a subtle type of approach where he pulled them to the side, private like, so that they could talk back, you know, give the person the opportunity to say something where he wouldn't say it in front of me or a counselor or something, you know.

PHAs made use of their personal relationships, natural contexts, and common values with other drug users to deliver intervention in culturally appropriate and indigenously congruent ways. Contacts responded to receipt of individual-level intervention from PHAs very positively as a result of this cultural congruence. The results were evident both in contacts' reduced risks as well as their increased belief in the ability of active drug users to affect others to reduce their risk and improve the health and well being of the whole drug using community. Likewise, PHA's skills increased over time and the combination of repeated practice and positive feedback reinforced their willingness to continue PHA work and risk reduction behavior change over time.

Peer Network Level RAP Intervention Components and Effects

Though these significant reductions in reported risk behaviors and improved efficacy attitudes among PHAs and CRs suggest efficacy of the individual level intervention focus, these reported outcomes cannot be separated analytically from another dynamic that occurred as PHAs entered the field and delivered RAP intervention to CRs, each other, and other drug-using and non-drug using contacts. Because risk reduction change is often measured on the individual level, observed changes are frequently attributed to the individually-focused intervention processes rather than broader network or social context processes. However, particularly in the case of a peer-delivered intervention implemented in real-world settings, the individual processes are concurrent with and both the impetus for and the result of social network changes, as well. Specifically, while PHAs modeled preventive practices and delivery of prevention messages and materials to individuals and small groups in their drug-using and non-drug-using networks, their continued presence and increasing numbers and influence in that social context over time had the potential to change the overall social environment of risk and the normative practices of the network as a whole.

Thus, the second level of RAP intervention effect was at the *social network level* of drug users in the city. Our formative research demonstrated that heroin and cocaine users in Hartford are highly connected to each other (Weeks et al., 2002; Weeks et al., 2001). Principles of diffusion theory (Rogers, 1995) suggest the potential to use these natural connections, and the trained PHAs as key opinion leaders and trustworthy change agents, to diffuse the adoption of prevention behaviors in the context of real-world practices of drug use and risky sex through the Hartford macro-network of heroin and cocaine users. This framed the concept of the social network level intervention impact.

Intended change on the network level began by focusing staff recruitment of PHAs on drug users who were structurally “central” network members, based on formative research evidence (Weeks et al., 2002) and ongoing community observation. This included recruiting highly connected or respected members of the drug-using community, as well as influential individuals (e.g., “gatekeepers” or controllers of drug-use sites). We targeted these individuals for PHA training to increase the likelihood that their intervention efforts would have broad network reach and influence. Training of central network members as PHAs was expected to change the general characteristic of the macro network of drug users in Hartford by building

the internal capacity of the network to protect itself. This included strengthening and making more evident support for risk and harm reduction across its members, including the denser core components as well as the sparser, more isolated areas of the network. Thus, PHA centrality and their associated influence over others within the network, in combination with their homophily with other active drug users, the value of their common experiences, and their ability to take advantage of their strategic presence at critical moments and in relevant situations to support group health and benefits, were all critical aspects of the RAP intervention to bring about network-level change. This process of utilizing the structural connections and the internal capacity of network members reflects in the RAP design both the cycling of resources and the interdependence principles of the social ecological model (Trickett, 2005).

To generate a social network level influence of the RAP intervention, PHAs were generally encouraged to contact close network members repeatedly in the context of their own drug using activity, but also to be a resource for more distant acquaintances within the drug-using network in the city by word of mouth. PHA promotion of harm reduction practices at critical moments, in combination with their modeling of preventive practices themselves (and more rarely, demonstration of proper prevention methods outside the context of their own drug use) was designed to support adoption of these practices among drug using peer groups.

The social network component of the baseline and follow-up surveys recorded the lists of people each participant named in response to a series of questions about whom they do drugs with, have sex with, get emotional or material support from, received prevention materials from or provided prevention materials to. Demographic (age, ethnicity, sex) and risk characteristics (using drugs together, sharing injection equipment, unprotected sex, HIV positive serostatus) and type of relationship (kin, friend, long-term, trusting) were recorded along with full names when possible. We used the name data to identify which network members on each participant's list were also participating in the RAP project as PHAs or CRs. We also determined whether named network members (whether PHAs, CRs, or neither) had given prevention information or materials to, or received them from, the participant. We analyzed the personal (ego) network data to assess the participant's interactions with their own network members. We also linked all project participants named by other participants to each other, using street outreach and ethnographic observations to confirm these linkages. In this way we were able to assess the exchange of prevention efforts within the ego-networks and across the macro network of RAP participants.

Analysis of personal (ego) network data and confirmed network linkages at the time of the 6-month follow-up interview revealed that PHA and CR participants reported an average of 1.11 PHAs in their named drug-using networks. They also indicated that an average of 33.4% of their named network members had provided them with health information within the previous six months, though PHAs reported fewer (26.3%) and CRs reported more (36.0%). Participants who returned for the follow-up survey also reported that an average of 27.7% of their named network members had provided them with prevention materials, though again, this was lower among PHAs (18.9%) than CRs (34.4%). These reports indicate that significant harm reduction intervention provision was occurring within many of these participants' networks, including those of the PHAs themselves. However, these numbers also under-report the intervention activities because they are limited to network members whom the participant felt close enough to name in the interview process. As indicated above, reports of receiving prevention intervention from other drug users suggest that outside their closest personal ties, support for prevention was also occurring. Nevertheless, these efforts within the closest circles of these participants suggest significant influence on their routine activities with each other.

Although there was strong evidence demonstrating that PHAs interacted with others in the community and delivered harm reduction messages and materials, it was the *adaptations* of

the intervention content and expansion of the project goals that offered evidence of the innovation adoption process. Each PHA received the same education and training, but by integrating PHA work into their own daily life, social network interactions, and personal history, they produced unanticipated positive results. For example, the individual attention many PHAs gave to people they did not know well during their outreach activities enhanced the program goals beyond risk reduction behavior change to include recognition of drug addicts' need for respect and understanding. People living in the neighborhoods where PHAs did their outreach began to recognize the PHAs as a resource, not only for materials and education, but also as a trusted individual who was concerned about the welfare of others, as illustrated in this interview excerpt with a 40 year old African American woman:

Ethnographer: What did they [contacts] talk to you about?

Participant: Oh they talk to me about a lot of things. About [their] love life. About [their] wife. Certain situations that got to do with the law. One girl told me she was HIV positive but she was scared to go to treatment.

E: Does that surprise you that people would tell you stuff?

P: Yes it did surprise me because when you live a certain lifestyle, people look down on you. And your issues and problems and situations don't mean nothing really.

E: So why do you think people were telling you stuff because you were doing PHA work?

P: Because I don't judge them. I don't dog'm and down'm, but I tell'm what's right. Because I do know right from wrong… I tell them you have a choice. And I keep telling, you don't have to settle for less. You are somebody. What you think, feel, say, and do, it means something. It's up to you to put it in action. That's what was told to me [during the PHA training program].

Not only did the RAP training improve the efficacy of the PHAs to do this work, it also prompted some to choose to take the message a step further and encourage the growth of self-efficacy for behavioral or life change and safety among their peers, whether friend or foe. A 42 year old Puerto Rican man said the following:

Ethnographer: Did anything surprise you when you were doing PHA work?

Participant: Surprise me. I can say yeah.

E: What was it?

P: I see a couple persons and we don't get along, you know? And one of them come to me and ask me for [materials]. So I was shocked he come ask me for something. I thought, that's good. And I tell him, “If you need something else I got, I can help you. You don't have talk to me, nothing wrong with that, but I'll give you what you need.”

E: So did you do it again?

P: Yeah. It surprised me, yeah. I give it to him, I say, “Be safe.”

As PHAs continued their education with their peers, they began to report feedback from members of their social network members. As contacts adopted new harm reduction practices, they also passed the information and practices on to others, as described by a 67 year old African American male PHA:

Ethnographer: Now what about the people that you do drugs with, have they changed their behaviors?

> Participant: Oh yeah. We had a lot of change, the few people that usually come over to my house and get off, I let them read the Flip-book. They say, “Man, you know, this is a lot of stuff that we didn't, we really didn't know.” I say, “Yeah, man, this book is enlightening, you know.” So, like I said, we all follow the rules, you know. And, if we're not together and they are with somebody else, they always tell them, “Look man, you gotta do this and do that, or else you can go by yourself… that's on you though. I'm telling you how to save you're life. And if you don't wanna take heed to that, you're not hurting me, you're hurting yourself, 'cause I'm not gonna do drugs with you, you know.”

Over time, the PHAs recognized that their work was impacting their peers. As their peers started changing behaviors, the chance grew for others to change as well. In the following interview excerpt, a 55 year old white male Contact Referral described how he believed peer influence and harm reduction innovations might spread through drug using social networks like his own:

> If a PHA says, `Hey, this is a better way to [be safer],' chances are the [drug using peer] may say, `You know, let me do that.' And the reason I think they would is because they're listening to someone who's been around on the streets a long time and is trying to help them.

The RAP program included other ways to strengthen PHA influence on the network of drug users, for example, by reinforcing their connections to each other. To support PHAs in their efforts after completing the RAP training program, the project organized monthly meetings open to trained PHAs (i.e., those who completed five or more sessions) called the Community Advocacy Group (CAG). The CAG meetings offered an opportunity for PHAs from all training cycles to meet each other and share experiences. It also provided ongoing support for PHAs to continue their work, by restocking their prevention supplies and reinforcing their identity as peer health advocates in their communities. Through the CAG meetings, trained PHAs established or reinforced support ties that also carried over into the community contexts and created opportunities for mutual feedback resulting in continued PHA work. The CAG meetings proved to be a critical component of the program needed to support its sustainability and the long-term continuation of PHA efforts, in part through the mutual support PHAs provided each other in this context.

PHA work and outreach occasionally moved beyond drug using network members and touched other members of the PHAs' social networks. In some cases PHAs chose to work in collaboration with each other, doing their PHA outreach together as a team. During the training, staff discussed taking harm reduction messages and HIV prevention wherever the PHAs traveled. Project staff and the PHAs were aware of opportunities for the RAP project to reach others, and PHAs were encouraged to do so. But many of these opportunities were serendipitous and connected to specific individual PHAs and the contexts of their lives.

During the initial training, PHAs were shown how their individual actions could impact at least one other person and prevent him or her from contracting HIV. Facilitators then pointed how, collectively, a group of 100 PHAs could have a greater impact on a larger scale. Staff frequently told the PHAs that if they each stopped the spread of HIV from a single person to one other, they were successful. In addition, there was always the chance that they could affect more than one person positively, and even potential for the collective PHA actions to have a large impact on reducing risk-taking behavior on the community level. Thus, over time, their small actions engaging in RAP peer health advocacy had the potential to change the social fabric of the larger drug user network, group norms, and the community in which they were a part in a significant way.

Community Level RAP Intervention Components and Effects

The third level targeted for intervention effect in the RAP project was the *community level*. This was guided by principles of community empowerment and engagement as the foundation for health promotion (Brown, 1991; Minkler, 1989; Robertson & Minkler, 1994), and a recognition of the PHA as embedded within and able also to influence and shape their broader community context over time. Attention to the community level was built into the PHA training curriculum as a focus on the need for public health advocacy and discussions about issues in the broader community, city, state and nation that affect drug addicts' health, well being, and quality of life. This was further supported through the ongoing monthly Community Advocacy Group (CAG) meetings. These emphases were primarily chosen to enhance sustainability of the program and its effects by linking the PHAs to the broader community and facilitating their access to and use of community resources.

Session one of the PHA curriculum opened up a discussion among trainees of the issues they identified as critical and needing rectification or improvement in the community that have a direct negative impact on drug users (Weeks et al., 2004). During these exercises, PHAs often listed issues like housing for people with a drug arrest record, access to job training and jobs for people with a prison record, and health insurance coverage for indigent men and women. These participant-identified issues then became subjects of subsequent discussions during the training and the focus of community actions after the training program was completed. The first session of the PHA training curriculum also included discussion of the concept of “health advocate” as a role for trainees that included a broader understanding of and responsibility to act on issues that affect all members of the drug-using community, as well as the broader community in which drug users are situated. Thus, the discussion called upon them as peer/public health advocates to join others in their neighborhoods, city and state with common interests to engage in social action when possible and to learn more about activist groups and their efforts. Much of this was accomplished, however, with staff support and identification of activities that were intermittent or ongoing in the city.

The monthly CAG meetings were designed to provide an infrastructure and motivation for PHAs to sustain their efforts in community health advocacy, as well as to stay abreast of and engaged in other prevention efforts and actions in the city or region. Emphasis in these meetings was placed on “public health advocacy,” the other role of the PHA. Participants in the CAG were given opportunities to coalesce around their common concerns and to identify meaningful and manageable activities outside of their routine in which to promote or support efforts to improve their living conditions.

PHAs used the CAG to stay anchored to the project and to the Institute as a base from which to reinforce basic health information and peer dissemination skills. These meetings provided a way to remain connected to each other and to the project staff, the latter of whom provided both educational and emotional support to the PHAs and often a broader perspective of their work for public health and benefit. Some of the community level activities in which members of the CAG participated included presentation of their PHA experiences at public events (e.g., an open house at our research institute, local and regional conferences, educational speaker forums, etc.), attendance at community rallies around health issues, and self-selected opportunities to reach out to community groups (e.g., youth, church, etc.) to inform those groups of health related risks and concerns.

As much as the project strived to have RAP affect the broader community level, there was truly no sure methodology to guarantee that this would happen. It was difficult to record and document changes at the community level. But, occasionally we saw glimpses of results, as reflected in this interview excerpt with a 50 year old African American female Contact Referral:

Ethnographer: So your friend [a PHA] is going out and talking to people about how to use drugs safer. But do you think it's better to do that or to tell them to stop using?

Participant: No he was trying to tell them they shouldn't use drugs at all. #1. But certain ones you know ain't gonna stop. So that's where you tell'm: “listen I know you ain't gonna stop,” he would say, “so in the meantime take this here so at least you could be safe, while hopefully in the process you get tired of this bullshit and you get your act together and leave that stuff alone all together.” You see what I'm saying? …

E: Well what if you were talking to someone at your church and they said: “Oh no, people shouldn't do drugs and you shouldn't; teaching them how to bleach their needles that just encourages them to use drugs more.”

P: I went through that with my pastor once. We used to talk because he said this is the deal we're gonna make. I will teach you about Christ, you gonna teach me about street life. Because it was very important to him to learn that. Because people looked at him as being so naïve. [After explaining PHA work he was still against it until she explained more.] I said, `No Pastor, you misunderstanding the whole point. People are gonna do drugs regardless, until it either kills them or until they get tired. So in the meantime, what they're trying to do, hopefully, is teach them a safer way to do what they're doing, so that's less a risk. For you part of it, too, for me, and anybody else they come in contact with. That's the purpose of teaching the safe act. So everybody's benefiting in the meantime.'

E: So what was it like to make your pastor understand that?

P: At first it was like kinda funny because it was like I had got like this rush talking about it. Like happy… if you knew this man and to get something across to him, you felt like you had accomplished a lot. He was not an easy person to work with. Everything you said he had something negative to say. He had all the right answers. Nobody knew nothing but him. His favorite words was, “I'm not asking you, I'm telling you.” And to reach somebody like him, it was like, whew, you would pat yourself on the back. Because this man was very difficult. And then when you're dealing with a person that don't have knowledge of something, sometimes it's even harder. But it was just amazing how he appreciated that information.

According to this CR, the preacher ultimately adopted a harm reduction philosophy within his relationships with drug using members of his community and passed the insights of harm reduction on to his congregation, though she did not specify how he did this. These examples show the potential that exists in a peer-led intervention. The peers became the seeds of change; given the right support and encouragement, they can spread change to their immediate peers, members of their social network, and eventually the broader community.

SOCIAL ECOLOGICAL PRINCIPLES IN THE RAP MULTI-LEVEL INTERVENTION

The ecological principles Trickett identified as relevant to conceptualizating multi-level community interventions are reflected in the RAP intervention model (Trickett, 2005). The principles of adaptation, cycling of resources, interdependence, and succession each support a general understanding of the interconnectedness of individuals within the community, and the need to build on the characteristics of social groups and the dynamic processes of their actions and relationships within the social, political and economic framework of their communities to bring about positive social change.

The principle of *adaptation* is reflected in the way in which RAP is designed to take advantage of the capacity of PHAs, as individuals and as central and influential network members, to make use of their changing environment. This includes their knowledge of the high-risk drug use sites they frequent and the connections they have to other drug users in these locations and around the city. The in-depth assessment of the community, drug-use sites, and drug network characteristics we had conducted in the formative stage prior to initiating the RAP pilot training with the first group of PHA candidates helped to elucidate the nature of relationships among members of the drug using community and the social contexts in which they interact, engage in risk or preventive efforts, and attempt to respond to threats and opportunities they identify in these contexts (Dickson-Gomez, Weeks, Martinez, & Radda, 2004; Weeks et al., 2002; Weeks et al., 2001). Data from that in-depth community assessment informed our understanding of factors affecting individual drug users in high-risk situations, network connections among drug users, and other community influences and opportunities for drug user risk or protection in the context of which community change agents like the PHAs will attempt to adapt a social change intervention in order for it to be accepted and effective.

Formative assessment is critical for building an informed approach to developing and implementing multi-level intervention to effect community level change. For example, formative research helped us identify social dynamics within drug use sites (e.g., the influence of the site gatekeeper) and social network characteristics (e.g., the "central" position of certain individuals with linkages to multiple others). This information consequently helped us characterize the most promising people to recruit into the PHA training program. Additionally, initial PHA feedback during the pilot of the RAP intervention training revealed the need to augment prevention materials and messages to include more options relevant to crack users, given the large and growing number of them in the drug using community and the irrelevance of injection related prevention messages to non-injectors (Weeks et al., 2006). This early input convinced us to add crack health kits (containing crack-pipe rubber tips, additional condoms, and broader messages of general health) to the repertory of prevention materials for PHAs to deliver in the community.

Thus, even in the development phase, direct input from community members resulted in the adaptation of the program content to more clearly match their experience and knowledge of the dynamics within the drug using community. Further, ongoing drug user reinvention of the intervention during implementation of the RAP intervention trial, in response to their interaction with their drug using peers and in the context of their drug use, was reflected in various adaptations of the initial RAP intervention components. For example, we discovered that many drug users began to replace rubber tips when not available with multiple rubber bands wrapped around crack pipe stems to achieve the same harm reduction effects. We also learned that participants renamed unfamiliar prevention materials such as dental dams using street names ("tongue lashers," "*estampa*") to make them more socially and culturally comfortable for recipients of the materials distributed by the PHAs. Moreover, as some PHAs reduced or stopped using drugs, they sought opportunities to continue doing PHA work outside of drug-using contexts, including with family members, in public gathering places, and one-on-one with drug using peers when the latter were not engaged in drug use.

Cycling of resources occurred in RAP through building capacity of key members of the drug using community to become health advocates so they could promote and support harm reduction within their own community and in their social networks. RAP built on the intrinsic interest of drug using community members to improve their living conditions, remove or reduce risks and threats to their health and well being, and support other members of their community, whether for reasons that were individualistic (e.g., improved image, increased social capital, enhanced personal resources) or altruistic (e.g., giving back to the community, "doing good," social justice) (Convey, Dickson-Gomez, Weeks, & Li, in preparation). RAP also took

advantage of the context of the drug use setting in which PHAs, who were active drug users, interacted with other drug users and could infuse the situation with resources (information, materials, motivation) to enhance risk and harm reduction. Likewise, the program utilized the natural network structure and connections among drug users as channels and support for dissemination of relevant prevention materials. Thus, key community resources and intrinsic characteristics of drug user networks were folded into the design and process of health advocacy and prevention intervention in the RAP program.

Interdependence is an essential concept in the RAP multi-level intervention model. Diffusion of intervention information, materials and effects depended on the interconnectedness and the feedback interaction among the PHAs, their direct contacts, and other drug users and non-drug users in the community with whom PHAs had influence in direct or indirect ways. Social relations among impoverished inner city drug users often reflect their need to rely on each other for life support and their dependence on mutual reciprocity in the context of limited resources, the illegal nature of their addiction, and the poverty they face. Despite the frequent and common rejection of heroin and cocaine users by the larger community, they are residents (even if transient), family members, and sometimes life long acquaintances of non-drug using community members. Multiple aspects of the community intersect to affect drug users, including the laws that restrict them, the threats to health that they encounter, and the potential for mobilization around their own and the broader social interests. As members of the community, they, in turn, shape the community context, for example, to the degree that they respond to health risks or take action against other social and political forces that threaten their ability to survive and thrive. As the RAP program continued over time, and through mechanisms like the monthly CAG meetings, the PHAs' interdependence with each other reinforced their ongoing efforts to engage in community and peer health advocacy and prevention work. They relied on each other to remain motivated and sometimes to get prevention materials to pass on as well. They folded their PHA efforts into their ongoing relationships, reciprocity, and mutual aid. Likewise, CRs observed these efforts and interactions and some appear even to have mimicked both the distribution of materials and the reinforcement of prevention messages and motivations (Weeks et al., 2007; Weeks et al., in press).

The principal of *succession* is particularly important in the conceptualization and implementation of the RAP program. Key to sustained effect of any change effort is ongoing presence of the resource that supports that change. In this case, the use of members of the risk community to become change agents within it built on the assumption that as long as they continue to be present in these contexts, they will continue to engage in health advocacy work. In an effort to support this presumption, we included in the training program the slogan, “Once a PHA, always a PHA” to emphasize the transformation of the role of trainees in the context of their network relations and in their communities. We emphasized that even when PHAs stopped all drug use, they could continue to advocate for and take action to promote health in their communities, on behalf of other drug users, or as neighborhood residents. Many embraced this idea and applied it in all aspects of their lives, while others had more limited capacity or cycled in and out of advocacy work, often modulating in relation to the state of their addiction.

However, we came to recognize the limitations to long term sustainability of both the PHAs' ability to engage actively in outreach for health promotion and risk or harm reduction, and the resources needed to keep them supplied, informed, and engaged as such. While the interactive feedback supporting PHAs that came from positive recognition by their peers as a source of information and prevention materials reinforced their motivation to continue this role, neither the feedback nor the motivation appears to continue indefinitely. This was evident from the progressively diminishing number of CAG meeting attendees and PHAs requesting replenishment of prevention supplies for community distribution. Ironically, PHAs' own

tendency to stop using drugs as a result of personal changes associated with their engagement in health advocacy work, for some, reduced their interest in continuing these efforts with active drug users, though others continued to do so in various capacities and with other groups (Weeks et al., 2006; Weeks et al., in press). Further, the community itself is continually changing in ways that can either undermine the efforts of PHAs (e.g., by their removal from the community through arrest or dislocation) or require their transformation (e.g., as popular drugs of choice change or disappear or new threats emerge). Programs like RAP need to continually replenish the number of newly trained health advocates because many cycle out of the context of risk by stopping drug use and changing their networks, moving away, being jailed or hospitalized, or dying from drug-related (e.g., overdose) or HIV-related causes.

Sustainability also requires long-term institutional commitment and resources to support the continued training and program activities. Without an anchor to a supplier of prevention materials and institutional support for the PHAs, their capacity to sustain their outreach efforts rapidly diminishes. Institutional support includes at minimum the opportunity to resupply, retrain, and reconnect with others like them (especially both role modeling staff and other peer health advocates), and opportunities to engage in broader efforts that allow them to engage as health advocates with non-drug users in broader community contexts. Thus, sustainability incorporates not just the fundamental training and intervention components, but also the dynamic interconnectedness and interrelationships of the PHAs with their community environment on all levels.

Multi-level intervention programs like RAP present numerous challenges for evaluating the processes and impacts of the program on the individual, network, and broader community levels. To address the difficulty of measuring PHA efforts and the effects of these on their peers and the community over time, we used an intensive observational design conducted in a single-city, with continuous and mixed method documentation over time. We collected and triangulated complementary qualitative and quantitative data on individual participants (PHA, CRs, others), their personal networks, their drug use site contexts, and their activities during PHA training sessions in the offices and in the community. These data sources included observations and narrative interviews, surveys, and other numeric counts of participation and use of resources. To the degree possible we used direct measures of PHA action, but because their intervention was primarily delivered (as designed) during times and in places where staff were not present, indirect measures were also needed to capture at least in part the activities of the PHAs and their personal, social network, and community influences.

Moving from the individual or peer network levels to the community level to effect change is particularly challenging for a peer intervention with drug users, given the immensity of forces that shape the barriers to their health and risk reduction at the community level and beyond. PHAs in training sessions clearly understood that their own and their peers' risk was shaped by such daunting social problems as homelessness, joblessness and poverty, racism, the war on drugs, stigma, and other social, economic, political, and cultural conditions. While they were able to identify these concerns and even recognize the connections among them in creating barriers to change, PHAs and project staff alike were frustrated by their severely limited ability to affect these community level and larger forces. Nevertheless, PHAs begin to seek small actions to respond to community level issues in ways that gave them a sense of action and connection to others with similar interests in creating change on this level.

Invariably, the effect of even the strongest multi-faceted, multi-level intervention needs an ongoing infusion of new resources, including newly trained PHAs, reinforcement of the infrastructure, and so on, in order to be sustained over an extended period of time. But the dynamic generated by the efforts of the PHAs in itself may have created something new, by changing the interactions and context of risk and prevention among drug users and their

network members, and the drug using community at large. Such efforts, then, have much to offer to public health and to understanding the dynamic processes needed for sustained prevention efforts.

Acknowledgments

This study was funded by the National Institute on Drug Abuse, grant #R01 DA13356. RAP is an affiliated study of the Center for Interdisciplinary Research on AIDS (P30 MH62294).

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Table I

Changes in Percent of RAP Participants Reporting Risk Behaviors in Prior 30 Days and PHA Efficacy Attitudes at Baseline and 6-month Follow-up by Participant Type (percent who completed both measures)

	Trained PHAs (attended 5-10 sessions, n=98)[a]		All Others (n=259)[b]	
	Baseline	6-month	Baseline	6-month
Injected drugs	39.8	22.4#	40.2	29.3#
Used previously used needle/syringe[c]	19.0	4.8*	23.5	11.8
Shared injection equipment[c]	35.0	10.0*	22.1	20.6
Shared drug solution from other's syringe[c]	25.0	10.0	17.6	13.2
Used crack	66.3	39.8#	56.8	45.9#
Used rubber tips on crack pipes[d]	35.7	88.1*	18.3	65.4
Used other non-injection opiates, cocaine or amphetamines	36.7	17.3*	39.0	14.8#
Any drug treatment in prior 6 months	33.7	57.1*	32.4	29.8*
Had multiple sex partners	31.6	17.3#	27.6	21.8#
Had any unprotected sex	36.5	24.0	34.3	30.3#
Unprotected sex with primary partner[e]	26.6	23.4	26.1	23.7#
Unprotected sex with non-primary partner[e]	14.9	0※	11.5	6.3#
Unprotected sex exchanged for money/drugs[e]	7.4	0※	6.3	6.7*
Unprotected sex with drug injector[e]	6.5	4.3	6.0	4.8#
Unprotected sex with crack smoker[e]	22.6	7.5*	15.9	11.6#
Mean PHA-efficacy scale score[f]	m=2.85	m=2.95#	m=2.67	m=2.71#

[a] Excludes 10 PHA recruits who received only 1–4 training sessions before dropping out.

[b] Includes PHA recruits who never started training (n=26) and all CRs (n=233) who complete both intake and followup surveys.

[c] Calculated as percent of participants who injected at both baseline and follow-up who completed both surveys (n=92).

[d] Calculated as percent of participants who smoked crack at both baseline and follow-up who completed both surveys (n=152).

[e] Calculated as percent of participants who were sexually active at either baseline or follow-up (n=360).

[f] Mean score on a 15-item Likert scale, with responses ranging from 1 = strongly disagree to 4 = strongly agree. Items measured beliefs that drug users can positively influence risk reduction in the community. Negative items were reverse coded for analysis.

* Significant change between baseline and 6-month measure for participant type in this measure ($p < .05$).

Significant change between baseline and 6-month measure for participant type in this measure ($p < .001$).

※ Significance can not be computed because the incidence rate of the behavior at 6 months is 0.