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## Behavioral Science and Public Health: A Necessary Partnership for HIV Prevention

We are now in the second decade of the AIDS epidemic in the United States. As of October 31, 1995, a total of 311,381 U.S. citizens had died from AIDS, another 189,929 had been diagnosed with AIDS (1), and it is estimated that nearly 1 million persons are infected with HIV, the virus that causes AIDS (CDC). Despite the best efforts of biomedical researchers, we still have neither a cure nor a vaccine to prevent this deadly disease. Yet AIDS is a preventable disease; AIDS is first and foremost a consequence of behavior. It is not who you are, but what you do that determines whether or not you expose yourself to HIV. As Kelly, et al. (2), have pointed out, the task confronting the behavioral sciences in HIV prevention is to develop theory-based intervention programs to reduce risky, and increase healthy, behaviors. This special issue focuses upon methodological issues associated with the development, implementation, and evaluation of such theory-based behavior change interventions (3).

To a certain extent, all behavior change interventions are theory-based. That is, they are based on one's implicit or explicit assumptions or "theory" about why people behave the way they do. For example, many people believe, assume, or theorize that the more one knows about HIV and how it is transmitted, the more likely one will be to avoid performing those behaviors that put one at risk for HIV infection. Given this "theory," one is likely to develop an educational intervention designed to provide clients with information about HIV and AIDS, including how HIV is transmitted and the course of the disease. And indeed, as described by Doll and Kennedy (4) and Kamb, Dillon, Fishbein, and Willis (5), much of the early "counseling" in publicly funded HIV counseling and testing programs was designed to teach clients about HIV and its modes of transmission. This same approach has been followed in many school-based HIV prevention programs. Unfortunately, this approach failed to utilize the extensive behavioral science literature that has consistently found that having information about a disease and how it is spread does not necessarily increase the likelihood that one will take preventive action (6, 7).

While having information about a disease and how it spreads is unlikely to lead to behavior change, other types of information can strongly influence a person's decision to perform (or not perform) a given behavior (8). What the behavioral sciences have to offer to those interested in developing effective interventions is a clearer understanding of the types of information that people

need for changing or maintaining a given behavior. Rather than basing a behavior change intervention upon possibly invalid or incorrect assumptions about behavior, scientists, clinicians, and public health workers should take advantage of the information that is currently available about behavior and its determinants. More specifically, behavioral science theory and research can provide important insights into why people behave the way they do. Clearly, the more one understands the factors influencing (or underlying) a person's decision to perform (or not perform) a given behavior, the more likely one is to develop interventions that can effectively change that behavior.

Behavioral science theory and research also suggest that the most effective interventions are those directed at a specific behavior. As we will describe, every behavior has its own unique determinants, and very different interventions are required to change different behaviors. Perhaps the most difficult part of developing any intervention is the identification of the behavior (or behaviors) that one wishes to change. All too often, interventions are directed at increasing the probability that one will reach a given goal (for example, to avoid AIDS, to stay healthy) or engage in a category of behaviors (such as practicing safe sex, negotiating condom use) rather than at increasing the probability that one will engage in a specific behavior (always using a condom for vaginal sex with one's main partner, or telling one's partner to always use a condom). Only the latter type of intervention is likely to be successful in changing behavior.

The distinction between goals, behavioral categories, and behaviors is not always obvious. For example, while condom use is a behavior for men, it is a goal for women. Further, even among men, condom use is not a specific behavior, but a behavioral category. That is, one does not just "use a condom." Instead, condoms are used for given sexual activities with specific partners, and the factors influencing the use of condoms for vaginal sex with one's main partner or spouse, for example, are quite different than those underlying the use of condoms for vaginal sex with an occasional partner or the use of condoms for anal sex with one's main partner. The uniqueness of behavioral determinants can best be illustrated by briefly considering the four theories that have most strongly influenced much of the CDC's AIDS behavioral prevention research: the Health Belief Model (9, 10, 11), Social Cognitive Theory (12, 13, 14), the Theory of Reasoned Action (7, 15, 16),

and the Transtheoretical Model of Behavior Change (17, 18, 19).

## The Health Belief Model

According to the health belief model, the likelihood that

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someone will adopt (or continue to engage in) a health-protective behavior is primarily a function of two factors. First, the person must feel personally threatened by the disease. That is, he or she must feel personally susceptible to (or at risk for) a disease with serious or severe consequences. Second, the person must believe that the benefits of taking the preventive action outweigh the perceived barriers to (and/or costs of) taking that action. Note that the costs and benefits of performing one behavior (such as always using a condom for vaginal sex with one's spouse) may be very different than

those associated with performing another behavior (such as always using a condom for vaginal sex with an occasional partner).

## Social Cognitive Theory

Social cognitive theory also identifies two factors as primary determinants underlying the initiation and persistence of an adaptive behavior. First, the person must have self-efficacy with respect to the behavior. That is, the person must believe that she or he has the capability to perform the behavior in question under a number of different circumstances. Second, one must have some incentive to perform the behavior. More specifically, the expected positive outcomes of performing the behavior must outweigh the expected negative outcomes. Social cognitive theory has focused on three types of perceived (or expected) outcomes: physical outcomes (performing the behavior will protect me from AIDS); social outcomes (performing the behavior will make my partner angry); and self-standards (performing the behavior will make me feel guilty).

## The Theory of Reasoned Action

According to the theory of reasoned action, performance or nonperformance of a given behavior is primarily determined by the strength of a person's intention to perform (or to not perform) that behavior, where intention is defined as the subjective likelihood that one will perform (or

try to perform) the behavior in question. The intention to perform a given behavior is, in turn, viewed as a function of two basic factors: the person's attitude toward performing the behavior (one's overall positive or negative feeling with respect to personally performing the behavior) and/or the person's subjective norm concerning the behavior (the person's perception of normative pressure to perform [or to not perform] the behavior in question).

The theory of reasoned action also considers the determinants of attitudes and subjective norms. Attitudes are viewed as a function of behavioral belief (beliefs that performing the behavior will lead to certain outcomes) and their evaluative aspects (the evaluation of these outcomes); subjective norms are viewed as a function of normative beliefs (beliefs that a specific individual or group thinks one should or should not perform the behavior in question) and motivations to comply (the degree to which, in general, one wants [or does not want] to do what the referent thinks one should do). Generally, the more one believes that performing the behavior will lead to positive outcomes or will prevent negative outcomes, the more favorable will be one's attitude toward performing the behavior. Similarly, the more one believes that specific referents (individuals or groups) think that one should (or should not) perform the behavior, and the more one is motivated to comply with those referents, the stronger will be the perceived pressure (the subjective norm) to perform (or to not perform) that behavior.

Based upon these three theories, one can identify four factors that may influence a person's intentions and behaviors:

1. The person's perception that he or she is personally susceptible to acquiring a given disease or illness.
2. The person's attitude toward performing the behavior, which is based upon his or her beliefs about the positive and negative consequences of performing that behavior.
3. Perceived norms, which include the perception that others in the community are also changing, and that those with whom the person interacts most closely support the person's attempt to change.
4. Self-efficacy, which involves the person's perception that he or she can perform the behavior under a variety of circumstances.

While there is considerable empirical evidence to support the role of attitude (or outcome expectancies), perceived norms, and self-efficacy as determinants of intention and behavior, this is not the case for perceived susceptibility (or perceived risk). Particularly in the AIDS area, there is growing evidence that perceived risk of exposure to HIV (or of getting AIDS) is, in many cases, unrelated to the likelihood that one will take any given preventive action. Indeed, it appears that although perceiving oneself at risk for AIDS may be a necessary first step in a change process, whether one does or does not change depends primarily on one's attitudes, norms, or self-efficacy (20).

The relative importance of these three factors as determinants of intention and behavior is expected to vary as a function of both the behavior and the population being considered. That is, while some behaviors are determined primarily by attitudinal considerations, others are determined primarily by norms or self-efficacy. Equally important, a given intention (or behavior) may be influenced primarily by attitudes in one population, but be influenced primarily by norms or self-efficacy in another population. For example, while sexually experienced U.S. male college students' intentions to always use condoms were found to be primarily under normative control, this same intention was found to be primarily under attitudinal control in a sample of sexually experienced male college students in Mexico City (21). Therefore, prior to developing an intervention, it is important to conduct formative research to determine empirically whether, in a given population, a specific intention (or behavior) is determined primarily by attitudes, by norms, by self-efficacy, or by two or all three of these factors.

If the results of formative research indicate the attitude is a primary determinant of behavior, then one should direct the intervention toward changing people's beliefs about the consequences of performing that behavior. As indicated previously, the more one believes that performing a given behavior will lead to positive outcomes and prevent negative ones, the more favorable will be one's attitude toward performing that behavior. Similarly, the more one believes that performing the behavior will lead to negative outcomes or prevent positive ones, the more unfavorable will be one's attitude. Thus, with respect to any given behavior, it is important to identify the beliefs about performing that behavior that are held by the members of the population being considered. The intervention then can be directed at those beliefs that differentiate between those who do and do not perform the behavior. That is, if one finds that a given belief is held by those who perform the behavior but not by those who do not perform the behavior, the intervention can be designed to provide information to strengthen this belief.

If perceived norms are found to be a primary determinant of behavior, then one should direct the intervention at changing community norms or at changing people's perceptions of the normative proscription of relevant others, or both. In order to do this, one must first identify the individuals or groups that serve as relevant others for the members of the population being considered. Then one must determine whether these relevant others are viewed as supporting or opposing the performance of the behavior. The intervention can then be directed at clarifying misperceptions or providing new referents who support the behavior.

Finally, if self-efficacy is found to be a primary determinant of the behavior under consideration, then the intervention should be directed at increasing the population's self-efficacy with respect to performing that behavior. In order to do this, one must first identify those circumstances that members of the population view as barriers to, or facilitators of, behavioral performance. The intervention can then be

directed at removing, or helping members of the population overcome, those barriers, for example, by providing necessary skills training.

In addition to conducting formative research to identify which of these factors are the most important determinants of a given behavior in a given population, knowing where an individual is in a change process is also necessary. Behavior change is usually not a one-step, all-or-nothing process, but often involves a series of steps along a behavior-change continuum. Clearly, different behavior change messages will be necessary for a person who has not even thought about adopting a preventive health behavior than for a person who is trying to adopt that behavior. The Transtheoretical Model of Behavior Change directly addresses this issue.

### Stages of Behavior Change

According to the transtheoretical model, adoption of a new behavior may involve five distinct stages of change (SOC). Many individuals who are performing risky behavior may have no intention to change that behavior or to adopt a given preventive health behavior (precontemplative stage). Any one of several events (for example, perceiving that one is personally at risk for an illness) may then lead the individual to consider change and perhaps to form an intention to adopt the behavior immediately or at some time in the future (contemplative stage). This immediate intention is often accompanied by initial, perhaps exploratory, attempts to adopt the behavior (preparation or ready for action stage). Then the new behavior is adopted (action stage), and ultimately it becomes a routine part of one's life (maintenance stage). Movement through the stages is assumed to be sequential, although people may skip certain stages or relapse (at any stage) and cycle back through the stages repeatedly before achieving long-term maintenance.

According to this stage of change model, in order to help people change their behavior, one should first determine where each person is on this continuum of behavior change and then develop interventions to help him or her move to subsequent, more advanced stages. The model further suggests that different behavior change processes, such as consciousness raising and self-reinforcement, are necessary at different stages. More specifically, it has been suggested that interventions focusing on cognitive and emotional factors will be most influential in early stages, while action-oriented approaches will be more effective in later stages (18). This hypothesis is currently being tested in several of the CDC's intervention projects (22, 23, 24). Irrespective of the validity of this hypothesis, having discrete and immediate objectives for persons at risk for HIV infection allows one to more precisely target an intervention to individual needs. For example, one can determine empirically which of the theoretical factors (such as norms, attitudes, or self-efficacy) one needs to focus on to move a person from one stage to the next.

The previous discussion raises a number of methodolog-

ical challenges to HIV prevention researchers. Not only must one develop valid and reliable measures of attitudes, perceived norms, and self-efficacy, but if one is to change these variables, one must identify and assess the beliefs (or outcome expectancies) underlying the attitudes, the normative beliefs underlying perceived norms, and the circumstances that influence a person's perception that he or she can (or cannot) perform the behavior in question. In addition, a valid and reliable measure is needed to locate respondents on the stage of change continuum. Two studies described in this volume address these issues. Middlestadt, et al. (25) describe how formative research involving elicitation procedures can lead to the development of culturally sensitive, fixed-item instruments to assess behavioral beliefs, normative beliefs, and self-efficacy, while the paper by Schnell, et al. (26) describes the development of an algorithm for measuring stages of change.

Even before assessing these variables, however, obtaining knowledge of the target population is necessary. To mount an effective intervention, one must know the size, composition, and mobility of the population in question. In particular, one should determine whether there are subpopulations that must be considered. In addition, it is important to understand the language and customs of these subpopulations, their sources of information, and the prevalence of the behaviors that are putting them at risk. Finally, and perhaps most important, one must determine where, when, and how these populations can be accessed, both for the delivery of the intervention and the assessment of its effectiveness. Studies by Higgins, et al. (27) and Goldbaum, et al. (28) describe and illustrate how ethnographic research can be used to obtain this information.

Once obtained, this information should guide decisions about how (via mass media or small media, in groups, in one-on-one interactions), where (in clinics, community-based organizations, other fixed-location sites, or "on the streets"), and by whom (trained counselors, outreach workers, paraprofessionals, or community volunteers) the intervention should be delivered. Many of the papers in this supplement deal with some of the methodological issues involved in implementing these decisions. For example, several of the projects being evaluated by the CDC and its partners have chosen to deliver interventions through the use of role model stories. Corby, et al. (29) describe methods for developing theory-based stories for small media (such as pamphlets, community newsletters). These types of small media are often distributed by community volunteers. Guenther-Grey, et al. (30) and Simons, et al. (31) describe and illustrate how volunteer networks have been established and maintained.

Interventions (including the distribution of small media materials) also may be delivered by paraprofessionals and outreach workers, and the role and training of outreach workers and paraprofessionals are discussed by Valentine and Wright-DeAgüero (32), Cabral, et al. (22) and Cheny, et al. (23). One study (32) makes an important distinction

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between contacts and encounters, while others (22, 23) show how paraprofessionals and outreach workers can be trained to deliver theory-based interventions. Kamb, et al. (5) focus explicitly on quality assurance issues in a multi-site randomized trial of counseling and testing in STD clinics. Finally, Person, et al. (24) present a framework for mobilizing a community to participate in, and sustain, an intervention.

Holtgrave, et al. (33) address the role of the community in HIV prevention planning. They focus on methods to evaluate the effectiveness of the CDC's newly established community planning process. One of the key questions that concerns community planners, and should concern anyone mounting an intervention, is, "How much will it cost?" Gorsky (34) attempts to answer this question by providing a methodology for cost assessment.

While most interventions are, by their very nature, geographically limited and targeted to a specific population, it is also important to obtain national data on the prevalence and incidence of AIDS and HIV infection, as well as on the prevalence of behaviors and other psychosocial factors that may contribute to HIV exposure. Data such as these help one target interventions by providing important input to epidemiologic analyses of HIV and AIDS. In addition, by monitoring AIDS-related knowledge, attitudes, beliefs, and practices, one gains valuable insights to guide the development of interventions (see, for example, Fishbein, et al., [35]). Although the field of behavioral surveillance is just beginning to emerge, its potential importance to AIDS prevention justifies its inclusion in this issue. Four studies describe CDC's activities in this domain. First, Safran and Wilson (36) describe three national survey systems coordinated by CDC: the National Health Interview Survey, the Behavioral Risk Factor Surveillance System, and the Youth Risk Behavior Surveillance System. Second, Anderson (37) describes CDC's Counseling and Testing Surveillance System and points out how data from this clinic-based system relate to data from the National Health Interview Survey. Buehler, et al. (38), describe the Supplement to HIV/AIDS Surveillance, which focuses on behaviors and access to services among those already infected with HIV or having AIDS. Finally, MacKellar, et al. (39) describe the sampling methodology used to conduct the Young Men's Survey,

which is designed to estimate the prevalence of HIV infection and related risk factors in populations of young men who have sex with men.

Behavioral interventions are key components of the national HIV prevention program. To develop an intervention for a given community, the determinants of behavior in that particular population must be ascertained. Then the intervention must be developed based on knowledge of these determinants and on theories of behavior and behavior change. This issue contains an in-depth description of how this can be done in public health settings. A partnership between behavioral scientists and public health workers is necessary for developing appropriate interventions for HIV prevention. One of the purposes of this special edition is to provide public health workers with an understanding of behavioral methodology. In doing so, our aims are to break down barriers that may exist between behavioral scientists and traditional public health workers and to strengthen partnerships that will be necessary for implementing effective HIV prevention programs in the United States.

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