

Behavioral interventions to improve infection control practices

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No single intervention has been successful in improving and sustaining such infection control practices as universal precautions and handwashing by health care professionals. This paper examines several behavioral theories (Health Belief Model, Theory of Reasoned Action and Theory of Planned Behavior, self-efficacy, and the Transtheoretic Model) and relates them to individual factors, also considering interpersonal and organizational factors. Further, this article includes recommendations of individual and organizational components to be addressed when planning a theoretically based intervention for improving infection control practices. A hypothetical framework to enhance handwashing practice is proposed. (AJIC Am J Infect Control 1998;26:245-53)

Many diseases and health problems are associated with certain behaviors or social norms. In some cases, problems relate to *doing* unhealthy things—eating or drinking excessively, engaging in stressful lifestyles, or injecting drugs. In other cases, the problems are a result of *failing* to do things—not getting immunized, for example. With respect to the health professions, failure to practice certain behaviors—such as handwashing, gloving, and universal precautions—is common and has been clearly associated with the transmission of nosocomial infection. Attempts to improve such behaviors have had minimal success. It appears that true behavioral change does not occur by targeting the individual alone; the organizational environment must also be addressed. In an attempt to better understand how one might plan to target more successful intervention strategies, we have reviewed major behavioral theories and their application to the health professions.

BACKGROUND

The literature abounds with studies on compliance of a variety of populations in a variety of behaviors.¹⁻⁴ However, no single intervention (education, feedback, education and feedback combined, or administrative mandate) has consistent-

ly been shown to increase compliance significantly or to sustain improved compliance with respect to infection control practices of health care workers.⁴ Despite efforts to reduce the risk of exposure to infection, to prevent the spread of infection, to reduce infection rates, and to meet the Healthy People 2000 goals and objectives regarding disease prevention and health promotion,⁵ the solution to achieving optimal compliance remains elusive.

Some theoretically based studies focusing on individual behaviors such as exercise, dietary change, smoking, treatment compliance, addictions, and risk reduction offer strategies for planning interventions.⁶⁻⁹ Additionally, Stanton and colleagues¹⁰ developed a framework for theory-driven behavioral intervention studies.

Compliance is the degree to which a person adheres to advice.¹¹ Health care workers have cited various reasons for noncompliance with handwashing and use of barrier precautions: insufficient time, inaccessible handwashing supplies, irritating handwashing agents, lack of knowledge of protocols, forgetfulness, interference with provider-patient relationships, altered tactile sensation, and restriction of movement (as summarized in Larson and Kretzer⁴).

Noncompliance with universal precautions has been reported to be significantly correlated with sex (male health care workers are less compliant), worker perception of patient needs (when needs are viewed as pressing), highly risk-taking personality, and the safety climate of the institution.¹² Compliance is also associated with certain sociodemographic and attitudinal factors, such as profession, type of clinical setting, and geographic location.¹³⁻²⁰

At the group level, active involvement and encouragement from key staff members may

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Box 1. HBM, TRA, TPB, self-efficacy, and Transtheoretic Model**HBM**

1. Perceived susceptibility to health threat is an element.
2. Perceived severity (or seriousness) of the threat is also an element.
3. Health recommendation must be beneficial without costly barriers or risk.
4. Cues to action initiate behavior.
5. Self-efficacy is an element.

TRA and TPB

1. The assumption is that human beings are rational, make use of available information, and consider the consequences of their actions.
2. Beliefs influence personal attitude, subjective norms, perceived behavioral control determinants, or all of these.
3. Personal and social determinants influence intention to act.
4. Perceived behavioral control can be a direct determinant of behavior or an indirect determinant mediated by intention.
5. Intention to act is considered the immediate determinant of action.

Self-efficacy

1. Self-efficacy is based in Social Cognitive Theory, which emphasizes the dynamic interaction among behavior, cognitive and personal factors, and environmental influences in determining one's behavior.
2. Personal perception or judgment of one's capability to carry out a particular behavior (self-efficacy expectancy) is involved.
3. Judgment that a behavior will produce a certain consequence (outcome expectation) is involved.
4. Sources of information include enactive attainment, vicarious experience, verbal persuasion, and one's physiologic state.

Transtheoretic Model

1. This model views health behavioral change through gradual and continuous stages:
 - A. Precontemplation (no foreseeable intention to change).
 - B. Contemplation (considering change soon).
 - C. Preparation (plans to change soon, may have initiated some steps).
 - D. Action (change of behavior is occurring).
 - E. Maintenance (incorporated behavioral change into life 6 months beyond action).
 - F. Termination (ultimate goal of 100% self-efficacy, ability to cope without relapse).
2. Shifts of attitude, behavior and intention occur through various processes of change (consciousness raising, self-reevaluation, self-liberation, counterconditioning, stimulus control, reinforcement management, helping relationships, dramatic relief, environmental reevaluation, and social liberation).

help to promote and sustain behavioral changes in health care settings.²¹⁻²³ Furthermore, administrative sanctions²⁴ and administrative leadership²⁵ have been associated with improved compliance rates. This suggests that both external (environmental) and internal (personal) variables must be considered when planning interventions to improve compliance. Seto²⁶ addresses the importance of applying the behavioral sciences in studies involving staff compliance with infection control practices. To reduce infection rates, Seto²⁶ points out the timely need for respecting individuality by employing coaching rather than manipulative methods.

In this article we explore several behavioral theories and relate them to the individual (personal factors) within the context of the interpersonal and organizational environments (environmental factors). We report how various components of these theories have been tested in descriptive and intervention studies in other areas and suggest how a theoretically based

intervention for improving and sustaining infection control practices by health care workers could be developed and applied.

SUMMARY OF THEORETIC FRAMEWORKS

Several behavioral theories have been tested sufficiently to be considered for potential application to infection control practices. These include the Health Belief Model (HBM), the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB), self-efficacy, and the Transtheoretic Model (Box 1). These theories have undergone extensive field testing and several share similar constructs. Representative studies are briefly highlighted with the discussion of each theory.

HBM

According to the HBM, one's action depends on one's perceived susceptibility to a health threat, the perceived severity of the threat, and the belief that a particular health recommendation would be benefi-

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cial without costly barriers or high risks. Internal and external cues (triggers) initiate an action or behavior.²⁷ More recently, the concept of self-efficacy (one's perception of one's capability of carrying out a behavior) has also been incorporated into the HBM.²⁸

One thus would adhere to universal precautions if one believed that one was susceptible to a serious infection during a patient interaction and expected to contract the infection if no protective measures were taken. Reminders (cues) in the environment would serve to trigger the use of these measures. Also, one would need to believe oneself capable of carrying out these precautions (self-efficacy) without undue costs and risks.

Sample studies. Various components of the HBM have been tested in a variety of studies. The cues component was tested in a study to increase the use of bicycle helmets. A cues-to-action intervention significantly affected the perception of threat but had no direct relationship to attitudes, intentions, or behaviors.²⁹

Other intervention studies have reported variable results. For example, in one study assessing the effectiveness of breast self-examination classes, there were changes in both beliefs and behaviors but weak relationships between those variables.⁹ Neither perceived severity of asthmatic attacks nor beliefs in benefits of self-management techniques for control of those attacks were predictive of self-management behavior as part of a children's health education program.⁸ Nor did cues to action (dental appointment reminders and scheduling methods) predict behavior (compliance with dental appointments) in an adolescent group; however, age and previous dental experiences were weakly correlated with appointment compliance.³⁰

In a review of motivational theories to explain and predict cardiovascular risk reduction, Fleury³¹ suggested that health beliefs alone did not explain individual motivation in sustaining long-term behavioral change. Harrison and colleagues,³² in a metaanalysis of studies measuring components of the HBM, concluded that because of weak effect sizes and lack of homogeneity, it was impossible to confirm predictive validity for the model. Maddux³³ reported that perceived barriers provided the strongest component and perceived severity the weakest component of the model.

TRA and TPB

The TRA and TPB are based on the assumptions that human beings are rational, make systematic use of available information, and consid-

er the implications of their actions before engaging in a behavior. A behavior is assumed to be under volitional control and can be predicted from intention. Intention is formed by certain determinants: personal attitude (the value of performing a behavior), subjective norms (perceived social pressures),³⁴ and perceived behavioral control (perceived ease or difficulty in achieving a valued outcome and the perceived ability to overcome constraints, which reflect past experience and anticipated impediments).³⁵ These determinants are formed by beliefs.

The theory suggests that one who believes that a behavior will lead to positive outcomes will hold a favorable attitude. Thus there is likely to be an intention (willingness to try) to perform the behavior. The theory can be regarded as a series of hypotheses linking beliefs with determinants, determinants with intention, and, ultimately, intention with behavior.³⁶

The first step in predicting a behavior is to clearly define and measure the specific behavior according to *specific* elements of action, target, context, and time, because a change in one element redefines the behavior of interest. For example, preventing drug use is different from decreasing drug use (action), trying marijuana is different from trying other drugs (target), using a drug privately is different from using it at a party (context), and using a drug every day is different from doing so occasionally (time).³⁶

Sample studies. In a population of persons with alcoholism, three appeals were designed to encourage sign-up for an alcoholic treatment unit of the target. These were a traditional appeal that was based on the HBM, a negative appeal in which failure to sign up was associated with negative consequences, and a positive appeal in which signing up was associated with positive consequences. A control group had no message delivered.⁶

Signing up significantly increased with the positive appeal (20%) and the negative appeal (30%) but decreased with the traditional appeal. Further, of those patients initially willing to sign up, a number in each group subsequently changed their minds: 5% with the positive appeal, 0% with the negative appeal, 5% with the no-message control, and 50% with the traditional appeal. The negative message had the greatest effect on beliefs; the positive message followed closely. Both messages were reflected in attitudinal and behavioral changes. The traditional appeal that was based on the HBM had a negative effect. Fishbein and associates⁶ concluded that once primary beliefs are

identified, persuasive communication could be effective in changing behavior.⁶

Attitudes and subjective norms have significantly predicted intention in several descriptive studies^{37, 38}; in addition, intention was significantly associated with behavior in one study assessing seat belt use.³⁹ In another intervention study, attitudes and subjective norms significantly predicted intentions and intentions correlated with behavior, but previous behavior was the best predictor of attitudes and subjective norms.⁴⁰ Female subjects were influenced more by important referents (subjective norms), whereas male subjects were influenced more by their own attitudes.³⁸

All three determinants (attitude, subjective norms, and perceived control) correlated significantly with intention in a descriptive study of weight reduction. Perceived control and intentions were moderately associated with actual weight loss (behavioral outcome).⁴¹

Self-efficacy

Self-efficacy is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances...[and] is concerned with judgments of what one can do with whatever skills one possesses."⁴² Self-efficacy can be individual or collective and is influenced in four ways: enactive attainment (successful performances raise efficacy appraisals, failures lower them), vicarious experiences (observing or visualizing others performing successfully raises self-efficacy), verbal persuasion (being persuaded that one possesses the capabilities for achievement increases effort to succeed), and physiologic state (physical responses such as autonomic arousal, fatigue, and pain that arise during challenges and may be perceived as vulnerability and affect confidence).⁴²

Personal perception accounts for the effort and persistence applied to a specific behavior. It is a resilient sense of self-efficacy that allows one to move forward or a low sense of self-efficacy that impedes accomplishments.^{43, 44} Self-efficacy may be one of the most important variables related to behavioral change,⁴⁵ and it has become an integral construct of various other behavioral theories.¹

Sample studies. Children's self-efficacy, participation in health education, and a previous hospitalization modestly predicted self-management behavior in an intervention study.⁸ In a community-based campaign to reduce diet-related cancer risk, self-efficacy had a strong, independent effect

on intention and self-reported behavior.⁴⁶ Maddux and coworkers⁴⁷ designed written communications on interpersonal effectiveness training to test the independent effects of self-efficacy expectancy (the belief that one is or is not capable of performing a behavior), outcome expectancy (the belief that a particular behavior will yield a certain result), and outcome value (the importance attributed to the result). Outcome expectancy had an independent effect on behavioral intentions. Additionally, all three were significant predictors of intention.

In a similar intervention study, self-efficacy had a main effect on intention to exercise to maintain cardiovascular fitness.⁴⁸ Adolescents received information designed to influence self-efficacy beliefs. Stronger intentions to exercise were reported by those who received information containing high levels of self-efficacy beliefs (e.g., "I do have the willpower to stick to a regular program of exercise."⁴⁸), suggesting that beliefs may be successfully influenced by providing subjects with positive information; however, intentions did not translate into actual behavior.

Gist and Mitchell⁴⁹ noted the importance of self-efficacy as a motivator in empirical studies of organizational behavior and commitment. A person whose perception of performing a task was high actually did better than a person who perceived failure. Likewise, Barling and Beattie⁵⁰ found that self-efficacy beliefs significantly predicted sales performance.

In a review of self-efficacy in health-related fields, Strecher and colleagues⁵¹ summarized studies that demonstrated strong associations between self-efficacy, health behavioral change, and maintenance. Fleury⁵¹ concluded that self-efficacy was an important factor in decision making regarding cardiovascular risk-reduction behaviors, yet its role in sustaining change was questioned if persons perceive more value in sustaining risk-producing behaviors.

Transtheoretic Model

The transtheoretic approach focuses on facilitating intentional change and views health behavioral change in a series of gradual, continuous stages evolving in a circular, spiraling pattern. Various processes of change facilitate movement through those stages (see Box 1).⁵²⁻⁵⁵

Some processes that allow movement through the stages of behavioral change include consciousness raising, self-reevaluation, self-liberation, counter-conditioning, stimulus control, reinforcement man-

agement, helping relationships, dramatic relief, environmental reevaluation, and social liberation. Prochaska and coworkers⁵⁴ demonstrated that cognitive processes such as consciousness raising and self-reevaluation are more likely to be used in the early stages, whereas behavioral processes such as helping relationships and counterconditioning are used in the action and maintenance stages.

Sample studies. A group of about 300 mental health outpatients changed predictably from one stage to another, adjacent stages were additive and highly correlated, and the Stages of Change Scale assessed clients' readiness for initiating involvement in therapy.⁵⁶

Marcus and coworkers⁵⁷ encouraged the use of the Transtheoretic Model as an intentional behavioral change model after a study assessing stage of exercise adoption. Pros (favorable perceptions of exercise), cons (unfavorable perceptions of exercise), and a decisional balance measure (pros minus cons) were significantly associated with stage of exercise adoption, which corresponded to the decisional balance measure. That is, pro scores and decisional balance scores were highest for subjects in maintenance and lowest in precontemplation, whereas con scores were highest for subjects in contemplation and lowest in maintenance.

In one study⁵² of persons trying to stop smoking, minimal processes of change were noted during the precontemplation stage, suggesting that precontemplators pay little attention to antismoking information. In contrast, during contemplation, subjects were most likely to use cognitive processes (e.g., consciousness raising) and to respond to feedback and education programs regarding smoking. Similarly, in an exercise study of two sample populations (one in the United States and another in Australia), persons in precontemplation also scored the lowest, whereas those in maintenance scored highest on self-efficacy and on pro and decisional balance indexes. Con scores for exercise were highest in precontemplation and lowest in maintenance.⁵⁸ Additionally, pros of changing were the greatest in the contemplation stage, whereas cons were highest for subjects in the precontemplation stage across 12 problem areas.⁵⁹

DISCUSSION

Behavioral theories

The HBM alone seems to have limited predictive value for either initiation or motivation of behavior. The role of perceived barriers (HBM) in affecting behavior is similar to the concept of per-

ceived behavioral control in TRA and TPB. Additionally, subjective norms (TRA and TPB) may provide situational triggers or cues (HBM), because observing others in one's external environment might promote or prevent an action. Thus the constructs of the HBM and of the TRA and TPB are closely related.

In studies that used TRA and TPB, intentions generally correlated with behavior, whereas both attitudes and subjective norms significantly predicted intentions. Attitudes seemed to be greater contributors to both intention and behavior than were subjective norms. Perceived control had some effect on intention and was directly associated with behavior. Thus an intervention targeted toward changing attitudes and increasing intention is likely, according to TRA and TPB, to be associated with behavioral change.

There was strong and consistent evidence that self-efficacy was associated with behavioral change and maintenance.^{7,46,48,51} "The stronger their self-efficacy beliefs, the higher are the goals people set for themselves, and the firmer their commitment to engage in the intended behavior, even if failures mount."⁴⁵ Interventions to promote behavioral change should include the concept of self-efficacy. In fact, self-efficacy has been integrated into the HBM, the TRA and TPB, and the Transtheoretic Model.

Aside from including self-efficacy in their frameworks, many behavioral theories incorporate in varying degrees the common thread of *beliefs*: belief of health threat (HBM), the concept that determinants are formed by beliefs (TRA and TPB), belief in one's capabilities (self-efficacy), and belief that a change of behavior may be warranted (Transtheoretic Model).

The transtheoretic approach provides a structure to identify the stage of readiness for change and to intervene with specific processes to promote movement to the next predictable stage. For example, precontemplators exhibit no intention to change behavior and exert little energy thinking about change. Because no action would even be considered by someone unless a health threat were perceived (HBM), it may be necessary to incorporate perceived health threat into an intervention plan at the precontemplation stage. Once the stage of change has been assessed, various processes of change can be employed to encourage movement through the change process (early stages may use cognitive processes, middle and later stages may use behavioral processes, and the final stages may use maintenance processes).

Box 2. Hypothetic framework to enhance handwashing practice

1. Identify and specify behavior of interest.
 - A. Do individuals agree with the goal?
 - B. Does the organization support the goal?
 - C. Is it a shared goal?
2. Identify organizational setting.
3. Identify cultural (work) group.
4. Assess cultural (work group) beliefs.
 - A. Do individuals value the goal?
 - B. Do individuals believe that they can achieve the goal?
 - C. Determine hindrances to achieving the goal.
5. Assess organizational beliefs and values.
 - A. Does the organization value the goal as a priority?
 - B. Does the organization value group effort?
6. Identify stages of change for individuals regarding readiness for behavioral change. Stages of change are as follows:
 - A. Precontemplation (no intention to change behavior soon)—"I can't wash my hands any more than I do now."
 - B. Contemplation (aware of problem, considering change).
 - C. Preparation (plans to change soon, some initial steps taken)—"Our unit has been discussing ways to foster team effort in reducing infection rates."
 - D. Action (change in progress).
 - E. Maintenance (maintaining and incorporating change in life).
 - F. Termination (successful coping without fear of relapse).
7. Group individuals according to identified stages of change to identify group readiness for change.
8. Modify and shape behavior of interest to specific population.
 - A. To what extent does handwashing occur at present?
 - B. How often should it occur?
 - C. Define frequency, quality, and other measures of handwashing.
9. Identify the most important theoretic components that are most applicable to the population (e.g., perceived health threat, self-efficacy, perceived behavioral control).
10. Make theoretic constructs operational by translating into individual (I) and organizational (O) categories (see Box 3).
11. Select appropriate intervention(s).
12. Assess effectiveness of interventions, construct modifications, and sustain intervention until work group has successfully shifted into later and final stages of change.

No behavioral theory has been shown consistently to predict behavior, but many theories share similar constructs that could be integrated into an intervention to improve infection control practices (Box 2). These constructs include self-efficacy, beliefs, perceived health threat, cues, attitudes, subjective norms, perceived behavioral control, intention, and the stages and processes of change.

Often one concept is similar to another but is named differently. For example, in self-efficacy, two terms are used interchangeably: *expectations* (anticipatory outcomes of behavior) and *expectancies* (the values one places on a given outcome or incentive). The fact that variables are poorly defined across and within theories prevents optimal conceptualization and accurate measurement of variables, leading to confusion among researchers. Clear definitions of variables are vital for testing of theories.

Connecting organizational and individual factors

Behavioral theories and interventions that are based on these theories have primarily targeted

individuals. Clearly they are insufficient to effect and sustain change if they do not recognize the environmental structure or culture supporting these individuals. The small effect sizes of behavioral intervention studies may be due in part to failure to consider the organizational support structures needed to sustain behavioral changes.

An intervention that deals with internal (personal) as well as external (environmental) factors must consider the various levels of behavioral interaction (personal, interpersonal, and organizational; Box 3). A health care worker with a high sense of self-efficacy toward infection prevention who also understands and believes in the organization's preventive goals will attempt to "own," will be committed to, and will strive to attain those goals. An individual with comparable self-efficacy working in an organization in which those goals are poorly articulated or absent would be less likely to attain those goals, even if they were consistent with his or her personal beliefs. An organization that promotes individual respect and partici-

Box 3. Operational realization of individual (I) and organizational (O) categories in the handwashing example

- A. Perceived health threat (perception of causality of threat and risk of infection):
I— "Am I aware that a threat to my health exists if I fail to wash my hands regularly?"
O— "Do we understand the relationship between handwashing and spread or risk of infection?"
- B. Cues and triggers (meanings associated with cues):
I— "Do reminders automatically provoke handwashing as a habit?"
O— "Do others (referents) signal us to wash more often?" "Which cues are most successful?"
- C. Self-efficacy (perception of capability to reduce spread of infection and of achieving outcome of decreased infection rates):
I— "Do I believe that I can contribute to the reduction of infection?"
O— "Do we wash as frequently as expected and as carefully as prescribed?" "Will handwashing reduce the spread of infection?"
"Do others convince us that we are competent in our technique?"
- D. Attitude (perception and feelings about causal relationship of handwashing to infection, perceived value of reducing infection rates, perceived reinforcers, and costs and benefits):
I— "I might wash my hands more frequently if my efforts were supported." "Do I value the reduction of infection enough to be committed to changing my behavior?"
O— "We feel committed to our organization and to the health care profession to enhance practice whenever possible." "We value reduced infection rates."
- E. Subjective norms (perceived social pressure to conform, group consensus to improve; referents remind others to engage in group effort to decrease infection):
I— "Do I think others expect me to improve handwashing methods?"
O— "Will individual handwashing improve by being a member of the work group?" "Are groups more likely to inspire motivation to reduce infection?" "How does the group value the outcome to reduce infection?" "Who signifies cues to conform?"
- F. Perceived behavioral control (perception of ease, resources, environmental barriers, and constraints to engaging in handwashing behavior; perception of individual and collective self-efficacy):
I— "Is the goal within my reach?"
O— "Do we possess the resources to attain the goal of reduced infection?" "Do we have too many barriers that prevent us from improving our handwashing technique?"
- G. Intention (perception of likelihood of performing action and of willingness and capability to act):
I— "Will I perform this behavior?"
O— "Will we choose to carry out the behavior of interest?"

pation in realistic goal setting will enhance a sense of commitment in the individual employee.

Because of the wide constellation of individual determinants dictating health behavior, it is clear that one specific intervention may not produce desired results. For example, targeting attitudes and beliefs but not subjective norms (TRA and TPB) may be appropriate for persons who are intrinsically motivated to a greater degree. Subjective norms may influence behavior and predict change to a greater extent with persons who are chiefly extrinsically motivated.

It would be ineffective to consider only the individual or only the organizational factors related to behavioral change in a health care setting, because these factors are interdependent. In a cohesive, balanced approach to planning successful interventions for improving practice, behavioral theories must be supported with consideration of the organizational dimension. Any intervention designed to have an impact on behavior must be considered from a multidimensional perspective.

Finally, the goal of applying behavioral and organizational theories is to explain, predict, and ultimately influence behavior. In health care, the term

compliance is frequently applied to the extent to which health care professionals follow the "rules" of infection control. Compliance implies that the doer is passively obeying or "giving in" to a mandate. Thus use of this term may reduce internal motivation and ownership of a behavior. If this is the case, use of a descriptor that promotes internalization and choice, rather than submission to a higher authority, may enhance self-efficacy and engagement. Rather than "improving compliance" with infection control procedures, we would refer to "enhancing infection control practice," for example.

To improve infection control practice requires continual assessment of the group's stage, intervention with appropriate processes of change, questioning basic beliefs, and supporting individual and group creativity. Because of the complexity of the change process, it is not surprising that single interventions—or even interventions that are based on a single behavioral theory but are out of organizational or individual context—often fail. Clearly, a multifactorial approach is necessary.

On the basis of our review of the literature and use of a structure suggested by Stanton and colleagues,¹⁰ we have determined those individual and

organizational components to be addressed and have developed a hypothetic intervention program to enhance handwashing practices (Boxes 2 and 3).

RECOMMENDATIONS

We recommend the following when planning a theoretically based intervention for improving infection control practices:

1. Incorporate into interventions the constructs that have been shown consistently to be predictors of behavior or to have strong influences on behavior. These include beliefs, perceived health threat, cues, self-efficacy, attitude, subjective norms, perceived behavioral control, intention, and stages of change.
2. Clearly define these variables.
3. Consider the organizational context and include factors in the work environment most likely to maximize effectiveness. These would include communication, participation, active involvement of organizational leaders, fairness, mutuality, respect, and external and internal reinforcers.
4. Use the stages of change to assess individual and group readiness before selecting any interventions.
5. Use a planning framework to track various components and processes in an ongoing evaluation of the effectiveness of interventions.
6. Consider the complexity of individual and organizational factors when designing behavioral interventions, realizing that a multidimensional intervention will have a greater impact on behavior.
7. Avoid use of words such as *compliance*. Replace them with descriptive phrases that promote a sense of active participation and internalization (e.g., "enhancing practice").

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