

# Population Treatment for Addictions

James O. Prochaska

*University of Rhode Island*

**ABSTRACT**—*Addictive behaviors are major causes of chronic disease, premature death, and high health care costs. Such behaviors have not been treated seriously by health care systems, and this is a major reason why such systems face an unhealthy future. Treating addictions seriously requires complementing a traditional individual-patient paradigm with a population paradigm, an action paradigm with a stage paradigm, clinic practices with home-based practices, a clinician paradigm with a computer paradigm, and programs that focus on changing single behaviors with programs that focus on changing multiple behaviors.*

**KEYWORDS**—*addictions; population treatment; stages of change*

Addictive behaviors are major causes of chronic disease, disability, and death. They are also major causes of high costs for health care systems, legal systems, employers, and educational systems. A promising approach for more effective treatment of addictions involves complementing traditional treatment and research paradigms with more comprehensive and innovative paradigms.

## PATIENT AND POPULATION PARADIGMS

Historically, as a profession and as a science, psychology took responsibility only for those persons in treatments or clinical trials. Psychotherapy research was preoccupied with efficacy for the individual patient. A therapy yielding 30% abstinence from the targeted undesired behavior would have 50% greater efficacy than a treatment yielding 20% abstinence. However, most addictions go undiagnosed and untreated. When health care systems offer smoking-cessation clinics for free, for example, 1% of eligible smokers participate. About 4% of pri-

mary-care patients with mental health problems receive appropriate treatments (Cummings, 2003).

In contrast to the traditional patient paradigm, a population paradigm focuses on impact, which is calculated as efficacy times participation. A therapy with 30% efficacy and 5% participation has an impact of 1.5%. A therapy with 20% efficacy and 75% participation has an impact of 15%. In this example, the therapy with 50% less efficacy has 10 times greater impact. In short, higher efficacy does not necessarily translate into greater impact, a fact that is easily overlooked if treatment efforts are framed within the patient paradigm. Complementing the patient paradigm with the population paradigm has the potential to produce unprecedented impact.

## PASSIVE-REACTIVE AND PROACTIVE PARADIGMS

High percentages of addicted persons can be reached only if a passive-reactive approach to treatment is complemented by proactive practices. Most health professionals are socialized to passively wait for patients and then react. This is appropriate for patients who are acutely sick, in pain, or distressed. However, in the case of chronic behaviors that are causes of chronic disease, most patients are not sick, in pain, or distressed. Professionals need to think of these behaviors as silent killers, the way they think of hypertension, and take a proactive approach, assessing relevant populations for their readiness to change these behaviors. Treatments matched to individuals' stages of change could then be prescribed.

## ACTION AND STAGE PARADIGMS

The traditional outcome paradigm construed behavior change as equaling action. Behavior change occurs, for example, when individuals quit smoking, drinking, or abusing drugs. In the stage paradigm, in contrast, behavior change is understood as a process that unfolds over time and involves progress through a series of stages: precontemplation, contemplation, preparation, action, and maintenance. In the United States, about 40% of smokers are in the precontemplation stage—that is, they do not

Address correspondence to James O. Prochaska, Cancer Prevention Research Center, University of Rhode Island, 2 Chafee Rd., Kingston, RI 02881; e-mail: jop@uri.edu.

intend to quit in the next 6 months. About 40% are in contemplation, meaning that they intend to quit in the next 6 months but not in the next month. Only about 20% are in preparation, prepared to quit in the next month. Of daily smokers, less than 10% are prepared to quit.

The vast majority of research and services for smoking cessation are based on the action paradigm and are designed for smokers who are prepared to quit. For example, the U.S. Public Health Service's clinical guidelines for the treatment of tobacco (Fiore et al., 2000) had access to more than 6,000 studies on tobacco covering a broad range of evidence-based treatments for smokers motivated to quit, defined as those in the preparation stage. But the authors concluded that there was not an adequate evidence base for treatments for the 80% or more of smokers in the precontemplation and contemplation stages. It is troubling that so much research excluded the vast majority of people with the most deadly of addictions. No wonder free action-oriented cessation clinics reach only 1% of smokers!

Action-oriented cessation treatments would serve even fewer smokers in countries that have not had extensive public-health campaigns. In countries like China, Germany, and Turkey, about 70% of all smokers are in precontemplation, and only about 5% are prepared to quit. If treatment programs are going to be designed to serve addicted populations, then action-oriented treatments need to be complemented by treatments that match patients' needs at each stage of change.

In one study, my colleagues and I reached out by telephone to a representative sample of 5,000 smokers and offered home-based treatments tailored to whether they were ready to quit, getting ready, or not ready. We recruited 80% of the people we contacted (Prochaska, Velicer, Fava, Rossi, & Tsoh, 2001), which is much better than typical with a standard action approach. In another stage-matched study, we recruited 85% of 4,500 smokers in a health maintenance organization (Prochaska, Velicer, Fava, Ruggiero, et al., 2001). We recruited over 70% of alcohol abusers on a college campus (Laforge, in press), even though 70% were in precontemplation and only 10% were prepared to take action.

Once a program reaches a high percentage of the target population, will they complete treatment? A meta-analysis (i.e., a statistical analysis combining the results of multiple studies) that analyzed the rates and causes of dropout from psychotherapy for a broad range of problems found that about 50% of participants discontinued treatment quickly (Wierzbicki & Pekarik, 1993). These dropout rates for "behavior medicines" are very similar to discontinuation rates across most biological medicines. In the meta-analysis, education, minority status, and having an addiction were the best predictors of dropout but still accounted for a only small percentage of dropouts. In studies of therapies for mental health, heroin addiction, obesity, smoking, and exercise, the best predictors of dropout were stage of change and the individual's ratings of the pros and cons of changing (e.g., Brogan, Prochaska, & Prochaska, 1999). In the Brogan

et al. study on mental health problems, we predicted over 90% of dropouts using stage of change and related variables. The entire 40% of premature dropouts were in the precontemplation stage. The 15% of participants who finished therapy quickly but appropriately were in the action stage. The treatment focus for patients who are in the action stage and have quit an addiction within the past 6 months should be relapse prevention. (Relapse prevention can help people progress to the maintenance stage, that is, to quit for more than 6 months; at this point, risks of relapse can continue to decrease.) But relapse prevention would not fit clients in the precontemplation stage, who would benefit instead from a clinical strategy focusing on dropout prevention. If treatment is matched to stage, people in precontemplation, who are most likely to drop out, can complete treatment at much higher rates.

In a review of the addiction literature, Connors, Walitzer, and Dermen (2002) found dropout rates ranged from 50% to 75%. They compared standard care with motivational interviewing (MI) based on a stage paradigm. Patients who received a single MI session completed treatment 25% to 50% more often than those who received standard care only.

These studies indicate that using a stage-based approach in treatment programs increases the enrollment rate and also reduces the dropout rate.

#### FROM CLINIC- TO HOME-BASED PARADIGMS

Individualized and interactive interventions have the greatest efficacy. Historically, such interventions were available mainly from clinic-based counselors. But clinic-based treatments are not reaching enough people. For example, obesity has increased at epidemic proportions in the past 16 years, yet participation in weight-management clinics has not increased appreciably. Obesity is the number-two cause of preventable death in the United States, but the nation's largest clinic-based delivery systems reach less than 5% of the overweight and obese populations. The problem appears to be not only that such programs are action oriented rather than stage based, but also that the settings in which the programs are delivered are themselves barriers. Marketing research revealed that 5% of Americans want clinic-based weight-management programs, but 50% want home-based programs.

Home-based programs can increase not only participation, but also efficacy. Even when people attend clinics, they spend 99% of their waking week outside of therapy, and what they do during that time is more important in determining their outcomes than is what happens within therapy sessions. Imagine medicine trying to improve efficacy by focusing only on the interactions in physicians' offices. Most primary-care treatment is provided by the pharmaceutical industry, which specializes in therapeutics delivered at home. Treatment for addictions needs to be home based as well as clinic based.

## CLINICIAN AND COMPUTER PARADIGMS

Delivering treatments at home requires using computers to complement a traditional clinician paradigm. Computers can provide individualized and interactive interventions that model the efforts of expert clinicians. A growing consensus holds that computer-generated communications that are tailored to the individual are the most promising approach for population-based interventions (Kreuter, Strecher, & Glassman, 1999). Interactive technologies are likely to be to behavior treatments what pharmaceuticals are to biological treatments: the most cost-effective means of bringing optimal amounts of science to bear on major health problems in entire populations in relatively user-friendly ways. Unlike pharmaceuticals, however, interactive technologies have no known side effects.

By providing guidance on principles and processes of change, an expert computer system can facilitate progress through the stages. For example, one such system asks a smoker 40 questions and on the basis of the answers provides feedback about the person's stage of change and whether he or she underestimates the benefits of quitting and overestimates the cons. The system also includes feedback on a total of 10 change processes (e.g., commitment, reinforcement, and social support), and participants receive feedback on a maximum of 6 processes relevant to their stage. The feedback indicates which processes the smoker is underutilizing, overutilizing, or utilizing appropriately compared with a group of peers in the same stage who made the most progress toward quitting. In follow-up interactions, participants receive feedback comparing them with their peers and feedback indicating how they have changed since their previous assessments. Participants learn what they are doing right, what mistakes they are making, and what they can concentrate on to progress the most. The system can also tell clinicians about their clients' progress and indicates how they can most help particular clients. In one study, such feedback reduced the percentage of clients who got worse by 50% and doubled positive outcomes (Lambert et al., 2001).

In our first clinical trial with smoking cessation, my colleagues and I compared four treatments: the American Lung Association's action and maintenance self-help manuals; stage-matched self-help manuals that targeted the precontemplation, contemplation, and preparation stages as well; stage-matched manuals plus three expert computer-system guides; and a combination of the manuals, the guides, and four proactive telephone calls from counselors over a 6-month period (Prochaska, DiClemente, Velicer, & Rossi, 1993). The self-help manuals and expert computer-system guides were mailed to smokers, who then followed the manuals and guides as best they could. The counselor calls added professional counseling to help the smokers progress from one stage to the next.

From a total sample of 753, smokers within each stage were randomly assigned to the four conditions. Eighteen months after the manuals and guides were distributed, the data showed that

the combination of expert computer systems with manuals was more than twice as effective as the American Lung Association's treatments (24% vs. 11% abstinence). Computers plus manuals and the combination of computers, manuals, and counselors were tied for efficacy at 12 months, but at 18 months the latter condition produced 18% abstinence, whereas the former produced 24% abstinence.

The counselors were distressed over their failure to outperform the expert computer systems. The computers told them to seek social support. But the counselors did not give up. Unlike computers, clinicians learn from clinical experience. They changed protocols for future applications.

In another study that involved 4,500 smokers proactively recruited from a health maintenance organization, results after 12 months were better among clients who were helped by expert systems plus counselors for 6 months than among those who worked with the expert systems only (25.6% vs. 20.6). At 18 months, results for the expert systems plus counselors declined, and those for the expert computer systems alone increased, so that the two conditions were tied at 23.2% abstinence (Prochaska, Velicer, Fava, Ruggiero, et al., 2001).

Why did the counselors plus computers not outperform the expert systems alone? One hypothesis is that some clients became dependent on counselors, much as they were dependent on nicotine. Historically, studies of therapies for addictions have shown a pattern of rapid relapse when therapy terminates. Such relapse has been attributed to addictions being resistant to change, but it is partly due to the loss of social support and social monitoring treatment provides.

With computer guides, rates of abstinence keep increasing for at least the 18- and 24-month follow-ups that have been used, rather than showing the rapid declines that often occur following counseling. Perhaps this is because computers enhance self-efficacy (i.e., increasing confidence in one's ability to continue making changes on one's own). When intervention ends, people can keep progressing through their own efforts based on self-efficacy or self-reliance. If people become dependent on clinicians, then one strategy for improving treatment would be to fade out therapists, much as nicotine is faded out in smoking-cessation programs.

In a review of 150 studies applying the transtheoretical model (TTM) of behavior change<sup>1</sup> to smoking, Spencer, Pagell, Hallien, and Adams (2002) identified 22 that tested stage-matched interventions. In my own analysis of the studies reviewed by Spencer et al., I identified 12 that used only stage for treatment matching: Four showed significant positive effects, 4 showed no significant effects, and 4 had results that were unclear. Five

<sup>1</sup>TTM is intended to be a comprehensive and integrative model of behavior change and therapy. In this model, behavior change is understood as a process that unfolds over time and involves progress through stages of change. Variables such as 10 processes of change, self-efficacy, and decision making (the balance of the pros and cons of changing) are applied to produce progress at each stage of change.

studies tested treatments that were tailored on a larger but partial set of TTM variables, such as stage, pros and cons of quitting, and self-efficacy. Three demonstrated significant positive results, and 2 did not. Five studies tested treatments that matched feedback to the participant using all TTM variables, including 10 processes of change, and 4 of these produced significant positive results. These results indicate that the greater the number of theoretical variables used for tailoring treatment to the client, the greater the chances that the treatment will be successful.

The studies varied on other key variables. The five using partial TTM tailoring had follow-ups of 10 weeks to 6 months and used reactive recruitment (i.e., the participants were smokers who had reached out to programs for help). The studies using treatments that were tailored on all the TTM variables had 18- to 24-month follow-ups, and four of the five were proactive population-based trials (i.e., they reached out to smokers to offer help). The more demanding the study (full TTM tailoring, long-term follow-ups, and high percentage of eligible smokers participating), the greater the likelihood of significant positive effects.

In population trials of treatment for alcohol abuse on college campuses, Laforge (in press) proactively recruited 70% of eligible students. Three expert computer systems that were fully TTM tailored produced significant reductions in alcohol problems in females but not males. To defend against pressures to change, males relied more than females on processes of resistance, such as reactance (getting angry and defensive when feeling pressure to change) and rationalization (excusing the problem behavior). These processes of resistance were an important reason why the treatment was ineffective for males. Future treatments should attempt to reduce processes of resistance in order to help male alcohol abusers progress to less risky drinking. Resistance to change is a challenge clinicians also face when treating individuals with other addictive behaviors.

#### FROM SINGLE TO MULTIPLE BEHAVIORS

Attempts to enhance the impacts of our expert computer-system guides by increasing efficacy or participation have failed. Because our proactive methods already recruit 80+%, they have limited potential to increase their recruitment rates. Efforts to increase efficacy for smoking cessation by doubling the number of contacts with participants, adding counseling calls, or providing nicotine replacement patches have been unsuccessful. However, the impact of treatments can be increased if they broaden their focus and treat multiple rather than single behaviors.

Clinical trials have the luxury of treating one problem. In studies of nicotine-replacement therapy, for example, smokers with mental health problems are typically excluded. Yet 45% of cigarettes in the United States are bought by smokers with

mental health problems. In practice, the majority of clients have multiple problems. The people with the highest risk and highest potential cost to the health care system are those with multiple behavior problems. Individuals who become free from two behavior risks reduce their health care costs on average by \$2,000 per year (Eddington, 2001).

In our first multiple-behavior trial, my colleagues and I recruited at home 2,360 parents (83.6% of the target population) of teenagers who were in a prevention program at school. Using three fully TTM-tailored expert-system guides for each relevant behavior, we produced significant impacts on smoking, diet, and sun exposure at a 24-month follow-up (Prochaska et al., in press). From primary care, we recruited 5,500 patients to the same treatments, and assessments 24 months later showed significant effects on the same three behaviors and on compliance with recommended schedules for mammograms (Prochaska et al., 2004). Treatments for smoking only and for multiple behaviors including smoking yielded the same long-term rates of abstinence from smoking (22 to 25%). Thus, it is possible to increase impacts by treating multiple behaviors without decreasing efficacy for the individual behaviors that are targeted.

#### FUTURE BREAKTHROUGHS AND CONCLUSION

Traditional paradigms were based on the assumption that relapse-prevention programs would produce breakthroughs in the efficacy of addiction treatments. To better understand relapse, my colleagues and I recently compared smokers who quit in our population-based study and remained abstinent (maintainers), smokers who quit and relapsed, and smokers who had not stopped smoking (stable smokers) for their use of 14 principles and processes of change (e.g., decision making, social support, and self-reinforcement). The study also included a control group, and all three categories of smokers were found in this group, too. Over 2 years, the maintainers demonstrated expert applications of the processes. The stable smokers showed little use of these processes. The smokers who quit and then relapsed initially paralleled the maintainers, but as they relapsed they began to behave like the stable smokers. Patterns of process use across the three groups were almost identical for treatment and control groups, but the treatment condition produced more maintainers.

Among maintainers and relapsers, the pathways of change do not differ between treatment and control groups. The common pathways for treatment and control groups could explain the mystery of how diverse treatments produce common outcomes. For example, Project Match, one of the largest therapy studies on alcohol problems, found no significant differences in outcomes for groups who were randomly assigned to cognitive-behavior therapy, MI, or 12-step treatment.

Traditional clinical paradigms have assumed that improved relapse-prevention strategies are likely to produce a breakthrough

in treatment outcomes. But for relapse prevention to produce a breakthrough, from 25% to 30% abstinence, in our best practice for smoking cessation, it would have to succeed with 70% of smokers who quit but then relapse with the current treatment, because relapsers constitute only 7% of the participants in our programs. This is not possible. However, a breakthrough of 5% could be produced by helping 7% of stable smokers quit, because stable smokers are 70% of our treatment population. This is possible. This example shows how traditional clinical paradigms and emerging population approaches provide different perspectives on what research and treatment strategies are likely to produce breakthroughs in efficacy.

A popular hypothesis is that multiple-level interventions are most likely to produce breakthroughs. According to this hypothesis, addictions are best treated by combining social controls (e.g., social policies), biological controls (e.g., pharmaceuticals), and self-controls (e.g., therapy). Experts advocating this position provide little evidence beyond a few well-known case studies, however. In our population trials, adding 2 years of multiple behavior interventions at the worksite (e.g., self-help groups and environmental policies) or 2 years of primary-care interventions (e.g., physician counseling) has failed to produce better results than our individual-level expert computer systems alone. These results are consistent with our previous research showing that more is not necessarily better. More treatment contacts, more treatment modalities (e.g., computer system plus counselor), and more treatment levels (e.g., interventions at both the worksite and individual levels) do not necessarily produce more successful outcomes.

What has produced breakthroughs in the impact of treatments for addictions are new paradigms. These new paradigms include proactive recruitment that targets entire populations and stage-matched interventions for multiple behaviors, delivered at home by individualized expert-system computers. Future breakthroughs are likely to emerge from innovative integrations of these new paradigms with best practices from traditional paradigms that have reached individual patients with action-oriented interventions for single behaviors, delivered in clinics by expert clinicians. Complementing established paradigms with new paradigms can produce more comprehensive approaches to the study and treatment of addictions.

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