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# Disseminating evidence-based practices in substance abuse treatment: A review with suggestions

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**Abstract**

Although substance abuse professionals are generally open to new and better therapeutic methods, most evidence-based treatments do not easily find their way into practice. Natural diffusion processes for innovations in substance abuse treatments are relatively informal and have yielded a widely acknowledged gap between science and community practice. This review focuses on methods for effectively disseminating new treatment methods into practice. Therapist manuals and one-time workshops are in themselves relatively ineffective in helping practitioners gain proficiency in new clinical approaches. Individual performance feedback and coaching improve the acquisition of clinical skills. Specific incentives for implementation may also be needed to encourage treatment providers, programs, and systems to adopt new approaches. 

*Keywords:* Diffusion; Dissemination; Evidence-based practice; Addiction; Evidence-based treatment

## 1. The science–practice gap in substance abuse treatment

In his classic volume, *Diffusion of Innovations*, Rogers (2003) documented the characteristic lag between the development of clearly advantageous innovations and their adoption in routine practice. For example, from the time of the first experiment showing that citrus fruits could completely eliminate the high mortality from scurvy, 194 years passed before this knowledge was implemented as a policy on naval sailing ships, a delay that cost a myriad of lives.

Even medical care often fails to provide treatment that is consistent with current research knowledge (Grimshaw & Eccles, 2004; Haines & Jones, 1994; Schuster, McGlynn, & Brook, 1998); however, the gap between science and standard practice seems to be particularly wide in substance abuse treatment in the United States (Lamb, Greenlick, & McCarty, 1998; Marinelli-Casey, Domier, & Rawson, 2002; Sorensen & Midkiff, 2002). Historically, there has been relatively little overlap between treatment methods commonly used in community practice and those with scientific evidence of efficacy. One review (Miller, Wilbourne, & Hettema, 2003, p. 41) concluded that "[t]he negative correlation between scientific evidence and treatment-as-usual...could hardly be larger if one intentionally constructed treatment programs from those approaches with the least evidence of efficacy."

This gap is partly caused by the unique development of American addiction treatment, which evolved in relative isolation from mainstream health care (Guydish, 2003; White, 1998). Through the middle of the 20th century, little or no professional help was available for these socially

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stigmatized disorders, which most practitioners and hospitals refused to treat. Consequently, there arose an alternative system of care, provided primarily by compassionate peers who were themselves in recovery. Although a disease model was advanced for alcoholism and subsequently for drug dependence, treatment remained segregated in specialist treatment programs with little connection to medical and mental health services. Treatment practices thus continued to be guided by the folk wisdom of recovering people, particularly through the perspectives of Alcoholics Anonymous and related 12-step programs (Alcoholics Anonymous, 1976; Jellinek, 1960). Individual providers, programs, and systems developed strong allegiance to particular treatment models, often regardless of scientific evidence for efficacy or lack thereof (Morgenstern, 2000). This developmental process led to a polarization of science versus practice perspectives (Kalb & Propper, 1976), reflected now in a broader impassioned debate regarding the merits of relying on evidence-based practices in behavioral health services (Beutler, 2004; Levant, 2004).

This review begins with a brief consideration of how substance abuse treatment procedures ordinarily find their way into practice. This process of adoption is often not simple. Beyond openness to and motivation for learning new methods, practitioners engage in various processes to develop skillfulness in new procedures. We use the term *dissemination* to describe these methods for strengthening practice competencies, and we use the term *diffusion* to describe the processes by which innovations are normally communicated to and adopted by practitioners (see National Institute on Drug Abuse [NIDA], 1991). After discussing natural diffusion processes, we briefly consider what treatment methods *should* be disseminated and various strategies for helping clinicians learn them. We then conclude with a review and discussion of research on the dissemination of substance abuse treatment methods.

We generated this article through an iterative process. An early source was an annotated bibliography on knowledge transfer in drug abuse treatment (Sorensen, Lin, & Sera, 2004) in which all authors had participated either by nominating or providing manuscripts or by reviewing drafts. The bibliography had drawn upon reference databases for articles identified through keyword searches, including the following keywords: "knowledge transfer," "diffusion," "dissemination," "technology transfer," "drug rehabilitation," "drug therapy," "substance abuse treatment," "practice to research," and "addiction research." Preparation of the bibliography also involved asking colleagues to nominate relevant manuscripts and names of frequently cited authors in the area. We also decided to focus only on addiction because of this area's singular history rather than to more broadly address mental health or medicine issues in this review. Finally, we stress that the article is not a systematic review of the literature but instead a review of issues addressed in the writings of our field. In this way, the review may be less systematic but more relevant to clinicians in substance abuse treatment.

## 2. The natural diffusion of substance abuse treatment methods

### 2.1. What is delivered in United States treatment?

Within the standards of evidence-based medicine, health care professionals are generally expected to provide treatment with the best current scientific evidence of efficacy. The same standard has been slow to emerge in substance abuse treatment (Lamb et al., 1998) and mental health care (Stirman, Crits-Christoph, & DeRubeis, 2004). Many widely practiced methods remain unsupported by scientific evidence, whereas other treatments with strong evidence of efficacy are rarely delivered in practice. For example, despite decades of evidence supporting the efficacy of behaviorally oriented couples counseling, only 4% of substance abuse treatment programs reported using it (Fals-Stewart & Birchler, 2001). This gap is perpetuated to the extent that internship and degree programs preparing the next generation of substance abuse professionals continue to neglect evidence-based treatment (EBT) in training. Graduate programs and internships in psychology, for example, may not require students to develop competence in even one empirically validated treatment (Crits-Christoph, Frank, Chambless, Brody, & Karp, 1995), if indeed they address addictions at all during clinical training (Miller & Brown, 1997).

It is useful here to distinguish between *unevaluated* treatment methods (for which there has been little or no research) and *disconfirmed* treatment approaches (which have been tested and found wanting in multiple trials) (Miller et al., 2003). Some treatment methods have been evaluated in only one or two clinical studies, a small evidence base from which to draw any conclusion. Other widely practiced methods (e.g., Berg & Reuss, 1997) have never been tested at all in a randomized clinical trial. For such unevaluated methods, efficacy is simply unknown.

In contrast, other treatment methods have a long history of negative findings in clinical trials yet continue in widespread practice. For example, many substance abuse programs continue to include educational lectures and films as a standard component of treatment, unaware of dozens of clinical trials showing no impact of such didactic approaches (Miller et al., 2003; Davis, Thomson, Oxman, & Haynes, 1995). Similarly, controlled trials have shown little or no beneficial impact on substance use outcomes from interventions such as acupuncture, confrontational approaches, insight-oriented group or individual psychotherapy, or *mandated* Alcoholics Anonymous attendance (Miller et al., 2003). In substance abuse prevention, the Drug Abuse Resistance Education program was widely disseminated well before any evidence base

was available and continues to be the most popular school-based approach in the United States despite clear failure to show efficacy in controlled trials (Rogers, 2002).

### 2.2. How open are clinicians to innovation?

Surveys have reflected a general openness of substance abuse professionals to learning new treatment methods, particularly those that appear to address common problems in practice (Erickson-Pritchard, 1999; Forman, Bovasso, & Woody, 2001; McGovern, Fox, Xie, & Drake, 2004). As would be expected, there is also variability among clinicians in their felt need to learn new approaches. Those who endorse a 12-step model or identify themselves as being in recovery have tended to express less interest in and use of evidence-based behavioral and pharmacotherapies (McGovern et al., 2004; Moyers & Miller, 1993; Thomas, Wallack, Lee, McCarty, & Swift, 2003). In a New Mexico survey, counselors endorsing a 12-step model reported using a larger array of treatment methods but fewer EBTs (Erickson-Pritchard, 1999). It does not appear that type of academic degree or years of education, however, predict use of EBT (Erickson-Pritchard, 1999). Physicians and programs with any involvement in research are substantially more likely to adopt treatment innovations (Thomas et al., 2003).

The continuing gap between science and practice in the addiction field may be related to values and models acquired during professional training. In a classic article, Kalb and Propper (1976) distinguished two training approaches that they identified as *craft* and *scientific* models. A practitioner trained in a craft model learns by apprenticeship—by observing and copying the performance of model teachers. Critical analysis of the overall model may be actively discouraged in favor of loyalty to the craft. In contrast, scientist-professionals are expected to be skeptical—to demand evidence for elements of any model. The scientist is supposed to be exposed to a wide variety of viewpoints and trained to think about issues in a critical and independent fashion. It would follow, Kalb and Propper reasoned, that those trained in a craft model would be more resistant to alternative views and innovations—more reluctant to question their own assumptions and approaches in light of new evidence. These authors linked the craft model to the historic American tradition of non-degree-holding recovering addiction counselors who follow a 12-step treatment approach.

Scientists have tended to rely on academic journals for the dissemination of new knowledge, but very few substance abuse clinicians use such journals to inform their practice (Miller, 1987b; Sobell, 1996). A survey of 99 directors of alcoholism treatment centers found that treatment providers preferred to obtain information by face-to-face interaction (e.g., workshops and consultation with colleagues) and made very limited use of scientific books, journals, and conferences (Levinson, Schaefer, Sylvester, Meland, & Haugen, 1982). The survey also highlighted the problem of perceived information overload as a result of the rapidly expanding literature in the field, combined with too little time to keep up with it. Indeed, the problem may not be too few but too many treatment options.

### 2.3. How are new practices diffused?

Erickson-Pritchard (1999) found through a survey that substance abuse counselors reported delivering a mean of 32 (±7) treatment methods or 69% of the 47 therapies listed. The American practice zeitgeist appears to have shifted from strong endorsement of one (disease model) school of thought (Miller, 1986) to an eclecticism that moderately endorses an array of models without a consistent focus (Ball et al., 2002; Taxman & Bouffard, 2003).

If diffusion of innovations is minimally influenced by the scientific evidence base, then how do specific treatment practices come to be adopted? Through his diffusion theory, Rogers (2003) identified five factors that increase the likelihood that an innovation, such as a new treatment practice, will be adopted. All have to do with perceptions of the new practice:

1. Relative advantage–the perception that it is significantly better than current practice, perhaps more effective or cost–effective, or meeting a particular need;
2. Compatibility–the extent to which the new practice fits with the provider's experience, values, and goals;
3. Simplicity–the perception that the new practice is easy to understand and use;
4. Trialability–the extent to which the new practice can be sampled or tried out before a decision is made; and
5. Observability–how readily the benefits of the new practice can be observed by others.

Rogers (2003) further identified an S-shaped curve to describe the process of adoption of an innovation. Diffusion is relatively flat in the beginning, picked up at first by a few innovators and then by opinion leaders who are generally early adopters. The curve then turns upward into a steep climb, first with the early majority and then with adoption by the average members from the group. Finally, the S curve begins to level out at what will be the plateau of adoption, as the skeptical late adopters and finally the laggard traditionalists come along (Rogers, 2003).

At the level of the individual practitioner, there are five steps involved in adopting a new practice (Rogers, 2003), roughly paralleling the transtheoretical stages of change (Prochaska & DiClemente, 1984). After learning about the new practice (*knowledge*), the clinician develops a positive attitude toward it (*persuasion*) and ideally gets support from his or her social/organizational system (Simpson, 2002; Thomas et al., 2003). This leads to an intention to try the

new method (*decision*) and the process of learning how to use it (*implementation*). Upon experiencing success with the new approach (*confirmation*), the clinician then integrates it into routine practice and may subsequently encourage its use by others.

If these are the processes that govern spontaneous diffusion, then what are the channels through which it occurs? Substance abuse providers indicate that far and away they are most likely to learn about new practices through informal channels—colleagues, practical experience, or reading—and less often through formal workshops or training (Erickson-Pritchard, 1999). Sometimes providers cannot identify how they became aware of an innovation other than through a variety of sources from which they picked up a positive buzz—the sum of comments about an innovation exchanged among people (Rosen, 2000). In the arena of substance abuse treatment, awareness of a new way of doing things may come from a wide range of sources, such as hearing about it in conversation with a colleague or client, seeing something on the news, picking up a brochure, reading a treatment improvement protocol, attending a staff meeting, or being at a professional conference.

In surveys, 82% of substance abuse clinicians agreed that research findings should be used more in practice (Forman et al., 2001), and most said that reading is one important way through which they learn about new treatments (Erickson-Pritchard, 1999). Beutler, Williams, and Wakefield (1993) similarly found that mental health clinicians most often used information from popular books, practice-oriented journals, and workshops and seldom used information from research journals. Clinicians tend to be mixed in attitudes toward the use of manuals to guide treatment (Addis & Krasnow, 2000) and respond more favorably to guidelines based on principles and procedures rather than to the session-by-session prescription of content that has characterized most National Institute on Alcohol Abuse and Alcoholism (NIAAA) and NIDA manuals to date (Godley, White, Diamond, Passetti, & Titus, 2001).

### 2.4. Barriers for adopting EBTs

There is a certain inertia in clinical practice, a tendency to continue doing what is familiar and comfortable, and perhaps a discomfort in considering that long-practiced methods may not be optimal. Research tends to be published in outlets and formats that are relatively inaccessible to busy practitioners, often with little effort given to addressing and adapting it to the needs of community programs (Miller, 1987a). Researchers and clinicians have operated in zones of comfort with too little overlap.

Beyond personal factors, there are various systemic barriers to the diffusion of new practice-relevant knowledge (Lamb et al., 1998). Some of these are practical aspects of how service delivery is currently structured. For example, small outpatient programs are unlikely to have medical staff who can provide medication or evaluate mental disorders. Larger organizations with more professional staff have a higher "absorptive capacity" to seek as well as use new information and to hire new staff already familiar with innovations (Knudsen & Roman, 2004). Austerity of funding leaves agencies concentrating on survival, with few resources left for learning and adopting new treatments. Funding sources often provide little support for practitioners in learning new approaches, and most training is on-the-job, which favors the status quo. Such specific systemic barriers should be considered and addressed early in the process of dissemination planning (Rollnick, Kinnersley, & Butler, 2002; Stirman et al., 2004).

### 2.5. Incentives for adopting EBTs

Given some natural barriers to adoption, it is sensible to explore positive incentives for implementing EBTs. Intrinsic incentives include the desire to offer one's patients the most effective treatment available, a sense of personal growth, and the prestige of working in an agency that uses cutting-edge innovations. Extrinsic incentives also help, and a potent one is differential funding. The State of Oregon, for example, has required that 75% of state funds go to evidence-based practices by July 2009 (Oregon Department of Human Services, 2005). This has created a considerable demand from providers to learn about and adopt EBTs. Follow-up monitoring is needed to document and sustain the use of EBTs; otherwise, providers can simply declare (and believe) that they are delivering EBTs behind closed doors without actually changing practice (Miller & Meyers, 1995).

Clinician adherence to key aspects of an EBT has been linked to greater effectiveness (Henggeler, Melton, Brondino, & Scherer, 1997; Miller, Benefield, & Tonigan, 1993). Even when counselors have developed the requisite skill and can perform an EBT competently on demand, adherence drift can be a problem. In one study, simple bar-graph feedback of performance fidelity presented privately to each counselor increased adherence from 42% to 71%. A lottery for cash prizes contingent on adherence further increased adherence to 81% (Andrzejewski, Kirby, Morral, & Iguchi, 2001). Modest incentives to programs (e.g., computers, annual $1,000 stipend) can also enhance adherence at the agency level (Carise, Cornely, & Gurel, 2002).

Incentives can also enhance clinician participation in the learning of new treatments. In moving toward differential funding for evidence-based substance abuse treatment, the city of Albuquerque (New Mexico) established recurrent annual funding to provide free EBT training for providers. Agencies can offer incentives such as training time off with pay, raises, bonuses, and promotions contingent on developing competence in EBT. Preferential hiring of EBT-proficient staff is a further incentive to keep clinical skills current. Training events can include meals, door prizes, and continuing education credit (VandeCreek & Brace, 1991).

There are a number of significant barriers to the dissemination of pharmacotherapies for addictive illness. Although the use of medication is widely accepted for the treatment of substance withdrawal (i.e., for detoxification), effective medications are not used widely to prevent relapse either on a time-limited basis or for an indefinite period of maintenance (Woody & McNicholas, 2004).

The history of addiction treatment programs is one of development independent of organized medicine, with great reliance on the approaches of the nonprofessional 12-step approach to recovery. Addiction treatment programs and 12-step groups have at times conveyed wariness about medications in the role of addiction treatment. No doubt, part of this wariness is justified by harmful prescribing practices to patients with addictions by some physicians. This barrier is reinforced by negative attitudes toward addiction treatment and persons with addictions on the part of some physicians. Programs that are motivated to incorporate innovative pharmacotherapy may be unable to afford sufficient physician time or to recruit appropriately trained physicians. Further barriers to adoption of medications include the relatively modest effects of certain medications, lack of funds to purchase medications, and the reluctance of pharmaceutical companies to develop and actively market medications.

### *2.6. Natural diffusion: summing up*

The diffusion of substance abuse treatment methods occurs naturally and through largely informal channels. The general processes by which innovations are adopted in practice have been thoroughly studied (Rogers, 2003) and seem to apply well in understanding the spread of intervention methods for substance abuse (Rogers, 1995, 2002). Unfortunately, these natural diffusion processes have created a large gap between EBT methods and those delivered in practice (Lamb et al., 1998; Miller, Zweben, & Johnson, 2005). It appears that intentional efforts are needed to disseminate EBT methods into practice and that economic and other specific incentives may be needed to encourage their adoption.

## 3. Which treatments should be disseminated?

Treatment methods deserve to be disseminated into practice once there is sufficient evidence of their efficacy (Persons, 1997), but there are various standards for judging the research necessary to render a treatment evidence based (Chambless & Ollendick, 2001; Davidson, Trudeau, Ockene, Orleans, & Kaplan, 2004). Consensus in expert professional opinion continues to be used as the primary standard in developing the treatment improvement protocols (see www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat5.part.22441) of the Center for Substance Abuse Treatment (CSAT). Some guidelines use a blend of empirical evidence and expert opinion (American Society of Addiction Medicine, 2001).

There is increasing reliance, however, on summary reviews and meta-analyses of published scientific evidence, particularly clinical trials, and various systems have been developed to describe levels of confidence in the specific efficacy of treatment approaches (Drake, Rosenberg, Teague, Bartels, & Torrey, 2003; McCrady, 2000; Miller & Wilbourne, 2002). The end product of such reviews is often a list of treatment methods that are evidence based, as distinguished (by omission) from those that are not (NIDA, 1999). Because definitions and evaluation criteria differ, the resulting lists of which treatments are evidence based can differ substantially, with a few treatments appearing on most lists (Miller, Zweben, et al., 2005). It can make quite a difference which list of criteria one uses to define *evidence based*. Any such list should not be reified and will require regular updating (McCrady, 2000). An alternative is to avoid listing treatments that are *in* and *out* and instead provide an accessible and updated tabulation of the amount and type of evidence supporting each approach (e.g., Miller & Wilbourne, 2002).

There is also a problem of gaps in the evidence base. There are fewer studies, for example, of how to treat particular combinations of substance abuse with concomitant psychological and medical disorders (Carey, Purnine, Maisto, Carey, & Simons, 2000). Existing studies may also be addressing the wrong questions from a program's perspective. Clinicians and programs are likely to be interested in whether a new treatment will improve results from what they are already doing (relative advantage) and not in whether the new treatment is superior to no treatment, minimal treatment, or placebo. Attention is needed not only to techniques but also to therapeutic relationship factors that can account for substantial proportions of variance in substance abuse treatment outcome (Ackerman et al., 2001; Najavits & Weiss, 1994; Norcross, 2004). Presumably, the purposes of adopting EBTs are to improve over current practices and ultimately to improve outcomes. Informed caution and humility are appropriate in generalizing from randomized trials to community practice (Borkovec & Castonguay, 1998; Goldfried & Eubanks-Carter, 2004; Haaga, 2004; Westen, Novotny, & Thompson-Brenner, 2004).

## 4. Strategies for learning new treatment methods

There are at least three general aids in the learning of any new skill, be it flying an aircraft, sailing, tennis, or chess. First, there is usually some fundamental preparatory knowledge to acquire, the *ground school* of flying or sailing. This often involves reading, verbal instruction, or observing competent practice by others. Next comes practice with feedback. Without information about how well one is doing, repeated trials are of little value and can quickly foster bad habits. Finally, there is coaching or supervision to

reinforce correct practice and provide expert tips for performance improvement.

### 4.1. Preparatory information

There is no shortage of available information about substance abuse treatment. The field has many scientific and professional journals (Arciniega & Miller, 1997; Babor, Stenius, & Savva, 2004), practice guidelines (American Psychiatric Association, 1995; American Society of Addiction Medicine, 2001), books and therapist manuals, demonstration tapes, treatment improvement protocols, information services, e-mail listserves, web-based information and training, and continuing professional education opportunities. If anything, substance abuse practitioners suffer from information overload, with little help in sorting wheat from chaff. Helpful here would be a public service that abstracts and synthesizes outcome research and applies it to policy implications for clinical practice (Haynes & Haines, 1998).

Providing preparatory information has been a primary dissemination strategy for pharmaceutical companies, which spend more than $12 billion per year promoting products (Ma, Stafford, Cockburn, & Finkelstein, 2003). A major portion of this amount is devoted to supporting visits by pharmaceutical representatives to physicians' offices. This practice, known as *detailing*, creates an ongoing relationship between the pharmaceutical representative and the physician, with a goal of increasing product prescriptions. *Academic detailing* (Soumerai, 1998; Soumerai & Avorn, 1990), based on this model of an ongoing relationship between a dissemination agent and a recipient, has been specifically effective in changing prescribing patterns (Davis, Thomson, Oxman, & Haynes, 1995). Direct-to-consumer advertising is a growing but still small portion of marketing (Ma et al., 2003).

Within the substance abuse field, particular educational effort has been devoted to the dissemination of buprenorphine, which, like methadone, can be highly effective in treating opiate addiction. The Drug Abuse Treatment Act of 2000 and subsequent approval as well as designation of buprenorphine as a Schedule III medication by the Food and Drug Administration in 2002 made it possible for opiate-dependent individuals to receive buprenorphine in private physician offices. In addition to some important pharmacological advantages for buprenorphine, these regulations provide greater flexibility and privacy in the use of buprenorphine compared with methadone treatment of opiate addiction, in addition to its pharmacological advantages. Using technology transfer procedures outlined in *The Change Book* (Addiction Technology Transfer Centers, 2000), McCarty, Rieckmann, Green, Gallon, and Knudsen (2004) offered a 1.5-day workshop for rural practitioners interested in learning to use buprenorphine in managing opioid dependence. Participants reported more positive beliefs about the efficacy of buprenorphine, and 35% were using it in practice 9 months later.

Another informational strategy to promote the adoption of buprenorphine has been directed to non-physician clinicians. The NIDA and the CSAT have chosen buprenorphine awareness as an objective for one of their blending teams (Whitten, 2005). By educating non-physician staff about the benefits of buprenorphine, momentum for adoption may be increased and, once adopted, better integrated into other aspects of treatment.

In diffusion research, a distinction is often drawn between hard and soft technologies. For hard technologies, such as machinery or medications, quality control is in the technology itself. Quality control of a medication occurs primarily outside the clinic, at the manufacturer, and is less reliant on the provider than in the case of soft technologies, such as counseling and psychotherapy, in which the effectiveness of the intervention is highly dependent on the skill with which the clinician delivers it. As distinguished from pharmacotherapies, treatments based on psychosocial methods and processes have come to be called *behavioral therapies*. This generic use of the term creates some confusion with the prior use of *behavior therapy* to describe a particular treatment approach rooted in learning theory. For present purposes, we are using *behavioral* in the more generic sense of verbal counseling and psychotherapies emphasizing psychosocial factors.

Hearing or reading about a behavioral treatment does not in itself yield competence in providing it. In a review of more than 100 trials of interventions to improve professional practice, Oxman, Thomson, Davis, and Haynes (1995) concluded that information-only strategies are usually insufficient to produce changes in the practice behavior of health professionals. Similarly, guidelines from professional organizations may predispose clinicians to consider change, but guidelines alone are unlikely to change practice behavior unless they are accompanied by opportunities for learning.

### 4.2. Monitored practice with feedback

Learning any new skill does not occur without feedback. One of the most consistent findings in motivational psychology is that feedback improves performance. Trying to learn a counseling method without feedback is like learning to bowl in the dark: One may get a feeling on how to release a ball and subsequent noise will provide some clue about accuracy, but without information about where the ball struck, years of practice may yield little improvement. Self-perceived competence in delivering a behavioral treatment bears little or no relationship to actual practice proficiency (Miller, Yahne, Moyers, Martinez, & Pirritano, 2004).

### 4.3. Supervision and coaching

In addition to reliable feedback about performance, it is helpful to have an expert coach, teacher, or supervisor when learning a new skill. It is very helpful to have a proficient expert in the new intervention used onsite or readily available

to line staff to provide ongoing training, coaching, and supervision. Expert coaching is an established technique for improving performance, and positive reinforcement for improving performance is another well-established behavioral principle.

An onsite mentor is helpful not only in acquiring the specific skills of a new treatment but also in supporting persistence in behavior change efforts. New practices feel awkward in the beginning, and implementing them may at least initially diminish therapist congruence (Miller & Mount, 2001), therapeutic alliance (Crits-Christoph et al., 1998), and other interpersonal relationship dimensions that are themselves associated with better client outcomes (Henry, Strupp, Butler, Schacht, & Binder, 1993). Without ongoing onsite reinforcement and support, it is easy to revert to prior practice habits.

The substance abuse area seems particularly disadvantaged in its ability to make good use of supervision, however, because there is insufficient training and internal organization to provide much supervision. McLellan and Meyers (2004) conducted a nationally representative survey of 175 substance abuse treatment programs for adults and found that "the organization, administrative and personnel infrastructures of many programs are fragile and unstable" (p. 768). There was a disturbing level of turnover at all levels, from counseling staff to program directors, and more than half had not been in their jobs for even 1 year (McLellan, Carise, & Kleber, 2003). Thus, supervision time is minimal in most programs, making it difficult to implement new evidence-based practices in a way that they will display the power they showed in clinical trials.

In partnership with a number of physician professional organizations, the CSAT has participated in the development of 8-hour meetings to train interested physicians in the use of buprenorphine. Participation in such training qualifies a physician to receive authorization from the Drug Enforcement Administration to prescribe buprenorphine. Since the beginning of this program, more than 6,000 physicians have been trained, fewer than half of whom have ever prescribed buprenorphine. To increase the number of actual prescribers, the CSAT has entered into a partnership with a number of physician organizations to create the Physician Clinical Support System (PCSS), a national mentoring network to promote the use of buprenorphine (McDowell, 2004). This research utilization strategy is setting the goal of consultation with an experienced mentor within 24 hours of a request. The PCSS printed material conveys not only reassurance that physicians will be given support in prescribing buprenorphine but also a positive view of the gratification resulting from involvement with the targeted patient population.

### *4.4. The Clinical Trials Network as a bidirectional model of diffusion*

Recognition that research advances in the treatment of addiction were not being adopted in the national system of community treatment programs led to the formation of a panel by the U.S. Institute of Medicine to explore this problem and make recommendations. The resulting publication, *Bridging the Gap Between Practice and Research: Forging Partnerships With Community-Based Drug and Alcohol Treatment* (Lamb et al., 1998), documented the panel's findings and recommendations, described barriers to more widespread adoption of treatments with proven efficacy, and suggested strategies to overcome them. One important strategic recommendation was to increase communication back and forth between researchers and clinicians. This recommendation for a bidirectional approach (Herschell, McNeil, & McNeil, 2004) went beyond researchers communicating results and clinicians expressing needs by explicitly urging a model in which researchers and clinicians collaborate to generate ideas for interventions to be tested.

The NIDA responded by creating the Clinical Trials Network (CTN), a web of university-based regional research and training centers each with a group of affiliated community treatment programs (see www.nida.nih.gov/CTN/Index.htm). The CTN thus brought together researchers experienced in addiction treatment efficacy research with established community treatment agencies willing to participate in clinical trials. These scientists and programs have collaborated to select and design studies testing the efficacy of EBT methods when delivered by the staff and with the patients of real-life community programs (Carroll et al., 2002), thus blurring the line between efficacy and effectiveness research (Glasgow, Lichtenstein, & Marcus, 2003). Studies were selected based on relevance to clinical needs and with an eye toward sustainability: the treatments tested should not be so complex or costly as to inhibit their continued use in practice, if found effective. Rogers (2003), whose research on dissemination was described earlier, described the CTN as an ideal "dissemination scaffold" with substantial potential to impact practice (Selzer & Shine, 2004).

Once treatments are found to be effective in community programs, how can they be disseminated into practice? To this end, a partnership was formed between the NIDA and the CSAT to develop blending teams (Whitten, 2005). These teams bring together scientists who have evaluated the particular approach, community clinicians who have participated in tests of the intervention, and members of the CSAT's Addiction Technology Transfer Centers. The blending teams are charged with the task of developing educational material and dissemination strategies to promote the adoption of CTN-tested protocols that proved effective.

## 5. Research on dissemination of evidence-based practices

### *5.1. Three stages of science*

Logically, dissemination should be the last step in a careful sequence of treatment development. First, a new

treatment method evolves, ideally with a specifiable theory of how and why it works. After initial experience to define procedures, the treatment next undergoes a series of tests to determine its efficacy. If (and only if) it works under controlled conditions, then the treatment is ready for dissemination into community practice. The NIDA has adopted this three-stage model for conceptualizing the state of behavioral therapy research (Onken, Blaine, & Battjes, 1997), paralleling phases through which new medications pass as they are being developed and tested.

*Stage I: Treatment development*. Considerable research and development are needed before a behavioral therapy is ready to be tested. The new treatment is specified not only in principle but also in operational procedures that can be described in print, allowing others to replicate the method. This process of specification now usually involves development of an intervention manual and of measures to document whether and how well the treatment is being delivered. A period of pilot testing normally follows, using feedback to improve the treatment and measures. This pilot phase also usually provides an estimate of the size of impact on patient outcomes that can be expected. If things look promising, then the treatment is ready for the next stage of development.

*Stage II: Establishing efficacy*. This stage establishes whether the therapy works and why. In treatment research, *efficacy* refers to how well a treatment works under ideal and well-controlled research conditions, whereas *effectiveness* refers to how well it works in the more chaotic real-life conditions of community practice (Haynes & Haines, 1998). Stage II research is focused on efficacy, usually through randomized clinical trials to compare the new method against control conditions or alternative treatments. This stage also involves studies aiming to understand a treatment's mechanism of action and the specific components that account for its success. If a treatment is efficacious, then studies on specific mechanisms of efficacy inform what features to emphasize in training when the treatment is disseminated.

*Stage III: Establishing effectiveness*. A treatment that works under controlled research conditions (efficacy) may not necessarily work in the community (effectiveness). Thus, Stage III involves taking a treatment that has shown promise in clinical trials and determining how well it can work in the community. Stage III studies also determine what it takes to help frontline clinicians learn the new treatment and apply it effectively in practice.

The stage model does not tell the whole story of course. Many treatments have been developed by innovators and have diffused into community practice without even Stage I research. Some examples are self-help programs (Nowinski, 2003), therapeutic communities (DeLeon, 2003), the Minnesota model (Cook, 1988), and drug courts (Deschenes, Peters, Goldkamp, & Belenko, 2003). The stage model describes a deliberate stepwise process to develop interventions that do work and that can be learned and used by practicing clinicians. There are other hybrid models that incorporate elements of both efficacy and effectiveness in the development of interventions (Carroll & Rounsaville, 2003). Nevertheless, the stage model is an excellent template for considering what interventions merit dissemination efforts to speed up their diffusion into the community. The stage model can also be used to specify and evaluate previously untested treatments that are already in widespread use (Hall, 2001).

Reports of successful dissemination efforts have begun to appear in the substance abuse literature (Martin, Herie, Turner, & Cunningham, 1998; Shanley, Lodge, & Mattick, 1996), along with guidelines for promoting the adoption of new treatment methods (Backer, David, & Soucy, 1995). However, reliable dissemination measures and benchmarks are needed to evaluate the effectiveness of such efforts. The following sections describe approaches for evaluating the effectiveness of diffusion and dissemination efforts.

### 5.2. Measures of diffusion

One key measure is the extent to which an innovation has been adopted in practice (Rogers, 1995). This can be assessed by surveying providers (Thomas et al., 2003). Large surveys of organizations provide an opportunity to not only measure use in the field but also examine the influence of organizational attributes that influence programs' likelihood of adopting new interventions. For example, Knudsen, Johnson, and Roman (2003), Knudsen, Johnson, Roman, and Oser (2003), Knudsen, Roman, and Ducharme (2004), and Roman and Johnson (2002) of the University of Georgia conducted studies to understand the extent to which evidence-based interventions were being used in clinical programs. They found that use of naltrexone in substance abuse treatment programs was significantly related to both the treatment center's age (older centers showing more adoption) and its administrative leadership (centers with more tenured leaders and more counselors holding degrees showing more adoption).

Each research group has tended to create its own measures of adoption, but there have also been efforts to develop more generally useful measures. An example is Organizational Readiness for Change assessment, which was developed at the Texas Christian University (Lehman, Greener, & Simpson, 2002).

### 5.3. Effectiveness of training

#### 5.3.1. Written measures

Perhaps the most common form for evaluating a dissemination event is a posttraining questionnaire that may ask about satisfaction with training and competencies acquired. Self-reports of competence, however, bear little or no relationship to actual behavioral proficiency in delivering a treatment (Carroll et al., 2002; Miller et al., 2004;

Schwarz, 1999), and such questionnaires are therefore of limited value in judging the effectiveness of training.

A second approach asks trainees to demonstrate their knowledge on a posttraining quiz or their skill by responding to specific stimuli such as a written case scenario (Miller, Hedrick, & Orlofsky, 1991). This is a step closer to practice, reflecting a trainee's ability to write appropriate responses or select them from among multiple options. Stimuli to prompt trainee responses could also be presented by audiotape, videotape, or interactive electronic technologies (Carpenter, Watson, Raffety, & Chabal, 2003; Weingardt, 2004).

#### 5.3.2. Practice samples

Still closer to practice are proficiency samples in which the trainee is asked to demonstrate skill in a simulated interaction. A common format here is to have a trainee interview an actor simulating a patient (Arthur, 1999; Barsky & Coleman, 2001; Ockene, Wheeler, Adams, Hurley, & Hebert, 1997; Levin, Owen, Stinchfield, Rabinowitz, & Pace, 1999; Lockyer et al., 1996). The trainee may also self-select a session from normal practice as a demonstration of acquired skillfulness in the new method (Miller et al., 2004). Such samples illustrate a trainee's ability to produce training-appropriate responses on demand in a live interaction. They thus show the extent to which a clinician is able to demonstrate a clinical skill but not the extent to which that skill is actually being applied in ordinary practice.

The clearest evidence of successful dissemination comes from work samples of ongoing practice, ideally selected at random from a larger set of (or all) recorded sessions. Obtaining structured observer ratings of actual psychotherapy sessions is a method pioneered by Carl Rogers and his students (Truax & Carkhuff, 1967). This has become a common method for monitoring treatment fidelity in clinical trials of behavioral therapies (Crits-Christoph et al., 1998; DiClemente, Carroll, Connors, & Kadden, 1994; Miller, Moyers, Arciniega, Ernst, & Forcehimes, 2005).

Most often, practice samples are rated on a series of Likert scales for general aspects of competence or for the presence of specific prescribed and proscribed practice behaviors (Bien, Miller, & Boroughs, 1993; Levin et al., 1999; Lockyer et al., 1996; Madson, Campbell, Barrett, Brondino, & Melchert, 2005). More global ratings of this kind may or may not differentiate between compared treatments and may show little improvement over the course of training (Crits-Christoph et al., 1998; Rounsaville, Chevron, Weissman, Prusoff, & Frank, 1986). Greater specificity tends to increase the sensitivity of ratings to detect training effects and between-treatment differences (Carroll et al., 1998; Henry et al., 1993). Specific therapist behavior counts can further enhance the predictive value of treatment process measures (Miller et al., 1993; Moyers, Miller, & Hendrickson, 2005; Patterson & Forgatch, 1985).

Ultimately, the aim of disseminating EBTs is to improve patient outcomes. Here, then, is a more distal measure of the effectiveness of dissemination: Training should change providers' practice behavior, which in turn should yield better treatment outcome. For example, Strosahl et al. (1998) trained therapists in acceptance and commitment therapy and documented that the patients of those therapists reported better ability to cope with their problems, fewer referrals for medical evaluations, and greater likelihood of completing treatment (see also Hayes, Strosahl, & Wilson, 1999).

### 5.4. Dissemination of behavioral therapies

To date, much of the research on dissemination of behavioral treatments for substance abuse have involved relatively short periods of training for health professionals to provide brief interventions (Hollis, Lichtenstein, Vogt, Stevens, & Biglan, 1993; Hollis et al., 1994; Levin et al., 1999; Lichtenstein et al., 1996; Lindsay et al., 1994; Lockyer et al., 1996). Targeting smoking (Ockene et al., 1988) and drinking (Ockene et al., 1997), Ockene et al. found modest skill improvements in ratings of taped interviews with standardized patient actors with medical personnel who received 3 hours of training in patient-centered counseling. Similarly, modest skill gains were reported after a 5-day training with physicians (Levin et al., 1999).

Most EBTs, however, are considerably more complex than brief medical interventions. How do practitioners learn new treatments that are more complicated? If they receive any formal training at all in the new approach (Erickson-Pritchard, 1999), a typical continuing professional education format is a 1- to 2-day clinical workshop, often attended to maintain professional licensure (Vande-Creek & Brace, 1991).

How effective are such workshops for increasing clinical skillfulness in more complex behavioral therapies? Two studies showed an increase in trainees' ability, after 1–2 days of training, to generate reflective listening responses on a paper-and-pencil task posing clinical vignettes (Miller et al., 1991; Rubel, Sobell, & Miller, 2000). Like self-report, however, such questionnaire responses do not reliably predict proficiency in actual counseling sessions (Miller et al., 2004). A 2-day clinical workshop on motivational interviewing, conducted by its progenitor, yielded statistically significant albeit modest skill increases on observer coding of sessions, but these practice behavior changes were not large enough to produce any improvement in patient response (Miller & Mount, 2001). In short, workshop training produced small practice changes that could be demonstrated on demand but not enough to make a difference to patients.

What then would increase the impact of training? A subsequent randomized trial tested two training aids—personal performance feedback and individual coaching—

in addition to workshop training (Miller et al., 2004). With a complex coding system, the Motivational Interviewing Skill Code (Moyers, Martin, Catley, Harris, & Ahluwalia, 2003), skill acquisition was significantly improved by either feedback or coaching. A self-training (from book and videotape) control group showed no improvement in clinical skill, and the workshop alone again produced only modest gains. When improvement in client response (rather than therapist behavior) was the criterion, only the group receiving both feedback and coaching showed significant improvement. Training, feedback, and ongoing coaching or supervision can bring 90% of substance abuse clinicians up to proficiency level in cognitive–behavior therapy (Morgenstern, Morgan, McCrady, Keller, & Carroll, 2001) and motivational interviewing (Miller et al., 2004).

This is a rather consistent finding: that providing written guidelines or therapist manuals is relatively ineffective in enhancing clinical skillfulness (Oxman et al., 1995) and workshop training typically results in at best modest increments in skill and implementation. Nonetheless, the publication of therapist manuals has been one heavily used dissemination strategy by both the NIDA (Budney & Higgins, 1998; Carroll, 1998; Szapocznik, Hervis, & Schwartz, 2003) and the NIAAA (Kadden et al., 1992; Miller, Zweben, DiClemente, & Rychtarik, 1992; Nowinski, Baker, & Carroll, 1992). Tens of thousands of these manuals have been distributed at cost or free, although the impact on practice remains unclear.

Workshops without follow-up may produce attitude change (Hayes et al., 2004; McCarty et al., 2004), but practice behavior is more challenging to modify. Personal outreach visits (academic detailing) are somewhat more effective in changing practice but variable (Oxman et al., 1995). Follow-up contact (e.g., ongoing coaching, supervision, or booster sessions) significantly enhances change in practice behavior (Kelly et al., 2000; Miller et al., 2004; Sholomskas et al., 2005; Sorensen, Hall, Loeb, & Allen, 1988). Short of in-person coaching, interactive instructional technology delivered via software or the internet offers promise as a way to convey knowledge and even shape clinical skills when learning new treatments (Sholomskas et al., 2005; Weingardt, 2004).

Besides training procedures themselves, various factors may influence the effectiveness of dissemination efforts in fostering adoption and clinical skill acquisition of new treatments. It is sensible to select for training those clinicians who are more receptive to the particular new approach and whose professional beliefs and orientation are more compatible with it (Ball et al., 2002). This happens to some extent through self-selection among training options. The specific method being trained can also make a difference. In one study with ongoing supervision and feedback, therapists delivering cognitive–behavior therapy became more proficient over time, whereas no case-to-case improvement effect of training was found for supportive–expressive therapy or generic drug counseling (Crits-Christoph et al., 1998). The levels of organizational readiness (Simpson, 2002) and support for new practices (Thomas et al., 2003) also influence the extent to which a program's providers will adopt them.

### 5.5. Dissemination research needs

Research on best practices for disseminating evidence-based substance abuse treatments into practice is still in its infancy. Clearly, the mere publication of efficacy studies and even training manuals has done little to promote the adoption of EBTs in clinical practice. Although medication prescribing may be altered by basic information provided by pharmaceutical companies, it is highly doubtful that proficiency in more complex behavioral interventions can be achieved by reading a therapist manual or attending a clinical workshop. A key direction for future dissemination research in substance abuse treatment is to identify the learning experiences that are necessary to develop competence in specific EBTs. Two promising candidates are methods often used in the acquisition of any skill: accurate feedback of performance and expert coaching for skill improvement. Although logical and promising, it remains unclear which kinds or amounts of feedback and coaching are necessary or sufficient.

Diffusion research would also be advanced by better understanding of how EBTs work (Silverman & Kurtines, 2004). Lacking clarity on the mechanisms of action, we are left to disseminate back-box treatment packages that may well contain superfluous, superstitious, or even counter-therapeutic components. Knowledge of the most important active ingredients of an EBT can help focus dissemination on those elements that are essential to effective practice. It can also inform the limits of reinvention of an innovation as it is adapted across cultures and contexts, separating the attributes that must be retained for effectiveness from those that can be modified without compromising the treatment (Rogers, 2003). Indeed, a degree of reinvention may be inevitable and may promote adoption.

The acquisition of proficiency in an EBT is only one step in the adoption process. Also needed is research on processes that favor the continued improvement of skills once they are established. In clinical trials, this concern is described as "drift from protocol." What are the critical dimensions of practice on which drift is detrimental and which aspects of an EBT can clinicians reinvent, adapting it to their own style? The ability to reinvent promotes diffusion but can compromise fidelity.

Based on the limited information available, a research utilization model in which dissemination agents and their recipients have ongoing contact and interaction is most likely to be successful. The ideal situation may be an onsite expert in the EBT who is available to train current and new staff and to provide ongoing supervision, coaching, and feedback. This will be feasible for some EBTs in some larger agencies. Telephone or web-based contact may also

be effective when the trainer-supervisor and trainees are separated geographically. Again, future research could clarify the frequency, amount, and type of contact that favors skill acquisition and maintenance. The cost and sustainability of such systems must also be considered. Forman et al. (2001) developed and tested high-sustainability systems to provide clinicians with ongoing feedback from clients (see www.patient-feedback.org).

Individual differences among providers can also influence the outcomes of dissemination efforts. Some clinicians take to a new approach more readily, acquiring proficiency rapidly and naturally integrating it into their ongoing practice. Other clinicians may not achieve proficiency in a particular behavioral approach no matter how much training, feedback, and supervision are provided. In the multisite COMBINE study, practice samples were prescreened for empathic ability before therapist candidates were hired and trained in a combined behavioral intervention that included motivational interviewing (Miller, Moyers, et al., in press). A pretraining level of competence in crucial component skills may enhance acquisition of proficiency in an EBT.

Although fidelity to pharmacotherapy interventions is much less a problem than it is with behavioral therapies, there are also important dissemination questions to answer for this type of intervention. How well does an intervention such as academic detailing work when targeted to physicians working limited hours in addiction treatment programs? The same questions about intensity, frequency, and nature of contact with dissemination agents for behavioral therapies are also important here. What would the impact be of direct-to-consumer marketing of a new pharmacotherapy? For example, would a buprenorphine awareness program directed to program clients have impact?

Finally, what are system factors that promote the adoption of evidence-based practices (Roman & Johnson, 2002)? What is the impact of incentives for the adoption of evidence-based practices? What is the impact if an organization's performance improvement measurements focus on evidence-based practice patterns? Do organizations that promote the adoption of evidence-based practices have better clinical outcomes for their clients? Do such organizations have improved retention of qualified staff?

## 6. Discussion

Whatever natural benefits there are for using evidence-based practices have usually been insufficient to bring about their adoption in community practice. Nonetheless, it is clear that, like other health care providers, substance abuse practitioners will be increasingly required to learn and adopt evidence-based practices. Established clinical practices are not easy to change and require interventions at both the systemic and the individual provider level (Mattson & Donovan, 1994). One problem concerns funding: Systems seeking to change provider behavior need to allocate sufficient resources for dissemination. This recognition has led federal institutes and agencies to implement major technology transfer initiatives to disseminate EBTs into practice (Addiction Technology Transfer Centers, 2000; NIDA, 1991).

### 6.1. Toward evidence-based dissemination

Similar to the ethical imperative for evidence-based practice in substance abuse treatment is the need for evidence-based approaches in disseminating EBTs (Grimshaw & Eccles, 2004). Much is known about how to promote the diffusion of innovations (McCarty, 2003; Rogers, 2003; Stirman et al., 2004) and how to help practitioners develop proficiency in new treatment methods, but relatively little of such knowledge is put into practice in continuing professional education.

The dissemination of knowledge about EBTs is certainly a first step. There has been a proliferation of substance abuse therapist manuals, books, treatment improvement protocols, videotapes, and other material intended to improve practice. As with the bewildering spectrum of self-help resources found in most bookstores, clear guidelines are needed to help providers distinguish EBTs from the much larger array of treatment methods that are promoted.

Yet knowledge alone does not change practice. Just as educational lectures and films have virtually no impact on clients' substance abuse treatment outcomes, didactic material and presentations appear to have little impact on providers' substance abuse treatment practices. The dissemination of knowledge-focused material and workshops cannot substitute for proper clinical training, feedback, and supervision in helping providers learn more effective EBTs (Herschell et al., 2004).

The above-reviewed treatment dissemination literature might be summarized in two simple principles. To learn any new behavioral skill, people need not only informational training but also (1) clear and accurate feedback regarding their performance and (2) guidance from a supervisor/coach who has greater expertise and proficiency in the skill.

Without performance feedback, significant change in practitioner behavior does not occur. This may account for why there is so little relationship between psychotherapists' years of experience and their patients' outcomes. In contrast, surgeons automatically receive ongoing and relatively rapid feedback regarding the outcomes of their work and become more skillful at procedures with continued practice. Most providers of substance abuse services work in a feedback vacuum, receiving little reliable information regarding the outcomes of their work. Likewise, supervision rarely involves observation of and feedback from actual practice sessions.

Yet feedback is of limited usefulness without guidance for how to improve performance. A persistent novice golfer on a driving range can gradually learn how to drive a ball farther, but learning can be substantially accelerated by a

little coaching from an experienced professional. Attending a workshop, studying a therapist manual, or trying to master a new treatment without feedback or coaching is like reading about and attending a lecture on golf then practicing swings blindfolded. You will hit one now and then albeit probably not very well.

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