White, W. (2016). Enhancing long-term addiction recovery outcomes: An interview with Dr. Michael Dennis. Posted at www.williamwhitepapers.com.

Enhancing Long-term Addiction Recovery Outcomes: An Interview with Dr. Michael Dennis

William L. White

Introduction

Calls to shift addiction treatment from acute care models of intervention to models of sustained recovery management have been propelled by research into the long-term course of substance use disorders and studies evaluating new approaches to extending the effects of addiction treatment. A prominent researcher at the center of this movement is Dr. Michael Dennis, a senior research psychologist and Director of the Global Appraisal of Individual Needs (GAIN) Coordinating Center at Chestnut Health Systems. The studies he and his colleagues have conducted are among the most important in recent decades on the post-treatment course of substance use disorders, with findings that have great import for the future design and conduct of addiction treatment. I recently (April 2016) had the opportunity to interview Dr. Dennis about his past work and the direction of his future studies. Please join us in this engaging conversation.

Early Career

Bill White: I often get questions from students about how to get started in a career in addiction-related research. Could you describe how you came to specialize in research related to addiction treatment?

Dr. Michael Dennis: My dissertation was on improving the implementation and impact of randomized field experiments in criminal and civil justice research – where many of the experiments focused on diverting people to substance use treatment or as part of community re-entry. When I graduated in 1988, the Watkins Commission had just come out with the finding that HIV was related to needle use and that there was a need to improve the availability and quality of methadone maintenance treatment (MMT). At the same time, Tom McLellan and colleagues had published a couple of articles showing that the "therapist effects" in MMT were actually as large, or larger, than the methadone dosage effects. We initiated a multisite study to try to figure out how to train therapists to act more like the most effective therapist – including doing things like standardized assessment, individualized treatment planning, better linkage to community resources, and improved continuity of care. Over the years, figuring out how to do these things (including building better tools like the GAIN and finding key collaborators like Dr. Christy Scott) have been the common themes across my research. A second thing I learned early on (also from Tom McLellan) was to tape record everything and listen to it. This has taught me so much, humbled my understanding of anyone's ability to learn from simple training, and made me recognize that long term success is really about on-going monitoring and coaching. Along the way, I have been fascinated by multitude of pathways to recovery and how little we know about sustaining recovery.

Bill White: You describe moving into addiction-related research by serendipity. Do you think that's typical for most addiction researchers?

Dr. Michael Dennis: I think this has changed over time. If you look at the people who came into the field before 1980, most came out of either a personal or family recovery experience. Many came out of the VA system or out of training programs that NIDA and NIAAA used to fund. But starting in about 1980, much of that training structure was defunded, so few researchers entered the field in the early and middle 1980s. When the Watkins Commission recommended increased addiction research in 1988, there was a resurgence of funding and we rehired many who had been pushed out of the field and also hired a new generation of researchers who had been trained in broader research methodologies. I came into the field when it was expanding and looking for people with skills to improve the quality of research and the quality of addiction treatment. Since then, there have been both cutbacks and surges in research funding, the latter of which included a Congressional push that doubled the NIH budget, which allowed creation of the Clinical Trials Network that created an infrastructure for doing large-scale, multi-site clinical trials across the United States. The infusion of CSAT funding spanned the 1990s and there have been two funding contractions since then. Addictions research has been an up and down affair, and that vacillation in funding has affected who was drawn to the field and who has been able to maintain addictions research as a career focus.

Bill White: The expansion period you reference coincides with the period that you joined the research team at Chestnut Health System's Lighthouse Institute (LI). Could you share how that opportunity arose?

Dr. Michael Dennis: I met Chris Scott at the American Evaluation meeting in 1994 when she was trying to develop instruments for her first addictions study, Target Cities, which parenthetically, eventually evolved into the Pathways for Recovery study that's still going on 20 years later. We were kindred spirits and continued to meet and talk for the next nine months. At the time, I was at the Research Triangle Institute in North Carolina doing a mix of surveys and clinical research related to addiction. At that time, I was interested in shifting from their focus on survey research to more clinically-oriented research. I had also personally adopted two of my foster kids, going from two to four small children, and wanted to be closer to family. I was attracted to LI because it was part of a treatment organization with a strong emphasis on performance monitoring and coaching. I also had a very easy rapport with all of the LI scientists and senior staff, so it was an easy decision to come here in '95 and I am still here after 20 years!

Bill White: The Lighthouse Institute rests within a community-based treatment organization [Chestnut Health Systems], as opposed to a medical institution or an academic institution. How do you think that has influenced the work that's been done at LI?

Dr. Michael Dennis: Because the vast majority of researchers in our field are in academia, they don't know quite what to make of us. Early on, that constrained us in competing for grants or in getting our work published. On the flip side, it gives us credibility in doing research that can influence clinical projects.

The Cannabis Youth Treatment Study

Bill White: One of the earliest and most important studies you conducted at LI was the Cannabis Youth Treatment Study. Could you talk a bit about that study?

Dr. Michael Dennis: Sure. In 1997, there had been a dramatic increase in cannabis use and, at the time, there were no published manuals for evidence-based practices related to treating adolescents with cannabis use disorder. Cannabis had recently surpassed alcohol as the most common drug among youth presenting to treatment, emergency rooms, and even in autopsies. So, the Center for Substance Abuse Treatment decided to fund a cooperative agreement to bring together several researchers and major treatment providers to develop manuals that could be used to conduct a large-scale field trial to evaluate the effectiveness and cost-effectiveness of various treatment and how they interacted with comorbidity and a variety of other problems. The Cannabis Youth Treatment (CYT) study marked the beginning of a dramatic change in adolescent treatment. We went from no randomized trials to dozens of randomized trials over 20 years. We went from virtually no one using standardized instruments to nearly everyone using them. We went from exceptionally low follow-up rates to what is now a norm of 80 to 90 percent follow-up rates. This marked a very dramatic change in the field from the sophistication of the research methods to the dissemination to practice.

Bill White: What were the modalities tested in the CYT trial?

Dr. Michael Dennis: At the time, about 88 percent of adolescents were seen in outpatient treatment with about 65 percent of those in regular outpatient versus intensive outpatient, and the median length of stay in treatment for adolescents was running about five to six weeks. So, we tested outpatient treatments that could be completed within three months. There was a form of motivational enhancement therapy combined with cognitive behavior therapy that we called METCBT, and that was delivered in a five-session version and a twelve-session version. These began with two sessions of motivational interviewing followed by the remaining sessions in group-based cognitive behavior therapy. We had a version of the twelve-session METCBT that also received a family support network (FSN) intervention that included family education nights, home visits with the family, bringing additional resources to the family, plus case management. We had a fourth version that was delivered as an individual therapy called the Adolescent Community Reinforcement Approach or A-CRA. It focused on three things: 1) getting the young person to recognize what made them happy, 2) setting goals to increase those activities, and 3) tracking their progress towards the goals that they had identified. The fifth CYT intervention tested was multi-dimensional family therapy or MDFT. MDFT integrated work with families, youth, and their parents or other caregivers to understand their roles and responsibilities and to try to improve their communications. It integrated drug treatment into the family therapy.

Bill White: And how would you summarize the major outcomes of that study and its implications for future adolescent treatment?

Dr. Michael Dennis: Well, we quickly learned from our standardized assessment that, even though these were relatively short-term, low-intensity outpatient treatments, the average youth coming in had five or more major clinical problems. Multi-morbidity was the norm. A small

number of them were costing a very large amount in terms of healthcare utilization and crime-related costs. When we did the randomized trial and looked at effectiveness, the five interventions were remarkably similar in their short-term effects, but then you saw the advantage of investing in more intensive treatments, particularly A-CRA and MDFT, when you looked at outcomes at 24, 32, and 40 months. When we compared these interventions to treatment as usual, all five of them were significantly better than usual practice. Our finding was somewhat controversial at the time but, subsequently, Emily Tanner-Smith and Mark Lipsey conducted a meta-analysis finding that treatment as usual actually had no effect relative to no treatment or education alone but that more evidence-based practices like that was studied in CYT did better than treatment as usual or no treatment. Within the evidence-based practices, there is a slightly better effect for those that involve some kind of family therapy or family component.

Bill White: Do you think CYT marked the beginning of increased optimism about adolescent substance use treatment?

Dr. Michael Dennis: Yes, at the time, many people were convinced that nothing worked. We showed that there were replicable interventions that were effective and cost-effective.

Bill White: How would you describe the state of adolescent treatment at the time of the CYT study?

Dr. Michael Dennis: There were adolescent treatment programs, but most were not doing evidence-based practice. Some did use very systematic practices. In a parallel Adolescent Treatment Models (ATM) study, we identified and evaluated 11 different better practice programs, and all of them worked better than the typical adolescent treatment, but not as well as some of the CYT interventions. Most programs in the late 1990s were doing relatively ad hoc things by applying adult models to youth, which actually had no effects. Some programs, such as the boot camp type programs, actually had negative effects.

Bill White: I recall that the Center for Substance Abuse Treatment used the CYT results as a springboard to replicate those more effective programs nationally.

Dr. Michael Dennis: Right. They did 36 site replications for METCBT first in which sites were encouraged to modify protocols to address limits that had been identified in the original trials, such as the lack of continuing care, a strong family component, and more effective clinical responses to comorbidity. On average, those replications did as well or better than the original clinical trial. They replicated the adolescent community reinforcement approach in more than 70 locations. The ability to sustain positive outcomes in these replication sites had a lot to do with CSAT providing the training, technical assistance, and monitoring for the first 3 years to assure model fidelity and a high quality of care.

The Pathways Study

Bill White: One of the longest running studies you have been involved with is the Pathways Project. Could you describe that project?

Dr. Michael Dennis: The Pathways to Recovery study started out as a project to improve treatment by placement through centralized intake in Chicago. There was only a 6-month follow-up in the original study, but through other funds, we were able to extend it to look at the longer term effects of treatment. Over time, we began to also investigate the long-term course of recovery. The study involved following 1,326 people out 19 years with over 95 percent follow-up per wave. We shifted from a simple evaluation of initial treatment to looking at how people transition between periods of using in the community, abstinence in the community, and going through treatment and incarceration. We found movement along all of those pathways in every direction. We figured out that we could predict the transitions. People who were using in the community were more likely to go to treatment if they had treatment resources, if their problems were more severe, or if they had friends who were in recovery. We found predictors of things that moved them towards recovery, predictors of who stayed in recovery, and predictors of relapse. Treatment helped predict the transition to recovery, but not who stayed in recovery. Mutual aid participation and several recovery environment factors did not predict who transitioned to recovery but they did predict who stayed in recovery. Different interventions operated on different parts of the addiction and recovery cycle. When you came out of treatment or incarceration, the biggest single predictor of whether you relapsed versus achieved stable recovery was the kind of recovery environment and support that you received. If they simply were thrown back into the old environment with no support, they relapsed. The environmental supports for recovery had to change if they were going to maintain post-treatment recovery in the community.

Bill White: The Pathways Study also illuminated how long it took for some people to achieve recovery stability.

Dr. Michael Dennis: That's right. In our sample, it took about 25 years for half the people to go from the first use to a year or more of sobriety. Now this is a treatment rather than a community sample. In community samples, that time period is much shorter. In our treatment sample, by 30 years from initial use, two-thirds of them are in recovery. And in fact, epidemiological data pretty consistently suggests that of everyone who has ever been addicted, about two-thirds will eventually achieve recovery or remission as DSM-V would define it. There are two people in recovery for every one person currently addicted. That recovery is possible in such a high severity population is remarkable. Most of those we studied had a severe substance use disorder, over half used multiple substances, over half had a co-occurring psychiatric illness, and such problems as homelessness, chronic unemployment, and health problems were common. The norm was five or more major clinical problems.

Bill White: Your Pathways work led to your and Dr. Scott's conceptualization of addiction as a chronic disorder and the application of chronic disease management approaches to it.

Dr. Michael Dennis: That's right. When you look at people who achieved abstinence for 11 months, literally two-thirds will relapse in the next 12 months. If you look at the people who achieved one to three years of abstinence, about one-third will relapse in the next 12 months. Of the people who achieved four to seven years, about 14 percent. Of those who've got 8 to 18 years, only about five percent relapse. So, it's truly a chronic condition that's got a survival curve, in terms of relapse risk and recovery stability. Relapse is not a given. Even among the

people in early abstinence, people make it. But the risk is very high in the beginning and declines with duration of recovery.

Bill White: One of the implications of Pathways was the need to extend short-term acute interventions to models of assertive recovery management to achieve that four to seven-year window of recovery stability. That led to your studies of the potential value of recovery checkups.

Dr. Michael Dennis: Yes, we have done three such studies to date. The first two were conducted with people following community-based treatment. In each case, we recruited an entire intake cohort over a couple months, about 450-480 people. In the first experiment, we randomly assigned half to just be interviewed every quarter for 2 years while the other half were randomly assigned to be interviewed and get quarterly management check-ups. In those check-ups, we did motivational interviewing to help them realize what problems they were having and how they related to their substance use and then tried to connect them back to treatment. If they had had problems with treatment in the past, we worked with the treatment agency to address those problems. We also negotiated with the treatment agencies to contact us before they dropped out so that we could try to intervene and act as an ombudsman to resolve any problems that were arising. Then in the next quarter, we would check in to make sure they were following through with treatment its continuing care recommendations. If they had relapsed, we would try to get them back again. If they didn't agree to go to treatment, we tried to get them to go to recovery support meetings of other kinds of recovery support activity. If they wouldn't agree to do that, we'd at least try to get them to commit to some kind of behavior change to reduce their risk. We would come back every quarter and see how they were doing. Over time, we were able to get over 80 percent of relapsed patients to return to treatment.

What we found over the course of the first study was that there were several things that we weren't doing as well as we could. We learned how to do the urine analysis on-site and show it to participants and use it to get them to do a better job of telling us the truth about their use. We learned the importance of offering more transportation assistance. We learned that it wasn't enough to get them to the door of treatment; if we didn't get them to stay at least 10 days, treatment had no effect. So we put a lot of emphasis on staying in contact once they were re-engaged with treatment. Over the course of the first study, we kept getting bigger and bigger effects each quarter. In our second study, we started with these improvements and got larger and more consistent effects. We reduced the time from relapse to treatment admission by 32 months within the course of four years. We were able to increase their retention in treatment, we were able to increase their days' abstinence, and reduce the number of months of symptoms with substance use disorders. At the end of 4 years, we had a higher rate of people in recovery among those who had received recovery checkups. We just published an analysis showing that the cost of doing these recovery management over the four years was actually less than the savings in the cost of healthcare service utilization and crime.

Bill White: That's counterintuitive because, early on, you would expect costs to actually increase due to the assertive re-linkage to treatment services.

Dr. Michael Dennis: That's right, but if we intervene early, we might be able to use much less costly and shorter term outpatient support as an alternative to more intensive and expensive

inpatient care. If we wait for you to crash and burn, it's more likely to be detox or residential. And we realized that some of those in our study had histories of 13 emergency room admissions per year and four to five hospitalizations, and all which costs tens of thousands of dollars. Although it costs something to do recovery management and service utilization may increase early on, more expensive forms of service utilization decline as recovery stability is enhanced.

Bill White: Mike, did you draw any conclusions about how long your recovery management check-ups should continue following treatment and who is best suited to provide those checkups in terms of types of organizations or type of workers?

Dr. Michael Dennis: Yes, the risk of addiction recurrence is extremely high in the first year, with some two-thirds of people relapsing to alcohol or drug use. At three years remission, the risk of relapse goes down to about 14 percent. If you look at other chronic diseases like cancer where there's a higher chance of relapse, they are managed by titrating the rates of monitoring. Initially, they are monitored quarterly, and then cutting back to maybe twice a year, then once a year and every 5 years. That type of schedule probably makes sense, given the risk profile that we see in substance use disorders.

Bill White: Yes, it's interesting that cancer and addiction recurrence rates seem to be very close to one another.

Dr. Michael Dennis: Very close. When you ask the question who should do it, most treatment providers are used to clients coming to them and their focus historically has been on the very specific step of taking the client from when they're ready to stop using to initial abstinence. They're not going out in the community finding people using who aren't necessarily ready to stop and convincing them to stop, and they are not necessarily the best people to ask people how they are doing after treatment. A third party may be needed to follow clients after treatment, check on how they are doing, re-engage them with treatment if and when needed, and act as an ombudsman to make sure they are getting what they need. Having a third-party or at least a separate unit that has that flexibility, I think, is beneficial.

Bill White: So that third party could be a separate unit of a treatment program but it could also be a research organization or a recovery community organization or a managed care organization?

Dr. Michael Dennis: Correct. One disturbing thing we found was that a small group of people were using treatment as a revolving door. We were very good at getting people back to treatment and getting them to stay. But we had a group of about 20 people over the course of four years who went back to treatment more than a dozen times. One had more than 20 admissions. The effects of treatment are strongest the first time, a little weaker the second time, a little weaker the third time, but still worth doing, but every time the prognosis become worse, much as it does in cancer. If you keep relapsing after treatment, you're probably not going to achieve stable recovery by episodic treatment; you're going to need a different approach; either one that is more intensive early on or some kind of maintenance care such as methadone maintenance. Typical durations of treatment of a couple weeks to a couple months have just systematically proven not adequate. You know the old line about the definition of insanity, doing the same thing again and

again and expecting a different result. It doesn't work. When you treat people again and again, some clients start having more experience than some of the counselors. So we've got a double-edged problem. On the back end, we need longer term maintenance availability and strategies to work with the different type of client. On the front end, managed care often has focused on limiting people to very short doses of initial treatment. In reality, they might want to do more up front and not make you fail because every time you go to treatment and then relapse, your odds of getting better in treatment the next time go down. So we need to do more of the transition to recovery support the first time, not wait until they've come back to treatment the third or fourth or fifth time. And we have to do a better job of linking clients to recovery communities and other forms of natural support, even in brief interventions.

Bill White: I remember one of the managed behavioral healthcare requirements was that you had to fail in a lower level of care before you could go to a higher level. You're suggesting that such policies may be very counter-productive for those with the most severe and complex substance use disorders.

Dr. Michael Dennis: That's right. The toolboxes that we have in treatment are not that strong and not that diverse so you really don't want to waste them. You want to get as much effect as you can from that initial episode. And the best single predictor of successful recovery initiation is not length of stay; it is whether or not you connect afterwards with a recovery environment for support. It doesn't have to be Twelve-Step environment. It could be alternative support groups or a recovery home or a recovery coach.

Bill White: When I think of the clinical profile of your Pathways group, it would also seem to suggest that that initial intervention also needs to be global in addressing a broad spectrum of problems and challenges to recovery.

Dr. Michael Dennis: Yes, but that can be tricky. There's often an unrealistic expectation that people should come out of treatment, be abstinent for a month, and then work full-time. What we found was that most people don't address employment gaps until a couple of years into recovery. By the four-year recovery benchmark, they've gone from 80 percent under the poverty line to 20 percent living under the poverty line. There's often this unrealistic expectations that, with recovery initiation, the sun should come out and everything in your life should be better, but that is not always what real recovery looks like. It can be a process that is slow and plodding. You have to rebuild these resources or build them for the first time in your life. You talk about it in terms of recovery capital. You have to rebuild relationships, you have to regain vocational experience, you have to compete in the job market, you have to find your way into sober housing and get better housing. Your mental health can be a challenge when you first stop. If you have been self-medicating for trauma or forms of emotional distress, your emotional health may initially get worse in recovery until you figure out new ways of coping.

Bill White: One of the exciting things I think you've done through your research is to begin to create norms for what recovery looks like as a staged process. What were your findings from the third ERI experiment?

Dr. Michael Dennis: After doing two very successful experiments with people coming out of treatment, we then looked at women coming out of a substance use treatment unit at Cook County Jail. Again we were able to show significant effects of assertive monitoring and early re-intervention. What was interesting there was that it did matter what other service they were getting. If women coming out of jail on intensive probation could get linked to ongoing treatment, abstinence rates increased. When rates of abstinence increased, crime rates decreased. Over three years, these women were often going in and out of probation and particularly relatively intensive forms of probation, which often operated on the same mechanism as RMC which was monitoring and linking these women to treatment. This goes to your question of who should do RMC. If probation was doing it, there was no value added to others doing it again. The big effect in RMC was on the women who were not on probation in any given quarter. And the women could be on probation in one quarter and then three-quarters in a row and then out for four quarters and then back in. And our big effects, which were consistent with what we found elsewhere, all have been when they were not on probation. When they were on probation, they did just as well without RMC. So getting monitoring and assertive linkage may be more important than who does such monitoring and linkage. When you deliver it through probation, for example, it also works.

The GAIN

Bill White: A central part of all of your research projects was a much more sophisticated approach to clinical assessment than what historically existed. That involved the development of the Global Appraisal of Individual Needs (GAIN) Instrument. Could you talk about the GAIN and how it was developed?

Dr. Michael Dennis: In 1989, on the week that the SAMHSA was created and the week that the Office of Treatment Improvement (what eventually became CSAT—the Center for Substance Abuse Treatment), I sat down with Jerry Jaffe. He was lamenting the lack of standardized measures in addiction. The one widely used tool at the time was the Addiction Severity Index. Dr. Jaffe had little problems with what was in it; the problems were what it did not contain. It really didn't deal with needle usage; it didn't deal with pregnancy; it didn't deal with LGBTQ issues. It wasn't focused on treatment planning or placement. It didn't even have a measure of substance use disorders. It really wasn't designed to work with adolescents or young adults. So, there was a need for kind of a new generation of instrument and for better process measures.

It was often said that clinicians asked more valid questions but were not reliable in the way they would ask questions, while researchers asked questions in more reliable ways, but often didn't ask the right questions. The idea emerged that you could actually ask the right questions that the clinicians asked in a more reliable way like researchers did. By integrating the resulting data into clinical practice and clinical research, it could be used to create an integrated clinical decision support system that was both valid and reliable. And we proposed doing that. The original design was abandoned because some felt that it would be impossible for clinicians to do something reliably. I left that project and decided to prove them wrong. In collaboration with three methadone programs, PBA in Pittsburgh, Sisters of Charity in Buffalo, and Santa Clara County in California, we developed the first iterations of the GAIN in 1993.

The first thing we did was to take several short scales that had been recommended by NIDA and put them together. It worked and workers at the three sites loved it. We had it

generating narrative reports and the scales were all were reliable even when collected by clinicians. But over time, as ASAM became more popular and DSM-IV came out, there was a desire to align the new instrument with ASAM and DSM. We worked with several systems of care to do that, initially with Chestnut Health Systems and Interventions. Both had a fairly large program of adolescents and young adults and wanted to make sure that it could work across ages and across the continuum of care. At that time, it was not uncommon for different instruments to be used in residential treatment than in outpatient treatment and different instruments to be used with adolescents, young adults, and adults. So we integrated them and found that when you make something clearer for an adolescent, usually you're making it clearer for everybody. We also found that when working in multicultural contexts and working with people who have English as a second language, what you do to make the wording better improves the instrument for everyone.

So, there was a lot of collaboration across levels of care and programs, and we brought in several national experts to help us make the GAIN better. When the CYT Study chose to use the GAIN, this brought in Operation PAR, the University of Connecticut Alcohol Center, and the Children's Hospital in Philadelphia. About a year later, CSAT decided to evaluate best 11 practice programs and they chose to use the GAIN so results would be comparable across all of these sites. And then the Robert Wood Johnson Foundation used it in evaluating juvenile justice programs. Pretty soon, the GAIN was being used in over 100 agencies. In 2001, we did a major revamp of the instrumentation and had to start dealing with HIPPA rules around privacy in our software. Those changes improved our ability to use the clinical data from the GAIN to generate decision guidance and treatment planning recommendations. We brought together people from 32 systems of care to help us develop treatment planning statements that were prototypic and to make sure that what we were developing worked at the practice level.

As the data set got larger and larger, we also started producing norms and evaluated the instruments to identify and fix problems with items and to better understand cultural differences. Then, we spent some ten years evaluating the measures relative to the Rasch Measurement Model. That allowed us to say not only how well the items and scales worked, but how they worked differently across gender, age, race, and primary substance. We could only do that because we had both evidence-based practice (i.e., the GAIN) and practice-based evidence (i.e., data from diverse agencies and patients). This in turn allowed us to improve the measures and create shorter and shorter versions that get the same information in a shorter amount of time. We started using Measurement Theory to figure out the five to six questions that were explaining most of the variance within the original 40 to 60 item batteries. With our shortest instrument's 23 questions, we can identify 90 percent of the people who have a behavioral health problem and rule out 90 percent who don't. For those who have a problem, we can further identify the substance use disorder, an internalizing mental health disorder like depression, anxiety, trauma, suicide, or an externalizing mental health like ADHD, conduct disorder, gambling, crime, or violence. Now, instead of doing an hour assessment, we're capturing most of it in a five- to twenty-five-minute assessment, depending on how much you want to capture.

Bill White: That's remarkable. What is the current state of dissemination of those instruments in the field and the role of the GAIN Coordinating Center in that process?

Dr. Michael Dennis: In 2003, we created the GAIN Coordinating Center so that individual agencies who weren't part of a federal project could cover their own cost to be part of the

system. The license is only a $100 for five years of unlimited use plus the cost of the software and any specific training or service they wanted. Originally, our support was PC-based, but many programs did not have great equipment or great internal IT resources, so we switched to a cloud-based system in 2008 which meant that they could use our system for as little as $180 per staff person per year.

Bill White: What are the services provided by the GAIN Coordinating Center to the organizations that use it?

Dr. Michael Dennis: We provide training and how to administer and interpret the GAIN, software support to allow them to administer it online and generate their reports or do a hard copy, key it, and then generate their reports for individuals. The software builds in reports that will automatically generate preliminary diagnostic recommendations, ASAM placement dimensions, and treatment placement statements. It generates a report tracking changes over time that comes from measures that are repeated. They can get a report of all the different scales that can be run immediately off the collected individual data as soon as it's done. They can edit those reports and also generate analytic files that can be used for secondary data analysis.

Bill White: Mike, would that include program evaluation data where individual outcomes can be aggregated for a program?

Dr. Michael Dennis: Yes. Programs can ask us to generate either quarterly or annual reports. We generate profiles of who they're serving, and if they were doing repeated measures, we report how their clients are responding to treatment. We will also pool it so that it can be used for secondary analysis in such areas as gender differences or how do people with opioid use problems differ from people with cannabis problems. The data allows a program to examine the special needs of particular populations they serve. They can, for example, look at how well evidence-based practices work by gender or race.

One of the more interesting things we did was in large-scale replications of the METCBT and A-CRA used in the CYT study. We did quasi-experimental comparisons of how well those treatments worked in school-based versus other settings using match-controls. We did the same thing with juvenile drug courts to examine how well kids in juvenile drug court did compared to those treated in other settings in the community. Several M.A., Ph.D., and post-doc candidates and university faculty have used the GAIN in their research. Several programs have used GAIN data to identify what types of clients they are most and least effective with and to identify who does well with the latter group in order to seek help to improve service quality.

New Technologies of Recovery Support

Bill White: Some of your latest research is experimenting with new technologies of recovery support. Could you describe that research?

Dr. Michael Dennis: Sure. Chris Scott and I have been frustrated in our work on recovery management check-ups to find a group of people who we'd get to treatment and who did well in treatment but who would then relapse, often within 90 days of leaving treatment. Quarterly check-ups were simply not enough with this population. So we first started looking at using Palm

Pilots, which now looks pathetic compared to current technology. As we started exploring this, people were already out with the crossover between a Palm and a cell phone and then the smartphones arrived. So, we started looking at using the smartphones to teach people to self-monitor and as a platform for delivering recovery support service.

Most addiction treatment programs in the United States use some form of relapse prevention in their curriculum. They talk about the need to monitor your persons, places, feelings, and activities; how to avoid risky situations and move towards supportive positive situations. They tell you to pay attention to these things when you leave treatment, but the reality is that most people don't or at least don't do on a consistent basis. At Chestnut, we used to give people cards on which they identified risky people, risky situations, and risky emotional states, as well as the positive steps you could take if exposed to these situations. A young woman who went through treatment at Chestnut was given one of these cards. When she relapsed after treatment and returned to Chestnut, the counselor asked, "Do you still have that card?" She had it in her wallet. The young lady had correctly predicted who she would be with, what she would be doing, where she would be, and what she would be feeling when she relapsed, but she hadn't been paying attention. On the upside, she also correctly predicted what she could do to recover from a lapse (talking to others supportive of her recovery and going back to Chestnut), did just that, and is now in long term recovery. Thus there is general agreement on what to do, but it is not getting done reliably.

So our idea was, if addiction is a brain disease marked by hypersensitivity to drug-using cues and triggers, then perhaps the smartphone could become a prosthesis for the brain to help people self-monitor their recovery process. We randomly pinged people five to six times a day to say, "Stop, look around. Who are you with? What are you doing? How are you feeling? Where are you at? How much does that make you want to use alcohol or drugs? How much is that supporting your recovery? Everybody in treatment agrees you should do it and yet nobody does it. So this prosthesis helps trigger clients at random times of the day to do it.

And then we explored what kinds of recovery support that same device could provide, particularly at times other supports are not available. You're lying in bed and you can't go to sleep and your mind is racing, right? And what do you do? Well, there's a lot of recovery support services we could put on these phones. We can put relaxation tapes into the phone' cues to reach your sponsor or others in recovery. We can provide distracting games. We can load recovery-supportive music. So, we did a couple of pilots in collaboration with the University of Wisconsin with Dave Gustafson and Kim Johnson (now Director of CSAT). We're currently in the middle of a clinical trial in which we're randomly assigning people to get six months of quarterly interviews or quarterly interviews plus the smart phone self-monitoring and phone-based recovery support resources. We don't have findings for that yet but certainly our hope is that they will show that they each add something to the ability to sustain recovery and to minimize the potential and duration of relapse.

Future of Recovery Research

Bill White: Mike, the research that you've done has helped shift the focus in addictions research from the study of pathology to the recovery process. What are your thoughts about the future of recovery research?

Dr. Michael Dennis: Well, recovery research started out with mostly qualitative studies, and that's okay. But for the research to be more respected and impactful, it has to become more rigorous and reveal interventions that are effective and cost-effective. And it has to tie into the latest addiction science. We're now working with some colleagues at Northwestern who have a long-term history of doing addiction-related research on the brain, mostly looking at the consequences of the use on the brain. What we want to do is understand the consequences of recovery on the brain. John Kelly at Harvard has done some wonderful research on the role of Twelve-Step groups with youth and young adults on long-term recovery outcomes. Research on the role of social support in recovery is very promising, with many implications for the design of addiction treatment and recovery support services. There's a lovely paper published in *Evaluation Review* by Karen Conrad and colleagues using data from the GAIN self-help involvement scale that measures various dimensions of involvement beyond attending meetings. Each one of those behaviors predicted better outcomes than simply going to 90 meetings in 90 days. I think we are starting to open the black box of recovery. I think in coming years we will be able to define much more clearly the precise mechanisms involved in the initiation and maintenance of addiction recovery. I am particularly excited about moving beyond understanding what happens in the brain in the addiction process to what happens in the brain as recovery unfolds.

Career-to-Date Reflections

Bill White: Who are some of the people who exerted the greatest influence on your career?

Dr. Michael Dennis: At the top of my list would have to be my colleagues here at Chestnut, Chris Scott, Mark Godley, and Susan Godley, with whom I have collaborated with for more than 20 years. Most researchers are not blessed by such long-term relationships in our field, and they've been a real gift. Another person of note is Tom McLellan. Even though he was the primary developer of the ASI, he encouraged me to go ahead and further develop the GAIN. He's the one who encouraged me to do digital recordings of the people doing the GAIN to make sure that they were actually doing it correctly. He's been very encouraging. Dwayne Simpson was also quite supportive in sharing data. Most people don't realize that in the field that Dwayne was actually one of the early people doing factor analysis and cluster analysis. He advanced the field methodologically. I don't think he really gets all the credit for it. At multiple points in my career, I have walked away from the GAIN research, and every time I did, it was treatment providers—people like Russ Hagen, Jim Fraser, Loree Adams, Nancy Hamilton, Jim Becknell, and many others who said, "No, don't give up yet." They're the people who gave me the energy to keep going.

Bill White: What have been the biggest challenges you've encountered working in addictions-related research?

Dr. Michael Dennis: I can think of a number of such challenges. The first was the state of addiction treatment research when I began, which typically focused on evaluating short-term single episodes of care that flew in the face of what we were finding in our early studies, which was that addiction typically lasts for decades and requires multiple episodes of care before recovery stabilization. The prevailing research also often focused on the subset of people with a

single type of substance problem, which was again challenged by our findings that most people entering treatment used multiple substances and had multiple co-occurring problems. The research has moved far faster than changes in clinical practices, which has raised at times unrealistic expectations of policy makers, staff, and/or clients about how fast systems can change. The challenge has been to find a balance in the timely application of new knowledge and technologies without overwhelming systems of care in the process.

Bill White: As you look back over the work that you've done to date, what do you feel best about in terms of your contributions to the field?

Dr. Michael Dennis: For me, one of the biggies was CYT, the Cannabis Youth Treatment experiments and their subsequent widespread replication. CYT was clearly a catalyst for improving the quality of adolescent treatment and research. It introduces the first five manualized interventions for adolescent treatment and made major advances in standardized assessment, recruitment, follow-up, and analyses of the cost-benefit of addiction treatment. The subsequent replications demonstrated that community-based providers could implement these interventions and do so consistently and with similar or better outcomes than in our original experiments. We were also able to demonstrate that these findings could be replicated in school and justice settings as well. The Joint Meeting on Adolescent Treatment Effectiveness (JMATE) held between 2005-2012 also constituted the best and most influential meeting on translation research in adolescent treatment—one that brings together policymakers, researchers, treatment providers, youth, and their parents. That was a very exciting development.

I also think our Pathways to Recovery longitudinal study improved our understanding of the long term effects of addiction and how many people cycle through periods of using, treatment, incarceration, and brief recovery experiments before achieving long term patterns of recovery and long term health. The Recovery Management Check-ups (RMC) we developed were important because they showed what could happen when we remained in people's lives, paid attention to them, monitored them, and intervened early as needed. We learned how to do that well and showed that it was clinically effective and cost effective. Our current work with smartphones is really taking that to the new frontier of recovery self-management.

Developing the Global Appraisal of Individual Needs (GAIN) family of instruments, software, and reports served as an infrastructure for all of this work and have been widely adopted for use within the field. We have much work yet to do, but I feel good about some of the contributions we have made to date.

Bill White: Let me ask a closing question. If you were meeting with a group of young Ph.D. candidates completing their doctoral work who were interested in specializing in addiction-related research, what guidance might you offer them?

Dr. Michael Dennis: If they are interested in treatment and recovery, they need to know that this is a complex enterprise and that there's really only a handful of groups doing work on it well. I would suggest that they get into one of those groups as opposed to trying to do this work on their own. I don't know that any of our studies could be done by one person starting up from scratch. It would be much harder to start a new addiction research institution today than it was when we began. Getting and sustaining funding as a solo researcher is today almost impossible. I always suggest that newcomers talk to patients and clinicians to get fresh ideas to test rather than just

doing slight variations of prior work and to focus on research that has great methodological rigor and that has important clinical and policy relevance.

Bill White: Mike, thank you both for taking this time to discuss your career and to review some of the studies you have led over these years.

Acknowledgement: Support for this interview series is provided by the Great Lakes Addiction Technology Transfer Center (ATTC) through a cooperative agreement from the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT). The opinions expressed herein are the view of the authors and do not reflect the official position of the Department of Health and Human Services (DHHS), SAMHSA, or CSAT.

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