

DEVELOPMENT OF A FRAMEWORK FOR COMPREHENSIVE EVALUATION OF CLIENT OUTCOMES IN COMMUNITY MENTAL HEALTH SERVICES

Joan E.H. Bishop
University of British Columbia, Riverview Hospital
Port Coquitlam, BC

Evelyn Vingilis
University of Western Ontario
London, Ontario

Abstract: The conduct of outcomes research on clients with serious mental illness using community mental health services is a challenge. Causal models with inclusion of mediating and moderating variables from social sciences evaluation methods provide a framework for conceptualizing and evaluating the complexity of community mental health services. This article presents the conceptualization and development of a framework for comprehensive evaluation of client outcomes in community mental health services and describes a case example of operationalizing and testing the framework in an evaluation of Assertive Community Treatment (ACT) in Southwestern Ontario, Canada. The initial framework was developed by hypothesizing a cause-effect pathway and links among delivered treatment variables, the implementation system, external factors, and intermediate and longer term outcomes. The framework was further validated and modified through stakeholder input. All variables identified in the framework were then operationally defined and instruments with good psychometric properties were chosen to measure the variables. This framework can provide a generic example for the conduct of community mental health evaluations.

Résumé: La réalisation de travaux de recherche sur les résultats obtenus auprès de patients atteints de troubles mentaux graves en ayant recours aux services communautaires de santé mentale pose un défi. Les modèles causals comportant des variables médiatrices et modératrices provenant des méthodes d'évaluation des sciences sociales fournissent un cadre pour conceptualiser et évaluer la

Corresponding author: Joan E.H. Bishop, Clinical Associate Professor of Psychiatry, University of British Columbia, Riverview Hospital, Hillside Building, 2601 Lougheed Highway, Port Coquitlam, BC V3C 4J2; <jbishop@bcmhs.bc.ca>

complexité des services communautaires de santé mentale. Cet article présente la conceptualisation et l'élaboration d'un cadre de travail visant à permettre une évaluation détaillée des résultats chez les clients des services communautaires de santé mentale et décrit, à titre d'exemple, un cas où ce cadre a été opérationnalisé et mis à l'essai dans une évaluation du Suivi intensif dans le milieu (SIM) dans le sud-ouest de l'Ontario, Canada. Le cadre initial a été élaboré en supposant un lien de causalité et des liens entre les variables de traitement, le système de mise en œuvre, les facteurs externes, ainsi que les résultats à moyen et à plus long terme. Le cadre a été validé plus à fond et modifié suite aux commentaires et suggestions des intervenants. Toutes les variables recensées dans le cadre ont ensuite été définies opérationnellement, et on a sélectionné des instruments possédant de bonnes propriétés psychométriques pour les mesurer. Ce cadre de travail peut servir d'exemple générique pour la réalisation d'évaluations en santé mentale communautaire.

Complex processes for delivering health and social services are obscure without some theoretical model or framework that identifies relevant variables and expected causal relations, and that provides some basis for organizing information and interpreting research results (Lipsey, 1988; Rossi, Freeman, & Lipsey, 1999; Vingilis & Burkell, 1996; Vingilis & Pederson, 2001; Vingilis et al., 2003; Weiss, 1998). In the absence of such a framework, there is no basis for understanding how and why the system worked (or not) or for reproducing its effects on a broader scale (Rossi et al., 1999). This is particularly true when evaluating mental health services in the community. The complexity of seriously mentally ill (SMI) clients' needs, and of services and systems of care required to meet those needs, presents a major challenge to evaluating outcomes of mental health services. To date, in the medical/psychiatric, mental health services evaluation literature, few descriptions of evaluation frameworks are available that have examined both the therapeutic process of change within clients—that is, a hypothesized process by which clients journey through recovery—and other person and system variables including treatment implementation and policy-driven variables that can influence treatment outcomes.

This article will present conceptual and methodological problems in community mental health services outcomes studies and describe the conceptualization and development of an evaluation framework, adapted from current social sciences program evaluation literature. Our framework seeks to obviate some conceptual and methodological problems and improve the validity of comprehensive evaluations

of client outcomes in community mental health services. We will describe a case example with suggestions for operationalizing and testing the framework in an evaluation of Assertive Community Treatment (ACT).

The framework is based on the causal or results chain approach used in current program evaluation methods (Chen, 1990, 2005; Chen & Rossi, 1980; Grembowski, 2001; Petrosino, 2000; Vingilis & Pederson, 2001; Weiss, 1998). Related are Judd and Kenny's (1981) "process analysis" of treatment effects, which begins with a theory-driven causal chain that links the "treatment at one end with the outcome variable at the other end" (p. 604), and Greenberg's (1986) "change process research" for psychotherapy. The framework is also based on other health-related and mental health models, previous research on variables influencing outcomes, stakeholder consultations, and clinical experience with the recovery and outcome process of clients with SMI. It provides a conceptual understanding of the many person and system factors that can affect community mental health outcomes. The framework elements can be conceptualized as moderators and mediators. Moderators are variables that precede clients' assignment to treatment and can interact with the treatment variable to affect the outcome variable, while mediators are intervening variables that occur after clients have been assigned to treatment but before measurement of ultimate client outcomes (Calsyn, 2003; Kenny et al., 2004). This framework is not intended as a final, omnibus framework to be used by all, but rather as an example of how both a hypothesized causal process of change (the intervening steps) occurring within the client and relevant person and system variables affecting outcomes can be brought into a single analysis plan. Certainly other hypothesized causal processes and relevant variables can be considered.

BACKGROUND

To date, most community mental health services research has used randomized controlled trial (RCT) methods and a "black box" paradigm (Gehrs et al., 2004; Mechanic, 1996) with no explicit causal process of change included. As a consequence, it is still unclear how community mental health services such as ACT and other factors influence persons with SMI, since causal processes reflecting the intervening steps to recovery are typically not captured (Burns & Santos, 1995; Hoagwood, 2005; Rush, Norman, Hirsh, & Wild, 1999). Studies have synthesized the research on active ingredients of effective case management (Rapp, 1998); related some critical ingredients of ACT

to outcomes such as reduction of hospitalization (Teague, Drake, & Ackerson, 1995; Teague, Bond, & Drake, 1998); summarized critical ingredients (Bond, Drake, Mueser, & Latimer, 2001); described which critical ingredients patients (Calsyn, Morse, Klinkenberg, Yonker, & Trusty, 2002; McGrew & Bond, 1995; McGrew, Wilson, & Bond, 1996, 2002) and case managers consider important (McGrew, Pescosolido, & Wright, 2003); and documented satisfaction with aspects of ACT (Chue, Tibbo, Wright, & Van Ens, 2004; Redko, Durbin, Wasylenki, & Krupa, 2004). Recently researchers have begun to explore the intervening steps (mediators) leading to ultimate expected outcomes and what person and system variables affect ultimate expected outcomes (mediators and moderators) in community mental health services (Calsyn, 2003; Gehrs et al., 2004). As Kenny et al. (2004) write: "The study of mediators allows researchers and clinicians to explain better how a program produces its effects" (p. 295).

Clarke et al. (2000) examined several adverse outcomes in clients with SMI in a three-year RCT of two ACT programs versus usual care ($N = 163$) and conducted exploratory analyses of factors moderating or mediating these outcomes. Using survival analyses, they found no main effect of ACT on hospitalization, homelessness, or ER visits, which is inconsistent with other literature. Using Cox proportional hazards models, they found sex, diagnosis, high symptomatology, and provider case load predictors of time to first hospitalization; Brief Psychiatric Rating Scale (BPRS) symptomatology predictive of ER visits; case manager-rated working alliance (Working Alliance Inventory) a predictor of homelessness; and client minority status and experimental condition a predictor of time to arrest. However, the predictor data for these analyses were from the baseline interview only, and thus the potential intervening causal processes leading to expected outcomes were not assessed. Calsyn, Morse, et al. (2002) reanalyzed the Morse et al. (1997) dataset to study moderators and mediators of client satisfaction in ACT at 18-month follow-up using a series of hierarchical regression equations ($N = 129$). They found that intensity of program contacts, continuity of care, assistance with daily living, and strength of the helping alliance were important mediators of satisfaction. They used their own measure of helping alliance and suggested that replication of findings was needed with a more conventional measure such as Working Alliance Inventory. They noted limitations such as the small number of moderators and mediators studied. Specifically, only one person mediator (helping alliance) and few system mediators (i.e., specific services) were included. Again, the potential intervening causal processes leading to expected outcomes were limited to one variable: working alliance.

Kenny et al. (2004), also reanalyzing the Morse et al. (1997) dataset ($N = 155$), used Hierarchical Linear Modelling (HLM) to identify appropriate analysis of longitudinal data. They estimated treatment effects of ACT in a randomized longitudinal experiment comparing ACT to brokered case management, and identified mediators and moderators of improved outcomes in stable housing and psychiatric symptoms over a two-year period. Mediators included system variables of service intensity, continuity, and specificity (types of services used) and one person variable of medication adherence. Moderators were age, sex, race, and diagnosis (schizophrenia, substance abuse, and personality disorder). Apart from an overall treatment effect for ACT, they found no moderator effects, and the only mediator effect was specific services used (case management, housing assistance, and financial assistance), which partially mediated housing outcomes. Similarly, no moderator effects were found for reduced symptoms. Although medication adherence strongly led to fewer symptoms, it was not considered a mediator of the treatment effect for psychiatric symptoms because medication adherence was not affected by treatment. The strength of the Kenny et al. study was that it made significant advances in statistical analysis of longitudinal data, but the authors recommended that future researchers should study therapeutic alliance and should not rely exclusively on client self report to measure service variables.

Most evaluations of mental health services are done at the level of the individual patient/client, using the widely accepted practice of collecting both process and outcome data (Posavac & Carey, 2003; Sederer & Dickey, 1996). However, this method is often inadequate for interpreting outcomes in the real world (Donenberg, Lyons, & Howard, 1999; Mowbray, Collins, Plum, Masterton, & Mulder, 1997; National Institutes of Mental Health, 1991; Williams & Garner, 2002). Many evaluations use only 1–2 outcome measures (e.g., readmission rates) and do not measure variables representing the target population, implementation system, or external factors. Interpreting such outcome data out of context is exceedingly difficult. For example, if clients with SMI in community-based programs have higher levels of readmission, is it because the community program did not implement their service fully or did not actually deliver the planned services? Or is the higher rate of readmission due to a target population that is in need of more inpatient care to prevent severe decompensation or inappropriate incarceration in jail? In other words, single variable outcomes are very difficult to interpret without a framework to show the bigger picture with all potential variables, expected

outcomes, and the causal chain required to achieve those outcomes. Evaluators must consider a wider array of factors at the same time, including the moderators (characteristics of the target population), person mediators (steps in a causal chain toward achieving longer term outcomes), and system mediators (content of services, ways to implement the delivery of services, the clients' natural supports in the community, and external or contextual influences) that could affect the outcomes.

This problem of having to simultaneously consider a wide array of variables has been evident to researchers for many years (Brugha & Lindsay, 1996; Donabedian, 1980; Jenssen, 1995; Mechanic, 1996; National Institutes of Mental Health, 1991; Rosenblatt & Attkisson, 1993; Ruggeri, 1995; Ruggeri & Tansella, 1996). Rosenblatt and Attkisson (1993), Rush et al. (2004) and others identified the need for multiple measures and approaches to measuring outcomes for persons with SMI. Mechanic (1996) discussed research findings on ACT programs to illustrate that experimental trials have limitations in mental health services research and that even when studies are well designed and carefully replicated, investigators often remain uncertain about the key elements of a complex intervention. He concluded that we still have a great deal to learn about for whom ACT works and how. He suggested improving the design of research to better understand key elements in successful interventions, which he called "looking inside the black box," but did not say how this should be done. In a National Institute of Mental Health (NIMH) monograph, Ciarlo, Brown, Edwards, Kiresuk, and Newman (1986) developed and recommended a multidimensional model for mental health outcome measures which included: (a) type of assessment, that is, individualized, partially standardized, and standardized methods; (b) the nature of respondent, that is, measures from the client, therapist, and other observers; and (c) the functional domain measured, that is, individual/self, personal/family relations, and community settings. This model was further expanded by Rosenblatt and Attkisson (1993).

The mental health service evaluation literature continues to reiterate the importance of comprehensive evaluation of the quality of health care (Busch & Sederer, 2000; Dickey, 2001; Hansson, 2001; Hermann, 2002) using a distinction among structure, process, and outcome information originally developed by Donabedian (1980). Hafner and an der Heiden (1989a, 1989b) describe an observational design that allowed for a "more or less reliable" analysis of cause and effect in evaluation

of care for disabled mentally ill persons. Their model included interventions, outcomes, intervening variables, confounders, and external influences, but it was not tested in a long term follow-up study. Thornicroft and Tansella (1999) adapted Donabedian's classification to create a "mental health matrix" that specifies information needs for evaluating services at regional, local, and patient levels. Although their matrix can organize a comprehensive description of the whole mental health system and facilitates the bridging of information among different levels of analysis (country/region, local, patient), it does not illustrate ways to test causal relations among inputs, processes, and outcomes or among regional, local, and patient levels. Others propose or use logic models to study both system- and client-level issues (Goldman et al., 1990; Goldman, Morrissey, & Ridgely, 1994; Goldman et al., 2002; Hernandez, 2000; Morrissey et al., 1994, 2002; Randolph et al., 2002; Rosenheck et al., 2002). However, the logic models either did not include (or did not test) steps in a causal chain at the client level—an essential prerequisite for examining the intervening processes that occur in clients and that lead to recovery. Thus, despite the advocacy by many over the last two decades to use multi-dimensional models for community health services evaluation, actual practice is limited. Our proposed framework builds on concepts of previous models by including different types of assessments, various respondents (i.e., not relying only on self-reports), measuring a variety of domains, and testing causal relations among inputs, processes and outcomes.

Moreover, the testing of frameworks/models with longitudinal data necessitates advanced statistical modelling methods. Gibbons (2000) states:

Despite recent advances in statistical methods for longitudinal research, the cost of mental health services research is not always commensurate with the quality of the analyses which often consist of little more than a correlation of variables measured at various times, or group means plotted at successive time points ... These [mixed-effects] models are critical to mental health services research in that they provide statistically rigorous approaches to both the definition and analysis of outcome which is invariably multi-dimensional and based on qualitative factors. (p. 91)

Longitudinal studies play an extremely important role in mental health services research, yet are a challenge for researchers in what

to do with repeated (intra-individual) measures collected on the same individual over time (Gibbons, 2000). Traditional approaches generally use baseline and post-intervention data and compute a change score (Gibbons, 2000) that leads to the loss of important information. When dropouts occur, endpoint analysis is conducted that eliminates subjects regardless of the length of treatment to which the subject was exposed (Gibbons, 2000). Or one-way ANOVAs are used at each follow-up time point, which causes multiple-comparison problems (Gibbons, 2000). Additionally, some studies include only study completers, leading to internal and external validity problems. Recent advances in longitudinal research recommend that modelling should begin at the individual client level because in mental health research response to treatment is quite individualized (Gibbons, 2000). This method allows for the assessment of *intra-individual level* and *inter-individual level* differences in change (Boyle & Willms, 2001; Brekke, Long, Nesbitt, & Sobel, 1997; Snijders & Bosker, 1999; Willett, Ayoub, & Robinson, 1991). Individual change across time is modelled, and subsequently the effects of covariates (mediators and moderators) are examined to determine whether there are systematic differences in rate or type of change. This dual aim can be accomplished with growth curves and HLM, and is a recommended method of analysis (Boyle & Willms, 2001; Brekke et al., 1997; Gibbons, 2000; Snijders & Bosker, 1999; Willett et al., 1991).

If advances are to be made in our understanding of causal pathways of outcomes for SMI clients who receive community mental health services, the challenge is to move beyond the rhetoric on the importance of developing causally complex models to actually operationalizing and testing such models. Judd and Kenny (1981) expound that the causal processes that mediate treatment effects should be an important part of evaluation studies, since this aids generalization, improvements in the efficacy of interventions, and knowledge acquisition about “causal mechanisms that produce socially significant outcomes” (p. 617).

DEVELOPMENT OF A CONCEPTUAL FRAMEWORK

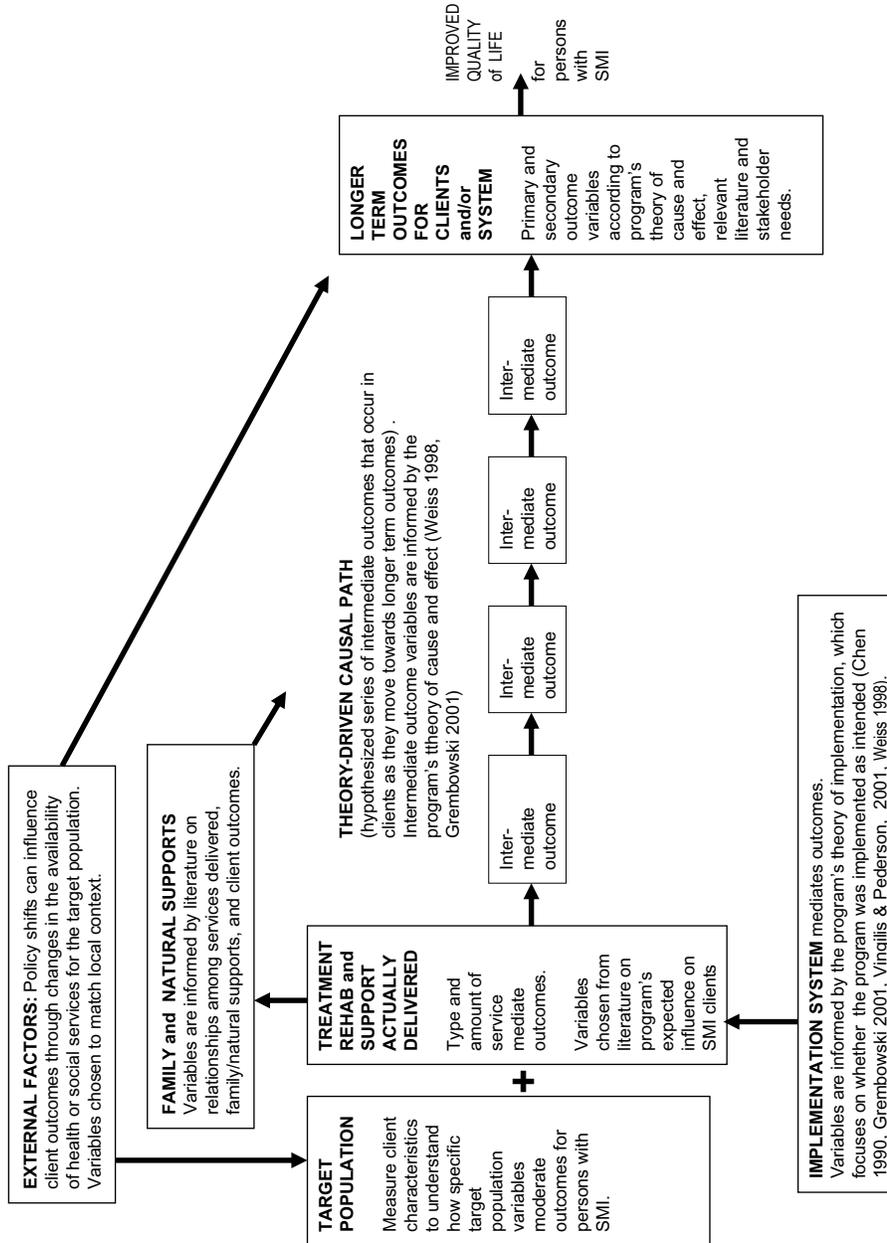
Programs are generally based on a set of explicit or implicit assumptions about how and why a program will work, which is called “program theory” (Chen, 2005; Grembowski, 2001; Weiss, 1998). There are two types of underlying assumptions: the program’s *theory of cause and effect* (also called explanatory theory or change model) and the program’s *theory of implementation* (also called change theory or action model) (Chen, 1990; Chen & Rossi, 1983; Grembowski,

2001; National Institutes of Health, 2003; Vingilis & Pederson, 2001; Weiss, 1998). The program's theory of cause and effect consists of the hypothesized assumptions about causal processes through which a program will cause specific outcomes. These "causal connections" are often captured by "if-then" statements about the program and pictorial representations of hypothesized causal pathways (results chain) (Chen, 2005; Grembowski, 2001; Weiss, 1998; W.K. Kellogg Foundation, 2001). Chen (1990, 2005), Grembowski (2001), Weiss (1998), and other evaluation scholars articulate the importance, as Weiss (1998) suggests, of "setting down the expected paths of change," although she also charges that "[u]se of program theory as a map for evaluation doesn't necessarily imply that every step of every possible theory has to be studied" (p. 62).

The central element in our framework illustrated in Figure 1 is a *theory-driven causal path* that includes an hypothesized *series of intermediate outcomes* or incremental changes that occur in clients as they move toward recovery. This causal path illustrates a possible mechanism of impact of community mental health services by hypothesizing a sequence of changes that occur in clients as they are exposed to services. Figure 1 shows how different mental health services can describe the causal path with a series of intermediate outcomes that correspond to a theory of how that particular program exerts its influence on persons with SMI. The number of intermediate steps included in any causal path will vary and is based on the theory underlying the model. Researchers can articulate their own hypothesized causal steps based on the recovery model that is being used by the program they are evaluating. It is important to realize that any model that is constructed is conceptual and needs to be tested empirically.

The program's theory of implementation defines the strategy for implementing a program and focuses on whether the program is actually implemented as intended (Chen, 1990; Grembowski, 2001; Weiss, 1998). The framework is informed by the hypothesis that for desired outcomes to occur: (a) the mental health program or service to be evaluated must be organized as identified in efficacy trials ("implementation system"); (b) specific treatment, rehabilitation, and/or support services must actually be delivered; (c) family and natural supports must be available and not be burdened; and (d) no major changes should occur to external factors, which could affect SMI client's expected longer term outcomes. The *implementation system* and *treatment, rehabilitation, and support services actually*

Figure 1
Framework for Comprehensive Evaluation of Client Outcomes
in Community Mental Health Services



delivered for any mental health service are important mediators of outcomes. The variables to be included are informed by the service's theory of implementation, which focuses on whether the program was implemented as intended and the type and amount of services were actually provided to each client (Chen, 1990, 2005; Grembowski, 2001; Vingilis & Pederson, 2001; Weiss, 1998). For example, Rapp (1998) describes eight structural and seven service requirements for effective case management. Supported employment is most effective when it is carried out using the Individual Placement and Support (IPS) model of vocational rehabilitation (Cook et al., 2005; Latimer, 2005) in which clinical and vocational services are very closely integrated, according to the IPS theory of implementation (Drake, Becker, Bond, & Mueser, 2003). Evidence-based reviews document the details of specific treatment and rehabilitation interventions, such as supported employment (Bond, 2004), social skills training (Pilling, Bebbington, Kuipers, Garety, Geddes, Martindale, et al., 2002), psychoeducation (Pekkala & Merinder, 2003), Cognitive Behavioural Therapy (Mueser et al., 2002; Pilling, Bebbington, Kuipers, Garety, Geddes, Orbach, et al., 2002), illness management (Mueser et al., 2002; Mueser, Torrey, Lynde, Singer, & Drake, 2003), and integrated mental health and substance abuse treatment (Drake, Mueser, Brunette, & McHugo, 2004), which may be included in this element of the framework as mediating variables, depending on the specific mental health program being evaluated. *Family and natural supports* and *external factors* are included in the framework elements as potential mediators to acknowledge the importance of other social influences and policy shifts that can influence SMI client outcomes through changes in the actual availability or delivery of health and social services. Evaluators would choose variables that are pertinent to the local context.

The next element in the framework describes *longer term outcome for clients* for both the cause-effect and implementation theories. This can include primary and secondary outcome variables according to the program's theory of cause and effect, relevant literature, and stakeholder needs. A final element that needs to be considered in a conceptual framework and analysis plan includes the moderators of mental health outcomes. In order to eventually improve the quality of life of clients with SMI, it is important to understand how specific *target population* variables moderate outcomes for persons with SMI.

The remainder of this article presents, for heuristic purposes, a case example of operationalizing and testing the framework in an ACT evaluation (Ministry of Health and Long-Term Care, 2005). ACT

was chosen to test the framework because it already has established overall treatment effects through efficacy and effectiveness RCTs in the USA, Britain, Australia, Africa and Canada (Allness, 1997; Bond et al., 2001; Bond, McGrew, & Fekete, 1995; Bond, Miller, Krumwied, & Ward, 1988; Bond et al., 1990; Marx, Test, & Stein, 1973; McGrew & Bond, 1995; Morse et al., 1997; Scott & Dixon, 1995; Stein & Test, 1980; Stein, Test, & Marx, 1975; Test & Stein, 1978; Thompson, Griffith, & Leaf, 1990).

CASE EXAMPLE: CONCEPTUALIZING, OPERATIONALIZING, AND TESTING A FRAMEWORK IN AN ACT EVALUATION

ACT is a community-based service in which a multidisciplinary team delivers comprehensive treatment, rehabilitation, and support services (a “mini-system of care”) to clients with persistent SMI. Most services are provided within this team without referring clients to multiple community mental health providers (Allness, 1997; Lehman, Dixon, Kernan, DeForge, & Postrado, 1997) because of the number and variety of staff available to flexibly deploy therapeutic resources (Latimer, 2005) with a level of intensity that is titrated to meet individual client needs. According to the updated Ontario Program Standards for ACT teams (Ministry of Health and Long-Term Care, 2005) an urban/full-size ACT team will have 12.8 FTE (full-time equivalent) multidisciplinary staff including nurses, social workers, occupational therapists, vocational specialists, peer support staff, an addictions specialist, a part-time psychiatrist, and a program assistant. Rural/small ACT teams should have 9.5 FTE with a similar range of disciplines. The client to staff ratio at capacity (excluding the psychiatrist and program assistant) is 10 for urban teams, 8 for rural/smaller teams, and 5.5 for rural teams with distant travel requirements.

Using the approach described by many program evaluation scholars (Chen, 1990, 2005; Chen & Rossi, 1980; Cordray, 1989; Grembowski, 2001; Lipsey, 1988; Mayne, 2001; Petrosino, 2000; Posavac & Carey, 2003; Rossi et al., 1999; Vingilis & Pederson, 2001; Weiss, 1998), we will present an hypothesized conceptual framework to pictorially capture both program cause and effect and implementation theories, a conceptualization of key variables that can influence longer term outcomes of SMI clients, and a method to empirically test the framework in an ACT evaluation.

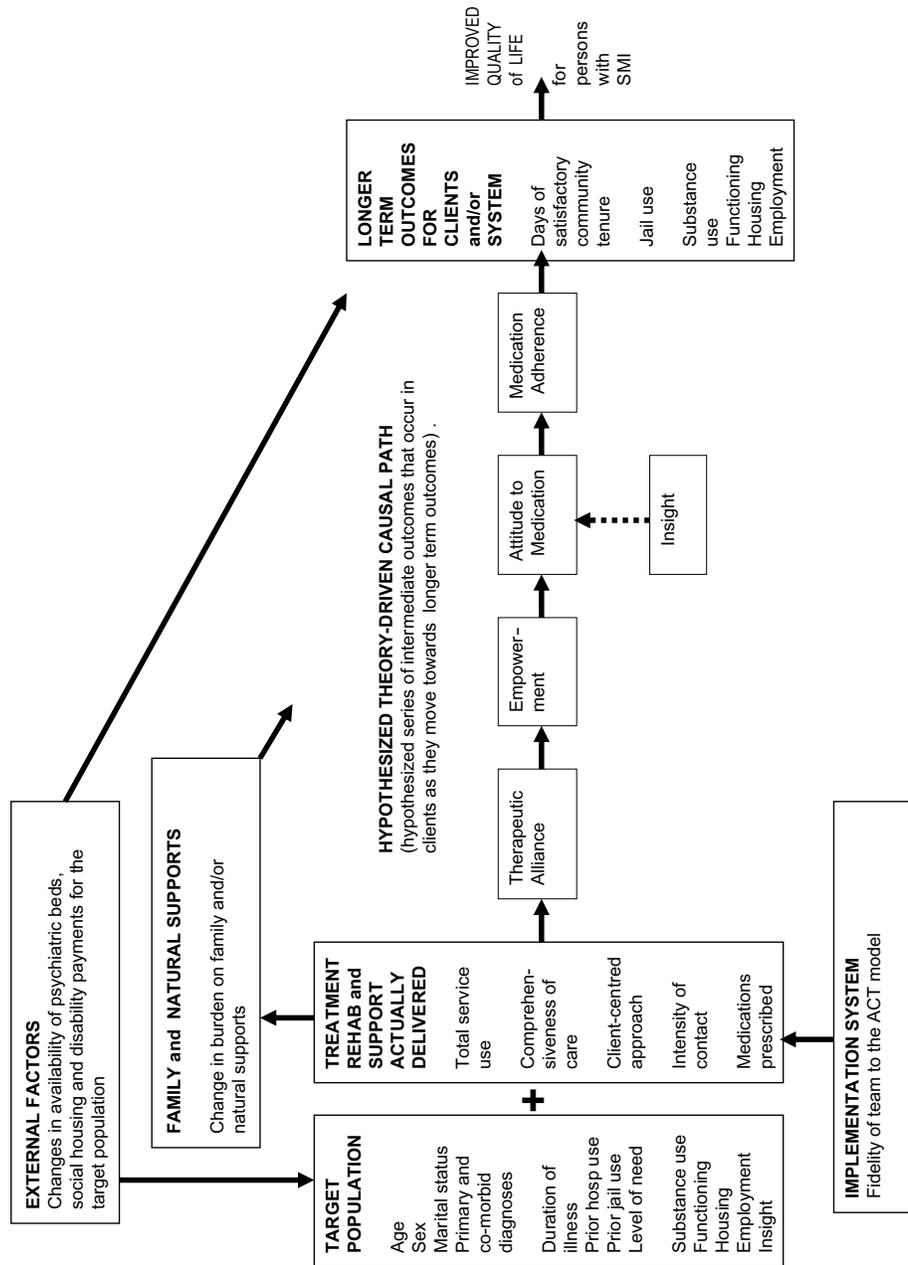
Findings from other health-related models and previous de-institutionalization outcome studies on variables influencing outcomes and

possible cause-effect pathways provided input for our hypothesized framework. Construct validity was further enhanced through three stakeholder consultations. In 1999, a colloquium was held in Southwestern Ontario to use the knowledge and experience of service providers, health planners, and service users to identify issues related to community-based mental health outcomes in anticipation of the projected closing of two local psychiatric hospitals (Schrecker, 1999). A list of potential participants was generated, and, using purposive maximum variation sampling (Flick, 1998) to include a range of stakeholders from both rural and urban jurisdictions, 35 stakeholders, who were blinded to the original draft framework, were facilitated to identify what they considered to be important mediators, moderators, outcomes, and causal pathways to community-based mental health services and to generate a model independently (Flick, 1998). The stakeholders included clients with SMI and their families, community psychiatrists, mental health service providers of all disciplines, representatives and administrators of social service and community mental health agencies, police, and mental health planners in Southwestern Ontario (Schrecker, 1999; Vingilis et al., 2003). The responses of participants were recorded by both audiotapes and flip charts, and used to revise the model. A second colloquium continued on the track of identifying issues related to community-based mental health outcomes which further informed the developing framework (Schrecker, 2001). The revised framework, including participants' suggestions for operational definitions/indicators, was presented at the third colloquium, and further input was generated to refine the details of the framework (Vingilis et al., 2003). The framework illustrated in Figure 2 will be described using details from the psychiatric and mental health services literature, other mental health models and health belief theories, and colloquia findings as it applies to persons with SMI.

Hypothesized Program Theory of Cause and Effect

The causal path that was identified to test in our framework includes therapeutic alliance, empowerment, attitude to medications, and medication adherence, as illustrated in Figure 2, although there are others that could be included. Substantive evidence is available on the importance of medication adherence for improved outcomes of clients with SMI (Fernandez, Evans, Griffiths, & Mostacchi, 2006; Magura, Laudet, Mahmood, Rosenblum, & Knight, 2002; Svedberg, Backenroth-Ohsako, & Lutzen, 2003; Tabor & Lopez, 2004) and therefore represents an important variable for recovery. Yet, medication

Figure 2
Framework for Testing in an ACT Evaluation



non-adherence is common, with researchers finding a non-adherence rate up to 50% in community-based persons with SMI (Fernandez et al., 2006; Wale & Moon, 2005). Many scholars have examined barriers to adherence and have identified various interpersonal factors that play an important role in supporting medication adherence. Key interpersonal factors found to influence medication adherence have been the therapeutic relationship and empowerment. Additionally, other research and health belief theories have indicated that attitudes are central to medication adherence (Corrigan, 2002a; Ellis & King, 2003; Svedberg et al., 2003; Tabor & Lopez, 2004; Usher & Arthur, 1997). The Health Belief Model and the Theory of Reasoned Action assert that individuals behave in ways to reduce perceived threats (disease symptoms) and increase perceived benefits (e.g., medication adherence) (Corrigan, 2002a; Tabor & Lopez, 2004). For testing our framework, we have hypothesized that the theory-driven causal path starts with *therapeutic alliance*. Howgego, Yellowlees, Owen, Meldrum, and Dark (2003) write that the concept of client empowerment through the therapeutic relationship is fundamental to the aims of service delivery in attempts to reduce the impact of mental illness on the individual and help in recovery. Various scholars have asserted that collaborative therapeutic relationships can lead to empowered clients who are likely to be active participants in the management of their illness, which should enhance their motivation to take medication, thereby leading to better outcomes (Corrigan, 2002b; Fernandez et al., 2006; Greenall, 2006; Usher & Arthur, 1997). In response to arguments that empowered clients might be less likely to take medications, Corrigan (2002b) asserts that the common psychological response of “reactance,” that is, the clients’ perceptions of threats to their freedom or control that may induce non-adherence to medication (Fogarty, 1997), should only occur if a therapeutic relationship is perceived as coercive and not empowering. However, empirical testing of the model will determine what variables are significant mediators along the causal path. Bordin’s (1994) model of therapeutic alliance, whereby collaborative endorsement of goals occur, is the most commonly used model and offers the most utility for case management treatment models (Howgego et al., 2003). Two meta-analyses, one descriptive review, and numerous other studies concluded that therapeutic alliance was a “robust” predictor of outcomes (Anthony, Rogers, & Farkas, 2003; Barker, 2001; Calsyn et al., 2002; Clarke et al., 2000; Gehrs & Goering, 1994; Horvath & Symonds, 1991; Howgego et al., 2003; Klinkenberg, Calsyn, & Morse, 1998; Martin, Garske, & Davis, 2000; McGrew et al., 1996; Mowbray, Cohen, & Bybee, 1993; Neale & Rosenheck, 1995; Priebe & Gruyters,

1993; Solomon, Draine, & Delaney, 1995; Tait, Birchwood, & Trower, 2003). Moreover, alliance ratings were also significantly associated with both attitude toward medication (Solomon et al., 1995) and medication adherence (Howgego et al., 2003). *Empowerment* is associated with clients' participation in their own recovery (Anthony, 1993; Davidson & Strauss, 1995; Fisher, 1994; Freund, 1993; Kirsh, Krupa, Horgan, Kelly, & Carr, 2005; Spaniol, Koehler, & Hutchinson, 1994) and is consistent with the consumer empowerment movement, a nursing management model, and the "strengths" model of case management (Franklin, Solovitz, Mason, Clemons, & Miller, 1987; Mueser, Bond, Drake, & Resnick, 1998; Rapp, 1998; Saleebey, 1996; Usher & Arthur, 1997). It continues to be an important theme in recent literature (Barker, 2001; Barry, Zeber, Blow, & Valenstein, 2003; Malm, Ivarsson, Allebeck, & Falloon, 2003; Mueser et al., 2002; Young et al., 2000). *Attitude to medications* is considered an important predictor of adherence and plays an important mediating role in health belief models (Corrigan, 2002a; Razali & Yahya, 1995; Tabor & Lopez, 2004; Voruganti & Awad, 2002). Many have written about the importance of "compliance" or "*adherence*" for persons with SMI (Azrin & Teichner, 1998; Bhanji, Chouinard, & Margolese, 2004; Corrigan, Liberman, & Engel, 1990; Cramer & Rosenheck, 1999; Dolder, Lacro, Dunn, & Jeste, 2002; Fenton, Blyler, & Heinssen, 1997; Gilmer et al., 2004; Tait et al., 2003; Weiss, Smith, Hull, Piper, & Huppert, 2002; Zygmunt, Olfson, Boyer, & Mechanic, 2002). Adherence is included because stopping medications is a very common reason for relapse and re-hospitalization (Fenton et al., 1997; Lieberman et al., 2005). There is considerable literature on the possible influence of *insight* on outcomes, but there does not appear to be agreement on the direction or nature of its influence (Birchwood et al., 1994; David, 1990; Tait et al., 2003; Weiler, Fleisher, & Arthur-Campbell, 2000). Differing views exist on how level of insight into psychotic symptoms might predict future outcomes and thus it is included as a possible mediating variable.

Hypothesized Program Theory of Implementation

The *implementation system* is measured by fidelity of ACT teams to the research-based model (i.e., implementing ACT with the critical ingredients) since fidelity influences efficacy and effectiveness in RCTs, especially the main outcome of reduced hospitalization (Bond et al., 2001; Brekke et al., 1997; Latimer, 1999; Marshall & Lockwood, 2002; McGrew, Bond, Dietzen, & Salyers, 1994; Minghella, Guantlett, & Ford, 2002; Rosenheck & Neale, 1998; Salyers et al., 2003).

The next element in our framework describes *treatment, rehabilitation and support services actually delivered* to the clients. These service variables that mediate outcomes are informed by the literature on the program's expected influence on SMI clients. For example, total service use, comprehensiveness of treatment, client-centred approach, intensity of contacts, and medications prescribed have all been shown to influence SMI clients' community outcomes (Allness, 1997; Allness & Knoelder, 1998; Anthony et al., 2003; Bond et al., 2001; Brekke et al., 1997; Everett et al., 2003; Frese, Stanley, Kress, & Vogel-Scibilia, 2001; Jacobsen, 2003; Jacobsen & Greenley, 2001; Kenny et al., 2004; Lehman et al., 2003; Lehman et al., 2004; McGrew et al., 1994; Rapp, 1998; Rosen & Teesson, 2001; Stein & Santos, 1998). *Family and natural support* variables are chosen from literature showing positive relationships among family support, reduced burden, and desired longer term client outcomes (McFarlane, Dushay, Stastny, Deakins, & Link, 1996) and from Cochrane reviews that found that family interventions may improve medication compliance and reduce relapse frequency in schizophrenia (Pharoah, Rathbone, Mari, & Streiner, 2005; Pilling, Bebbington, Kuipers, Garety, Geddes, Orbach, et al., 2002). *External factors*—for example, changes in availability of psychiatric beds, social housing, or disability payments—can mediate the outcomes of SMI clients receiving community mental health services.

For *longer term outcome for clients, days of satisfactory community tenure* as a *primary outcome* is frequently cited in the literature as the “collateral outcome” (Brown, Burlingame, & Lambert, 2000) of greatest interest to policy makers. It is a valid outcome measure when the framework includes as a mediator external influences such as changes in availability of psychiatric beds. Days of community tenure are also affected by adequacy of services provided (“treatment rehabilitation and support actually delivered”). *Secondary outcomes* include variables that will help interpret the results of the evaluation of the primary outcome. For example, if the primary outcome is community tenure, it may be difficult to “distinguish efficiency from under-treatment,” according to Lehman, Carpenter, Goldman, and Steinwachs (1995), who suggested measuring a wider range of client outcomes, not just symptoms and hospitalization. Incarceration is an important negative outcome of deinstitutionalization (Hartford, Heslop, Stitt, & Hoch, 2005; Pandiani, Banks, & Scjacht, 1998; Robertson, Pearson, & Gibb, 1996). Jail use as a secondary outcome reflects research on the high prevalence of mental illness in jails and the expanding role of criminal justice as a system of last resort in the era of de-institutionalization (Gunn, 2000; Hartford et al., 2005; Lamb &

Weinberger, 1998; Lamb, Weinberger, & DeCuir, 2002). Other longer term client outcomes related to community tenure include substance use, functioning, housing, and employment (Bond et al., 2001; Marshall & Lockwood, 2002). Different programs may measure different longer term primary and secondary outcome variables depending on their unique context and stakeholder needs.

A final set of variables are the moderators of mental health outcomes which include *target population* characteristics. For example, studies have found associations between younger age, male sex, previous hospitalization, previous incarceration, level of need, and substance use and longer term outcomes such as hospitalization, homelessness, and incarceration (Clarke et al., 2000; Essock et al., 2006; Goering, Wasylenki, Lancee, & Freeman, 1984; Joannette, Lawson, Eastabrook, & Krupa, 2005; Klinkenberg & Calsyn, 1998; Swartz et al., 1998). Moderators such as history of high hospital utilization, a primary psychotic diagnosis, long duration of illness, high level of client needs, low level of functioning, and co-morbid disorders describe the target population of SMI persons for whom ACT is cost effective, as measured mostly by reduced hospital use (Allness & Knoelder, 1998; Bond et al., 1990, 1995, 2001; Lehman et al., 2004; Marshall & Lockwood, 2002; Rosenheck & Cicchetti, 1998; Stein & Santos, 1998). Substance abuse is important to measure due to its potential role as a moderator because it can influence both the likelihood that SMI clients will receive ACT services and the outcomes such as hospital use (Essock et al., 2006; Green, Salomon, Brenner, & Rawlins, 2002; Rosenheck et al., 1999). In evaluations of other community mental health services, these moderating variables could be client eligibility criteria for the specific program being evaluated.

In the development of an evaluation framework, once the theoretical constructs are identified, indicators are chosen. Ideally, the outcome indicators for measuring the effectiveness of clinical services should be those that can be changed by the interventions provided by the program being evaluated. This is hard to achieve because of the complexity of needs of people with SMI and because of the multiple domains of intervention. Thus, multiple indicators are needed to improve the validity of the findings. A mixed-method, multi-measures, repeated measures approach with at least a two-year follow-up period is used as a way to enhance validity via convergence of findings, to assess the plausibility of identified threats to validity, and to enhance the interpretability of the causal paths (Cook & Campbell, 1979; Posavac & Carey, 2003; Rossi et al., 1999).

Figure 2 illustrates how our framework has been operationalized for testing in an ACT evaluation, and Table 1 presents our choice of variables and indicators. However, we recognize there are many different choices that could be made by other evaluators depending on the program being evaluated, their own context, and stakeholder needs. For the purposes of illustration, we have included a list of the variables, operational definitions and suggested frequency of measurement.

Instruments for the study were chosen with the following criteria: validated psychometric properties, commonly used, seen as clinically meaningful by front line staff, “do-able” in ordinary settings, appropriate for clients with SMI, and brevity. In keeping with the recommendations of the NIMH monograph (Ciarlo et al., 1986), we chose data that could be successfully collected from six sources (Table 1): (a) client self-reports, (b) ACT clinicians, (c) client records, (d) ACT team’s staff activity records, (e) ACT coordinators, and (f) client families.

To test the program theory of cause and effect, the mediating effects of the intermediate variables can be examined using structural equation modelling (Calsyn & Winter, 2002) or hierarchical multiple regression (Watson & Geller, 2005) techniques. According to Judd and Kenny (1981) and Baron and Kenny (1986), to demonstrate mediation it is necessary to find a relationship between mediator and the outcome variable and to demonstrate that the size of the treatment effect on the outcome variable is reduced when controlling for the mediator. The hypothesized “mediating causal chain” to be tested is as follows: treatment delivered → therapeutic alliance → empowerment → attitude to medication → medication adherence → community tenure. If our hypothesis is correct, treatment delivered should predict alliance; treatment delivered should predict community tenure; alliance should predict community tenure when entered into the equation with treatment delivered. Total mediation is observed if all these conditions are met and the inclusion of therapeutic alliance in the analysis renders the correlation between the treatment delivered and community tenure insignificant, while partial mediation is observed when the treatment effect size is reduced. On the other hand, if the correlation is still significant, it means that both treatment and alliance directly and independently affect community tenure, that is, alliance is not a mediator of treatment delivered. The other variables are assessed in similar fashion and mediation is similarly observed. The analyses will examine the adjusted effects of system and person mediators on

Element in the framework	Variable	Operational definition or instrument	Frequency	Description
TARGET POPULATION (continued)	Insight	Present State Exam (PSE) - insight score	Baseline, q 12mo	(7 items) = .89; attentiveness (4 items) = .83; social deviancy (4 items) = .67; phobic (4 items) = .81; suicidal (2 items) = .72; substance abuse (2 items) = .83 (Herman & Mowbray, 1991). CCAR has detailed behavioural descriptions of all anchor points and levels of severity to improve reliability, and was designed for use by front line clinicians. Subscales measure substance use, level of functioning, housing and employment. PSE item #17 is a rating of insight into psychotic symptoms (Wing, Cooper, & Sartorius, 1974) is a single item with 4 response categories which have behavioural descriptors that improve reliability of ratings. Concurrent validity shown when PSE insight categories were differentiated by a self report insight scale (Birchwood et al., 1994).
TREATMENT, REHABILITATION and SUPPORT ACTUALLY DELIVERED	Total service use Comprehensiveness of care Client-centred approach Intensity of contact Medications prescribed	Number of months in ACT Care plan score as a categorical variable 0-3 Client signature on plan Number contacts by ACT staff/month Medications prescribed by categories	All are q 6 mo	Total service = number of months in ACT (measured from participant's date of registration to the ACT team) Comprehensiveness of treatment, rehabilitation and support care plan in each 6 month period: 0 = no new plan in any domain of treatment, rehabilitation or support; 1 = one domain has a plan; 2 = two domains have a plan; 3 = three domains have a plan Client-centred approach is indicated by presence of client signature on the plan (yes/no). Intensity of service is extracted from staff activity sheets as number of contacts by ACT staff per month. Psychotropic medications & maximum doses prescribed in each 6 mo period for categories: typical antipsychotics, atypical antipsychotics, mood stabilizers, antidepressants and anti-anxiety or benzodiazepine medications.
IMPLEMENTATION SYSTEM	Fidelity of team to the ACT model	Dartmouth ACT Scale (DACTS)	Baseline, q12mo	DACTS (Teague, Bond, & Drake, 1998) provides a reliable and valid measure of the degree to which services are implemented according to best practice standards. Empirically and theoretically derived criteria address multiple dimensions of program structure and process; Cronbach's alpha .92; construct validity shown by high scores on DACTS related to lower hospital use by clients.

Element in the framework	Variable	Operational definition or instrument	Frequency	Description
EXTERNAL FACTORS	Availability of psychiatric beds, social housing and disability benefits	# Psych beds per 100,000 population in areas served by ACT teams # Social housing units per 100,000 population in same area Monthly disability payments in \$	q 12 mo	Data from Southwestern Ontario mental health planning bodies Data from social housing agencies in areas where the participants' ACT teams are located Data from Ontario Disability Support Program (ODSP) and Canada Pension Plan disability benefits
THEORY-DRIVEN CAUSAL PATH (Series of Intermediate Outcomes that occur in clients as they move towards longer term outcomes)	Therapeutic alliance Empowerment Attitude to medication Adherence to medication Insight into psychosis	Working Alliance Inventory (WAI) Empowerment Scale Drug Attitude Inventory (DAI-10) Medication Adherence Scale Present State Exam (PSE) insight score	All variables measured q 6 months	WAI is a self report scale. Cronbach's alpha .93; evidence supporting convergent validity of the scales (Goering et al. 1984; Horvath & Greenberg, 1989; Horvath & Luborsky, 1993). This assesses the bond between patient and therapist, mutual endorsement of treatment goals and mutual responsibility for the tasks of treatment. Self report scale (Rogers, Chamberlin, Ellison, & Crean, 1997); measures empowerment as defined by mental health consumers; Cronbach's alpha .86; can discriminate amongst groups of respondents in self help vs institutionalized patients and non-patients; a second study confirmed Cronbach's alpha .85 and factor structure (Wowra & McCarter, 1999). Construct validity demonstrated in a study on partial hospitalized patients with SMI (Corrigan, Faber, Rashid, & Leary, 1999). DAI-10 is a self report scale with reliability .93; 4 week retest reliability .82; items discriminated between adherent and non-adherent patients (Hogan, Awad, & Eastwood, 1983; Awad, Hogan, Voruganti, & Heselgrave, 1995) A single item scale with 5 response choices covering the 6 month preceding period. 1 = never missed medication; 2 = missed a couple of times but essentially took all prescribed doses; 3 = missed several times, but took at least half; 4 = took less than half; 5 = stopped taking medications altogether (Miklowitz, Goldstein, Nuechterlein, Snyder, & Doane, 1986). PSE item #17 rating of insight (Wing et al., 1974)

Element in the framework	Variable	Operational definition or instrument	Frequency	Description
FAMILY and NATURAL SUPPORTS	Potential burden shift to family or natural supports	Family Burden Interview Schedule	q12 mo	Family Burden Interview Schedule (Pai & Kapur, 1981, 1982; Schene, Tessler, & Gamache, 1994) is administered by a mail survey to family/natural supports with permission of the participants. It has acceptable psychometrics as a self-administered scale in family members of SMI clients. Inter-rater reliability of the 24 items: reliability coefficient was above 90% for 20 items and between 87-89% for the other 4 items. Validity was tested with a correlation coefficient of .72 (df=1) between overall objective burden assessed by the raters with the subjective burden as reported by the relatives (Pai & Kapur, 1982).
LONGER TERM OUTCOMES for CLIENTS and/or SYSTEM	Primary outcome: Days of satisfactory community tenure	Total days in the 6 month period minus days in hospital minus days in jail	q 6 mo	Data to calculate days of satisfactory community tenure are extracted from participants' clinical records.
	Jail use	Days in jail in previous 6 months	q 6 mo	Days in jail are extracted from participants' clinical records
	Secondary outcomes: Substance use	CCAR substance use subscale	q 12 mo	These four secondary outcomes are measured with subscales in CCAR. (See above psychometrics re: CCAR)
	Functioning	CCAR level of functioning subscale	q 12 mo	
Housing	CCAR housing data	q 12 mo		
Employment	CCAR employment status	q 12 mo		

the *primary* (satisfactory community tenure), and *secondary* (jail use, and Colorado Client Assessment Record [CCAR]-subscale scores for level of function, housing, and employment) outcomes. These analyses will assist in determining what variables directly and indirectly affect community tenure and the other outcome variables, that is, whether the relationship among hypothesized mediating variables is “linear” or not.

To test the utility of the hypothesized comprehensive evaluation framework, a two-level Poisson model (HLM) is proposed to test the conceptualized relationships (mediators and moderators) within the evaluation framework (Raudenbush & Bryk, 2002). This approach could also validate the analyses suggested above. The primary outcome is the satisfactory community tenure (the number of days in a half-year period that a client is not in hospital or in jail). For this count response, a Poisson model is appropriate. Secondary outcomes to also be modelled could include CCAR subscale scores, including level of function, employment, and living arrangements.

Other dependent variables include time-varying variables such as mediators within the causal model (therapeutic alliance, empowerment, satisfaction with medication, medication adherence, insight) over the course of the study. There are also many baseline dependent variables as listed in Table 1. The differences between ACT teams may affect the outcomes, so this must be given consideration by our model.

The first level models the time-varying covariates through the logarithm of the outcomes. That is, Level One will measure intra-individual changes in the event rate over time and will include time-varying variables such as the causal chain mediators over the course of the study. As a simple example, the model can be specified as:

$$\text{Log}(y_{ij}) = \pi_0 + \pi_1 * \text{time}_j + \pi_2 * \text{causal model mediators} \\ (\text{e.g. therapeutic alliance, etc}) + \varepsilon$$

where y_{ij} denotes the days of satisfactory community tenure for client i during the time = j th 6-month period. ε is assumed to be random with mean 0 and variance τ^2 . Other time-varying variables can be added to the model.

Note that this model is not the same as an ordinary generalized linear model. The covariate coefficients π 's are assumed to be random

variables, and they may be affected by the individual factors or items such as treatments actually delivered, family supports, and/or fidelity to the ACT model. Level Two will measure differences among individuals, such as target population characteristics (moderators). For example, these relations may be approximately linear as in:

$$\pi_k = \beta_{k0} + \beta_{k1} * \text{target pop characteristics (e.g., sex)} + \beta_{k2} \text{ fidelity} + \beta_{k3} * \text{fidelity} * (\text{treatment delivered}) + \varepsilon_k$$

where these ε_k 's are assumed to be random with mean 0 and variance τ_k^2 .

A number of statistical methods can be used to study inference questions arising from the model. If parametric distributions (e.g., normal distributions for the ε 's) are assumed, the maximum likelihood method can be applied in a straightforward manner. From a robustness standpoint, we may envision situations in which the assumed distributional conditions are violated but where the assumptions on the mean and variance of the ε 's still hold; in such cases, we may proceed by employing an estimating equation methodology.

The factors that affect the outcomes significantly may be interpreted as factors that influence the outcomes. Interactions among the factors should also be considered, especially between mediators and moderators; these could be added into the second level; the interpretation of such interactions is as usual. It may be possible, or necessary, to model the data using a three-level model. In that case, the τ_k 's from the second level could be modelled as linear combinations of variables such as ACT teams.

CONCLUSIONS

This article reviews the challenges in conducting comprehensive evaluation of SMI client outcomes in community mental health services. Two issues precipitated our interest in developing and testing a more comprehensive model to evaluate community mental health services. The first issue related to the health care policy in Ontario in the mid 1990s on the planned downsizing of psychiatric hospitals. The worry, as described in the media and academic journals alike, was that further de-institutionalization of persons with SMI without sufficient community resources would augment their challenges, whereby lack of housing and community mental health service options could lead to homelessness, inconsistent use of services and treatments, crimi-

nalization, and so on. The interest in the community mental health services that were being implemented and concern about potential negative consequences brought about demands to evaluate the current mental health reform policy and to provide feedback to governments interested in outcome information. Yet, it was clear to us as clinicians that the RCT methodology, using very circumscribed and controlled treatments and with very strict inclusion and exclusion criteria, would not work as an evaluation model when many different persons with SMI were living in the community, using a wide range of services. The evaluation methods that were commonly used in community psychiatry then did not reflect the complicated realities of our SMI clients' lives, appeared unable to capture the causal complexity of their care, and did not seem to evaluate the recovery process and outcomes of care in a valid manner. A second and related issue was the accountability movement during the same time period, which seemed to lead many health ministries and researchers to identify the need for performance indicators. For example, the Ontario Ministry of Health and Long Term Care has mandated mental health reporting using the Resident Assessment Instrument–Mental Health (RAI-MH) data collection system, which includes a Minimum Data Set for Mental Health (MDS-MH) with about 250 data elements, 28 Mental Health Assessment Protocols (MHAPs) for care planning, 32 Quality Indicators for Mental Health (QIMHs), a series of outcome measures, and the System for Classification of In-Patient Psychiatry (SCIPP) in all hospitals with adult inpatient mental health beds (Canadian Institute for Health Information, 2006). Although the development of indicators is to be commended, this push to identify indicators has been done rather independently of developing an overall conceptual framework by which to understand how and why persons with SMI recover and to interpret the 300+ measures that are being collected. It is not clear how the various measures are hypothesized to hang together conceptually both cross-sectionally and longitudinally, how the different measures are hypothesized to interact with each other, and how the different patterns of indicators are to be interpreted.

In our search for answers, we increasingly found in the evaluation and social sciences literature support for using a theory-driven, causal model approach to outcome evaluations. However, we also found that few evaluations had attempted to develop and test comprehensive frameworks of outcomes for SMI clients using community mental health services. The challenge for us was to conceptualize both a causal model and key mediators and moderators to bring into a single analysis plan. A thorough review of various program evaluation

methods, “change process research” approaches for psychotherapy, other health-related and mental health models, and previous research on variables influencing outcomes assisted in developing a broader understanding of relationships, linkages, and processes by which an initial framework could be developed. In order to flesh out the hypothesized framework for testing in an ACT evaluation (Figure 2), the biggest challenge was deciding on the sequence for the theory-driven causal path. We were guided by clinical experience with the recovery and outcome process of clients with SMI, and used a variety of publications, some of which were intended to explore the directionality/sequence of some of these steps and some of which were not, but which did provide indirect support for making hypotheses about sequence. The stakeholder colloquia participants (described above) provided valuable input for making such decisions. The framework was then further refined through examination of the rudimentary statistical analyses of our feasibility study data. Finally, peer reviewers from our grant submissions provided comments and questions that helped us clarify and reframe our thinking on this theory-driven causal path. The final set of challenges came with decisions about operationalizing the framework for testing in an actual ACT evaluation. From a dizzying array of possibilities described in the literature, we had to choose specific indicators to measure all of the variables that we had already said were important for each element of the framework. To meet this challenge, we had to make choices on instruments that were informed by the literature as showing sound psychometric properties. However, to be able to maximize completeness of data collection by staff and clients, the choices had to have both face validity (that is, were supported by stakeholders at the colloquia, made sense to front-line ACT clinicians, were methodologically sound, yet were practical for an evaluation that occurred in ordinary ACT practice, and were able to be measured from client interviews, staff interviews, or chart extraction) and non-redundancy (that is, if there was a choice among similar valid instruments, then obviously the choice would be to include the government-mandated instrument and/or the instrument already being collected by the ACT teams so as to not put excessive burden on clients or staff).

This article presents an illustrative example of how a comprehensive evaluation framework can be conceptualized, developed, operationally defined, and tested. This article is not presented as a final answer, but rather as our attempt to provide a strategy for building an evaluation framework that captures the complexity of community mental health services, includes incremental steps toward change within SMI

clients, is based on previous models, and uses current social science evaluation methods. The real test of the framework, however, will be based on the findings of the statistical analyses. Importantly, advances in statistical modelling in the last few years have provided the opportunities to test empirically whether the conceptualized model is supported, as “the proof of the pudding” is really in the statistical analyses to determine the most parsimonious model. In conclusion, we realize that our decisions on aspects such as the causal path and choice of indicators may be challenged by readers for a variety of reasons, but we look forward to this peer input to further develop and test our framework.

ACKNOWLEDGEMENTS

This study received support from the Donner Canadian Foundation and the Canadian Institutes for Health Research (CIHR), Interdisciplinary Capacity Enhancement Team (ICE-T) grants. The authors would like to thank Drs. Wenqing He and John Braun for their development of the multilevel modelling section of the article, and Drs. Beth Mitchell and Cheryl Forchuk for their contribution to the research study and the development of the original research proposal.

REFERENCES

- Allness, D.J. (1997). The program of Assertive Community Treatment (PACT): The model and its replication. *New Direction for Mental Health Services*, 74, 17–26.
- Allness, D.J., & Knoelder, W.H. (1998). *The PACT model of community-based treatment for persons with severe and persistent mental illnesses: A manual for PACT start-up*. Arlington, VA: NAMI.
- Altschul, D.B., Wackwitz, J., Coen, A.S., & Ellis, D. (2001). Colorado assessment record inter-rater reliability study: Final report. Colorado: Colorado Mental Health Services.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of the American Psychiatric Association—Version IV*. Washington, DC: American Psychiatric Publishing.

- Anthony, W. (1993). Recovery from mental illness: The guiding vision of the mental health service system in the 1990's. *Psychosocial Rehabilitation Journal*, 4, 11–23.
- Anthony, W., Rogers, E.S., & Farkas, M. (2003). Research on evidence-base practices: Future directions in an era of recovery. *Community Mental Health Journal*, 39, 101–114.
- Awad, A.G., Hogan, T.P., Voruganti, L.N.P., & Heselgrave, R.J. (1995) Patients' subjective experience on antipsychotic medications. *International Clinical Psychopharmacology*, 10(Suppl. 3), 123–132.
- Azrin, N.H., & Teichner, G. (1998). Evaluation of an instructional program for improving medication compliance for chronically mentally ill outpatients. *Behavior, Research & Therapy*, 36, 849–861.
- Barker, P. (2001). The tidal model: Developing an empowering, person-centred approach to recovery within psychiatric and mental health nursing. *Journal of Psychiatric & Mental Health*, 8, 233–240.
- Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182
- Barry, K.L., Zeber, J.E., Blow, F.C., & Valenstein, M. (2003). Effect of strengths model versus assertive community treatment model on participant outcomes and utilization: Two year follow-up. *Psychiatric Rehabilitation Journal*, 26, 268–277.
- Bartsch, D.A., Shern, D.L., Coen, A.S., & Wilson, N.Z. (1995). Service needs, receipt, and outcomes for types of clients with serious and persistent mental illness. *Journal of Mental Health Administration*, 22, 388–400.
- Bhanji, N., Chouinard, G., & Margolese, H.C. (2004). A review of compliance, depot intramuscular antipsychotics and the new long-acting injectable antipsychotic risperidone in schizophrenia. *European Neuropsychopharmacology*, 14, 87–92.
- Birchwood, M., Smith, J., Drury, V., Healy, J., Macmillan, F., & Slade, M.A. (1994). A self-report insight scale for psychosis: Reliability, validity and sensitivity to change. *Acta Psychiatrica Scandinavica*, 89, 62–67.

- Bond, G.R. (2004). Supported employment: Evidence for an evidence-based practice. *Psychiatric Rehabilitation Journal*, 27(4), 345–359.
- Bond, G.R., Drake, R., Mueser, K.T., & Latimer, E. (2001). Assertive Community Treatment for people with severe mental illness: critical ingredients and impact on patients. *Disease Management and Health Outcomes*, 9, 141–159.
- Bond, G.R., McGrew, J.H., & Fekete, D.M. (1995). Assertive outreach for frequent users of psychiatric hospitals: A meta-analysis. *Journal of Mental Health Administration*, 22, 4–16.
- Bond, G.R., Miller, L.D., Krumwied, R.D., & Ward, R.S. (1988). Assertive case management in three CMHCs: A controlled study. *Hospital and Community Psychiatry*, 39, 418.
- Bond, G.R., Witheridge, T.F., Dincin, T., Wasmer, D., Webb, J., & DeGraaf-Kaser, R. (1990). Assertive Community Treatment for frequent users of psychiatric hospitals in a large city: A controlled study. *American Journal of Community Psychology*, 18, 865–891.
- Bordin, E.S. (1994). Theory and research on the therapeutic working alliance: new directions. In A.O. Horvath and L.S. Greenberg (Eds.), *The working alliance: Theory, research and practice* (pp. 13–37). New York: Wiley.
- Boyle, M.H., & Willms, J.D. (2001). Multilevel modelling of hierarchical data in developmental studies. *Journal of Child Psychology Psychiatry*, 42, 141–162.
- Brekke, J.S., Long, J.D., Nesbitt, N., & Sobel, E. (1997). The impact of service characteristics on functional outcomes from community support programs for persons with schizophrenia: A growth curve analysis. *Journal of Consulting Clinical Psychology*, 65, 464–475.
- Brown, G.S., Burlingame, G., & Lambert, M. (2000). *Behavioral healthcare performance and outcomes management: A survey of best practices*. Olympia, WA: State of Washington Joint Legislative Audit and Review Committee.
- Brugha, T.S., & Lindsay, F. (1996). Quality of mental health service care: The forgotten pathway from process to outcome. *Social Psychiatry Psychiatric Epidemiology*, 31, 89–98.

- Burns, B.J., & Santos, A.B. (1995). Assertive Community Treatment: An update of randomized trials. *Psychiatric Services, 46*(7), 669–75.
- Busch, A.B., & Sederer, L.I. (2000). Assessing outcomes in psychiatric practice: Guidelines, challenges, and solutions. *Harvard Review of Psychiatry, 8*, 323–327.
- Calsyn, R.J. (2003). A modified ESID approach to studying mental illness and homelessness. *American Journal of Community Psychology, 32*(3–4), 319–331.
- Calsyn, R.J., Morse, G.A., Klinkenberg, W.D., Yonker, R.D., & Trusty, M.L. (2002). Moderators and mediators of client satisfaction in case management programs for clients with severe mental illness. *Mental Health Services Research, 4*, 267–275.
- Calsyn, R.J., & Winter, J.P. (2002). Social support, psychiatric symptoms and housing: A causal analysis. *Journal of Community Psychology, 30*, 247–259.
- Canadian Institute for Health Information. (2006). *Ontario Mental Health Reporting System (OMHRS)*. Retrieved from <http://www.cihi.ca/cihiweb/disPage.jsp?cw_page=services_omhrs_e>.
- Chen, H.-T. (1990). *Theory-driven evaluations*. Newbury Park, CA: Sage.
- Chen, H.-T. (2005). *Practical Program Evaluation*. Thousand Oaks, CA: Sage.
- Chen, H.-T., & Rossi, P.H. (1980). The multi-goal, theory-driven approach to evaluation: A model linking basic and applied social science. *Social Forces, 59*, 106–122.
- Chen, H.-T., & Rossi, P.H. (1983). Evaluating with sense: The theory-driven approach. *Evaluation Review, 7*(3), 283–302.
- Chue, P., Tibbo, P., Wright, E., & Van Ens, J. (2004). Client and community services satisfaction with an assertive community treatment subprogram for inner-city clients in Edmonton, Alberta. *Canadian Journal of Psychiatry, 49*(9), 621–624.

- Ciarlo, J.A., Brown, T.R., Edwards, D.W., Kiresuk, T.J., & Newman, F.L. (1986). *Assessing mental health treatment outcome measurement techniques* (Rep. No. National Institutes of Mental Health FN No. 9 DHHS Publication No. [ADM]86-1301). Washington, DC: U.S. Government Printing Office, Superintendent of Documents.
- Clarke, G.N., Herinckx, H.A., Kinney, R.F., Paulson, R.I., Cutler, D.L., Lewis, K., et al. (2000). Psychiatric hospitalizations, arrests, emergency room visits, and homelessness of clients with serious and persistent mental illness: Findings from a randomized trial of two ACT programs vs. usual care. *Mental Health Services Research, 2*, 155–164.
- Cook, J.A., Leff, S., Blyler, C.R., Gold, P.B., Goldberg, R.W., Mueser, K.T., et al. (2005). Results of a multi-site randomized trial of supported employment interventions for individuals with severe mental illness. *Archives of General Psychiatry, 62*, 505–512.
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.
- Cordray, D.S. (1989). Optimizing validity in program research: An elaboration of Chen and Rossi's theory-driven approach. *Evaluation and Program Planning, 12*, 379–385.
- Corrigan, P.W. (2002a). Adherence to anti-psychotic medications and health behaviour theories. *Journal of Mental Health, 11*, 243–254.
- Corrigan, P.W. (2002b). Empowerment and serious mental illness: Treatment partnerships and community opportunities. *Psychiatric Quarterly, 73*, 217–228.
- Corrigan, P.W., Faber, D., Rashid, F., & Leary, M. (1999). The construct validity of empowerment among consumers of mental health services. *Schizophrenia Research, 38*, 77–84.
- Corrigan, P.W., Liberman, R.P., & Engel, J.D. (1990). From noncompliance to collaboration in the treatment of schizophrenia. *Hospital and Community Psychiatry, 41*, 1203–1211.
- Cramer, J.A., & Rosenheck, R. (1999). Enhancing medication compliance for people with serious mental illness. *Journal of Nervous and Mental Diseases, 187*, 53–55.
- David, A.S. (1990). Insight and psychosis. *British Journal of Psychiatry, 156*, 798–808.

- Davidson, L., & Strauss, J. (1995). Beyond the biopsychosocial model: Integrating disorder, health and recovery. *Psychiatry*, *58*, 44–55.
- Dickey, B. (2001). Measuring quality: An overview. In B. Dickey & L.I. Seiderer (Eds.), *Improving mental health care: Commitment to quality* (pp. 77–88). Washington, DC: American Psychiatric Publishing.
- Dolder, C.R., Lacro, J.P., Dunn, L.B., & Jeste, D.V. (2002). Antipsychotic medication adherence: Is there a difference between typical and atypical agents? *American Journal of Psychiatry*, *159*, 103–108.
- Donabedian, A. (1980). *Explorations in quality assessment and monitoring* (Vol. I, 1980; Vol. II, 1982; Vol. III, 1985). Ann Arbor, MI: Health Administration Press.
- Donenberg, G.R., Lyons, J.S., & Howard, K.I. (1999). Clinical trials versus mental health services research: Contributions and connections. *Journal of Clinical Psychology*, *55*, 1135–1146.
- Drake, R.E., Becker, D.R., Bond, G., & Mueser, K.T. (2003). A process analysis of integrated and non-integrated approaches to supported employment. *Journal of Vocational Rehabilitation*, *18*, 51–58.
- Drake, R.E., Mueser, K.T., Brunette, M.F., & McHugo, G.J. (2004). A review of treatments for people with severe mental illnesses and co-occurring substance abuse disorders. *Psychiatric Rehabilitation Journal*, *27*(4), 360–374.
- Durbin, J., Cochrane, J., Goering, P.N., & Macfarlane, D. (2001). Needs-based planning: Evaluation of a level-of-care planning model. *Journal of Behavioural Health Services & Research*, *28*, 67–80.
- Ellis, G., & King, R. (2003). Recovery focused interventions: Perceptions of mental health consumers and their case managers. *Australian e-Journal for the Advancement of Mental Health*, *2*(2), 1–10.
- Ellis, R.H., Wackwitz, J.H., & Foster, M. (1991). Uses of an empirically derived client typology based on level of functioning: Twelve years of the CCAR. *Journal of Mental Health Administration*, *18*, 88–100.
- Ellis, R.H., Wilson, N.Z., & Foster, F.M. (1984). Statewide treatment outcome assessment in Colorado: The Colorado Client Assessment Record (CCAR). *Community Mental Health Journal*, *20*, 72–89.

- Essock, S.M., Meuser, K.T., Drake, R.E., Covell, N.H., McHugo, G.J., Frisman, L.K., et al. (2006). Comparison of ACT and standard case management for delivering integrated treatment for co-occurring disorders. *Psychiatric Services*, *57*, 185–196.
- Everett, B., Adams, B., Johnson, J., Kurzawa, G., Quigley, M., & Wright, M. (2003). *Recovery rediscovered: Implications for the Ontario mental health system*. Ontario: Canadian Mental Health Association, Ontario Division.
- Fenton, W.S., Blyler, C.R., & Heinssen, R.K. (1997). Determinants of medication compliance in schizophrenia: empirical and clinical findings. *Schizophrenia Bulletin*, *23*, 637–651.
- Fernandez, R.S., Evans, V., Griffiths, R.D., & Mostacchi, M.S. (2006). Educational interventions for mental health consumers receiving psychotropic medication: A review of the evidence. *International Journal of Mental Health Nursing*, *15*, 70–80.
- Fisher, D.B. (1994). Health care reform based on an empowerment model of recovery by people with psychiatric disabilities. *Hospital Community Psychiatry*, *45*, 913–915.
- Flick, U. (1998). *An introduction to qualitative research*. London: Sage.
- Fogarty, J.S. (1997). Reactance theory and patient noncompliance. *Social Science and Medicine*, *45*, 1277–1288.
- Franklin, J.L., Solovitz, B., Mason, M., Clemons, J.R., & Miller, G.E. (1987). An evaluation of case management. *American Journal of Public Health*, *77*, 674–678.
- Frese, F.J., Stanley, J., Kress, J.D., & Vogel-Scibilia, S. (2001). Integrating evidence-based practices and the recovery model. *Psychiatric Services*, *52*, 1462–1468.
- Freund, P.D. (1993). Professional role(s) in the empowerment process: “Working with” mental health consumers. *Psychosocial Rehabilitation Journal*, *16*, 66–73.
- Gehrs, M., & Goering, P.N. (1994). The relationship between the working alliance and rehabilitation outcomes of schizophrenia. *Psychosocial Rehabilitation Journal*, *18*, 43–54.

- Gehrs, M., Smith Fowler, H., Rourke, S.B., Wasylenki, D., Smith, M., & Cousins, J.B. (2004). Inside the black box: Challenges in implementation evaluation of community mental health case management programs. *Canadian Journal of Program Evaluation, 19*(3), 109–133.
- Gibbons, R.D. (2000). Mixed-effects models for mental health services research. *Health Services & Outcomes Research Methodology, 1*, 91–129.
- Gilmer, T.P., Dolder, C.R., Lacro, J.P., Folsom, D.P., Lindamer, L., Garcia, P., et al. (2004). Adherence to treatment with antipsychotic medication and health care costs among Medicaid beneficiaries with schizophrenia. *American Journal of Psychiatry, 161*, 692–699.
- Goering, P.N., Wasylenki, D., Lancee, W., & Freeman, S.J.J. (1984). From hospital to community: Six-month and two-year outcomes for 505 patients. *Journal of Nervous and Mental Disease, 172*, 667–673.
- Goldman, H.H., Lehman, A.F., Morrissey, J.P., Newman, S.J., Frank, R.G., & Steinwachs, D.M. (1990). Design for the national evaluation of the Robert Wood Johnson Foundation Program on chronic mental illness. *Hospital and Community Psychiatry, 41*, 1217–1221.
- Goldman, H.H., Morrissey, J.P., & Ridgely, M.S. (1994). Evaluating the Robert Wood Johnson Foundation program on chronic mental illness. *Milbank Quarterly, 72*, 37–47.
- Goldman, H.H., Morrissey, J.P., Rosenheck, R.A., Cocozza, J., Blasinsky, M., & Randolph, F. (2002). Lessons from the evaluation of the ACCESS program. *Psychiatric Services, 53*, 967–969.
- Green, A.J., Salomon, M.S., Brenner, M.J., & Rawlins, K. (2002). Treatment of schizophrenia and comorbid substance use disorder. *CNS & Neurological Disorders, 1*, 129–139.
- Greenall, P. (2006). The barriers to patient-driven treatment in mental health: Why patients may choose to follow their own path. *Leadership in Health Services, 19*(1), xi–xxv.
- Greenberg, L.S. (1986). Change process research. *Journal of Consulting and Clinical Psychology, 54*(1), 4–9.
- Grembowski, D. (2001). *The practice of health program evaluation*. Thousand Oaks, CA: Sage.

- Gunn, J. (2000). Future directions for treatment in forensic psychiatry. *British Journal of Psychiatry*, 176, 332–338.
- Hafner, H., & an der Heiden, W. (1989a). Evaluation of care for the disabled mentally ill: Theoretical issues. *European Archives of Psychiatry and Clinical Neuroscience*, 238, 179–184.
- Hafner, H., & an der Heiden, W. (1989b). The evaluation of mental health care systems. *British Journal of Psychiatry: The Journal of Mental Science*, 155, 12–17.
- Hansson, L. (2001). Outcome assessment in psychiatric service evaluation. *Social Psychiatry Psychiatric Epidemiology*, 36, 244–248.
- Hartford, K., Heslop, L., Stitt, L., & Hoch, J.S. (2005). Design of an algorithm to identify mentally ill persons in a police administrative database and to track contacts and associated costs. *International Journal of Law & Psychiatry*, 28, 1–11.
- Herman, S.E., & Mowbray, C.T. (1991). Client typology based functioning level assessments: Utility for services planning and monitoring. *Journal of Mental Health Administration*, 18, 101–115.
- Hermann, R.C. (2002). Linking outcome measurement with process measurement for quality improvement. In W. IsHak, T. Burt, & L. Sederer (Eds.), *Outcome measurement in psychiatry: A critical review* (pp. 23–34). Washington, DC: American Psychiatric Publishing.
- Hernandez, M. (2000). Using logic models and program theory to build outcome accountability. *Education & Treatment of Children*, 23, 24–41.
- Hoagwood, K.E. (2005). Family-based services in children's mental health: a research review and synthesis. *Journal of Child Psychology Psychiatry*, 46(7), 690–713.
- Hogan, T.P., Awad, A.G., & Eastwood, R. (1983). A self-report scale predictive of drug compliance in schizophrenics: Reliability and discriminative validity. *Psychological Medicine*, 13, 177–183.
- Horvath, A.O., & Greenberg, L.S. (1989). Development and validation of the Working Alliance Inventory. *Journal of Counselling Psychology*, 36, 223–233.

- Horvath, A.O., & Luborsky, L. (1993). The role of the therapeutic alliance in psychotherapy. *Journal of Consulting and Clinical Psychology, 61*, 561–573.
- Horvath, A.O., & Symonds, B. (1991). Relation between working alliance and outcome in psychotherapy: A meta-analysis. *Journal of Counselling Psychology, 38*, 139–149.
- Howgego, I.M., Yellowlees, P., Owen, C., Meldrum, L., & Dark, F. (2003). The therapeutic alliance: the key to effective patient outcome? A descriptive review of the evidence in community mental health case management. *Australian and New Zealand Journal of Psychiatry, 37*, 169.
- Jacobsen, N. (2003). Defining recovery: An interactionist analysis of mental health outcome scale: Reliability and validity of the Global Assessment of Functioning (GAF). *Qualitative Health Research, 13*, 378–393.
- Jacobsen, N., & Greenley, D. (2001). What is recovery? A conceptual model and explication. *Psychiatric Services, 52*, 482–485.
- Jenssen, T. (1995). Methodological problems in evaluation of social reforms exemplified by deinstitutionalization of the mentally-retarded in Norway. *Psychological Record, 45*, 535–563.
- Joannette, J.A., Lawson, J.S., Eastabrook, S.J., & Krupa, T. (2005). Community tenure of people with serious mental illness in Assertive Community Treatment in Canada. *Psychiatric Services, 56*, 1387–1393.
- Judd, C.M., & Kenny, D.A. (1981). Process analysis: Estimating mediation in treatment evaluations. *Evaluation Review, 5*, 602–619.
- Kenny, D.A., Calsyn, R.J., Morse, G.A., Klinkenberg, W.D., Winter, J.P., & Trusty, M.L. (2004). Evaluation of treatment programs for persons with severe mental illness: Moderator and mediator effects. *Evaluation Review, 28*, 294–324.
- Kirsh, B., Krupa, T., Horgan, S., Kelly, D., & Carr, S. (2005). Making it better: Building evaluation capacity in community mental health. *Psychiatric Rehabilitation Journal, 28*, 234–241.
- Klinkenberg, W.D., & Calsyn, R.J. (1998). Predictors of psychiatric hospitalization: A multivariate analysis. *Administration and Policy in Mental Health, 25*, 403–410.

- Klinkenberg, W.D., Calsyn, R.J., & Morse, G.A. (1998). The helping alliance in case management for homeless persons with severe mental illness. *Community Mental Health Journal, 34*, 569–578.
- Lamb, H.R., & Weinberger, L.E. (1998). Persons with severe mental illness in jails and prisons: A review. *Psychiatric Services, 49*, 483–492.
- Lamb, H.R., Weinberger, L.E., & DeCuir, W.J., Jr. (2002). The police and mental health. *Psychiatric Services, 53*, 1266–1271.
- Latimer, E. (1999). Economic impacts of assertive community treatment: a review of the literature. *Canadian Journal of Psychiatry, 44*, 443–454.
- Latimer, E. (2005). Economic considerations associated with assertive community treatment and supported employment for people with severe mental illness. *Journal of Psychiatry Neuroscience, 30*, 355–359.
- Lehman, A.F., Buchanan, R.W., Dickerson, F.B., Dixon, L.B., Goldberg, R., Green-Paden, L., et al. (2003). Evidence-based treatment for schizophrenia. *Psychiatric Clinics of North America, 26*, 939–954.
- Lehman, A.F., Carpenter, W.T., Jr., Goldman, H.H., & Steinwachs, D.M. (1995). Treatment outcomes in schizophrenia: Implications for practice, policy, and research. *Schizophrenia Bulletin, 21*, 669–675.
- Lehman, A.F., Dixon, L.B., Kernan, E., DeForge, B.R., & Postrado, L.T. (1997). A randomized trial of assertive community treatment for homeless persons with severe mental illness. *Archives of General Psychiatry, 54*, 1038–1043.
- Lehman, A.F., Kreyenbuhl, J., Buchanan, R.W., Dickerson, F.B., Dixon, L.B., Goldberg, R., et al. (2004). The Schizophrenia Patient Outcomes Research Team (PORT): Updated treatment recommendations 2003. *Schizophrenia Bulletin, 30*, 193–217.
- Lieberman, J.A., Stroup, T.S., McEvoy, J.P., Swartz, M.S., Rosenheck, R.A., Perkins, D.O., et al., for the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) Investigators. (2005). Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *New England Journal of Medicine, 353*, 1209–1223.
- Lipsey, M.W. (1988). Practice and malpractice in evaluation research. *Evaluation Practice, 9*, 5–24.

- Magura, S., Laudet, A.B., Mahmood, D., Rosenblum, A., & Knight, E. (2002). Adherence to medication regimens and participation in dual-focus self-help groups. *Psychiatric Services, 53*(3), 310–316.
- Malm, U., Ivarsson, B., Allebeck, P., & Falloon, I.R.H. (2003). Integrated care in schizophrenia: A 2-year randomized controlled study of two community-based treatment programs. *Acta Psychiatrica Scandinavica, 107*, 415–423.
- Marshall, M., & Lockwood, A. (2002). Assertive Community Treatment for people with severe mental disorders [Review]. *Cochrane Database of Systematic Reviews*, Issue 1.
- Martin, D., Garske, J.P., & Davis, K. (2000). Relation to the therapeutic alliance with outcome and other variables: A meta-analytical review. *Journal of Consulting and Clinical Psychology, 68*, 438–450.
- Marx, A.J., Test, M.A., & Stein, L.I. (1973). Extrahospital management of severe mental illness: Feasibility and effects of social functioning. *Archives of General Psychiatry, 29*, 505–511.
- Mayne, J. (2001). Addressing attribution through contribution analysis: Using performance measure sensibly. *Canadian Journal of Program Evaluation, 16*(1), 1–24.
- McFarlane, W.R., Dushay, R.A., Stastny, P., Deakins, S.M., & Link, B. (1996). A comparison of two levels of family-aided assertive community treatment. *Psychiatric Services, 47*, 744–750.
- McGrew, J.H., & Bond, G.R. (1995). Critical ingredients of assertive community treatment: Judgments of the experts. *Journal of Mental Health Administration, 22*, 113–125.
- McGrew, J.H., Bond, G.R., Dietzen, L., & Salyers, M. (1994). Measuring the fidelity of implementation of a mental health program model. *Journal of Consulting and Clinical Psychology, 62*, 670–678.
- McGrew, J.H., Pescosolido, B., & Wright, E. (2003). Case managers' perspectives on critical ingredients of assertive community treatment and on its implementation. *Psychiatric Services, 54*(3), 370–6.
- McGrew, J.H., Wilson, R.G., & Bond, G.R. (1996). Client perspectives on helpful ingredients of assertive community treatment. *Psychiatric Rehabilitation Journal, 19*, 13–21.

- McGrew, J.H., Wilson, R.G., & Bond, G.R. (2002). An exploratory study of what clients like least about Assertive Community Treatment. *Psychiatric Services, 53*, 761–763.
- Mechanic, D. (1996). Emerging issues in international mental health services research. *Psychiatric Services, 47*, 371–375.
- Miklowitz, D.J., Goldstein, M.J., Nuechterlein, K.H., Snyder, K.S., & Doane, J.A. (1986). Expressed emotion, affective style, lithium compliance, and relapse in recent onset mania. *Psychopharmacology Bulletin, 22*, 628–632.
- Minghella, E., Guantlett, N., & Ford, R. (2002). Assertive outreach: Does it reach expectations? *Journal of Mental Health, 11*, 27–42.
- Ministry of Health. (1999). *Comprehensive Assessment Project*. Toronto: Ontario Ministry of Health and Long Term Care.
- Ministry of Health and Long-Term Care. (2005). *Ontario for ACT teams: Second October 2004*, updated January 2005. Toronto: Author.
- Morrissey, J.P., Calloway, M., Bartko, W.T., Ridgely, M.S., Goldman, H.H., & Paulson, R.I. (1994). Local mental health authorities and service system change: evidence from the Robert Wood Johnson program on chronic mental illness. *Milbank Quarterly, 72*, 49–80.
- Morrissey, J.P., Calloway, M.O., Thakur, N., Cocozza, J., Steadman, H.J., & Dennis, D. (2002). Integration of service systems for homeless persons with serious mental illness through the ACCESS program. *Psychiatric Services, 53*, 949–957.
- Morse, G.A., Calsyn, R.J., Klinkenberg, W.D., Trusty, M.L., Gerber, F., Smith, R., et al. (1997). An experimental comparison of three types of case management for homeless mentally ill persons. *Psychiatric Services, 48*, 497–503.
- Mowbray, C.T., Cohen, E., & Bybee, D. (1993). The challenge of outcome evaluation in homeless services: Engagement as an intermediate outcome measure. *Evaluation and Program Planning, 16*, 337–346.
- Mowbray, C.T., Collins, M.E., Plum, T.B., Masterton, T., & Mulder, R. (1997). Harbinger. I: The development and evaluation of the first PACT replication. *Administration and Policy in Mental Health, 25*, 105–123.

- Mueser, K.T., Bond, G.R., Drake, R.E., & Resnick, S.G. (1998). Models of community care for severe mental illness: A review of research on case management. *Schizophrenia Bulletin*, *24*, 37–74.
- Mueser, K.T., Corrigan, P.W., Hilton, D.W., Tanzman, B., Schaub, A., Gingerich, S., et al. (2002). Illness management and recovery: A review of the research. *Psychiatric Services*, *53*, 1272–1284.
- Mueser, K.T., Torrey, W.C., Lynde, D., Singer, P., & Drake, R.E. (2003). Implementing evidence-based practices for people with severe mental illness. *Behavior Modification*, *27*(3), 387–411.
- National Institutes of Health (NIH) (2003). *Theory at a glance: A guide for health promotion*. Retrieved from <www.cancer.gov/aboutnci/oc/theory-at-a-glance>.
- National Institutes of Mental Health. (1991). *Caring for people with severe mental disorders: A national plan of research to improve services*. DHHD Publication No. [ADM]91-1762. Washington, DC: US Government Printing Office, Superintendent of Documents.
- Neale, M.S., & Rosenheck, R.A. (1995). Therapeutic alliance and outcome in a VA intensive case-management program. *Psychiatric Services*, *46*, 719–721.
- Pai, S., & Kapur, R.L. (1981). The burden on the family of a psychiatric patient: Development of an interview schedule. *British Journal of Psychiatry*, *138*, 332–335.
- Pai, S., & Kapur, R.L. (1982). Impact of treatment intervention on the relationship between dimensions of clinical psychopathology, social dysfunction and burden on the family of psychiatric patients. *Psychological Medicine*, *12*, 651–658.
- Pandiani, J.A., Banks, S.M., & Scjacht, L.M. (1998). Using incarceration rates to measure mental health system performance. *Journal of Behavioural Health Services and Research*, *25*, 300–311.
- Pekkala, E., & Merinder, L. (2003). Psychoeducation for schizophrenia [Review]. *Cochrane Database of Systemic Reviews*, Issue 1.
- Petrosino, A. (2000). Answering the why question in evaluation: The causal model approach. *Canadian Journal of Program Evaluation*, *15*(1), 1–24.

- Pharoah, F.M., Rathbone, J., Mari, J.J., & Streiner, D.L. (2005). Family intervention for schizophrenia [Review]. *Cochrane Database of Systematic Reviews*, Issue 1.
- Pilling, S., Bebbington, P., Kuipers, E., Garety, P., Geddes, J., Martindale, B., et al. (2002). Psychological treatments in schizophrenia II: Meta-analysis of randomized controlled trials of social skills training and cognitive remediation. *Psychological Medicine*, *32*, 783–791.
- Pilling, S., Bebbington, P., Kuipers, E., Garety, P., Geddes, J., Orbach, G., et al. (2002). Psychological treatments in schizophrenia I: Meta-analysis of family intervention and cognitive behaviour therapy. *Psychological Medicine*, *32*, 763–782.
- Posavac, E.J., & Carey, R.G. (2003). *Program evaluation: Methods and case studies* (6th ed.). Upper Saddle River, NJ: Prentice Hall.
- Priebe, S., & Gruyters, T. (1993). The role of the helping alliance in psychiatric community care: A prospective study. *Journal of Nervous and Mental Diseases*, *181*, 552–557.
- Randolph, F., Blasinsky, M., Morrissey, J.P., Rosenheck, R.A., Cocozza, J., & Goldman, H.H. (2002). Overview of the ACCESS program. *Psychiatric Services*, *53*, 945–948.
- Rapp, C. (1998). The active ingredients of effective case management: A research synthesis. *Community Mental Health Journal*, *34*, 363–380.
- Raudenbush, S.W., & Bryk, A.S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Razali, M.S., & Yahya, H. (1995). Compliance with treatment in schizophrenia: A drug intervention program in a developing country. *Acta Psychiatrica Scandinavica*, *91*, 331–335.
- Redko, C., Durbin, J., Wasylenki, D., & Krupa, T. (2004). Participant perspectives on satisfaction with assertive community treatment. *Psychiatric Rehabilitation Journal*, *27*(3), 283–286.
- Robertson, G., Pearson, R., & Gibb, R. (1996). The entry of mentally disordered people to the criminal justice system. *British Journal of Psychiatry*, *169*, 172–180.
- Rogers, E.S., Chamberlin, J., Ellison, M.L., & Crean, T. (1997). A consumer-constructed scale to measure empowerment among users of mental health services. *Psychiatric Services*, *48*, 1042–1047.

- Rosen, A., & Teesson, M. (2001). Does case management work? The evidence and the abuse of evidence-based medicine. *Australian and New Zealand Journal of Psychiatry*, 35, 721–746.
- Rosenblatt, A., & Attkisson, C.C. (1993). Assessing outcomes for sufferers of severe mental disorder: A conceptual framework and review. *Evaluation and Program Planning*, 16, 347–363.
- Rosenheck, R., & Cicchetti, D. (1998). A mental health program report card: A multidimensional approach to performance monitoring in public sector programs. *Community Mental Health Journal*, 34, 85–106.
- Rosenheck, R., Cramer, J., Allan, E., Erdos, J., Frisman, L.K., Xu, W.C., et al. (1999). Cost-effectiveness of clozapine in patients with high and low levels of hospital use. *Archives of General Psychiatry*, 56, 565–572.
- Rosenheck, R.A., Lam, J., Morrissey, J.P., Calloway, M.O., Stolar, M., & Randolph, F. (2002). Service systems integration and outcomes for mentally ill homeless persons in the ACCESS program. *Psychiatric Services*, 53, 958–966.
- Rosenheck, R.A., & Neale, M.S. (1998). Cost-effectiveness of intensive psychiatric community care for high users of inpatient services. *Archives of General Psychiatry*, 55, 459–466.
- Rossi, P.H., Freeman, H.E., & Lipsey, M.W. (1999). *Evaluation: A systemic approach* (6th ed.). Newbury Park, CA: Sage.
- Ruggeri, M. (1995). Evaluating outcome in mental-health-care. *Current Opinion in Psychiatry*, 8, 116–121.
- Ruggeri, M., & Tansella, M. (1996). Individual patient outcomes. In H.C. Knudsen, G. Thornicroft, & N. Sartorius (Eds.), *Mental health service evaluation* (pp. 281–296). New York: Cambridge University Press.
- Rush, B., Norman, R., Kirsh, B., & Wild, C. (1999). *Explaining outcomes: Developing instruments to assess the critical characteristics of community support programs for people with severe mental illness*. Toronto: Canadian Mental Health Association.
- Rush, B., Tate, E., Norman, R., Kirsh, B., Prosser, M., Wild, T.C., & Lurie, S. (2004). The experience of developing a package of instruments to measure the critical characteristics of community support programs for people with a severe mental illness. *Canadian Journal of Program Evaluation*, 19(3), 159–166.

- Saleebey, D. (1996). The strengths perspective in social work practice: extensions and cautions. *Social Work, 41*, 296–305.
- Salyers, M.P., Bond, G.R., Teague, G.B., Cox, J.F., Smith, M.E., Hicks, M.L., et al. (2003). Is it ACT yet? Real-world examples of evaluating the degree of implementation for assertive community treatment. *Journal of Behavioural Health Services & Research, 30*, 304–320.
- Schene, A., Tessler, R.C., & Gamache, G.M. (1994). Instruments measuring family or caregiver burden in severe mental illness. *Social Psychiatry & Psychiatric Epidemiology, 29*, 228–240.
- Schrecker, T. (1999). *Making the invisible, visible in research on psychiatric de-institutionalization* (CAREMH Report 1). Colloquium report. London, ON: Population & Community Health Unit.
- Schrecker, T. (2001). *Psychiatric de-institutionalization: Identifying the barriers to improving outcomes* (CAREMH Report 2). Colloquium report. London, ON: Population & Community Health Unit.
- Schrecker, T., Hartford, K., Heslop, L., & Brown, B. (2001, July). 'Never say never again': A troubled look at privacy protection in mental health services research. Report presented at International Academy of Law & Mental Health, Montreal, QC.
- Scott, J.E., & Dixon, L.B. (1995). Assertive community treatment and case management for schizophrenia. *Schizophrenia Bulletin, 21*, 657–668.
- Sederer, L.I., & Dickey, B. (1996). *Outcomes assessment in clinical practice*. Baltimore: Williams and Williams.
- Snijders, T., & Bosker, R. (1999). *Multilevel analysis*. London: Sage.
- Solomon, P., Draine, J., & Delaney, M.A. (1995). The working alliance and consumer case-management. *Journal of Mental Health Administration, 22*, 126–134.
- Spaniol, L., Koehler, M., & Hutchinson, D. (1994). *The recovery workbook*. Boston: Centre for Psychiatric Rehabilitation.
- Stein, L.I., & Santos, A.B. (1998). *Assertive Community Treatment for persons with severe mental illness*. New York: Norton.

- Stein, L.I., & Test, M.A. (1980). Alternative to mental hospital treatment I: Conceptual model, treatment program, and clinical evaluation. *Archives of General Psychiatry, 37*, 392–397.
- Stein, L.I., Test, M.A., & Marx, A.J. (1975). Alternatives to the hospital: A controlled study. *American Journal of Psychiatry, 132*, 517–522.
- Svedberg, B., Backenroth-Ohsako, G., & Lutzen, K. (2003). On the path to recovery: Patients' experiences of treatment with long-acting injections of antipsychotic medication. *International Journal of Mental Health Nursing, 12*, 110–118.
- Swartz, M.S., Swanson, J.W., Hiday, V.A., Borum, R., Wagner, R., & Burns, B.J. (1998). Taking the wrong drugs: The role of substance abuse and medication noncompliance in violence among severely mentally ill individuals. *Social Psychiatry Psychiatric Epidemiology, 33*, S75–S80.
- Tabor, P.A., & Lopez, D.A. (2004). Comply with us: Improving medication adherence. *Journal of Pharmacy Practice, 17*(3), 167–181.
- Tait, L., Birchwood, M., & Trower, P. (2003). Predicting engagement with services for psychosis: Insight, symptoms and recovery style. *British Journal of Psychiatry, 182*, 123–128.
- Teague, G.B., Bond, G.R., & Drake, R.E. (1998). Program fidelity in Assertive Community Treatment: Development and use of a measure. *American Journal of Orthopsychiatry, 68*, 216–232.
- Teague, G.B., Drake, R.E., & Ackerson, T.H. (1995). Evaluating use of continuous treatment teams for persons with mental illness and substance abuse. *Psychiatric Services, 46*(7), 689–695.
- Test, M.A., & Stein, L.I. (1978). Training in community living: Research design and results. In L.I. Stein and M.A. Test (Eds.), *Alternatives to mental hospital treatment*. New York: Plenum.
- Thompson, K.S., Griffith, E.E., & Leaf, P.J. (1990). A historical review of the Madison model of community care. *Hospital and Community Psychiatry, 41*, 625–634.
- Thornicroft, G., & Tansella, M. (1999). *The mental health matrix: A manual to improve services*. Cambridge: Cambridge University Press.

- Usher, K.J., & Arthur, D. (1997). Nurses and neuroleptic medication: Applying theory to a working relationship with clients and their families. *Journal of Psychiatric & Mental Health Nursing*, 4, 117–123.
- Vingilis, E., & Burkell, J. (1996). A critique of an evaluation of the impact of hospital bed closures in Winnipeg, Canada: Lessons to be learned from evaluation research methods. *Journal of Public Health Policy*, 17, 409–425.
- Vingilis, E., Hartford, K., Schrecker, T., Mitchell, B., Lent, B., & Bishop, J. (2003). Integrating knowledge generation with knowledge diffusion and utilization: A case study analysis of the Consortium for Applied Research and Evaluation in Mental Health. *Canadian Journal of Public Health*, 94, 468–471.
- Vingilis, E., & Pederson, L. (2001). Using the right tools to answer the right questions: The importance of evaluative research techniques for health services research in the 21st century. *Canadian Journal of Program Evaluation*, 18(2), 1–26.
- Voruganti, L.N., & Awad, A.G. (2002). Personal evaluation of transitions in treatment (PETiT): A scale to measure subjective aspects of antipsychotic drug therapy in schizophrenia. *Schizophrenia Bulletin*, 56, 37–46.
- Wale, J.B., & Moon, R.R. (2005). Engaging patients and family members in patient safety: The experience of the New York City Health and Hospitals Corporation. *Psychiatric Quarterly*, 76(1), 85–95.
- Watson, J.C., & Geller, S.M. (2005). The relation among the relationship conditions, working alliance, and outcome in both process-experiential and cognitive-behavioral psychotherapy. *Psychotherapy Research*, 15(1–2), 25–33.
- Weiler, M.A., Fleisher, M.H., & Arthur-Campbell, D. (2000). Insight and symptom change in schizophrenia and other disorders. *Schizophrenia Bulletin*, 45, 29–36.
- Weiss, C.H. (1998). *Evaluation: Methods for studying programs and policies*. Upper Saddle River, NJ: Prentice Hall.
- Weiss, K.A., Smith, T.E., Hull, J.W., Piper, A.C., & Huppert, J.D. (2002). Predictors of risk of nonadherence in outpatients with schizophrenia and other psychotic disorders. *Schizophrenia Bulletin*, 28, 341–349.

- Willett, J.B., Ayoub, C.C., & Robinson, D. (1991). Using growth modeling to examine systematic differences in growth: An example of change in the functioning of families at risk of maladaptive parenting, child-abuse, or neglect. *Journal of Consulting and Clinical Psychology, 59*, 38–47.
- Williams, D.D., & Garner, J. (2002). The case against “the evidence”: A different perspective on evidence-based medicine. *British Journal of Psychiatry, 180*, 8–12.
- Wing, J.K., Cooper, J.E., & Sartorius, N. (1974). *Measurement and classification of psychiatric symptoms: An instructional manual for the PSE and Catego program*. Cambridge: Cambridge University Press.
- W. K. Kellogg Foundation. (2001, December). *Using Logic Models to bring together planning, evaluation and action. Logic Model Development Guide*. Battle Creek, MI: Author.
- Wowra, S.A., & McCarter, R. (1999). Validation of the empowerment scale with an outpatient mental health population. *Psychiatric Services, 50*, 959–961.
- Young, A.S., Forquer, S.L., Tran, A., et al. (2000). Identifying clinical competencies that support patterns of remission from substance use disorder among persons with severe mental illness. *Journal of Behavioural Health Services and Research, 27*, 321–333.
- Zygmunt, A., Olfson, M., Boyer, C.A., & Mechanic, D. (2002). Interventions to improve medication adherence in schizophrenia. *American Journal of Psychiatry, 159*, 1653–1664.

Joan Bishop, M.D., M.Sc. (Epidemiology and Biostatistics), FRCPC, is a Clinical Associate Professor of Psychiatry at the University of British Columbia and a Professor Emeritus at the University of Western Ontario. She was an Assertive Community Treatment team psychiatrist for many years in Ontario and currently specializes in rehabilitation and treatment of people who have chronic, severe psychotic disorders at Riverview Hospital in BC. She is involved in mental health services research through the Provincial Health Services Authority (PHSA) in BC and the Consortium for Research and Evaluation in Mental Health (CAREMH) at UWO.

Evelyn Vingilis is Director of the Population and Community Health Unit and Professor in the Departments of Family Medicine, Epidemiology and Biostatistics, Nursing, and Political Science at the University of Western Ontario. She has clinical, management, and research experience with a particular focus on program evaluation and knowledge transfer. Her research interests are in road safety, at-risk youth, and mental health services. She has over 200 publications and presentations, has received 30 grants for over \$5 million in the last five years, and has been a consultant and committee member on numerous provincial, federal, and international governments and organizations. She teaches graduate courses in program and policy evaluation to graduate students in epidemiology, family medicine, nursing, psychology, and public administration.