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**FACULTÉ DES ÉTUDES SUPÉRIEURES
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**FACULTY OF GRADUATE AND
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**A Comprehensive Costing analysis of Intensive Case Management for Individuals with Severe Mental
Illness and a history of Homelessness, including Cost-effectiveness as compared to Standard Care**

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A Comprehensive Costing analysis of Intensive Case Management for Individuals with Severe
Mental Illness and a history of Homelessness, including Cost-effectiveness as compared to
Standard Care

by

Sarah Birnie

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
in the School of Psychology

UNIVERSITY OF OTTAWA

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Your file Votre référence
ISBN: 978-0-494-51790-1
Our file Notre référence
ISBN: 978-0-494-51790-1

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Abstract

The current study used the comprehensive costing methodology of Knapp and Beecham (1990) to examine the comprehensive costs of community support services over the last six months (18-24 months) of a two-year study. The sample consisted of 77 clients with severe and persistent mental illness and a history of homelessness receiving either intensive case management (ICM) or standard care. Costs from the overall societal perspective were calculated by summing the direct and 'hidden' (e.g., travel time) costs associated with: 1) Agency costs (case management services), 2) governmental costs (e.g., non-agency health care costs, non-health care costs), and 3) family/friend costs. Subtracted from this initial total to reach a final societal cost were employment and/or volunteer 'benefits'. Of interest in the study was: (1) Examining the relationship between clients needs at 18 months of a two year trial, global societal costs per client for the six-month period from 18 to 24 months, and 24-month outcomes, and (2) cost-effectiveness of intensive case management over standard care from three costing perspectives (e.g., agency, government, society). Results yielded an overall average comprehensive cost of treatment (both ICM and standard care combined) per client of \$57.08/day which is comparable to previous research investigating the costs of community support services. Needs did not predict six month total societal costs; however, receiving ICM and reporting more severe symptomatology predicted higher six-month agency costs. Higher total costs of services and supports predicted poorer housing stability at 24 months for our participants. Higher expenditures related to non-health care costs predicted poorer community ability at 24 months. In general, it seems that higher costs are related to poorer client functioning. Cost-effectiveness analyses revealed that ICM is more cost-effective than standard care from the perspective of the government (i.e., health-related expenses) and society overall, despite agency costs being significantly greater in ICM. Nonparametric bootstrapping methods using net monetary benefit

revealed a 0.77 to 0.80 chance of ICM being a cost-effective alternative to standard care. It is clear from this study that increased costs are associated with clients who are doing the poorest in terms of symptoms, housing stability, and community ability. Despite the finding that more intensive treatment does not guarantee better clinical outcomes within our six month window, ICM is shown to be a more cost-effective treatment in the community when compared with standard care. Implications of this research are discussed.

Acknowledgments

First and foremost, I would like to thank Tim Aubry for his limitless patience in reviewing drafts of this thesis as it took shape. I continue to respect his passion for conducting research with practical implications for a very vulnerable sector of our population.

I would also like to thank my committee members and my external examiner: Dr. Doug Angus, Dr. Susan Farrell, Dr. Bob Flynn, and Dr. Eric Latimer. Each provided supportive and constructive feedback along the way.

Thank you also to Mr. Dwayne Schindler who provided helpful statistic consultation.

The staff at CMHA Ottawa must not go unmentioned. Ms. Heather Smith-Fowler and Ms. Marnie Smith answered my many initial questions and worked tirelessly on organizing data collection.

I would like to give a special thank you to Dr. Doug Coyle, Faculty of Medicine and Epidemiology, University of Ottawa, for his assistance in the cost-effectiveness analysis. Thank you to my friends both within and outside of the program that kept me well-rounded throughout my doctoral program.

To my family who instilled in me a love of learning and an example of a hard work ethic.

To those who helped me see the bigger picture and who I could be.

Statement of the Contributions of Co-Authors

Both manuscripts involved the work of Dr. Tim Aubry as primary thesis advisor. In addition, the second manuscript involved the contributions of Dr. Doug Angus and Ms. Marnie Smith as co-authors. Dr. Angus and Dr. Coyle provided health economic consultation for the cost-effectiveness analyses. Because of her intimate knowledge of the services provided by CMHA Ottawa, Ms. Smith offered her suggestions for the implications section for the second manuscript. All contributors with the exception of Dr. Aubry were consulted once initial manuscript drafts were complete.

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A Comprehensive Literature Review on the Effectiveness and Cost-effectiveness of Intensive Case Management

A trend in the treatment of severe mental illness is to ensure that individuals can remain out of hospital and functional in the community. The cost of coordinating this level of care, known as “case management”, can be quite high. It is important to determine what these costs are and relate them to expected outcomes for individuals with severe mental illness who are often on the verge of homelessness or hospitalization. To do this we must have an adequate understanding of what outcomes to assess and what the literature reveals about the clinical effectiveness of case management. Following this, we will review comprehensive costing and cost-effectiveness and provide the rationale for two studies investigating the relationship between costs and outcomes for this population.

Homelessness

Homelessness can be defined as a situation in which an individual or family has no housing at all, or is staying in a temporary form of shelter (Region of Ottawa-Carleton, 1999a, p. 2). Homelessness is a serious problem in many major Canadian cities, as well as a major social problem in the United States and Western Europe. Research has focused on the consequences of homelessness on health (e.g., Daly, 1990), and researchers have been working toward the development of programs to target problems associated with being homeless (Canadian Mortgage and Housing Corporation, 1999; Fitzgerald, 1995; Humphreys & Rosenheck, 1998; Toro et al., 1997). It is important to be aware that many individuals who are homeless also have concurrent severe mental illness. Deinstitutionalization has made it imperative that programs be developed to aid these individuals to live successfully in the community.

Models of Care for the Homeless Mentally Ill

Community support services for people who are homeless and have severe and persistent mental illness can be divided into three levels of service intensity: acute, intermediate, and rehabilitation (Barton, 1999). Acute care includes services such as inpatient, partial hospital and crisis services, whose function is to stabilize symptoms. Intermediate intensity involves case management and counseling, and the goal of these services is to support and maintain the individual in the community. Rehabilitative services involve skills training, supported employment, and peer support, which function to increase competency, recovery, and empowerment (Barton, 1999). Ross (1980) described a continuum of case management services where a “minimal model” included services such as outreach, assessment, case planning, and referral. A “comprehensive model” included services such as “crisis intervention, public education, monitoring, resource development, reassessment, natural support system development, direct casework, and client advocacy” (p. 11).

The term “case management” has historically covered a broad range of services and treatment intended to provide support for those individuals with severe and persistent mental illness living in the community (Aubry, 2004). This population was first described by Tessler and Goldman (1982) as those individuals who have chronic mental or emotional disorders that prevent optimal functioning in three or more primary aspects of life: personal hygiene and self-care, self-direction, interpersonal relationships, social transactions, learning, and recreation. It excludes those individuals with organic brain injuries, antisocial personality disorders, and a primary diagnosis of anxiety without psychotic symptoms or substance use.

Case management has six broad functions including: 1) Client identification, 2) outreach, 3) direct services including assessment, counseling, crisis intervention, and support, 4) service planning, 5) linkage to other services, and 6) client advocacy (McCurrin & Worley, 1993). The

history of case management is as follows: When deinstitutionalization was first implemented, community-health centers attempted to fulfill the needs of clients with severe and persistent mental illness by operating under the traditional medical model of psychiatric after-care. This focused on symptom reduction, medication review, individual and group outpatient psychotherapy, and day or partial hospitalization services. There was little attention paid to areas of the client's lives that were once subsumed under the hospital's responsibility, and became challenges for clients attempting to live in the community. These areas included "acquiring housing, vocational rehabilitation, employment, recreational activities, food and clothing, dental and medical care, transportation, and many other goods and services necessary for adequate community life (McCurrin & Worley, 1993; p. 60)." In this way, a fragmented mental health care system was in place. In 1976, the Joint Commission on Accreditation of Health Care Organizations defined case management as:

activities aimed at linking the service system to a consumer and coordinating the various system components in order to achieve a successful outcome. The objective of case management is continuity of services (Joint Commission on Accreditation of Health Care Organizations, 1976, pp 20).

In this way, treatment and activities managed by case managers should include a comprehensive assessment, medical follow-up, psychiatric follow-up for medication monitoring, social/recreational activities, and daily living skills training (McGurrin & Worley, 1993). Some researchers noted that case managers were becoming burnt out quite quickly, resulting in extensive turnover, and many were unclear about their roles and responsibilities (Intagliata & Baker, 1983). Despite these general comments, the term "case management" has been used to describe a number of distinct, though similar, theoretical orientations towards service provision.

Corrigan et al. (2008) offered a useful figure linking the goals, service objectives, and service functions of case management more broadly (see Figure 1). They described that the figure

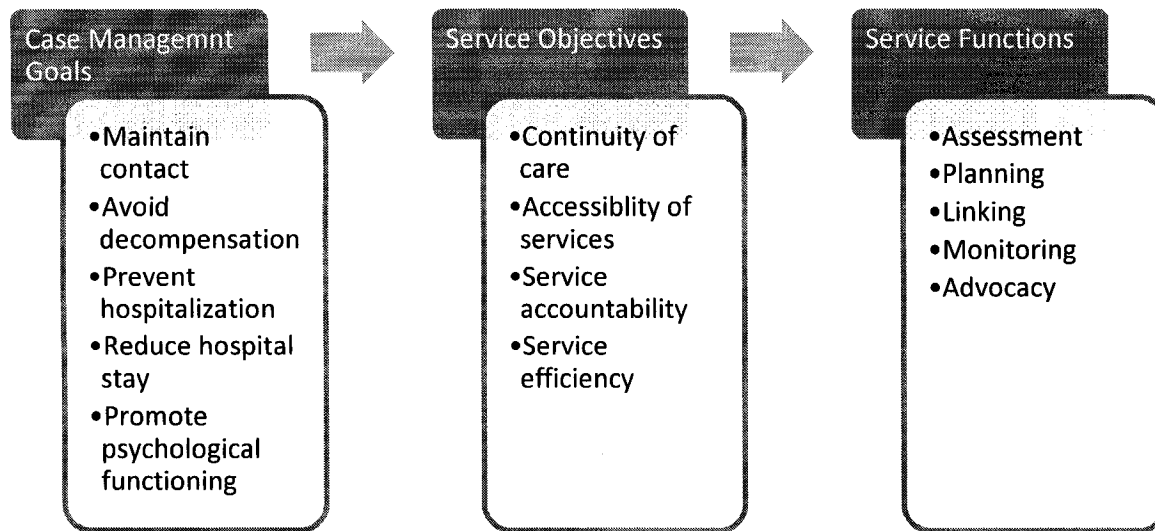


Figure 1. Goals, objectives, and service functions of case management (p. 140, Corrigan, Mueser, Bond, Drake, & Solomon, 2008)

highlights the basic service functions provided by all case management services, though noted that ‘various models may add on treatments and/or rehabilitation practices and technology (p. 140)’.

Six models of case management have been proposed and described by Mueser et al. (1998) and Corrigan et al. (2008): Broker case management, clinical case management, strengths-based, rehabilitation case management, assertive community treatment, and intensive case management. In the literature, these different models appear repeatedly, and are presented in more detail below.

The Brokerage Model was the first form of case management in the literature (Mueser et al., 1998) and is the most basic of the models (Corrigan et al., 2008). It uses case managers to represent the mental health agency in providing information about services and access to services for the client. The specific functions of brokered case management include (1) assessment, (2) planning, (3) linking to services, (4) monitoring, and (5) advocacy. Case managers in this situation have large caseloads and are only able to provide individualized services when a client is in crisis (Intagliata & Baker, 1983). The philosophy of this model is that clinical intervention or management is not needed for effective case management (Mueser et al., 1998). This being said, Corrigan and colleagues (2008) argue that supportive counseling is often an integral part of the delivery of other broker case management services. Despite this, this method of case management has been argued to be an effective and cost-effective use of case management for individuals within a psychiatric hospital setting who will soon be transitioning to the community as it helps them navigate the mental health system once discharged (Mandendran et al., 2006).

Clinical case management was developed in response to the fact that many case managers had to provide clinical services in the face of highly distressed clients (Lamb, 1980). Thus, in addition to traditional brokered case management activities such as assessment, planning,

consultation, resource building, and linkage with resources and support, clinical case managers are also seen as having skills in psycho-education and psychotherapy (Lamb, 1980). Case managers in this model explicitly provide client-level interventions (e.g., individual psychotherapy, training in daily living skills, psycho-education, crisis intervention, and monitoring; Kanter, 1989). These client-level interventions are intended to help clients ‘in acquiring functional skills and increasing their psychological growth by means of teaching various skills and problem-solving techniques and providing psycho-education (p. 143; Corrigan et al., 2008). Despite the intention of clinical case management, Sullivan and Rapp (2002) noted that the model is hard to implement as case managers require high therapeutic skill, and many times the therapists either do not have the time or interest to engage in basic broker case management activities.

Assertive Community Treatment was developed in the 1970s and was first called Program of Assertive Community Treatment (PACT; Mueser et al., 1998). It came out of the work of Mary Ann Test and Leonard Stein in 1980 and it was intended to go beyond what brokered or clinical case management could offer to clients. In essence, it was developed to be a comprehensive community-based treatment alternative to the hospital for clients presenting with severe mental illness (i.e., typically severe psychoses) or for those with history of high service usage (Test & Stein, 1980). The ACT philosophy grew from the observed phenomenon that skills learned in hospital settings were not necessarily generalizable to the community, resulting in clients continuing to have difficulty living in the community despite intensive hospital treatment. Unlike typical case management, the philosophy of ACT dictates that treatment be provided in a comprehensive way with the use of multidisciplinary teams instead of individual case managers.

Corrigan and colleagues (2008) noted that the ACT model is designed for the clients who experience the most persistent and extreme symptoms of mental illness, and the model goes

beyond all the others in terms of direct service provision. Teams usually consist of a psychiatrist, nurse, and two case managers (Test & Stein, 1980), although can also include social worker, occupational therapists, and addictions counselors. In this way, very few clinical services within an ACT team are brokered to professionals outside of the team itself (Mueser et al., 1989). In this way, ACT teams can meet most of the needs of clients within the team itself, allowing for comprehensive, integrated, and continuous provision of services. Despite the team approach, clients are assigned a primary care worker, who acts as a clinical manager for that clients' care within and outside the ACT team. In this way, ACT teams also allow for individualized and tailored services. There is a low client-staff ratio (i.e., usually 10-1), staff can be reached 24 hours a day for crisis management, and services take place in the clients' environment (e.g., their home, coffee shop, etc.) to enhance acquisition of new skills and engage clients in treatment. The frequency of contact is high in the initial stages but tapers off once the client is more autonomous. The treatment lasts until the client no longer needs the service (Baronet & Gerber, 1998).

The Strengths or Development Acquisition Model is another influential form of case management that places the case manager as a mentor (Modrcin, Rapp, & Poertner, 1988; Weick et al., 1989; Sullivan, 1982; Corrigan et al., 2008). It is focused on identifying strengths in the client and setting personal goals, and came as a response to the notion that service providers traditionally focused on clients' limitations instead of their strengths and ability to reach their goals. In this model, community supports are used to the extent that they will aid individuals in achieving their personal goals (Modrcin et al., 1988). This approach has six principles: 1) A focus on strengths, 2) a primary and essential case manager-client relationship, 3) interventions based on the principle of facilitating client self-determination, 4) a preferred method of intervention is aggressive outreach, 5) the community is viewed as a resource and not as an obstacle, and 6) an

acknowledgement of the idea that individuals with severe and persistent mental illness can continue to learn, grow, and change with assistance (Modrcin et al., 1988; Rapp, 1993). These principles are used to guide the six step process of engagement, assessment, case planning, resource acquisition, tracking, and evaluation.

The Psychosocial Rehabilitation Model (PSR) was initially designed to aid individuals in the community subsequent to being discharged from hospital for severe psychiatric illness (Anthony et al., 1988). It is focused on identifying instrumental or affiliative barriers to independent community living and developing strategies to overcome these barriers. This kind of case management involves the case manager being an artificial extension of the client in accessing services, surveying care, and attempting to improve community life (Draine, 1997). Similar to the strengths model, the PSR model provides services based on individual patients' desires and goals, rather than those dictated by the mental health system (Mueser et al., 1998).

A more recently developed arm of clinical case management includes Family-Focused Case Management (developed at the Royal Ottawa Hospital in 1997). This model offers case management to those with severe and persistent mental illness living in the community and includes support to family members of these clients (Aubry et al., 2000). It was developed by the Royal Ottawa Hospital in response to the needs of many family members who serve as caregivers to clients with mental illness. In addition to regular case management support services, family-focused case management services also include the following: a) Family participation in assessment of clients' needs, b) developing a service plan that takes the family's concerns and preferences into account, c) providing counseling, support, and education to the families, and d) facilitating changes in family relationships as desired by clients and families (Aubry et al., 2000).

Intensive case management was developed to provide more intensive support to individuals with high service usage, who are living with a severe mental illness, and who need a

high degree of support to remain in the community. Much like ACT services, ICM came as a response to a fragmented system of care for individuals leaving hospital and re-integrating into the community. Similar to traditional clinical case management, clients are aided in negotiating for needed services and the treatment is organized around specific services. There are four basic activities: connecting with clients, planning for services, linking clients with services, and advocating for service improvements (McCurrin & Worley, 1993). Rehabilitation assessments, crisis intervention, outreach services, and skills teaching can all be integrated in intensive case management. Contact with clients is usually made in vivo in the community and, although the frequency of contact and client-to-staff ratio can be variable, contact is usually of high frequency with a low client-to-staff ratio. This model can comprise some direct service provision, but is unlike ACT where all services are provided by the multidisciplinary team. *Intensive* means that the client-to-staff ratio is no more than twenty to one. A higher client to staff ratio is usually referred to as outreach services or regular case management (Aubry, T., personal communication).

In the real-world application of community support models, it can be difficult to empirically distinguish between different models of case management. Rapp (1988) reviewed the empirical literature on process elements related to community support models such as case management. The following variables were identified as being important key components in the models: 1) Type of case management (team vs. individual), 2) staffing, 3) location of work, 4) service provision (direct vs. referral), 5) caseload size and frequency of contact, 6) length of service, 7) responsibility for treatment and life decisions, and 8) availability. Mueser et al. (1998) have provided a very synthesized and intelligible table outlining the models of case management according to many of these facets.

The literature seems to suggest that there are a few *major* distinguishing factors between the models (Bond, McDonel, Miller, & Pensec, 1991; Mueser et al., 1989; Kanter, 1989), corresponding mainly to numbers 1, 4, and 5 in Rapp's (1988) list of key component variables in case management.

The first is what distinguishes ACT services from other forms of case management, which is whether clinical services are provided directly and comprehensively within a team that shares responsibility for a client (i.e., ACT), or provided by a case manager who brokers out at least some of the clinical and medical services (i.e., clinical case management, strengths, broker model). The second is the client-staff ratio within a model: Lower client-to-staff ratios have typically been called 'intensive case management' while higher ratios have typically been referred to as 'outreach services' or 'traditional case management'. The third is the duration of service delivery: typically ACT and ICM services continue until the clients no longer need the service. This is not necessarily the case with more traditional case management services, where workers act more as time-limited brokers and service advocates until clients have secured needed services in the community.

With the distinguishing characteristics of varying community support models in mind, the following review will focus on intensive case management services exclusively. The decision to focus exclusively on ICM is in response to the studies that will be described following this review, which outline the effectiveness and cost-effectiveness of a model of ICM provided to a sample of clients with severe mental illness, high service usage, and a history of unstable housing. It is important to focus on existing literature describing and providing effectiveness outcomes for similar intensive case management models. By including other forms of community support in the review, it is easy to forget that, in fact, ICM is quite different from team-based approaches or from traditional case management services. Mueser et al. (1998) clearly showed

how ICM differs from both traditional case management services in terms of smaller caseloads, being community-based, focusing on skills training, and having 24-hour support. They also showed how ICM differs from ACT primarily in terms of the team versus individual service delivery model.

Are Intensive Case Managers Actually Providing Services Aligned with the Model?

In any model of community support, barriers to the real-world application of the model highlight the question of fidelity to the intended treatment model. As our focus is on ICM, it is important to ask this question within the scope of this particular model of community support. There is empirical evidence to support the specific activities of case managers involved in ICM (Cousins, Aubry, Smith Fowler, & Smith, 2004). This is especially important given the criticism in case management research that one is dealing with a ‘black box’ phenomena in terms of clinical, social, or housing improvement. It is also important in differentiating the activities of ICM from other forms of case management (e.g., ACT).

Cousins, Aubry, Smith Fowler, and Smith (2004) used Key Components Analysis (KCA) to develop a tool for use within an agency providing ICM to clients with severe mental illness and a history of homelessness. The goal was to develop a tool that captured the many facets of ICM treatment and that could be used as a way of investigating ‘treatment fidelity’ in a process (implementation) evaluation. Using the program logic model of the agency and collaborative feedback from two experienced case managers and their supervisors, a tool was developed and piloted at the agency. The KCA tool consisted of five areas of service: 1) Meeting the client’s basic needs (e.g., safety, trusting relationship, secure housing, financial assistance, food/clothing, mental/physical health care), 2) Developing a formal network of support for the client, 3) Developing an informal network of support for the client (i.e., friends), 4) Aiding clients in accessing needed and desired services (i.e., discussing client rights and responsibilities,

advocating for access/treatment, and 5) Skill development for goal achievement and maintenance (i.e., daily living skills, skills to navigate accessing/maintaining services/treatment, coping skills for recovery from mental health problems, problem solving). For each area, there were three groups of descriptive statements outlining to what depth a case manager had worked with a client in the particular area.

The final tool was completed by a group of six additional case managers and their supervisors to investigate the agency's fidelity to the model of ICM. Results showed that case managers' perception of their daily activities did indeed align with previous literature outlining the expected activities of frontline workers involved in intensive case management (e.g., direct service provision, a strong therapeutic alliance, and a small caseload). Further to this, there was moderate agreement between case managers and supervisors on the level at which a worker was working with a client within a particular area.

Outcomes of Intensive Case Management Effectiveness

How effective is intensive case management? It is important to review the literature focused on the outcomes associated with intensive case management in order to understand which outcomes would best represent potential for effective change over time. Rossler, Loffler, Fatkenbeuer, and Riecher-Rossler (1995) have highlighted some of the difficulties in assessing the effectiveness of case management services. They highlight that early studies used designs with severe limitations or were exploratory. Because the care is viewed as being of benefit to most clients despite limited empirically-supported outcomes, random assignment is not always possible. Even when experimental designs are used, the results can be difficult to interpret because they focus on "heterogeneous, poorly defined case-mix groups of patients with severe mental [illnesses], rather than on strictly defined diagnostic groups" (p. 30). Rossler et al. (1995) also discussed how different researchers use different outcome measures, making comparison

between studies difficult. Finally, they point out that it is often not clearly stated which case management activities were carried out and to what extent. For example, although theoretical differences between two case management approaches might be minimal, the actual delivery of services can be highly contingent upon the national or regional service delivery system in which the case managers operate (e.g., rural versus urban).

Despite these difficulties, Chamberlain and Rapp (1991) identified some important dependent variables used in research evaluating case management outcomes. They are client functioning, recidivism, hospital days used, quality of life, service use, medication compliance, and symptoms. In their review of the psychiatric rehabilitation literature, Baronet and Gerber (1998) also quantified outcomes in the following ways: Symptomatology and service use pattern outcomes (i.e., recidivism, symptomatology, medication adherence, use of alternative mental health services, involvement in treatment) and psychological well-being and community adjustment outcomes (i.e., global and social functioning, quality of life, residential and occupational status, use of psychoactive substances, involvement with the legal system, satisfaction). We will first present the findings from the seven reviews of ICM that have been completed since 1995. The following sections will review the effectiveness of ICM according to different areas of outcome.

Reviews of Intensive Case Management

There have been seven reviews of community support services since 1995 that included ICM treatment. Six were identified by Corrigan et al. (2008). For the purposes of this section, the reviews will be described in their entirety so as not to misrepresent the conclusions and arguments made by the authors. This means that some of the conclusions by the authors of the reviews are based not only on ICM services, but may also include ACT and standard case management.

Baronet and Gerber (1995) reviewed 25 studies of case management and intensive case management though had no specific inclusion criteria for their review. Their narrative review approach highlighted that involvement in case management led to a tendency for increased use of mental health services, and increased level of social functioning, and increased hospital use (perhaps due to advocated access to hospital-based treatment).

Bond, McGrew, and Fekete (1995c) reported on a meta-analysis of nine studies of intensive case management that included an assertive outreach component. They included studies that were either experimental, quasi-experimental, or that had a pre-post comparison. Overall the authors noted that compared to standard care, involvement in intensive case management led to treatment retention rates improving, fewer hospitalizations, and shorter hospital stays.

Holloway, Oliver, Collins, and Carson (1995) reviewed 23 studies on all case management models, and differentiated studies by study design (not type of case management, although the authors broadly defined the studies as either brokerage or clinical case management). These authors reviewed studies that compared two types of treatment (one of which had to be a form of case management, although the authors were inclusive in this regard), and the only exclusion criteria for the study participants were that they not have a primary diagnosis of substance dependence.

Of the 23 included studies, the authors reported that 11/21 showed a superior outcome for case management over standard care (in this case, mostly less intensive forms of support) in terms of a reduction in hospital use. Six studies (of nine that reported on this outcome) showed case management to aid in improving medication adherence. Two of the reviewed studies showed case management to reduce symptoms in the targeted population, though six additional studies showed no difference between groups. Additional variables that were significantly improved with the use of case management included an increased uptake of additional health services and an

increase in patient satisfaction with services. Only two out of eight studies that measured global social functioning showed a superior effect in the case management group over standard care, although 4/5 studies that measured social networks showed case management to significantly impact the size of the clients' social networks. The review highlighted the fact that historically, case management has been focused primarily on reducing time spent in hospital. The authors made the point that it is more difficult to make conclusions about other health and social variables when such a small percentage of the studies reviewed examined these variables (Holloway et al., 1995).

A few years after Holloway et al. (1995) published their review, Mueser et al. (1998) reviewed and presented a check-box method of investigating outcomes related to ICM, ACT, and standard case management services. The authors included many of the studies of Holloway et al. (1995), but updated the review to include a total of 75 studies overall. They included studies that compared ICM or ACT with another (usually less intensive) model, although ICM and ACT were directly compared in one study. They also included studies that utilized a pre-post study design including only one group of clients. Group comparisons included only those studies that described the groups being moderately similar at baseline, though random assignment was rare. Mueser et al. (1998) also commented that null findings are often not published and so the review is unlikely to be exhaustive, and care should be taken in assuming that the published findings represent all the research completed in the area.

Of the 75 studies reviewed by Mueser et al. (1998), 44 investigated outcomes related to ACT, and 17 to ICM, with the remaining investigating outcomes related to a less intensive form of case management such as brokerage or strengths-based case management. Overall, when investigating the group of controlled studies comparing ICM/ACT with less intensive services, findings showed a general trend toward ACT and ICM being at least the same as or superior to

less intensive forms of case management on clinical and social outcomes. The review showed consistent findings of ICM/ACT as superior to less intensive forms of support in helping clients reduce time spent in hospital, secure housing, and be satisfied with treatment. Other variables were associated with equal numbers of studies showing a superior outcome for more intensive services and also no difference between levels of service intensity (e.g., symptomatology, quality of life, and satisfaction of family members with treatment). A third set of outcome variables were associated primarily with studies that showed no differences between ICM/ACT and less intensive services (e.g., involvement with the legal system, substance use, vocational functioning, and social adjustment). Only one study showed ICM or ACT to be inferior to standard services on time spent in hospital, housing stability, and involvement with the legal system. Thus, despite varying methodological designs, variation in the characteristics of the sampled groups, and limited reporting of information on the measures used to assess targeted outcome variables, Mueser et al. (1998) concluded that, overall, there is evidence to suggest that ICM and ACT are, at least as good as, if not superior, on a moderate number of clinical and social outcomes, with the greatest evidence to support their effectiveness (and the authors argue, cost-effectiveness, although this is not specifically assessed) in targeting time spent in hospital and housing stability.

Simmonds, Coid, Philip, Marriott, and Tyrer (2001) investigated the effectiveness of five studies of multidisciplinary community mental health teams. While these teams functioned similarly to intensive case management teams, they were not designed with this structure in mind. Nevertheless, the authors reported that the five randomized controlled trials comparing these teams with standard care revealed fewer deaths, fewer treatment dropouts, shorter hospital stays, and a lower cost of care.

Nelson, Aubry, and Lafrance (2007) reported on a review of eight studies of ACT and ICM as they relate to outcomes for individuals with a severe mental illness and also a history of

homelessness. The authors used stringent inclusion criteria, consisting of only experimental or quasi-experimental controlled studies in which ACT or ICM was compared to ‘standard care’ (typically a less intensive form of case management such as outreach services or brokered case management), outcomes with good psychometric properties, and follow-up period of at least one year. This being said, one of the studies included an ICM group that was time-limited in nature, unlike traditional ICM treatment, which is indefinite. All of the included studies were carried out in the United States. This review also calculated overall effect sizes by type of community support model, thus extending the earlier review work of Mueser et al. (1998). Unlike Mueser et al. (1998), this was possible due to the more stringent inclusion criterion used by Nelson et al. (2007).

The review by Nelson et al. (2007) showed that, overall, all four studies of ACT showed it to be superior to standard care on measures of housing stability ($ES = .47$). In contrast, of the four studies of ICM, only two showed superior outcomes related to housing for ICM over less intensive services ($ES = .24$). Both ICM and ACT showed superiority over standard care in reducing time spent in hospital, and were also associated with increased access and usage of community-based mental health and social services. Two of the ACT studies and one of the ICM studies showed clients reporting a greater decrease in symptomatology when compared with brokered services or standard treatment. There was also some evidence to suggest that ACT and ICM are superior to standard treatment on clients’ ratings of their perception of their own physical and mental well-being, as well as on their ability to meet their own basic needs. ICM and ACT showed equal effectiveness when compared with standard treatment on helping clients improve familial relationships and in improving overall life satisfaction. The authors commented that this review lends evidence to suggest that, as intended, ACT and ICM target housing and

time spent in the hospital, but also go beyond such indicators to positively affect broader determinants of social functioning.

A recent meta-analytical review of 29 studies linking case management and hospital use has shown that ICM and ACT work best at reducing hospital usage when the baseline level of hospital use is high, and do not typically serve to reduce hospital use when baseline levels are low (Burns et al., 2007). Additional complex analyses in this review showed that case management works best when there is high fidelity to the ACT model, but does not improve by merely lowering client-to-staff ratios (Burns et al., 2007). It was unclear from the review which studies were included, as the authors did not include the 29 studies in their reference section. For this reason, it is difficult to disentangle ACT from ICM studies in their concluding comments.

Service Use Patterns

Hospital use. Studies looking at hospital use after involvement in intensive case management show mixed results. Bush, Langford, Rosen, and Gott (1990) found that when 28 clients with high rates of hospital use or difficulties living in the community were assigned to either intensive case management or a control condition (less intensive support), it was found that patients who received ICM had fewer days in hospital than control patients by 10 bed days. These results were tempered, however, by the fact that clients were not matched on number of previous hospitalizations or number of days previously spent in hospital. One experimental study (i.e., Macias, Kinney, Farley, Jackson, & Vos, 1994) with random assignment to either ICM or PSR showed that at 12 months after implementation, hospitalizations decreased in the ICM group and increased in the PSR group. It was also shown that the case managed individuals had significantly fewer crisis contacts after implementation of the program, whereas this was not the case for the PSR group (Macias et al., 1994).

Many studies have found no difference between groups on hospital use (as measured by number of hospital days or length of time spent in hospital) following intensive case management versus varying control conditions that included less intensive case management or no case management (e.g., Rossler et al. 1995, Burns et al. 1999, Goering et al., 1988, Johnston et al., 1998; Lehman et al. 1993; Jerrell and Hu, 1989, Hornstra et al., 1993; Muijen et al., 1994; Patterson & Lee, 1998; Quinlivan et al., 1995). Individual results are presented below in an attempt to investigate reasons for small group differences.

Rossler et al. (1995) compared a group of patients in case management with a group of matched patients who received no outpatient care from case managers. Both groups were recently discharged from hospital and matched on demographic characteristics and previous hospitalizations. Case managers provided support to families, assisted in developing social networks, provided training in independent living skills, but did not engage in medication management. All the case managers worked closely with traditional outpatient services. During the observational period, case managed patients (39%) and “no treatment” patients (29%) had similar levels of re-hospitalization. There was also no difference in length of hospital stays between groups. It was posited that perhaps the services given to controls were adequate for meeting their needs, thus explaining the lack of significant differences between groups.

Jerrell and Hu (1989) looked at patients recently discharged from hospital that used high levels of service and were low functioning in the community. These individuals were randomly assigned to either ICM or standard aftercare and no significant differences in hospitalizations were found. Muijen et al. (1994) contrasted two groups of patients. The first group received ICM (client-to-staff ratio of 11:1) where the case manager was a member of a team and worked as a client advocate. Case management services focused on social issues and entailed aggressive outreach. The second group received standard care at the same clinic. The participants were

assessed at 6, 12, and 18 months, and no significant differences in number of hospital admissions or in length of stay in the hospital were found between groups.

Muijen et al. (1994) speculated that case interventions may not have been specific enough to target recidivism. The ICM workers also had little training and were an unqualified group of people to begin with and received no formal training in case management or advocacy work. Input from other professions other than nurses was also low. They also speculated that the quantity of care may have been poorly focused: intensive case managed clients may have been given more services but they may not have been effective services.

Patterson and Lee (1998) developed a retrospective, quasi-experimental study to investigate the effectiveness of ICM on hospitalizations. Case managed individuals were those already receiving services, and were compared to a randomly assigned group of controls who were eligible for intensive case management but were not receiving it due to limited funding. This intensive case management model focused on clients' strengths, low client-staff ratios, facilitating resources to promote staying in the community, aggressive outreach, linkages to resources, provision of support, and increased continuity of service provision to clients. The comparison group of patients only received medication evaluations, occasional visits to a day hospital program, and intermittent contact with a psychiatric nurse or psychiatrist. The two groups were found to have no significant differences on demographic characteristics. Hospitalization rates did not differ between the two groups, despite the ICM group having more referrals to outside agencies and services in the mental health center where the research was taking place.

Many studies have looked at contrasting ICM with standard case management, where the main difference between groups seems to be in the client-to-staff ratio. Burns et al. (1999) compared ICM to standard case management where the intensive part was in a low client-to-staff

ratio of 15:1 versus standard care of 30-35:1. It was found that the two groups did not differ significantly on number or length of stay of hospital admissions. Goering, Wasylenki, Farkas, Lancee, and Ballantyne (1988) assigned patients to ICM and matched them with patients receiving traditional aftercare on the basis of gender, diagnosis, number of previous admissions, and employment status. At 6 months and 2 years, it was found that ICM did not reduce the need for hospitalization. Johnston, Salkeld, Sanderson, Issakidis, Teesson, and Buhrich (1998) also contrasted ICM (client-to-staff ratio of 9:1) versus routine case management (30:1) and found no differences between groups over the 12 month study period for the number of days spent in hospital and the mean number of admissions. Hornstra, Bruce-Wolfe, Sagduyu, and Riffle (1993) looked at 112 clients with a diagnosis of schizophrenia who were receiving ICM with a client-to-staff ratio of 9-30:1, and matched these individuals with another 112 clients receiving regular case management (100:1). No significant difference was found in the number of hospitalizations or the length of time in hospital for the two groups. It was found that those individuals in ICM the longest were more likely to be hospitalized. This could be due to the length of time they were in the study or the course of the disease.

Lehman, Herron, Schwartz, and Myers (1993) extended the use of ICM to a population of dually-diagnosed individuals. Participants were randomly assigned to usual psychosocial and community-mental health services (including a daytime psychosocial rehabilitation program, routine outpatient services, and supported housing) or to ICM and participation in a Being Sober Group. The client-to-staff ratio for the ICM group was 15:1 whereas for the comparison group it was 25:1. They found no differences on the use of hospital services. It was posited that it may have been difficult to see changes in the ICM group as they were particularly hard to engage. They only attended about 1/5th of the classes in the Being Sober Group. It was also posited that many of the individuals in the ICM group were in the early stages of thinking about making

changes in their lives, whereas the Being Sober Group targeted those in active stages of change. Again, it was mentioned that the comparison group was “itself a substantial intervention that engaged and stabilized patients” (p. 89).

Only one study compared ICM, traditional case management, and a third comparison group receiving standard care (Quinlivan, Hough, Crowell, Beach, Hofstetter, & Kenworthy, 1995). Participants from a community mental health centre were randomly assigned to one of the three groups. The client-to-staff ratio for ICM was 15:1 and for traditional case management was 40-60:1. Other differences between the services included a team-based approach in terms of client discussion in the ICM group (e.g., weekly team meetings to discuss clients) but not in the traditional case management group. Over 24 months, the ICM group had fewer average days in the local county hospital (4.3 days) than traditional case management (30.1 days) and standard care (51.4 days), however there were no differences in average number of days spent in local private psychiatric hospitals in the area. This was contrasted in part with the finding that those individuals in the ICM group had the highest use of crisis residential facilities versus the other two groups; however, the result only approached significance. It is posited that these types of services were pushed by case managers to avoid having clients in locked treatment in the county hospital.

A few studies have found an increase in recidivism or use of hospital following intensive case management. Curtis, Millman, Struening, and D’Ercole (1992) looked at 435 patients recently discharged from psychiatric hospitals in New York. They were assigned to three types of services: ICM, less intensive case management (higher client-to-staff ratio and fewer hours with client), and traditional services. Eighteen to 52 months after the study began, patients in ICM had twice as many hospitalizations as those in traditional services and the same number as those in less intensive case management. It is important to realize, however, that patients were not

matched on number of previous hospitalizations nor randomly assigned to the three groups. Patients eligible for intensive case management were generally more impaired and had more extensive histories of psychiatric hospitalization.

Following a survival analysis, Patterson and Lee (1998) found that their standard care group (not receiving intensive case management) had a 41% greater likelihood of not being re-hospitalized when all other covariates were held constant between the standard care and ICM groups. It was found that the clients most at risk of being re-hospitalized were those in the ICM group who “had received shorter intervals of intensive case management, had higher levels of services per month, and had experienced frequent hospitalizations of shorter lengths of stay” (p. 163). The researchers posited a few explanations for these findings. Perhaps the ICM clients were being more closely monitored, such that problems were more likely to be detected by case managers than in the standard care group, resulting in re-hospitalization. Intensive case managers may have had more access to state beds, and also case managers were told to accompany clients to the assessments at hospitals and this may have increased their chances of being hospitalized.

Therefore, the results of studies of ICM’s effectiveness at reducing hospitalizations are mixed. There is some evidence to suggest that hospitalizations decrease with intensive case management, and this could be because more crises are able to be averted (e.g., Macias, Kinney, Farley, Jackson, & Vos, 1994). Where no differences were found between ICM and comparison groups, a number of possible reasons can be entertained: 1) The services offered under the comparison conditions were sufficient to meet client needs adequately (e.g., Rossler et al. 1995), 2) the population is low functioning and typically engages in high levels of service use despite receiving case management (Jerrell & Hu, 1989), 3) intensive case managers may have had insufficient training (Muijen et al. 1994), 4) there was not enough focus on medication management in ICM (Muijen et al., 1994), 5) the quality of care in ICM may not have differed

from the control group despite an increase in frequency of contact (Muijen et al. 1994), and 6) it was hard to engage clients in the treatment regimen (Lehman, Herron, Schwartz, & Myers, 1993). Where it was found that ICM patients had fewer hospital admissions, it was also noted that they used crisis residential facilities to a greater extent than patients receiving standard care, suggesting that one type of service is substituted for another (e.g., Quinlivan et al., 1995). Studies finding that there were more hospitalizations for ICM did not use random assignment of groups (e.g., Curtis, Millman, Struening, and D'Ercole, 1992). Additionally, ICM clients were more closely monitored than participants receiving regular services and therefore may have been more likely to be identified as needing hospitalization admission (e.g., Patterson & Lee, 1998).

Medication adherence. Medication adherence may be the most powerful tool for preventing relapse and improving symptoms for clients with psychiatric difficulties (Schatzberg & Nemeroff, 1998; Zygmunt, Olfson, Boyer, & Mechanic, 2002). One study found medication nonadherence to be a significant problem within a sample of clients with severe mental illness, with over half of consumers being nonadherent to medication regimens during the course of their illness (Corrigan, Liberman, & Engle, 1990).

The research on medication adherence finds mixed results in comparing ICM and regular case management, and ICM and standard care. Two studies (Ryan, Sherman, & Judd, 1994; Bush, Langford, Rosen, & Gott, 1990) showed an increase in medication adherence as part of the program; however, the first was only a study of regular case management, not intensive case management, and the second did not match clients for number of previous hospitalizations or number of days previously spent in hospital. Only one study of ICM has shown an increase in medication compliance versus standard care (Patterson & Lee, 1998). No effects of ICM on this outcome were found by Bond et al. (1990), Modrcin, Rapp, and Poertern (1988) or Ford et al. (1997), even when ICM and standard care participants were matched on important demographic

characteristics. When compared to regular case management, Franklin et al. (1989) and Johnston et al. (1998) did not find ICM superior in linking clients to medication management services or in client compliance with medication regimens at follow-up.

Use of mental health services. One of the major goals of ICM is to link individuals to other community services and supports. It is important to look at whether individuals receiving ICM actually use more mental health services, such as visits to psychiatrists, primary health care, residential care, and general outpatient services, compared to clients receiving standard care. Again, studies show mixed results.

Several studies have shown that participants in ICM engaged in greater use of mental health services versus those in standard care. Ford et al. (1995) compared those in intensive case management with those not receiving any case management and found that case managed clients had significantly more contacts with psychiatric care, primary health care, case manager time, residential care, general outpatient services, and home help than controls over 18 months.

In a quasi-experimental design, McGurrin and Worley (1993) found that ICM clients used emergency services to a lesser degree than controls (those registered to treatment agencies but who were not necessarily regularly participating in a service plan). However, they still used outpatient services and partial hospitalization programs to the same extent. Hornstra et al. (1993) replicated these results with 112 clients with a diagnosis of schizophrenia in intensive case management (client to staff ratio of 9:1) who were matched for age, diagnosis, number of hospitalizations, and length of time in hospital with another 112 receiving regular case management (client to staff ratio of 30:1). It was found that the ICM clients had significantly more caseworker contacts, clinic visits, doctor visits, appointments scheduled, and appointments kept.

Johnston et al. (1998) found similar results with a clinical trial of ICM versus regular case management. It was noted that ICM patients used mental health services of the case managers to a significantly greater rate than the routine case management patients. They also used general hospital outpatient services and charitable services to a greater degree. Quinlivan et al. (1995) found that ICM patients used significantly more units of outpatient services than clients in standard care. It is interesting to note that Toro et al. (1997) found that clients in standard care engaged in additional mental health services to the same extent (and of their own accord) as those in ICM.

A few studies have found that service use is no different between ICM and standard care groups. Jerrell and Hu (1989) looked at patients recently discharged from hospital and those selected for high levels of service use and low functioning. They found no significant differences in service utilization for the ICM versus standard aftercare groups. Muijen et al. (1994) found that when patients were randomly assigned to either ICM (client-staff ratio of 8-11:1) versus standard care, the mean number of contacts with psychiatrists and GPs did not differ significantly between the groups.

Baronet and Gerber (1998) suggest that the mixed results in this area can be explained by the definitions of alternative mental health services. Usually, ICM patients show a decreased use of visits to crisis centers, whereas studies showing an increase or no difference in services were often looking at visits to psychiatrists, case managers, or physicians. Toro et al. (1997) found that both the clients randomly assigned to receive DEPTH services (which included case management) and those in the control group (who only used community services) sought about the same number of inpatient mental health or substance abuse care, outpatient mental health or substance abuse counseling, child or family counseling, financial counseling, vocational training, crisis services, and self-help groups.

Involvement in treatment. Involvement in treatment can be defined as the number of appointments kept with service providers. As ICM usually encompasses an aggressive outreach component, it is important to address whether this aids individuals in keeping appointments with health care providers. Hornstra et al. (1993) and Ford et al. (1995) both found greater involvement in treatment for the ICM patients versus those in standard care. Ford et al. (1995) found that in a randomized control trial of case management versus standard care (but no case management), 3% of case managed individuals lost contact with their case manager at 18 months compared with 24% losing contact with service providers in the control condition. This was replicated by Johnston et al. (1998), who found that there were a significantly greater number of people at 12 months who were interviewed from the ICM group than from the routine case management group.

Muijen et al. (1994) confirmed that those individuals in intensive case management actually see the case worker more times per month than those receiving regular community services (2.9 times per month in relation to 0.7 times per month). Only one study found that those individuals in intensive case management actually show less involvement in treatment. Burns et al. (1999) found that more clients in ICM lost contact with their case manager than those in standard case management, and this was primarily due to a large number of ICM clients that ended up in prison or a secure hospital facility. Overall, it seems that the consensus is that ICM, with its aggressive outreach approach and more frequent visits to see clients, produces more involvement of clients.

Recent research has shown treatment involvement to be an important mediator in producing positive outcomes for individuals receiving community treatment (e.g., Morgenstern et al., 2008). In a randomized controlled trial comparing ICM and standard care (referral to self-help groups) and involving 302 female clients with drug-dependence, those involved in ICM had more

case manager contacts than those in standard care. Subsequently, female clients in the ICM group were significantly more likely to be abstinent at follow-up intervals (4-15 months post treatment) than those in standard care (Morgenstern et al., 2008).

Satisfaction with treatment. Muijen et al. (1994) found that satisfaction levels were the same for their intensive case management group when compared to standard care in terms of client and relatives' satisfaction. This was replicated by Macias et al. (1994), who found similar satisfaction levels between those receiving case management and those receiving psychosocial rehabilitation.

Functioning and Community Adjustment Outcomes

Global and social functioning. It is not enough to look solely at hospitalizations or use of additional mental health services as indicators of the effectiveness of ICM. Global and social functioning measures are also important indicators of the usefulness of ICM in improving overall life status for clients. There are many studies showing that these areas improve as a result of receiving ICM. Ford et al. (1996) found that an intensive case managed group matched with a comparison group in a neighbouring town who received no case management had superior improvements in social functioning. Significant differences were found between the groups on the Life Skills Profile (LSP) and the Socially Supportive Behaviours scales. Case managed clients also engaged in lower levels of violence towards others, less self-harm behaviours, and encountered less trouble with the police. However, no differences were found between groups on having someone to confide in or level of contact with friends. Also, using the Life Skills Profile (LSP), Johnston et al. (1998) found that 17 out of 33 patients in the ICM group (client to staff ratio of 9:1) compared to 6 out of 25 in the routine case management (client to staff ratio of 33:1) group showed clinically significant improvement in total LSP scores from baseline to 12 months;

however, the two groups did not differ with respect to the number of patients who were involved in at least one incident of self-harm or harm to others.

Franklin et al. (1989) found that their case management group improved (although only marginally) in the areas of activities of daily living, self-esteem, and psychological well-being, compared with a standard care group. Macias et al. (1994) found that both client and professional assessments of competence in daily living were higher for a case managed group than for those receiving only psychosocial rehabilitation. McGurrin and Worley (1993)'s quasi-experimental study looking at ICM versus standard care found that over a 3-year period, the ICM group had slight improvements in personal care, interpersonal skills, and work skills.

Patterson and Lee (1998) found that their ICM group had higher levels of social support on three dimensions of social support and had a higher overall global assessment of functioning than the standard care group. Toro et al. (1997) showed that among homeless individuals receiving ICM as part of the DEPTH program, there was a more dramatic decrease in stressful life events over time than in standard care; however, no differences were found between groups at follow up on family support, social support, friend support, self-efficacy, drinking index, nor on days homeless, job income, or other income.

One study has shown that global and social functioning does not differ between ICM and standard care over time. Muijen et al. (1994) found no significant change in social functioning occurring in any of the areas measured by the Social Adjustment Scale (work, social, extended family, marital, parental, family unit and economic adequacy). Patients in both an ICM (where case workers were involved in social issues and had a client to staff ratio of 8-11:1 initially, which later expanded to 20-25:1) and standard care (generic case workers who worked independently and offered generic care with rapid turnover of referrals to primary or secondary care) remained moderately impaired throughout the study. The same study also found higher

scores on a measure of global adjustment for standard care versus the ICM group at 18 months (Muijen et al., 1994).

Another study showed mixed results (Modrcin et al., 1998): Significant others were more likely to rate the individual in ICM as better adjusted in terms of community living skills and appropriate community behaviours, and ICM clients were more likely than those in standard care to show an increase in tolerance to stress and perceive their leisure time as pleasurable. However, case managers' ratings of socialization skills were found to be lower for the clients receiving ICM than those receiving standard care (Modrcin et al., 1998).

The researchers commented that perhaps these lower scores were more reliable, as these case managers had more contact with the individuals in ICM than the case managers delivering standard care. The case managers delivering standard care may have assumed a higher degree of client functioning when they were unsure about a client's level of performance. Because these case managers, due to limited time, were often with their clients in times of crisis only, they may have not had a good sense of their normative socialization skills. The case managers delivering ICM may also have had higher expectations for their own clients and therefore rated them more poorly on socialization items (Modrcin et al., 1998).

In summary, the evidence suggests that ICM has a significant and positive effect on overall psychosocial adjustment and functioning within the community, as measured by personal care, interpersonal skills, work skills, social support, and overall global functioning. Where results have been mixed or shown those in ICM groups to have lower socialization skills (e.g., Modrcin et al., 1998), the case managers delivering ICM may have either a) expected more from clients and so rated them lower, or b) had more time with clients and so therefore had a better sense than standard care case workers of where their clients' deficits lay.

Quality of life. For the most part, when quality of life is assessed as an outcome of intensive case management, the results have shown no significant differences when compared to standard care. Franklin et al. (1987) found no significant difference between these the two groups on either subjective or objective measures of quality of life. Ford et al. (1996) confirmed this result when they found no difference in overall self-reported quality of life between the case managed and traditional psychiatric care groups. Franklin et al. cited that perhaps there were no differences in quality of life with increased services because the group was quite ill at baseline and the time interval of 12 months was not enough time to see positive change in this regard.

Franklin et al. (1987) also posited that there may not have been enough distinction between the case managed group and the standard care group (i.e., both the case managed group and control group receiving traditional care were serviced out of the same community service centre), allowing both groups the opportunity for similar services. A third reason was posited to be that the subjects in the case managed group were more likely to be male, African-American, never married, and unemployed, and therefore there may have been fewer individuals who could improve their quality of life as a result of increased services. Lehman et al. (1993) found that, in fact, those participants in case management were lower on quality of life than those in standard care, although they posit that because of statistical error, their results could be due to chance and not a treatment effect.

Residential and occupational status. ICM has been shown to have a positive impact on occupational and residential status, especially when vocational services and independent living skills are emphasized (e.g., Bjorkman & Hansson, 2007; Goering et al., 1988; Modrcin et al., 1988). Wasylenki, Goering, Lemire, Lindsey, and Lancee (1993) found that there was an increase in the number of participants housed following participation in ICM. Modrcin et al. (1989)

showed that individuals involved in a strengths-based approach to case management were more likely to be involved in specific vocational training than those in regular case management.

However, when clinical trials are reviewed, there are mixed results on ICM's effectiveness in improving residential status. Johnston et al. (1998) found no differences in the number of patients spending one or more days employed (paid, voluntary, or sheltered) or in the number of patients who had at least one residential move in clinical trials comparing ICM to standard care. Solomon and Draine (1995) found no differences between groups on homelessness or employment. However, Toro et al. (1997) found that ICM clients (those part of the DEPTH program) had significantly fewer days homeless than standard care clients. They did not find significant group differences on job income. However Franklin et al. (1987) reported that the clients in their ICM group showed slight gains in employment and total monthly income over the clients in standard care.

One study investigated the use of assertive outreach and a variation of ICM for a sample of 94 male shelter-dwellers where all had severe mental illness and upwards of 60% of the sample had alcohol and/or drug dependence (Susser et al., 1997). The men were engaged assertively in treatment at the shelter, randomly assigned to receive either ICM for a period of 9 months or standard care, and followed for 18 months on a monthly basis to track housing status. At follow-up, there were significantly fewer clients in the ICM group (8%) than the standard care group (23%) who were homeless. As well, there was a significant three-fold decrease in the number of nights spent homeless in the ICM group versus the standard care group when looking at housing data from the 18 month period. The authors concluded that assertively reaching clients in shelters and engaging them in ICM treatment was shown to effectively reduce homelessness in a sample of men with severe mental illness and substance dependence, and that the superiority of ICM held up even 9 months after ICM treatment had terminated (Susser et al., 1997).

Symptomatology. Studies looking at changes in symptomatology post-intervention of intensive case management have found mixed results. Jerrell and Ridgely (1995) found a decrease in psychiatric symptoms in a patient sample of dually diagnosed individuals (e.g., co-occurring mental health and substance abuse problems) over an 18 month period (schizophrenia, depression, and mania symptoms) when compared to a Twelve Step Alcoholics Anonymous group. Burns et al. (1999) contrasted ICM (client-to-staff ratio of 15:1) versus standard case management (30-35:1) using the Comprehensive Psychiatric Rating Scale (CPRS), which rates severity of 65 items of psychopathology over the preceding week on a 0-3 scale and consists of subscales for depression, anxiety, psychotic symptoms, and behavioural disturbance. The ICM group was significantly lower on psychiatric symptoms at one year follow-up, but this difference did not hold up at two years. Like the explanations for not finding differences in mean hospital stays, the authors make the point that both groups had coordinated care, and the only real difference between the groups was in the staff-client ratio. They state that in well-coordinated mental health services, a smaller number of patients in a case load alone does not improve outcomes for patients.

McGurrin and Worley (1993) conducted a quasi-experimental study looking at ICM versus standard care where the two groups were matched for diagnosis, age, and gender. It was found that psychiatric symptoms fluctuated randomly and were not correlated with either the amount of ICM or the length of time spent in the ICM program. In contrast, Muijen, Cooney, Strathdee, Bell, and Hudson (1994) found a trend towards lower scores on the Brief Psychiatric Rating Scale (BPRS) for the ICM group versus the standard care group at 18-month follow up; however, they did not find differences on other measures of psychopathology.

One study found lower psychopathology ratings for a group of homeless individuals with severe and persistent mental illness who had been randomly assigned to receive services in a

Demonstration Employment Project-Training and Housing (DEPTH) Program or a comparison group receiving standard care (Toro, Rabideau, Bellavia, Daeschler, Wall, & Thomas, 1997). Two hundred and two cases were referred to the project and followed up at 6, 12, and 18 months. One hundred and five people ended up being interviewed at all follow-up times (Toro et al., 1997). DEPTH used a holistic approach and combined services concerned with job training with the long term goal of helping the person escape homelessness. As part of DEPTH, the clients received intensive case management where they received access and linkage to services like financial aid, housing support, counseling for drug and alcohol problems, mental health assessment and treatment, and job training. Staff provided services if there was no identified service in place. DEPTH clients had a median of 41 staff contacts over 4-8 month period. Those in standard care received no DEPTH service but were free to use whatever services were available to them in the community. When ratings of psychopathology by the BPRS were compared across groups, it was found that the standard care group did not show improvement over time, whereas the DEPTH program participants did (Toro et al., 1997). However, we must be cautious in attributing these gains to ICM, as case management was only part of the larger DEPTH service. Also, only a portion of the individuals in the study had experienced severe and persistent mental illness.

One study looked at psychopathology symptomatology ratings from the perspective of the client, family member, and professional assessments (Macias et al., 1994). Here, clients were randomly assigned to receive PSR or a strengths-based approach to case management (staff-client ratio of 1:10). The psychosocial rehabilitation consisted of daily activities, group discussions, recreational outings, lunch program, help obtaining financial benefits, money management, employment linkage, medical care linkage, and informal counseling. The case managed individuals also received counseling, the building of a strong relationship with their case worker,

practical problem solving, direct instruction in life skills, and a monitoring of consumer functioning and advocating on behalf of the client for community services. Case managed consumers reported having fewer problems with mood and thinking (lower symptomatology), better overall mental and physical health, higher daily living competency levels, and greater psychological well-being than the PSR group. The mean rating by family members of case managed clients' psychiatric symptomatology was lower than for the PSR group. Professional assessments put the case managed consumers as less depressed in mood, more clear-thinking and rational, and more productive in daily activities than participants in the PSR group.

The literature seems to show some support for ICM's effectiveness in reducing symptomatology in patients with severe mental illness. Several studies have shown that lower client to staff ratios result in lower levels of symptomatology (Jerrell and Ridgely, 1995; Muijen et al., 1994), suggesting that the "intensive" part of ICM is a critical ingredient. Toro et al. (1997) found that clients involved in the DEPTH program had significantly decreased symptomatology; however, we cannot attribute this solely to intensive case management, as there were other service differences between DEPTH clients and clients receiving standard care.

Macias et al. (1994) showed that for self-report, family report, and professional report, ICM clients were lower on symptomatology than those not receiving case management. Because both of the groups in this study received psychosocial rehabilitation, the noted reductions in symptomatology can be more strongly attributed to the unique aspects of intensive case management (i.e., a low client to staff ratio, counseling, strong alliance, practical problem solving, skill building, monitoring and advocating for additional services).

Substance use. Overall, ICM does not appear to influence or impact substance use (Baronet & Gerber, 1998). At least four studies have found no differences between clients' use of psychoactive substances in ICM versus standard care (e.g., Ryan et al., 1994; Jerrell & Ridgely,

1995; Lehman et al., 1993; Solomon & Draine, 1995). One randomized controlled trial, however, did show that for a sample of homeless substance-abusing individuals, ICM was superior to standard care in aiding individuals in reducing their alcohol use over 24 months (Cox et al., 1998). A recent review noted that the effectiveness of case management for reducing substance use is inconsistent and seems related primarily to treatment retention and specific substance dependence/abuse treatment within the case management model (Vanderplasschen, Wolf, Rapp, & Broekaert, 2007).

Involvement with the legal system. A recent review of 19 studies investigated the use of intensive case management as jail diversion for individuals with severe mental illness and involvement in the legal system (Loveland & Boyle, 2007). Of the seven identified randomized controlled trials comparing “case management” (both ICM and ACT were subsumed under this heading) and ‘treatment as usual’ on arrest rates, the authors concluded that, overall, case management did no better at reducing arrest rates than standard care (Loveland & Boyle, 2007).

Studies exclusively of ICM have shown mixed effects when it comes to its influence on client involvement with the legal system. Some studies have shown no effect on involvement in the legal system (e.g., Solomon & Draine, 1995; Bond et al., 1988), while another found that ICM was associated with fewer days spent in correctional institutions and more time spent in the community after release (Wilson, Tien, & Eaves, 1995). One clinical trial showed that the same number of people in ICM or standard care had contact with police or legal services (Johnston et al., 1998). Many studies do not measure legal involvement as an outcome and further work is needed in this area.

Summary of Outcome Literature

We have reviewed the outcomes for the ICM literature. Varying study designs, poor descriptions of the service provided, and differing client groups contribute to difficulty in

drawing firm conclusions about the effectiveness of case management (Ford et al., 1997).

However, there is still substantial evidence to suggest that ICM leads to fewer hospitalizations, lowered levels of symptomatology, and an increased use of additional mental health services in the community. Individual studies have also shown ICM to be effective in improving medication adherence (Patterson & Lee, 1998), psychological well-being (Franklin et al., 1989), competence in the community (Macias et al., 1994), improved life skills (Ford et al., 1996; Johnson et al., 1998), improved social support (Patterson & Lee, 1998), and improved residential status (Wasylenki et al., 1993). Ford et al. (1997) cite that systems of case management are widely implemented in the Western world. Little research has been conducted to date on the costs associated with these services (Morse, 1999). Thus it is important to review the literature on overall costs and costs as they relate to outcomes in intensive case management.

Costing of Community Support Services

Economic evaluation is important in mental health and social service care as resources are scarce and funding bodies constantly have to make decisions about allocation of monetary resources. Without the inclusion of cost information, one has only half the equation in deciding whether treatment A or B is worth investing in further. For example, a treatment may be highly effective, however much too expensive to implement within a constrained budget. Drummond et al. (2005) highlight three important reasons for economic evaluations. The first is that without systematic analysis, one cannot be fully informed about all relevant alternatives. It is often when a new treatment choice is offered that the 'old' treatments are more fully understood (in often what they are not). Secondly, economic evaluations reflect a chosen economic perspective, and one can often examine costs and outcomes from more than one perspective (e.g., the individual patient, the specific institution, the government, and/or the overall societal perspective).

Understanding these different economic perspectives is crucial as not every perspective includes

all the costing components available. Thirdly, attempting to measure the costs associated with treatments can often provide information about the possible cost ‘benefits’ of ameliorating other services (e.g., cost savings from being able to forgo ‘old’ treatments and associated costs; Drummond et al., 2005).

An important point in economic evaluation is that it always involves a comparative analysis of alternative courses of action (even if the alternative is ‘nothing’). Even without a second treatment option as a comparable alternative, it may still be important to consider the baseline of doing nothing (or another low-cost option). Drummond et al. (2005) provide a useful table for determining when particular economic evaluations are appropriate (see Table 1).

As Table 1 outlines, full economic evaluation requires information on costs and outcomes. Drummond et al. (2005) outline the differences between the three noted analyses in the ‘full economic evaluation’ category. *Cost-effectiveness analyses* are typically employed when costs are related to a single, common effect that differs between alternative treatment options. Results of cost-effectiveness analyses may be stated in terms of a cost per unit of effect (in the natural units of the outcome). *Cost-utility analyses* allow for health-related quality of life adjustments to be given to a set of treatment outcomes (the generic outcome is usually *quality-adjusted life years* or *QALYs*). *Cost-benefit analyses* are used when both the costs and the consequences of alternatives are measured in monetary units and the resulting statistic is a ratio of costs to benefits.

Overall Costs

Several studies have looked at the costs of serving clients with severe mental illness in a community setting (Galster, Champney, & Williams, 1994). The first set of studies, primarily in the late 70s, looked at the comparison of costs between institutionalization and case management. Overall, it was found that the cost of treatment in hospitals was more expensive than the cost of

Table 1

Distinguishing characteristics of health care evaluation (adapted from Drummond et al., 2005)

Is there comparison of two or more alternatives?	Are both costs and outcomes of the alternatives examined?			
	NO	NO		YES
		Examines only outcomes	Examines only costs	Partial evaluation: Cost-outcome description
		Partial evaluation: Outcome description	Partial evaluation: Cost description	
	YES	Partial evaluation: Efficacy or effectiveness evaluation	Partial evaluation: Cost analysis	Full economic evaluation: Cost-effectiveness analysis Cost-utility analysis Cost-benefit analysis

case management. Weisbrod, Test, and Stein (1980), in a cost-benefit analysis, found that when subjects were assigned to either a hospital-based treatment program or a community-based alternative (ACT), the community-based treatment program showed more monetary benefits for the mental health system.

Bond et al. (1990) found that annual per-client treatment costs for ACT case management were estimated to be less than for a drop-in centre alternative, primarily because non-case managed clients were more likely to end up back in state hospitals. Dickstein, Hanig, and Grosskopf (1988) found that an intensive community support and treatment program reduced the rates of hospitalization, resulting in reduced costs to the mental health care system. McGurrin and Worley (1993) found that clients in ICM cost less to treat than those in the control group (matched controls receiving standard care), as more individuals from the control group used inpatient hospital services. Although Quinlinvan et al. (1995) found average hospital costs to be lower for an ICM group, compared with standard care (greater client to staff ratio than ICM); this difference was not statistically significant.

While costs of hospitals have consistently been found to be more expensive than costs for community-based alternative treatments, case management has been found to be more expensive than traditional community mental health services. Rydman (1990) found case management services to cost more than routine community-based services alone. Other studies have shown that in some cases, while reducing the costs of hospitalizations, case management is related to an increase in the use of alternative community resources. Savings in hospital costs are offset by increased costs of community care. Borland, McCrae, and Lycan (1989) looked at five years of intensive case management given to 72 young treatment-resistant chronically thought-disordered clients. They found that while patients' days in the hospital were reduced by 75%, this reduction was offset by a 193% increase in the number of days spent in structured residential care (e.g.,

supported living environment) in the community. These results were confirmed by Hafner and van der Heiden (1989) and Rydman (1990).

A more recent study confirmed these results when a randomized controlled trial of those in case management versus standard psychiatric care was compared. It was found that the cost was 2-3 times higher for those in the case managed group (Ford et al., 1997). This was due not only to the case management services themselves, but because of what the authors call “increased service uptake” (using significantly more outpatient services, community psychiatric nurse services, other primary services, residential care, and other social services). For the two groups to have no significant difference in cost, the case management services would have had to have been reduced by 75% (Ford et al., 1997). Quinlivan et al. (1995) reported similar results a few years earlier when they noted that their ICM group incurred significantly higher outpatient services costs than clients in standard care, despite finding no differences in costs in inpatient care between the two groups. Preston and Fazio (2000) also reported on increased outpatient service costs for those in ICM versus a matched-controlled group receiving standard care over a two year period. However, unlike Quinlivan et al. (1995), they found a total cost-offset in favour of ICM of \$801, 475 (AUS) due to significantly fewer inpatient hospitalization costs in the ICM group. In Canadian dollars, this means that it cost on average \$11,600 less per person in the ICM group versus standard care over the two year period, despite a three-fold increase in outpatient services in the ICM group.

Galster, Champney, and Williams (1994) looked at the direct social costs of serving the severely mentally ill with housing difficulties. They broke down their costing analyses in two ways: first, by type of case management (non-intensive: 1-3 hours with client per month; intensive: 1-3 hours per week, and very intensive: 3.5-5 hours per week), and second by residential setting (public subsidized dwelling, private subsidized dwelling, unsubsidized private

dwelling, state psychiatric hospital). Random assignment was not carried out. Participants were placed in the case management groups based on level of need. The participants needed to be over 18, not in a nursing home, and paying some sort of rent. Clients were interviewed monthly, and the following costing information was obtained: mental health services, physical health services, dental services, out-of-pocket expenses, housing, personal income, employment, volunteer work, general community service use like Salvation Army, payment sources like Medicare and private insurance, number of days in hospital or prison. Cost figures were adjusted for inflation.

The results showed that the non-intensive case management group (in nonsubsidized dwelling) was significantly lower in overall cost than all other groups except for the intensive case management (in nonsubsidized dwelling) group. The very intensive case management group differed significantly from all other groups. Total operating costs per month were as follows: non-intensive case management (\$748 for subsidized housing and \$1114 for nonsubsidized), intensive case management (\$1082 for subsidized housing and \$1434 for nonsubsidized), and very intensive case management (\$1730). Hospitalization ranged from \$4200-\$5300 per client per month. This study confirms the results of earlier studies that found both hospital costs to be more expensive than case management, but the more intensive the type of case management, the higher the community operating costs.

A recent report from British Columbia estimated that approximately 39,000 adults with substance abuse and mental illness are inadequately housed in the province (Patterson, Somers, McIntosh, Shiell, & Frankish, 2008). They estimated that the average homeless individual in BC costs the system \$54,833/year in health care, correctional/institutional care, and social services. They proposed that service utilization would drop to approximately \$37,000/year/individual if supportive housing was made available (Patterson et al., 2008). The authors did not, however, utilize comprehensive costing estimates, nor did they include the costs of community treatment.

Additionally, their costs were projected based on available literature estimating costs and not primary data.

Comprehensive Costing

Galster, Champney, and Williams (1994) highlight the importance of assessing costs in a comprehensive manner. When measuring costs of a service, it is important to measure both direct and indirect costs of a service. This is typically called comprehensive costing (Knapp & Beecham, 1990). Direct costs are those attributable to service provision, and indirect costs are costs attributable to lost wages due to illness. There are a number of examples of studies both inside and outside of the area of mental health which have looked at both direct and indirect costs when analyzing service components.

Examples of comprehensive costing outside of mental health are varied, including asthma (Cisternas et al., 2003), pancreatic cancer (Muller-Nordhorn et al., 2005), nephrolithiasis (Saigal & Timilsian, 2005), osteoarthritis (Woo et al., 2003), and chronic pain (Fortner et al., 2003). Within the mental health field there have been a few studies on costing of anxiety disorders (Issakidis et al., 2004).

Goossens, Rutten-van Molken, Vlaeyen, and van der Linden (2000) developed a cost diary that assessed direct health care costs, direct non-health care costs, and indirect costs for use in cost-effectiveness research. Direct health care costs included visits to the general practice, specialist care, alternative medicine, physiotherapy, days of hospitalization, and units of medication. Direct non-health care costs included costs incurred by patient and family such as costs of medications, costs of health activities, hours of paid and unpaid household help, transportation, and value of other out-of-pocket expenses. Indirect costs included the value of production lost due to illness-related absence, such as the number of days absent from work and days lost from housekeeping and other daily activities.

Comprehensive Costing of Community based Services for Individual with Severe Mental Illness

In their 1995 review, Holloway et al. reported on 10 studies of case management that included a cost component, although only three of their reviewed studies showed a form of comprehensive costing (all ACT or a variation of ACT; Hoult et al., 1983; Stein & Test, 1980; Muijen et al., 1994). Two of these studies showed a decrease in costs associated with case management services over 'usual care', but only when employment wages were figured into the overall costing package for clients (Hoult et al., 1983; Stein & Test, 1980). Muijen et al. (1994) found no cost benefit to case management over standard care.

Since this review, a few additional studies have looked at the direct and indirect costs of caring for individuals with severe mental illness in the community. Tarricone et al. (2000) examined the direct and indirect costs associated with caring for those with schizophrenia in Italy. They looked at the coordinated care from community health centers, psychiatric ambulatories, psychiatric wards in general hospitals, day-hospitals, sheltered homes, hostels, day-care centers, sheltered work-shops, home-based care and community residential facilities. They only included those individuals who met strict inclusion criteria involving a diagnosis of schizophrenia. The researchers collected data on both direct and indirect costs. Direct costs components concerned: Community mental health care interventions, living arrangements, inpatient care, pharmacological treatments, lab tests, and out-of-pocket expenditures. Indirect costs measured production lost because of the illness (patients' time off of paid and unpaid work) as well as caregivers' time off of paid and unpaid work and leisure time forgone.

An American review in 2000 examined published costing studies related to caring for individuals with severe mental illness and homelessness (Rosenheck, 2000). He examined research in three categories: outreach services, case management, and supported housing. He presented his earlier research with colleagues examining American data on Veteran's Affairs

costs for individuals before and after the first year of outreach services and noted that costs for medical and psychiatric care increase with entrance to an outreach program (by almost \$1000/client/per year; Rosenheck et al., 1993). The remainder of the review focused exclusively on ACT services, and so will not be summarized here. Nevertheless, this review highlighted the overall finding that more intensive community supports generally cost more at the program level, but can have cost-offsets in a global sense due to decreased hospital use and health care costs (Rosenheck, 2000).

Blouin, Aubry, and Angus (2004) used the comprehensive costing methodology of Knapp and Beecham (1990) to examine the first nine months of a two year clinical trial comparing intensive case management and standard care. Using combined group outcome data from 90 participants tested at both baseline and nine months, the authors investigated a number of hypotheses having to do with whether needs at baseline predicted costs, and whether costs (when holding baseline needs constant) predicted outcomes at nine months. Blouin et al. (2004) found that the average global cost to maintain an individual in the community by either case management or standard care was \$34,713.11 in 2001 dollars ranging from \$5280.00 to \$94,402.00) per year, or \$95.10 per client per day (this estimate included transfer payments). The authors did not calculate different costs associated with treatment type. Functioning at baseline (as measured by the Multnomah Community Ability Scale), number of residential moves, and life satisfaction were all found to be unrelated to total global costs from a societal perspective. Nor did global costs over the nine months predict follow-up levels of functioning, number of moves throughout the nine months, or life satisfaction. These results held constant when subgroups of costs (government costs, agency costs, etc.) were used instead of total global costs. One reason for the lack of findings could be that nine months is not enough time to see changes in life satisfaction, as typically the first months of either program target more immediate concerns

like food, medication stabilization, and housing. It could also be that resources were not being allocated according to need, as there was no relationship between level of functioning and the resources consumed by clients. Moreover, more services were not shown to produce better outcomes.

Cost-effectiveness of Community Support for Individuals with Severe Mental Illness

One study used costing methodology to examine whether an inpatient hospital stay or community-based residential crisis program was more cost-effective for a sample of 119 individuals with severe mental illness in the US, of whom 25 were homeless (Fenton et al., 2002). The authors reported on a randomized clinical trial in which individuals were randomly assigned, when in crisis, to be hospitalized or stay at McAuliffe House (an 8-bed residential crisis program located in a residential neighborhood in Rockville, MD). There was a difference in provided services between locations, with more group and individual therapy and on-site medication management given to the hospitalized individuals. The residential care facility did not offer treatment of any type, but would make sure that individuals continued to follow up with existing community services. A variety of data sources were used to estimate service utilization, such as client and staff interview data, computerized state Medicaid service claims, and medical record source documents. All service components were listed and both fixed and variable unit costs were calculated. Outcomes of interest in the study included symptom reduction (measured by the PANSS: Positive and Negative Syndrome Scale measuring episode symptom reduction) and total days living in the community over the next six months following admission.

Incremental cost-effectiveness ratios were calculated for the mentioned outcome variables, and the results indicated that the residential crisis program was less expensive than inpatient hospitalization; however, it also yielded less substantial outcomes (six fewer PANSS points and six fewer community days than hospitalization; Fenton et al., 2002). The researchers

asked the question of whether or not the less expensive residential crisis program was worth it, as the outcomes in this program were not as substantial as hospitalization. They concluded that the more expensive hospital-based program of acute care achieved six additional PANSS points of episode symptom reduction at an incremental cost of \$395 per PANSS point. Likewise, the hospital achieved each of six additional community days over six months at an incremental cost of \$1070 per community day (Fenton et al., 2002). Whether or not the cost is worth it depends, according to these researchers, on the value of other services that might be purchased with these savings.

Johnston et al. (1998) conducted one of the few studies to look at the cost-effectiveness of ICM. They investigated the costs in a clinical trial which put participants in either ICM or routine case management. They made the point that it is no longer a question of whether case management is cost-effective when compared to hospital treatment, but a question of whether it is cost-effective relative to other forms of community services and supports. For this reason, they wanted to compare the costs and outcomes in a cost-effectiveness ratio for both ICM and routine case management. The difference between groups was in the number of patients per case worker (9:1 in ICM and 30:1 in routine case management). They found that when hospital, mental health, general health, and community costs were computed per patient for the 12 month period of study, the overall mean cost of ICM was not significantly different from the routine case management services, despite case management costing more in the ICM group. The mean cost per patient was \$7745 more in the intensive group than in the routine group. The biggest contributor to cost in both groups was hospital costs, accounting for 78% and 79% of total costs in the intensive and routine case management groups, respectively.

The researchers were also interested in the incremental cost-effectiveness ratio when looking at life skills as the outcome variable of interest. This means that they were interested in

what it costs, per client, to obtain a clinical improvement in life skills (as measured by the Life Skills Profile; LSP) over a 12-month period. To obtain this ratio, firstly the program cost was extrapolated to 100 patients for both groups separately. Using subtraction, the difference in costs between the two groups was obtained. This number was then divided by the differences (between groups) in the number of patients out of 100 who clinically improved in life skills. The end result was an incremental cost-effectiveness ratio of \$27,661, meaning that it costs this much over 12 months for 100 additional patients in the ICM group to make clinically significant improvement in functioning. It means that for another client to improve in a significant way, theoretically \$276.61 more dollars must be spent in ICM.

A more recent study has shed light on the steps involved in comprehensive costing and cost-effectiveness within a community support system (Rosenheck, Kaspro, Frisman, & Liu-Mares, 2003). Comparing three groups of homeless men with either a severe mental illness or substance dependence disorder (or both), the authors showed how comprehensive costing was utilized over a 36 month period to assess the cost-effectiveness of three groups in a controlled trial: Intensive case management plus housing vouchers, intensive case management, or standard case management. While the results are important in and of themselves, the study also shed light on how community costing researchers can examine cost-effectiveness analyses from more than one economic perspective (as Drummond et al., 2005 stated is of paramount importance). The authors determined costs from the perspective of Veteran's Affairs, the broader governmental perspective, and finally the societal perspective. They used their understanding of these economic perspectives to guide their placement of particular costing elements into these three categories. For example, transfer costs (e.g., any monies directed to clients themselves from the government such as disability payments or welfare) are included in the governmental perspective, but not the overall societal perspective, as these costs are merely 'moved' from one hand (taxpayers) to

another (clients receiving benefits), resulting in a net cost to society of zero. However, when one uses the societal perspective, client employment is subtracted from the net cost as this is seen as a 'payback' to society but not to the government.

The authors also introduced the reader to the concept of acceptability curves for use in cost-effectiveness analyses of case management as a way to deal with the inevitable uncertainty related to costing and outcome estimates. The main outcome of interest in Rosenheck et al.'s (2003) study was housing stability (measured by number of days housed). To this end, the authors determined a curve which mapped the relationship between costs and outcomes by bootstrapping methods. Using a predetermined range of monetary 'values' of a night of secured housing for a client, the acceptability curve provided a scatter-plot which allowed the authors to determine the probability of the net benefit of the alternative treatment outweighing the 'value' of another night of secured housing. This 'value' of a night of secured housing was in part determined by the difference in cost between securing an additional night in the more intensive case management groups versus the standard case management group, however it was artificially manipulated in either direction to determine at what point the 'value' of a night of housing equals a high probability that the benefit of the more expensive service will outweigh the costs. For example, from the overall societal perspective, the authors reported that there was a 56% chance that the benefit of the ICM groups would outweigh the costs of the standard case management if they valued a night of housing at approximately \$50.00. The chance that the benefit of the more expensive service will outweigh the costs increases as the 'value' of a change in the outcome variable is artificially increased (Rosenheck et al., 2003).

The Current Study

The current study will employ comprehensive costing to examine the costs associated with community care (ICM and standard care) for individuals with a history of homelessness and

severe mental illness in a large Canadian city. The comprehensive costing methodology will be employed in an attempt to answer two sets of research questions. The first set of research questions target the relationship between needs, costs, and outcomes for the last six months of a two-year trial of ICM and standard care. These research questions include: 1) Can we predict overall societal costs for the last six months of the interventions based on client needs at 18 months? As well, 2) can we predict housing and clinical outcomes at 24 months based on overall costs for the six month period? The second set of research questions target the cost-effectiveness of intensive case management over traditional standard care in a clinical trial where participants were matched and randomly assigned to receive either intensive case management or standard community care. This research question is: 3) Is intensive case management more cost-effective than standard care?

With respect to ‘needs’ and ‘outcome’ variables, it is important to examine enough relevant variables without losing statistical power. For the purposes of our current study, four relevant variables were chosen based on the theoretical underpinnings guiding goals for clients involved in community support services. The four variables of interest are *psychiatric symptomatology, community ability, medication adherence, and housing stability*. The first three variables were noted by Corrigan et al. (2008) as particularly relevant in the psychiatric rehabilitation model, and we would argue are equally important in any form of case management. Corrigan and colleagues (2008) noted that evaluating symptomatology is important within those with severe mental illness, and while most rehabilitative efforts cannot expect to eliminate symptoms, they can be ‘successful at reducing the severity of symptoms and the suffering associated with them (p. 90)’. They also make the point that the distress associated with having symptoms can interfere with functioning (Corrigan et al., 2008).

With respect to community ability (or ‘adaptation’), Corrigan and colleagues (2008) note four reasons for evaluating this variable (that they call ‘social functioning’, including social skills, environmental factors, and resource factors) as a treatment target within samples of clients with psychiatric disabilities. First, problems in social functioning, role functioning, close relationships, and self-care/independent living are included as diagnostic criteria for many psychiatric disorders, and therefore are important areas to target in treatment. Second, for many clients, problems in community integration may have preceded the onset of severe psychiatric difficulties, and will thus not be ameliorated by medication alone. Third, the research has shown that higher quality and frequency of social contacts predict the course of psychiatric disabilities, including relapse and hospitalization (e.g., Erickson et al., 1989). Corrigan and colleagues argue that the stress-buffering theory of social support (Bebbington & Kuipers, 1992) helps explain these findings. Fourth, social functioning is ‘a highly valued dimension of life experience, and for this reason alone it is important to improve it (p. 214)’.

Medication adherence is an important targeted outcome in psychiatric rehabilitation, especially given clients’ reports of undesirable side effects (Corrigan et al., 2008). Research has shown that medication adherence is an important variable in negating symptom relapse and rehospitalization (Zygmunt, Olfson, Boyer, & Mechanic, 2002), which are both goals of community support services in general, and case management in specific. Objective measurement of medication adherence is argued as best practice (e.g., pill counting; electronic cap devices), although these methods are often time-consuming and confounded by the availability of free samples and the use of non-countable medications (e.g. injection; use of PRNs; Corrigan et al., 2008). The accuracy of self-reported medication adherence is questionable, though it has been argued that if clients are reporting non-adherence, this can usually be trusted as accurate (Corrigan et al., 2008). In our study, medication adherence was reported by case workers and was

based in part on client self-report but also included the clinician's assessment of clients' medication adherence.

Housing stability is an important variable for our study in that our sample of clients are those with severe mental illness and a history of (or current) homelessness, and past research has already examined housing stability as an important factor in cost-effectiveness of case management (Rosenheck et al., 2003). For clients with severe mental illness and a history of homelessness, community support services involve actively engaging clients in trying to secure housing. Corrigan et al. (2008) outline in great detail the many possibilities of housing types for individuals with severe mental illness, including institutions/custodial care, crisis housing, semi-independent living, and independent living. Torrey (2001) found that in a sample of American clients living with Schizophrenia, only 34% were living independently, while 25% lived with family, and 18% in supervised housing. Five percent of the sample was living on the streets or in shelters, and another 5% in hospitals. Housing stability is an important goal of case management models, especially as having a fixed address is a prerequisite for accessing some services and obtaining a health card.

Examining these health and housing indicators and their relationship to treatment costs is important given the burgeoning field of comprehensive costing analyses within 'real-world' community mental health treatment. While some of this research has begun in the United States, there is still a dearth of available information on comprehensive costs and cost-effectiveness for community treatments in Canada. Related to the first set of research questions, we are particularly interested in whether client variables can predict costs later in treatment (18 months in), as previous research has shown 9 month costs to be unrelated to client need at baseline, or client outcome at 9 months (Blouin et al., 2004). The first set of research questions will help

illuminate whether this pattern remains the same later in treatment. This is currently an unanswered research question.

Related to the second set of research questions, no study to date in a Canadian context has examined the cost-effectiveness of ICM over standard care using a time period later in treatment. Again, we are interested in this time period as typically by 18 months into treatment, those receiving initial outreach services are no longer receiving any case worker support, increasing the qualitative differences between ICM and standard care. In essence, it becomes the question of whether it is cost-effective to continue to provide intensive support to clients beyond what is typical (e.g., standard care consisting of minimal outreach services). We have the advantage of examining a piece of treatment where this distinction is most defined.

These research questions are examined as part of a larger multi-site study of community mental health services commissioned by the Ontario Ministry of Health and Long-Term Care, looking at outcomes of the participants, costing, as well as program implementation. The program under study was the Community Support Services (CSS) program of the Ottawa branch of the Canadian Mental Health Association (CMHA). This service offers individualized, portable services and support (i.e., intensive case management) to individuals who live in the community and suffer from severe and persistent mental illness and who are either homeless or at risk of homelessness. The data used for this study will be outcome measures at both 18 months and 24 months (the last six months of a two-year trial), and documented direct and other direct but “hidden” (e.g., transportation) costs for the last six months of the two-year period. The outcomes of interest for the first set of research questions, based on the literature, will be housing stability, symptomatology (both self-assessed and clinician-assessed), medication adherence, and community ability. All four have been shown to change with the introduction of ICM in the literature and are targeted outcomes in psychiatric rehabilitation in general (Corrigan et al.,

2008). These outcome variables were chosen to give a well-rounded and varied look at participants' lives.

Contribution to the Literature

This study will add to the literature on the effectiveness of ICM for a number of reasons. First, it has a unique participant pool: those individuals who not only have a severe mental illness, but who are also homeless or at-risk of homelessness. It will also uniquely contribute to the literature in the following specific ways: 1) A cost estimate will be measured by comprehensive costing (Knapp & Beecham, 1990) for the last 6 months of a 2-year trial of treatment, a costing methodology that is typically not employed due to its need for a depth of detail in costing typically unavailable in mental health research, 2) we will ascertain whether at the 18-24 month mark, there may be a similar or dissimilar relationship between client-level needs, costs, and outcomes than that shown earlier in ICM treatment (Blouin et al., 2004), 3) we will use specific outcome variables shown to be important in rehabilitation efforts with clients with psychiatric disabilities, including housing stability, symptomatology, medication adherence and community ability, 4) it will be the first to compare a model of Intensive Case Management to Standard Care in a Canadian context in terms of total costs, cost-effectiveness, and incremental cost-effectiveness for a time period later in treatment where the differences between these two groups are maximized, and 5) when examining the cost-effectiveness of ICM, we will follow the lead of Rosenheck et al., (2003) and examine costs from different perspectives, such as the agency, the government, and society overall. We will add to Rosenheck et al.'s (2003) research in that we will investigate more outcomes than solely housing stability.

Research Questions

Our general comprehensive costing research questions were as follows:

- 1) What is the overall cost for the last six months of a two-year trial of treatment in either intensive case management or standard care?
- 2) Do needs at 18 months in terms of housing stability, medication adherence, symptomatology, and community ability predict overall comprehensive treatment costs over the next six months for individuals in both ICM and standard care?
- 3) Do costs for the last six months of the two-year trial predict outcomes in terms of housing stability, medication adherence, symptomatology, and community ability at 24-months?

Our treatment comparison costing questions were as follows:

- 4) Which is more costly overall (based on the six month data): intensive case management, or standard care services? Are costs associated with hospitalizations less for intensive case management than standard care? Are costs associated with community services less for standard care than intensive case management?
- 5) Which treatment (ICM or standard care) is more cost-effective in terms of our targeted outcome variables? What is the probability that ICM will be cost-effective over standard care using nonparametric bootstrapping methods?

The Relationship of Client Needs and Client Outcomes to Costs of Supporting Individuals with a
History of Homelessness and Severe Mental Illness to Live in the Community.

Abstract

The current study used the comprehensive costing methodology of Knapp and Beecham (1990) to examine the comprehensive costs of community support services from the societal perspective over a six-month period for a sample of 77 clients with severe and persistent mental illness and a history of homelessness receiving either intensive case management (ICM) or standard care. Global costs were calculated by summing the direct and indirect costs associated with four areas in a client's life: 1) Agency costs (case management or outreach services), 2) non-agency health care costs (e.g., doctor's appointments, hospital costs), 3) non-health care costs (e.g., shelters, drop-in centers), and 4) family/friend costs. Subtracted from this initial total to reach a final societal cost was employment and/or volunteer 'benefits'. Of interest in the study was: (1) determining an overall societal cost estimate for community case management, (2) whether greater client need (as measured by symptomatology, community ability, housing stability, and medication adherence) would predict prospectively higher global costs over a six month period, and (3) whether societal costs over a six-month period would be related in any way to housing and health outcomes. Results yielded an overall average comprehensive cost of treatment per client of \$57.08/day which is comparable to previous research investigating the costs of community support services. Additionally, we found that needs did not predict six month global costs; global costs of services and supports predicted only worsening housing stability. Higher agency costs were predicted by more ICM and more severe symptomatology at 18 months. Higher non-agency health care costs were associated with poorer housing stability at 24 months, and higher non-health care costs were associated with poorer community ability at 24 months. It is clear from this study that client need is not necessarily related to treatment intensity, and that more intensive treatment is associated with poorer clinical outcomes. Implications of this research are discussed.

The Relationship of Client Needs and Client Outcomes to Costs of Supporting Individuals
with a History of Homelessness and Severe Mental Illness to Live in the Community.

Intensive case management (ICM) is a well-documented service that aids individuals with a history of homelessness and severe mental illness remain housed in the community and out of hospital. Specifically, it assists clients in five ways: (1) Assertively connecting with them, (2) planning their service needs, (3) delivering direct services, (4) advocating for and linking clients with needed community resources, and (5) advocating for service improvements. Rehabilitation assessments, crisis intervention, outreach services, and skills teaching can all be integrated in ICM (Aubry, Dostaler, & Baron, 2004). The “intensive” part of the treatment denotes the frequency and intensity of contact with clients. Unlike other forms of case management, where workers have caseloads of 30-40 clients at a time, in ICM, workers limit their caseload to less than 20 individuals at a time (Aubry et al., 2004).

Ford et al. (1997) stated that when examining the literature on ICM, varying study designs, poor descriptions of service provision, and differing client groups make it difficult to conclusively determine the effectiveness of this form of case management. Despite this interpretation of the research on its effectiveness, there is some evidence to suggest that ICM achieves positive outcomes for clients receiving it. Specifically, ICM has been linked to fewer hospitalizations over time for individuals with severe and persistent mental illness (Ford et al., 1997; Macias et al., 1994; Lehman et al., 1999). ICM has also been linked to lower level of symptomatology relative to standard case management that has higher client to staff ratios (Jerrell & Ridgely, 1995; Macias et al., 1994; Muijen et al., 1994; Toro et al., 1997). Additional research has demonstrated a relationship between ICM and the frequency of additional community-based service use, specifically a decreased use of crisis services (e.g., Macias et al., 1994; McGurrin & Worley, 1993), and an increased use of non-crisis mental health services (e.g., Ford et al., 1995;

McGurrin & Worley, 1993; Hornstra et al., 1993; Johnson et al., 1998). Individual studies have also shown ICM to be effective in improving medication adherence (Patterson & Lee, 1998), psychological well-being (Franklin et al., 1987), competence with living in the community (Macias et al., 1994), improved life skills (Ford et al., 1996; Johnson et al., 1998), social support (Patterson & Lee, 1998), and housing stability (Clark & Rich, 2003; Conrad et al., 1998; Drake et al., 1997; Hurlburt, Wood, & Hough, 1996; Wasylenki et al., 1993).

Despite the robust finding that case management is much less expensive than institutional care (Galster, Champney, & Williams, 1994), we do not know what contributes to varied treatment and support costs *within* groups of individuals. What factors predict which clients receiving case management will be the most costly to serve? Do clients who present with greater needs consume more services? Are higher expenditures associated with better outcomes? The current study was designed to fill this gap in the research literature.

One Canadian study to date examined the relationships between needs and costs of services and supports, and between costs and outcomes for a group of 90 clients with a history of homelessness and severe mental illness (Blouin, Aubry, & Angus, 2004). Blouin et al. (2004) used a method of assessing program costs on a more global level known as “*comprehensive costing*” (Knapp & Beecham, 1990; Beecham, 2000), which has been increasingly used to determine the overall costs associated with community-based programs. In the research by Blouin et al. (2004), the clients were in two different treatment groups defined as “standard care” (i.e., outreach services plus any other additional community services other than ICM) and ICM but were combined in a single group for purposes of analyses. “Needs” and “outcomes” were examined in the areas of community ability, life satisfaction, and housing stability. Contrary to the hypotheses proposed by Blouin et al. (2004), no statistically significant relationships were found between needs, costs, and outcomes. Blouin et al. (2004) did, however, calculate that the

average daily cost of supporting a person with severe mental illness to live in the community was approximately \$68.00/day when transfer payments (e.g., Ontario Disability Support Program) were excluded.

The researchers speculated that the non-significant relationships between needs, costs, and outcomes at nine months, especially for life satisfaction, may have been related to the fact that nine months may be too limited a time frame to see significant client change. They argued this as the first few months of any case management service is focused on basic needs such as housing, food, and financial resources (Blouin et al., 2004). There is an obvious need for further research investigating these relationships, especially over different periods of time in the context of intensive case management.

What happens with respect to the relationships between needs, costs, and outcomes after clients have been receiving case management for a longer period of time? Using the same clients as Blouin et al. (2004), followed for an additional 15 months after the original nine month cut-off point, we planned to examine the needs-costs-outcomes relationship in the last six months (i.e., 18-24 months) of the two year clinical trial. Our choice to focus on the last six months was because we were interested in investigating the needs-costs-outcomes relationship once greater differences in treatment emerged. For those clients initially assigned to “standard care” who were receiving a continuation of outreach services, it was expected that outreach services would terminate in many cases within a year, while ICM can continue at a similar intensity for an unlimited amount of time. Our research question is therefore *not* a question of examining overall change over the 24 – month period, but rather if needs, costs, and outcomes show a similar (unrelated) pattern (Blouin et al., 2004) when examining a specific time period later in treatment.

Previous research had focused especially on the following outcome variables in case management research: symptomatology and service use patterns, and psychological well-being

and community adjustment outcomes (Chamberlain & Rapp, 1991; Baronet & Gerber, 1998). We chose to focus on four pressing outcomes in our target population: (1) Symptomatology, (2) community ability, (3) medication adherence, and (4) housing stability. These variables have also been highlighted as important target outcomes for psychiatric rehabilitation programs intended to aid our targeted population in living independently in the community, improving the quality of their lives, and developing and maintaining social connections (Corrigan et al., 2008). Age and sex are also important to consider as they relate to costs; recent work by Gilmer et al. (2006) has shown case management services to increase in cost the older a client becomes. Emergency room use, a variable linked to our comprehensive costing, has also been associated to a greater extent with men than women (Young et al., 2007). Unlike Blouin (2004), we also plan to investigate the influence of treatment type on both costs and the six-month needs-costs-outcome relationship. To our knowledge, this is the first research of its kind following Blouin et al. (2004) to investigate the needs-costs-outcomes relationship within a Canadian context and focusing exclusively on our aforementioned targeted population.

Hypotheses and Research Questions

Our hypothesis for the study is that needs, as measured by levels of community ability, housing stability, adherence to prescribed medication regimens, and severity of mental health symptoms will predict costs from the societal perspective. Specifically, lower community ability, greater housing instability, a lack of adherence to prescribed medication regimens, and higher levels of symptom severity will be associated with greater total costs of services and supports from a societal perspective.

An additional research question that will be investigated is whether or not costs are related to outcomes at 24 months. Findings in this area have been mixed: Knapp and Beecham (1990) have shown a relationship between higher costs from a societal perspective and better

outcomes for different populations, however this was not supported in our target population (Blouin et al., 2004). Although it may make intuitive sense to assume that greater costs will lead to better outcomes, we know that samples of individuals with severe mental illness and homelessness are often high service users and have chronic medical and mental health conditions that require ongoing support. For this reason, we will hypothesize that costs will be related to outcomes, but we will not hypothesize in what direction. It could be that greater costs merely predict poorer outcomes given the chronic nature of the problems in this population.

Method

Setting

This study is part of a larger multi-site study of mental health known as the Community Mental Health Evaluation Initiative (CMHEI) commissioned by the Ontario Ministry of Health and Long-Term Care. The CMHEI involved six different studies evaluating community mental health programs in the areas of case management, self-help initiatives, and crisis services located in different regions across Ontario. The current study evaluated the intensive case management program at the Ottawa branch of the Canadian Mental Health Association (CMHA).

Research Design

The research design was a randomized matched controlled trial where clients were randomly assigned to one of two treatment conditions: (1) ICM or (2) Standard Care. For the purposes of our analyses, all the clients were combined in a single group for analyses, although we controlled for treatment type. Participants in the study were followed for a period of 24 months. Over the course of the study, they were interviewed at baseline, 9, 18, and 24 months. For the purpose of our costing study, data that were analyzed were collected at 18- and 24-month follow-up.

Treatment Conditions

Prior to admission into the study, all participants were receiving community support focusing on meeting basic needs from an outreach worker located at CMHA Ottawa. Clients selected for ICM terminated with their outreach worker and were assigned a case manager. Clients assigned to the Standard Care condition continued to receive community support from their outreach worker.

The ICM program offers individualized, portable services and support to individuals who live in the community and suffer from severe and persistent mental illness and who are either homeless or at risk of homelessness. Clients in the ICM treatment group met with their individual case manager for an average of 4 hours per month (Aubry, personal communication). The client to staff ratio for ICM in the program was 15 to 1. They were engaged in the following treatment goals: a) Meeting their basic needs (securing a trusting relationship, housing, access to food/clothing, and access to medical and psychiatric care), b) networking with the client to receive formal support (professional contact, program placement), c) developing with the client an informal network of support (friends, community activities, etc.), and d) helping the client develop skills for goal achievement and maintenance (e.g., education, problem solving, etc.)

Clients in the Standard Care Condition included follow-up with their outreach worker for a period that usually lasts less than a year. The client to staff ratio is 15-20 to 1. Outreach workers typically follow 20-30 clients per year. The goals of outreach services are to help clients in an individualized manner secure housing and financial aid as well as access needed health and social services. Clients assigned to Standard Care could receive all services available in the community with the exception of ICM.

Study Participants

Participation in the study was based on the criteria used for admission to the ICM program: 1) The individual had a severe and persistent mental illness (i.e., diagnosis of schizophrenia, bipolar disorder or severe personality disorder; produces impairment in daily living; has a chronic course); 2) the individual had health and social service needs that were not being adequately addressed; and 3) the individual was homeless or at risk of becoming homeless.

Informed consent to participate in the study was obtained from all participants included in the study. Patients were then randomly allocated to either ICM (N = 76) or Standard Care (N = 71). By the end of the two year trial, there were 49 participants in the ICM condition and 41 in the Standard Care condition. The attrition rate was approximately 38% (in both groups).

We had complete costing data for 40 clients in the ICM group and 37 clients in the standard care group. Table 1 shows a comparison of demographic and clinical characteristics between our sample (those who had complete costing data) and the remaining sample (44 clients who dropped out and 13 clients with incomplete costing data) at baseline. Additionally, when the 77 clients with complete costing data were compared only to the 13 with incomplete costing data, there were no significant differences between any demographic or clinical variables at baseline.

Measures

Four measures were used to assess “needs” in our investigation using the data collected on them at 18 months. These were the Multnomah Community Ability Scale (MCAS; see Appendix A) to measure level of community ability, the Symptom Distress Scale (SDS; see Appendix B) to measure severity of mental health symptomatology, a measure of medication adherence, and a measure of housing stability. The same measures were used to collect data on outcomes at 24 months.

Table 1

Comparison of Clients with Complete Costing Data (N=77) versus Those without Complete Costing Data (N=13) and Clients who Dropped Out (N=57) on Baseline Demographic Characteristics and Clinical Variables

Variable	Clients with complete costing data at 24 months (N=77)	Clients with incomplete costing data (N=13) and 24-month drop-outs (N=57)
Age	$X = 39$ (17-66); $SD = 11$	$X = 37$ (17-65); $SD = 12$
Sex	49% Men; 51% Women	56% Men; 44% Women
Housing Stability	66% Stable; 34% Unstable	60% Stable; 38% Unstable; 2% Missing
Med Adherence	47% Adherent; 53% Non-Adherent	51% Adherent; 49% Non-Adherent
MCAS	$X = 51$ (26-69); $SD = 8$	$X = 51$ (33-65); $SD = 8$
SDS	$X = 40$ (16-71); $SD = 14$	$X = 39$ (15-67); $SD = 13$

Note. Med Adherence = Medication Adherence; MCAS = Multnomah Community Ability Scale; SDS = Symptom Distress Scale.

Multnomah Community Ability Scale (MCAS). The MCAS is a 17-item clinician rating scale that measures the degree of impairment experienced by adults with psychiatric disabilities who live in the community (Barker, Barron, McFarland, & Bigelow, 1994). The MCAS measures degree of disability through 17 items which represent four areas of community ability:

(1) Interference with functioning, (2) adjustment to living, (3) social competence, and (4) behavioural problems. Ratings can be attained for each item ranging from no impairment (1) to extreme impairment in an area (5). Both a total scale score and subscale scores for each area can be ascertained.

The samples on which the norms for the MCAS were based include clients from both rural and urban areas. The clients were all enrolled in community support units of community mental health centers, suffered from a major mental illness, have been hospitalized recently or were at risk of being hospitalized, and suffered from social role impairment in several areas. Total scores on the MCAS can range from 17 to 85, providing an indication of global adaptation to living in the community. A high level of functioning is reflected by a score ranging from 63 to 85, a medium level of functioning, between 48 and 62, and a low level of functioning, between 17 and 47. Barker et al. (1994) showed the MCAS to be reliable and valid. The test-retest reliability was 0.82, and total MCAS scores have been shown to predict future hospitalizations during a one-year period (Zani et al., 1999). Internal consistency (Chronbach's alpha) for the total scale for the current study was 0.85.

Symptom Distress Scale (SDS). Symptom distress was assessed using the 15-item self-report measure known as the Symptom Distress Scale (SDS; Appendix B). The SDS is made up of the 10 items making up the SCL-10 (Nguyen et al., 1983) measuring depression, somatization and phobic anxiety, and five other items from the SCL-90 that loaded on an anxiety factor. The scale asks people the extent that they were bothered by symptoms in the last seven days.

Response alternatives fall on a 5-point scale of distress ranging from “not at all (1)” to “extremely (5)”. A total score is calculated based on the item scores (ranging from 15 to 75); the more elevated the score, the greater the severity of symptoms. The SDS was tested by Derogatis and Melisaratos (1983) and found to have internal consistency of 0.71 to 0.85 and a test-retest reliability of 0.68 to 0.91. The skewness measures and frequency distribution of the total score were at acceptable levels, and there was no evidence of floor or ceiling effects. In the current study, internal consistency was 0.92 for all four time points: baseline, 9 months, 18 months, and 24 months.

Medication adherence. Medication adherence was measured by a one-item measure completed by a client’s case worker retrospectively for the past six months. It was measured on a Likert scale from 1 to 4 asking “How often does the consumer take these medications as prescribed?” (1 = most of the time, 2 = about half of the time, 3 = less than half of the time, and 4 = unknown). Reliability for our measure was supported with the finding that medication adherence at 9 months was found to correlate significantly with medication adherence at both 18 months ($r_s(81) = .34, p < .01$) and 24 months ($r_s(71) = .42, p < .001$). Medication at 18 and 24 months were also significantly positively correlated ($r_s(72) = .23, p = .05$). Baseline medication adherence was not found to be significantly correlated with medication adherence at any other time point, although this could be due to the most dramatic clinical changes occurring within the first nine months of treatment (Aubry & Smith-Fowler, 2004).

We tested the validity of our one-item medication adherence measure by testing its association with item #14 on the Multnomah Community Ability Scale (i.e., How frequently does the consumer comply with his/her prescribed medication regimen?; 1 = Almost never complies to 5 = Almost always complies). Significant negative correlations were found between the two items at baseline, 9 months, 18 months, and 24 months ($r_s(125) = -.52, p < .001$; $r_s(92) = -.64,$

$p < .001$; $r_s(84) = -.63$, $p < .001$; $r_s(78) = -.79$, $p < .001$ respectively), indicative of a high correspondence.

Our ordinal medication adherence variable was transformed into a dichotomous variable for use in logistic regression. It was constructed consisting of “medically adherent” (equivalent to “1=most of the time”) and “non-medically adherent” (equivalent to “2 = about half of the time” and “3 = less than half of the time”).

Housing stability. Housing stability was assessed by determining a client’s housing status relative to three criteria. The first criterion was a measure of the number of residential moves in the past six months. The client was coded as being unstably housed if they had moved three or more times in the last six months. The second criterion was a measure of the client’s current housing situation, and participants were considered “homeless” (and therefore unstably housed) if their current housing was a hostel, a shelter, or on the street. The third criterion was the case-worker’s recording of the instability of the client’s current housing situation by answering Yes/No to the following question: Does the consumer expect to be staying where he/she is for less than 60 days in total? If a participant met any one of these three criteria they were coded as having housing instability. Reliability for our measure of housing stability was supported by significant positive associations between the measure at baseline and 9 months ($r_s(121) = .21$, $p < .05$) and at 18 months and 24 months ($r_s(94) = .48$, $p < .001$).

Costing Variables

To estimate costs for the last six months in the two-year study (i.e., 18-24 months), a specific form was created (Appendix C). Items in the form were completed by the primary caseworker working with the client in either ICM or Standard Care. When a caseworker could not answer a particular question, the item was posed to the client. The items were created based on the “Client Service Receipt Interview” developed by Jennifer Beecham of the University of

Kent in Canterbury (Knapp & Beecham, 1990). Economic costing analyses traditionally include both “direct” and “indirect” costs in their calculations. Indirect costs are those associated with lost productivity due to illness/injury, however are typically employed only when someone no longer receives income from a place of employment. In our study, our participants did not have a history of employment prior to the two-year trial and so we did not assess “indirect” costs in the traditional way. However, using comprehensive costing, we assessed for and included “hidden” costs such as those costs accrued by family and friends who accompanied our participants to appointments.

We were interested in the costs from the overall societal perspective in this study. The societal perspective includes both costs to the agency, the Ontario Ministry of Health and Long Term Care, and to society overall, but also includes ‘benefits’ to society in the form of client employment and/or volunteer work. The societal costing perspective does not include transfer payments (e.g., Ontario Disability Support Program, Ontario Works). From a costing theoretical perspective, it can be argued that these payments are not ‘lost’ to society overall but merely ‘change hands’ (Rosenheck et al., 1997). Table 2 shows the costing components involved in the overall societal costing perspective.

Service-related information for each category listed in Table 2 was recorded individually for each client in at 24 months, retrospective for six months. For example, visits to professionals were listed by type of professional and duration of visit. Medications were listed complete with daily dosage. Length of time spent in shelters or weekly visits to drop-in centers or food banks were recorded. Case worker or family members’ travel time associated with accompanying clients to appointments was also determined. See Appendix D for the complete Client Receipt Interview Form.

Table 2

Costing Components of the Overall Societal Costing Perspective

<i>Overall Societal Perspective</i>
<i>AGENCY COSTS:</i> - Direct Case Management Services - Overtime of Case Managers - Travel time of Case Managers - Overhead Agency Costs <i>NON-AGENCY HEALTH RELATED COSTS:</i> - Hospital Use - Emergency Room Use - Ambulance Use - Physician Visits - Professional Visits (e.g., social worker, psychologist, occupational therapist) - Dentist Visits - Medications - Homecare Use <i>NON-HEALTH RELATED COSTS:</i> - Education Tuition/Supplies - Shelter/Drop-in Centre Use - Meals provided in Community - Food Bank Use - Lawyer Use - Arrests - Jail Visits - Parole Officer Visits - Residential Rental Supplements Family/Friend Travel Time (e.g., to accompany client to doctor's appointment) Family/Friend Income Provision Administrative Cost of Transfer Payments <i>BENEFITS TO SOCIETY:</i> - Client Employment/Volunteer Work

Costs were determined by using the service-related information for each client and attaching unit costs for each kind of service or costing component in Table 2. Unit costs are typically the cost associated with the smallest entity of service (e.g., usually 1 hour for service delivery). All costs were in Canadian dollars and were from a base year of 2001. To facilitate calculations of unit costs related to direct services and medication costs, relevant professional associations and pharmacies were contacted (see Appendix E). If a service could not provide information regarding the estimation of their costs of services, we used the unit costs of a similar service. Volunteer hours were valued at the cost of one hour of minimum wage work (\$6.85/hr). While the decision to use minimum wage could be considered a conservative estimate, it is unlikely given the education level and chronic mental illness in our client sample that any particular client could have secured anything above an entry-level position (usually at minimum wage). See Appendix F for a list of the unit costs for professional and community services used by the study participants.

Agency costs were determined by using hourly wages for workers (\$28.75/hr) as well as a fixed cost for each client representing operation costs at the agency. A fixed cost for each client was determined to be \$672.00 for the six months in the ICM, and \$252.00 for the six months in standard care that included outreach services. This constant was determined by taking overhead and operation costs for the Canadian Mental Health Association – Ottawa Branch and dividing it by the number clients serviced each month. This constant was multiplied by six and added to each participant's total agency cost. The constant was not applied for participants in Standard Care who were no longer receiving outreach services during the six month period.

Although typically the administrative costs associated with transfer payments are included in the societal perspective (Drummond et al., 2005), we chose not to estimate these due to our concern that our estimates would be inaccurate given the retrospective nature of the study, and

also with the knowledge that these administrative costs are typically related to new disability-payment clients. We felt confident in assuming that our sample contained mostly individuals who had been receiving disability payments for quite some time (and thus, we could assume that these administrative costs would be minimal at most).

Once costs were calculated for each service ‘unit’ associated with each client for the six month period, the total costs from the three perspectives could be calculated for each client. Figure 1 outlines the calculation of the total costs from each perspective in pictorial form. Of particular note is that only in the overall societal perspective, employment and volunteer work are viewed as a monetary ‘benefits’ to society and are thus subtracted from the total ‘costs’ to society for the overall, global, societal perspective.

Procedure

Firstly, researchers informed potential clients about the study and obtained informed consent from those who wished to participate. Matching in pairs for group assignment took place for all participants on the variables of sex, age and level of functioning (i.e., Multnomah Community Ability Scale scores completed by outreach workers). The pairs were randomly assigned to either the ICM condition or the Standard Care condition. Each individual in the ICM condition was assigned a case manager.

The larger study from which the current project originates used a repeated measures design. Participants were assessed at baseline (upon assignment to either ICM or outreach services), 9 months, 18 months, and 24 months. We have chosen to focus on the 18 and 24 month data, as it is important to assess how individuals are doing two years after starting the program. Costing data were available at 24 months. Using the 24 month costing data and limiting other variables to the 18 and 24 month data allowed for a close examination of solely the last six months of the two-year program.

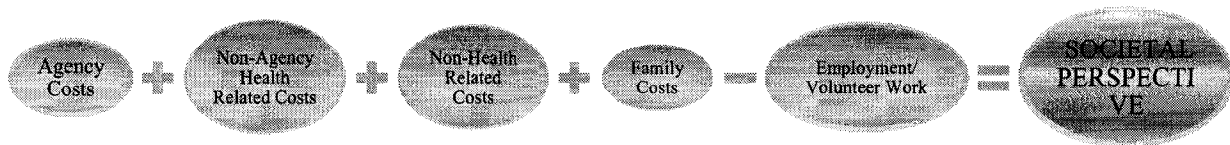


Figure 1. Calculation of the Costs associated with the Societal Perspective (adapted from Rosenheck et al., 1997).

Statistical Analyses

The data were screened according to the procedures outlined by Tabachnick and Fidell (2003), such as testing for normal distribution, skewness, and outliers. Costs from the societal perspective were gleaned on an individual client level from the comprehensive costing method described above and outlined in Figure 1.

The two sets of hypotheses were tested by using hierarchical regressions. For parsimony's sake, 'costs' will mean the total cost from the societal perspective. For the first set (predicting costs over the last six months of the two year trial; 18-24 months), demographics such as age and sex were entered into the first step of the regression, followed by treatment type in the second step, followed by the four predictor variables at 18 months (level of community ability, severity of mental health symptoms, housing stability, and medication adherence). The last step contained interaction variables (each "needs" variable multiplied by treatment type). The criterion variable was the total societal costs over the six month period.

For the research question related to the association between six month costs and client outcomes at 24 months, it should be noted that costs were calculated *without* subtracting employment/volunteer benefits. The rationale for this decision was that participants who were able to work or volunteer could be deemed as doing "better" than those who were not able to work or volunteer to the same extent. It was determined that by subtracting the costs associated with employment or volunteer work, we could be washing out a potential relationship between higher costs and better 24-month outcomes. In essence, this changes our costing perspective to one of societal costs only.

To investigate our research question, a different hierarchical regression was carried out for each outcome variable at 24 months (two linear regressions and two logistic regressions depending on the nature of the criterion variable). As an example, for 24-month symptomatology,

demographic variables were entered into the first step. The second step was symptomatology at 18 months (to control for it). Treatment type was a third step, followed by costs (without client contribution) as a fourth step. A treatment type x costs interaction term was a fifth step. The hierarchical method allowed us to partial out the variance attributable to costs over and above that attributable to demographics or symptomatology at 18 months. Similar hierarchical regressions were conducted to predict community ability, medical adherence, and housing stability. Because four regressions were performed for each costing perspective in this second section, we used an adjusted familywise error rate of $.05/4 = .0125$ to reduce the possibility of making a Type I error.

Results

We were able to calculate complete comprehensive costing data for a total of 77 clients (37 clients in Standard Care and 40 clients in ICM). The sample consisted of 39 men and 38 women. There were no significant differences ($p > .05$) on any of the measures between our sample of clients with complete costing data and excluded clients with incomplete costing data.

Normality testing revealed the costing variables to be minimally to moderately positively skewed, and so transformations were used where appropriate, although results were no different with and without the use of the transformations. Therefore, results are presented without the use of transformed variables. One variable showed extreme outliers and so the top three outliers from 'benefits' were replaced with the next highest value for regression analyses. Missing values analysis was carried out using EM (expectation-maximization) estimation. The MVA analysis was used to examine patterns between variables that occurred more than 1% of the time.

Descriptive analyses revealed that 92.2% were stably housed at 18 months and 94.8% at 24 months. At 18 months, 71.4% were medically adherent and 28.6% were not. Comparatively, at 24 months, 79.2% were medically adherent while 20.8% were not. Table 3 depicts the means,

Table 3

Means, Standard Deviations, and Range for Continuous Variables (N=77)

Variable	Mean	SD	Minimum	Maximum
Age at baseline (years)	40.0	10.1	16.8	62.4
SDS at 18 months	37.8	14.6	15	71
SDS at 24 months	34.9	13.4	9	61
MCAS at 18 months	62.7	10.7	41	96
MCAS at 24 months	62.5	10.3	31	84

Note. SDS = Symptom Distress Scale; MCAS = Multnomah Community Ability Scale.

SDs, and ranges for each of the continuous variables used as “needs” or “outcomes” in the subsequent analyses.

An analysis of the overall societal costs yielded an average cost for the six month period at \$10,416.31, equaling \$57.08/day (both in Canadian dollars). This is a bit lower than the average cost found by Blouin et al. (2004) of \$68.00/day for her sample of 90 clients. See Table 4 for the breakdown of costs by agency, non-agency health care costs, non-health care costs, family costs, and employment/volunteer benefits. Surprisingly, we found that it cost \$13.43 Canadian dollars more per day in standard care than in ICM. This will be discussed further in our second paper. For now, we are interested in examining the results of our two sets of hypotheses, for which we combined the two treatment types.

Our hypothesis was that needs, as measured by level of community ability, severity of symptomatology, housing stability, and medication adherence at 18 months would predict total costs from the societal perspective, over and above treatment type, over a six month period ending at 24 months. Specifically, *we predicted that the presence of lower community ability, greater severity of symptomatology, unstable housing, and non-adherence to medication, at 18 months would be associated with greater costs.* Results of the first hierarchical multiple regression indicated that, taken together, our needs variables did not predict a significant portion of the variance in societal costs over and above the effects of age, sex, and treatment type (see Table 5). The multiplicative term, housing stability by treatment type, was excluded from the analysis as it was constant across all participants. The overall effect size was small at Cohen's $f^2 = 0.16$, corresponding to a power calculation of 0.62.

Table 4

Per-client Descriptive Statistics on Costing Components of the Societal Costing Perspective for the Last Six Months (18-24 Months; N=77)

Costing Variable	Mean	SD
Agency Costs	1151.7	1221.3
Non-Agency Health Care Costs	5856.16	10216.64
Non-Health Care Costs	3746.55	3727.42
Family/Friend Costs	23.2	91.1
Employment/Volunteer Benefits	474.42	1513.24
SOCIETAL COSTS	10416.31	11796.13

Note. SOCIETAL COSTS were calculated by adding the first four costing components and subtracting employment/volunteer benefits.

Table 5

Hierarchical Multiple Regression predicting Overall Societal Costs During 18-24 Months from Needs at 18 Months (N=77)

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					.04
Sex	1053.84	2751.36	.045	.703	
Age	-210.77	136.66	-.181	.127	
Block 2					.02
Treatment Type	-3022.14	2688.65	-.129	.265	
Block 3					.07
SDS @18 mos.	103.11	96.00	.127	.287	
MCAS @ 18 mos.	-234.82	136.57	-.214	.090	
HS @ 18 mos.	2108.62	5461.27	.048	.701	
Meds @ 18 mos.	-1281.09	3208.35	-.050	.691	
Block 4					.01
SDS x TT	54.33	204.16	.104	.791	
MCAS x TT	76.29	279.16	.210	.785	
Meds x TT	-3016.87	6452.77	-.198	.642	

Note. Criterion Variable was SIX MONTH SOCIETAL COSTS. SDS = Symptom Distress Scale; MCAS = Multnomah Community Ability Scale; HS = Housing Stability; Meds = Medication Adherence; TT = Treatment Type. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM.

Overall costs from a societal perspective for each client were calculated by adding agency costs, non-agency health care costs, non-health care costs, and family costs. Societal ‘benefits’ in the form of employment or volunteer work was subsequently subtracted from this total for the overall cost from the societal perspective. We wanted to investigate whether the pattern of results would differ if we investigated different components of the formula used to determine the total societal costs. Therefore, we re-ran the hierarchical regression associated with the first hypothesis separately for agency costs, non-agency health care costs, and non-health care costs, and employment/volunteer costs.

When agency costs were investigated independently of global societal costs, needs at 18 months predicted a significant proportion of the variance (9.3%) in the six-month agency costs over and above age, sex, and treatment type, $\Delta F(4,69)=3.12, p=.02$ (see Table 6). The fourth step in this regression, which consisted of the interaction terms (needs x treatment type), did not significantly predict any additional variance, and so was excluded from Table 6. Treatment type also emerged as a significant predictor in the second step, over and above sex and age, with individuals in ICM costing significantly more than individuals in outreach services, $\Delta F(1,73)=45.80, p<.001$. Self-rated symptomatology at 18 months emerged as a significant predictor of agency costs in the third step, $t(4)=2.60, p=.01$. In other words, agency costs were higher for individuals with greater severity of symptomatology (SDS). Power calculations showed this multiple regression to have a large overall effect size (Cohen’s $f^2 = 0.92$) suggesting our sample size was adequate to detect statistical predictors (power > .99; Cohen, 1988).

Needs at 18 months did not predict variance in non-agency health care costs over and above age, sex, and treatment type. In contrast, when *non-health care costs* were investigated independently, needs at 18 months predicted a significant proportion of the variance (13.3%) in

Table 6

Hierarchical Multiple Regression predicting Agency Costs from Needs at 18 Months (N=77)

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					.01
Sex	-264.29	288.82	-.109	.363	
Age	-.213	14.35	-.002	.988	
Block 2					.38*
Treatment Type	1510.17	223.15	.622	.001	
Block 3					.09**
SDS @18 mos.	19.84	7.622	.237	.011	
MCAS @ 18 mos.	-13.29	10.84	-.117	.225	
HS @ 18 mos.	-123.56	433.61	-.027	.777	
Meds @ 18 mos.	244.83	254.73	.092	.340	

Note. Criterion Variable was SIX MONTH AGENCY COSTS. SDS = Symptom Distress Scale; MCAS =

Multnomah Community Ability Scale; HS = Housing Stability; Meds = Medication Adherence. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM. Housing Stability was coded 0 = stable housing and 1 = unstable housing.

*p<.01; **p<.05

the six-month non-health care costs over and above age, sex, and treatment type, $\Delta F(4,69)=2.84$, $p=.03$ (see Table 7). The fourth step in this regression, which consisted of the interaction terms (needs x treatment type), did not significantly predict any additional variance, and so was excluded from Table 7. Both community ability at 18 months, $t(4)=2.19$, $p<.05$, and housing stability at 18 months, $t(4)=2.22$, $p<.05$, emerged as significant predictors of non-health care costs in the third step. High expenditures related to non-health care services and supports were associated with high initial community ability though poor housing stability. Power calculations showed this multiple regression to have a small overall effect size (Cohen's $f^2 = 0.23$), though still suggesting our sample size was adequate to detect statistical predictors (power = .86; Cohen, 1988).

Needs at 18 months did not significantly predict any variance in the remaining two components of the societal costing perspective (family costs, or employment/volunteer benefits).

Our research question following the first hypothesis was related to whether or not costs over the six month period would be associated with client outcomes at 24 months. Knapp and Beecham (1990) work within a model that hypothesizes that greater cost of services and supports will be associated with better client outcomes. However, Blouin et al. (2004) found that within a sample of clients with severe mental illness and a history of homelessness, costs over a nine month period were unrelated to outcomes. We were interested in whether this same non-association between needs and costs would appear later in community treatment for a similar sample of individuals.

To investigate this question, four individual hierarchical regressions were performed using blocks where sex and age were entered in the first block, the 18-month variable in the second, treatment type in the third, costs in the fourth, and the interaction term between treatment type and costs in the last. This interaction term was added to investigate whether costs predicted

Table 7

*Hierarchical Multiple Regression predicting Non-Health Care Costs from Needs at 18 Months**(N=77)*

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					.05
Sex	11.69	863.51	.002	.989	
Age	-83.47	42.89	-.227	.055	
Block 2					.01
Treatment Type	-616.48	848.04	-.083	.470	
Block 3					.13**
SDS @18 mos.	47.45	29.17	.186	.108	
MCAS @ 18 mos.	90.76	41.49	.262	.032	
HS @ 18 mos.	3689.29	1659.34	.267	.029	
Meds @ 18 mos.	1825.24	974.82	.226	.065	

Note. Criterion Variable was SIX MONTH NON-HEALTH CARE COSTS. SDS = Symptom Distress Scale; MCAS = Multnomah Community Ability Scale; HS = Housing Stability; Meds = Medication Adherence. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM. Housing Stability was coded 0 = Stable Housing and 1 = Unstable Housing.

*p<.01; **p<.05

24 month data differently depending on the treatment type. Power calculations revealed that our sample sizes were more than adequate to detect significant predictors (if they existed) as our power statistic was greater than 0.9 (Cohen, 1988).

Results revealed that the only significant predictor of all 24-month outcome variables were the 18-month needs variables, which can be expected. Overall results revealed that when age, sex, and needs variables were held constant, costs of services and supports did not predict a significant additional portion of the variance in 24-month community ability (see Table 8), self-reported symptomatology (see Table 9), and medication adherence (see Table 10). However, the costs of services and supports predicted 4.6% additional variance in 24-month housing stability, $\Delta\chi^2(1)=5.150, p=.023$ (see Table 11). Thus, higher expenditures from a societal perspective predicted less stable housing at 24-months.

Societal costs for the stated research question were calculated for each participant by adding agency costs, non-agency health care costs, non-health care costs, and family costs (with no subtraction of benefits this time). Similar to the first set of hypotheses, we wanted to investigate whether the pattern of results would differ if we used the costing components as predictors of the 24 month outcome data, instead of the overall societal costs. Therefore, we re-ran the four hierarchical regressions associated with the second hypothesis separately for each costing component mentioned above.

Six month agency costs did not significantly predict any of the 24 month outcome variables. Non-agency health care costs, however, were found to predict 4.6% additional variance in 24-month housing stability scores over and above demographics, 18-month housing stability scores, and treatment type, $\Delta\chi^2(1)=5.15, p=.023$. It should be stated, however, that this p -value was not below our familywise cut-off of 0.0125. See Table 12. This being said, higher

Table 8

Hierarchical Multiple Regression Predicting 24-month Community Ability Scores from Six Month (18-24Month) Societal Costs (N=77)

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					<.01
Sex	-.237	2.449	-.012	.923	
Age	-.046	.122	-.046	.704	
Block 2					.40**
MCAS @ 18 mos.	.618	.088	.644	<.001	
Block 3					.01
Treatment Type	1.621	1.866	.079	.388	
Block 4					.02
Global Costs	<.001	<.001	-.135	.153	
Block 5					<.01
Global Costs x TT	<.001	<.001	.161	.414	

Note. Criterion Variable was 24 MONTH MCAS SCORES. Global costs did not include a subtraction of client contribution to society. MCAS = Multnomah Community Ability Scale; TT = Treatment Type. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM.

*p<.01; **p<.05

Table 9

Hierarchical Multiple Regression Predicting 24-month Self-reported Symptomatology from Six Month (18-24 Month) Societal Costs (N=77)

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					.07
Sex	<.001	3.083	<.001	1.00	
Age	-.343	.153	-.259	.028	
Block 2					.31**
SDS @ 18 mos.	.525	.087	.571	<.001	
Block 3					<.01
Treatment Type	-1.717	2.502	-.064	.495	
Block 4					<.01
Societal Costs	<.001	<.001	-.073	.452	
Block 5					<.01
Societal Costs x TT	<.001	<.001	-.108	.453	

Note. Criterion Variable was 24 MONTH SDS SCORES. Societal costs did not include a subtraction of client contribution to society. SDS = Symptom Distress Scale; TT = Treatment Type. Sex was coded 1 = male and 2 = female.

*p<.01; **p<.05

Table 10

Hierarchical Multiple Logistic Regression Predicting 24-month Medication Adherence from Six Month (18-24 Month) Societal Costs (N=77)

Variable	β	SE	Wald χ^2	Sig (p)	R ² _{change}
Block 1				.15	.05
Sex	-.074	.601	.015	.90	
Age	-.054	.030	3.218	.07	
Block 2				.03	.05**
Meds @ 18 mos.	-1.313	.622	4.457	.04	
Block 3				.45	<.01
Treatment Type	.478	.619	.597	.44	
Block 4				.52	<.01
Societal Costs	<.001	<.001	.440	.51	
Block 5				.27	.01
Societal Costs x TT	<.001	<.001	.786	.38	

Note. Criterion Variable was 24 MONTH MEDICATION ADHERENCE SCORES. Societal costs did not include a subtraction of client contribution to society. Meds = Medication Adherence; TT = Treatment Type. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM.

*p<.01; **p<.05

Table 11

Hierarchical Multiple Logistic Regression Predicting 24-Month Housing Stability from Six Month (18-24 Month) Societal Costs (N=77)

Variable	β	SE	Wald χ^2	Sig (p)	R ² change
Block 1				.82	.01
Sex	.150	1.078	.019	.89	
Age	-.032	.052	.385	.54	
Block 2				<.001	.28**
HS @ 18 mos.	39.062	6750.04	<.001	.99	
Block 3				>.99	<.001
Treatment Type	.505	8457.92	<.001	1.0	
Block 4				.02	.046*
Societal Costs	.008	.231	.001	.97	
Block 5				>.99	<.001
Societal Costs x TT	-.009	1.041	<.001	.99	

Note. Criterion Variable was 24 MONTH HOUSING STABILITY SCORES. Societal costs did not include a subtraction of client contribution to society. HS = Housing Stability; TT = Treatment Type. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM. Housing Stability was coded 0 = Stable Housing and 1 = Unstable Housing.

*p<.01; **p<.05

Table 12

Hierarchical Multiple Logistic Regression Predicting 24-Month Housing Stability from Six Month (18-24 Month) Non-Agency Health Care Costs (N=77)

Variable	β	SE	Wald χ^2	Sig (p)	R ² change
Block 1				.82	.01
Sex	.150	1.078	.019	.89	
Age	-.032	.052	.385	.54	
Block 2				<.001	.28**
HS @ 18 mos.	39.062	6750.04	<.001	.99	
Block 3				>.99	<.001
Treatment Type	.505	8457.92	<.001	1.0	
Block 4				.02	.046*
Non-Agency Health \$	.007	.263	.001	.98	
Block 5				>.99	<.001
Non-Agency Health \$ x TT	-.008	.661	<.001	.99	

Note. Criterion Variable was 24 MONTH HOUSING STABILITY SCORES. HS = Housing Stability; TT =

Treatment Type. Sex was coded 1 = male and 2 = female. Treatment type was coded 0 = Standard Care and 1 = ICM.

Housing Stability was coded 0 = Stable Housing and 1 = Unstable Housing.

*p<.01; **p<.05

expenditures related to health care (though not case management) were predictive of less stable housing at 24-months. It also provides an explanation for the relationship between higher societal costs and less secure housing at 24 months (in that this relationship can be explained almost entirely by the relationship between non-agency health care costs and housing stability). Non-agency health care costs did not significantly predict any other 24-month outcome variable.

Non-health care costs for the six month period were found to predict 8.1% additional variance in 24-month community ability scores over and above demographics, 18-month community ability scores, and treatment type, $\Delta F(1,71)=11.32, p<.001$. Thus, higher expenditures related to non-health care services and supports are associated with poorer community ability scores at 24 months. See Table 13. This finding is curious given our earlier report that high initial community ability leads to higher non-health care expenditures over the six month period. These results could be explained in part due to the nature of the sample's community ability scores. When the sample was divided based on positive or negative change on the MCAS, results revealed a similar number of individuals with worsening MCAS scores over the six months as individuals showing improving MCAS scores (N=33 and N=44 respectively). Additional analyses revealed that the relationship between high initial MCAS scores and higher six month non-health related expenditures was only consistent within the group of individuals who worsened in MCAS scores over the six month period, $t(7)=2.55, p=.02$. Within the group of individuals who showed improvement on the MCAS over the six month period, 18-month MCAS scores were unrelated to non-health care costs over the six month period. It should be noted that there was much more variability in MCAS change scores within the group who worsened in community ability versus the group who improved in community ability over the six month period. Nevertheless, it is possible that some individuals who showed higher community ability at 18 months quickly worsened in this ability within the costing period under study, resulting in

Table 13

Hierarchical Multiple Regression Predicting 24-month Community Ability Scores from Six Month (18-24 Month) Non-health Care Costs (N=77)

Variable	β	SE	Beta	Sig (p)	R ² change
Block 1					<.01
Sex	-.237	2.449	-.012	.923	
Age	-.046	.122	-.046	.704	
Block 2					.40*
MCAS @ 18 mos.	.618	.088	.644	<.001	
Block 3					<.01
Treatment Type	1.621	1.886	.079	.388	
Block 4					.08*
Non-health Care \$	-.001	<.001	-.295	.001	
Block 5					<.01
Non-health Care \$ x TT	<.001	.001	.063	.656	

Note. Criterion Variable was 24 MONTH MCAS SCORES. MCAS = Multnomah Community Ability Scale; TT =

Treatment Type. Sex was coded 1 = male and 2 = female.

*p<.01; **p<.05

higher expenditures. Our finding that higher expenditures are associated with poorer community ability at 24 months lends evidence to support this hypothesis. Non-health care costs were not found to predict any of the other three 24-month outcome variables.

Six-month family costs were not found to significantly predict any outcome variable at 24 months, although this is likely due to the fact that only 11 individuals in the sample had family contributions of any kind. Out of additional interest was the fact that, although not a subset cost in the set of second hypotheses, clients' contribution to society was also a non-significant predictor of any 24-month outcome variable.

In summary, needs at 18 months did not significantly predict overall six month costs from a societal perspective. When costing components were examined individually, higher agency costs were predicted by treatment type (ICM) and greater severity of symptomatology. Non-health care costs were also predicted by higher community ability and lower housing stability. When examining how costs may predict 24 month outcomes for the individuals in our sample, it was found that greater overall societal costs (without the subtraction of 'benefits') only predicted worsened 24-month housing stability status. This relationship was largely explained by the relationship between non-agency health care costs and 24-month housing stability. It seems that higher expenditures related to health care services (though not agency-related case management) over the six months were associated with poorer housing stability at 24 months. Of additional interest is the finding that higher expenditures related to non-health care costs (i.e., social service use, educational, legal, and residential costs) were associated with initially higher community ability but eventual poorer community ability. As was hypothesized above, this could be explained by the large number of individuals who showed worsening in community ability over the six month period and who statistically drove the association between 18-month MCAS scores and non-health care costs. It was clear that examining the costing *components* of overall societal

costs were important as we did not find strong associations between needs, *overall* societal costs, and outcomes.

Discussion

Our study was designed to address a gap in the literature specifically addressing the relationships between clinical variables and comprehensive costing from a societal perspective for supporting individuals with severe and persistent mental illness with a history of homelessness to live in the community. We assessed the relationship between community ability, severity of mental health symptoms, housing stability, and medication adherence at 18 months of a two-year case management treatment trial and costs for the last six months of the trial, and subsequently, whether these costs (without subtracting clients' contribution to society) would predict outcomes in these areas at the end of the two-year trial (i.e., 24 months). Participants were clients assigned to two forms of community support, and all had a history of severe mental illness and homelessness. With regard to the needs-costs-outcomes relationships, we were particularly interested in whether our results would converge or diverge from those of Blouin, Aubry, and Angus (2004) who analyzed the same individuals in the first nine months of their treatment and found that baseline needs did not predict costs nor did costs predict mental health and housing outcomes nine months into treatment. We were particularly interested in whether our results would diverge from this previous work given the fact that many of the clients who were receiving community supports in the first nine months of the trial were no longer receiving these supports in the last six months of the trial, leading to greater agency cost differences between individuals.

Overall Costs

We found an overall average comprehensive cost from a societal perspective of treatment in this study of \$10,416.31, equaling \$57.08/day (both in Canadian dollars). This is a bit lower than the average daily cost of Blouin et al. (2004) of \$68.00/day. This could be in part because

clients in the standard care condition were no longer receiving outreach services in the last six months of the trial.

It is difficult to compare our results to existing costing literature on ICM, because, to our knowledge, this kind of work has not been published in the Canadian context to date. We hope that this will spur additional research in this area, especially with larger sample sizes and ongoing comprehensive costing data. Our findings estimate that it costs \$10,416.31 on average to support one individual for a six month period in the community once they have become established in the support structure (our time period does not give an estimate of what it may cost to initially involve someone in the service as our sample clients were already receiving services for 18 months at the beginning of the costing time period). This means that over a year it would cost approximately \$21,000 per individual. This figure is higher than what was documented as being needed to support the average person in supportive housing in the US for a year (\$15,000; Culhane, 2002), although this US sample included individuals who were not necessarily receiving ICM. Additionally, our figure is roughly equivalent to what it was documented to cost to support the average homeless person in the US (based on n=5000; Culhane, 2002).

Needs-Costs Relationship

We found that, taken together, clients' level of community ability, severity of symptomatology, housing stability, and medication adherence at 18 months did not significantly predict six month costs associated with services and supports from a societal perspective. This could be explained in part due to the fact that the costing components used to calculate the overall cost from a societal perspective were not significantly correlated with each other. Thus, clients could have had very different agency costs, for example, but still have had similar overall costs due to having dissimilar costs related to other costing components.

The fact that we did not find unstable housing as predictive of overall societal costs diverges from recent research documenting significantly lower health care costs for clients with substance use disorders placed in housing versus those still homeless (Martinez & Burt, 2006). Our non-significant finding could be explained by the fact most of the clients in our sample were housed at 18 *and* 24 months. We may be dealing with a ceiling effect in terms of housing stability. As well, this recent research focused exclusively on health care costs and not comprehensive costs.

When costing components were investigated separately, we found that higher agency costs were predicted by being in ICM and by those clients reporting greater severity of mental health symptomatology. The association between being in ICM and higher agency costs could be explained in part by the fact that the “constant” assigned to participants in ICM is almost triple that assigned to standard care. There is also the obvious explanation in that most of the standard care clients were not receiving any case management services, and thus had zero cost related to the agency. The finding that ICM clients had higher agency costs is directly in line with the finding that direct ICM services are more expensive than less intensive support (e.g., Rydman, 1990; Borland, McCrae, & Lycan, 1989).

The association between more severe mental health symptomatology and greater agency costs also makes sense given that additional or ‘extra’ agency costs would be associated with more severely mentally ill clients. This may also suggest that the agency workers respond to clients to some degree on an as-needed basis. Symptomatology was unrelated to any other costing component involved in calculating overall costs from a societal perspective. Thus while one may assume that psychiatric symptoms would be a large contributor to who receives the most service overall, it seems that symptomatology accounts only for changes in the amount of case management services one receives. We can therefore assume that symptomatology is important in

mobilizing case management workers in securing additional community services or treatment (thus increasing the individual time they spent one-on-one with the client or in work related to assisting them to access services in the community). However, there does not appear to be the same association between more severe symptomatology and more intensive additional community services. This could be explained in light of the fact that participation in many additional health services or available community services does not depend on having severe mental health symptomatology (i.e., food banks, dentist visits, drop-in centers).

Unlike our finding that poorer mental health symptomatology predicted greater agency costs, McGurrin and Worley (1993) found that symptomatology ratings were not correlated with either the amount of ICM or the length of time spent in the ICM program. This contrast between our findings and previous research could be explained by the fact that our agency costs included *both* those in ICM and standard care. Perhaps if we had only used agency costs related to ICM as our criterion variable we would not have found more severe symptomatology predicting higher agency costs.

In contrast to our hypothesis, we found that higher community ability at 18 months predicted greater six-month non-health care costs for the clients in our sample. This may seem curious in light of the finding that more severe symptomatology at 18 months predicted greater agency-related costs. It could be that clients who report higher community ability use more non-health care supports and services such as drop-in centers and social-recreational facilities/programs. As mentioned earlier, there were no significant associations between different costing components; higher costs in one area (agency) did not necessarily imply higher costs in another area (non-health care services). The orthogonal nature of the costing components suggests that different factors may be involved in predicting costs related to these components.

Although no 18 month needs variable predicted the amount of societal ‘benefits’ (i.e., employment or volunteer work), we believe this may have been related to lack of statistical power, as 76.8% did not contribute in any way to society via employment or volunteer work. This finding is in stark contrast to recent research showing that in a sample of low-income African American women, having a steady job was associated with decreased depressive symptomatology at six-month follow-up (Mascaro, Arnette, Santana, & Kaslow, 2007). Perhaps given the chronic nature of the mental health problems of clients such as those in our sample, employment and volunteering is not always possible, regardless of variations in symptomatology or housing status. This is an unfortunate finding given that a few authors have cited the benefits of volunteering for clients with disabilities, despite the opportunities being limited (e.g., Young & Passmore, 2007). These research studies suggest that employment and volunteering have potential psychological benefits, not to mention the cost-offset to society. It is not clear from our study what specifically predicts whether a client will be able to ‘give back’ to society in the form of paid or unpaid work, or what benefits this contribution to society may have on client functioning. This is an area for further study.

Costs-Outcomes Relationship

Although we would have liked to see that higher expenditures equaled better mental health and housing stability at 24 months, this was not the case. In fact, the opposite trend occurred in our study, though only for housing stability. We showed that greater societal costs over the six month period predicted poorer housing stability at 24 months. We found no association between societal costs and medication adherence, symptomatology, or community ability at 24 months. Although the authors did not report costs, our findings are in line with previous research (Muijen et al., 1994) reporting no differences in symptomatology and social adjustment between clients with severe and persistent mental illness receiving different levels of

intensity of aftercare services (half received case management). Our findings differ from additional research linking increased ICM – related costs (compared with standard care) to lower levels of symptomatology (Toro et al., 1997). Unlike Toro et al. (1994), who used mean comparisons between groups, we were using regression to predict individual client-level changes in outcomes as they related to costs.

When we examined costing components individually, we found that greater costs were again associated with poorer outcomes at 24 months. We found that higher expenditures related to health care services predicted poorer housing stability at 24 months, and in fact this association is likely what drove the overall association between overall costs and poorer housing stability.

Along a similar vein we found that higher expenditures related to non-health care costs predicted poorer community ability at 24 months. This was a little curious given the finding that better initial community ability predicted higher non-health care costs. We had speculated earlier that it could be those clients with higher community ability who were using more social-recreational services, although this does not make sense in light of the subsequent relationship between greater non-health care costs and poorer 24 – month community ability. In an attempt to explain this set of (seemingly) divergent results, further analyses showed that in fact the relationship between higher initial community ability and higher non-health care costs was driven almost entirely by only half the sample: those who showed a worsening of community ability over the six month period. It could be that these folks worsened in community ability quite quickly into the costing period and thus required and/or sought out more community support (recreation, drop-in centre, etc.). Thus, given these additional analyses, our study seems to suggest that more severely struggling clients were the clients receiving more resources to support them in the community.

Conclusions

In summary, our study highlights several important points when examining the costs of supporting clients with severe and persistent mental illness and a history of homelessness in the community. First, overall costs decrease with time as fewer standard care clients are utilizing outreach services. Of more importance is the limited knowledge we have about what predicts higher overall expenditures at the client level, and additionally the lack of association between most costing variables and client medication adherence. Of additional importance is the fact that the costing components were orthogonal. It was clear that certain needs/outcome variables were related to certain costing components. This being said, our research does suggest that clients who are doing more poorly receive more intensive agency support, as well as cost society more in additional community services and health care services over the course of the examined time period.

These points highlight a need to examine current practices within the sector responsible for supporting clients with severe mental illness and homelessness in the community. It is difficult to know how to allocate services at a client/systems level with limited information on the association between client need, costs, and outcomes. It is clear that more research is needed in this area to investigate other variables that may be contributing to higher costs. This is made further difficult given the orthogonal nature of the costing components that drive the overall costs from the societal perspective. How are agency costs unrelated to health care costs, non-health care costs, and societal 'benefits'? This may be explained in part by clinical case management involving more direct intervention than typical brokerage models of community support, however, unlike ACT, our interventions under study still required the 'brokering out' of many additional health and non-health care services. Is part of the reason that increased agency-related

costs did not lead to better outcomes related to the fact that agency cost variation is unrelated to the amount of and/or intensity of additional supports or services?

These questions are important given the well-documented evidence linking ICM and improved outcomes when compared to standard care. Are we giving all clients, despite their initial level of need, access to the same level of additional services? Does this make economical sense? As well, given the non-association between different costing components, to what extent do differences in community support services actually impact to what degree other services are accessed, used, and maintained?

Limitations and Future Research

It is important to examine the limitations of the current study. Our study included a smaller than ideal sample size due to roughly 38% subject attrition. Despite this, we had adequate sample sizes for our analyses according to our power calculations. Additionally, the attrition rate was similar in both treatment types and across genders. The target population for this research is historically hard to track and engage in longitudinal research due to transient housing situations, severe mental illness, death, and addictions issues (Hough et al., 1996; Stefanic et al., 2004). The fact that we looked solely at the last six months of the two-year treatment trial, although seemingly a potential limitation, actually showed us that, like in the first nine months, it is of little explanative benefit to examine overall costs from a societal perspective in linking needs, costs, and outcomes. Even when clients have been accessing services for 18 months or more, there is little association between the amount of case management services and the costs related to other additional health and non-health care services.

Future research would do well to consider utilizing additional multi-site research programs in an effort to boost numbers, as well as consulting previous research on effective long-term tracking of homeless populations (e.g., Stefanic et al., 2004). At the theoretical level,

additional research tracking the decision-making practices of case managers in relation to decisions of treatment intensity at the client level would be paramount in an attempt to understand the non-association between client needs and the costs of services and supports. In addition, investigating whether all clients are linked to additional community supports outside of the agency to the same degree, despite need, would be important. Understanding the “whys” of the limited relationship between needs, costs, and outcomes is paramount in this era of increased fiscal responsibility, notwithstanding the impact on the clients themselves of an improved system for determining which clients require more intensive supports in an effort to encourage improved mental health and housing outcomes.

**Cost-effectiveness of Intensive Case Management for Individuals with Severe and
Persistent Mental Illness and a History of Homelessness.**

Abstract

The current study used the comprehensive costing methodology of Knapp and Beecham (1990) to examine the cost-effectiveness of intensive case management services and “standard care” over a six month period (18-24 months of a two-year trial) for a sample of 77 clients with severe and persistent mental illness and a history of homelessness. Direct and “hidden” (e.g., travel time) costs were calculated from three perspectives: 1) Agency, 2) government, and 3) society overall. Government costs included agency and health care costs. Societal costs included all costs associated with a client’s life, including agency costs, health care costs, non-health care costs, and costs to family/friends, subtracting ‘benefits’ to society in the form of paid or unpaid (volunteer) work. Results showed that ICM treatment was less expensive overall than standard care, despite higher agency costs, primarily because of reduced hospital costs and a greater number of ICM clients either working or volunteering during the six month period examined. Net monetary benefit and net health benefit calculations showed ICM was a cost-effective alternative to standard care in promoting greater housing stability and medication adherence in this vulnerable population. When examining housing stability, uncertainty analyses (nonparametric bootstrapping) showed that even if the government or society were not willing to invest any additional money into ICM treatment, it still showed approximately an 80% chance of being cost-effective. This probability rose statistically as a 10% improvement in housing stability was ‘valued’ at increasingly larger monetary units. Implications of this research are highlighted.

Cost-effectiveness of Intensive Case Management for Individuals with Severe and Persistent Mental Illness and a History of Homelessness.

Caring for individuals with co-occurring psychiatric illness and repeated episodes of homelessness has historically resulted in repeated hospital-based care. Over the past few decades, there has been an increased interest in caring for these individuals in the community, both for financial reasons as well as a hope that community care will result in an increased quality of life for patients. Systems of care such as intensive case management have evolved as cost-effective alternatives to repeated hospitalizations. Despite this, very little research has examined the cost-effectiveness of different forms of community support. Our study was designed to address this gap in the literature, with specific reference to the cost-effectiveness of an intensive form of case management relative to standard care. We also address a second limitation of previous research on costing of mental health services, namely the use of incomplete costing data (i.e., using direct costs only). Our study utilized a comprehensive costing procedure, including both direct and 'hidden' costs (e.g., travel time) associated with client treatment.

What is intensive case management (ICM)? ICM is a form of community-based support that has been shown to produce positive client outcomes (Jerrell & Ridgely, 1995; Muijen et al., 1994; Toro et al., 1997; Macias et al., 1994). Historically different from the well-known Assertive Community Treatment (ACT; Stein & Test; 1980), in that clients receive services from an individual case manager (and not a team, as in ACT), intensive case management aids clients in four ways: assertively connecting with them, planning for their services, linking clients with services, rehabilitation, counseling, and advocating for service improvements (Toro et al., 1997). Crisis intervention, outreach services, and skills teaching can all be integrated in intensive case management (Aubry, 2004). The "intensive" part of the treatment denotes the frequency and intensity of contact with clients. Unlike other forms of case management, where workers have

caseloads of 30-40 clients at a time, in ICM, workers limit their caseload to 20 or fewer individuals at a time (Aubry, personal communication).

How effective is ICM? Ford et al. (1997) stated that when examining the literature on ICM, varying study designs, poor descriptions of service provision, and differing client groups make it impossible to firmly state the effectiveness of this form of case management. Despite this interpretation of the research on its effectiveness, there is some evidence to suggest that ICM achieves positive outcomes for clients receiving it. Several reviews since 1995 have shown positive benefits associated with ICM such as a reduction in hospital stays, a reduction in psychiatric symptomatology, an increase in social functioning, a greater retention rate in treatment, and an increase in the use of community-based support services (Baronet & Gerber, 1995; Bond, McGrew, & Fekete, 1995c; Holloway et al., 1995; Mueser et al., 1998; Simmonds et al., 2001; Nelson, Aubry, & Lafrance, 2007; Burns et al., 2007).

As the reviews of ICM have documented, the community-based treatment has been linked to fewer hospitalizations over time for individuals with severe and persistent mental illness (Ford et al., 1997; Macias et al., 1994), although additional research has found no benefit of ICM over standard care in terms of the number of hospital admissions (e.g., Hornstra et al., 1993; Johnson et al., 1998; Muijen et al., 1994; Rossler et al., 1995). ICM has also been linked to lower level of symptomatology over case management with higher client to staff ratios (Jerrell & Ridgely, 1995; Muijen et al., 1994), and additionally to decreased symptomatology over time (e.g., Toro et al., 1997; Macias et al., 1994). Additional research has linked components of ICM to the frequency of community-based service use, specifically a decreased use of crisis services (e.g., Macias et al., 1994; McGurrin & Worley, 1993), and an increased use of non-crisis mental health services (e.g., Ford et al., 1995; McGurrin & Worley, 1993; Hornstra et al., 1993; Johnson et al., 1998). Individual studies have also shown it to be effective in improving medication adherence

(Patterson & Lee, 1998), psychological well-being (Franklin et al., 1989), competence in the community (Macias et al., 1994), improved life skills (Ford et al., 1996; Johnson et al., 1998), improved social support (Patterson & Lee, 1998), and improved residential status (Wasylenki et al., 1993).

Accountability to funding sources has forced community services to show both effectiveness and cost-effectiveness. *Comprehensive costing* is a framework for reporting all the costs associated with a particular service (PSSRU; Netten & Beecham, 1993; Knapp, 1995a; 1995b; Knapp and Beecham, 1990; Beecham & Knapp, 1992). Unlike the traditional understanding of “direct” (e.g., service delivery) and “indirect” (e.g., cost of lost productivity) costs, the comprehensive costing framework views direct costs as both explicit and “hidden” (such as travel time to and from appointments).

Beecham and colleagues describe four stages in the comprehensive costing process: 1) Describe the ingredients of the service (including both “direct” service costs like dental treatment and “hidden” direct costs like travel time to and from appointments), 2) identify the activities and a unit of measurement, 3) estimate the cost implications of the service elements, and 4) calculate unit costs. Costs are ultimately related to outcomes, as Figure 1 shows. An example of a resource input would be the number of case workers at a community health centre. A non-resource input might be family and friends willing to accompany clients to appointments. Outputs include quantitative counts such as the number of clients served/housed or the number of hours of case management over a one-month period. Outcomes include changes in clients’ lives such as improved community ability or a reduction in symptomatology. Unit costs are the value of resources (input) used to produce a service, divided by the level of activity (output) it generates and should be: 1) Inclusive (unit cost calculations should include the financial implications of all the components of a service such as staffing, electrical power and

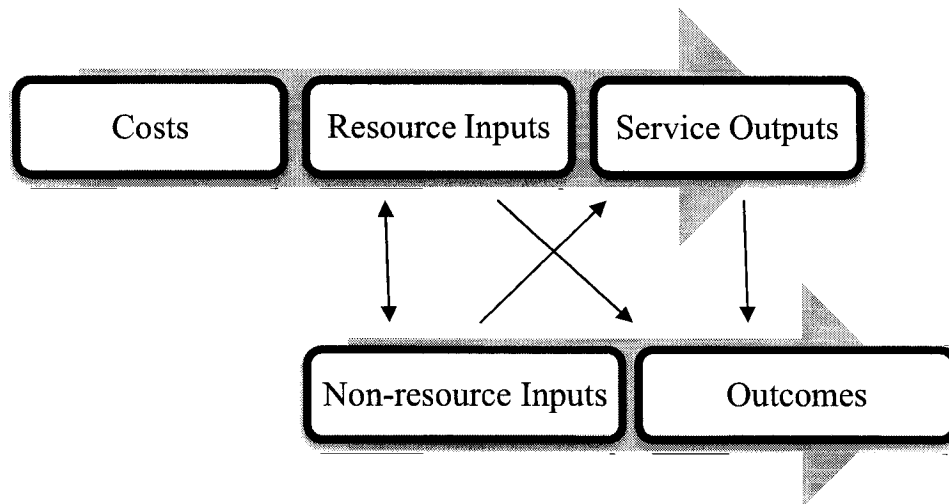


Figure 1. Elements of costing relationships (Knapp & Beecham, 1990)

maintenance), 2) they should include service use, 3) they should reflect long-run marginal opportunity costs (e.g., what it would cost a volunteer to give up their time), and 4) the data should be up-to-date.

Economic analyses are the comparative analyses of courses of action in terms of both their costs and consequences (Drummond et al., 2005). This implies that one needs to know both the costs and the outcomes ('consequences') of more than one treatment option to make accurate and meaningful comparisons. One kind of full economic evaluation is the method of determining cost-effectiveness of a treatment alternative (Drummond et al., 2005). Cost-effectiveness analyses are particularly important when examining costs and outcomes in mental illness, especially schizophrenia (Knapp, 2002). Garber, Weinstein, Torrance, and Kamlet (1996) cite cost-effectiveness analysis as "a method designed to assess the comparative impacts of expenditures on different health interventions" (p. 26). The central measure used in cost-effectiveness analysis (CEA) is the cost-effectiveness ratio. This ratio compares a treatment group (intervention) to a control group, or a treatment group to a different treatment group. The ratio is computed by comparing the two alternatives in their difference in costs divided by their difference in effectiveness. It is essentially "the incremental price of obtaining the desired health benefit/effect from a given health intervention when compared with an alternative intervention (Barrett & Byford, 2003)".

When comparing a new with an existing intervention, four possible outcomes can arise, as depicted in Figure 2. The new intervention under study is said to *dominate* the old alternative when it is both less costly and produces better outcomes. This is evident in the box SE in Figure 2. In this situation, there is no need for a C/E ratio (Garber et al., 1996). It is far more common to find that an intervention is both more costly but also more effective (box NE in Figure 2). In this case, we are interested in the lowest C/E ratio possible. For example, if Treatment A costs \$200

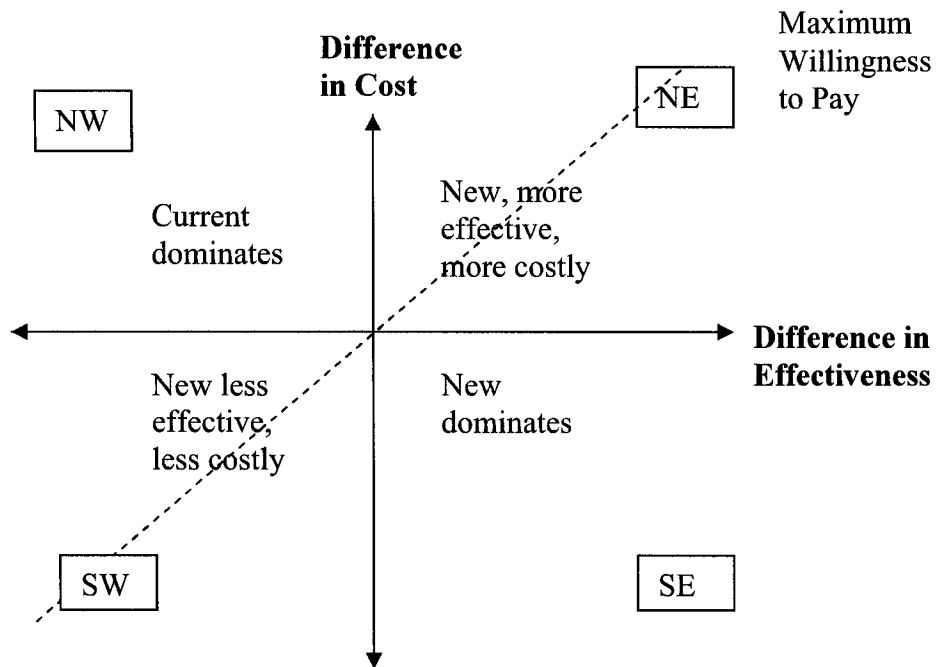


Figure 2. The cost-effectiveness plane (Barrett & Byford, 2003; Drummond et al., 2005)

per client to make a significant change on an outcome measure, and Treatment B costs \$100 per client for the same change, but Treatment A shows half of its participants improving and Treatment B only shows 1/3rd of its patients improving, we could say that Treatment A has a cost-effectiveness ratio of \$200 per client improved and Treatment B has a cost-effectiveness ratio of \$300 per client improved. Thus Treatment A is more cost-effective, all other variables being equal.

Incremental cost-effectiveness ratios (ICERs): Incremental cost-effectiveness ratios are a preferred method of comparing two groups (rather than simply eye-balling two cost-effectiveness ratios; Yates, 1996; Drummond et al., 2005). They are usually used when there is a difference in effectiveness between the two groups; otherwise the analysis can be reduced to simply the difference in costs between two treatment alternatives (referred to as a cost-minimization analysis; Drummond et al., 2005). Incremental cost-effectiveness ratios are calculated by taking the difference in average costs (ΔC) between Treatment A and Treatment B and dividing it by the difference in numbers of people achieving each outcome over a specific time period (difference in effectiveness, or ΔE). If two cost-effectiveness ratios (one for each treatment) were plotted on the graph in Figure 2, the slope of the line connecting the two ratios would be the ICER. The following set of formulas outline how ICERs are calculated for both continuous and categorical outcome variables:

Continuous Outcome Variables:

$$\text{Incremental cost-effectiveness ratio} = \frac{\Delta C}{\Delta E} = \frac{C1 - C2}{E1 - E2}$$

Where:

C1 = Average Cost of Treatment A

C2 = Average Cost of Treatment B

E1 = Average Effectiveness (Outcome) of Treatment A

E2 = Average Effectiveness (Outcome) of Treatment B

Categorical/Ordinal Variables:

Where the outcome variable is not a continuous variable but rather a discrete variable (e.g., number of individual housed), the following formula is used:

$$\text{Incremental cost-effectiveness ratio} = \frac{\Delta C}{\Delta E} = \frac{C1 - C2}{(\# \text{ of individuals who achieved outcome E1/100}) - (\# \text{ of individuals who achieved outcome E2/100})}$$

These formulas will give the incremental cost associated with one unit of change on an outcome variable for a treatment alternative (e.g., how much more one must spend in Treatment A versus Treatment B for a similar unit change in a targeted outcome). If the value is a positive value, it indicates that while it is more expensive to treat individuals in Treatment A, more individuals show a significant change in the outcome measure of interest. If the number is negative, there are two possibilities. The first is that it shows that Treatment A is not only more expensive than Treatment B, but affords fewer people the move towards better outcomes. The second is that Treatment A may be less expensive than Treatment B and simultaneously produces better outcomes, and can be said to *dominate* Treatment B (Yates, 1996; Drummond et al., 2005).

What is the usefulness of an incremental cost-effectiveness ratio? If a new treatment is found to dominate an old treatment, it is clear that it is a cost-effective alternative. However, interpreting cost-effectiveness ratios when a new treatment is both more expensive and more effective is much more complicated. In this case, an incremental cost-effectiveness ratio can be compared to a funder's *maximum willingness to pay* (R_T) for an improvement in effectiveness within the constraints of existing budgets (see Figure 2; Barrett & Byford, 2003). This maximum willingness to pay is also a ratio. A new treatment would be considered cost-effective if the slope connecting the *CEs* for the two treatments (the *ICER*) was smaller than the ratio (slope of the line) for the maximum willingness to pay. For existing programs and treatments, the ratio can be

compared to the maximum willingness to pay ratio to decide whether or not to invest additional dollars in the program (Angus, personal communication).

Although incremental cost-effectiveness ratios have traditionally been the most popular method of presenting results of cost-effectiveness analyses, using them has drawbacks (Drummond et al., 2005). A cost-effectiveness ratio does not inform the reader of the size or scale of the treatments or programs being considered (Drummond et al., 2005). According to Figure 2, if we plotted the *CE* ratios associated with both Treatment A and Treatment B and connected them with a regression line, conceivably the slope (the *ICER*) of the line could be extended into additional quadrants, providing less meaningful interpretive value. As well, would a new treatment not be considered cost-effective if the *ICER* slope was over the maximum willingness to pay (R_T)? (Drummond et al., 2005).

Net Monetary/Health Benefit

As an alternative to the *CE* ratio, the use of *net benefit* has been described as a way to summarize the value for money of treatment alternatives (Stinnett & Mullahy, 1998). The existing cost-effectiveness decision rule is

$$\Delta C / \Delta E < R_T$$

The net benefit approach simply re-arranges the cost-effectiveness decision rule, showing that a new treatment is cost-effective if

$$R_T \Delta E - \Delta C > 0$$

This re-arranged formula is referred to as the *net monetary benefit (NMB)*. It is ‘the increase in effectiveness (ΔE), multiplied by the amount the decision-maker is willing to pay per unit of increased effectiveness (R_T), less the increase in cost (ΔC); Drummond et al., 2005; pp. 131).

A second alternative way to re-arrange the cost-effectiveness results in the *net health*

benefit (NHB). For a new treatment to be deemed cost-effective in this case, the following formula must hold:

$$NHB = \Delta E - (\Delta C / R_T) > 0$$

In this case, the health gain (ΔE) has to exceed another possible health gain from investing the same resources in another cost-effective program (where the cost-effectiveness ratio is R_T).

Uncertainty Analyses- Bootstrapping Method

Nonparametric bootstrapping is a statistical method employed to deal with the fact that there is inherent uncertainty in any costing estimate. O'Brien and Briggs (2002) define nonparametric bootstrapping as follows:

Nonparametric bootstrapping is a re-sampling procedure that estimates an empirical sampling distribution for a chosen statistic of interest rather than relying on parametric assumptions. Bootstrap samples of the same size as the original data are drawn with replacement from the original sample and the statistic of interest is calculated. This process is repeated [a minimum of 1000 times] to generate a vector of bootstrap replicates of the statistic of interest, which is the empirical estimate of that statistic's sampling distribution (O'Brien & Briggs, 2002, pp. 461).

To use bootstrapping for cost-effectiveness estimates (e.g. *NMB*), the approach is three-fold.

O'Brien and Briggs (2002) outline the steps as follows (adapted for *NMB* estimates, as they describe ICERs):

- (1) Sample with replacement n_C cost/effect pairs from the participants in the control group (where n_C is the number of observed participants in the control group) and calculate the mean cost and effect in this bootstrap resample.
- (2) Sample with replacement n_T cost/effect pairs from the participants in the treatment group (where n_T is the number of observed participants in the treatment group) and calculate the mean cost and effect in this bootstrap resample.

- (3) Using the bootstrapped means from the steps above, calculate the difference in effect between the groups, the difference in cost between the two groups, and an estimate of the *NMB* where R_T is equal to zero.

Ultimately, when a *NMB* is calculated for all 1000 re-samples, the probability of ICM being cost-effective can be determined, as this would be equivalent to any outcome where $NMB > 0$.

Acceptability Curves

Traditionally acceptability curves have been used to plot *ICERs* based on incremental increases in a funder's willingness to pay (R_T) for an increase in effectiveness in a new treatment. More recently, researchers in the area of health economics have been plotting acceptability curves based on the probabilities of a new treatment being cost-effective at differing values of funders' willingness to pay for a greater (i.e., better) outcomes, but basing these probabilities on *NMBs*. The use of *NMBs*, as mentioned, circumvents the problem associated with interpreting negative *ICERs*. Traditionally, one examines how the probability of the new treatment being cost-effective would change as a function of increasing threshold willingness to pay for a particular artificial inflation of the effectiveness of the new treatment. This allows one to examine whether increasing (additional) funds, R_T , results in a greater probability of the new treatment being cost-effective over the (old) treatment. The bootstrapped estimates are used to determine these new probabilities, where the equation

$$NMB = R_T \Delta E - \Delta C$$

is calculated for incrementally increasing R_T values, such as ten estimates ranging from \$100-\$1000 dollars. For all of these estimates of *NMB*, the value of ΔE would be multiplied by a factor representing the artificial inflation of the effectiveness of the new treatment. In other words, one is examining the new *NMB* associated with valuing said artificial inflation at differing monetary

amounts. When this is calculated for all 1000 estimates, it is possible to calculate a probability of a certain $NMB > 0$, equivalent to when the new treatment is cost-effective.

Cost-effectiveness of Community Treatment

Taking the above calculations into account as a way to understand the term ‘cost-effectiveness’, what do we know about whether community treatments are cost-effective? There is well-documented evidence to suggest that community-based treatments are less expensive than hospital-based care on a day-to-day basis (Galster, Champney, & Williams, 1994; Weisbrod, Test, & Stein, 1980). This being said, traditional “intensive” services such as ACT and ICM have traditionally cost more than less intensive services when direct treatment costs are compared (e.g., Rydman, 1990; Borland, McCrae, & Lycan, 1998). Other research has documented these intensive treatments as actually costing less than control groups receiving little to no service because of reduced hospitalization costs (Bond et al., 1990; Dickstein, Hanig, & Grosskopf, 1988; Quinlivan et al., 1995), while others have documented increased overall costs associated with intensive treatments because of ‘increased service uptake’ (Ford et al., 1997). This suggests that comprehensive costing and more sophisticated cost-effective analyses are needed to truly disentangle how intensive services are different from controls in the costs associated with different costing perspectives (i.e., government, society).

What has the research shown to date about the cost-effectiveness of ICM when compared with standard care? Johnston et al. (1998) carried out one of the few studies to look at the cost-effectiveness of intensive case management. They investigated the costs alongside a clinical trial which put participants in either intensive case management (9:1 client-worker ratio) or standard care (routine case management; 30:1). They found that when hospital, mental health, general health, and community costs (global costs) were computed per patient for the 12-month period of study, the overall mean cost of ICM was not significantly different from standard care, despite

case management costing more in the ICM group, suggesting that clients in routine case management were incurring greater costs in other areas. The mean cost per patient for case management services was significantly greater in the ICM group than the standard care group (by \$7745). The biggest contributor to cost in both groups was hospital costs, accounting for 78% and 79% of total costs in the intensive and standard care groups, respectively.

Johnson et al. (1998) also calculated an incremental cost-effectiveness ratio, using life skills as the outcome variable. This means that they were interested in what it costs, per client, to obtain a clinical improvement in life skills (as measured by the Life Skills Profile; LSP) over a 12 month period. To obtain this ratio, firstly the program cost was extrapolated to 100 patients for both groups separately. Using subtraction, the difference in costs between the two groups was obtained. This number was then divided by the differences (between groups) in the number of patients out of 100 who clinically improved in life skills. The end result was an incremental cost-effectiveness ratio of \$27,661, meaning that it costs this much over 12 months for 100 additional patients in the ICM group to make a clinically significant improvement in functioning. It means that for one additional client to improve in a significant way, theoretically \$276.66 more dollars must be spent. The research reported by Johnson et al. (1998) is important as a first step in suggesting that cost-effectiveness is a useful concept to test in intensive case management; however, they did not utilize a complete comprehensive costing methodology when calculating costs for their 12-month trial.

One study to date has examined the cost-effectiveness of ICM using methods beyond merely incremental cost-effectiveness ratios. Rosenheck, Kasprow, Frisman, and Liu-Mares (2003) compared three groups of homeless men over a 36 month period with either a severe mental illness or substance dependence disorder (or both). Earlier research by the same authors showed that in a review of cost-effectiveness of community supports for individuals with a

history of homelessness and severe mental illness, determining whether more intensive services are cost-effective has more to do with how much society is willing to 'value' an increase in effectiveness (Rosenheck et al., 2000). In the 2003 study, the authors compared the costs associated with three groups: Intensive case management + housing vouchers, intensive case management, or standard case management. Three costing perspectives were examined: Veteran's Affairs, the broader governmental perspective, and finally the societal perspective. They used their understanding of these economic perspectives to guide their placement of particular costing elements into these three categories. For example, client employment was subtracted from the net cost from the societal perspective as this is seen as a 'payback' to society but not to the government. The main outcome of interest was housing stability. The authors calculated incremental cost-effectiveness ratios and also performed uncertainty analyses (bootstrapping) where they determined a curve which mapped the relationship between costs and outcomes by bootstrapping methods. Using a predetermined range of monetary 'values' of a night of secured housing for a client, the acceptability curve provided a scatter-plot which allowed the authors to determine the probability of the net benefit of the alternative treatment outweighing the 'value' of another night of secured housing. From the overall societal perspective, the authors reported that there was a 56% chance that ICM was cost-effective if they valued a night of housing at approximately \$50.00. The chance that the benefit of ICM would outweigh the costs increased as the 'value' of a change in housing stability was artificially increased (Rosenheck et al., 2003).

With the exception of Rosenheck et al. (2003), there is very limited research using comprehensive costing to investigate the cost-effectiveness of ICM using methods beyond simple incremental cost-effectiveness ratios (i.e., net monetary benefit) and taking the inherent uncertainty in cost estimates into account (i.e., statistical uncertainty analyses). As well, no study

to date has examined the cost-effectiveness of ICM in a *Canadian* context from multiple costing perspectives, or expanded the investigation to include both housing and clinical outcomes.

The Current Study

The current study will employ comprehensive costing to examine the costs associated with the last six months of a two-year trial of community care (intensive case management and standard care) for individuals with a history of homelessness and severe mental illness in a large Canadian city. To date this has not been investigated. Our research questions target the cost-effectiveness of intensive case management over traditional standard care in a clinical trial where participants were matched and randomly assigned to receive either intensive case management (ICM) or standard community care (SC). We chose to focus on the last six months of the two-year trial for two reasons: a) We were limited in the costing data available to us, and b) we wanted to compare a time in the treatment when the differences in service intensity between the two groups would be most heightened. Typical 'standard care' tends to reduce in intensity the longer an individual is followed, unlike intensive case management, where clients are served for an unlimited amount of time at the same level of intensity.

Previous research had focused especially on the following outcome variables in case management research: symptomatology and service use patterns, and psychological well-being and community adjustment outcomes (Chamberlain & Rapp, 1991; Baronet & Gerber, 1998). We chose to focus on four pressing areas of need for our target population when investigating cost-effectiveness between ICM and standard care: (1) Symptomatology, (2) community ability, (3) medication adherence, and (4) housing stability. These variables have been highlighted as important target outcomes for psychiatric rehabilitation programs intended to aid our targeted population. They have been shown to aid clients in living independently in the community,

improving the quality of their lives, and developing and maintaining social connections (Corrigan et al., 2008).

We were interested in the costs from three costing ‘perspectives’, including the Agency (i.e., Canadian Mental Health Association- Ottawa Branch), the government (i.e., Ministry of Health and Long-Term Care, MOHLTC), and society overall. These three perspectives are important to distinguish between as they differ in what costing components are included in each.

Research Questions

- 1) Which treatment (ICM or standard care) is more costly (based on the six month data) from the perspective of the agency: intensive case management, or standard care services?
- 2) Which treatment (ICM or SC) is more costly from the perspective of the Ministry of Health and Long Term Care (MOHLTC)? Related to this question, are costs associated with hospitalization less for intensive case management than standard care?
- 3) Which treatment is more costly from the overall societal perspective?
- 4) Which treatment (ICM or SC) is more cost-effective from the perspective of the MOHLTC in terms of our four outcome variables at 24 months: symptomatology, community ability, housing stability, and medication adherence? Each outcome variable will have a different incremental cost-effectiveness ratio, net monetary benefit, and net health benefit.
- 5) Which treatment (ICM or SC) is more cost-effective from the perspective of society overall in terms of our four outcome variables at 24 months: symptomatology, community ability, housing stability, and medication adherence? Each outcome variable will have a different incremental cost-effectiveness ratio, net monetary benefit, and net health benefit.
- 6) What is the probability that ICM is cost-effective over SC using nonparametric bootstrapping re-estimates? In other words, how certain are we that the costing estimates in our sample are accurate depictions of the cost-outcome relationship in the population?

- 7) Will our probability of ICM being cost-effective change as a function of incrementally increasing funders' threshold willingness to pay for a desired increase in effectiveness in ICM over standard care?

Method

Research Design

The study used a randomized controlled trial design to compare the outcomes and costs of intensive case management and standard care, designed to aid persons with severe mental illness who are homeless or at risk of homelessness in the city of Ottawa. The cost-effectiveness analysis, which was described above, follows the procedures detailed by both Drummond, Schulpher, Torrance, O'Brien, and Stoddart (2005) as well as O'Brien and Briggs (2002). The method requires that both the treatment and control group ("standard care") participants be measured on identical outcomes.

Setting. This study was part of a larger multi-site study of mental health commissioned by the Ontario Ministry of Health and Long-Term Care, examining outcomes of participants, costing, as well as program implementation. The program under study was intensive case management (ICM) of the Ottawa branch of the Canadian Mental Health Association (CMHA). This service has a catchment population of approximately 1 million and offers individualized, portable services and support (i.e., intensive case management) to individuals who live in the community and suffer from severe and persistent mental illness and who are either homeless or at risk of homelessness.

Treatment Conditions

Firstly, researchers informed potential clients about the study and obtained informed consent from those who wished to participate. Matching in pairs for group assignment took place for all participants on the variables of sex, age and level of functioning (i.e., Multnomah

Community Ability Scale scores completed by outreach workers). The pairs were randomly assigned to either the treatment condition (intensive case management) or the control group (standard community care). Outreach workers were informed of the outcome of the random assignment. Outreach workers were then instructed to continue to give support for those in the control group, but not for those in the treatment group who were referred to the community support program at CMHA. Each individual in the treatment group was assigned an intensive case manager. Individuals in both groups were interviewed at baseline, 9, 18, and 24 months following random assignment to treatment or control groups, even if they terminated with their case worker.

Services offered to individuals in the ICM condition. The first goal of the ICM services examined in the study is meeting a client's basic needs. The steps toward this end are: 1) Meeting the client in a familiar, safe environment in the community (ideally in a client-familiar environment), 2) developing an ongoing contact with the client (frequency that is comfortable and appropriate to the relationship), 3) developing a mutual, trusting relationship, 4) improving access to secure housing (assessment, comprehensive housing search with client, assist in setting up new housing), 5) improving access to financial assistance (assessment, financial plan, links to services, practical support), 6) improving access to basic food/clothing (assessment, establish plan, link, practical support), 7) developing a safety plan (client's real and perceived safety risks), and 8) meeting basic mental/physical health needs (assessment, links).

The second goal of ICM is assisting clients to receive formal support. Steps toward this end are: 1) Coordinating clients' formal network of professionals, 2) assisting clients to access needed services, and 3) sustaining a network of formal services.

The third goal of ICM is assisting clients to develop an informal network of support. Steps to accomplish this goal are: 1) Creating a network of informal supports (discuss who are

friends and informal supports, assess deficits, teaching, identify strategies to reconnect with people), 2) developing informal supports with client (e.g., teach skills to meet new people, market client to groups), and 3) sustaining network of informal supports (primarily by providing education or support to people in informal network).

The fourth goal of ICM is to improve clients' awareness of their own rights and responsibilities and helping them advocate for themselves in the community. Steps to accomplish this goal include: 1) Educating the client about their own rights and responsibilities (keep client up to date about rights and responsibilities, follow up), and 2) developing rights advocacy (assess ability to self-advocate, advocating when necessary).

The fifth and final goal of ICM is helping the client to develop skills for goal achievement and maintenance. Steps to accomplish this goal include: 1) Helping clients to develop skills for activities for daily living (skill assessment and development), 2) assisting clients to develop skills related to different areas such as social and vocational skills (assess skill level, develop/implement plan to teach skills, evaluate skill development), 3) assisting clients to develop coping skills and strategies for recovery (assess knowledge and acceptance of own mental health issues, educate, develop strategies, support), 4) helping clients to develop the skills needed to use services appropriately (assess, educate, develop specific strategies, support client to use strategies to use services appropriately), 5) teaching clients the use of problem solving strategies (assessment of problem solving skills, review/teach skills, support client to apply skills), and 6) developing service plans and assisting clients to implement them (assess needs and strengths, determine goals and needed resources, develop service plan, implement strategies, evaluate and update service plan).

Services offered to individuals in standard care. The comparison group was defined as standard community care. This included follow-up with an outreach worker for a limited time,

and referral to other community services as needed. The goals of outreach services are to help clients connect with other community services, secure housing, and secure financial aid. Outreach services are not intended to last more than about nine months. In contrast, ICM is open-ended in duration. The typical client to staff ratio for ICM was 15:1. Outreach workers typically have similar client to staff ratios as ICM. However, because of the shorter duration of services, outreach workers can provide services to up to 30 individuals per year. The focus of outreach services is helping clients meet their basic needs beginning with housing issues.

Study Participants

Admission criteria. Participation in the study was based on the criteria used for admission to the ICM program: 1) The individual had a severe and persistent mental illness (i.e., diagnosis of schizophrenia, bipolar disorder or severe personality disorder; produces impairment in daily living; has a chronic course); 2) the individual had health and social service needs that were not being adequately addressed; and 3) the individual was homeless or was at risk of becoming homeless.

Informed consent to participate in the study was obtained from all participants included in the study. Patients were then randomly allocated to either intensive case management (N = 76) or to continue to receive standard care (N = 71). By the end of the two year trial, there were 49 participants in the ICM group and 41 in the standard care group. The attrition rate was approximately 38%. There were no differences in demographic characteristics and diagnoses between the two groups at 24 months.

We had complete costing data for 40 clients in the ICM group and 37 clients in the standard care group. Table 1 shows a comparison of demographic and clinical characteristics between our sample (those who had complete costing data) and the remaining sample (44 clients who dropped out and 13 clients with incomplete costing data) at baseline.

Table 1

Comparison of Clients with Complete Costing Data (N=77) versus Those without Complete Costing Data (N=13) and Clients who Dropped Out (N=57) on Baseline Demographic Characteristics and Clinical Variables

Variable	Clients with complete costing data at 24 months (N=77)	Clients with incomplete costing data (N=13) and 24-month drop-outs (N=57)
Age	$X = 39$ (17-66); $SD = 11$	$X = 37$ (17-65); $SD = 12$
Sex	49% Men; 51% Women	56% Men; 44% Women
Housing Stability	66% Stable; 34% Unstable	60% Stable; 38% Unstable; 2% Missing
Med Adherence	47% Adherent; 53% Non-Adherent	51% Adherent; 49% Non-Adherent
MCAS	$X = 51$ (26-69); $SD = 8$	$X = 51$ (33-65); $SD = 8$
SDS	$X = 40$ (16-71); $SD = 14$	$X = 39$ (15-67); $SD = 13$

Note. Med Adherence = Medication Adherence; MCAS = Multnomah Community Ability Scale; SDS = Symptom Distress Scale

Additionally, when the 77 clients with complete costing data were compared only to the 13 with incomplete costing data, there were no significant differences between any demographic or clinical variables at baseline.

Outcome Measures

Multnomah Community Ability Scale (MCAS). The MCAS is a 17-item clinician rating scale that measures the degree of impairment experienced by adults with psychiatric disabilities who live in the community (Barker, Barron, McFarland, & Bigelow, 1994). The MCAS measures degree of disability through 17 items divided into four areas: (1) Interference with functioning, (2) adjustment to living, (3) social competence, and (4) behavioural problems. Ratings can be attained for each indicator ranging from no impairment (1) to extreme impairment (5). Both a total scale score and subscale scores for each area can be ascertained.

The samples on which the norms for the MCAS were based include clients from both rural and urban areas. The clients were all enrolled in community support units of community mental health centers, suffered from a major mental illness, have been hospitalized recently or were at risk of being hospitalized, and suffered from social role impairment in several areas. Total scores on the MCAS can range from 17 to 85, providing an indication of global ability to living in the community. A high level of functioning is reflected by a score ranging from 63 to 85, a medium level of functioning, between 48 and 62, and a low level of functioning, between 17 and 47. Barker et al. (1994) showed the MCAS to be reliable and valid. The test-retest reliability was 0.82, and total MCAS scores have been shown to predict future hospitalizations during a one-year period (Zani et al., 1999). Internal consistency (Chronbach's alpha) for the total scale for the current study was 0.85.

Symptom Distress Scale (SDS). Symptom distress was assessed using the 15-item self-report measure known as the Symptom Distress Scale (SDS; Appendix B). The SDS is made up

of the 10 items making up the SCL-10 (Nguyen et al., 1983) measuring depression, somatization and phobic anxiety, and five other items from the SCL-90 that loaded on an anxiety factor. The scale asks people the extent that they were bothered by symptoms in the last seven days.

Response alternatives fall on a 5-point scale of distress ranging from “not at all (1)” to “extremely (5)”. A total score is calculated based on the item scores (ranging from 15 to 75); the more elevated the score, the greater the severity of symptoms. The SDS was tested by Derogatis and Melisaratos (1983) and found to have internal consistency of 0.71 to 0.85 and a test-retest reliability of 0.68 to 0.91. The skewness measures and frequency distribution of the total score were at acceptable levels, and there was no evidence of floor or ceiling effects. In the current study, internal consistency was 0.92 for all four time points: baseline, 9 months, 18 months, and 24 months.

Medication adherence. Medication adherence was measured by a one-item measure completed by a client’s case worker retrospectively for the past six months. It was measured on a Likert scale from 1 to 4 asking “How often does the consumer take these medications as prescribed?” (1 = most of the time, 2 = about half of the time, 3 = less than half of the time, and 4 = unknown). Reliability for our measure was supported with the finding that medication adherence at 9 months was found to correlate significantly with medication adherence at both 18 months ($r_s(81) = .34, p < .01$) and 24 months ($r_s(71) = .42, p < .001$). Medication at 18 and 24 months were also significantly positively correlated ($r_s(72) = .23, p = .05$). Baseline medication adherence was not found to be significantly correlated with medication adherence at any other time point, although this could be due to the most dramatic clinical changes occurring within the first nine months of treatment (Aubry & Smith-Fowler, 2004).

We tested the validity of our one-item medication adherence measure by testing its association with item #14 on the Multnomah Community Ability Scale (i.e., How frequently does

the consumer comply with his/her prescribed medication regimen?; 1 = Almost never complies to 5 = Almost always complies). Significant negative correlations were found between the two items at baseline, 9 months, 18 months, and 24 months ($r_s(125) = -.52, p < .001$; $r_s(92) = -.64, p < .001$; $r_s(84) = -.63, p < .001$; $r_s(78) = -.79, p < .001$ respectively).

Our ordinal medication adherence variable was transformed into a dichotomous variable for use in logistic regression. It was constructed consisting of “medically adherent” (equivalent to “1= most of the time”) and “non-medically adherent” (equivalent to “2 = about half of the time” and “3 = less than half of the time”).

Housing stability. Housing stability was assessed by determining a client’s housing status relative to three criteria. The first criterion was a measure of the number of residential moves in the past six months. The client was coded as being unstably housed if they had moved three or more times in the last six months. The second criterion was a measure of the client’s current housing situation, and participants were considered “homeless” (and therefore unstably housed) if their current housing was a hostel, a shelter, or on the street. The third criterion was the case-worker’s recording of the instability of the client’s current housing situation by answering Yes/No to the following question: Does the consumer expect to be staying where he/she is for less than 60 days in total? If a participant met any one of these three criteria they were coded as having housing instability. Reliability for our measure of housing stability was supported by significant positive associations between the measure at baseline and 9 months ($r_s(121) = .21, p < .05$) and at 18 months and 24 months ($r_s(94) = .48, p < .001$). An association approaching significance also existed between our measure of housing stability at baseline and 24 months ($r_s(95) = .17, p = .09$).

Costing Variables

To estimate costs for the last six months in the two-year study (i.e., 18-24 months), a specific form was created (Appendix C). Items in the form were completed by the primary caseworker working with the client in either ICM or Standard Care. When a caseworker could not answer a particular question, the item was posed to the client. The items were created based on the “Client Service Receipt Interview” developed by Jennifer Beecham of the University of Kent in Canterbury (Knapp & Beecham, 1990). Economic costing analyses traditionally include both “direct” and “indirect” costs in their calculations. Indirect costs are those associated with lost productivity due to illness/injury, however are typically employed only when someone no longer receives income from a place of employment. In our study, our participants did not have a history of employment prior to the two-year trial and so we did not assess “indirect” costs in the traditional way. However, using comprehensive costing, we assessed for and included “hidden” costs such as those costs accrued by family and friends who accompanied our participants to appointments or supplemented their income in any way. With this in mind, the items on the Client Service Receipt Interview contained both “direct” costs and “hidden” costs.

We were interested in the costs from three costing ‘perspectives’, including the Agency (i.e., Canadian Mental Health Association- Ottawa Branch), the Ministry of Health and Long-Term Care (MOHLTC; government-related expenses having to do with health expenditures) and Societal. These three perspectives are important to distinguish between as they differ in what costing components are included in each. Table 2 shows the costing components involved in each of the three perspectives. The societal perspective includes both more ‘costs’ than the Agency or MOHLTC perspectives (i.e., social service costs such as shelters, family members’ time) but also includes ‘benefits’ to society in the form of client employment and/or volunteer work. Although not examined here, an overall ‘governmental’ perspective is a fourth way of examining the

Table 2

Costing Components of the Three Costing Perspectives of Interest

<i>Agency Perspective</i>	<i>Ministry of Health and Long-Term Care Perspective</i>	<i>Overall Societal Perspective</i>
<i>AGENCY COSTS:</i> Direct Case Management Services Overtime of Case Managers Travel time of Case Managers Overhead Agency Costs	<i>AGENCY COSTS:</i> Direct Case Management Services Overtime of Case Managers Travel time of Case Managers Overhead Agency Costs <i>NON-AGENCY HEALTH RELATED COSTS:</i> Hospital Use Emergency Room Use Ambulance Use Physician Visits Professional Visits (e.g., social worker, psychologist, occupational therapist) Dentist Visits Medications Homecare Use	<i>AGENCY COSTS:</i> Direct Case Management Services Overtime of Case Managers Travel time of Case Managers Overhead Agency Costs <i>NON-AGENCY HEALTH RELATED COSTS:</i> Hospital Use Emergency Room Use Ambulance Use Physician Visits Professional Visits (e.g., social worker, psychologist, occupational therapist) Dentist Visits Medications Homecare Use <i>NON-HEALTH RELATED COSTS:</i> Education Tuition/Supplies Shelter/Drop-in Centre Use Meals provided in Community Food Bank Use Lawyer Use Arrests Jail Visits Parole Officer Visits Residential Rental Supplements Family/Friend Travel Time (e.g., to accompany client to doctor's appointment) Family/Friend Income Provision Administrative Cost of Transfer Payments <i>BENEFITS TO SOCIETY:</i> Client Employment/Volunteer Work

costing data in this study (e.g., all costs subsumed under governmental responsibility, including transfer payments). In this way, neither the costing perspective of the MOHLTC nor the overall societal perspective includes transfer payments (i.e., ODSP). From a costing theoretical perspective, it can be argued that these payments are not 'lost' to society overall but merely 'change hands' (Rosenheck et al., 1997).

Service-related information for each category listed in Table 2 was recorded individually for each client at 24 months, retrospective for six months. For example, visits to professionals were listed by type of professional and duration of visit. Medications were listed complete with daily dosage. Length of time spent in shelters or weekly visits to drop-in centers or food banks were recorded. Fidelity to the 'comprehensive costing' model was ensured by determining the costs associated with case managers' and family members' travel time related to client service use. See Appendix D for the complete Client Receipt Interview Form.

Costs were determined by using the service-related information for each client and attaching unit costs for each kind of service or costing component in Table 2. Unit costs are typically the cost associated with the smallest entity of service (e.g., usually one hour of service delivery). All costs were in Canadian dollars and were from a base year of 2001. The source of all relevant unit costs is outlined in Appendix E.

For professional services, we used regional norms for corporations/associations of different professions. For services covered under the Ministry of Health, the expenses associated with this ministry were used. Five of the six hospitals in the Ottawa region that were mentioned by participants provided precise information concerning the unit costs of a day of hospitalization and a visit to the emergency room (see Appendix F). For the expenses connected to the hospital which did not give us this information, the average costs of services from the other centers were used. Costs were reflected in 2001 dollars.

For many services, unit costs were already given to us. However, for some services unit costs had to be calculated from agency or professional information on costs. Volunteer hours were calculated by using the value of one hour of minimum wage work (\$6.85/hr). While the decision to use minimum wage might be considered a conservative estimate, it is unlikely given the education level and chronic mental illness in our client sample that any particular client could have secured anything above an entry-level position (usually at minimum wage).

If a service could not provide information regarding the estimation of their costs of services, we used the unit costs of a similar service. An example of this was the use of local food banks. Based on information provided, we calculated a unit cost per visit to a food bank, and estimated that most of the food banks in Ottawa functioned appreciably in the same way. We thus used the unit cost from one food bank to estimate the costs at other food banks.

To assess costs payable by the agency, two types of costs were calculated. The first was an hourly rate for case workers/outreach workers of the two types of programs. This hourly rate was calculated using the annual salary of the employees at the agency. It was determined that an hour of service cost \$28.75 to the agency. Thus this amount was able to be used as the unit cost and multiplied by the number of hours each client was served. The other type of cost calculated was a fixed cost for each client, representing operation costs at the agency such as rental of the office space, telephones, furniture, vacation pay, education, administrative costs, and supervision costs. A fixed cost for each client was determined to be \$672 for the six months of intensive case management, and \$252 for the six months of outreach services, though this constant was not included for clients in standard care when they were no longer receiving outreach services.

A list of medications and dosages for each client was taken by the interviewer or by the participant themselves. A pharmacy in the region supplied us with the year 2001 costs for a 30-day supply of every type of medication, complete with the medication costs, operating costs, and

preparation costs. It should be noted that these are probably underestimated costs, as psychiatrists have noted that clients will typically underreport how much of a medication they are taking, or fail to identify all of their medications.

The fidelity of the costing methodology was tested by two independent evaluators, who took data collected from the case workers for the same ten clients and assigned unit costs to the data and calculated overall total global costs (for the first nine months of the two-year trial). When the overall costs were compared between evaluators, it was found that there was a high inter-rater reliability coefficient between evaluators ($r = .99$).

Although typically the administrative costs associated with transfer payments are included in the societal perspective (Drummond et al., 2005), we chose not to estimate these due to our concern that our estimates would be inaccurate given the retrospective nature of the study, and also with the knowledge that these administrative costs are typically related to new disability-payment clients. We felt confident in assuming that our sample contained mostly individuals who had been receiving disability payments for quite some time (and thus, we could assume that these administrative costs would be minimal at most).

Once costs were calculated for each service 'unit' associated with each client for the six month period, the total costs from the three perspectives could be calculated for each client. Figure 3 outlines the calculation of the total costs from each perspective in pictorial form. It is only in the overall societal perspective where we view employment and volunteer work as monetary 'benefits' to society and are thus subtracted from the total 'costs' to society.

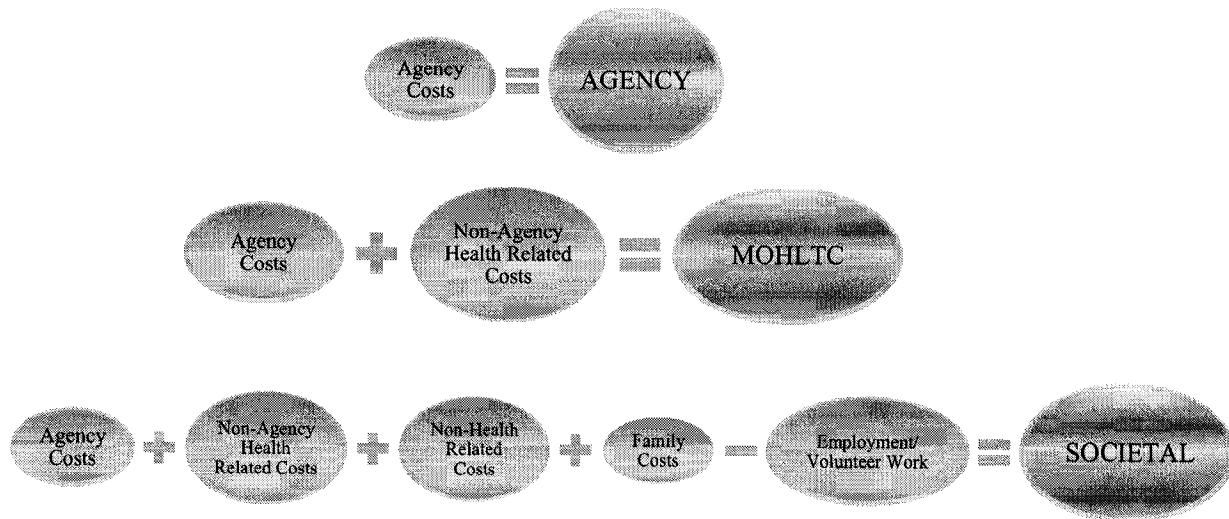


Figure 3. Calculation of the Costs associated with the Agency, Ministry of Health and Long-Term Care (MOHLTC), and Societal Perspectives (adapted from Rosenheck et al., 1997).

Procedure

The larger study from which the current project originates used a repeated measures design. Participants were assessed at baseline (upon assignment to either intensive case management or outreach services), 9 months, 18 months, and 24 months. For the purpose of the present study, 18 month and 24-month data was used. The reasoning behind this decision was two – fold: 1) We were interested in how clients were doing father along in community support treatment, and 2) unlike the first nine months of treatment, by 18 months, clients in the standard care condition were no longer receiving case management services and thus their agency-related costs could be assumed to be lower than the clients in the intensive case management group. Thus we were interested in the cost-effectiveness of ICM over standard care once clients are beyond the ‘start-up’ phase of community support in which there are likely to be fewer cost-related differences between ICM and standard care (as standard care clients receive outreach services that provide similar services to ICM in the first 8-10 months treatment). Choosing to investigate the last six months of the two – year trial was also an artifact of available data, as no costing data was collected between 9 and 18 months. The 9 month data was investigated by Blouin et al. (2004). Using the 24 month costing data seemed the practical and logical choice, and limiting other variables to the 18 and 24 month data allowed for a close examination of the cost-outcome relationship in the last six months of the 2-year program.

Results

Overall costing variables (agency costs, non-agency health care costs, non-health care costs, family costs, and ‘benefits’) were screened for outliers, normality, and homogeneity of variance according to Tabachnick and Fidell (2006). All costing variables were minimally to moderately positively skewed, and so transformations of square root and log were used where needed when using the variables in t-test comparisons. One variable showed extreme outliers and

so the top three outliers from societal ‘benefits’ were replaced with the next highest value (Tabachnick & Fidell, 2006). Missing values analysis was carried out using EM (expectation-maximization) estimation. The MVA analysis was used to examine patterns between variables that occurred more than 1% of the time in the dataset. Table 3 shows the costing components involved in determining costs from the perspective of the agency, the MOHLTC, and society. This included societal ‘benefits’ in the form of either paid or volunteer work for both groups. It should be noted that only twelve clients in ICM and six in standard care had a ‘benefit’ value greater than zero. In ICM, eight clients were working for pay and seven were volunteering; in standard care, four clients were working for pay and two were volunteering. Of additional note is that no participant in our study reported any subsidized educational support for additional work-related training.

Descriptive Statistics

Descriptive analyses revealed that 50.0% of the ICM sample was male, while 51.4% of the standard care sample was male. Within the ICM group, 100.0% of the sample was stably housed at 18 and 24 months respectively. In contrast, within the standard care group, 83.8% and 89.2% of the sample were stably housed at 18 and 24 months respectively. With respect to medication adherence, within the ICM group, 65.0% and 80.0% were adherent to medication regimens at 18 and 24 months respectively. Within the standard care group, 73.4% and 78.4% were adherent at 18 and 24 months respectively. Table 4 depicts the means and standard deviations for each treatment group on age, the Symptom Distress Scale (measuring symptomatology) and the Multnomah Community Ability Scale (measuring community ability). There were no significant differences between groups on any of the continuous variables depicted in Table 4.

Table 3

Per-client Descriptive Statistics on Costing Components of the Ministry of Health and Long-Term Care (MOHLTC) and Societal Costing Perspectives for the Last Six Months (18-24 Months)

Costing Variable/Perspective	ICM (n=40)		SC (n=37)	
	Mean	SD	Mean	SD
Agency Costs	1865.18	1061.55	380.35	866.57
AGENCY PERSPECTIVE	1865.18	1061.55	380.35	866.57
Non-Agency Health Care Costs	4299.73	7887.45	7538.80	12139.17
MOHLTC PERSPECTIVE	6164.91	8050.93	7919.15	12248.33
Non-Health Care Costs	3552.10	2515.89	3956.77	4731.43
Family/Friend Costs	14.64	58.63	32.41	116.76
Employment/Volunteer Benefits ^a	493.48	1043.10	218.36	729.58
SOCIETAL PERSPECTIVE	9,238.17	8851.85	11,689.98	14,340.99

Note. MOHLTC PERSPECTIVE was calculated by adding the agency costs and non-agency health care costs.

SOCIETAL PERSPECTIVE was calculated by adding AGENCY PERSPECTIVE, MOHLTC PERSPECTIVE, non-health care costs, family/friend costs, and subsequently subtracting employment/ volunteer benefits.

^a These cost estimates are based on an ICM sample size of 12 and a SC sample size of 6. The remaining clients did not work for pay or volunteer during the study.

Table 4

Means, Standard Deviations, and Range for Continuous Variables for ICM and Standard Care Treatment Groups

Variable	ICM (n=40)		SC (n=37)	
	Mean	SD	Mean	SD
Age at baseline (years)	38.80	9.75	41.23	10.52
SDS at 18 months	39.26	15.42	36.14	13.62
SDS at 24 months	35.07	12.97	34.68	14.07
MCAS at 18 months	63.04	9.39	62.31	12.16
MCAS at 24 months	63.00	8.87	61.49	11.70

Note. SDS = Symptom Distress Scale; MCAS = Multnomah Community Ability Scale.

Treatment Costing Comparison Hypotheses

The first three hypotheses were concerned with comparing costs from the perspective of the agency, the MOHLTC, and society overall. We did find that, from the perspective of the agency, ICM cost significantly more than standard care treatment in our sample, $t(75) = -6.69$, $p < .001$). However, the two treatment conditions did not differ significantly in the costs covered by the Ministry of Health and Long-Term Care, or in the overall cost from a societal perspective. The non-significant difference between groups from the perspective of the MOHLTC could be partially explained by a difference in hospital costs between groups that approached significance, showing that hospital costs (hospital stays plus doctors visit costs) were significantly less in ICM than in standard care, $t(59) = 1.70$, $p = .095$. Despite the average non-agency health care cost being \$3000 higher in the standard care group, this group difference was not significant (potentially because of high variance in this costing component in both groups). To test the limits of this *t-test*, the four highest costs related to non-agency health care costs were replaced with the 5th highest cost in an attempt to increase the power of the comparison (by reducing variability), however the difference was still non-significant. Despite this non-significant group difference, this difference may also have contributed statistically to the non-significant differences from the perspective of the MOHLTC between groups, and helping to offset the significantly higher agency costs in the ICM group. Non-health related costs, family costs, or societal ‘benefits’ were not significantly different between groups. Of interest was an additional (though non-significant) comparison: Clients in ICM showed greater economic ‘benefits’ to society in the form of either paid work or volunteer activities than clients in standard care.

The fourth and fifth set of hypotheses dealt with the cost-effectiveness of ICM over standard care from the perspectives of 1) the Ministry of Health and Long-Term Care, and 2) society overall for our four targeted outcome variables at 24 months. The calculations for the

incremental cost-effectiveness ratios (*ICERs*) for each outcome variable from the Ministry perspective and the overall societal perspective are outlined below. Costs in Canadian dollars are depicted by “Cs”. Outcome variable ‘units’ are depicted by “Es” in the following calculations:

$$(\text{MOHLTC}) \Delta C = \text{ICM} (C) - \text{SC} (C) = 6164.91 - 7919.15 = -1754.24$$

$$(\text{SOCIETY}) \Delta C = \text{ICM} (C) - \text{SC} (C) = 9238.17 - 14340.99 = -5102.82$$

$$\text{MCAS } \Delta E = \text{ICM} (E) - \text{SC} (E) = 63.00 - 61.49 = 1.51$$

$$\text{SDS } \Delta E = \text{ICM} (E) - \text{SC} (E) = 35.07 - 34.68 = 0.39$$

$$\text{Housing Stability } \Delta E = \text{ICM} (E/100) - \text{SC} (E/100) = 100 - 89 = 11$$

$$\text{Medication Adherence } \Delta E = \text{ICM} (E/100) - \text{SC} (E/100) = 80 - 78 = 2$$

ICERs: MOHLTC Perspective:

$$\text{MCAS } \Delta C/\Delta E = -1754.24/1.51 = -1161.7$$

$$\text{SDS } \Delta C/\Delta E = -1754.24/-0.39 = 4498.05^*$$

$$\text{Housing Stability } \Delta C/\Delta E = -1754.24/11 = -159.48$$

$$\text{Medication Adherence } \Delta C/\Delta E = -1754.24/2 = -877.12$$

ICERs: Societal Perspective:

$$\text{MCAS } \Delta C/\Delta E = -5102.82/1.51 = -3379.35$$

$$\text{SDS } \Delta C/\Delta E = -5102.82/-0.39 = 13084.15^*$$

$$\text{Housing Stability } \Delta C/\Delta E = -5102.82/11 = -463.89$$

$$\text{Medication Adherence } \Delta C/\Delta E = -5102.82/2 = -2551.41$$

*Note: These *ICERs* are positive because, on the SDS, the ICM group showed a higher mean score (i.e., worse symptomatology) than the standard care group, although only marginally, and so this calculation can be reduced to a cost-minimization analysis (explained below).

Calculations of the *ICERs* revealed that from both the MOHLTC and societal perspective, and for all four outcome variables, the *ICERs* were negative. Examination of the *ICERs* out of

context are difficult to interpret, as a negative *ICER* can occur because treatment is cost saving and effective (preferable) or because it is more costly and less effective (not preferable).

However, we know that our ICM condition was dominant in all cases. This means that, with the exception of symptomatology (where higher scores reflect poorer functioning), regardless of the chosen costing perspective, the ICM condition was simultaneously less expensive and afforded clients better clinical and housing outcomes.

From the MOHLTC perspective, results showed that it cost \$1161.7 less in ICM than standard care to move a single client one point on the MCAS. With regard to symptomatology, it cost \$4498.5 more in standard care to move a single client one point toward lower levels of symptomatology. Because the difference on the SDS between ICM and standard care was so negligible, it may be possible to conceptualize this cost-effectiveness ratio as part of a cost-minimization analysis, where we would assume that because of the error variability associated with the mean SDS values for ICM and standard care, the difference between groups is essentially zero. In this case, we would simply report on the differences in costs and say that ICM was more cost-effective as it afforded similar outcomes at a cheaper overall cost.

With respect to the costs related to housing stability from the perspective of the MOHLTC, it cost \$159.48 *less* in ICM per additional client moving into stable housing at 24 months. Medication adherence showed similar results, with it costing \$877.12 less in ICM per additional client achieving a medically adherent state.

From the overall societal perspective, results showed that it cost \$3379.5 less in ICM than standard care to move a single client one point on the MCAS toward better community ability. With regard to symptomatology, it cost \$13084.15 more in standard care to move a single client one point toward lower levels of symptomatology. As stated above because the difference on the SDS between ICM and standard care was so negligible (i.e., not even one point on the scale), it

may be possible to conceptualize this cost-effectiveness ratio as part of a cost-minimization analysis, where we would assume that because of the error variability associated with the mean SDS values for ICM and standard care, the difference between groups is essential zero. In this case, we would simply report on the differences in costs and say that ICM was more cost-effective as it afforded similar outcomes at a cheaper overall cost.

With respect to the costs related to housing stability from the perspective of society overall, it cost \$463.89 *less* in ICM per additional client moving into stable housing at 24 months. Medication adherence showed similar results, with it costing \$2551.41 less in ICM per additional client achieving a medically adherent state. While examining these cost-effectiveness ratios can provide some information about the benefits of ICM over standard care, they can be confusing to interpret given the negative value of the ratios. Drummond et al. (2005) cautioned readers against interpreting the ratios given that they do not give any idea of the size or scale of the treatment options. As mentioned above, negative *ICERs* are un-interpretable out of context (Drummond et al., 2005). As well, with respect to symptomatology, the ratio does not indicate how much more money would have to be spent in ICM to afford better (lower) levels of symptomatology for this group. Therefore, we will now use our ratios to determine net monetary benefits and net health benefits associated with the ICM condition.

Net Monetary Benefit

The ICM condition *dominated* the standard care condition on three of the four outcome variables, and from both perspectives of interest. This means that for three outcomes of note (MCAS, housing stability, and medication adherence) we are not left to determine whether our cost-effectiveness ratios are less than what funding bodies would be willing to pay for an increase in treatment effectiveness (e.g., whether $\Delta C/\Delta E < R_T$). In other words, even if the Ministry

decided that they were not willing to pay anything additional for ICM treatment over standard care (i.e., $R_T = 0$), ICM would still be the cost-effective choice.

If we examined the net monetary benefit (*NMB*) associated with a R_T value equal to zero, we can see that our *NMB* calculations would simply become the cost savings (from either perspective) associated with the ICM condition over standard care. From the perspective of the MOHLTC, the calculations would be as follows:

$$NMB \text{ (MCAS)} = R_T \Delta E - \Delta C = (0)(1.51) - (-1754.24) = 1754.24$$

$$NMB \text{ (Housing Stability)} = R_T \Delta E - \Delta C = (0)(11) - (-1754.24) = 1754.24$$

$$NMB \text{ (Medication Adherence)} = R_T \Delta E - \Delta C = (0)(2) - (-1754.24) = 1754.24$$

Thus the net monetary benefit associated with the ICM condition would be \$1754.24 when the maximum willingness to pay for a more effective treatment is equivalent to zero. From the societal perspective, using this same formula, the *NMB* would be \$5102.82. According to the formula, because the *NMB* from both perspectives is greater than zero, we can conclude that ICM is a cost-effective treatment alternative.

Further examination of the *NMB* of ICM with respect to symptomatology shows that if funders set their $R_T = 0$, the formula would still be as follows:

$$NMB \text{ (SDS)} = R_T \Delta E - \Delta C = (0)(-0.39) - (-1754.24) = 1754.24$$

As we can see, the difference in costs between the groups would have been zero, or ICM would have been more expensive than standard care to conclude that ICM is not a cost-effective alternative, despite the slightly better outcomes in the standard care group related to symptoms. With respect to the overall societal perspective, we would have the following formula:

$$NMB \text{ (SDS)} = R_T \Delta E - \Delta C = (0)(-0.39) - (-5102.82) = 5102.82$$

Again, despite the slightly better outcome in standard care, the net monetary benefit for ICM is still over zero, and thus we can conclude that ICM is the more cost-effective alternative. We

would only not be able to make this conclusion if the standard care group costs dropped by \$5102.82, resulting in no cost differences between groups, and a $NMB = 0$.

As one can see from the calculations of $NMBs$, if the ‘value’ of the difference seen between treatments was increased ($R_T > 0$), the net monetary benefit would increase. For example, if society overall were to ‘value’ one person achieving stable housing in ICM treatment at \$500, our NMB would be

$$NMB (\text{Housing Stability}) = R_T \Delta E - \Delta C = (500)(11) - (-5102.82) = \$10,602.82$$

This means that if society were willing to pay \$500 per person who achieved stable housing, the cost savings to society relative to standard care would be \$10,602.82. These formulas can also be calculated using percentages, such that society may value an 11% superior outcome in ICM at \$500, making the NMB the following:

$$NMB (\text{Housing Stability}) = R_T \Delta E - \Delta C = (500)(.11) - (-1754.24) = \$5,157.82$$

Either way, it is clear that as a funding body ‘values’ the difference in treatment groups at increasing monetary values, the net monetary benefit of ICM as compared to standard care increases.

Net Health Benefit

The net health benefit can also be calculated from our two costing perspectives if R_T is assigned a value greater than zero, due to the impossibility of division by zero according to the formula

$$NHB = \Delta E - (\Delta C / R_T)$$

In this case, from the perspective of the MOHLTC, and assigning R_T equal to 1 dollar, the calculations would be as follows:

$$NHB (\text{MCAS}) = \Delta E - (\Delta C / R_T) = 1.51 - (-1754.24/1) = 1755.74$$

$$NHB (\text{SDS}) = \Delta E - (\Delta C / R_T) = -0.38 - (-1754.24/1) = 1753.86$$

$$NHB \text{ (Housing Stability)} = \Delta E - (\Delta C / R_T) = 11 - (-1754.24/1) = 1765.24$$

$$NHB \text{ (Medication Adherence)} = \Delta E - (\Delta C / R_T) = 2 - (-1754.24/1) = 1756.24$$

From the perspective of society overall, and assigning R_T equal to 1 dollar again, the calculations would be as follows:

$$NHB \text{ (MCAS)} = \Delta E - (\Delta C / R_T) = 1.51 - (-5102.82/1) = 5104.33$$

$$NHB \text{ (SDS)} = \Delta E - (\Delta C / R_T) = -0.38 - (-5102.82/1) = 5102.44$$

$$NHB \text{ (Housing Stability)} = \Delta E - (\Delta C / R_T) = 11 - (-5102.82/1) = 5113.82$$

$$NHB \text{ (Medication Adherence)} = \Delta E - (\Delta C / R_T) = 2 - (-5102.82/1) = 5104.82$$

It is clear that for more effective treatments that are also more expensive, unlike our situation with ICM versus standard care; the treatment would only be deemed cost-effective if the funding body was willing to pay more than the cost difference between treatments. However, in our case, even if the MOHLTC or society was only willing to pay one dollar for another unit of change in an outcome (e.g., 11 more people reaching stable housing, 2 more people becoming medically adherent, etc.), ICM would still be a more cost-effective alternative than standard care, as our NHB value is greater than zero even with this insignificant value of R_T . Again, examining the symptomatology outcome more closely, ICM would be still be more cost-effective even if the mean SDS score for ICM dropped to 15 (the lowest possible mean value possible on the SDS) and the standard care mean rose to 75 (the highest possible mean value). In this hypothetical case ($\Delta E = 60$), the ΔE would still not be large enough to counteract the large cost difference.

In summary, from both the perspective of the MOHLTC and society overall, the net monetary benefit of ICM over standard care in a situation where decision-makers set a threshold willingness to pay of zero dollars, is still a significant amount of money: \$1756.24 from the perspective of the MOHLTC and \$5102.82 from the perspective of society overall. Our net health benefits from both perspectives, where decision-makers set a threshold willingness to pay of 1

dollar, are almost identical in value than our *NMB*. Thus, we can say that ICM is a more cost-effective alternative to standard care on four important variables related to the clinical and housing needs of community support programs.

Uncertainty Analyses using Nonparametric Bootstrapping

Due to the inherent uncertainty in cost estimates, nonparametric bootstrapping was performed for both costing perspectives for a chosen outcome variable (housing stability). Housing stability was chosen as it gave the largest net monetary benefit/net health benefit. Uncertainty analyses are not typically performed on all outcome variables due to redundancy (Drummond et al., 2003).

In our case, for housing stability, 1000 bootstrap samples were drawn simultaneously for each treatment group (ICM and standard care) and the average cost for the bootstrap sample and the percentage of the sample with unstable housing was calculated. For each pair of 1000 samples, a net monetary benefit was calculated comparing the two treatment groups on costs and housing stability. The purpose of the initial bootstrapping was to calculate the probability of ICM being cost-effective ($NMB > 0$) over standard care when examining housing stability taking all 1000 samples into account.

From the costing perspective of the MOHLTC, our initial probability of ICM being cost-effective over standard care when examining the bootstrapped estimates of *NMBs* was 0.77. This means that there is a 77% chance that ICM will be cost-effective over standard care when our threshold maximum willingness to pay is set at zero.

From the costing perspective of society overall, our initial probability of ICM being cost-effective over standard care when examining new bootstrapped estimates of *NMBs* was 0.80. This means that there is a 80% chance that ICM will be cost-effective over standard care when our threshold maximum willingness to pay is set at zero. The next section will provide results

examining the artificial manipulate this threshold maximum willingness to pay ('acceptability curves').

Costing Acceptability Curves

As mentioned above, the initial bootstrap estimates of *NMBs* were based on a threshold willingness to pay (R_T) of zero dollars. Even in this case, we found a 0.77 probability that ICM is cost-effective over standard care. How would our probability of cost-effectiveness change if we were willing to pay incrementally increasing \$100 dollar units for an extra 10% increase in effectiveness of ICM over standard care in housing stability? The value of '10%' was chosen as it was roughly equivalent to the difference in outcomes in housing stability between ICM and standard care at 24 months (11 more clients were stably housed out of 100 in ICM). The increments are typically chosen to represent the difference in effectiveness between treatment groups (O'Brien & Briggs, 2002). To investigate this question, we first multiplied the difference in effectiveness (ΔE) for each corresponding bootstrapped sample estimate by .10 (for the 10% increase in the difference in effectiveness between ICM and standard care). Next, we calculated *NMBs* for each of the 1000 bootstrap sample dyads using the new value of ΔE under increasing R_T estimates (dollar values equivalent to 100, 200, 300, 400, 500, 600, 700, 800, 900, and 1000).

As an illustration, a bootstrap estimate (from the MOHLTC perspective) for ΔE could be -0.189 (corresponding to an 18% better outcome in housing stability for ICM over standard care), and the corresponding ΔC could be equal to -6719.64. As explained, the ΔE estimate is first multiplied by -0.10, indicating that we wish for ICM to increase in effectiveness by another 10%. In this case, our new ΔE would equal 1.89. The following *NMBs* could be calculated using incremental R_T values of 100 dollars:

$$NMB (HS) = R_T \Delta E - \Delta C = (100)(1.89) - (-6719.64) = 6908.83$$

$$NMB (HS) = R_T \Delta E - \Delta C = (200)(1.89) - (-6719.64) = 7098.02$$

$$NMB (HS) = R_T \Delta E - \Delta C = (300)(1.89) - (-6719.64) = 7287.21$$

$$NMB (HS) = R_T \Delta E - \Delta C = (400)(1.89) - (-6719.64) = 7476.40$$

$$NMB (HS) = R_T \Delta E - \Delta C = (500)(1.89) - (-6719.64) = 7665.59$$

$$NMB (HS) = R_T \Delta E - \Delta C = (600)(1.89) - (-6719.64) = 7854.78$$

$$NMB (HS) = R_T \Delta E - \Delta C = (700)(1.89) - (-6719.64) = 8043.97$$

$$NMB (HS) = R_T \Delta E - \Delta C = (800)(1.89) - (-6719.64) = 8233.16$$

$$NMB (HS) = R_T \Delta E - \Delta C = (900)(1.89) - (-6719.64) = 8422.84$$

$$NMB (HS) = R_T \Delta E - \Delta C = (1000)(1.89) - (-6719.64) = 8611.53$$

This process would be repeated 1000 times, and for each incremental R_T value, an overall probability of $NMB > 0$ could be calculated taking all 1000 estimates into consideration. This probability increases as our value of R_T increases (O'Brien & Briggs, 2002). These probabilities can be plotted and an 'acceptability curve' will show the slope of the probability of ICM being cost-effective over standard care as our threshold maximum willingness to pay for a 10% increase in effectiveness increases.

From the perspective of the MOHLTC, we found the following probabilities associated with the incremental increases in R_T .

R_T	Probability Estimate
0	.770
100	.785
200	.796
300	.816
400	.830
500	.842
600	.850
700	.859
800	.868
900	.874
1000	.885

Figure 4 shows the plotted probability estimates from the perspective of the MOHLTC.

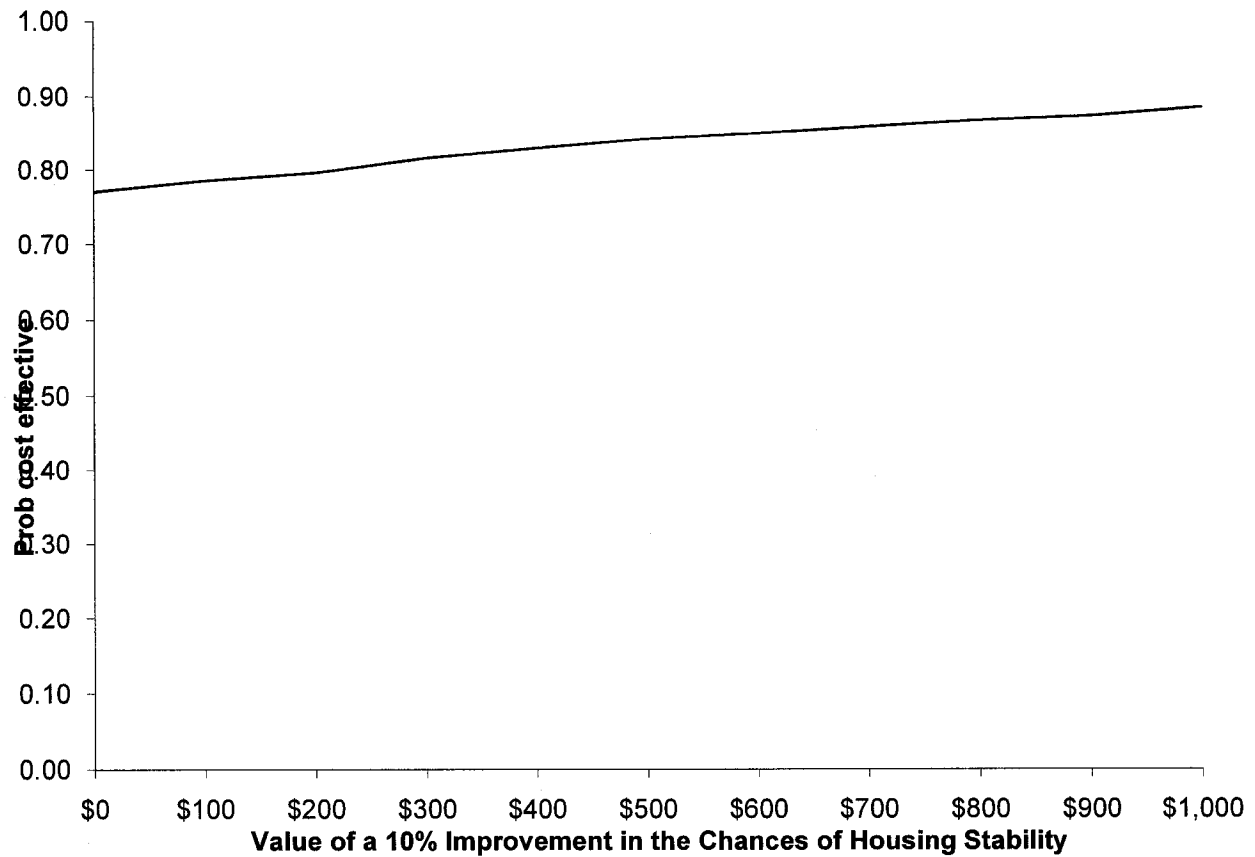


Figure 4. The Probability of finding ICM Cost-effective over Standard Care for Incremental R_T Values Associated with a 10% Increase in the Effectiveness of ICM (Ministry of Health and Long – Term Care Costing Perspective).

As Figure 4 shows, even with quite large increases in R_T values, our probability of ICM being cost-effective does not increase exponentially. This can be explained in part by the fact that our ICM treatment condition was already cost dominant before performing uncertainty analyses. Nevertheless, this exercise shows that with every increase in \$100 ‘value’ ascribed to a 10% increase in ICM’s effectiveness, the chances of ICM being cost-effective increase by roughly 1.20%.

From the perspective of society overall, we found the following probabilities associated with the incremental increases in R_T .

R_T	Probability Estimate
0	.800
100	.808
200	.816
300	.827
400	.839
500	.844
600	.852
700	.860
800	.873
900	.881
1000	.886

Figure 5 shows the plotted probability estimates from the perspective of society overall.

As with the Ministry perspective, Figure 5 shows again that, from the perspective of societal overall, even with quite large increases in R_T values, our probability of ICM being cost-effective does not increase exponentially. Again, this is because ICM was cost dominant initially. Nevertheless, this exercise shows that with every increase in \$100 ‘value’ ascribed to a 10% increase in ICM’s effectiveness, the chances of ICM being cost-effective from the perspective of society increase by roughly 0.86%. This increase in the probability of ICM being cost-effective is slightly lower from the perspective of society than from the perspective of the ministry. Nevertheless, if society overall was willing to invest more dollars into ICM treatment, we could

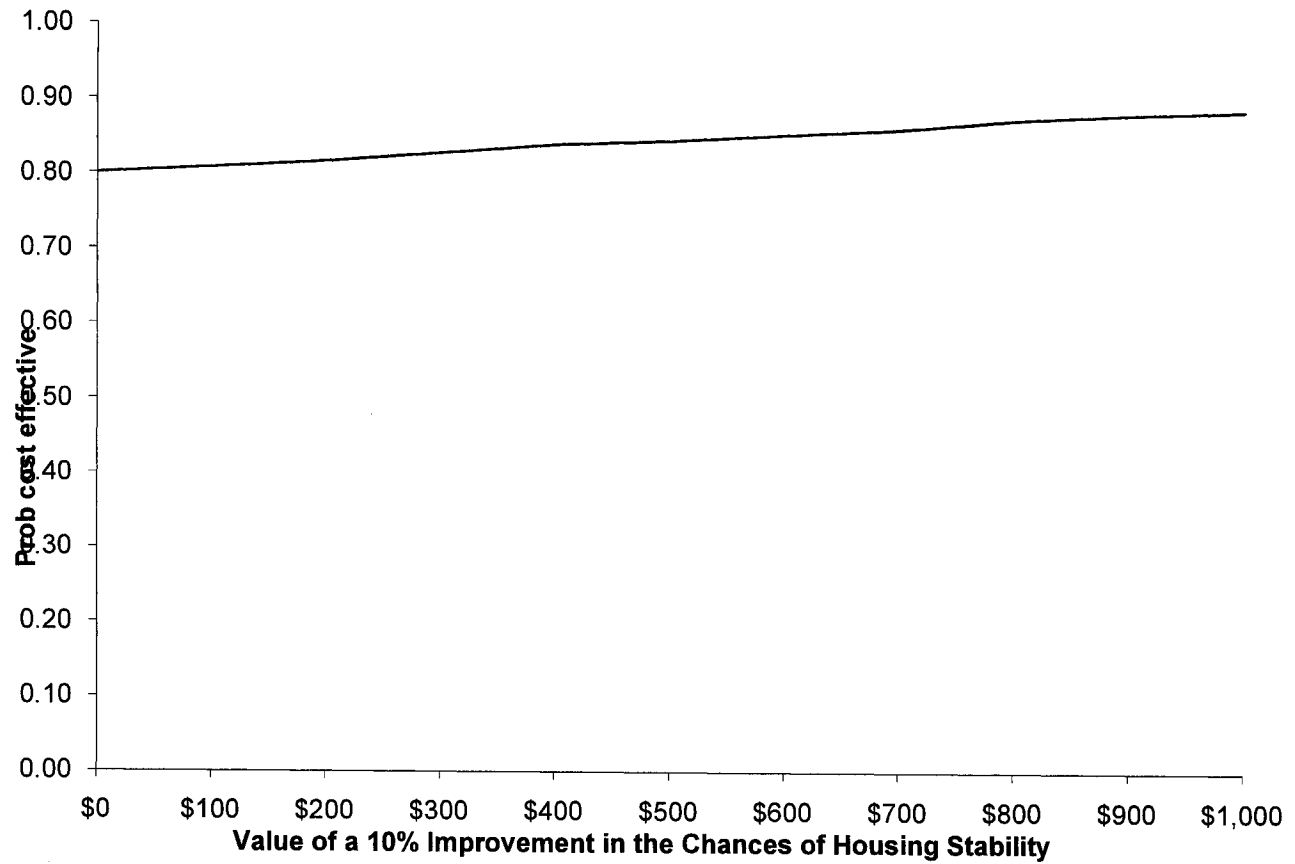


Figure 5. The Probability of finding ICM Cost-effective over Standard Care for Incremental R_T Values Associated with a 10% Increase in the Effectiveness of ICM (Societal Costing Perspective).

expect the probability of the treatment being cost-effective to increase as a factor of the increase of R_T .

Discussion

Our study is the first within a Canadian context to investigate the cost-effectiveness of intensive case management over standard care using the comprehensive costing methodology first described by Knapp and Beecham (1990). It is also the first in a Canadian context to investigate cost-effectiveness from more than one costing ‘perspective’ (agency, government, and society), and the first to employ uncertainty analyses when dealing with costing estimates. Despite previous research linking more “intensive” services with greater overall costs, we found that from both the perspective of the MOHLTC and society overall, intensive case management was no more expensive than standard care. This was even the case despite the robust finding that costs associated with direct service provision of case management services was significantly higher in ICM than standard care (i.e., agency costs were 2.5 times higher in ICM than standard care).

How, then, can we explain the non-significant differences in costs from both the perspective of the MOHLTC and society between groups? Additional analyses showed that hospital costs and overall non-agency health care costs were quite a bit lower in ICM than standard care, making up in a financial way for the increased direct service costs. Of additional importance was the finding that twice as many clients in ICM were either working or volunteering than in standard care, increasing the ‘benefit’ to society in the ICM group in comparison to standard care. In summary, even though more money was being spent on direct case management treatment in ICM, clients in this group had fewer costs associated with non-agency health care (i.e., primarily hospital use), and also showed a much larger propensity

towards paid employment or “giving back” indirectly to society in the form of paid or volunteer work.

Our finding that ICM clients had fewer costs associated with hospital treatment is in line with previous research that has linked ICM with fewer hospital bed days, when compared to controls (Bush et al., 1990; Macias et al., 1998). This strengthens this theoretical relationship given that Bush et al. (1990) did not use matched controls when comparing groups. Additional research has found no relationship between intensive case management and fewer hospital stays relative to standard care, although this may be due to the type of comparison group used (Rossler et al., 1995), the use of untrained staff (Jerrell & Hu, 1989) and the use of retrospective data collection methods (Patterson & Lee, 1998). Our finding is particularly important in light of recent research citing hospital inpatient stays as the most costly expenditure in the mental health system (Block et al., 2005).

While previous research has documented fewer hospital costs associated with more intensive community treatment, these findings have been made particularly in reference to Assertive Community Treatment (e.g., Weisbrod, Test, & Stein, 1980; Wolff et al., 1987; Lehmann, 1999) or to ICM without the context of comprehensive costing (Dickstein, Hanig, & Grosskopf, 1988; Bond et al., 1990; Johnson et al., 1998). To date, no study has linked employment or volunteer work as a potential reason that one would find non-significance between an intensive form of community support and standard care in terms of overall costs. This could also help explain non-significant cost differences between ICM and less intensive treatments despite better outcomes in ICM (e.g., Wolff et al.), if we assume that employment and volunteer options afford one greater community ability and life satisfaction over time. For a target population that has historically suffered much adversity and discrimination, this is a much anticipated and exciting result of our study. Other research has shown the benefits of volunteering

for clients with disabilities, despite the opportunities being limited (e.g., Young & Passmore, 2007).

With regard to the cost-effectiveness of intensive case management over standard care, we examined four outcome variables: housing stability, medication adherence, community ability, and symptomatology. Results showed that from both perspectives, ICM was less costly in aiding individuals towards stable housing and a medically adherent state. ICM was not found to be clinically effective in aiding individuals toward better community ability or symptom management. The findings related to housing stability and medication adherence are especially important, as we know that both variables are crucial to secure in thwarting the ubiquitous cycle of homelessness and relapse into mental illness (Corrigan et al., 2008). Research has shown that the “housing first” approach secures individuals and allows them to flourish in other areas, such as community ability and participation (e.g., Martinez & Burt, 2006). Thus, having an intensive program that succeeds in helping individuals achieve both secure housing and a medically adherent state sets them up well for contributing back to society.

We calculated the cost-effectiveness from a monetary value for ICM in three ways, from both costing perspectives, and for all four outcome variables. The three calculations were incremental cost-effectiveness ratios (*ICERs*), net monetary benefits (*NMBs*), and net health benefits (*NHBs*).

ICERs: The Perspective of the Ministry of Health and Long-Term Care

From the perspective of the MOHLTC, we found that it cost, on average, \$159.48 *less per person achieving stable housing* in ICM than standard care in a six month period. This means that if we compare ICM and standard care, it costs the MOHLTC \$159.48 less in ICM to secure one person in stable housing in the last six months of the two year trial. It also cost, on average, \$877.12 *less per person achieving a medically adherent state* in ICM than standard care in a six

month period. This means that it costs the MOHLTC roughly \$877.12 less in ICM than standard care to secure one client in a medically adherent state in the last six months of the trial. We also found that, on average, it cost the MOHLTC \$1161.7 *less per person* to move up one point on the measure of community ability (MCAS; where higher scores are better) and \$4498.05 *more* to move one person down a point on a measure of self-reported symptomatology (SDS; lower scores are better). When the outcome variables differ by so little between groups (as was the case for community ability and symptomatology), Drummond et al. (2004) recommends that the ICER be reduced to a cost-minimization analysis, where only costs are taken into account. In this case, ICM would still be cost-effective despite not producing better community ability or a lowered symptom profile due to ICM's reduced cost from the perspective of the MOHLTC (\$1754.24 cheaper in ICM from this costing perspective).

ICERs: The Perspective of Society Overall

From the perspective of society overall, results were very similar to what we reported for the Ministry perspective, although overall we found more cost savings from the perspective of society than the MOHLTC. This makes intuitive sense given the finding that twice as many clients in ICM were able to 'give back' to society in the form of work or volunteer work, and these 'benefits' were only included in the societal perspective.

In this case, we found that it cost, on average, \$463.89 *less per person achieving stable housing* in ICM than standard care in a six month period. This means that if we compare ICM and standard care, it costs the MOHLTC \$463.89 less in ICM to secure one person in stable housing in the last six months of the two year trial. It also cost, on average, \$2551.41 *less per person achieving a medically adherent state* in ICM than standard care in a six month period. This means that it costs the MOHLTC roughly \$2551.41 less in ICM than standard care to secure one client in a medically adherent state in the last six months of the trial. From the societal

perspective, we also found that, on average, it cost \$3379.35 *less per person* to move up one point on the measure of community ability (MCAS; where higher scores are better) and \$13,084.15 *more* to move one person down a point on a measure of self-reported symptomatology (SDS; lower scores are better). As mentioned above, when the outcome variables differ by so little between groups (as was the case for community ability and symptomatology), *ICERs* are much less meaningful (Drummond et al., 2004). When reduced to a cost-minimization analysis, ICM would still be cost-effective despite not producing better community ability or a lowered symptom profile due to ICM's reduced cost from the perspective of society overall (\$5102.82 cheaper in ICM from this costing perspective).

From both the perspectives of the MOHLTC and society overall, we found that for all four outcome variables, ICM was cost-effective over standard care. ICM was especially strong when it came to housing stability and medication adherence, showing both reduced costs and better outcomes. This is good news, given the dearth of research showing ICM to be effective in increasing clients' medication regimen adherence when compared with other treatments (e.g., Bond et al. 1990; Modrcin, Rapp, & Poertern, 1998; Ford et al., 1997) or less intensive case management (e.g., Franklin et al., 1989; Johnston et al., 1998).

Previous research (i.e., Johnson et al., 1998) has shown a positive incremental cost-effectiveness ratio when comparing ICM to regular case management on 12-month clinical outcomes. We only found one positive *ICER* from both costing perspectives (symptomatology), although this *ICER* was not particularly meaningful given the miniscule differences on the MCAs between groups at 24 months. Our negative *ICERs* differ from previous research, and this could be due to a variety of reasons: a) We used different clinical outcomes, two of which showed significant differences between groups at 24 months, b) we assessed costs later in the treatment life of clients (the last six months versus Johnston's study which assessed the first 12), and c) we

employed a more comprehensive costing methodology, and, as mentioned above, included the costs paid back to society in the form of employment or volunteer work. Had we only included agency costs or non-health care costs in these analyses, we would have also had overall positive incremental cost-effectiveness ratios from both costing perspectives. This highlights the importance of costing research including the “payback” to society in the form of employment/volunteer opportunities in getting a clearer picture of global costs and the benefits of treatment. It could be that the first 12 months is not long enough to really see differences between the two groups in these areas, and thus not long enough to see the cost-payoffs to ICM over the long-term. It is also noteworthy that twice as many clients in the ICM group were working or volunteering, despite no differences between groups in educational support for further work-related training.

One recent study has examined the three-year associated costs of case management using comprehensive costing from the societal perspective (i.e., taking employment ‘benefits’ into consideration) with a sample of homeless mentally ill veterans in the US (Rosenheck et al., 2003). The authors examined both health and housing outcomes and reported positive incremental cost-effectiveness ratios associated with case management treatment. In fact, the authors found negligible differences between the case management group and the standard care group on measures of symptomatology, social networks, and number of days homeless in a ninety day period. Further examination of the documented costs associated with the case management treatment in Rosenheck et al.’s study revealed that the case managed group had only 10 more visits on average with a case manager per year than the standard care group, and overall had fewer than 20 visits per year. The relatively infrequent contact with case managers could help explain the negligible differences between the groups on the housing and health indicators. In fact, the only group in this study that showed improved housing outcomes was a third group of

veterans receiving both case management and housing vouchers (Rosenheck et al., 2003). As well, the number of veterans in the case management group was only half of those in the standard care group. These factors help explain why our results diverged from Rosenheck et al. (2003); in essence, we are dealing with an very different model of care in terms of case management. Unfortunately, no other documented research has examined these costs in a clinical trial where a comparable arm of ICM treatment was used.

Net Monetary and Net Health Benefits

Due to the economically *dominant* nature of ICM in our study, ICERs have limited interpretive value (Drummond et al., 2003; O'Brien & Briggs, 2002). This is because the monetary value associated with the ratio increases as ICM is less effective. This becomes hard to interpret when we have negative incremental cost-effectiveness ratios, as in essence we are reporting on cost savings that mathematically reduce as ICM becomes more effective. Due to the interpretative limitations of *ICERs* in our study, net monetary and net health benefits were calculated for ICM treatment over standard care for all four outcome variables, and from both costing perspectives. Overall, we found that even when the MOHLTC or society was not willing to invest any more money into ICM treatment, the net monetary benefit of a client being involved in ICM was simply the difference in overall costs between the two groups: \$1754.24 (MOHLTC) and \$5102.82 (society). In a sense, these calculations are equivalent to a cost-minimization analysis; when the threshold willingness to pay is zero, it cancels out any effectiveness differences between the groups. Because our net monetary benefits were above zero, we can conclude that ICM is cost-effective over standard care (Drummond et al., 2004).

When the maximum willingness to pay was set at \$1.00 for the calculation of net health benefits (\$0 is impossible to use due to the required division), we found that the monetary equivalent associated with an ICM – related health benefit ranged from \$1753.86 to \$1765.24

(MOHLTC) and \$5102.44 to \$511.82 (society). The net health benefit increases in monetary value as ICM is more clinically effective in producing desired outcomes. The net health benefit is beneficial to examine as even in the case of symptomatology (where clients were slightly 'better' in standard care), there is still a huge net health benefit to being involved in ICM due to the reduction in associated costs in ICM.

Uncertainty Analyses

One of our initial research questions was how sure we could be that our finding that ICM is cost-effective is reflective of the general population, primarily due to the inherent uncertainty and variability associated with costing estimates. To deal with the problem, we used nonparametric bootstrapping on our own data to investigate the probability of ICM being cost-effective over standard care when 1000 random samples were generated and net monetary benefits were used as the calculation of interest. We ran this uncertainty analysis on housing stability only, as it had a significant difference between groups in outcome at 24 months, and therefore the variable for which our analyses would produce the most meaningful results. Overall, we found that the probability of ICM being cost-effective (*NMB*) was 0.77 from the perspective of the MOHLTC and .80 from the perspective of society. This means that there is a 77% and 80% chance that the housing benefits associated with ICM treatment will equal the costs of ICM in 1000 re-sampled estimates (Rosenheck et al., 2003).

Due to the dominant nature of the ICM intervention on three out of four outcome variables (i.e., ICM is both cheaper and more effective), there is not an inherent need to investigate whether increasing the maximum willingness to pay will increase the probability of ICM being cost-effective. However, out of interest's sake, we investigated whether increasing the maximum willingness to pay would increase the probability of ICM being cost-effective. In essence, we assigned a range of 'values' to a 10% increase in the difference in housing stability

between ICM and standard care. Ten percent was chosen as it was already roughly the difference between ICM and standard care at 24 months (Doug Coyle, personal communication). Choosing 10% meant that we would be examining the probability of ICM being cost-effective over standard care when *another* 10% difference was valued at 100-dollar values ranging from \$100-\$1000. Rosenheck et al. (2003) found that when they ascribed a \$75 ‘value’ to one more *day* of housing for clients in ICM, there was a .80 probability that ICM would be cost-effective over standard care. However, in their case, ICM was simultaneously *more* expensive and more effective, unlike our finding of a dominant cost-effectiveness for ICM.

When we ascribed a range of ‘values’ to securing this additional 10% difference (in favour of ICM), we found that from both costing perspectives, the probability of ICM being cost-effective increased as a function of increasing the maximum willingness to pay (the ‘values’ ascribed to the 10% difference). While traditionally, this analysis helps funders make decisions about the amount of money they need to invest in a problem to see an equal cost-benefit ratio, in our case it was simply an exercise to show that as more money is spent on ICM, the probability of it increasing in cost-effectiveness is clear. From the perspective of the MOHLTC, when an additional 10% difference in housing stability was valued at \$1000, the probability increased from 0.77 to .89, equaling a 12% increase. From the perspective of society overall, the probability increased from .80 to .88, an increase of 8%. It is impossible to compare these results with previous research, as these analyses have not been performed using *NMBs* in a Canadian context from two differing costing perspectives. Hopefully this will spurn additional research in this area.

Overall, our results revealed that ICM was a dominant intervention over standard care. It produced large net monetary and net health benefits as compared to standard care, and even in the situation where the MOHLTC or society was willing to invest zero additional dollars into the

intervention, ICM is still cost-effective as a treatment alternative to standard care roughly 77-80% of the time. This being said, as a funding body is willing to invest additional dollars into ICM treatment (say, \$1000 per person), the probability of ICM being cost-effective would rise (in this case to almost 89%).

Costing Estimates as they relate to Previous Research

It is important to note that our overall six month societal cost for ICM treatment (\$9,238.17) is comparable with what has been documented in the costing literature on individuals with mental health and housing difficulties. Knapp et al. (2002) found an annual cost per patient with schizophrenia to be supported in the community totaled £5038, roughly equaling \$5,250 Canadian per six month period. The discrepancy in costs between our costing estimate and Knapp et al.'s could be attributed to the fact that in their research, they were looking at 5 different geographical locations and documented large discrepancies in costs by area. It could also be that our population was more high-need in terms of housing issues. Our costing results seem roughly equivalent with those of Wolff et al. (1997), who found that it cost the equivalent of \$26,193.00 Canadian (the study was conducted in the USA) to support an individual in ACT for a 1 year period (\$13,096.5 for a six month period), and 8% of the total global costs were attributable to the direct services of ACT. Although our costing estimate was lower (and potentially explainable by the fact that we were examining cost estimates 18 months into treatment, unlike Wolff et al.), we found that 20% of total societal costs were attributable to the direct services of ICM. Our proportion of agency-related costs could be higher than Wolff's estimate in that by 18 months, clients may not be using additional services to the same extent as in the first year of treatment, and also we subtracted 'benefits' to society from the total costs, artificially inflating the proportion attributable to the direct services of ICM.

Our estimates of health care usage for ICM over the six month period are also comparable to American estimates of medical and psychiatric health care costs for VA patients in the first year of receiving outreach services (Rosenheck et al., 1993). Rosenheck's estimate of \$7,269US/client for the first year of outreach services is quite a bit higher than both our estimate of ICM treatment (\$3730.36CND/client/year) and standard care (\$760.70CND/client/year). This being said, the comparison lacks interpretive value as the services were quite different, and our clients had already been receiving community support for 18 months. Our estimates are also comparable to additional research examining case management services (though not 'intensive') in a similar sample of veterans, where documented total societal costs were estimated at \$14,805/client/year in case management and \$13,638.67/client/year in standard care (i.e., no case management; Rosenheck et al., 2003). These reported estimates are likely higher than our estimates due to averaging the total three-year costs for clients (from entry into the program). The standard care costing estimates are also likely higher due to these clients receiving very little community support even from the outset, unlike our sample of standard care clients who received outreach services for at least nine months.

Our results also seem congruent with an American study of 5000 individuals followed longitudinally as they entered a supportive housing program (Culhane, 2002). As a group of homeless individuals, they had cost the system roughly \$40,500/client/year. Once they were housed, this yearly figure dropped to \$16,282. Our yearly societal costs/client in ICM of \$18,476.34 is very similar to Culhane's estimate. Our figure was drastically reduced from the average cost to serve a homeless client in the community (Culhane, 2002).

Intensive case management has shown itself in our study to be a cost-effective alternative to standard care, and, despite having higher agency costs than standard care, the cost offsets to society in terms of reduced hospital costs and client volunteer work suggest a benefit to

continued investment in ICM as a treatment of choice for the homeless mentally ill in Canada. It was shown to be cost-effective in nonparametric uncertainty analyses (bootstrapping) 77-80% of the time.

Limitations and Future Research

Limitations to the current study include a 38% client attrition rate, resulting in a relatively small sample size. This being said, tracking such a vulnerable population is extremely challenging, and therefore a substantial attrition rate is to be expected. A second limitation of the study is the dichotomous nature of the medication adherence measure, limiting the conclusions that can be inferred about more fine grained changes in medication adherence. A third (and related) limitation is the use of a clinician rating scale for medication adherence based on clients' report and presentation, especially given the common over-reporting of medication use. It could be that clients are reporting taking their medication when in fact, they are not, and unless they develop many more (observable) symptoms to their case worker, it is difficult to know how accurate these self-reports are. Future research would do well to begin with a larger sample size to allow for client attrition and the avoidance of resulting limited statistical power.

Perhaps the biggest limitation of the cost-effectiveness analyses was the fact that we only had cost estimates for the last six months of the two year trial. In essence, we are then limited in our generalizations of cost-effectiveness of ICM to those clients who have been receiving treatment for 18 months, and comparing these clients to those who have received short term outreach services but who are not receiving these services anymore. Future research would do well to investigate these same questions with complete costing data from baseline to 24 months, especially given the documented reduction in overall costs as treatment progresses (e.g., Blouin et al., 2004).

OVERALL DISCUSSION

There is very little empirical literature citing *comprehensive costing* of case management services, especially ICM. Taken together, our two studies demonstrate value-added findings to the fields of both case management and comprehensive costing research. Additionally, this research expands upon the earlier work of Blouin, Aubry, and Angus (2004) in establishing the needs-costs-outcomes relationship for a time period later in case management treatment history. It is also the first in Canada to compare the cost-effectiveness of ICM and shorter-term outreach services followed by standard care when individuals in the standard care group are no longer receiving any case management intervention.

Taken together, our two studies document the results from a randomized matched controlled trial of ICM versus standard care for individuals with a history of homelessness and severe mental illness. We attempted to show, firstly, what particular housing and health needs of clients are related to increased costs from the perspective of society overall, and subsequently, how costs may predict six-month outcomes. We subsequently investigated the six month cost-effectiveness of ICM over standard care on housing and health variables. Our research is value-added to the knowledge base of ICM research as well as to the literature on cost-effectiveness of community mental health services, as our study applies the principles of economic research on an under-researched population.

While some pioneering work on ACT showed it to be a cost-effective alternative to hospital treatment, cost-effectiveness analyses have typically been limited to medical interventions with strict protocols and complicated economic analyses (with the exception of Rosenheck et al., 2003). With the political climate shifting toward one of more fiscal accountability, mental health agencies that deliver community-based services are faced with the monumental task of showing that services are cost-effective relative to traditional hospital-based

services. It is important to be able to show potential funding bodies that a) the costs of services delivered are related to the needs of the clients, that b) greater costs expended on clients produce better outcomes.

Evidence in support of these claims also needs to use comprehensive costing methods, as past research has primarily included direct service costs. Knapp and Beecham (1990) have shown that one must include both direct and indirect costs when looking at the total “global package” of care spent on one client. This means that total global costs include direct agency costs, costs to client, costs to family, and costs to society (e.g., medications, physicians, governmental support, hospital stays, etc.), as well as the subtraction of any contributions that clients make to society in the form of employment or volunteer work. Additional work within the field of mental health and case management has examined costs in several helpful categories: agency, non-agency health care, non-health care, family, and ‘benefits’ to society in terms of work/volunteer work (Rosenheck et al., 2003).

We chose to focus our attention on the last six months of the two-year clinical trial for two reasons: (1) An artifact of available data, as costs were only calculated for the first nine months and the last six, and (2) we wanted to focus on a time period sufficiently different from that of Blouin, Aubry, and Angus (2004) who studied the relationship between needs, costs, and outcomes for the first nine months of the trial. Using the last six months of the clinical trial has both shortcomings and strengths. One shortcoming is the fact that by this time in the trial, we had a 38% attrition rate, and it is impossible to know whether the “lost” participants stopped treatment because they were doing well or because they were doing poorly (e.g., lost housing, had a relapse of substance abuse, etc.). However, when the baseline data for the dropouts were compared to those clients for whom we had complete data, there were no significant differences on any of the targeted variables, suggesting that our remaining sample was representative of the

target population. Another limitation is the generalizable nature of the costing results to those clients who have been receiving treatment for at least 18 months.

Using the last six months of the two year trial as our costing time period of interest however, is also a strength of the research. In many ways we are studying the ‘real world’ of community services, and, if anything, our claims are more modest because of the participant attrition. A second strength to using the last six months of the trial is particular to the community services studied in this research: the community services received by our ‘standard care’ group typically dropped off in intensity after about a year, so we can expect more variability in terms of service intensity, and therefore more agency cost variability between clients. Of additional note is that most costing research has examined the first year of treatment, and so our research adds a layer of interpretive value in that we are essentially examining differences between groups after both have been receiving at least 18 months of intervention.

Overall Costs

An analysis of the overall global costs yielded an average cost of CDN \$57.08/day. This is a bit lower than the average daily cost of Blouin, Aubry, and Angus (2004) of \$68.00/day. Our overall societal cost is lower than the estimate put forth by Blouin et al., (2004) in part due to participants in standard care no longer receiving case management services, unlike in the first nine months of the two year trial.

It is difficult to compare our results to existing costing literature on ICM, because to our knowledge, this kind of work has not been published in the Canadian context to date. We hope that this will spur additional research in this area, especially with larger sample sizes and ongoing comprehensive costing data. Our finding of roughly \$3730/year/client for the *agency costs* associated with ICM is comparable to past findings of agency costs for community support, although higher than agency-related costs associated with outreach services (Rosenheck et al.,

1993). Latimer (1999) cited yearly costs of \$7400 in Quebec to support one client in ACT services. Although this number is quite a bit higher than our own, it should be noted that there was great variability within our sample for agency-related ICM costs, ranging from \$1,344-12,380 CDN/client/year. As well, ACT services are not delivered in the same way at ICM. Additional research has linked ICM and ACT services with decreased hospital costs (as we found) and increased social service utilization when compared to standard treatment, but without citing specific monetary values (e.g., Quinlivan et al., 1995; Dickstein, Hanig, & Grosskopf, 1988; Rydman, 1990; Borland, McCrae, & Lycan, 1989).

Our finding that it costs, on average, \$10,416.31 per individual for a six month period in case management means that over a year it would cost approximately \$21,000 per individual. However, this estimate is modest given that half of the sample was not receiving case management services at all. Our estimate is higher than the documented costs associated with supporting the average person in supportive housing in the US for a year (Culhane, 2002), especially given that their sample also included individuals who were not necessarily receiving ICM. This is most likely due to the fact that most of our sample (94.8%) were housed at 24 months. Our estimate is only half of the documented costs associated with supporting the average homeless person in the US (\$40,000/client/year based on n=5000; Culhane, 2002).

Our figure also corresponds adequately with the documented comprehensive costs of supporting clients in ICM and ACT treatment in the US and Britain. Documented total yearly estimates (base year 1994) have included \$1082-1730 (US)/month to support clients in ICM, roughly totaling 13,000-20,760/year/client (Galster, Champney, & Williams, 1994). If this was adjusted for inflation to the year 2000, costs would total roughly 15,000-23,900/year/client (Friedman, 2008; <http://www.westegg.com/inflation/>). McGurrin and Worley (1993) found a yearly estimate for ICM/client of US \$27,791 compared with US \$62,210 for the control group

(no treatment). When adjusted for inflation from the 1993 base year to the year 2001, this ICM yearly estimate corresponds nicely with our finding of CND \$21,000/year/client. A study comparing the comprehensive costing of ICM and standard care in the UK found the mean total cost per ICM client over 18 months to be £21,759 (un-inflated; Ford & Raftery, 1997). Converted to Canadian dollars and limited to a one year period, this estimate becomes CND \$29,630. Again, our estimates are most likely lower due to clients being farther along in treatment.

Comprehensive costing of a PACT program (adaptation of ACT) has been documented in two separate studies. The first found the PACT program to cost roughly US \$29,700/client/year (Jerrell, 1995) and the second roughly US \$26,000/client (base year 1998) for the first year (Hu & Jerrell, 1998). Both of these estimates correspond nicely to (although are higher than) our ICM estimates, despite the variation in treatment delivery model.

Needs-Costs-Outcomes Relationship

In our first study, we found that the “needs” variables at 18 months, overall, did not predict overall global costs for the six month period. However, increased agency costs were associated with being in ICM and with more severe symptomatology. It was hypothesized that this could be due (in part) to the fact that the costing components involved in calculating the overall societal perspective (i.e., agency, non-agency health care, non-health care, family, ‘benefits’ to society) were not correlated with each other. This means that different clients could have had quite different (and/or opposite) relationships between different costing components.

This being said, it is interesting to note that agency staff members were responding to clients based on agency protocol (assigned treatment), as well as symptom presentation, regardless of treatment (we did not find statistically significant differences in symptoms by treatment type). This may be because symptoms of mental illness are a typical reason for a client to request more contact with their case worker. Treatment intensity did not change as a function

of clients' community ability or housing situation. This could be because agency workers routinely make sure that *all* clients have avenues for social participation and support, adequate health and mental health care, and stable housing.

It was also interesting to note that a group of clients who worsened in community ability over the six month period was associated with higher non-health care costs in our sample. This gives evidence that, for clients who are worsening in community ability, case workers may be directing these individuals to more community (non-health) resources as a way to improve their situation. This seemed to be confirmed by higher non-health care costs being associated with lower community ability at 24 months.

No other needs variables at 18 months predicted any other costing components (non-agency health care, family, 'benefits' to society), and we believe this is because we did not have enough variability in these costing areas between clients. As well, we had fewer than 50% of clients reporting any costs associated with employment/volunteer work or costs to family/friends.

Increased overall costs from the societal perspective were associated with more unstable housing for clients at 24 months, though were not associated with any other outcome variable. When costing components were investigated separately, we found that higher health care costs (non-agency) were associated with poorer housing stability (and in fact, it is likely that this relationship drove the overall association between total costs and poorer housing stability). We also found that non-health care costs predicted poorer community ability at 24 months, but mostly for a group that were initially higher on community ability and who worsened over the course of the six months.

While these results may initially seem pessimistic, we would do well to remember that the clients in most need of the services *should* be the ones receiving more intensive support. As well, Aubry and Smith Fowler (2005) and the CMHEI Working Group (2004) found that the most

significant changes occurred in the first nine months and leveled out after that point. This being said, our findings indicate that when costing components are examined independently, it is clear that clients who are worsening in community ability or symptoms, or those with poorer housing stability are the ones utilizing more agency and non-health care costs.

Comparing the Costs of ICM and Standard Care

It is important to note that using comprehensive costing methods, ICM clients actually cost both the government and the “system” less than those in standard care. Specifically, from the perspective of the Ministry of Health and Long-Term care, ICM clients cost roughly CND \$3500 less/client/year than standard care. From the perspective of society overall, the difference increased; ICM clients cost roughly CND \$5000 less/client/year. Although these cost differences seem impressive, they were (unfortunately) not statistically significant, most likely due to our small sample size. However, our cost differences were driven in large part by a roughly \$7400/client/year decrease in hospital costs in the ICM group versus standard care. This reduction in hospital costs associated with ICM is comparable to a documented US \$10,300/client/year decrease in community inpatient hospital costs in the first year of treatment for those in ICM versus no treatment (or very limited treatment; McGurrin & Worley, 1993).

The finding that ICM clients cost less to both the Ministry and society than those in standard care deviates from previous research linking ICM with higher global costs when compared to no treatment or alternative treatments. For example, Galster, Champney, and Williams (1994) found that when clients in subsidized housing were compared in three case management groups differing in level of intensity (i.e., hours seen by case workers each week and case load of worker), there was a \$4000/client/year increase in global costs from the non-intensive group to the intensive group, and another \$7776/client/year increase from the intensive group to the “very intensive” group. However, the authors note that assignment to the ICM group

was not random and based on symptomatology and need. Because of this, it is not possible to directly compare our results with Galster et al. (1994), as it seems logical that their more disturbed clients would result in larger global costs when compared with higher functioning clients. The fact that our study was a matched controlled trial gives further evidence to the credibility to the finding that ICM, at least at 18 months into treatment, is less expensive to society than standard care.

Our study also deviates from the results of a randomized controlled trial documenting a CND \$18,000/client/year increase in costs associated with ICM treatment over standard care (Ford & Raftery, 1997). This could be explained by the fact that the “standard care” clients in Ford and Raftery’s study received no case management, used substantially fewer community services, and had on average CND \$2000/client fewer costs associated with inpatient hospital stays. Because the authors were documenting the first 18 months of costs associated with treatment, it is possible that due to the ICM treatment, clients receiving ICM were sufficiently connected to additional community services and needed hospital treatment in a way unlike their ‘standard care’ counterparts. Although these findings diverge from our research, it is important to remember that our cost estimates are based on clients who had been receiving services for 18 months: a time when our ICM clients may have reached a certain level of stability and therefore not requiring extensive hospital treatment. This trend toward fewer hospital-related costs after a significant time receiving case management services (in this case, PACT services) has been documented in two studies, both of which found a three-fold decrease in hospital-related costs from the first six months to the last six months of an 18-month trial of PACT services (Hu & Jerrell, 1998; Jerrell, 1995).

A comparison across treatment groups of the individual costing components involved in calculating the overall societal cost revealed only two noteworthy cost differences: agency costs

(significantly higher in ICM; a CND \$1,484.83/client/year difference) and societal ‘benefits’ associated with clients’ paid or volunteer work (which approached significance). Seventeen percent more ICM clients were actively contributing to society than clients in standard care, and within the clients’ contributing to society, ICM clients’ contributions were of greater monetary value. It is interesting to note that we found an insignificant difference between groups in overall costs from both costing perspectives, despite a three-fold increase in agency costs associated with ICM treatment. Again, this can be explained by the cost-offsets involved in ICM, including a reduced cost associated with non-agency health care costs (explained by a decrease in hospital use in ICM) and a greater societal ‘benefit’ associated with ICM subtracted from the total global costs.

Cost-effectiveness Analyses

For our cost-effectiveness analyses, we chose to focus our analyses on our four outcome variables: housing stability, medication adherence, community ability, and symptomatology; we also focused on cost-effectiveness from two costing perspectives, namely the Ministry of Health and Long-Term Care, and society overall. These two perspectives are quite different, as the societal perspective takes into account family/friend costs, non-health care costs, and societal ‘benefits’ in terms of paid or unpaid work, as well as the cost components in the Ministry perspective (agency and non-agency health care). It should be noted, however, that both perspectives took into account ‘hidden’ costs such as travel time.

We examined the cost-effectiveness of ICM over standard care using both incremental cost-effectiveness ratios and net monetary/health benefit calculations. We chose to include net monetary/health benefit calculations as these are recommended in the economic literature (e.g., Drummond et al., 2005) to help combat the inherent interpretive difficulties associated with incremental cost-effectiveness ratios. The use of net benefit ratios also provides us with a way to

examine the probability of ICM being cost-effective at certain assigned societal ‘values’ of a unit change in an outcome of interest for ICM clients.

The use of incremental cost-effectiveness ratios for housing stability, medication adherence, and community ability showed ICM to be a *dominant* intervention. In the cost-effectiveness literature this means that ICM clients both cost the MOHLTC and societal overall less than standard care clients while simultaneously showing better outcomes for clients. This was not the case for symptomatology, however given the miniscule (i.e., 0.36) average difference between groups on the self-report symptom inventory, this cost-effectiveness analysis was reduced to a cost-minimization analysis (where only costs are compared; Drummond et al., 2004), showing ICM to cost less than standard care. For each ratio we ended up with a monetary value that indicated the incremental cost savings associated with one more unit change on an outcome. However, the interpretive value of these ratios are lacking when the treatment under investigation is in a dominant position. This is because the larger the difference in outcome between groups, the smaller the incremental cost-effectiveness ratio. If ICM had been both more expensive and more effective, this would have made interpretive sense, as the incremental cost would reduce as more ICM clients improved relative to standard care clients. However, in a dominant situation we are left with an incremental cost that increases as the difference between groups decreases (i.e., ICM clients are not doing that much better than standard care clients). Because we are taking about cost savings in ICM, the larger number does not reflect better outcomes for ICM clients.

To combat the interpretive limitations of incremental cost-effectiveness ratios in a dominant intervention, Drummond et al. (2005) has suggested the use of net benefit and net health ratios. These net ratios give a monetary ‘benefit’ associated with treatment either from the perspective of actual costs or the value we assign to a health outcome, irrespective of the

dominant or non-dominant nature of the intervention. From the perspective of the Ministry of Health and Long-Term Care, we found that for all four outcomes, the net monetary benefit of ICM was \$1754.24. From the perspective of society overall, this net monetary benefit increased to \$5102.82. All four outcomes showed the same net monetary benefit for this first calculation due our setting the ‘value’ of a change in effectiveness (i.e., maximum willingness to pay). In essence, these net monetary benefits were reduced to simple cost-minimization analyses (i.e., the difference in cost between the two treatment alternatives). From both perspectives, ICM was cost-effective even in a situation where the government or society sets the value of improved outcomes in ICM at zero dollars. This gives strong evidence for ICM being a cost-effective alternative to standard care for those clients who have been receiving treatment for at least 18 months.

When the equation was re-organized to give the net health benefit (i.e., the monetary value associated with the documented difference in effectiveness), and we set the value of a change in effectiveness at 1 dollar, our results were similar to the net monetary benefits, ranging from \$1753.86-\$1765.24 (Ministry) and \$5102.44-\$5113.82 (society). Unlike the interpretive difficulties associated with negative incremental cost-effectiveness ratios, these net health benefit ranges show that as ICM is more effective, the net health benefit increases. Again, because these net health benefit values are greater than zero, we can conclude that ICM is cost-effective (Drummond et al., 2005; Rosenheck et al., 2003).

Dealing with Uncertainty in Costing Estimates

Costing estimates have inherent uncertainty (Drummond et al., 2005). One way of dealing with this uncertainty is to calculate the probability of finding a positive net monetary benefit with the use of nonparametric bootstrapping on the sample data. When 1000 re-samples were drawn from our existing data on costs and housing outcomes, and our ‘value’ of a difference in

effectiveness between ICM and standard care was set at zero, we found that 770/1000 re-samples showed a positive net monetary benefit from the perspective of the MOHLTC and 800/1000 showed a positive value from the perspective of society overall. This means that there is a 0.77 and 0.88 probability, respectively, that ICM is cost-effective when our maximum willingness to pay for a difference in housing status between groups is zero. When the 'value' of an additional 10% difference in housing stability (in favour of ICM) was set at increasing monetary values (i.e., acceptability curves) ranging from \$100-\$1000/client, the probability of ICM being cost-effective using the same re-sampling technique increased as a function of the increasing 'value' (though not at a constant rate due to the random re-sampling). When another 10% difference in housing stability was valued at \$1000, we found that the probability of ICM being cost-effective increased to 0.885 (MOHLTC) and 0.886 (society).

Despite the dominant nature of ICM, these calculations highlight two important points: 1) ICM is not guaranteed to be cost-effective all the time, and 2) the more that a funding body is willing to 'value' the increased effectiveness of ICM (and thus decide to fund the program at an increasing amount), the probability of ICM being cost-effective increases. While acceptability curves are usually more useful in a situation where the intervention of choice is both more costly and more effective (as this gives us the dollar amount that must be spent in order to see the same cost-offset to society in terms of outcome change), it is still useful in our situation. It is clear that even while the probability of ICM being cost-effective increases as a function of funders' willingness to pay, this research gives evidence to suggest that even when additional funds are not available, ICM is still a more cost-effective choice over standard care. While at the agency level it may seem like costs are still exponentially higher in ICM versus standard care later in treatment, our research shows that even still, the monetary benefit associated with ICM is still greater than standard care later on in treatment.

It is noteworthy that the dominant nature of ICM in our research deviates from previous research linking ICM with *both* greater overall costs and more positive outcomes. Johnson et al. (1998) found a positive incremental cost-effectiveness ratio when comparing ICM to regular case management on 12-month clinical outcomes. Our results may have differed because: (1) We used different clinical outcomes that were already shown to be significantly different between groups, (2) we assessed costs later in the treatment life of clients (the last six months versus Johnston's study which assessed the first year), and (3) we employed a more comprehensive costing methodology, and, as mentioned above, included the costs paid back to society in the form of employment or volunteer work.

Our results also deviate from the one published clinical trial comparing costs and health and housing indicators in a sample of homeless mentally ill veterans (Rosenheck et al., 2003). Rosenheck et al. compared three groups, two of which corresponded to our groups of ICM and standard care. Rosenheck et al. did not call their case management 'intensive', and it was clear from their results that the veterans in the case management group were not seeing their case worker very often (13 times per year on average in the second year of the study). Despite this, standard care clients still reported the use of community supports though at a reduced rate compared to case managed veterans (16.2 visits/year for case management group vs. 5.2 visits/year for standard care). The authors documented no differences between the groups in symptomatology, number of days homeless, or the number of days veterans were able to work/volunteer. Like our study, the authors reported on associated costs for the groups related to VA costs, health care costs, non-health care costs, and employment/volunteer 'benefits'. Like our study, while the costs associated with case management were significantly higher in the case management group, overall societal costs were not found to be significantly different between groups. However, it should be noted that the costs associated with case management services in

the study by Rosenheck and colleagues were quite a bit lower than in our study. We were not able to directly compare our cost estimates with the costs associated with Year 2 in Rosenheck et al. (2003), as the authors did not provide these cost details. This is unfortunate as simply examining Year 2 costs would have provided a more valid comparison to our 18-24 month estimates. This being said, it is still clear that our clients in ICM were receiving much more case management than the veterans in the aforementioned study. It is clear that the insignificant (and negligible) differences between groups reported by Rosenheck et al. (2003) on veteran's employment, health care costs (particularly hospitalizations) non-and non-health care costs contributed to their positive incremental cost-effectiveness ratios for case management treatment. It is clear that the clients in our study were receiving more intensive case management services, and this had an impact on reducing the costs associated with other costs such as hospital treatment and employment 'benefits'.

The Power of Comprehensive Costing

Our results give evidence to support the notion that comprehensive costing is a powerful (and necessary) way of assessing costs as they relate to clinical outcomes (Knapp & Beecham, 1990; Drummond et al., 2005). Had we only looked at one costing component (e.g., agency costs) involved in calculating the Ministry or societal perspective, we may have missed importance pieces of the larger picture. For example, we would not have known that clients in ICM are more likely to be either employed or volunteering than clients in standard care. As was discussed in both articles, we know that there are psychological benefits to work, be it paid or unpaid (e.g., Young & Passmore, 2007). We know that clients in ICM are receiving more agency services, but not receiving more non-health care services, and in fact receiving significantly less hospital services than clients in standard care. They are also significantly more likely to be housed and medically adherent at 24 months than clients in standard care. Perhaps there is a

relationship between clients' reduced hospital costs (as evidence of better community functioning), their housing and medical status, and their ability to maximize community resources and 'give back' in terms of paid or unpaid work. Statistically speaking, we found moderate correlations linking higher community ability (as measured by the MCAS) at 18 and 24 months with both a reduction in hospital costs ($r(75)=-.22, p<.05$; $r(75)=-.24, p<.05$ respectively) and an increase in client contribution to society in the form of volunteer work ($r(75)=.24, p<.05$; $r(75)=.20, p<.05$ respectively). This highlights the importance of community ability regardless of its lack of statistical power to predict costing variables in our regression equations. It may also suggest that when clients are aided in reducing their stays in hospital and are able to "give back" to society, their sense of belonging in the community increases.

A second benefit of comprehensive costing is the ability to examine the relationships between costing components and different clinical outcomes. The first article highlighted this benefit; overall, the costing components were not significantly associated in any way. Thus, a reduction in costs associated with one area does not necessarily mean that a similar reduction will happen in another area. The use of costing components allowed for an examination of the relationships between particular costs and outcomes, rather than relying on overall costs. We were able to see that agency costs increased as a function of worsened symptomatology, regardless of treatment type. Of additional interest was that higher non-agency health care costs predicted worsened housing stability at 24 months and higher non-health care costs were associated with worsening community ability among clients. Thus it seems that particular outcomes are related to particular outcome measures, and in ways that make intuitive sense. Case workers are responding more to clients with increased symptoms. Clients who use more health care services are those with more unstable housing. Clients who use more non-health care community services are those with worsening community ability. It was curious that agency costs

were not related to any outcome other than symptomatology. This suggests that case workers may be responding more out of immediate need (symptom management) rather than differentiating treatment intensity based on the complete ‘picture’ of what a client needs in terms of housing issues, feeling connected in the community, and managing medication. The second article showed that ICM was a cost-effective alternative to standard care, and so the increased time spent with clients results in cost savings for the government and society. This being said, within ICM, case managers may not have a well-developed way of integrating client need with associated time allocation. They may be dealing primarily with those clients who are experiencing distressing symptoms.

The Power of Examining the ‘Value’ of Improved Outcomes

Our second study showed the power of ‘valuing’ an increase in effectiveness as a way to determine whether it is worth increased funding. Even when a larger difference between outcomes in ICM and standard care is valued at zero dollars, ICM is still cost-effective in terms of net benefit. This being said, the true ‘value’ of an increase in effectiveness of ICM in relation to standard care is really what either the MOHLTC or society overall is willing to pay to see ICM produce better outcomes. Acceptability curves demonstrated that as society is willing to invest more money in ICM treatment, we can expect the probability of it being cost-effective increase. Because our second study showed ICM to be in an economically dominant position in terms of three out of four outcomes (and the fourth showed negligible differences), the increased ‘value’ placed on superior outcomes in ICM is really related to the probability that a funding body is comfortable with in determining that ICM really will be cost-effective in the general population.

Conclusions

Our results suggest that there may be a complex interplay of variables predicting which clients will cost more to the “system” when involved in ICM services. This is primarily due to the

non-association between costing components involved in determining overall costs from the societal perspective. For example, ICM clients showed simultaneously *higher* agency treatment costs and *lower* hospital costs, as well as *higher* ‘benefits’ to society in terms of employment or volunteer work (which were subtracted from the total costs). Because ICM clients cost both *more and less* to the “system” at the same time, this could have contributed to a “washing out” of the overall variability in six month societal costs. Despite this, investigation of individual costing components revealed that particular outcome variables are associated with particular kinds of costs (e.g., health versus non-health care costs). Even still, it was unclear what 18-month needs predict increased health and non-health care costs. It was only clear that clients with more severe symptoms cost the agency more over the six month period.

Despite this, there is substantive evidence that ICM is a cost-effective alternative to standard care for clients with a history of homelessness and severe mental illness when particular outcome variables are investigated. ICM clients cost the system less overall and yet are still more likely to be housed and be medically adherent at 24 months than clients in standard care. There is a roughly 80% chance that ICM is a cost-effective alternative to standard care in helping clients secure housing. The ‘value’ that a funding body places on ICM’s superior effectiveness is directly and positively related to the probability that it will be a cost-effective alternative to standard care.

Implications from Examining the Needs-Costs-Outcomes Relationship

What is most striking from the results of the first study assessing the needs-costs-outcomes relationship is the fact that, for our sample, needs do not in fact predict costs with a large degree of reliability. Leaving out the intuitively obvious relationship between treatment type and agency costs, the only remaining “need” variable that predicted agency costs was symptomatology. As clients experienced more distressing mental health symptoms, they cost the

agency more. This primarily means that as clients are experiencing more symptoms, they are spending more time with their case workers. In a sense, this means that the “system” of case management is responsive to client’s changing levels of symptomatology. This is good news as it speaks to the flexibility of case managers and their awareness of clients’ changing needs. What is interesting, however, is that no other “need” variable predicted agency costs, such as community ability, housing status, or medication adherence from 18 to 24 months. This speaks to one of two possibilities: (1) The variability in community ability, housing status, and medication adherence was not sufficient for case managers to respond to the differences between clients, or (2) case workers provide the same level of service to clients regardless of clients’ community functioning, housing status, or medication adherence. It could also be a combination of both possibilities, especially given the nature of the “leveling out” of most functioning variables after the first nine months of receiving community services in either of our groups. At any rate, these results speak to the necessity of re-examining the allocation of services to clients. Are needs variables taken into consideration in treatment planning to a sufficient degree? Do case workers have sufficient time in their workload to assess client changes in these variables and respond accordingly? If not, how is it determined who will really benefit from ICM versus simply standard care (including outreach services) in helping clients secure housing?

It was also evident from our sample that increased health care costs and non-health care costs predicted different (though worse) outcomes at 24 months. Increased health care costs were associated with worsened housing status and increased non-health care costs were associated with worsened community ability. This speaks to the necessity of case workers continually assessing and re-assessing their clients’ needs on all of the indicators for treatment. The relationship we found between worsening community ability and higher non-health care costs lends evidence to suggest that case workers may be sensitive to changing levels of socializing and connectedness in

their clients and therefore recommend that these clients seek out further community (non-health) supports. This may be the case irrespective of an increase in the number of hours spent with a client, and may reflect a change in focus when spending time with a client.

Our results also suggest that worsening physical or mental health may be a predictor in determining which clients may be at risk for losing housing once treatment terminates. It could be that since case workers are responding to clients' levels of symptomatology, they are able to circumvent major relapses in clients. Without case managers' responsiveness to symptom changes in their clients, clients may have difficulty navigating the health and mental health care system to receive the services they need to stay housed and functioning in the community.

Implications from Examining the Cost-effectiveness Analyses

Our second study pointed to some encouraging news advocating for the cost-effectiveness of ICM. Our finding that clients in ICM both cost the system less (from both the perspective of the MOHLTC and society) as well as showed either improved and/or similar outcomes in health and housing, speaks to the economic advantages of ICM for society as a whole. The simple fact is that clients in ICM showed better housing stability, medication adherence, lowered hospital use, and also (although only approaching significance) showed more contribution to society in terms of employment or volunteer work. We know from a societal viewpoint that even if funding bodies value these clinical outcomes at zero dollars, ICM still has an approximately 80% chance of being cost-effective when implemented with our population of interest. Unfortunately, this does not mean that the agency itself will see a monetary 'benefit' associated with ICM treatment. The ethical question that remains is whether the three-fold agency costs involved in ICM are "worth it" for the agency in order to see these client-level results. The issue of comprehensive costing leaves the reader having to wrestle with the notion that although the "system" is paid back in terms of increased client contributions (mostly volunteering), the agency will not see this

monetary pay-back, and may in fact continue to have to support this individual indefinitely to allow them to continue to flourish as a productive member of society (retain housing, keep taking medication, and be able to contribute as a volunteer to society). This being said, the value system employed by most community agencies allows for an understanding that although they may not see the monetary payoff to working with such a vulnerable population themselves, it is both economically and ethically rewarding from a 'systems' perspective to continue providing ICM services. Even for far-removed funding bodies such as those in the MOHLTC who may not have the same professional or ethical investment in seeing clients succeed more independently and secure housing, our research suggests that ICM is a cost-effective alternative from simply an economic standpoint.

Implications for Policy and Program Development

This research highlights the need for costing analyses to be a regular part of program development, implementation evaluations, and outcome evaluations of new and existing programs serving the homeless mentally ill. Of even greater importance is the use of comprehensive costing analyses. When only direct costs are assessed and linked to housing and health outcomes, one is left with the discouraging news that increased program costs do not necessarily lead to better clinical outcomes. However, when "cost benefits" are also included in the analyses, one can see how the agency level spending may be influencing the in and out flux of monies at the greater "societal" level. For policy makers and those in program development, it would be imperative to have this "bigger picture" mentality with regard to costs of services for the homeless mentally ill. Without this framework, policy makers may decide to cut what they perceive are "expensive" intensive (and potentially ineffective) services, without an understanding of how the services are actually saving money at the more "systems" level. It is also imperative for those at the agency level to have an understanding that their hard work is

indeed transferrable to cost-offset savings, even if they do not see the savings at the agency level in the form of reduced clinical symptoms.

Limitations and Future Research

It behooves us to discuss the implications of our research within the context of the six month window of available cost estimates used in our two studies. In essence, any findings that we attribute to ICM must be interpreted within the context that all clients had been receiving services for 18 months. This is especially important when examining the cost-effectiveness of ICM, as we used 24 month estimates of outcomes with six month costing estimates. Our results are only generalizable to clients who have been receiving community support for at least 18 months. This being said, our estimates of the costs associated with ICM treatment are most likely similar to what we could expect for the entire two-year trial. Our overall estimate of societal costs collapsing across treatment type (from the first study) was slightly reduced relative to Blouin et al. (2004)'s estimate because of the fact that our standard care clients were no longer receiving outreach services. Thus, in many ways, our comparison becomes that of clients in ICM versus clients who did receive outreach services but who have not been receiving any services for at least nine months. No standard care client in our sample reported the use of any case management services. Our limitation related to only having six month estimates for the last part of the two year trial becomes less about the generalizability agency-related costs, but more an interpretive issue of the nature of the clients in the 'control' group. It is important to remember that, in this case, our standard care clients are not those who have never received community support, but are those who received it at an earlier point in treatment and are now continuing along despite receiving no case management. One could argue that this fact actually increases the power of the finding that ICM is both less costly overall and more effective, as our comparison group is actually made up of clients who received services aimed at connecting them with housing, health,

and non-health supports at an earlier time point. The use of our six month window highlights the fact that clients who continue to receive services, even when they are more expensive, may be able to maintain their gains to a greater degree than those clients who do continue to receive support. Our research highlights that these ‘continued gains’ reflect cost savings of a greater magnitude in ICM, resulting in the more intensive treatment being cost-effective.

Despite this, future research would do well to replicate and expand these findings over a larger time frame, allowing for a more ‘complete’ costing picture when comparing different levels of intensity in community supports. It would also have been interesting to have complete costing data so that one could examine the cost-effectiveness of ICM at different points in treatment. Perhaps initially ICM is no more cost-effective than standard care, and it is only once clients have been receiving services for a while that the cost savings are evident.

Future research would also do well to examine the needs-costs-outcomes relationship separately for different type of community support. Examining these relationships separately by men and women would also be an interesting area of further research. We were unable to do this due to our 38% participant attrition rate. In many ways this kind of community research is always up against substantial participant attrition, thus requiring large initial sample sizes and up-to-date tracking methods to follow clients over time.

The “intent to treat” philosophy suggests that all participants should be included in an assessment of effectiveness of treatment, regardless of adherence to protocol (Gross & Fogg, 2004). This is a philosophy commonly used in medical treatment trials, as even those participants who did not follow protocol can be assessed at termination. In our case, this would mean assessing our sample of participants who dropped out at the two year mark in order to include them in our analyses. Unfortunately, this is not possible given the inability to contact those who terminated treatment prematurely. At times it seems unnecessarily repetitive to mention caution

in interpreting results from a small (due to participant attrition) sample size. However, regardless of our finding that our participants who dropped out were no different than our study participants on demographics and clinical variables at baseline, we cannot assume that there were no additional differences between participants who dropped out and those who completed treatment *following* admission to ICM or standard care. For instance, those who terminated treatment prematurely could have had lower levels of motivation to continue in the program, higher life stress that made participation impossible, or a perception that the demands of the program were too high. Although it is likely that case workers would have a sense of these issues from individual participants, future research should include reliable measures of motivation for treatment and/or perceived capability to continue in treatment.

It would be mendacious not to point out that our results could have less theoretical power given that our sample of participants who dropped out may have terminated prematurely due to the *treatment itself*. Simply put, it is hard to make a statement about the effectiveness or cost-effectiveness of our treatments when over 1/3rd of our initial participants may have left treatment due to it being unhelpful or too demanding. Despite both groups showing a similar 38% attrition rate, the rate itself suggests that both treatments have work to do in supporting clients to remain in treatment. Recent work has focused on ICM as a predictor of client retention in outpatient services (e.g., Lehner, 2007), although future research should also examine those personal and/or environmental factors leading to treatment retention in community – based case management.

Despite our attrition rate, this research still raised important “system” level questions regarding program evaluation, fiscal accountability, and allocation of funds to continue community-based programs for the homeless mentally ill. Remaining questions include: How can we support clients to remain in treatment? How are we determining how much service a client requires? Can we adequately determine who will stave off a relapse or loss of housing once

treatment terminates? Coupled with our research findings, these and others questions could guide the development of further case management services and be helpful in determining what level of “intensity” is actually required and cost-effective for individuals within this vulnerable population.

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Appendix A: Multnomah Community Ability Scale (MCAS)



20858

CMHEI - Multnomah Community Ability Scale
(Please print using BLOCK letters and numbers inside boxes)

24 months
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ID:

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Date (mm/dd/yy):

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Person Completing Form:

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Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

FILL THE CIRCLE which corresponds with the consumer's functioning during the PAST 3 MONTHS except for Section 4 (Behavioural Problems), which should reflect the consumer's functioning during the PAST 6 MONTHS.

Section One: INTERFERENCE WITH FUNCTIONING

This section pertains to those physical and psychiatric symptoms that make life more difficult for the consumer. Many of these can be lessened with medications but others are permanent. Regardless, rate the consumer as he/she functions with current medications and services.

1. *Physical Health:* How impaired is the consumer by his/her physical health status?

NOTE: Impairment may be from chronic physical health problems and/or frequency and severity of acute illness, not from psychiatric problems.

- ☐ Extreme physical health impairment
- ☐ Marked physical health impairment
- ☐ Moderate physical health impairment
- ☐ Slight physical health impairment
- ☐ No physical health impairment

2. *Intellectual Functioning:* What is the consumer's level of general intellectual functioning?

NOTE: Low intellectual functioning may be due to a variety of reasons besides congenital mental deficiency: e.g. organic damage due to chronic alcohol/drug abuse, senility, trauma, etc. It should, however, be distinguished from impaired cognitive processes due to psychotic symptoms, which are covered in later questions. Rate functioning independent of psychotic symptoms.

- ☐ Extremely low intellectual functioning
- ☐ Moderately low intellectual functioning
- ☐ Low intellectual functioning
- ☐ Slightly low intellectual functioning
- ☐ Normal or above level of intellectual functioning

3. *Thought Processes:* How impaired are the consumer's thought processes as evidenced by such symptoms as hallucinations, delusions, tangentiality, loose associations, response latencies, ambivalence, incoherence, etc.? *For this item only, rate current presentation.*

- ☐ Extremely impaired thought processes
- ☐ Markedly impaired thought processes
- ☐ Moderately impaired thought processes
- ☐ Slightly impaired thought processes
- ☐ No impairment, normal thought processes

4. *Mood Abnormality:* How abnormal is the consumer's mood as evidenced by such symptoms as constricted mood, extreme mood swings, depression, rage, mania, etc.

NOTE: Rate abnormality based on range, intensity and appropriateness of mood.

- ☐ Extremely abnormal mood
- ☐ Markedly abnormal mood
- ☐ Moderately abnormal mood
- ☐ Slightly abnormal mood
- ☐ No impairment, normal mood

5. *Response to Stress and Anxiety:* How impaired is the consumer by inappropriate and/or dysfunctional responses to stress and anxiety?

NOTE: Impairment could be due to inappropriate responses to stressful events (e.g. extreme responses or no response to events that should be of concern) and/or difficulty in handling anxiety as evidenced by agitation, perseveration, inability to problem-solve, etc.

- ☐ Extremely impaired response
- ☐ Markedly impaired response
- ☐ Moderately impaired response
- ☐ Slightly impaired response
- ☐ Normal response

Shade circles like this:

Not like this:





CMHEI - Multnomah Community Ability Scale

 24 months
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Section Two: ADJUSTMENT TO LIVING

This section pertains to how the consumer functions in his/her daily life and how he/she has adapted to the disability of mental illness. Rate behavior, not potential.

6. *Ability to Manage Money*: How successfully does the consumer manage his/her money and control expenditures?
- ☐ Almost never manages money successfully
 - ☐ Seldom manages money successfully
 - ☐ Sometimes manages money successfully
 - ☐ Manages money successfully a fair amount of the time
 - ☐ Almost always manages money successfully
7. *Independence in Daily Life*: How well does the consumer perform independently in day to day living
 NOTE: Performance includes personal hygiene, dressing appropriately, obtaining regular nutrition, and housekeeping.
- ☐ Almost never performs independently
 - ☐ Often does not perform independently
 - ☐ Sometimes performs independently
 - ☐ Often performs independently
 - ☐ Almost always performs independently
8. *Acceptance of Illness*: How well does the consumer accept (as opposed to deny) his/her illness?
- ☐ Almost never accepts illness
 - ☐ Infrequently accepts illness
 - ☐ Sometimes accepts illness
 - ☐ Accepts illness a fair amount of the time
 - ☐ Almost always accepts illness

Section Three: SOCIAL COMPETENCE

This section pertains to the capacity of the consumer to engage in appropriate interpersonal relations and culturally meaningful activities.

9. *Social Acceptability*: In general, what are people's reactions to the consumer:
- ☐ Very negative
 - ☐ Fairly negative
 - ☐ Mixed, mildly negative to mildly positive
 - ☐ Fairly positive
 - ☐ Very positive
10. *Social Interest*: How frequently does the consumer initiate social contact or respond to others' initiation of social contact:
- ☐ Very infrequently
 - ☐ Fairly infrequently
 - ☐ Occasionally
 - ☐ Fairly frequently
 - ☐ Very frequently
11. *Social Effectiveness*: How effectively does he/she interact with others?
 NOTE: "Effectively" refers to how successfully and appropriately the client behaves in social settings, i.e., how well he or she minimizes interpersonal friction, meets personal needs, achieves personal goals in a socially appropriate manner, and behaves prosocially.
- ☐ Very ineffectively
 - ☐ Ineffectively
 - ☐ Mixed or dubious effectiveness
 - ☐ Effectively
 - ☐ Very effectively

Shade circles like this: Not like this:  



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CMHEI - Multnomah Community Ability Scale

24 months
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12. *Social Network*: How extensive is the consumer's social support network?

NOTE: A support network may consist of family, friends, acquaintances, professionals, coworkers, socialization programs, etc. Note: How extensive the network is does not depend on the social acceptability of the sources.

- ☐ Very limited network
- ☐ Limited network
- ☐ Moderately extensive network
- ☐ Extensive network
- ☐ Very extensive network

13. *Meaningful Activity*: How frequently is the consumer involved in meaningful activities that are satisfying to him or her?

NOTE: Meaningful activities might include arts and crafts, reading, going to a movie, etc.

- ☐ Almost never involved
- ☐ Seldom involved
- ☐ Sometimes involved
- ☐ Often involved
- ☐ Almost always involved

Section Four: BEHAVIOURAL PROBLEMS

This section pertains to those behaviours that make it difficult for the consumer to integrate successfully in the community or comply with his/her prescribed treatment. **NOTE:** Rate consumer's current behaviour, considering as appropriate events during the PAST 6 MONTHS.

14. *Medication Compliance*: How frequently does the consumer comply with his/her prescribed medication regimen?

NOTE: This question does not relate to how much those medications help your client.

- ☐ Almost never complies
- ☐ Infrequently complies
- ☐ Sometimes complies
- ☐ Usually complies
- ☐ Almost always complies

15. *Cooperation with Treatment Providers*: How frequently does the consumer cooperate as demonstrated by, for example, keeping appointments, complying with treatment plans, and following through on reasonable requests?

- ☐ Almost never cooperates
- ☐ Infrequently cooperates
- ☐ Sometimes cooperates
- ☐ Usually cooperates
- ☐ Almost always cooperates

16. *Alcohol/Drug Abuse*: How frequently does the consumer abuse drugs and/or alcohol?

NOTE: "Abuse" means to use to the extent that it interferes with functioning.

- ☐ Frequently abuses
- ☐ Often abuses
- ☐ Sometimes abuses
- ☐ Infrequently abuses
- ☐ Almost never abuses

17. *Impulse Control*: How frequently does the consumer exhibit episodes of extreme acting out?

NOTE: "Acting out" refers to such behavior as temper outbursts, spending sprees, aggressive actions, suicidal gestures, inappropriate sexual acts, etc.

- ☐ Frequently acts out
- ☐ Acts out fairly often
- ☐ Sometimes acts out
- ☐ Infrequently acts out
- ☐ Almost never acts out

Shade circles like this: 

Not like this:  

Appendix B: Symptom Distress Scale (SDS)



CMHEI - Symptom Distress (Please print using BLOCK letters and numbers inside boxes)

24 months
Page 20 of 37

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

HAND CONSUMER ANSWER KEY CARD. I am going to ask you some questions about how much you were distressed or bothered by some things during the PAST 7 DAYS. I'd like you to tell me which of the answers on the card best describes how you feel. **FILL THE APPROPRIATE CIRCLE.**

During the PAST SEVEN (7) DAYS about how much were you distressed or bothered by:

	Not at all	A little bit	Moderately	Quite a bit	Extremely	N/A
1. Nervousness or shakiness inside?	☐	☐	☐	☐	☐	☐
2. Being suddenly scared for no reason?	☐	☐	☐	☐	☐	☐
3. Feeling fearful?	☐	☐	☐	☐	☐	☐
4. Feeling tense or keyed up?	☐	☐	☐	☐	☐	☐
5. Spells of terror or panic?	☐	☐	☐	☐	☐	☐
6. Feeling so restless you couldn't sit still?	☐	☐	☐	☐	☐	☐
7. Heavy feelings in your arms or legs?	☐	☐	☐	☐	☐	☐
8. Feeling afraid to go out of your home alone?	☐	☐	☐	☐	☐	☐
9. Feelings of worthlessness?	☐	☐	☐	☐	☐	☐
10. Feeling lonely even when you are with other people?	☐	☐	☐	☐	☐	☐
11. Feeling weak in parts of your body?	☐	☐	☐	☐	☐	☐
12. Feeling blue?	☐	☐	☐	☐	☐	☐
13. Feeling lonely?	☐	☐	☐	☐	☐	☐
14. Feeling no interest in things?	☐	☐	☐	☐	☐	☐
15. Feeling afraid in open spaces or on the streets?	☐	☐	☐	☐	☐	☐

Shade circles like this: 
Not like this:  

Appendix C: Comprehensive Costing Evaluation Package



CMHEI - Socio-Demographic Information - Follow-up (Please print using BLOCK letters or numbers inside boxes)

STA (2)
CM
pg 1/6

ID:

--	--	--	--	--	--	--	--	--	--

Date (mm/dd/yy):

		/			/		
--	--	---	--	--	---	--	--

 Person Completing
Form:

--	--	--	--	--	--

Indicate Period:

- ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

 GENDER: ☐ Female ☐ Male

DATE OF BIRTH (mm/dd/yy):

		/			/		
--	--	---	--	--	---	--	--

EDUCATION - years of school completed: (Please circle one.)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+
Primary									Secondary						Post-secondary					

 MARITAL STATUS:
(check one)

- ☐ Single, Never Married ☐ Separated
☐ Married ☐ Divorced
☐ Cohabiting with Significant Other ☐ Widowed

ILLNESS INFORMATION:

Indicate consumer's diagnoses (given by licensed mental health professional) using the following categories. Select one or more:

- | | | |
|--|--|---|
| ☐ Mood disorder | ☐ Developmental handicap | ☐ Specific disorder of childhood/ adolescence |
| ☐ Anxiety disorder | ☐ Substance-related disorder | ☐ Other |
| ☐ Schizophrenic disorder | ☐ Mental disorders due to a medical condition | ☐ Unknown |
| ☐ Personality disorder | ☐ Delirium, dementia, amnesic, other cognitive disorders | |


CMHEI - Health, Education and Legal Issues - Follow-up

(Please print using BLOCK letters or numbers inside boxes)

 STA (2)
CM
pg 2/6

 ID:

 Date (mm/dd/yy): / /

 Person Completing Form:

 Indicate Period: ☐ Baseline ☐ Follow-up 3

☐ Follow-up 1 ☐ Follow-up 4

☐ Follow-up 2

 If no follow-up data collected, fill in circle and return form to CC: ☐ No follow-up

Health and Compliance (in the past 9 MONTHS):

 Please use the following scale to rate the consumer's physical health problems in the past 9 MONTHS:

- ☐ No physical health problem.
☐ Minor health problems (e.g. cold, non-serious fall, etc.).
☐ Physical health problem imposes mild restriction on mobility and activity.
☐ Moderate degree of restriction on activity due to physical health problem.
☐ Severe or complete incapacity due to physical health problem.

How often does the consumer attend scheduled/ planned contacts with his/ her primary worker (not completed at baseline)?

- ☐ Most of the time ☐ About half of the time ☐ Less than half of the time ☐ Not at all ☐ Unknown

How often does the consumer have any contact with his/ her primary worker (not completed at baseline)?

- ☐ Daily ☐ At least weekly ☐ At least monthly ☐ Less than monthly ☐ Not at all

 Has the consumer been prescribed medications for emotions, nerves or alcohol/ drug abuse? ☐ Yes ☐ No

If yes, how often does he/she take these medications as prescribed?

- ☐ Most of the time ☐ About half of the time ☐ Less than half of the time ☐ Unknown

Education:

 Has the consumer currently been enrolled as a student (in the past week)? ☐ Yes ☐ No

 Has the consumer been enrolled as a student during the past 9 MONTHS? ☐ Yes ☐ No

Go to "Legal Issues" section

 What is the most recent institution?: ☐ Secondary (High School) ☐ Vocational/Technical / Trade School
☐ Adult Education ☐ University
☐ Community College ☐ Other

 Was the program: ☐ Full-time ☐ Part-time

 How regularly did the consumer attend classes? ☐ Most of the time ☐ Less than half of the time
☐ About half of the time ☐ Unknown

Legal Issues:

 Please answer the following questions for the period beginning 9 MONTHS ago and ending today. Has the consumer...

 ... been arrested? ☐ No ☐ Yes If yes, # of arrests:

 ... spent any nights in prison/ jail? ☐ No ☐ Yes If yes, # of nights:

 # separate prison/ jail episodes:

 # episodes for offences committed in last 9 MONTHS:

 ... been on parole/probation? ☐ No ☐ Yes If yes, # of episodes:

 # episodes for offences committed in last 9 MONTHS:

 ... been violently victimized? ☐ No ☐ Yes If yes, # of times:

 ... been otherwise victimized? ☐ No ☐ Yes If yes, # of times:
Note: ASKED FOR PAST 6 MONTHS, NOT PAST 9 MONTHS



CMHEI - Employment Log - Follow-up (Please print using BLOCK letters or numbers inside boxes)

 STA (2)
 CM
 pg 3/6

 ID:

 Date (mm/dd/yy): / /

 Person Completing Form:

 Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

 Is the consumer **CURRENTLY** working, including volunteer work? ☐ No ☐ Yes

 For the **9 MONTH** period ending today, total number of different jobs (paid & unpaid):

 If none, go to
 next page

 For the **9 MONTH** period ending today, list details of each different job (paid & unpaid) starting with most recent (or current) job:

Job status	Paid?	Job support	Self-employed?	Employed by CSI?	# of weeks
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	
☐ Full-time ☐ Part-time regular ☐ Part-time casual	☐ Volunteer ☐ Paid (if so, give hourly wage) \$.	☐ Sheltered workshop ☐ Other supported approach ☐ Independent	☐ No ☐ Yes	☐ No ☐ Yes	

 If **Employed** during the last 6 months: (1) What job is s/he doing? _____
 (2) How many hours did s/he work per week? _____

 If **Volunteered** during the last 6 months: (1) What job is s/he doing? _____
 (2) How many hours did s/he work per week? _____

Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 9 MONTHS



CMHEI - Financial Log - Follow-up
(Please print using BLOCK letters or numbers inside boxes)

STA (2)
CM
pg 4/6

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

Did the consumer have a regular source of income/ benefits during the past **9 MONTHS**? ☐ Yes

☐ No

If no, go to next page

If consumer did have a regular source of income/ benefits, indicate average monthly income during the past **9 MONTHS**? (Code 9999 if amount received is unknown.)

\$

For a **TYPICAL MONTH** in the past **9 MONTHS**, indicate sources of income/ benefits:

	Indicate whether source received	Indicate amount rec'd from EACH source (Code \$9999 if amount rec'd unknown)	Mark primary source (only one)
Ontario Works (General Welfare Assistance)	☐ Yes ☐ No	\$	☐
Ontario Disability Support Program (Family Benefits Allowance)	☐ Yes ☐ No	\$	☐
Disability Income (GAINS-D, CPP)	☐ Yes ☐ No	\$	☐
Gross Earnings (self)	☐ Yes ☐ No	\$	☐
Pension/ Insurance (Workman's Compensation, Old Age Supplement (OAS), GIS, SPA, Employment Insurance)	☐ Yes ☐ No	\$	☐
Contributions from family (including Spouse/ Partner) for living expenses (e.g., rent, food, utilities, allowance)	☐ Yes ☐ No	\$	☐
Other Income, not Earnings or Benefits (e.g., alimony, child support, trust fund, inheritances) Specify:	☐ Yes ☐ No	\$	☐

Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 9 MONTHS

FINANCIAL LOG (CONTINUED)

- (1) Does s/he receive any **GST**? (CIRCLE ANSWER) **YES** **NO**
- (2) Has s/he received any loans, grants or subsidies in the last **6 MONTHS** (e.g., housing start up, clothing and books, student loans, recreation subsidies? **YES** **NO**

(SEE 2) IF YES: Describe briefly

Description	Source	Amount (weekly, monthly, annually)



CMHEI - Hospitalization Log - *Follow-up*

(Please print using BLOCK letters or numbers inside boxes)

STA (2)
CM
pg 5/6

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

Has the consumer had any overnight stays during the past **9 MONTHS**?
(e.x., for treatment, detox, safe bed)

☐ Yes ☐ No

If no, go to
next page

If yes, please provide the following information for each separate stay:

Facility (enter first 12 letters)	Province (if not ON)	Reason* (check all that apply)	Facility code**	Voluntary	Days in Facility	Admission date also in last 9 months?
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No
		☐ Psy ☐ SA ☐ Detox ☐ Med	☐ PPH ☐ Sp ☐ GH1 ☐ GH ☐ Other	☐ Yes ☐ No		☐ Yes ☐ No

*: Reason: PSY: Psychiatric SA: Substance Abuse treatment DETOX: Detoxication MED: Medical

**: Facility Codes:

PPH: Provincial Psychiatric Hospital SP: Specialty Hospital
GH1: General hospital with psychiatric ward (schedule 1)
GH: General hospital without psychiatric ward (non-schedule 1)
Other: Non-hospital setting

20167



Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 9 MONTHS

HOSPITALIZATION LOG (CONTINUED)
(FOR THE LAST 6 MONTHS)

Accompanied	Travel Mode (1)	Travelling Cost (2)	Total time (including travel time)
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			

NOTE:

- (1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)
 (2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$



CMHEI - Residential Log - Follow-up (Please print using BLOCK letters or numbers inside boxes)

STA (2)
CM
pg 6/6

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

CURRENT SETTING:

Which setting best represents where the consumer is currently staying/ sleeping?

- ☐ Private house/ apartment } *How many people share this house/ apt/home (include consumer)?*
- ☐ Group home (Shared common space, varying levels of support.) }
- ☐ Hostel/ shelter }
- ☐ Boarding/ Foster home } *How many people live under this roof (include consumer)?*
- ☐ Rooming house }

- ☐ Retirement/ Long term care facility }
- ☐ Correctional facility }
- ☐ Hospital }
- ☐ On the street }
- ☐ Other

If consumer is currently staying in a facility, hospital, or on the street go to "STABILITY"

For this current setting,

Who does the consumer CURRENTLY (in the past week) live with? (Indicate all that apply.)

- ☐ Spouse/Partner ☐ Parent(s) ☐ Child(ren) ☐ Other family ☐ Alone ☐ Friend(s)/Other non-family

Is the consumer sharing a bedroom (excluding spouse/ partner)? ☐ Yes ☐ No

Level of staff support LINKED to the residential setting (e.g., support is lost if consumer moves). Exclude support provided by family.

Indicate all that apply. ☐ None ☐ On call ☐ Regular ☐ On site (specify): ☐ Night ☐ Day ☐ 24 hour
(e.g. Crisis) Visit

Does the consumer pay rent? ☐ Yes ☐ No

IF YES: Amount of monthly rent: \$

Is the rent either geared to his/ her income or subsidized in some other way? ☐ Yes ☐ No

STABILITY:

How many nights (consecutive or non-consecutive) has the consumer spent on the streets or in the shelters in the past 9 months?

- ☐ None ☐ <7 days ☐ 7-30 days ☐ 31-90 days ☐ >90 days

Does the consumer expect to be staying where he/she is for less than 60 days in total (include # of days already there)? ☐ Yes ☐ No

How many times has the consumer moved during the past 9 months (excluding hospital and jail)?

If 0, go to NEXT PAGE

MAIN SETTING:

Which setting best represents where the consumer stayed/slept most nights in the past 9 months?

- ☐ Private house/ apartment } *How many people shared this house/ apt/home (include consumer)?*
- ☐ Group home (Shared common space, varying levels of support.) }
- ☐ Hostel/ shelter }
- ☐ Boarding/ Foster home } *How many people lived under this roof (include consumer)?*
- ☐ Rooming house }

- ☐ Retirement/ Long term care facility }
- ☐ Correctional facility }
- ☐ Hospital }
- ☐ On the street }
- ☐ Other

If consumer stayed most nights in a facility, hospital or on the street, go to NEXT PAGE

For this main setting,

Who was the consumer living with? (Indicate all that apply.)

- ☐ Spouse/Partner ☐ Parent(s) ☐ Child(ren) ☐ Other family ☐ Alone ☐ Friend(s)/Other non-family

Was the consumer sharing a bedroom (excluding spouse/ partner)? ☐ Yes ☐ No

Level of staff support LINKED to the residential setting. Exclude support provided by family.

Indicate all that apply. ☐ None ☐ On call ☐ Regular ☐ On site (specify): ☐ Night ☐ Day ☐ 24 hour
(e.g. Crisis) Visit

Did the consumer pay rent? ☐ Yes ☐ No

IF YES: Amount of monthly rent: \$

Was the rent either geared to his/ her income or subsidized in some other way? ☐ Yes ☐ No

20167

Note: ASKED FOR PAST 6 MONTHS, NOT PAST 9 MONTHS

RESIDENTIAL LOG

- (1) Client's present address _____
 Name of Establishment (if relevant) _____
 Address _____

- (2) Approximate date s/he moved here, if less than 6 months ago _____

Who manages the establishment? (CIRCLE NUMBER OF RESPONSE)

MANAGER

NAME

OTTAWA HOUSING

1 _____

NON-PROFIT ORGANIZATION (e.g., City Living, CTOC)

2 _____

PRIVATE OWNERS (rooming/boarding house/residential)

3 _____

OTHER (specify)

4 _____

- (3) Has s/he lived anywhere else over the last 6 months, excluding short-term hospital stays and jail? (CIRCLE ANSWER)

YES

NO

If YES: Describe briefly:



CMHEI - Service/ Resource Use Form
Psychiatrist Visits Log - Follow-up
 (Please print using BLOCK letters and numbers inside boxes)

SU (2)
CM
pg. 1/5

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

In the **PAST 30 DAYS** did the consumer use the services of a psychiatrist?

☐ No If no, go to next page.
☐ Yes If yes, complete one line for each visit:

Location	Province (if not ON)	Group, individual or family therapy ?	Length of visit
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.
☐ Provincial hospital ☐ All other sites		Group ☐ Individual ☐ Family ☐	☐ <20 min. ☐ 30-59 min. ☐ 20-29 min. ☐ 60+ min.

Note: ASKED FOR PAST 6 MONTHS, NOT PAST 30 DAYS

PSYCHIATRIST VISIT LOG (CONTINUED)
(FOR THE LAST 6 MONTHS)

Accompanied	Travel Mode (1)	Travelling Cost (2)	Focus of visit (3)	Total time (including travel time)
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				
☐ Yes ☐ No Who? _____				

NOTE:

- (1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)
- (2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$
- (3) Choose options – (1) psychotherapy; (2) medication follow-up; (3) other (specify)



CMHEI - Service/ Resource Use Form
Non-psychiatrist Health Professional Visits Log - Follow-up
(Please print using BLOCK letters and numbers inside boxes)

SU (2)
CM
pg 2/5

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

In the **PAST 30 DAYS** did the consumer visit a physician (non-psychiatrist) in any setting or another health professional in an office-based practice? ☐ No If no, go to next page.
☐ Yes If yes, complete one line for each type of service:

Type of visit*	Provider	Location	Province (if not ON)	Average length of visit	Number of visits
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	
☐	☐ Physician ☐ Other (e.g., dentist, podiatrist, social worker)	☐ Provincial hospital ☐ All other sites		☐ <20 mins ☐ 30-59 mins ☐ 20-29 mins ☐ 60+ mins	

Type*: 1= mental health 5= foot care
2= eye care 6= lab tests
3= dental care 7= other physical health
4= ear care 8= other

Shade circles like this: ☒
Not like this: ☐ ☐

Note: Cards were shown to clients with the following health professionals as options: GENERAL HOSPITAL (OUTPATIENT; DAY TREATMENT), PSYCHIATRIC HOSPITAL (OUTPATIENT; DAY TREATMENT), WALK-IN CLINIC, FAMILY PHYSICIAN, PSYCHOLOGIST, CHIROPRACTOR, CHIROPODIST, PODIATRIST, DENTIST, OPTOMETRIST, AUDIOLOGIST, DIETICIAN, and PHYSICAL THERAPIST.

Also asked: Is s/he registered with a family physician? YES NO

Note: ASKED FOR PAST 6 MONTHS, NOT PAST 90 DAYS

NON-PSYCHIATRIST HEALTH PROFESSIONAL VISIT LOG (CONTINUED)
(FOR THE LAST 6 MONTHS)

Accompanied	Travel Mode (1)	Travelling Cost (2)	Total time (including travel time)
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			

NOTE:

(1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)

(2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$



CMHEI - Service/ Resource Use Form
Community Services and Support Programs Log - Follow-up
 (Please print using BLOCK letters and numbers inside boxes)

SU (2)
CM
pg 3/5

ID:

Person Completing Form:

Date (mm/dd/yy): / /

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

Has the consumer used community services and support programs during the **PAST 30 DAYS**?

☐ No If no, go to next page.

☐ Yes If yes, complete the following for each program:

Name of Program/ Agency	City (enter first 6 letters)	Province (if not ON)	Program Type*	Total contacts in past 30 days	Contacts in past 30 days which were in a group	Contacts in past 30 days which were on the phone	Total # weeks attended in past 30 days	Average hours per week (during weeks attended)

Program Type*:

0 = Substance abuse	5 = Medical/ therapeutic
1 = Social/ recreational	6 = Case management
2 = Vocational/ educational	7 = Self-help/ consumer initiative
3 = Crisis	8 = Legal advocacy
4 = Housing	9 = Other

16802



Note: Community services included: TRAINING CENTER/SHELTERED WORK, DROP-IN FACILITY, SOCIAL CLUB, COMMUNITY CENTRE, POLICE DEPARTMENT, LEGAL AID/COURT, PROBATION SERVICES, FIRE DEPARTMENT, EMPLOYMENT AGENCY, EDUCATIONAL FACILITIES, OUTGOING LEISURE ACTIVITIES, ADDICTION PROGRAM, PRIVATE COUNSELLING, PSYCHOLOGIST, FAMILY SERVICES

Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 30 DAYS

COMMUNITY SERVICES AND SUPPORT PROGRAMS LOG (CONTINUED)**(FOR THE LAST 6 MONTHS)**

Accompanied	Travel Mode (1)	Travelling Cost (2)	Total time (including travel time)
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			

NOTE:

(1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)

(2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$

COMMUNITY SUPPORT WORKER

In working with this client has there been any above average administrative or managerial involvement: (CIRCLE ANSWER)

YES

NO

IF YES:

1. Specify the extra involvement (i.e., more than average phone calls, case conferences, extra referrals, supervision, etc.)

2. Approximately how much more time than for the average client have you spent on the extra involvement with this client? (for the last 6 months)

_____ hours / week

OR

_____ hours / month

HOME CARE

Has s/he received any home care services during the last **6 months**?

YES

NO

IF YES: Complete the box below:

Service	Who service is provided by (1)	Frequency of Visit	Duration of Visit	Average Time / week	Total # sharing service	Cost of care (2)

(1) Service provided by – Name of Public Agency, Voluntary, Private Organization, or Other

(2) Travelling Cost: If covered place a “C” in the box; If out of pocket, record charge in \$

NOTE: Home care includes the following options shown to client:

NURSING ASSISTANCE, VISITS BY FAMILY PHYSICIAN (PSYCHIATRIC OR MEDICAL CARE), COMMUNITY PSYCHIATRIC NURSE, FIELD SOCIAL WORKER, CHIROPODIST, HOME HELP SERVICE, PRIVATE DOMESTIC HELP, MEALS ON WHEELS, PRIVATE NURSING CARE, SOCIAL SECURITY OFFICER, CARE ATTENDANT (i.e., Comcare), VISITING OR BEFRIENDER SCHEMES (i.e., volunteer, partner of progress, hired companion), PHYSICAL THERAPIST, OCCUPATIONAL THERAPIST, OTHER – SPECIFY



CMHEI - Service/ Resource Use Form
Emergency Room Visits Log - Follow-up
 (Please print using BLOCK letters and numbers inside boxes)

SU (2)
CM
pg 4/5

ID:

Date (mm/dd/yy): / /

Person Completing Form:

Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

Has the consumer used emergency room services during the **PAST 90 DAYS** ?

☐ No If no, go to next page.
☐ Yes If yes, complete the following for each ER visit:

Name of Hospital for ER visit (enter first 15 letters)	City (enter first 6 letters)	Province (if not ON)	Purpose* (check all that apply)	Stayed overnight in holding bed?	Led to a hospital admission?
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Psy ☐ Med ☐ SA ☐ Oth	☐ Yes ☐ No	☐ Yes ☐ No

Purpose*: Psy = Psychiatric
 SA = Substance Abuse
 Med = Medical
 Oth = Other

Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 90 DAYS

EMERGENCY ROOM VISIT LOG (CONTINUED)**(FOR THE LAST 6 MONTHS)**

Accompanied	Travel Mode (1)	Travelling Cost (2)	Total time (including travel time)
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			
☐ Yes ☐ No Who? _____			

NOTE:

- (1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)
- (2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$



10602

CMHEI - Service/ Resource Use Form
Prescribed Psychiatric Medication Log - Follow-up
 (Please print using BLOCK letters and numbers inside boxes)

SU (2)
 CM
 pg 5.5

ID: Date (mm/dd/yy): / / Person Completing Form:
 Indicate Period: ☐ Baseline ☐ Follow-up 3
☐ Follow-up 1 ☐ Follow-up 4
☐ Follow-up 2

 Have psychiatric/ substance abuse medications
 been dispensed to the consumer during the **PAST**
30 DAYS?
☐ No If no, go to next page.
☐ Yes If yes, complete the following for each medication:

Prescription Name (enter first 11 characters)	Type*	Prescribed Dose <i>Indicate mg per dose (if not available, indicate number of pills/ injections taken at one time)</i>	# doses in 24 hour period prescribed (if injection or PRN, see below)	During past month, # days for which medication or injection dispensed
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		
	☐	mg OR # pills/ injections		

Type*: 1 = Sleeping pills or other sedatives (e.g. Halcion, Dalmane)
 2 = Antidepressant or mood stabilizing medications (e.g. Prozac, Elavil, Lithium)
 3 = Tranquillizers (e.g. Ativan, Valium)
 4 = Analgesics or painkillers (e.g. Demerol, Darvon)
 5 = Anti-psychotics (e.g. Haldol, Moticate)
 6 = Substance abuse treatment (e.g. Methadone, Antabuse)
 7 = Other

Indicate:
 97 = PRN
 98 = Injection
 99 = Unknown

10602



Note: ASKED FOR PAST **6 MONTHS**, NOT PAST 90 DAYS

PRESCRIBED PSYCHOTROPIC MEDICATION LOG (CONTINUED)**(IN PAST 6 MONTHS)**

Who paid for the medication/injection? ***	Amount of charge, if not covered by FBA/GW per month	Assistance to obtain medication?	Travel mode (1)	Travelling Cost (2)	Total Time (including travel time)
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			
		☐ Yes ☐ No Who? _____			

Coverage ***: 1 = Parent/Family Insurance Plan
 2 = Personal Insurance Plan
 3 = FBA/GW
 4 = Own pocket

Note:

- (1) Mode of Travel – Transport provided, Public Transport, Taxi, Other (specify)
 (2) Travelling Cost – If covered, place a “C” in box; If out of pocket, record charge in \$

Appendix D: Costing Data Collection Summary Sheets

COSTING DATA COLLECTION

1. Baseline information

I.D. _____ Sex: M ☐ F ☐ Interviewer _____

II. Costing information

A. Education

Currently enrolled? Yes ☐ No ☐Enrolled in the past 6 months? Yes ☐ No ☐

How many months during past 6 months? _____

Where is the client studying? _____

Who paid for education? Client amount _____
Family amount _____
Government amount _____

Level of education presently studying:

- (1) secondary (high school)
- (1) adult education
- (2) community college
- (3) vocational / technical / trade school
- (4) university
- (5) other

\$ Edu

B. Legal issues (past 6 months)

.... been arrested? Yes ☐ No ☐ If yes, # of arrests: _____... spent any nights in prison/jail? Yes ☐ No ☐ If yes, # of nights: _____... been on parole / probation? Yes ☐ No ☐ If yes, # of episodes: _____

\$ Legal

C. Employment (past 6 months)

Did the consumer work (**paid job**) during the past 6 months? Yes ☐ No ☐

hours/week _____ Hourly rate \$ _____ # of weeks _____

\$ _____ /6 months

\$ Employ

Did the consumer do some **volunteer job** during that period? Yes ☐ No ☐

hours/week _____ # of weeks _____ Total hours/6 months _____

\$Volunt

D. Financial status

Did the consumer have a regular source of income/benefit during the past 6 months?

Yes ☐ No ☐

	Source	Amount/month	
(1)	Ontario Works (General welfare assistance)	\$ _____	income1
(2)	Ontario Disability Support Program (FBA)	\$ _____	income2
(3)	Disability Income (GAINS-D, CPP)	\$ _____	income3
(4)	Gross earnings (self)	\$ _____	income4
(5)	Pension/Insurance	\$ _____	income5
(6)	Contributions from family	\$ _____	income6
(7)	Other income, not earnings or benefits (alimony, child support, trust fund, inheritances)	\$ _____	income7

\$ income

Does client receive any GST? Yes ☐ No ☐

\$ Gst

Has the client receive any loans, grants or subsidies in the last 6 months? (e.g. housing start up, clothing and books, students loans, recreation subsidies, etc.) Yes ☐ No ☐

If yes, \$ _____

\$ loans

E. Hospitalization

Has the consumer had any overnight stays during the past 6 months? Yes ☐ No ☐

If yes, # of stays _____ # of days for each stay

a. _____

b. _____

c. _____

\$ hosp

(Provide this information for each hospitalization)

- a. Mode of transportation _____
- Was the client accompanied? Yes ☐ No ☐ By who? _____
- Who paid for transportation? _____ cost \$ _____

\$ Transpcost

Travelling time _____

Time ____ X ____ (salary) =

\$ Transptime

- b. Mode of transportation _____
- Was the client accompanied? Yes ☐ No ☐ By who? _____
- Who paid for transportation? _____ cost \$ _____

\$ Transpcost

Travelling time _____

Time ____ X ____ (salary) =

\$ Transptime

- c. Mode of transportation _____

Was the client accompanied? Yes ☐ No ☐ By who? _____

Who paid for transportation? _____ cost \$ _____

\$ Transpcost

Travelling time _____

Time ____ X ____ (salary) =

\$ Transptime

\$ Totaltime

\$ Transptotal

F. Residential information

1. Which setting best represents where the consumer is currently staying/sleeping?

- (1) private house/ apartment
- (2) group home (shared common space, varying levels of support)
- (3) hostel/ shelter
- (4) boarding / foster home
- (5) rooming house
- (6) retirement/ long term care facility
- (7) correctional facility
- (8) hospital
- (6) on the street
- (10) other _____

2. Who does the consumer currently live with?

- (1) spouse / partner
- (2) parent(s)
- (3) child(ren)
- (4) other family
- (5) alone
- (6) friend(s) / other non-family

3. Is the consumer sharing a bedroom (excluding spouse/partner)? Yes ☐ No ☐

4. Who manages the establishment? _____

5. Does the consumer pay rent? Yes ☐ No ☐ If yes, \$ _____ / month

6. Is the rent either **geared to his/her income, or subsidized** in some other way ?

Yes ☐ No ☐

\$ Reside1

**Residential cost to client
for current setting** \$ _____
/month

\$ Residgov1

**Residential cost to agency/gov./other
for current setting** \$ _____
/ month
(Specify _____)

\$ Residf1

Residential cost to family/friend \$ _____ **for current setting**
/month

7. Which setting best represents where the consumer stayed / slept most nights in the past 6 months?

- (1) private house/ apartment
- (2) group home (shared common space, varying levels of support)
- (3) hostel/ shelter
- (4) boarding / foster home
- (5) rooming house
- (6) retirement/ long term care facility
- (7) correctional facility
- (8) hospital
- (6) on the street
- (10) other _____

8. Who did the consumer live with?

- (1) spouse / partner
- (2) parent(s)
- (3) child(ren)
- (4) other family
- (5) alone
- (6) friend(s) / other non-family

6. Was the consumer sharing a bedroom (excluding spouse/partner)? Yes ☐ No ☐

10. Who manages the establishment? _____

11. Was the consumer paying rent? Yes ☐ No ☐ If yes, \$ _____ / month

12. Was the rent either geared to his/her income, or subsidized in some other way ?

Yes ☐ No ☐

\$ Reside2

Residential cost to client
for main setting \$ _____
/month

\$ Residgov2

Residential cost to agency/gov./other
for main setting \$ _____
(Specify _____) / month

\$ Residf3

Residential cost to family/friend
for main setting \$ _____
/ month

TOTAL COST FOR RESIDENCE (FOR THE 6 MONTH PERIOD:

\$ Reside

Residential cost to client \$ _____/month

Residential cost to agency/gov./other \$ _____ / month

\$ Residgov

(Specify _____)

\$ Residf

Residential cost to family/friend \$ _____
/ month

G. Psychiatrist visits

In the past 6 months, did the consumer use the services of a psychiatrist? Yes ☐ No ☐

of visits: _____

In what setting: (1) Hospital (2) Private office

Therapy: (1) group (2) individual (3) family

Length of each visit: _____ minutes (average)

\$ Psychia

Total time: _____ x \$ _____

Was the client accompanied to the visits? Yes ☐ No ☐

If yes, who was companion? _____ Travelling mode: _____

Travelling cost \$ _____ Who paid? _____

Total time (including travel time) _____

\$ Psytrav

\$ Psytravtime

H. Non-psychiatrist health professional visits

In the past 6 months, did the consumer visit a non-psychiatrist health professional?

Yes ☐ No ☐ If yes, specify:

- (1) general practitioner
- (2) neurologist
- (3) general hospital - out patients, day treatment
- (4) psychiatric hospital - out patients, day hospital
- (5) walk-in clinic
- (6) psychologist
- (7) chiropractor
- (8) chiropodist
- (6) podiatrist
- (10) dentist
- (11) optometrist
- (12) audiologist
- (13) dietician
- (14) physical therapist (in hospital or clinic base practice)

Prof.	\$ /hr	Type of service	Location		Length of visit	# of visits	Total\$ of visit (a)	Was accomp.	Travel cost (b)	Total time including travel (c)	who paid travel cost
			H*	P**							

\$ Npsycost (a)

\$ npsytime (c)

\$ npsytrav(b)

* hospital setting ; ** private office setting

I. Community services and support

Has the consumer used community services and support programs during the past 6 months?

Name of agency or program	Type of service used	Total contacts	# of group contacts	# of phone contacts	Average hours for 6 months	\$\$ (a)	Trav. \$\$ (b)	Who paid travel fees	Accomp.	Total time including travelling (c)

\$ Service\$ (a)

\$ servictime (c)

servictrav(b)

\$ CMHA

(Only if consumer has an official case manager)

J. Community Support worker

In working with this client, has there been any above average administrative or managerial involvement: Yes ☐ No ☐

If yes, approximately how much time more than for the average? _____ hours/ month

\$ Above

K. Home care

Did client receive any home care services during the past 6 months? Yes ☐ No ☐

Service	Service provided by (1)	Frequency of visit	duration of visit	average time per week	total number sharing service	cost of care

1. Service provided by - Name of public agency, voluntary, private organization, or other - specify)

\$ homefam

\$ homecl

\$ homegov

L. Emergency Room visits

Has the consumer used emergency room services during the past 6 months? Yes ☐ No ☐

\$ Emerg

1. If yes, specify: # of visits: _____
of stays overnight in holding bed _____

2. Did the client go by ambulance? Yes ☐ No ☐

3. Did someone accompany the client? Yes ☐ No ☐

If yes, specify _____

4. Travelling cost \$ _____ Who paid for? _____

5. Total time (including travelling time) _____

M. Prescribed medication

1. Have medications been dispensed to the consumer during the past 6 months?

Yes ☐ No ☐

If yes,

Medication	Type	Dose		# of dose in 24 hours	# of days in the past 6 months	cost
		Pills	Injection			

\$ med

2. Who paid for the medications _____

3. Did client need assistance to get the medications? Yes ☐ No ☐

If yes, who helped? _____

4. Travel cost \$ _____

5. Total time including travelling time _____

\$ medtime

COSTING SUMMARY SHEET

\$ edugov

A. EDUCATION

1. Fees covered by government

\$ edufam

2. Fees covered by client's family/friends

\$ educl

3. Fees covered by client himself

\$ legal

B. LEGAL

Police + Probation officer + Jail + lawyers
**** check under community services**

\$ salary

C. EMPLOYMENT

1. If client had a job, report his total salary

\$ volunt

2. If client did some volunteer work, calculate total time at minimum wage

D. FINANCES (client's source of income)

1. Ontario works (General welfare)

\$ gw

2. Ontario disability support pension (ODSP)

\$ ODSP

3. Disability income

\$ disable

4. Pension/Insurance

\$ pension

5. Contribution from family

\$ family\$

6. GST

\$ gst

7. Grants subsidies

\$ grants

E. HOSPITALIZATION FEES

1. Hospitalization fees

\$ hosp

2. Doctor's visits during hospitalization
(Calculate one visit/day as in-patient + one assessment)

\$ docvisit

Total hospitalization fees: (hosp + docvisit)

\$ hospital

F. RESIDENCE

1. The amount of the rent paid by client

\$ rent

2. Total residential cost to agency/government

\$ residgov

3. Total residential cost to family/friends
(If living at home or with friends, or if family
is paying full rent or part of it)

\$ residfam

G. PSYCHIATRIST VISITS

Total fees for psychiatrist visits

\$ psychia

H. NON-PSYCHIATRIST VISITS

Total cost for non-psychiatrist professional visits

\$ nopsy

I. COMMUNITY SERVICES AND SUPPORT

1. Case managers (planned meeting) (this excludes the time spent to accompany to different appointments/services, etc.)

\$ cm\$

2. Total other services used

\$ comserv

J. COMMUNITY SUPPORT WORKER

\$ above

(When client required above average work, like administration or managerial involvement)

K. HOME CARE

1. If services are dispensed free of charge to client

\$ homecost

2. If services are paid or dispensed by family/friends

\$ homefam

3. If services are paid by client

\$ homecl

L. EMERGENCY ROOM VISITS

1. Emergency room cost

\$ emerg

2. Ambulance fees if used

- a) If paid by government

\$ ambugov

- b) If paid by family/friend

\$ ambufam

- c) Client's part of the costs

\$ ambucl

M. MEDICATION

1. Total of medication fees (include delivery, dosette preparation if applicable, etc.) paid by drug cards

\$ medgov

2. Total cost to family if they provide meds

\$ medfam

3. Total cost to client

\$ medcl

N. TOTAL TRANSPORT COSTS IN GETTING SERVICES

1. Client:

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
hosp	psych	no-psy	services	emerg	med

Total transport costs for client:

\$ transpcl

2. Family/friends:

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
hosp	psych	no-psy	services	emerg	med

Total transport costs for family/friends:

\$ transpfam

O. TOTAL TIME SPENT IN GETTING SERVICES**1. Client:(use mininum wage)**

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
hosp	psych	no-psy	services	emerg	med

Cost for total time client spent to get services:

\$ timecl

2. Family/friends (use mininum wage)

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
hosp	psych	no-psy	services	emerg	med

Cost for total time spent by family members/friends to help client get services:

\$ timefam

3. Case manager (use \$28.74/hour for both case manager and outreach worker)

<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
hosp	psych	no-psy	services	emerg	med

Cost of total time spent by c.m. to accompany client:

\$ timecm

P. CONSTANT**

- 1. When client is in the case manager program, use \$672.00 as a constant for the cost related to CMHA services**
- 2. When client is in the outreach program, use \$252.00 as a constant for the cost related to CMHA services**

PACKAGE OF CARE FROM SOCIETAL PERSPECTIVE

Total cost to agency

\$ Agency

(Constant + cm\$ + above + timecm)

Total cost of non-agency health care

(+) **\$ Non-Agency Health Care**(hospital + psychia + nopsy +
emerg + ambugov + medgov)

Total cost of non-health care services

(+) **\$ Non-Health Care Services**

(edugov + legal + comserv + homecost)

Total cost to family/relatives/friends

(+) **\$ Family**(edufam + family\$ + residfam + homefam +
ambufam + medfam + transpfam + timefam)

Societal 'benefits':

if s/he has been employed indicate total earnings: _____

+

if s/he has been involved in volunteer work,
use minimum wage to cost his/her total time: _____

Total societal 'benefits':

(-) **\$ Benefits****TOTAL COSTS FROM SOCIETAL PERSPECTIVE:****\$ SOCIETY**

(\$ Agency + \$ Non-Agency Health Care + \$ Non-Health Care + \$ Family - \$ Benefits)

Additional costs not used in calculation:

Total costs to the client:

\$ Client

(timecl + educl + rent + homecl + ambucl + medcl)

*not used because only relevant if client lives primarily from job income

Transfer payments:

\$ Transfer Payments

(gw + odsp + disable + pension + family\$ + gst + grants)

*not used because transfer payments are not a cost to society as funds merely 'change hands'

Appendix E: Sources of Unit Costs

The following table outlines the source of determining unit costs for all relevant services and supports.

Item/Service/Support	Description of Source of Unit Cost Information
Education	If client was currently enrolled in a college or university program, the college or university was contacted and tuition was ascertained for the base year 2001. Part time was deemed the cost of one course. Yearly tuition was halved for the 6-month period.
Arrests	A local police station was contacted to determine the cost of one arrest.
Night in prison/jail	A local police station was contacted to determine the cost of a night in a local jail and a provincial prison.
Parole/probation	A local parole office was contacted to determine the hourly salary of a parole officer.
Lawyer	Legal aid was contacted to determine the hourly wage of a lawyer working in this capacity. The Law Society of Upper Canada was contacted to determine the hourly rate for a lawyer working outside of Legal aid.
Hospitalization	The finance departments for all local hospitals were contacted for the following information: The cost of one night of hospital stay, one visit with a medical doctor, and one visit with a psychiatrist for a psychiatric admission. For the one hospital that did not return the call after several attempts, the unit costs for the remaining hospitals were averaged.
Ambulance Use	The Ontario Ministry of Health and Long-Term Care was contacted to determine ambulance costs (hourly rate for drivers, hourly rate for

paramedics, and fixed cost for ambulance use). The unit cost was determined by combining the salary of the driver, the salary of the paramedic, and the use of the van.

Emergency Room	The finance departments of all local hospitals were contacted to determine the cost of an emergency room visit at said hospital.
Transfer payments	Clients reported on the amount of disability payments, welfare, and government benefits they received.
Residential Information	Clients reported on their monthly rent and this was multiplied by 6 for the 6 month rental cost.
Psychiatry	Ontario Medical Association was contacted to ask what the hourly rate in 2001 was for a psychiatric assessment and psychiatric follow-up.
General Practitioner	Ontario Medical Association was contacted to ascertain what the hourly rate for a family practitioner is (base rate 2001).
Other specialist physician	Neurologist, Chiropracist, etc. → Ontario Medical Association was contacted to ask what the hourly rate for said specialist is (base rate 2001)
Dietician	The Dieticians of Canada website was consulted to determine the hourly rate for a dietician.
Physiotherapist	The College of Physiotherapists of Ontario was contacted to determine the hourly wage of a registered physiotherapist in Ontario.
Occupational Therapist	The College of Occupational Therapists of Ontario was contacted to determine the hourly wage of a registered occupational therapist in Ontario.

Massage Therapist	The College of Massage Therapists of Ontario was contacted to determine the hourly wage of a registered massage therapist in Ontario.
Psychologist	Ontario College of Psychologists was contacted to ask what the 2001 hourly rate for a registered clinical psychologist was.
Audiologist	Canadian Academy of Audiology was contacted to ask what the hourly rate for an Audiologist in Ontario is.
Optometrist	Ontario Association of Optometrists was consulted to ask what the hourly rate for an optometrist is, including the cost of one eye exam.
Chiropractor	Ontario Chiropractic Association (OCA) was contacted to ask what the hourly rate is for a chiropractic assessment, and a half hour follow-up appointment.
Dentist	Ontario Dental Association was contacted to determine the cost of a dental cleaning (hygienist only), dental exam, and dental x-rays.
Nurse	The College of Nurses of Ontario was contacted to determine the hourly wage of a nurse practicing in Ontario.
Case Manager/ Worker	The Canadian Mental Health Association – Ottawa Branch supplied us with the hourly wage of intensive case workers, outreach workers, ACT case workers, and counselors at the agency. The Royal Ottawa Mental Health Centre was contacted to ascertain the hourly salary of one of their case workers or social workers if client indicated worker was specifically from the hospital.
Social Worker	Ontario College of Social Workers and Social Service Workers was contacted to ascertain the cost of one hour of social worker service.

Community Services and Supports Shelters, food banks, rent banks, drop-in centers, church meals, Youth Services Bureau, women's centers, peer support groups, etc. were contacted as they arose (if a client indicated using them) to ascertain the cost of whatever service the client indicated. After three attempts at contacting a service with no response, the service was costed with the nearest 'like' service.

Home Care Clients provided the name of the public agency, volunteer, or private organization providing the home care service. The relevant organization (if applicable) was contacted and travel time and direct service provision for one hour of home care was ascertained. If a client was receiving home care from a relative or friend (volunteer), the hours were costed at minimum wage.

Medications A local pharmacy was contacted to determine the at-cost worth of one pill/injection of all relevant medication listed by clients. The pharmacy was also asked to provide a dispensing fee that was added to the total of each medication cost (x6 for each month, assuming clients had prescriptions filled once a month).

Appendix F: Unit Costs for Professional and Community Services

COSTING FOR PROFESSIONALS

<i>Profession</i>	<i>Hour Rate</i>
ACT- case management	\$833.33/month/client
Ambulance staff	\$22.00
Counselor	\$98.00
Dentist (Fees from Ontario Dental Association)	Oral exam = \$17 Polish = \$28 X-Ray = \$12 Double filling = \$69 When type of service unknown use = 1 visit = \$126 2 visits = \$196
Lab technician (lab test)	\$50. / test
Lawyer	\$60.00/hr = Legal aid \$105.00/hr = others
Massage therapist	\$50.00
Nurse	\$44.00
Nutritionist	\$26.00
Occupational Therapist	\$60.00
Optometrist	Assessment = \$78.00 Glasses = \$50 + \$68 if regular \$50 + \$80 if bifocal (What government pays for people on welfare)
Physiotherapist	\$107.25 (regular visit) \$38.80 (one assessment)
Police	Arrest: \$260.00/arrest Other services: \$55.00/hr
Probation officer	\$40.00/contact
Psychologist	\$100.00 Psychological Evaluation = \$750.00
ROMHC case manager/social worker	\$35.00
Social Worker	\$28.74

MEDICAL PROFESSIONALS

Note: each 16 minutes = .5 hour

Family doctor:

Visit with **no mental health** service:

≤ 20 minutes = \$29.65 (includes a minor assessment)

between 20 and 30 minutes = \$53.55

between 30 and 60 minutes = \$107.10

> 60 minutes = \$107.10 + additional time

In-patient visit = \$53.55 / unit

Visit with mental health services / counseling / psychotherapy

.5 hour = \$49.95

1 hour = \$99.90

Psychiatrist

≤ 20 minutes = \$49.95

If only one visit = \$56.55 (includes an assessment)

If multiple visits, calculate one at \$56.55 and the others at \$24.40

between 20 and 30 minutes = \$56.55

between 30 and 60 minutes = \$156.45

> 60 minutes = \$ 156.45 + additional time

In-patient = \$58.90 / unit

Consultation (use only if has been referred) = \$111.25 / .5 hr

If client sees a medical doctor for a mental problem and has one visit to a psychiatrist, then assume it is a referral and use consultation fee

All other specialists: if one or two visits only assume it is a referral = \$111.25 / .5 hr

If regular visits calculate one visit @ 111.25 / .5 hr

and the other visits @ \$56.55/.5 hr

COSTING HOSPITAL SERVICES

CHEO	Emergency Room:	\$110.00/visit
	24 hours stay:	\$1031.00/day
GENERAL	Emergency Room:	\$110.00/visit
	24 hours stay:	\$1001.00/day
CIVIC	Emergency Room:	\$150.00/visit
	24 hours stay:	\$968.00/day
ROYAL	Emergency Room:	\$110.00/visit
	24 hours stay:	\$481.00/day
MONTFORT	Emergency Room:	\$110.00/visit
	24 hours stay:	\$383.40/day
QUEENSWAY CARLETON	no costing information- use average cost	
	Emergency Room:	\$110.00/visit
	24 hours stay:	\$773.00/day

When inpatient, ADD one doctor's visit per day

If medical reason = \$71.65

If psychiatric reason = \$118.45