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Evaluating the Effectiveness of a Program Targeting Behaviour Disorders: The Development of a Logic Model

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Abstract

While rigorous experimental studies have provided evidence of the efficacy of certain types of interventions in reducing behaviour disorders, findings are less helpful for clinicians and managers in integrating these treatment approaches into efficient service models. Furthermore, it is still not clear how and why interventions work, either when applied alone or in combination. Further research is needed to understand the mechanisms leading to the achievement or non-achievement of interventions outcomes. We hypothesized that the development of a logic model would help to evaluate intervention effectiveness in reducing behaviour disorders and understand its underlying mechanisms. This paper presents a logic model developed to assess the effectiveness of a program for persons with intellectual and developmental disabilities and behaviour disorders. It first describes how the model was developed, and then presents recommendations for service providers, decision-makers, as well as researchers in their effort to build scientific evidence.

Current approaches of service delivery in intellectual and developmental disabilities (IDD) aim for evidence-based practices. Decisions on whether or not an intervention or a program is funded and implemented should be based on its proven relationships with intended outcomes. Consequently, there is a growing need for scientific evidence of interventions' effectiveness. Service providers and decision-makers also need some cues on how to adapt the "evidence" to their context (Burton & Chapman, 2004; Martin, Shooshtari, Temple, & Yu, 2010). However, building and applying evidence is a complex undertaking. Researchers and program evaluators face multiple conceptual and systemic problems on the road from knowledge production to practice (Burton & Chapman, 2004). These problems are common to the evaluation of all community health and social services since the environment in which interventions are implemented is not enclosed and controlled. Many external factors interact with clinical factors to impede or increase the intervention success. These interventions are thus complex. They have many components and the causal chains between activities and outcomes are not usually linear, and they cannot be articulated in advance (Rogers, 2008). Evidence useful for service delivery and decision-making must capture the complexity of the relationships between an intervention, its context and the targeted outcomes.

Theory-based evaluation is centred around the description of the theory underlying a given intervention – effectiveness that can be derived from the scientific literature or from the perspective of those who provide or design the intervention (Chen, 1990; 2005). This theory describes presumed links between activities and the achievement (or non-achievement) of expected outcomes. These assumptions can be illustrated in a logic model using figures and graphs (Frechtling, 2007; Wyatt Knowlton, & Phillips, 2008). The logic model provides a framework to design a program evaluation and then to collect and interpret data from various sources and using different methods (Cooksy, Gill, & Kelly, 2001). Logic models are particularly relevant when evaluating the effectiveness of complex interventions (Rogers, 2008). The model helps understanding which causal chains are supported by the data collected and which chains break down.

This paper presents a logic model developed to assess the effectiveness of a program for persons with IDD and behaviour disorders. It also examines some of the challenges faced in the evaluation of complex interventions, and presents recommendations for service providers, decision-makers, as well as researchers in their effort to build scientific evidence.

Interventions in Behaviour Disorders: Current State of Evidence

Between 10% and 40% of persons with IDD also present with behaviour disorders (Benson, 2005; Crocker et al., 2006). A behaviour disorder is defined as an "action or set of actions deemed problematic because it deviates from social, cultural or developmental norms and is prejudicial to the person or the person's social or physical environment" (Tassé, Sabourin, Garcin, & Lecavalier, 2007, p.1; 2010). Most common behaviour disorders include aggressive behaviours towards self or others, and destruction of material. The prejudice is "deemed severe if it actually or potentially jeopardizes the physical or psychological integrity of the person, another person, or the environment, or jeopardizes the person's liberty, social integration or social supports" (Tassé, Sabourin, Garcin, & Lecavalier, 2007, p.1; 2010).

Both pharmacological and psychological interventions are used in managing behaviour disorders. Current evidence demonstrates small differences between the mean effects of psychotropic medication, psychotherapeutic interventions or contextual interventions (Heyvaert, Maes, & Onghena, 2010). Moreover, psychotropic drugs are often prescribed, even though evidence of their efficacy in reducing behaviour disorders is controversial (Tyrer et al., 2008). Intervention effectiveness seems to rely on a functional and multidimensional assessment of the behaviour disorders (Ager & O'May, 2001; Didden, Duker, & Korzilius, 1997). This assessment consists of identifying the behaviour antecedents and consequences which can "motivate" the person to perform the behaviour disorder (O'Neil et al. 1997). Because the factors that contribute to the manifestation and maintenance of a behaviour are numerous and vary from one person to another, a multidimensional approach is recommended (Gardner, Dosen, Griffiths, & King, 2006; L'Abbé & Morin, 2001). Effective interventions target the behaviours' functions as identified in the assessment and change, when possible, contextual and personal factors that contribute to the behaviour disorder. In terms of service organization, the strongest evidence supports using short-term programs of multidimensional functional assessment and behavioural interventions, especially when the person's needs are complex (Asmus et al., 2004). The intervention approach should also be person-focussed so that clients are redirected toward community settings and their quality of life is improved (Gardner et al., 2006). The success of interventions also depends on the staff training and supervision (McClean et al., 2005).

While rigorous experimental studies have provided evidence of the efficacy of certain types of interventions in reducing behaviour disorders, findings are less helpful for clinicians and managers in integrating these treatment approaches into efficient service models (Grey & Hastings, 2005). Furthermore, it is still not clear how and why interventions work, either when applied alone or in combination. Further research is needed to understand the mechanisms leading to the achievement or non-achievement of interventions outcomes (Heyvaert et al., 2010).

We hypothesized that the development of a logic model would help to evaluate intervention effectiveness in reducing behaviour disorders and

understand its underlying mechanisms. Logic models are developed to illustrate stakeholders' assumptions. This paper presents a logic model based on stakeholder's assumptions to assess the effectiveness of a program for persons with IDD and behaviour disorders. The paper first describes how the model was developed, and then presents recommendations for service providers, decision-makers, as well as researchers in their effort to build scientific evidence. To note is that the model benefitted from a few months of data collection at the time this manuscript was written, but it has not yet been validated. This paper does not pretend to present a validated approach to measure the effectiveness of programs targeting behaviour disorders.

Method: The Development of a Logic Model

The logic model was developed to support the evaluation of the effectiveness of a program for persons with intellectual disabilities and behaviour disorders. It provided a framework for data collection and analysis. It was not meant to fit a predetermined dataset. It reflects the assumptions of the managers and staff on the causal chains between their actions and the desired outcomes.

The program under evaluation was a medium-term (maximum 18 months) residential service for persons over 13 years of age with both intellectual disability and severe behaviour disorders. It aimed to provide multidimensional functional assessment and behavioural interventions to reduce the frequency or the severity of the clients' behaviour disorders. This transitional program, which opened in November 2008, was part of a continuum of services and was integrated into a regional agency providing supports for persons with IDD. Considered a demonstration project, this program was assigned an evaluation team in its planning stage to monitor it from the start. This team had the mandate to evaluate both the program implementation and effectiveness.

The evaluation team decided to develop a logic model to describe the assumptions of the program managers and staff about what elements they consider essential for effectiveness, that is, what they intended to do and why they wanted to proceed in this particular way (Birckmayer & Weiss, 2000). Practitioners and service providers often hold some implicit or explicit assumptions about the relationships between their actions and outcomes, and between external and clinical factors – that is, their "theory of action." Their "theory of action" has a variety of sources – specialized literature, experience, peer influence – and mixes scientific knowledge with clinical judgment (Burton & Chapman, 2004). Therefore, the logic model was developed with field actors (program managers and staff), iteratively and in a way that respected their "theory of action" (Frechtling, 2007; Rogers, 2008; Wyatt Knowlton & Phillips, 2008). This means that each of their assumptions was described in terms of objectives – activities planned to achieve them – and intended short- and long-term outcomes.

After the program proponents identified their assumptions, indicators were searched for measuring activities implementation and assessing results against intended outcomes. To minimize biases, indicators were first defined based on the findings of a literature review on the effectiveness of interventions targeting behaviour disorders in persons with intellectual disabilities (Grol, Wensing, & Eccles, 2005). We also consulted clinicians and researchers with expertise in behaviour disorders to check the face-validity of the proposed indicators. Indicators were then refined in collaboration with the program proponents. Each indicator was evaluated with respect to: (1) its relevance, i.e., was it useful for assessing intervention effectiveness and the achievement of outcomes; (2) its sensitivity to change, i.e., was it sensitive enough so that the changes occurring during the observation period could be assessed; (3) its validity and reliability, i.e., could the variable be measured accurately with complete and consistent data; and (4) its feasibility, i.e., were the resources required to carry out the measurements available. Data systematically collected for clinical or management purposes were given precedence over those that would require additional measurements. Priority was given to indicators upon which it was possible to act in order to improve practices.

This project received ethics approval from the Université du Québec à Montréal Ethics Committee.

Results

Presentation of the Logic Model

Given the project's distinctive character, which emphasized physical and organizational elements, the theory of action of its managers and staff focussed on both structural dimensions (i.e., physical facilities and organizational aspects) and clinical process. The logic model illustrates their assumptions about the structure and clinical process required to achieve the program objectives and intended outcomes (Figure 1). The program objectives were to:

- Make available a medium-term specialized program for the assessment, intervention and stabilization of persons with behaviour disorders;
- Ensure a transfer of expertise to facilitate their integration into less restrictive living environments; and
- Improve the staff's quality of life at work.

Assumptions about the program structure had to do with: (1) the program physical structure (architecture, interior design and layout, and furnishings and equipment), as well as the (2) recruitment and (3) training of a multidisciplinary team. Assumptions about the clinical process relate to: (1) applying recommended practices; (2) holding multidisciplinary meetings and intervention monitoring; (3) developing, implementing and updating an intervention plan; (4) applying criteria for selecting and orienting the program's clients; and (5) carrying out liaison and communication activities with clients' destination resources. Hypothesized causal links between the elements of the logic model are diverse, multi-directional and difficult to articulate in advance. Therefore, the description below may not reflect the complexity of the links. (See Figure 1 on following page.)

Physical and Organizational Structure

The architectural structure, interior design and layout, furnishings and equipment (i.e., physical structure) were all planned to reduce the behaviour disorders severity and frequency. They were also designed to reduce the risk of injury to staff and to improve their quality of life at work, which should translate into less stress in the workplace and higher levels of job satisfaction. Therefore, because large groups are likely to increase the frequency of behaviour disorders, the residence was divided into two wings that each accommodated four persons. Strong lighting was avoided, windows were unbreakable, corridors were wide and rooms large enough to facilitate physical interventions. The rooms were uncluttered, and objects (such as the television) were integrated into the walls or into pieces of furniture that do not open. Indicators used to assess assumptions related to architecture, interior design and layout, furnishings and equipment were the presence of specific devices in building and material. Their effectiveness in reducing behaviour disorders was assessed by the frequency and severity of the behaviours, the frequency of utilization of restrictive measures, and the number of incidents or accidents reported for each client. Indicators selected to assess the effectiveness of activities aiming to reduce staff injuries and improve quality of life at work were the frequency of occupational hazards and the frequency and number of days of absence due to occupational hazards. Measurements were also taken of staff's stress and job satisfaction.

With regard to the organizational structure, the program proponents hypothesized that recruiting and retaining a multidisciplinary team and providing staff members with ongoing training and supervision should improve the quality of life at work and help achieve clinical objectives. The multidisciplinary intervention team included direct care staff, as well as a psychologist, a nurse, a psychiatrist and a social worker. The whole team, including the managers, was trained in practices recommended by the current state of evidence (i.e., in functional and multimodal assessment and intervention techniques). Supervision was provided by an external team of consultants specialized in interventions in severe behaviour disorders. Training and supervision should increase staff adherence to new practices and thereby also improve their skills and decrease their stress. Indicators to measure outcomes and implementation of these organizational activities were the percentage of positions filled, the percentage of staff trained in recommended practices, and the frequency of training and supervision.

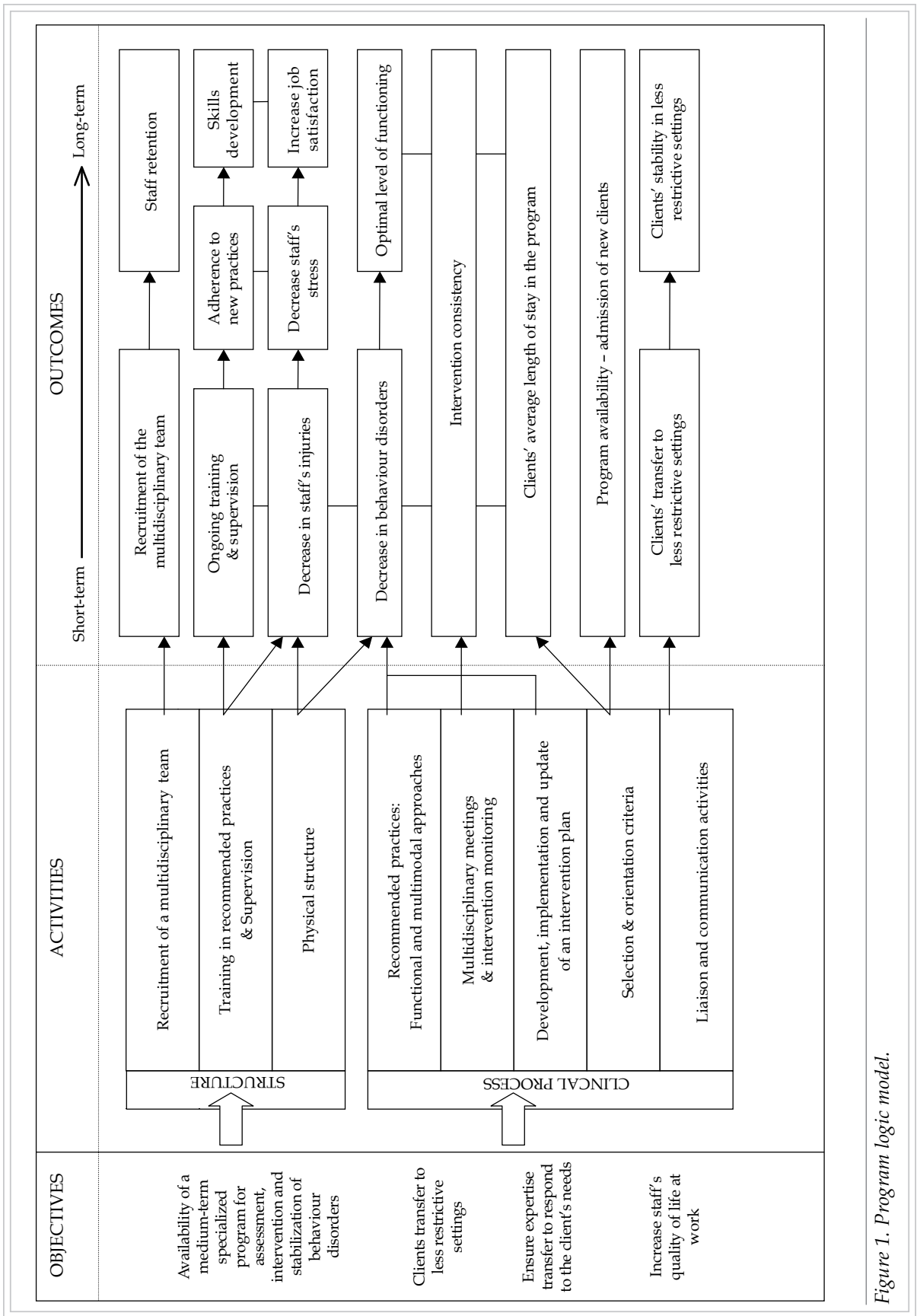

Figure 1. Program logic model.

Longer-term indicators for recruitment and training-related activities included the length of employment in the same position and the frequency of new hiring, skills development and job satisfaction.

The Clinical Process

With regard to the clinical process, outcomes were targeted in two major areas. First, it was expected that applying current best practices would impact the clients' behaviours. The program required for each client that a multimodal functional assessment be completed and regularly updated using feedback from intervention monitoring activities. All assessments and interventions should be decided in multidisciplinary team meetings to ensure consistency in the interventions. Whether these activities had been carried out and the results achieved were assessed by the presence of assessment reports and an intervention plan in the client's file.

Implementation of the intervention plan was described in reports of multidisciplinary meetings to monitor interventions. Expected outcomes are a decrease in the clients' behaviour disorders frequency or severity and, in the longer term, their optimal functionning, including good physical and mental health, increased adaptive behaviours, and better quality of life. Indicators were the frequency or severity of challenging behaviours, the frequency of restrictive measures, and the frequency of reported accidents or incidents. Level of functionning was assessed by measuring clients' physical and mental health, as well as their quality of life.

The program aimed to make available an assessment, intervention and stabilization program for persons with IDD and behaviour disorders and to direct these clients toward less restrictive living environments and services. According to the logic model, these outcomes would be achieved by applying criteria at clients' admission, orientation and discharge. Indicators considered relevant for this purpose were the correspondence between clients' characteristics and the pre-determined selection criteria, regular access to the program by new clients (number on waiting list and waiting time), and clients' length of stay in the specialized program. In addition, the model presumed that clients would move into less restrictive settings, better suited to their needs and where they would be stable. To accomplish this, the program team must transfer expertise into the community and plan the client's transition from one setting to another. Indicators were the dates, duration, objectives, and attendees of liaison and communication meetings, as well as the use of common forms and clinical processes by both the specialized program and the post-discharge environment, waiting time for the transfer to the recommended new residential setting, and length of stay in this same setting.

Discussion

This article proposed a logic model to evaluate the implementation and effectiveness of a program for persons with IDD and behaviour disorders. The purpose of the model was to demonstrate that a logic model can be useful to conceptualize a complex intervention and plan its evaluation. The logic model guided the selection of indicators and, therefore, helped focus data collection and interpretation. Assumptions illustrated by the logic model helped to capture the complexity of a program where structural and clinical elements were required to achieve the intended outcomes, where causal chains were not linear, and where intended outcomes influenced each other. The program proponents expected, for example, that reducing behaviour disorders would help decrease staff injuries, as would training and supervision. This model has not been empirically tested to validate the assumptions of the program proponents; it does not constitute a proven explanatory model of the effectiveness of services for managing behaviour disorders. However, it represents an hypothesised model that can be used to evaluate the implementation and effectiveness of a program (Birckmayer & Weiss, 2000). The main benefit of using a logic modelling approach is that it allows for the collection of data on both the outcomes and activities implemented to achieve them (Streiner, 2002). In reality, there may be gaps between planned activities and their actual implementation, which may interfere with the program effectiveness and, consequently, bias its evaluation. For example, as was the case with the program under evaluation, training sessions in multimodal assessment may be organized more than a month after the program started; clinical supervision and multidisciplinary meetings

to monitor interventions may only be set up three months after the first clients' arrival. Yet timely supervision and feedback are needed to counteract the cognitive and emotional factors that can create resistance to change among staff (Kushlick, Trower, & Dagnan, 1997). A theory-based program evaluation supports a better understanding of the multiple causal chains that come into play between an intervention, its context and its expected outcomes. When decisions need to be made about program management and implementation, theory-based program evaluation is able to provide some information about the factors influencing its effectiveness (Rogers, 2008; Streiner, 2002).

The proposed logic model guided the identification of indicators that were considered relevant, sensitive to change, valid and reliable for evaluating activities outcomes. It became clear that operationalizing these indicators and collecting data presented with significant problems. The multiple and various selected indicators call for different methods of data collection. Analysis relies on multiple strategies, such as statistical methods for comparisons over time (e.g., results on a mental health scale) or visual analysis of graphs (e.g., frequency of challenging behaviours). Some information from clients' files and interviews with staff members require qualitative analyses. Data collection and analysis are therefore resource-intensive. The logic model is likely to evolve as the program's proponents realize that available resources are insufficient for such a thorough evaluation.

Assessing effectiveness requires collecting data at different points in time, that is before, during and after the intervention. To ensure internal validity, the classical design uses a comparison group. However, in community health and social services, it is often difficult to select appropriate comparison groups and therefore comparisons in time are preferred (Grol et al., 2005). The interrupted time-series design can be best suited to evaluating the effectiveness of these services. Data is collected at multiple instances over time before and after an intervention to detect whether the intervention has an effect significantly greater than the underlying secular trend. Comparisons are between points in time, on multiple indicators, rather than between groups. Pre-intervention measurements are most important for assessing natural or cyclical trends in the observed effects and, consequently, for determining whether these effects can be attributed to the program being evaluated (Grol et al., 2005). It is only possible to use an interrupted time-series design if sufficient pre-intervention data was collected.

In the present case, the use of a time-series design was greatly compromised by the lack of pre-intervention data. Indeed, clients admitted into the program came from a variety of settings where data was not always collected (e.g., family settings). Similar limitations are likely to arise when it comes to post-intervention data collection as well, when clients will be integrated in a variety of community-based residential settings.

Recommendations and Future Directions

Logic models appear to provide integrative frameworks that are very useful for the planning of a strategy of data collection based on various sources and methods. However, data collection is still a challenge for intervention settings as it is resource-intensive. Data collected for clinical or administrative purposes should be given precedence to increase the evaluation feasibility. The evaluation team must thoroughly acknowledge the impact of data validity and reliability. Logic models are powerful tools to conceptualize presumed links between activities and expected outcomes, and help test causal chains. The approach of developing a logic model, if applied in various clinical settings, will help clarify the mechanisms underlying interventions for persons with IDD and behaviour disorders, which will inform decision-makers and service providers on efficient service models.

The logic model presented does not constitute an explanatory model of the effectiveness of services for managing behaviour disorders. Causal chains illustrated in the model must be tested and statistically supported. However, it represents an hypothesized model that can be used to evaluate the implementation and effectiveness of a program for persons with IDD and behaviour disorders (Birckmayer & Weiss, 2000). Other groups could use it as a framework for data collection and analysis, though it might not represent their own theory of action.

The road to evidence-based practices in IDD is long and challenging, but worthwhile as it will assure persons with IDD receive efficient support. Researchers, service providers and decision-makers must partner to provide better evidence. With their combined knowledge, they will be better equipped to operationally define their targeted intervention outcomes, that is, in a way that is measurable. Researchers can also support their community partners in developing ongoing data collection embedded in their daily practice. Ongoing data collection would increase data availability, especially for pre-intervention measures which are necessary to demonstrate the effect of an intervention.

Key Messages From This Article

People with disabilities: You deserve to receive services and supports which are known to be useful to you and efficient. However, it is very difficult to assess whether or not an intervention has the expected results. This article explains why it is difficult and makes recommendations to improve assessment methods.

Professionals and policymakers: The road to evidence-based practices in intellectual and developmental disabilities (IDD) is long and challenging, but worthwhile as it will assure persons with IDD receive efficient support. It is crucial to operationally define targeted intervention outcomes and means to attain them, to identify ways to track and measure them, and to develop ongoing data collection.

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