

PRACTICE NOTE

THE KEY FUNCTIONS OF COLLABORATIVE
LOGIC MODELLING: INSIGHTS FROM THE
BRITISH COLUMBIA EARLY CHILDHOOD
DENTAL PROGRAMS

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Abstract: As part of a government partnership to evaluate British Columbia Early Childhood Dental Programs, the development of a provincial logic model provided an effective tool to integrate regional variations of dental public health programming and also foster collaborative processes with program stakeholders. Specifically, logic modelling provided a program documentation tool, a validity feedback loop, a means to collaborate across different levels of organization, and a forum for cross-health authority decision-making. This article highlights our experiences using logic models to enhance and provide structure to a collaborative approach in evaluation.

Résumé : Dans le cadre d'un partenariat gouvernemental visant l'évaluation de programmes dentaires de la petite enfance en Colombie-Britannique, British Columbia Early Childhood Dental Programs, la mise au point d'un modèle logique provincial a su fournir un outil efficace pour intégrer les variations régionales en matière de programmation publique de santé dentaire. Il a aussi favorisé un processus de collaboration avec les intervenants. Plus particulièrement, le modelage logique répond aux fonctions intégrales : d'outil de documentation du programme, de boucle de rétroaction concernant la validité, de moyens de collaboration entre les différents niveaux de l'organisme, et de forum de prise de décision pour les instances de la santé. Cet article met en évidence nos expériences d'utilisation des modè-

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les logiques afin d'améliorer et de structurer l'approche collaborative en évaluation.

INTRODUCTION

Logic models have been used as tools to support collaborative program planning and evaluation (Fielden et al., 2007; Helitzer et al., 2010; Hill & Thies, 2010; Kaplan & Garrett, 2005). There is extensive documentation of the key functions of logic models for program planning and evaluation (see Table 1), including the role of logic models in fostering collaboration (Renger & Hurley, 2006). This practice note aims to describe our experiences of developing a provincially coordinated logic model for a four-year evaluation (2007–2011) of British Columbia (BC) Early Childhood Dental Programs with particular emphasis on key functions of our collaborative logic model development. Our evaluation team from the Human Early Learning Partnership (HELP) at the University of British Columbia conducted the evaluation in collaboration with the BC Dental Evaluation Committee, which comprised representatives from each health region, the Ministry of Health, and other provincial (e.g., First Nations Health Council) and national centres, who were consulted on an ad hoc basis. The Dental Evaluation Committee provided recommendations for the development and implementation of the multi-year evaluation plan that reflected early childhood dental health surveillance, risk assessment, health promotion and prevention strategies, and partnership-building activities.

An initial step of the evaluation was to construct a program logic model (Table 1) for the purposes of evaluation, as well as performance measurement and management. This logic model provided a common

Table 1
Logic Model Functions

<i>Program Planning and Management</i>	<i>Monitoring and Evaluation</i>	<i>Fostering Collaborative Processes</i>
Develop a comprehensive program strategy (Kaplan & Garrett, 2005; Kellogg, 2004; Lane & Martin, 2005; Millar, Simeone, & Carnevale, 2001)	Ensure program evaluation was considered in program design (Moyer, Verhovsek, & Wilson, 1997)	Build consensus among staff concerning the problems, activities, and outcomes associated with a particular program, program services, and goals (Julian, Jones, & Deyo, 1995; Kellogg, 2004; Millar et al., 2001)

Articulate, clarify, and provide logical explanation of how program goals, individual components, and specific activities fit together to achieve desired outcomes (Gugiu & Rodríguez-Campos, 2007; Kaplan & Garrett, 2005; Moyer et al., 1997; Rowan, 2000; Yampolskaya, Nesman, Hernandez, & Koch, 2004)

Strengthen program design by assessing validity of the underlying program theory (and identify gaps in logic or knowledge) (Gugiu & Rodríguez-Campos, 2007; Julian et al., 1995; Kaplan & Garrett, 2005; Moyer et al., 1997; Rowan, 2000)

Articulate a plausible theory of change (Yampolskaya et al., 2004)

Distinguish between short-term outcomes and long-term impacts (Julian et al., 1995)

Form the basis of action plans for more pragmatic application (i.e., prioritize activities, ensure long-term outcomes or impacts, drive program activities) (Millar et al., 2001; Rowan, 2000)

Consider alternative strategies to achieve program goals (Moyer et al., 1997; Porteous et al., 2002)

Provide an opportunity for program staff to adopt a set of outcomes for which they are willing to be held accountable (Julian et al., 1995)

Assign responsibility for tasks and outcomes (Julian et al., 1995; Moyer et al., 1997; Renger & Hurley, 2006)

Provide a format for outlining future path of the program or trajectory for research related to the program or service activity (Lane & Martin, 2005)

Provide a focused management plan/framework to identify and collect data (i.e., select appropriate indicators, develop survey instruments) (Gugiu & Rodríguez-Campos, 2007; Julian et al., 1995; Kellogg, 2004; Lane & Martin, 2005; Torghele et al., 2007)

Facilitate ongoing monitoring, reporting and communications (i.e., present program information to stakeholders), and development of grant applications (Julian et al., 1995; Kaplan & Garrett, 2005; Kellogg, 2004; Lane & Martin, 2005; Porteous, Sheldrick, & Stewart, 2002)

Enable evaluation to be linked directly to each aspect of the program (Lane & Martin, 2005)

Examine program fidelity and program effectiveness (identify sequence of steps where program implementation deviated from program design if expected outcomes not achieved) (Julian et al., 1995; Rowan, 2000; Yampolskaya et al., 2004)

Identify essential components of a program for replication (Yampolskaya et al., 2004)

Reconcile between-group differences to achieve a workable agreement needed to move forward in a given program (Fielden et al., 2007)

starting point for discussion of the priorities for the evaluation, the evaluation questions, and the multi-phase evaluation plan. It played a key clarifying role by making explicit the essential features of the program (Owen, 2006). We drew from a utilization-focused approach to give careful consideration to how intended users would apply the evaluation findings (Patton, 2008) and to develop components of the evaluation plan that had shared relevance and significance across five regional health authorities and various stakeholders. This article focuses on the insights gained from efforts to establish and maintain a coordinated and integrated approach to using logic models within a multi-partner government collaboration.

CONSTRUCTING A LOGIC MODEL FOR BC EARLY CHILDHOOD DENTAL PROGRAMS

In 2006, the BC Ministry of Health established a province-wide objective to reduce the prevalence of dental decay: 60% of BC's kindergarten population will have "no visible decay experience." To monitor this goal, the Ministry established data collection standards for provincially coordinated surveillance that aimed to promote evidence-based best practice and enhance equity in dental programming and health outcomes (BC Ministry of Health, 2006). Current surveillance efforts reflect both a change to and an extension of previous collaborative processes, where provincial guidelines and standard materials for dental public health services had been managed by a provincial coordinator, which later became the BC Dental Public Health Committee (British Columbia Dental Public Health Committee, 2005, 2006). The development of a provincial logic model for BC's Early Childhood Dental Programs provided a management-oriented means of evaluation (Kellogg, 2004) that aimed to facilitate program planning and decision-making at a provincial level. The Early Childhood Dental Programs had been implemented for several years; however, it had not been formally evaluated. Therefore, understanding the underlying program theory was an important first step in the evaluation and would serve multiple program planning, management, monitoring, and evaluation functions. The construction of the logic model was informed by W.K. Kellogg Foundation's approach (Kellogg, 2004), which emphasizes logic model development as an iterative and group process based on shared understanding between evaluators and program practitioners. We developed the logic model by collaboratively working with program stakeholders to identify program activities, influential factors, activities, outputs, outcomes, and impacts. Although we revisited the logic model in subsequent stages of the evaluation, its primary use was at the initial stages of the evaluation.

CHALLENGES OF COLLABORATION IN A MULTI-SITE ENVIRONMENT

Preventive dental health services for young children are separately administered through five regional health authorities, resulting in some regional differences in program implementation. Such variation reflected a primary challenge to collaborative evaluation activities not only in constructing the logic model itself, but also in coordinating with program representatives, who were located at different sites across the province. Moreover, public health administration has generally been experiencing growing differentiation, increasing the need for collaboration between organizations on different levels of the hierarchical structure (vertical integration) as well as those on the same level (horizontal integration) (Axelsson & Axelsson, 2006).

To address these challenges, our approach was, first, to identify the primary intended users of the evaluation findings and, second, to establish clear and consistent communications with each region. Importantly, the Ministry of Health facilitated the formation of the Dental Evaluation Committee that met on a bimonthly basis to plan, implement, and coordinate strategies collectively. To streamline and further support the process, we also identified a key contact person on the evaluation team to manage communications with the various stakeholders in each of the health authorities. This process required us to learn about regional governance structures and, in turn, the appropriate authorities and routes for exchanging information related to the evaluation.

KEY FUNCTIONS OF COLLABORATIVE LOGIC MODEL DEVELOPMENT

Logic model development played a significant role in facilitating collaborative evaluation processes through several integrative functions: (a) serving as a key program documentation tool, (b) providing a common source to validate study data, (c) providing opportunities for collaboration across different levels of organization, and (d) facilitating cross-health-authority decision-making.

A Program Documentation Tool

Our process of logic model development began with a review of the literature, including research syntheses, best practice recommen-

dations, and key program documents from the Ministry of Health and regional health authorities. Following our review, we sought nominations of primary intended users of the evaluation findings from the Ministry of Health and other members of the provincial Dental Evaluation Committee. We then conducted consultations with primary stakeholders around the province who were involved in BC Early Childhood Dental Programs and its components (e.g., health authority staff/advisory groups; regional and local program planners, coordinators, and management; and government). Initial drafts of the logic model, which were largely based on Ministry of Health documents, provided a basic structure from which to compile documents from the health authorities.

Variations in dental programming required us to initially work individually with health authorities to develop regional program logic models. In most cases, the health authorities had previously developed logic models for their regional practices and programs. We drew from these existing models to obtain additional background about previous and current evaluation practices, as well as to clarify program resources, activities, and goals. The pre-existing health authority logic models typically did not reflect all components of the early childhood dental programs. Therefore, our work with the health authorities was to facilitate the development of comprehensive logic models that captured all such components. The five health authority logic models that we developed in collaboration with the health authorities captured specific context and services unique to each geographic region and provided a tangible means for comparing and contrasting program activities across regions.

Collaborative development of the logic models in a multi-site environment involved an iterative process of teleconferences with health authorities, document review, and revision via e-mail. This ongoing dialogue with dental program leads at the Ministry of Health, dental program managers and staff from the health authorities, and scheduled bimonthly in-person meetings with the Dental Evaluation Committee were essential to the collaborative process. Once we had consolidated the regional logic models with our health authority partners, we reviewed the separate models and identified similarities; these similarities were compiled into a working draft of a BC-wide early childhood dental programs logic model. Various draft reviews at the bimonthly meetings enabled stakeholders to collectively define components, shared understandings, and desired outcomes in a comprehensive and systematic manner.

Validity Feedback Loop

Although the logic model served as the framework that structured the broader evaluation plan, the logic model was refined as additional data emerged through implementation of the evaluation. Ongoing meetings with the Dental Evaluation Committee served as a means to verify and validate preliminary findings as they were integrated into the logic model. This mirrors logic modelling processes described in other literature, which typically begins with the construction of a theoretical model based on established information sources and is further developed through the experiential evidence of program stakeholders (MacPhee, 2009; McLaughlin & Jordan, 1999).

The feedback loop ensured that the contents of the logic model were presented in a way that was clear, accessible, and understandable to a range of public health representatives, ensuring that all representatives were able to participate equally in informed decision-making. The logic model also provided a structure through which to elicit staff perspectives and facilitate dialogue on the extent to which documentation of regional program activities was accurate, dental programming objectives and outcomes were appropriate, and proposed evaluation approaches were feasible. For example, an aspect of the initial stakeholder consultation process involved compilation and review of BC public health handouts related to oral health and nutrition for children under six years old. Through our review, we learned that there were variations among risk assessment implementation protocols and guidelines for dental health. As a result of this process, we were able to distill key themes that cut across the regional handouts as well as identify regional and health service delivery area differences in tools and guidelines that were related to dental visits, signs of decay, tooth brushing and fluoride, feeding practices, and barriers to access. Our in-person Dental Evaluation Committee meetings served as the primary venue for review of these themes, clarification of service similarities and differences, as well as definition of key terms and activities in the logic model. This feedback process also provided a means for the committee to prioritize evaluation activities, and, in this case, to choose whether to focus solely on reviewing existing risk assessment procedures or to facilitate collaborative decision-making processes for the development of a standardized provincial caries risk assessment tool. In this case, the Dental Evaluation Committee determined that the development and validation of a caries risk assessment tool was premature and that the primary interest would instead be reviewing and documenting existing risk assessment procedures.

A Means to Collaborate Across Different Levels of Organization

The membership of the Dental Evaluation Committee reflected a range of health service representatives, both in geographic reach as well as range of positions within their respective organizations. Given the vastly different contexts of dental service provision in BC—which includes rural and remote, urban and inner-city, and a high proportion of racialized communities—logic model development with stakeholders provided an avenue for dialogue to ensure that these considerations were considered in the evaluation. The construction of a province-wide logic model provided the basis upon which to integrate the varying perspectives and experiential knowledge from different levels of dental program planning and implementation, from health authority managers to dental hygienist team leaders to university researchers. We facilitated this process through initial consultation with various stakeholders across the province, collection of health authority documentation reflecting both practice and policy, and drawing from the Committee members themselves. In this way, we were able to include a mix of stakeholders at the outset of the evaluation, including high-interest stakeholders with diverse levels of power (Eden & Ackermann, 1998). This enabled negotiation and integration of the different interests, needs, and practices of program planners and health practitioners with the language and standards of program evaluation.

A Forum for Cross-Health-Authority Decision-Making

The logic model offered a useful tool to organize, present, and discuss potential directions for the evaluation. The logic model provided a systematic means to facilitate prioritization of evaluation activities and decision-making processes to contain the evaluation within a realistic and feasible scope. For example, committee dialogue around the province's public health information system revealed the diversity in fluoride varnish data-recording practices across regions and incompleteness of the population-level dataset. Some health authorities captured these data consistently and others did not. In this way, this collaborative exchange of data collection practices amongst health authority representatives enabled a focused discussion and enhanced understanding of current and potential uses of routinely collected data for program evaluation and ultimately resulted in the committee decision to forego inclusion of fluoride varnish program data as a primary data source for the evaluation.

The creation of the provincial logic model also represented the first structured opportunity in the evaluation for cross-health-authority dialogue around province-wide early childhood dental programming. Having at least one representative from each health authority on the committee was critical to documenting the unique contexts of dental programs service delivery. Cross-health-authority dialogue enabled discussion of variation in regional contexts that would influence implementation processes and outcomes, as well as ways that health authorities utilized diverse strategies (e.g., primarily school-based or mixed school- and community-based) for obtaining access to the early childhood population. Committee meeting discussions served as important opportunities for health authority managers and staff to learn from each others' experiences and best practices for their own program development while creating a shared vision for dental programming across the province.

LESSONS LEARNED

The experience of this evaluation elucidates the far-reaching functions of logic model development. The functions outlined in this article illustrate diverse process uses of logic model development (Patton, 2012) that would not have been achieved otherwise. Logic model development with sustained cross-health-authority and provincial government involvement was critical to the enhancement of shared understandings for clarifying the program's goals, activities, and desired outcomes; for developing the evaluation plan and priorities; and for providing a consistent, interactive structure for stakeholders to share their perspectives (Patton, 2012). The establishment of new collaborations and the reinforcement of existing working relationships across stakeholders also helped to increase engagement in the evaluation, encourage reflective practice, and build evaluation capacity (Patton, 2012, pp. 145–146). The formation of a new provincial committee with government leadership, a balance of regional representation, and sustained interaction with the primary intended users of the evaluation both within and outside of our committee meetings validated the existence of a provincial program with common objectives, guidelines, tools, and practices. Our collaborative processes included a mix of in-person, electronic, and telephone communications. Electronic and telephone communications were well suited for obtaining small amounts of feedback from regional health authority stakeholders. Discussion of cross-regional objectives, current activities, and desired outcomes was most effective in person at the Dental Evaluation Committee meetings. In-person interactions were also

critical for developing rapport amongst committee members as well as an atmosphere of collaboration and openness to share diverse perspectives.

Reflections on our logic modelling process underscore the complexities of collaborative evaluation among multiple, cross-disciplinary, and cross-regional representatives who may have differing—and sometimes conflicting—expectations and interests. To address this challenge, we aimed in our situation analysis to provide ample opportunities through our consultations and ongoing communications structures (e.g., in-person meetings) for stakeholders to communicate their interests and identify areas of alignment and difference. Given that our primary objective was to develop and implement a provincial, multi-year evaluation plan, we emphasized common objectives and practices, but also integrated regional interests into our evaluation planning at each stage of implementation. The Committee members had different levels of authority within their organizations while staff changes and organizational restructuring resulted in changing Committee representation—factors that affected continuity between meetings and made decision-making difficult at times. Our response to this challenge was not only to ensure that we were up to date with changes to committee representation but also that new representatives had the requisite background information to fully participate in the meetings. In future initiatives, the situation analysis could be expanded to identify new stakeholders' interests and more actively engage them in the evaluation process from the initial point of participation.

An additional lesson learned is to further deepen and broaden opportunities for shared program planning and decision-making by developing strategies to orient logic modelling processes toward the goal of co-operation, which involves a high degree of both horizontal and vertical integration (Axelsson & Axelsson, 2006). The shifting policy context affected collaborative processes where, for example, public dental care coverage for families on social assistance was reduced from two routine dental examinations per year to one (Fowle, 2010; O'Neill, 2010). In one respect, the hierarchical structure of the committee facilitated coordination and timely communications of such policy changes amongst members with differing levels of authority. At the same time, however, these shifts were not discussed in relationship to their potential effects—positive or negative—on the program's capacity to achieve its outcomes, which was, in retrospect, a missed collaborative opportunity to discuss perceived impacts on

program logic. In retrospect, it would have been useful for us to use the logic modelling process as an avenue for structured discussion of ways that policy changes affected programming and service delivery at different levels of organization, as well as potential strategies to mediate these impacts.

While logic model development within diverse stakeholder settings can provide a platform from which to build collaboration, the unique dynamics within each group and project context highlight the important role of evaluators in leading these processes (MacLellan-Wright, Patten, Cruz, & Flaherty, 2007). Because members of our committee had unique and diverse types of knowledge and experiences to share and contribute, one of our primary roles was to encourage and engage committee members to provide input and play an active role in the design of the evaluation plan, development of tools, and interpretation of results. The extent to which consensus and compromise are maintained is often dependent on the ability of the evaluators to adapt and respond to changing needs and conditions. Establishing clear channels of communication through designated contact people or, in other words, the “tipping point connectors” (Patton, 2012, p. 74) in the Ministry of Health and each region enhanced accountability, simplified decision-making processes, and clarified communications and dissemination protocols, which ultimately enabled health authorities to maintain their roles as active, key contributors to the evaluation. Another effective strategy was to supplement communications in Committee meetings with individual consultations via phone or e-mail. This better accommodated busy schedules, addressed individual questions, and ensured each member had up-to-date information and adequate opportunity for feedback.

Our approach for developing a provincial program logic model drew from Kellogg's (2004) guide to logic model development, as a number of our health authority partners were already familiar with its basic structure and components. A challenge with this approach was that the structure facilitated a modest amount of dialogue about the interconnections and interdependencies between components. In future collaborative evaluation initiatives, it would be useful to explore diverse approaches to logic model development, such as the Antecedent-Target-Measurement (ATM) approach, which includes opportunities for development of visual maps, in-depth discussion of antecedent conditions, collaborative priority-setting activities, and identification of relationships between antecedents and outcomes (Renger, 2006).

CONCLUSION

Overall, the lessons learned are revealing of the strengths and challenges of collaborative evaluation processes. We facilitated the formation of a sustained, multi-year collaboration of an interdisciplinary group of health professionals toward a shared vision and specific set of objectives that promote early childhood dental health in the areas of prevention, detection, and access to treatment. Our experiences of collaboratively developing the provincial logic model highlighted the importance of several key factors: a comprehensive situation analysis, identification of primary intended users that were representative of all health authorities, strong communications mechanisms to support ongoing collaborative processes, creation of an atmosphere that encouraged active stakeholder involvement in the process, and an openness to inviting and integrating diverse perspectives and approaches. The collaborative development of the logic model was critical in setting the tone for the evaluation and core processes for ongoing collaboration in the development and implementation of the multi-year evaluation plan.

ACKNOWLEDGEMENTS

The authors thank the dedicated members of the British Columbia Early Childhood Dental Evaluation Committee for their time, input, and support throughout the evaluation. This evaluation was funded by a grant from the British Columbia Ministry of Health.

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