A program logic model is used to make a program ready for an evaluation. It diagrammatically shows the relationships between the objectives of the program, program activities, indicators, and resources. This article describes an expanded logic model that has a greater focus on measurement of program performance. The expanded logic model specifies both outcome and process indicators, whereas other logic models only show service delivery indicators. Also, this article describes how the expanded logic model was used to develop a bicycle safety program. A workgroup established program boundaries and reviewed documents early in the process of developing the logic model. The workgroup developed the logic model which was subsequently reviewed by other stakeholders. The workgroup continually assessed the plausibility of the logic model. Challenges and advantages in using the logic model are discussed.

Overview of the logic model
A logic model is a diagrammatic representation of a program. It is also referred to as an evaluability assessment (i.e., assessing whether the program is evaluable) or a feasibility analysis (i.e., assessing whether it is feasible to evaluate the program). The logic model depicts the relationships between the objectives of the program, program activities, indicators, and resources. A logic model is useful for various reasons. First, it schematically describes a program to stakeholders such as public health staff, board of health members, community partners, and funders to clarify how the program is structured. Staff have some rationale for their program but the logic or theory underlying the program may be implicit. A logic model makes the implicit theory explicit. Second, a logic model shows how different facets of a program are linked. For example, it lists the activities that need to be implemented to achieve specified outcome objectives. Third, it is used to integrate program planning and evaluation. For example, program planning includes developing program objectives and activities. Program evaluation includes specifying measurable objectives and identifying or developing indicators to determine whether the objectives have been met and the activities have been implemented as intended. A logic model lists objectives, activities, and indicators, which facilitates accountability.

Logic models have been applied to a variety of programs. Figure 1 shows the expanded framework or template for a logic model, and includes several improvements to previous logic models. First, it specifies program goals and differentiates these from outcome objectives. Goals are written in broad terms to provide a general rationale for the program, whereas objectives are written as quantifiable statements. The second revision relates to the positioning of outcome objectives. Other logic models position outcome objectives at the bottom, corresponding with the notion of an if-then relationship between activities and desired end results (i.e., if these activities are implemented, then these outcomes will be achieved). This sequence could lead to activities determining which outcome objectives are set. In contrast, the expand-
ed logic model positions outcome objectives near the top to emphasize the appropriate sequence of first stating the desired outcomes and then specifying which activities need to be provided to achieve these outcomes. The outcome objectives should drive the program activities rather than activities driving the desired outcomes. The third revision relates to performance measurement. Previous logic models do not include outcome indicators. For example, Rush’s and Ogborne’s model only includes indicators of service delivery. In contrast, the expanded logic model has a greater focus on performance measurement in that both outcome and process indicators are specified.

The arrows show the relationships among the elements in the logic model. The logic model framework is flexible; the general layout of the logic model can accommodate most programs but some minor changes can be made to deal with unique characteristics of programs. For example, the logic model might show more than one target group, resources for each component, and a more complex structure of arrows to profile the program. Also, if you consider macro-level programs to include comprehensive programs such as injury prevention and micro-level programs to include sub-programs such as a bicycle safety program or a playground safety program, then it may be easier and more practical to develop a logic model for micro programs. Often, the complexity of macro programs (e.g., different target groups, components, and outcome objectives) makes it very challenging to develop a detailed yet easy-to-understand logic model for a macro program.

Case study
The application of the expanded logic model to a health department bicycle safety program illustrates the usefulness of this planning tool. Initially, two public health nurses responsible for developing a program to promote the use of bicycle helmets by school-age children met with the first author for consultation on how to evaluate this program. It became apparent that the evaluation objectives had not been clearly articulated. This led to questions about the structure of the program. The develop-
ment of a logic model was chosen as a strategy to provide a framework to develop the program, integrating program evaluation into the program planning process.

**Process to develop the logic model**

There are various approaches to developing a logic model. A shortened version of Smith’s comprehensive approach was used in this case and is described below.

**METHOD**

A small workgroup comprised of the two authors and three public health nurses was formed. In contrast to a single person developing the logic model, a small workgroup allows for greater stakeholder involvement, the opportunity for open negotiation of program objectives, greater commitment to the final conceptualization of the program, and increased likelihood to accept and utilize the evaluation results.

The workgroup established boundaries for the program to ensure the development of a feasible program that could be realistically implemented. For example, limits related to available staffing, budget, and time commitment were identified.

The workgroup identified and reviewed key documents to help them better understand the structure of the program. The documents included the pending Province of Ontario bicycle helmet legislation, a board of health report and departmental strategic plan that called for a program to address childhood head injuries, a bicycle safety promotion literature review, and an informal survey of existing programs. Discussion with teachers, parents, and children provided valuable information.

**Developing the logic model**

Once the relevant information was gathered, only a couple of meetings were necessary to actually develop the logic model. The first author adopted the role of consultant/facilitator, guiding the workgroup to develop the bicycle safety logic model (see Figure 2) which included the elements described below.

**Program goal**

The workgroup specified the goal, which is a directional statement, as “To decrease incidence and severity of bicycle-related head injuries in North York.” It was acknowledged that this program alone could not be solely accountable for achieving this goal and was, in fact, one of a number of factors that could contribute to this goal.

**Target groups**

The target group is the persons or organizations who are to receive the program. This group may be defined on the basis of demographics such as age, sex, income, ethnicity, health characteristics, and geographical location. The primary target group was grade 4 and 5 students attending public and separate schools in North York. Parents play a key role in promoting health behaviours of children in that age group (e.g., purchasing the helmet; requiring that they wear it), so the program also targeted parents.

**Program components**

Components are groups of program activities that appear to belong or go together conceptually. Each component is given a label to define that collection of activities. For example, program activities might be organized on the basis of strategies such as marketing, advocacy, and education components. Specifying components makes it easier for staff to later identify which activities within each strategy need to be implemented to achieve the outcome objectives, and makes the logic model easier to understand. The primary health promotion strategy for this program was education. Both school-based education (i.e., classroom education and school events) and community-based education were specified as components.

**Outcome objectives**

The following criteria for well-written objectives were discussed: (a) objectives should be realistic; (b) objectives should not be double-barrelled (i.e., the statement should not consist of two or more separate objectives); (c) objectives should be specific and unambiguous; (d) objectives should have purposeful or meaningful standards; (e) objectives should have a time frame, if appropriate; and (f) objectives should be measurable, as much as possible.

Outcome objectives are the desired end results of the program. The long-term outcome objective specified for the students and parents was the same, namely, “To increase bicycle helmet use among children in North York.” The short-term outcome objectives for the students related to knowledge about the role of helmets in preventing head injury, skills to select and wear helmets, attitudes about using helmets, and bicycle safety behaviour. The short-term outcome objectives for the parents related to intention to purchase helmets for their children.

**Process objectives**

The relationship between process and outcome objectives is analogous to the “means to the ends”. Process objectives, which are sometimes referred to as implementation objectives, specify the activities that need to be implemented to achieve the outcome objectives. Process objectives that included action phrases such as to provide, to deliver, and to liaise were specified.

**Process indicators**

Indicators were specified for each outcome objective. These indicators, which were in the form of percent of students or parents, were derived from the wording of the objectives. Taking the time to develop measurable objectives makes it easier to identify indicators.

**Resources**

Personnel, physical resources, and finances may be listed as the resources required to implement a program. However, given that many of these were established at the outset of the project, the workgroup listed only the required program materials.

**Seeking feedback from stakeholders**

Department managers and public health nurses who would be implementing the program reviewed the bicycle safety logic model and provided feedback.
Assessing plausibility of the logic model

The workgroup examined the plausibility of the logic model during the process of developing it. To assess plausibility, the members considered some questions suggested by Smith and Rutman:

- Are the components/activities well defined?
- Are the objectives clearly stated and measurable?
- Are the type and amount of activities sufficient to achieve the desired outcomes?
- Are the causal linkages in the logic model plausible?
- Are the type and amount of resources sufficient?
- Is the research methodology (e.g., research design; validity and reliability of indicators) adequate?
The program described in the logic model was implemented in the spring of 1995. The planned strategies and the evaluation were carried out without complication. A modified version of the program is being continually implemented, evaluated, and revised.

CONCLUSION

There are, of course, some challenges in developing a logic model. Program planners must be prepared to invest the time required to work through the process. Also, negotiating and writing measurable objectives may not be a simple task. However, the advantages outweigh these challenges. First, the logic model integrates program planning and evaluation. It encourages stakeholders to think about evaluation when planning the program. Second, the outcome objectives drive the program activities in the expanded logic model. This ensures that the “horse” (i.e., goal and outcome objectives) comes before the “cart” (i.e., activities) during program planning. Third, the group process to develop the logic model helps key stakeholders to share a common understanding of the program. Fourth, it provides a rational, organized way to profile the program to management, boards, community partners, and implementation staff.

In summary, this article describes the framework for an expanded logic model that has a greater focus on performance measurement and describes the process for developing such a logic model by illustrating its application to a bicycle safety program. This application demonstrated that the logic model is an effective tool to integrate program planning and evaluation.

REFERENCES


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