Constructing a Logic Model for a Healthy Public Policy: Why and How?

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This briefing note outlines the process for constructing a logic model as proposed in the National Collaborating Centre for Healthy Public Policy’s (NCCHPP’s) method for synthesizing knowledge about public policies (Morestin, Gauvin, Hogue, & Benoit, 2010). It also shows the use of this type of logic model in applications other than knowledge synthesis, as a tool that public health actors can use to analyze public policies.

The process of constructing a logic model is useful in many respects for professionals who are called upon to advise policy makers or to implement and evaluate public policies, in the interest of promoting informed decision making. Logic models can be developed for public policies and interventions of all kinds. For the purposes of this briefing note, we will be focusing specifically on healthy public policies, as the selected examples will show.

In the following pages, we will attempt to answer three questions:

- What is a logic model for a healthy public policy?
- Why construct a logic model for a healthy public policy?
- How does one construct a logic model?

What is a logic model for a healthy public policy?

Logic models have been used widely for decades for planning and evaluation purposes. In the past few years, authors have also been recommending that they be used to guide the production of knowledge syntheses (Morestin et al., 2010; Anderson et al., 2011). It is important to note that different authors use different terms to describe tools that often turn out to be similar: logic models, theoretical models, conceptual frameworks, logical frameworks, etc. Some authors include resources and activities within these tools whereas others concentrate solely on effects. We do not wish to quibble about terminology or definitions. What is important here is to understand the nature of the tool that is described in this document, which represents one possible approach among many. The term we have chosen is “logic model,” but our focus here is on the tool and not on the label.

A logic model as it is defined here represents the chain of expected effects that link a public policy to a health problem it aims to solve. It goes beyond the question “Does it work?” to gain a better understanding of how it works, i.e., how the policy being studied is meant to operate.

Often, when a public policy is put forward with the goal of obtaining a specific effect on a health problem, there are no details as to how the effect is intended to occur. The proposal is based on general assumptions about the effectiveness of the policy (does it work?), sometimes supported, to the extent possible, by evidence. But the thinking about the policy’s precise mechanisms of action remains at the “black box” stage (Figure 1). For example, nutrition labelling (e.g., the nutrition facts table found on food labels) is a public policy that has been proposed to prevent obesity. But what are the mechanisms of action by which changing a product label is supposed to have an impact on an individual’s weight?

A black box situation is inadequate to inform decision-making with regard to adopting a new public policy or evaluating an existing one. As pointed out by Weiss (1998, p. 57), the mechanisms of change are not the intervention per se, but the response that the intervention generates. It is therefore this response that needs to be the focal point, especially in the case of public policies. The scope of public policies is vast and complex, as are the problems these policies target. Accordingly, a public policy does not directly tackle a given problem; it activates a
series of events that eventually address the problem. It is therefore necessary to examine what occurs during this process to determine whether the general assumption of effectiveness is plausible.

The logic model, a tool borrowed from program evaluation methods (Weiss, 1998; Champagne, Brousselle, Hartz, & Contandriopoulos, 2009), helps to perform this analysis. In constructing a logic model, it is necessary to reflect on the chain of effects that must occur to achieve the ultimate expected effect: the public policy analyzed should produce an initial intermediate effect, which should trigger another effect and so on down the line until the ultimate effect on the problem is achieved. A logic model represents this chain of expected effects (Figure 2).

Let us take a closer look at the example of nutrition labelling to illustrate these points. How can this public policy contribute to the ultimate effect on a health problem like obesity?

As Figure 3 shows, the first expected intermediate effect is that potential consumers will read the nutritional information on food labels. The second step implies that they correctly understand the information they read. Equipped with better information on the nutritional value of available food, consumers would then presumably be prompted to buy healthier foods and therefore have a healthier diet, which would in turn contribute to the desired ultimate effect, i.e., the prevention of obesity. Note that a direct link can also be drawn between one’s understanding the nutritional information and improved diet, for example for members of a family who choose what they eat based on the food available within the home, but which they have not bought themselves.

It is very important to note that the logic model does not claim to prove that things actually happen the way they are described. It simply outlines the desired effects on the basis of logical assumptions (Williams, Eiseman, Landree, & Adamson, 2009; Morell, 2012). It is only by gathering data on the actual effects that it becomes possible to see how well these data fit with the theory (Weiss, 1998).

The type of logic model we are proposing is deliberately pared down, precisely because the goal is to represent public policies that are complex and difficult to interpret in a simple, straightforward way (Champagne et al., 2009). Such a simplified representation is sufficient when using a logic model as an initial tool, in preparation for a more in-depth analysis (evaluation, knowledge synthesis, etc.). If, however, the goal is to have a final tool that can inform practical action (decision making, planning, etc.), it may be advisable to enhance the logic model. It could feature elements such as external factors (that may run counter to the policy being studied or, conversely, amplify its effects), contingencies (the contextual conditions which might cause one outcome to occur as opposed to another (Weiss, 1998)) and unintended effects that a public

Figure 2  Generic logic model

Figure 3  Example of a public policy logic model: nutrition labelling
policy may inadvertently trigger.¹

These elements are always interesting, but there are feasibility issues at play: generally speaking, the more specific the subject being studied, the easier it is to construct a comprehensive logic model, and vice versa. For example, one can attempt to build an exhaustive logic model of Canada’s nutrition facts table (a specific nutritional labelling format used in this country); if, however, the focus is on nutrition labelling policies in every format in every industrialized country, it would be very difficult to identify and represent all the corresponding external factors, contingencies and unintended effects. In the following section we will examine what logic models can contribute, and show that even the simplest models are undeniably useful in the promotion of informed decision making.

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**Figure 4**  A matter of distinction: Causal model of factors influencing weight-related problems

Adapted from: Groupe de travail provincial sur la problématique du poids (inspired by the work of the International Obesity Task Force), 2004, p.12.

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¹ For more information on unintended effects, see Morestin, 2012, for one example among many.
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Box 2 – On differing definitions: Logic models in health impact assessment (HIA)

NCCHPP publications on HIA also refer to logic models, but the meaning is different than the one used here (see, for example, St-Pierre, 2012).

− In this document, we are concentrating on the effectiveness of a public policy at addressing a specific health problem. The perspective is clearly focused: the starting and end points are predetermined, and we are trying to understand what happens between them.

− An HIA endeavours to identify the incidental effects upon health that could result from a public policy developed for some other purpose that is not primarily health. The HIA perspective is broad and expansive, in an attempt to anticipate the many effects on all determinants of health. Only the starting point is set. An exploratory and exhaustive approach is taken as regards identifying the intermediate effects and the ultimate effects.

Why construct a logic model for a healthy public policy?

Because logic models make the assumptions of effectiveness explicit, they are useful in a variety of applications: in defining the public policy being studied, assessing its plausibility, guiding the collection of data and the selection of indicators and articulating causal links. Furthermore, logic models are a relevant tool for communication purposes and for fostering collaboration among stakeholders. Often, the process of constructing a logic model is as enlightening as the model itself (Porteous, Sheldrick, & Stewart, 2002).

Let us take a closer look at the various benefits of a logic model.

1. DEFINING THE PUBLIC POLICY BEING STUDIED

If a logic model turns out to be overly complex, it may be because one is trying to handle as a single policy what actually constitutes a set of policies. At first glance, for example, improving the quality of food provided in schools may be considered to be one public policy. But in attempting to build a logic model, it quickly becomes apparent that this endeavour can lead in many directions: offer only healthy food in the cafeteria; maintain the current menu but reduce the price of healthy foods; display nutrition facts; and so on. This is in fact a family of policies, each based on a different mechanism of action. To avoid confusion, a logic model needs to be developed for each of these policies, and they should be studied separately. In any analysis of public policies (from a decision-making, planning, evaluation or other perspective), identifying these situations helps to break down the complexity of the task (Champagne et al., 2009). In the context of a knowledge synthesis, this is specifically useful in pinpointing the object of study, which may as needed be further broken down and dealt with through a series of syntheses (Morestin et al., 2010; Anderson et al., 2011).

2. ASSESSING PLAUSIBILITY

The logic model helps to assess the plausibility of the chain of expected effects. When a model is being developed, it may appear that some expectations are naïve or simplistic (Weiss, 1998) or, in extreme cases, that some assumptions simply do not hold. The logic model can reveal a significant flaw in the process that represents a break in the chain of effects, such that none of the expected effects later in the chain can plausibly be expected to occur. For example, many consumers do not have the level of literacy and numeracy needed to properly understand nutrition facts tables. In these conditions, the subsequent effects cannot be expected to occur for these people (Figure 5).

Once stated, this may seem obvious, but it is precisely by provoking further thought that constructing a logic model can bring to the fore issues that may not have otherwise been identified.

In a planning context, recognizing weak plausibility early in the process makes it possible to come up with solutions if the identified weaknesses can be addressed, or to put forward another policy altogether to deal with the targeted problem if the weaknesses are more serious. In an evaluation or a knowledge synthesis context, this approach enables one to redefine the mandate (e.g., to analyze the reasons for the failure instead of trying to collect effectiveness data which, clearly, cannot exist).
3. GUIDING DATA COLLECTION AND INDICATOR SELECTION

A logic model is very useful when planning the collection of effectiveness data, either through an evaluation or a review of the existing literature. In the absence of guidance, the risk of straying from the objective is high when studying public policies and the complex situations within which they are applied. For example, in the context of a knowledge synthesis, a documentary search on nutrition labelling turns up documents that, intuitively, seem to be connected somehow to this public policy but that deal with very different topics, including various display formats, consumer behaviours, legibility and the relation between information and choice. Without the clarity provided by a logic model, it may therefore be difficult to determine what is relevant and what is not.

Box 3 – Effectiveness of responses triggered by nutrition labelling, at each step

1) Effectiveness of labelling in ensuring that information is read
2) Effectiveness of information in triggering understanding
3) Effectiveness of information in influencing purchases
4) Effectiveness of purchases in influencing diet
5) Effectiveness of information in influencing diet
6) Effectiveness of diet in influencing body weight

N.B.: Each of these six points corresponds to one of the arrows shown in the logic model above.

A logic model makes it possible to approach data collection in a more structured manner:

- It helps identify the relevant intermediate effects to be documented. Referring to a logic model and a corresponding list, like the example in Box 3, helps to thoughtfully choose the important links to be examined. For example, in the case of nutrition labelling, one may consider that the last link (effectiveness of diet in changing body weight) is already so well established in public health literature that it is unnecessary to seek out any more data to substantiate it. In concrete terms, a logic model helps to establish the inclusion and exclusion criteria for a literature review (Anderson et al., 2011) and select the evaluation questions and the indicators to be checked in the context of an evaluation of effectiveness (Porteous et al., 2002).

- The logic model provides from the start a common thread by highlighting the relations between various effectiveness data. Some authors consider that specifying these relations a priori through constructing the logic model, uninfluenced by the data found (which are almost never exhaustive), should help reduce bias in the judgment of those gathering the data (Anderson et al., 2011).

4. ARTICULATING CAUSAL LINKS

Establishing a cause-and-effect relationship between a policy and its presumed ultimate effect is problematic for two reasons. First, the ultimate effects of a public policy often only emerge over the long term (Milton, Moonan, Taylor-Robinson, & Whitehead, 2011). For example, the effectiveness of subsidizing daycare programs to ensure children
from all social groups are given an equal chance in life can be measured only once these children have reached adulthood. Second, the presumed effects are “diluted” by external factors, since public policies are only one factor among countless others that simultaneously influence the targeted problem (Milton et al., 2011). As a result, drawing a correlation between a public policy and a presumed ultimate effect, without any other element to shed light on the relationship between the two, is a very tenuous foundation upon which to argue the existence of a causal link. An examination of the evolution of the prevalence of obesity does not necessarily provide any relevant information as to the impact of a nutrition-labelling policy on the situation. The two phenomena may well be entirely unrelated.

Analyzing intermediate effects based on the logic model helps address both issues: it provides early feedback as to the effectiveness of the policy being studied while strengthening the presumption of a causal connection. The logic model pinpoints the intermediate effects that will provide early indications of effectiveness (Weiss, 1998). Measuring them makes it possible to confirm, on one hand, that something is actually taking place and, on the other, that the public policy is playing a role. We then assume that if the first intermediate effects have been attained and the policy is founded on plausible assumptions, it is likely that long-term effects will follow (Porteous et al., 2002). Using the earlier daycare example, it is feasible, after a few years, to determine whether the subsidy has allowed more economically disadvantaged families to enrol their children in daycare and to compare the development of five-year-olds from various social groups who have, and have not, attended daycare. If the data on these two intermediate effects are conclusive, we can assert that the daycare subsidy policy has at least contributed to the effect and that the correlation between daycare subsidy and equal opportunity is not a false one (although evidence of the latter can be substantiated only over the long term). The very nature of public policy means a causal link can never be proven beyond a doubt. But an analysis based on the logic model allows us to move forward in this regard: if we can show that a public policy works up to a certain point in the chain of effects, we can get a better idea of its contribution to the ultimate effect (Weiss, 1998; Mayne, 2008).

5. **COMMUNICATING THE LOGIC OF THE INTERVENTION**

The logic model in and of itself is an excellent communication tool. It provides a visual description of an intervention in a clear and concise manner, graphically representing the presumed causal relationships; it is therefore more meaningful and carries more impact than a written description of several pages (Champagne et al., 2009) or effectiveness data alone (Weiss, 1998). A logic model can be used for internal communication purposes within an organization (between various departments, or in training and orienting new employees (Porteous et al., 2002)) or to meet external communication needs (involving partner organizations, policy makers, the public, etc.).

In addition to providing a schematic representation, the logic model puts forward a coherent plan for presenting the findings of an analysis or data collection in a text. A report can therefore be designed presenting a sequence of effectiveness data corresponding to each step in the chain of effects. Readers can then better understand how the public policy being studied works and can more accurately determine where problems occur in the chain of effects and, consequently, identify where action is required to address the situation (Weiss, 1998). A document whose structure is based on the logic model therefore fosters knowledge-sharing with people in charge of decision making and action.

6. **FOSTERING COLLABORATION**

Because logic models are straightforward, interaction-friendly tools, they can be used to facilitate stakeholder discussions about a public policy and potentially encourage collaboration. Joint construction of a logic model is an opportunity for stakeholders to explain their own logical reasoning, uncover their respective goals (Champagne et al., 2009) and perhaps, through discussion, make progress towards consensus and a convergence of their efforts (Weiss, 1998; Porteous et al., 2002).
Summary: Healthy public policy logic models

**What they enable:**
- Defining the public policy being studied
- Assessing plausibility
- Guiding data collection and indicator selection
- Articulating causal links
- Communicating the logic of the intervention
- Fostering collaboration.

**What they do not do:**
- Identify all the possible causes of a given problem (this is the purpose of a causal model)
- Identify all of the effects of a public policy on health (this is the purpose of an HIA logic model).

How does one construct a logic model?

This last section proposes a few ideas for constructing a logic model.

For a start, one should sketch the “black box” situation. Using a board, piece of paper or other tool, indicate the public policy on the left and the desired ultimate effect on the targeted problem on the right (Figure 6).

If the focus is on potential effects a policy may have on multiple problems, and if these problems do not easily lend themselves to a joint analysis, it may be necessary to develop a different logic model for each problem (Weiss, 1998).

Then, one has to identify the logical steps that have to occur from the public policy to the ultimate effect, using “if/then” statements. Each box representing an effect must specify the direction of the desired change (using terms such as increase, decrease, eliminate, improve, prevent, shorten, alleviate, more, less, better, etc.) (Porteous et al., 2002).

The chain of intermediate effects can also be put together in reverse order, starting with the ultimate effect and working backwards. This is done by asking what would have to happen immediately before the ultimate effect so that it can be attained, then asking the same question for that intermediate effect and each preceding one back to the public policy.

For those experiencing problems in articulating the chain of intermediate effects, a handy trick is to start by defining the “last” intermediate effect before the ultimate effect. This effect is generally well known because it is related to a proximal determinant of the targeted problem (see examples in Figure 7). Once this link in the chain is indicated, it may serve as inspiration in identifying other intermediate effects.

There are no rules as to the number of intermediate effects to include. Neither are there any limits regarding the number of paths to be used. In the example of nutrition labelling, we have identified two paths: one leads directly from a better understanding of nutrition information to a healthier diet, while the other leads through food purchasing behaviour. But logic models for other public policies may contain just one path, or they may have many.
The relevant number of intermediate effects and paths to be represented varies according to:

- the nature of the public policy and problem being studied, which will influence the events that link them;
- the intended use of the logic model, which will affect how detailed the analysis needs to be (Porteous et al., 2002; Champagne et al., 2009; Morell, 2012). The criterion for defining the appropriate level of detail consists in asking whether adding more elements to the logic model will help or hinder the analysis.

While recognizing that a logic model must adequately describe inherently complex issues, literature on this topic is unanimous in advocating simplicity. Porteous et al. (2002) recommend that those new to developing logic models keep them fairly straightforward and linear. Once they have become more experienced with the technique, they can experiment with more sophisticated models. In any event, the process must always begin with a simple logic model, which can be refined as thinking advances (Mayne, 2008). The number of paths and intermediate effects can be increased at this later stage. And, if deemed appropriate, additional elements (external factors, contingencies, unintended effects) can be integrated in one of the following ways: in parallel to the chain of expected effects, with arrows indicating where these elements have an impact (on boxes representing the effects or on the links between the boxes; for visual examples, see Mayne, 2008; De Vlaming, 2010), or they can be documented in appendices, in order to preserve the visual simplicity of the logic model (Porteous et al., 2002).

How much knowledge of a public policy is required to be able to construct its logic model? An initial logic model is based on simple reasoning and general knowledge (resulting from experience, observation, parallels drawn with other similar policies, etc.). The goal in constructing this initial model is to highlight logical relations, with only a general level of analysis. If one requires more data to support the initial logic model, one can turn to experts or to the literature. Stakeholders can also be considered sources of data, but as indicated earlier in this document it is interesting to go one step further and actually involve them in the construction of the logic model, in order to encourage them to broaden their thinking about the public policy in question.

A logic model should be seen as a flexible, progressive work tool. The construction process is almost always an iterative one: the initial logic model will be updated as understanding of the corresponding public policy advances. The focus should therefore not be on building the “perfect” logic model. Several drafts may be required to arrive at a model that is simple but still includes all the important elements (Porteous et al., 2002). At any rate, there is no one right answer or single model for each policy (Porteous et al., 2002; Anderson et al., 2011). A logic model does not claim to represent a single truth. Its purpose is to support and stimulate thought.
Summary: Constructing a logic model

- Break down the chain of expected effects between the public policy and the targeted problem:
  - On one side, identify the policy being studied
  - On the other side, indicate the desired ultimate effect
  - Identify the logical steps leading from the policy to the ultimate effect (using “if/then” statements)
  - (or vice versa, starting with the ultimate effect and working backwards)
  - For each effect, specify the direction of the desired change
- Tip: Start by identifying the “last” intermediate effect
- The number of steps and paths can vary
- Option: Integrate other elements (external factors, contingencies, unintended effects)
- Define the level of detail by asking what kind of additional information would contribute to the analysis
- A flexible, iterative process.

Conclusion

Many disciplines use logic models, and in a variety of ways. The goal of this briefing note is not to provide a synthesis of these uses or summarize the corresponding schools of thought. Our less-ambitious objective has been to present an approach for constructing a logic model for the purpose of analyzing the effects of a healthy public policy. We hope to impress upon readers that, in this context, constructing a logic model does not require a specific set of skills or knowledge. It entails a minimal investment in terms of time, even when several stakeholders are involved, and it can be helpful in many ways in supporting analysis on the effectiveness of public policies.
References


