



# Quality Improvement & Innovation Partnership

Advancing Improvement in Primary Healthcare in Ontario



## LOGIC MODEL RESOURCE GUIDE

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## HOW TO USE THIS GUIDE

This guide is intended for health professionals working in Family Health Teams (FHTs). It describes how logic models are used in program planning and evaluation.

A logic model is a diagram that describes a program and shows the relationships among program components. This guide provides an example of a logic model developed for a smoking cessation program. It points out how a logic model can assist program planners with program choices and allow the program to be clearly described in a brief diagram.

## WHAT IS A PROGRAM?

A program is a set of activities that are carried out to meet specific objectives or goals. Programs usually have some way of identifying/recruiting and assessing potentially eligible participants, providing participants with assistance of some kind (drugs, counseling, advice, surgery, and assistance with life-style modification) and some way of determining when the person has left or completed the program and their status at that time. All of these activities comprise the program.

In this guide to logic models, a smoking cessation program is used to illustrate how to develop a logic model. The program goal is fairly clear. Yet, we will need to decide what we consider success. (For example, will reduction in smoking count or only complete cessation of smoking? If so, how long must cessation be present?). In completing the logic model, we will need to sort through for whom the program is intended and the activities required to carry out the program. What outcomes we attribute to the program will also need to be clarified. As you will later see, a logic model can also help us identify the staffing needed to carry out the program.

## THE LOGIC MODEL'S ROLE IN EVALUATION: WHAT PURPOSES CAN A LOGIC MODEL SERVE?

Logic models were developed as tools to clarify the nature of a program and its intended effects. A logic model of the program is a useful planning tool that provides a diagrammatic description of a program by depicting its goals and objectives, the component activities needed to accomplish the goals, their outputs (countable by-products of each component), short and long term outcomes (direct results or accomplishments) and impacts (effects for which the program can claim only partial responsibility). It is a clear, concise tool for communicating with others about the program. It helps identify all of the tasks required for program implementation. It allows examination of assumptions about how a new program (or changes in a program) will produce the effects intended. The logic model may reveal that some activities needed for a program to have some of its intended effects are not yet part of the program. Conversely, it can point out that some on-going activities are not well linked to program objectives.

A logic model spells out how the program works. It describes the activities that are a part of the program and the changes you expect if these activities are carried out as planned. It sets out the answer to the basic question: How does change occur in this program?

**Table 1: Purpose of a Logic Model**

Plan / Review Programs	Ensure Program Integrity	Communication Tool	Evaluation Aid
<ul style="list-style-type: none"> <li>• clarify program goals and assumptions</li> <li>• assess need for program</li> <li>• think through activities needed to carry out program</li> <li>• think through staffing implications</li> <li>• examine likely outcomes and possible impacts of program</li> </ul>	<ul style="list-style-type: none"> <li>• monitor program performance</li> <li>• identify if planned processes are being followed</li> </ul>	<ul style="list-style-type: none"> <li>• describe program clearly</li> <li>• be concise</li> <li>• ensure common understanding of program</li> </ul>	<ul style="list-style-type: none"> <li>• improve program accountability</li> <li>• identify how success will be measured</li> <li>• target both processes used and outcomes to be achieved</li> </ul>

A logic model provides a program overview that helps everyone understand how the program works and the assumptions that underlie its delivery. It is a useful communication aid. It allows a common understanding of the program to develop among the people who are involved in developing the program, those delivering it and others who have a stake in its success.

A logic model can be useful not only in program planning and implementation but also in reviewing existing programs. It helps ensure the program’s goals are clear and that the activities undertaken allow the program’s mission to be achieved. Programs tend to evolve over time; thus, the assumptions underlying how the program is currently delivered may be vaguely understood. By clarifying these basic assumptions, their validity can be examined. Sometimes, it even allows us to know that our program has been so successful that it is no longer needed.

A logic model is a useful evaluation tool because it readily identifies the processes and outcomes that should be measured to determine whether our program has been implemented successfully and is producing the outcomes expected. It allows clarification of the outcomes expected and helps develop a mutually shared definition of “success” for this program.

## DEVELOPING A LOGIC MODEL

### Logic Model Components

#### **Goal: What is the overall purpose of your program? Why are you doing it?**

What a program is trying to achieve and how it goes about achieving it may seem clear; but, sometimes asking questions about what the program's goals are and how they are achieved can reveal ambiguities.

For example, in our smoking cessation example, the goal of the program may be to help smokers in the practice to stop smoking. Or, we may say that the goal of the program is to reduce the number of smokers in the practice to less than 10% of patients on the roster. How we state our goal has implications for how the program is carried out and how it will be evaluated. In the logic model developed for smoking cessation, the goal chosen is to help smokers in the practice to stop smoking and remain non-smokers for a year.

#### **Participants: For whom is your program designed? Who will benefit from it?**

The people the program is intended to help are the program participants. They will receive a direct benefit from the program if it is successful. Participants are also sometimes called recipients. We prefer the term participants as it suggests active involvement rather than passive participation.

We need to decide whether we are trying to help those who are current smokers with our program or are also interested in preventing more patients from becoming smokers. If both current and possible future smokers are our target group, the program will have different components than if the program is limited to those who currently smoke. The age group targeted by the program is also important and may lead to the refinement of our goal. The logic model developed assumes that the program is targeted at current smokers in the practice who are at least 16 years of age and hopes to assist them in quitting smoking.

#### **Activities: What activities are needed to run the program?**

It is instructive to develop a step-by-step list of all the activities that a program comprises by describing how a patient enters the program, what happens while they are in the program and how discharge occurs. Usually some mechanisms are required for identification or intake of possible program participants, some assessment activities, some activities that may be seen as therapeutic, educational or supporting behaviour change and some activities related to termination of the person in the program. Sometimes the program will have print materials for participants to read and take home. Technologies may be used to support the program (e.g., swab from mouth for cotinine).

In our smoking cessation program, we might decide to identify smokers by asking every patient seen in the practice by a health professional if they currently smoke. To avoid asking non-smokers repeatedly if they smoke, screened patients (who have had their smoking status ascertained) will have a flag on their chart covers. A special flag will indicate the patients who are smokers so that they will be asked again about their smoking status and interest in the program during subsequent visits. If someone drops out from the program or is not a non-smoker when contacted six or 12 months after they ceased smoking, the medical chart will again have the special flag to indicate that they are a smoker).

The health professional seeing the patient will ask the smoker whether they are interested in attempting to quit and describe the program available to help them quit. If they are interested, their name will be given to the staff member (or one of the staff) in charge of intake to the program. This person will contact the smoker, schedule an appointment to discuss their smoking behavior, ascertain their smoking history, whether (and how) they have tried to quit previously, the outcome(s) of their attempt(s), the longest period that they have not smoked during previous attempts, perceived reasons for relapse, etc.. The staff will then work with the smoker to tailor a quitting strategy that has proven successful for other smokers and matches this smoker’s needs. Developing a plan can take from one to two half hour sessions. Once the plan is implemented, the staff member meets directly or talks on the telephone with the smoker once or twice a week (tailored to the wishes of the smoker) for the first three months to discuss how things are going and make adjustments. The participant is encouraged to call the staff person about problems experienced so that they can problem solve together. The participant may continue to receive telephone support up to six months after quitting. If a person does not attend a scheduled meeting, they are telephoned to ascertain why. Those who indicate they are dropping out or who do not attend subsequent sessions are noted as drop-outs and their file is again flagged as a smoker for further identification.

**Outputs: What are the tangible products of your activities?**

Outputs are things that occur as a by-product of service delivery (e.g. number of patients served, mean number of sessions per patient). They are direct results of the program. The smoking cessation program has several tangible outputs of its activities. An incomplete list, comprised mainly of simple outputs that can be tracked and counted readily while carrying out the activities of the program, is included in Table 3. More sophisticated measures of process and outcome can be obtained by subdividing participants into groups based on entry characteristics, type of assistance chosen or program outcomes to see if systematic differences exist.

**Table 2: Examples of Outputs of Program Components**

Component	Output
Screening	<ul style="list-style-type: none"> <li>• Number(#) of practice members identified as smokers by health professionals asking everyone who has an appointment and is age 16 or over whether they smoke cigarettes</li> <li>• Percentage (%) of practice screened in six months, one year, etc.</li> <li>• # and % of smokers asked who express interest in the program</li> </ul>
Intake into Program	<ul style="list-style-type: none"> <li>• # and % of patients who agree to attend program when contacted for a first appointment</li> </ul>
Program Delivery	<ul style="list-style-type: none"> <li>• # and % of people who attend 1<sup>st</sup> session with program staff as scheduled</li> <li>• # of sessions needed to develop the plan to quit</li> <li>• # of sessions to cessation by type (telephone or face-to-face)</li> <li>• # of supportive sessions following cessation by type</li> <li>• % of participants who drop out before completing the program</li> </ul>

**Outcomes: What changes do you expect to occur as a result of the program? How will you know that the intended participants benefit from the program?**

Outcomes of a program can be directly attributed to the intervention done by the program in terms of observable changes in the patient's lives (e.g. increase in the number and proportion of frail elderly who have no falls in the year after a 'falls-proofing your house' program). Outcomes are stated as changes in knowledge, skill, attitudes, and levels of functioning or behaviours. An increase in non-smokers (behaviour change) is the main outcome targeted by the smoking cessation program.

**Impacts: What longer term changes do you expect to result from the program (recognizing that they also may be influenced by factors external to the program)?**

Sometimes, it is difficult to know whether the program is solely responsible for a change observed. In such cases, it may be more realistic to regard these changes as program "impacts". Impacts are program effects that cannot be attributed directly to the program as a number of other factors interact with the program to produce the effect seen. For example, decreased smoking in public places in the community may be one program impact; but, it is likely other things that have occurred in the community will also affect whether smoking in public places increases or decreases.

## HOW DO YOU START LOGIC MODEL DEVELOPMENT?

Although there are many different logic model formats, they all contain the same core concepts. Some people like to create logic models whose components are formatted in rows. Some prefer that these concepts are listed in columns. Even the core concepts are sometimes labeled slightly differently (e.g. recipients versus participants, program activities versus program components). Yet the underlying concept is the same. One difference you will find is that some evaluators include resources needed (also called inputs) as a part of the logic model, while others consider resources required as information that flows out of the logic model but is not part of it. The latter choice is used in this guide. There is no right or wrong. You can choose what fits your program the best.

Logic models are usually not created in one sitting. People involved in creating the program meet to discuss the program and map out a preliminary logic model for it in a brainstorming fashion. Then they talk with others involved in the program to get their input and refine the model. When everyone is satisfied that the logic model clearly describes the program and its intended effects, it is considered complete.

However, neither programs nor logic models are likely to be completely static. Programs often change with time. It is useful to periodically review the program logic model to see if it still reflects the way the program is organized and running. Modifications may be needed in the logic model to reflect modifications made in the program.

You can begin constructing a logic model by starting with the goal (problem that the program is attempting to solve) as we have in this guide. Or, you can start with the intended outcomes and work back from there. There are no hard and fast rules on how to proceed. However, everyone working on the logic model must use the same approach or chaos will prevail!



## A Logic Model for the Smoking Cessation Program (an Example)

A logic model (see Figure 1) is a diagram with text that describes the program and shows the relationships among program parts. First, the program's goal and participants are identified. For the smoking cessation program, the goal is to reduce cigarette smoking among patients of the FHT by providing current smokers with a program to help them quit smoking. We limited the program's participants to patients of the FHT who are at least 16 years of age. Smoking cessation, not just reduction, is the program's objective. (see Figure 1)

Next, we describe the program. It consists of four component parts:

1. Smoker Screening (Identification and Recruitment)
2. Program Intake
3. Program Delivery
4. Outcome Monitoring

We could decide to have only three components and collapse the Smoker Screening and Program Intake components into a "Program Entry" component. However, for program clarity, it is usually better to separate intake from screening and referral activities.

Each component involves some specific activities which are listed below the component title in a step-by-step fashion. The screening component identifies smokers, reminds them of the harmful effects of smoking, invites them to consider the program and sets up referral. It also continues to ask smokers to consider the program on subsequent visits. The program delivery component has the most activities as it describes what happens while in the program and how discharge occurs. Outcome monitoring involves ascertaining the smoking status of quitters six and 12 months later, provides an opportunity to invite people who relapse to join the program again and to update the smoking status information on the cover of the patients' charts. So, these activities are part of outcome monitoring as well.

Outputs, things that happen as part of carrying out the program, are listed under the component whose activities created the outputs. Thus, under the screening component, the number of FHT practice members who are newly flagged as smokers each week and the weekly number and percentage of smokers who express interest and are referred to the program can be tracked. The time period over which the data are combined can be daily, weekly, monthly, and quarterly, depending on program needs and interest. Note that it is important to keep track of the number of patients seen by health professionals but *not* screened for smoking status. This output represents screening failure. It provides information about how well program implementation is going. Similarly, the number of patients who are telephoned, who agree to an appointment with program staff and who attend the first meeting after agreeing to attend are important outputs of the program that can be readily tracked and provide important feedback.

Program outcomes are changes or benefits that result from program activities and outputs and be seen in the short term or after a longer period of time. Outcomes are always expressed as changes (increase/decrease; improvement/deterioration). Changes in knowledge, attitudes, skills, behaviour or practice are thought of as changes usually evident after program completion. In the Smoking Cessation Program logic model, we anticipate that if the program is successful there will be greater awareness of the harmful effects of smoking among patients who are members of the FHT.

Behaviour change is also expected. We anticipate that the number of former smokers will increase as the number of smokers decreases. There should also be less exposure to second-hand smoke at home among family members.

There may also be longer term changes in conditions (e.g. less chronic obstructive lung disease (COPD) among long term FHT members) although these changes may be harder to attribute solely to the Smoking Cessation Program. Thus, this anticipated change is listed under program impacts.

The logic model is not cast in stone and should be revised as changes are made in the program. The program components and their activities are open to revision as experience with the program grows. In our example, the program staff decided to discharge all participants who have ceased smoking by six months after their quit date. But, the staff may find that a three or four month period is more realistic time frame or they may find that some people need support even longer. The program staff may decide to hand out written material about quit strategies, something that is currently not envisaged as part of the program in the logic model. Similarly, current outcome monitoring involves telephoning quitters at six and continued quitters again at 12 months after smoking cessation to ask them their smoking status. Asking randomly selected patients for a mouth swab to detect smoking behaviour may be added later as a check on the veracity of self-report data.

### **Deciding on if / how to get started and what staffing is needed**

Having a Smoking Cessation Program presumes that the FHT has a fair number of patients who are smokers and might be convinced to accept referral to such a program if it were available. It also presumes that our program is designed using evidence about successful strategies to help people stop smoking and we have staff (or can provide training to staff) to carry out these strategies with fidelity.

Let us assume that you think you need this program but are not sure about the staffing and training required. Using the logic model, you might implement screening of patients (for a week or month, depending on volume or by just a few of the health professionals over a longer period of time) to estimate the number of patients who are smokers, and the number of smokers who express interest in the program and would accept referral, if the program were available to them now. You would also want to track the number of times the health professionals forget to ask patients about their smoking status. You might need to implement some in-service education to get everyone screening in a similar, effective manner or need to develop guidelines about when it is okay not to screen.

By examining the outputs generated by program components, the logic model can be used as a tool that helps you with planning and implementing the next program components. If screening is implemented well and numbers of patients interested justify a program in the FHT, you will have a good idea about how much time will be needed in the start up phase to implement the program. As intake occurs and program delivery start to occur, how many staff will be needed as more smokers enter the program can be estimated using the program output data created by each component.

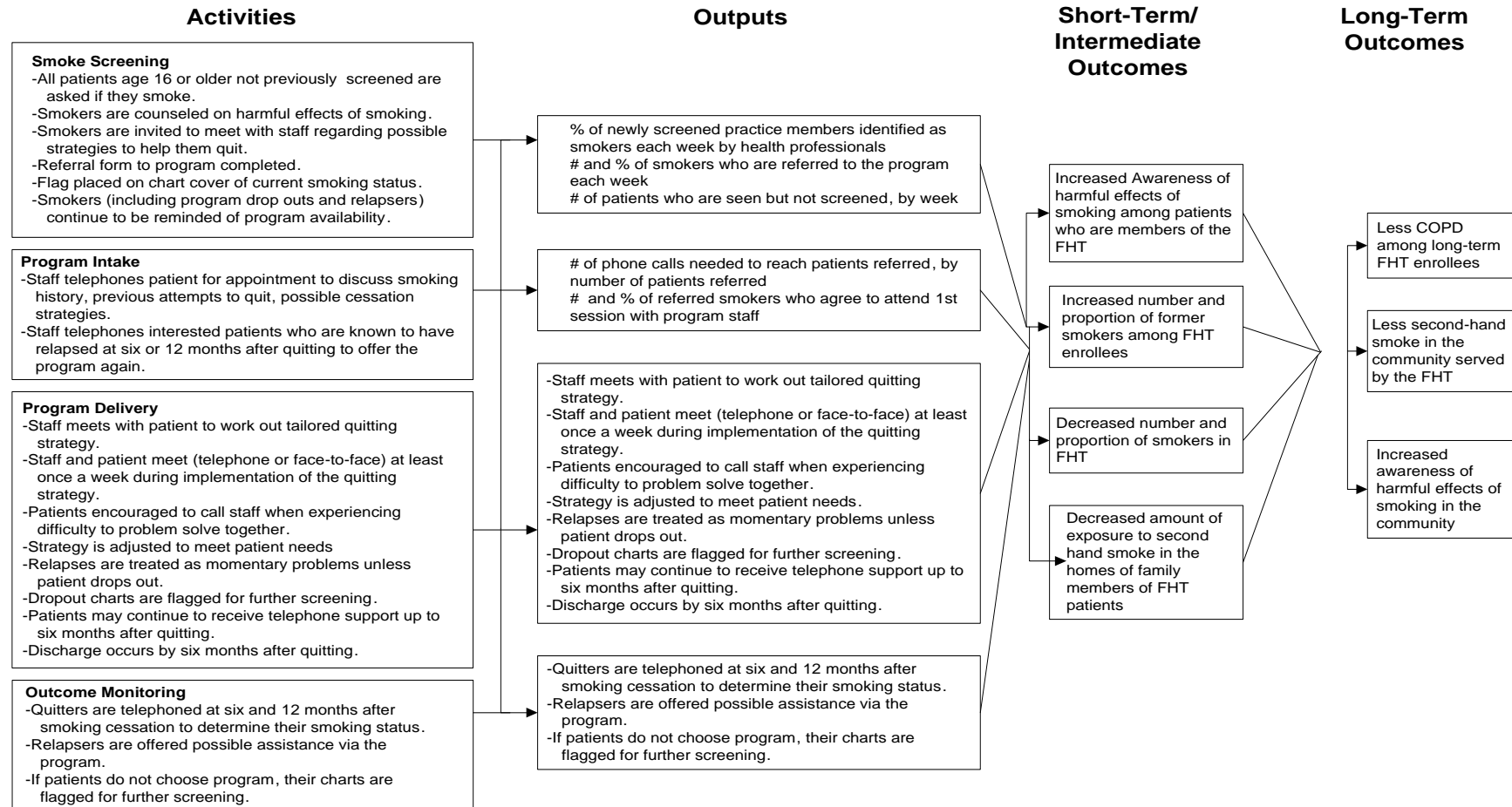
**Figure 1 - Logic Model for Smoking Cessation Program**

**GOAL**

To reduce cigarette smoking among patient of the FHT by providing current smokers with a program to help them quit smoking and remain non-smokers

**PARTICIPANTS**

Patients of the FHT who are current smokers and 16 years of age or older.



## FURTHER READINGS AND RESOURCES

University of Toronto. The Health Communication Unit (2001) The Centre for Health Promotion. Logic Models Workbook.

<http://www.thcu/infoandresources/publications/logicmodel.wkbk.v6.1.full.aug27.pdf>

Wikipedia, the free encyclopedia [http://en.wikipedia.org/wiki/Logic\\_model](http://en.wikipedia.org/wiki/Logic_model)

Ontario Ministry of Health and Long Term Care. Health System Intelligence Project.(2008). Evaluation. Module 6. The Health Planner's Toolkit. Please especially see Appendix B.

[http://health.gov.on.ca/transformation/providers/information/resources/health\\_planner/module\\_6.pdf](http://health.gov.on.ca/transformation/providers/information/resources/health_planner/module_6.pdf)

W.K. Kellogg Foundation. (2004). *Logic Model Development Guide* [online].

<http://www.wkcf.org/Pubs/Tools/Evaluation/Pub3669.pdf>\* (You can order a copy for free or download the PDF file.)

Centers for Disease Control and Prevention. Healthier Worksite Initiative, Logic Model

[http://www.cdc.gov/nccdphp/chpa/hwi/program\\_design/logic\\_model.htm](http://www.cdc.gov/nccdphp/chpa/hwi/program_design/logic_model.htm)

Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention - State Program Developing and Using a Logic Model.

[http://www.cdc.gov/DHDSP/state\\_program/evaluation\\_guides/logic\\_model.htm](http://www.cdc.gov/DHDSP/state_program/evaluation_guides/logic_model.htm)

University of Idaho Extension. [The Logic Model](#) (PDF file)

<http://www.uidaho.edu/extension/LogicModel.pdf>

University of Wisconsin Extension. Enhancing Program Performance with Logic Models. (on line course, two modules) <http://uwex.edu/ces/lmcourse/>

Free Management Library (website). [Guidelines and Framework for Designing Basic Logic Model](#)

[http://www.managementhelp.org/np\\_progs/np\\_mod/org\\_frm.htm](http://www.managementhelp.org/np_progs/np_mod/org_frm.htm)

Office of the Auditor General of Canada (2003) Reporting on Outcomes: Setting Performance Expectations and Telling Performance Stories. [http://www.oag-bvg.gc.ca/internet/english/oag-bvg\\_e\\_10189.html](http://www.oag-bvg.gc.ca/internet/english/oag-bvg_e_10189.html)

Office of the Auditor General of Canada [Addressing Attribution Through Contribution Analysis: Using Performance Measures Sensibly](#) (PDF 54 KB)—June 1999

US Department of Health and Human Services. (2002). Physical Activity Evaluation Handbook. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention.

United Way of Metropolitan Atlanta OM 101: Developing Logic Models

<http://www.unitedwayatlanta.org/docs/ci/OM101.ppt> This is a brief PowerPoint presentation about logic models.

United Way of America (1996). *Measuring Program Outcomes: A Practical Approach*. This manual can be purchased for \$5.00 plus shipping and handling by calling 1-800-772-0008 and ordering item number 0989. It is no longer on the United Way web site.

Centers for Disease Control and Prevention. (1999). *Framework for Program Evaluation in Public Health*. *MMWR* [online], 48(No. RR-11). <http://www.cdc.gov/eval/framework.htm>

Local chapters of the Canadian Evaluation Society often put on workshops about logic models. To discover if one is available near you, check the website of the Canadian Evaluation Society. <http://evaluationcanada.ca> (Click on chapter events under professional development.)