

# Community health intervention research: Is reporting on interventions a weak link?

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# **Abstract**

## **Background**

The persistent gap between research and practice compromises the impact of multi-level and multi-strategy community health interventions. Part of the problem is limited understanding of the processes, mechanisms and conditions that make interventions successful in producing desired population health outcomes. Systematic investigation of these intervention processes across studies requires sufficient reporting. Guided by a set of nine ‘best processes’ related to the development, implementation and evaluation of community health interventions, this article presents the results of a pilot study designed to examine reporting on these processes in the published literature.

## **Methods**

The pilot study involved three steps: 1) selection of a sample of community health intervention studies and their publications; 2) development and refinement of a data extraction tool; and 3) data extraction from the publications. Heart health was used as a case example. Specific studies included three of the early exemplar programs, including the North Karelia Project, the Minnesota Heart Health Program, and Heartbeat Wales.

## **Results**

Results are organized according to six themes that reflect ‘best processes’: integrating theory; creating synergy; achieving adequate implementation; creating enabling structures and conditions; modifying interventions during implementation; and facilitating sustainability. In the publications for the three heart health programs, reporting on the intervention processes was variable across studies and across processes. Overall, reporting on the intervention processes was too limited and variable to explore their role in understanding intervention effectiveness.

## **Conclusions**

Pilot study results suggest that limited reporting on intervention processes may be a weak link in community health intervention research. This link must be strengthened to enable research that is specifically designed to improve community health practice. To do so, recommended directions include developing a standard tool to guide systematic reporting of multi-level and multi-strategy intervention programs; revising publication policies so that more complete information can be reported on intervention processes; and developing programs of research that focus on questions of how and why interventions are effective under various circumstances.

## Background

This article is part of a program of research to build capacity for community health intervention research, with a particular focus on multi-strategy and multi-level interventions (also referred to as ‘multiple interventions’). The aim to build intervention research capacity is in direct response to the persistent gap between research and practice in community health. This gap compromises the impact of programs and policies. Part of the problem is limited research on interventions and their implementation [1, 2]. Many gains are apparent [3], notably in the last 2-3 years, especially in systematic processes to identify ‘effective’ and ‘promising’ interventions for possible dissemination [4, 5]. Nevertheless, understanding remains quite limited on the processes, mechanisms and conditions that make interventions ‘work’; that is, successful in producing desired population outcomes [3, 6]. Also quite limited is capacity to study intervention processes.

Building research capacity to better understand effective intervention processes requires many complementary activities, such as setting research priorities, financing, developing research tools and methods, mentoring, and establishing appropriate publication policies [7]. Setting research priorities is the focus of another article (submitted August 2006). Specifically, the article outlines nine propositions that can be used to guide community health intervention research. The propositions (summarized below) describe key processes related to the development, implementation and evaluation of community health interventions. In order to study these processes systematically, information must be available on the intervention processes [8].

The purpose of this article is to report the results of a pilot study undertaken to examine reporting of key intervention processes in the published literature. Findings have several implications for research. They can inform reporting and publication of interventions by researchers; identify issues with word limit and other publication policies; and assist in the development of research tools to monitor the design, implementation and evaluation of community health interventions.

### **Propositions for community health intervention research**

The propositions provided the conceptual framework to guide this pilot study on intervention reporting. The propositions refer to multi-strategy and multi-level community health interventions and are anchored by a ‘multiple interventions framework’ (see Figure 1). The multiple interventions framework is based on social ecological principles and supported by theoretical and empirical literature describing the design, implementation and evaluation of multiple intervention programs [9-22]. In addition to the four main elements in the framework, Figure 1 identifies the set of processes that are reflected in the propositions (in italicized text).

Effective multiple interventions:

- (1) are based on an *integration of relevant theories* that contribute to a multi-level and multi-strategy intervention plan;
- (2) create synergy through *combinations and sequencing of interventions* within and across levels of the system;
- (3) create synergy through *coordinating and integrating intervention efforts across sectors and jurisdictions*;
- (4) are implemented with *sufficient quantity* to achieve population impacts;
- (5) are implemented with *high quality*, and with particular attention to the ‘active ingredients’ of interventions and with efforts to tailor the timing and the features of intervention strategies to the relevant implementation context;
- (6) are supported by *relevant enabling structures and conditions* at professional, organizational, community and other system levels;
- (7) undergo *continuous adaptation* to the contextual environment (e.g., setting, leadership, structures, culture, etc), while maintaining integrity with theoretical underpinnings
- (8) use *evaluation feedback* to modify intervention development and implementation; and
- (9) attend to *sustainability* from the outset of planning, and maintain a focus on continuing and extending benefits of interventions.

In concert with the intervention processes reflected in the multiple interventions framework, the propositions were based on: a) a review of literature on multiple intervention programs in diverse fields (e.g., tobacco, low birth weight, heart health, injury prevention); b) a large body of literature that has reported the effectiveness of multiple intervention programs and examined the underlying reasons for the apparent failure of many large-scale multiple intervention programs to achieve their intended outcomes [9, 10, 13, 19-24], and; c) author experiences in evaluating multiple intervention programs [25-28].

## Methods

The pilot study involved three main steps:

1. Selection of a sample of multiple intervention projects and publications;
2. Development and refinement of a data extraction tool; and
3. Data extraction from the publications.

### 1. Selection of a sample of multiple intervention projects and publications

The research team anticipated that reporting on intervention processes would be very limited in the published literature. We chose a conservative approach by selecting programs that were exemplars of multiple intervention programs and most likely to report on the key intervention processes based on well-resourced research and evaluation studies. We wanted projects that focused on community-based primary prevention and

had accessible published information. These criteria were best achieved by community heart health programs, which we used as a case example.

In the last 30 years, community-based cardiovascular disease prevention programs have been conducted world-wide. The first pioneer was the North Karelia Project in Finland, launched in 1971. Subsequent pioneering efforts included research and demonstration projects in the United States and Europe, such as the Stanford Three-Community and Five-City Projects, the Minnesota Heart Health Program, the Pawtucket Heart Health Program, and Heartbeat Wales [5, 7, 12]. Although specific interventions varied across the projects, the general approach was similar. Community interventions were designed to reduce major modifiable risk factors in the general population and priority subgroups, and were implemented in various community settings to reach well-defined population groups. Interventions were theoretically sound and were informed by research in diverse fields such as individual behaviour change, diffusion of innovations, and organizational and community change. Combinations of interventions employed multiple strategies (e.g. media, education, policy) and targeted multiple layers of the social ecological system (e.g. individual, social networks, organizations, communities). Many of these exemplar community heart health programs were well-resourced relative to other preventive and public health programs, including large budgets for both process and outcome evaluations.

A pool of eligible projects was identified from a recent systematic review of community heart health programs [14]. From this pool, three projects were selected that best met the four criteria. The three projects were: the North Karelia Heart Health Project (1971-1992), Heartbeat Wales (1985-1990), and the Minnesota Heart Health Program (1980-1993).

A subset of publications was reviewed for each of the three programs. The objective was to identify publications most likely to include information on the interventions and to be accessible to the research team. Primary reports cited in systematic reviews of cardiovascular disease prevention programs provided the starting point for the selection of studies for the Minnesota and Heartbeat Wales projects. In total, 4 articles were retrieved and reviewed for the Minnesota Heart Health Program [29-32] and 5 articles for Heartbeat Wales [33-37]. For Heartbeat Wales, a technical report was also used since several of the publications referred to it for descriptions of the intervention [38]. For the North Karelia Project, primary articles were difficult to retrieve. Instead, a book was used that included several of the primary studies and more detailed descriptions of the project design, implementation and evaluation [39].

## **2. Development of and refinement of a 'data extraction tool'**

A next step was to develop a method to systematically explore the intervention information reported for the selected research studies. The particular focus was on information that corresponded to the intervention processes described in the nine propositions. To start, existing forms used to extract intervention data were reviewed [40, 41]. These forms tended to provide close-ended responses for various characteristics of

interventions, but did not gather information on the more complex intervention processes reflected in the propositions. Thus, the research team identified the need to develop a tool designed specifically to gather information on the propositions.

To this end, the team reviewed some key sources that described terms and concepts contained in the propositions (e.g., sustainability, synergy, etc) [1, 42-46]. Informed by these sources, operational definitions were developed for each proposition. These definitions are included in tables 1 through 6 in the results section.

The resulting tool used an open-ended format to extract verbatim text, and contained standard definitions for each proposition. The tool was refined following some preliminary data extraction. Two members of the research team were assigned to each of the three heart health projects. Each member first extracted information from studies independently, and then pairs for each project compared results to identify any inconsistencies and challenges. Only minor revisions were made to the tool, such as adding examples to improve consistency and completeness of data collection.

### **3. Data extraction from the publications**

Using the final version of the data extraction tool, each pair of researchers continued their work on one of the three projects. Information gathered in the preliminary data extraction was used, as appropriate. Using an iterative process, each pair reached consensus on the information extracted and consolidated the information onto a single form.

The consolidated form from each pair served as the 'raw data' from which patterns were explored. All members of the research team participated in the process to identify trends and issues related to reporting on relevant intervention processes. These trends and issues are described in the next section.

## **Results**

Results are reported for each proposition in order from 1 through 9, and grouped according to the themes shown in the multiple interventions framework (Figure 1). For each proposition, results are briefly described in the text. These descriptions are accompanied by a table that includes the operational definition for the proposition, findings related to reporting on the proposition, and illustrative verbatim examples from one or more of the projects.

***Integrating theory (Proposition 1):*** Information regarding the use of theories was most often presented in the form of a 'shopping list', with limited description of the complementary or unifying connections among the theories in the design of the interventions. Commonly, intervention programs projected changes at multiple socio-ecological levels, such as individual behavior changes, in addition to macro environmental changes. However, while theories were used for interventions targeting various levels of the system, the integration of multiple theories was generally implicit

and simply reflected in the anticipated outputs. Although less common, the use of integrated theory was made explicit through description of the use of a program planning tool, such as a logic model. Refer to Table 1.

***Creating synergy (Propositions 2 & 3):*** General references were frequently made regarding the rationale for combining and sequencing/staging interventions as an approach to optimizing overall program effectiveness and/or sustainability. Reference to the combining and sequencing/staging of interventions was found in proposed explanations for shortfalls in expected outcomes. However, specific details regarding the design of the combining and sequencing/staging within and across levels, as well as across sectors and jurisdictions were less explicit.

More specific details were reported for the combining and sequencing/staging of interventions within levels of the system (i.e. a series of interventions directed at the intrapersonal level), compared to across levels in the system. Information reported on the timing (sequential versus simultaneous) of multiple interventions, both within and across levels of the system, was also variable. Descriptions regarding the importance and deliberate combining and sequencing/staging of interventions that crossed sectors and jurisdictions showed the same pattern of variability. Inferences to intersectoral collaboration did not provide sufficient information that would be relevant to understanding the potential synergies from coordinating interventions across sectors and jurisdictions. Refer to Table 2.

***Achieving adequate implementation (Propositions 4 & 5):*** Proposition four specifically considers the quantitative aspects of implementation. Information reported ranged from general statements to specific detail. Although the targeted audience was most often clearly identified, information regarding the estimated reach (e.g. numbers or proportion) of the population receiving the intervention was more vague. The amount of time for specific interventions and the overall program tended to be reported in time periods, such as weeks, months or years. Information regarding specific exposure times for interventions tended to be unavailable. Information regarding the intensity of interventions was also provided in some reports, with authors describing strategies that included the passive receipt of information, interaction, and/or environmental changes. Descriptions of the investment of interventions also ranged in detail. Some authors identified challenges to reporting cost and cost-benefits, while other authors provided information regarding investment through staffing or funding contributions.

Proposition five considers the quality of implementation, represented through qualitative descriptions of the intervention. Reporting regarding the quality of the implementation was primarily implicit. Refer to Table 3.

***Creating enabling structures and conditions (Proposition 6):*** Reporting of information relative to the deliberate creation of structures and conditions was limited and generally implicit, often embedded in the details of intervention implementation. Refer to Table 4.

***Modifying interventions during implementation (Propositions 7 & 8):*** Although authors acknowledged the importance of flexibility in intervention delivery, information reported regarding adaptations to implementation made in response to environmental circumstances remained vague. Reference to context was often in relation to partial explanation for unintended or unexpected outcomes. There was minimal description regarding the modification of interventions in response to information gained from process/formative evaluation, outcomes, or population trends, the core of proposition eight. Again, authors acknowledged the significance of process/formative evaluation in informing intervention implementation, with some examples to illustrate how interventions were guided in response to information gathered. At other times, in the summative evaluation, reporting focused on using process evaluation results to explain why expected outcomes were or were not achieved, rather than how the process evaluation results did or did not shape the interventions during implementation. Suggestions for improved program success, based on information gained from formative evaluations, were noted in some discussions. Refer to Table 5.

***Facilitating sustainability (Proposition 9):*** Reporting on elements regarding the intention to facilitate sustainability of multiple intervention benefits was also variable. Authors made reference to the notion of sustainability at the onset of projects and described the conditions and supports that were in place to facilitate continued and extended benefits. Elements of sustainability represented in program outcomes were also described in some detail. In other examples, reporting only focused on sustainability of the program during the initial research phase of program implementation and discussed the desirability of continuing the program beyond the research phase. Refer to Table 6.

## **Discussion**

The results of the pilot study reported in this paper show that for a subset of community heart health programs, reporting on ‘best’ processes for multi-level and multi-strategy interventions is insufficient to systematically explore their role in making interventions produce desired population outcomes. Although some information was reported for each of the nine propositions, there was variability in the quantity and specificity across studies, and across propositions.

Reporting was more robust for some propositions than others, making them more ‘ready’ for systematic study. Those propositions with the most sufficient information were related to the quantity of implementation, combinations of interventions, responding to evaluation feedback, and facilitating sustainability. This finding is not surprising, since these topics are more well-established in the literature compared to other topics (namely, quality of implementation, enabling structures and conditions, integrating theory, adaptation to context). The propositions with less sufficient information may need more new data collection before they can be studied systematically.

Several possible explanations may account for the insufficient reporting of implementation information. Authors are bound by word count restrictions in journal articles, and consequently, process details like “program reach” might be excluded in favour of reporting outcomes. Reporting practices reflect what has traditionally been viewed as important in research. There is emphasis on reporting to ‘prove’ the worth of interventions over reporting to ‘improve’ community health interventions [47]. A shift to be more inclusive of reporting intervention processes can lead to understanding of successful or unsuccessful features of multi-strategy and multi-level interventions.

To generalize the results of the pilot study to other programs must consider features of the study design and the status of the broader literature on multiple intervention programs. The pilot study included three multiple intervention programs (the North Karelia Project, Heartbeat Wales, and the Minnesota Heart Health Program). During their implementation period (1971-1993) these programs represented the ‘crème de la crème’ of heart health programs in terms of study resources and design. Therefore, generalizability of findings to other heart health programs, past or present, cannot be assumed. It is even less clear whether the findings are generalizable to other multiple intervention programs (e.g., smoking cessation trials), especially those that are more recent. The collective experience of the authors, however, in diverse areas such as tobacco control, mental health, healthy weights, and chronic disease prevention, suggests that similar findings would be found in literature related to other, more contemporary programs.

## **Conclusions**

Study findings suggest that limited reporting on intervention processes may be a weak link in community health intervention research. Insufficient reporting prevents systematic study of processes contributing to health outcomes across a number of studies. Based on the study findings, we offer three recommendations to advance the field of community health intervention research. First, it is clear that a standard tool to guide systematic reporting of multiple intervention programs is needed. Such a tool could inform both the design of such research as well as ensure that important information is available to readers of this literature. In addition, a research tool that describes ‘best processes’ for interventions could benefit practitioners who are responsible for program design, delivery and evaluation. Second, editorial boards of relevant journals are encouraged to revisit their publication policies to accommodate lengthier articles for intervention and implementation research. This would allow for inclusion of more complete reporting of interventions, such as those outlined in the propositions. Third, researchers interested in the area are encouraged to develop programs of research that explore how and why intervention processes can contribute to improving community health and other outcomes. The nine propositions can be used to guide these programs of research. In turn, the results of this future research would help to continuously refine the propositions and thus our understanding of ‘best processes’ for multiple intervention programs. Finally, application of these intervention processes will contribute to community health impact through evidence-informed programs and policies.

## **Competing interests**

The authors declare that they have no competing interests.

## **Authors' contributions**

BR conceived of the study, managed the project, and was the lead writer. JM led development of the data extraction tool. OM led the description of results. All authors contributed substantively to the operational definitions, data extraction, and writing.

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## Figures

*Figure 1 - Multiple Interventions Framework*

## Tables

**Table 1 - Summary of data reported for integrating theory**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 1: Integration of relevant theories</b>		
<p>Descriptions of theories, including any references regarding the relationships among the specific mid-range theories for the various dimensions of Multiple Intervention Programs including:</p> <p>the targets of change, channels, settings, and intervention strategies</p>	<p>A ‘shopping list’ of theories was reported</p>	<p>The “program operated at the individual, group and community levels and encompassed a wide range of strategies stimulated by social learning theory, persuasive communications theory and models for the involvement of community leaders &amp; institutions” [30:p.203]</p>
	<p>Most often, use of isolated theories was described for specific intervention design features</p>	<p>“The innovation of diffusion theory provided a central framework for the project team... the role of the project as a change agent was to promote the diffusion of the lifestyle innovations of quitting smoking and adopting low fat diets” [39: p.42]</p> <p>Organizational change theory was directed at improving the “macro environment” while influencing individuals “choices and opportunities to change” [33: p.8]</p>
	<p>Some reporting about the relationships among theoretical concepts through use of planning tool, such as a logic model</p>	<p>“The approaches described above are unified...to depict the behavioural/social model of community intervention found to be most relevant” [39: p.43]</p>

**Table 2 - Summary of data reported for creating synergy**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 2: Combinations and sequencing/staging of interventions</b>		
<p>Descriptions of the deliberate combination of interventions (implemented at the same time) and sequencing/staging of interventions (ordered in time) within and across levels of the system relative to their potential for enhanced synergistic &amp; minimized antagonistic effects</p>	<p>Description regarding the combining and sequencing/staging of interventions at multiple levels of the system as an approach to optimizing overall program effectiveness and / or sustainability ranged from inferences to explicit details</p>	<p>“Staff training was implemented in work sites &amp; churches to facilitate offering of health promotion programs such as quit smoking [30: p.203]</p> <p>The program consists of a “complex set of projects and initiative which combine and interact in different ways to produce overall effect which is being measured through the outcome evaluation” [33: p.14]</p> <p>“The aim is to promote synergism whereby each component reinforces the others” [38: p.89]</p>
<p>Some referencing regarding the combining and sequencing / staging of interventions potentially attributable to both the anticipated positive outcomes, as well as explanation for shortfalls in expected outcomes.</p>	<p>Some referencing regarding the combining and sequencing / staging of interventions potentially attributable to both the anticipated positive outcomes, as well as explanation for shortfalls in expected outcomes.</p>	<p>The “combination of mass communication and community organization... was a valuable device for accelerating the diffusion of health innovation” [39: p.321]</p> <p>“Intervention program may have focused on the wrong population segments or used the wrong mix of intervention components” [31: p.1391]</p>
<p>More specific details were reported for the combining and sequencing/staging of interventions within levels of the system (such as interventions directed at the intrapersonal individual level), compared to across levels in the system (such as a combination of intrapersonal and policy level changes)</p>	<p>More specific details were reported for the combining and sequencing/staging of interventions within levels of the system (such as interventions directed at the intrapersonal individual level), compared to across levels in the system (such as a combination of intrapersonal and policy level changes)</p>	<p>“In the two direct intervention schools, butter used on bread was replaced by soft margarine... These changes were also recommended for... meals at home... a nutritionist visited the homes of the children... Healthy diet was also discussed during school lessons. Parent gatherings, leaflets, posters, written recommendations, a project magazine, and the general mass media were used... Screening results were explained... A school nurse repeated the screening... and good advice and counseling to children...” [39: p.293]</p> <p><i>Compared to...</i></p> <p>“With an effective political system, public health leaders can gain authority to strenuously exert influence over personal behaviours without arousing resistance. ... this was accomplished through a blended approach which included both manipulation and empowerment [39: p.319]</p>

Operational Definition	Information Reported on Propositions	Illustrative Examples
	Reporting on the timing (sequential versus simultaneous) of interventions spanned from specific detail to general descriptions	<p>“Actual screening programmes were often run simultaneously.” [39: p.97]</p> <p>“Staggered entry of communities to intervention to allow for gradual development of the intervention program and strengthened the design through replication” [31: p.1384]</p> <p>“The model Choice-Change-Champion process for health promotion” [was] constructed for “idealized sequence of events” and intended to “guide planning and priority setting”. [33: p.9]</p> <p>“...individuals are supported to move from stage one of having a “choice” for lifestyle... through stage two of making “changes” successfully... and stage three becoming a “champion” for health at the local level which requires whereby individuals move from being a recipient to provider” [38: p.48]</p>
<b>Proposition 3: Coordinating and integrating intervention efforts</b>		
Descriptions of complementary interventions across sectors (e.g., health, education, recreation, labour, environment, housing, etc) and across jurisdictions (i.e., local/regional, provincial/state, federal/national).	Reporting on the importance and deliberate combining and sequencing/staging of interventions through use of multiple channels that crossed sectors and jurisdictions was both implicit and explicit	<p>“The programme must be founded on intersectoral activity, community organization and grassroots participation.” [39: p.34]</p> <p>The development of advisory boards “were made up of influential political business, health, and other leaders in the community and citizen task force” [30: p.202]</p> <p>“The intervention comprises a wide range of locally organized projects together with centrally led initiatives...across all sectors of Welsh life, including the health and educational authorities, local and central government, commerce, industry, mass media, agricultural and voluntary sectors” [33: p.6]</p>

**Table 3 - Summary of data reported for achieving adequate implementation**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 4: Adequate implementation</b>		
Quantitative descriptions of the intervention implementation, the amount & extent of engagement, include: 1. <i>duration</i> (time period); 2. <i>intensity</i> (depth of engagement such as passive receipt of information, interaction, or an environmental change); 3. <i>exposure</i> (total educational time, total minutes/hours/years of exposure); 4. <i>investment</i> (direct funding or in-kind contributions from various sources); & 5. <i>reach</i> (e.g. total number of participants, proportion of population)	General information was often reported on the targeted audience rather than the reach (estimated numbers or proportions receiving intervention)	<p>“Programme activities are usually simple and practical in order to facilitate their enactment by the widest spectrum of the community. Rather than the highly sophisticated services are generally simple basic services for a few people, simple basic services are generally provided for the largest possible stratum of the population” [39: p.48]</p> <p>“All 8<sup>th</sup> graders enrolled in public schools” [29: p.219]</p>
	Duration was generally reported for the overall program; total time for specific interventions was reported less frequently.	<p>A TV series of 15 programmes called “Key to Health” was broadcast during the 1984-85 school year.” [39: p.300]</p> <p>“Systematic risk factor screening &amp; education were conducted during the first 3 years of the intervention program” [30: p.202]</p> <p>“first intervention – competition: took place over a 4 week community-wide competition” [29: p.219]</p>
	Descriptions provided regarding the depth of engagement, including the passive receipt of information, to interaction, and environmental change	<p>“The following list gives some idea of the extent to which print media were exploited during the five first years of the project (1972-77): local newspaper articles (877.000 column mm) 1509;...Health education leaflets (series of five) 278.000 copies...” [39: p.279]</p> <p>“Activities were experiential – designed to require active participation” [32: p.1211]</p> <p>“Activity was encouraged through a competition...role modeling...and environmental change” [29: p.219]</p>

Operational Definition	Information Reported on Propositions	Illustrative Examples
	Challenges to reporting cost and cost-benefits, as well as information regarding investment were described.	<p>In evaluating the smoking component, cost-benefits were not calculated based on per-capita investment because a) cost of the smoking programme and its administration is “impossible to estimate, or differentiate from usual operation”, and b) the “cost to some unites such as volunteers is not calculated” because of “difficulty estimate it” [34: p.131]</p> <p>“In 1990 the North Karelia Project employed nine full-time and eight part-time field office staff, who worked a total of over 18 000 hours that year” [39: p.66]</p> <p>“The money to employ staff and finance the work has come from various sources” [39: p.72]</p>
<b>Proposition 5: Appropriate implementation</b>		
Qualitative descriptions regarding the quality of the intervention including: 1. fidelity (implementing all essential components of interventions as intended); 2. alignment with changing context (to ensure best fit); & 3. implementing the most potent ‘active ingredients’.	No explicit data reported regarding the quality of implementation	
	Descriptions regarding the quality of implementation were implicit, embedded in reporting of 1. program features, such as priority setting or strategies undertaken to enhance quality implementation; & 2. explanations for problems with intervention fidelity relevant to explaining the results.	<p>“One third (1/3) of the budget was dedicated to funding well-defined projects initiated locally that serve the objective of the program....” [33: p.17]</p> <p>“Over its 20 years, the project has initiated or been otherwise involved in hundreds of training seminars. Although the nature of the seminars has changes, the focus has always been the discussion of practical tasks (derived for the objectives), action needed, and progress and feedback.” [39: p.278]</p> <p>“After [the early years of the project ] it became both possible and necessary to introduce more specialized services to support the basic activities. These were prepared and tested by the project and implemented gradually”. [39: p.274]</p>

**Table 4 - Summary of data reported for creating enabling structures and conditions**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 6: Enabling structures and conditions</b>		
<p>Descriptions of the creation of structures (infrastructure) and conditions (processes and relationships) at system levels that support the design, implementation and/or evaluation of interventions, such as : media support; incentive grants; capacity building (for providers, organizations, communities); mechanisms for monitoring, evaluation, surveillance; networks; active citizen participation; opinion leader support.</p>	<p>Information regarding the deliberate creation of enabling structures and conditions was embedded in descriptions of intervention implementation.</p>	<p>“There was great stress placed on efforts to teach practical skills for change such as smoking cessation techniques and ways of buying and cooking healthier foods. For the latter, close co-operation with the local housewives’ association has been proven invaluable, Activities have been coordinated to provide social support, expand options and availability (i.e. production and marketing of healthier foods), and ultimately to organize the community to function in a healthier mode” [39: p.40]</p> <p>“Information gained from the community, clinical and youth baseline surveys about knowledge and lifestyles was shared in community meetings, with professional opinion leaders and published in easily understandable form for the local population... This served as a great force for...winning commitment from key decision makers, and motivating change among individuals and organizations.” [33: p.17]</p>

**Table 5 - Summary of data reported for modification of interventions during implementation**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 7: Adaptation to the contextual environment</b>		
<p>Descriptions regarding the adjusting or tailoring of interventions to ongoing and unpredictable contextual changes, while maintaining theoretical underpinnings and integrity. Changes include such factors as: demographics, political priorities; organizational changes or priorities; economic environment; community events; network/coalition development, etc.</p>	<p>Authors described the importance of context and need for flexibility in intervention delivery</p>	<p>“Even when the framework of an intervention is well-defined...the actual implementation must be flexible enough to respond to changing community situations and to advantage of any fresh opportunities” [39: p.33]</p>
	<p>Details regarding what modifications were made to initial intervention implementation plans were vague, most often reported as part of the discussion for findings</p>	<p>“Project leaders and staff immersed themselves in the community and among the people, where they developed and adjusted programme activities according to the available local options and circumstances” [39: p.33]</p>
<b>Proposition 8: Responsive to evaluation feedback</b>		
<p>Descriptions regarding the collection and utilization of information about the process of intervention implementation, intervention outcomes (preliminary or later stage), or broader trends on risk factors or conditions, demographics, morbidity and mortality, etc.</p>	<p>Importance of process evaluation described as a tool for improving programs.</p>	<p>“Process evaluation “...is intended to identify features of a project which enhance or hinder its chances of success as the project develop” [33: p.14]</p>

Operational Definition	Information Reported on Propositions	Illustrative Examples
	Some description of how interventions were guided in response to preliminary evaluative information and population trends	<p data-bbox="943 264 1528 531">“The project field office is actively involved with many aspects relating to process and formative evaluations. The health behaviour surveys have questions about the person’s exposure to various intervention activities, which provides immediate feedback. The health education materials and media campaigns rely heavily on the result of the monitoring” [39: p.71]</p> <p data-bbox="943 564 1549 764">“The 1987 population survey found that the decrease in population cholesterol means had leveled off. Novel and intensified activities began in North Karelia and across the country, coinciding with new national cholesterol guidelines” [39: p.108]</p>
	Reporting on formative evaluation as post hoc activities in an attempt to explicate why expected outcomes were or were not achieved.	<p data-bbox="943 1005 1500 1100">“There was suggestive evidence, however, that innovative modification in format could lead to renewed interest in contests” [30: p.204]</p>

**Table 6 - Summary of data reported for facilitating sustainability**

Operational Definition	Information Reported on Propositions	Illustrative Examples
<b>Proposition 9: Sustainability</b>		
<p>Discussion regarding the continuation or extension of the issue, program, partnerships, benefits, etc. Includes planning at the outset</p>	<p>Reporting on the notion of sustainability at the outset of the project</p>	<p>“In principle, a community-based project can vary from a relatively restricted academic study, or local effort, to a major programme with strong nationwide involvement. The North Karelia Project definitely falls into the latter category. At the very onset the national health authorities decided that the North Karelia Project would be a pilot for all Finland.” [39: p.51]</p>
	<p>Description of conditions and supports in place that would facilitate sustainability such as finances, partnerships, and previous experience</p>	<p>“The fact that the project director represented North Karelia in the National Parliament from 1987-1991 was important in this respect. The cooperation of the local health services and health personnel has guaranteed a firm foundation for the project activities. Numerous community organizations have also contributed greatly over the years. Because project activities have been integrated into the existing health services and broad community participation has been a key feature, the overall costs of the programme have been kept modest.” [39: pp.71-72]</p> <p>“The project has arranged numerous competitions in collaboration with the food-industry, the media, schools, sports clubs, voluntary organizations etc. over the past twenty years” [39: p.287]</p> <p>“During the project several of its leading members have been active in various health and health research policy functions” [39: p.287]</p>

Operational Definition	Information Reported on Propositions	Illustrative Examples
	<p>Descriptions of sustainability evidenced in outcomes of the program such as policy change and extension of the issue illustrated by the role of projects as a catalyst for other jurisdictions</p>	<p>“The creation by Secretary of State for Wales of The Welch Health Promotion Authority with clear brief to sustain and support the program provide longer possibilities for Heartbeat Wales” [33: p.17]</p> <p>This “new administrative arrangements...ensure the future and.. support the complementary initiatives on health promotion for young people and sensible drinking” [35: p.346]</p> <p>“The project became associated with healthy public policy in may ways, by contributing to anti-smoking legislation, for instance.” [39: p.43]</p> <p>“The project has been a major and diverse contributor to many policy decisions on the national and local levels” [39: pp.71-72]</p> <p>“The North Karelia Project has itself been a model for imitation and acceleration of similar activities around the world [39: p.322]</p> <p>“It was considered worthwhile for the project to continue operating beyond the initial five-year period, but at the same time to expand activities to contribute to national developments. So while North Karelia continued to be an active demonstration area the project evolved a national dimension to its activities” [39: p.360]</p>

# Figure 1: Multiple Interventions Framework

(adopted from Edwards, Mill & Kothari, 2004, reproduced with permission)

