

# What Is Population Health Intervention Research?

Penelope Hawe, PhD,<sup>1</sup> Louise Potvin, PhD<sup>2</sup>

## ABSTRACT

Population-level health interventions are policies or programs that shift the distribution of health risk by addressing the underlying social, economic and environmental conditions. These interventions might be programs or policies designed and developed in the health sector, but they are more likely to be in sectors elsewhere, such as education, housing or employment. Population health intervention research attempts to capture the value and differential effect of these interventions, the processes by which they bring about change and the contexts within which they work best. In health research, unhelpful distinctions maintained in the past between research and evaluation have retarded the development of knowledge and led to patchy evidence about policies and programs. Myths about what can and cannot be achieved within community-level intervention research have similarly held the field back. The pathway forward integrates systematic inquiry approaches from a variety of disciplines.

**Key words:** Evaluation; population health intervention research; evidence-based practice; intervention research; population health

La traduction du résumé se trouve à la fin de l'article.

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There is an increasing move worldwide to shift the emphasis of population health research away from purely descriptive and analytic studies and towards the study of interventions to reduce health problems and reduce health inequities.<sup>1</sup> This requires an appreciation of the best that we have learned from the diverse settings in which both health and social scientists have been working. As far as possible we call for an integration of that learning to assist in the development of the relatively new overarching field of population health intervention research.

This paper outlines the practice of intervention research in population health. We draw attention to a number of features that mark problematic and unnecessary distinctions between intervention research and evaluation research, arguing that these fields comprise very similar research practice and orientation. We discuss the skill sets involved in this type of research and end by describing and debugging common myths with regard to intervention research.

### Defining intervention research

The definition of intervention draws from its Latin roots, *venire*, meaning to come and *inter*, meaning between, drawing attention from the outset that to intervene literally means to come in between, to disturb the “natural” order of things or a foreseeable sequence of events. If we characterize descriptive or analytic research in population health as seeking to understand phenomena, then intervention research is about testing those understandings by the act of intervention in the causal mechanisms under investigation. It is also about learning from the actions implemented to address those phenomena in order to improve our practice. The iconic figure of John Snow removing the handle of the Southwark and Vauxhall Company water pumps that he suspected were responsible for the London cholera outbreak<sup>2</sup> is a dramatic example.

The Population Health Intervention Research Initiative for Canada (PHIRIC) defines population health intervention research thus:

*Population health intervention research involves the use of scientific methods to produce knowledge about policy and program interventions*

*that operate within or outside of the health sector and have the potential to impact health at the population level.<sup>3</sup>*

We use the term “population health” in the way it is used in Canada to refer to the science underpinning the practice of public health and understandings about health that come only from an appreciation of how health is generated in populations. However, we recognize that in many countries the term “population health” is less used, and hence here “population health research” and “public health research” can be taken to mean the same thing.

The definition refers to the use of scientific methods that have informed the development of many disciplines. In the case of public health, the original critical scientific developments were about social statistics and virology.<sup>4,5</sup> In public health the tradition of intervention research is closely linked to that of experimental medicine, which goes back to the pioneer work of Claude Bernard. The principles of experimental medicine as proposed by Bernard are to systematically examine and, if possible, isolate the physiological consequences of actions undertaken in response to ill health and to try to reproduce those consequences under various conditions. For Bernard, as for most scientists of his time (1870s), causality and scientific laws are only possible through the decomposition of the mechanism, understood as the sequence of events that produces an effect. Altering the outcome of a sequence in a predicted direction constitutes evidence of the truth or validity of the scientific proposition. Today, scientific methods from a variety of disciplines, including the social sciences, are included in the evaluator’s toolbox.

The PHIRIC definition also points to interventions both inside and outside the health sector and is neutral on the intentionality

### Author Affiliations

1. Population Health Intervention Research Centre, University of Calgary
  2. Léa-Roback Research Centre on Social Health Inequality, University of Montreal
- Correspondence and reprint requests:** P. Hawe, Population Health Intervention Research Centre, University of Calgary, G012, 3330 Hospital Drive NW, Calgary, AB T2N 4N1, Tel: 403-210-9383, Fax: 403-220-7272, E-mail: phawe@ucalgary.ca
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of those events. If we confined ourselves to actions within the health sector intended to improve health we would miss a great deal. The definition reflects an interest in the social determinants of health – economic policy, education policy and environment policy. Actions in sectors outside health, designed for purposes other than health, are often studied by people within health as “natural experiments”, e.g., road construction, factory closures, food market openings. Studies of the impact of such events are included in the PHIRIC definition of population health intervention research along with ongoing practices and policies in sectors other than health that might affect population health. Evidence about population health impact has been successful so far in changing practices in the motor vehicle construction industry,<sup>6</sup> the food and beverage industry<sup>7</sup> and the petroleum industry.<sup>8</sup>

The final aspect of the definition is “impact at the population level”. The Canadian Institutes of Health Research, Institute of Population and Public Health, reminds us that this does not simply mean improving health or reducing health risks but, rather, involves interventions intended to change the conditions of risk in order to alter the distribution of health risk<sup>9</sup> in keeping with the ideas of Geoffrey Rose.<sup>10</sup> To be truly effective, a population health intervention should be reducing risk exposure in successive cohorts of people within the setting(s) under investigation.

### **Is intervention research the same as implementation research?**

Systematic observation built up around the roll-out of programs and policies as they are implemented in order to appreciate reach, context-level adaptation and effects has a strong tradition in the field of public administration, where it tends to be called “implementation research”.<sup>11-13</sup> But what is more associated with the phrase “intervention research” in the health field is the notion that its primary purpose is to test a hypothesis or causal pathway. Hence, attribution of effect to that intervention is a primary driver of the study design in intervention research, as its origin in the 19<sup>th</sup> century underlines. Note that some health researchers have reserved the term “implementation research” for a phase of work that follows the demonstration of a program’s or policy’s effects.<sup>14</sup> This implementation research phase is designed to elucidate more understanding about the process of a program that has already shown its effectiveness in a demonstration trial.<sup>14</sup> This idea is often seen in clinical settings.<sup>15</sup> However, others have argued that systematic observation of and improvement in process and implementation should precede the measurement of effects. Indeed to not do so might diminish the chance of a new intervention achieving its effects.<sup>16</sup>

The stepped-wedge cluster-randomized trial design has evolved quite recently for situations in which there is high demand for a policy or program of unknown effectiveness and unlikely harm but insufficient resources for the program or policy to be uniformly provided initially.<sup>17</sup> Policy-makers are often more likely to be persuaded to adopt this staged, randomized roll-out design than a traditional cluster-randomized trial. The stepped-wedge design allows effectiveness to be assessed optimally while local demand is served. From a traditional researcher’s perspective the stepped-wedge design remains an effectiveness trial and a classic case of intervention research. For policy-makers it is perhaps seen more as a progressive introduction of a policy or program, with more

data-gathering around it than they are perhaps used to. Dual perspectives are important and not incongruent.

We take the view that all systematic inquiry and learning from observing an intervention’s process or implementation, impact or outcome is encompassed in the term “intervention research”. Terms may always be used differently in different fields, but better research overall will derive from understanding the contributions that have come from different vantage points. In this sense, rather than insisting on any particular language, it is better to pin down the purpose of the research (e.g., testing effectiveness, elucidating the process of action, documenting variations in implementation, tracking reach into populations with highest needs) and to ensure that the methods appropriately match that purpose.

### **Is intervention research the same as evaluation research?**

Evaluation involves making judgements about the worth or value of something.<sup>18</sup> Evaluation research is about the use of scientific methods for that purpose.<sup>19</sup> The focus of enquiry is to interpret an action and make a pronouncement about it, according to values or standards that are pre-set (and usually enshrined in the goals and/or objectives of the action). Evaluation is usually broken down into components named variously but usually encompassing process evaluation (how well an intervention is delivered, whether it reaches the intended target group), impact evaluation (immediate effects) and outcome evaluation (subsequent or longer-term effects). The goals or objectives are enshrined within the sample size calculation that is required for quantitative studies in impact and outcome evaluation. The amount of desired important change is pre-specified.

Evaluation research and population health intervention research encompass many of the same activities and methods. All evaluation research in population health is population health intervention research, but not all population health intervention research is evaluation research. This is because some population health intervention research assesses the health impact of policies and programs in sectors outside of health. Because these policies and programs were not designed with a health outcome or objective in mind they do not conform to the definition of evaluation research in the sense that the criteria for interpreting the health impact are not preset. However, differences between the two fields of work have emerged in practice, some of which are listed in Table 1.

These differences mark a division in the culture of the two areas, in an everyday sense, that has some worrying features. They represent issues we need to address in Canada if we are to gain fully from all the work being undertaken to understand ways to improve health at a population level.

First, there is a tendency to see evaluation as “not research”. In many health regions in Canada, evaluation projects are not sent for ethical review and therefore the investigation methods proposed are not scrutinized externally. This may compromise quality.

Second, important questions about intervention effectiveness may be being pursued under the guise of evaluation research and hence commissioned with insufficient resources to pursue answers adequately. This contributes to a poverty of evidence on important issues. For example, the US Task Force on Community Preventive Services has recently lamented that in 50% of the interventions

**Table 1.** Common Differences That Have Arisen between Intervention Research and Evaluation Research

<b>Intervention Research</b>	<b>Evaluation Research</b>
Intervention is often initiated by the researcher, although it may be designed in collaboration with practitioners.	Intervention under investigation is usually designed by practitioners or agencies.
Funded by a research grant.	Funded by resources within the commissioning agency.
Budgeted according to the information required and the cost to produce that information.	Funded as percentage of the cost of the program, e.g., at an arbitrary level of 10%.
Results are destined for the public domain, e.g., in peer-reviewed journals.	Results may be restricted to an internal report by contract agreements.
Usually focused on assessment of intervention outcomes, assisted by a large budget for primary data collection. May also include assessment of process and mechanism of action.	Smaller budgets frequently limit enquiry to secondary data sources in relation to outcome or restrict the evaluation questions to matters of intervention process, reach or consumer satisfaction.
Requires ethics approval.	Ethics approval not routinely sought.

reviewed there was insufficient research evidence to make any practice recommendations.<sup>20</sup> This is probably not because a wide variety of practices have not been investigated; it is more likely that what has been investigated has not produced evidence that the Task Force considers worthwhile.

A typical scenario comes from the World Health Organization's (WHO) Safe Communities project. There are more than 80 such projects worldwide, which are designed to mobilize and involve communities in reducing injuries. However, only seven of those projects have undertaken controlled evaluations using objective sources of injury data, and only two have been shown to be effective.<sup>21</sup> The dearth of evidence most probably arises because evaluations of Safe Communities projects typically are commissioned by local agencies, with budgets insufficient to employ more than one person full time. They therefore tend to address questions about who is involved in the project, what people think about it, what activities have been conducted and whether inter-sectoral collaboration increased, as described in a case study funded by a state health department in Australia, for example.<sup>22</sup>

Finally, the divide between evaluation and intervention research has meant that a different body of knowledge has evolved to serve each professional field, and important opportunities for cross-development have been lost or delayed. For example, journals such as *Evaluation*, *Evaluation Review*, *New Directions for Evaluation*, *Evaluation and Program Planning* and *Evaluation and the Health Professions* have published numerous studies about implementation assessment, the importance of context assessment and theories of change processes for a decade or more. Yet it has only been comparatively recently that these notions have been given prominence in the field of evidence generation in public health.<sup>23</sup> One reason for PHIRIC to bring these two fields closer together is to ensure that such misadventure does not persist. Some of the "great failures" in population health intervention research<sup>24</sup> can be attributed to issues that experienced evaluation researchers would have detected earlier. These include issues like inadequate intervention implementation, failure to stage the design of the research to the stage of the intervention's development and/or inadequate program theory. These are domains that health promotion evaluators have long been encouraged to examine systematically at the outset of study design during the process of evaluability assessment.<sup>16</sup> We note, for example, that the failure of the Stanford Heart Disease Prevention Program was predicted at the start by those who argued in journals published at the time that its community-based change logic (theory) was weak.<sup>25</sup> A formal evaluability assessment of the intervention might have held the investigators' decisions around this up to greater scrutiny and debate.

**The skill set of an intervention researcher**

As the task of intervention research is laid out, it becomes apparent that the skill set to accomplish the task is complex. Technical competence in empirical enquiry is vital and, given the breadth of tasks – e.g., study design, questionnaire design, interview design, data management, data extraction, statistical analysis, qualitative data analysis, economic evaluation and economic modelling – may require the resources of a multidisciplinary team. However, any or all of these skills are part of the regular repertoire of any population health researcher. Because population health interventions are designed to address social conditions that determine risk, a good intervention researcher must have additional skills, including those that allow him or her to play a strategic role in the development and uptake of high-quality interventions (assuming here that the intervention research is real time and not historical, using secondary data sets).

In the first instance, researchers must be able to theorize about change dynamics. Intervention research is about transformation processes. Thus a researcher might need to look for more things, different things or different things in different ways, than if he/she were doing a descriptive or an analytical study. Investigators who have had to deal with the ramifications of interventions (side effects, unintended effects)<sup>26</sup> and the possibility that interventions could cause harm have been led to theorize at multiple levels.<sup>27</sup> McLeroy reminds us that the "theory of the problem" and the "theory of the solution" are not the same.<sup>28</sup> Some of the modest or negative findings in population health intervention research might be attributable to investigators, frustrated with their work in documenting the problems, trying their hand at intervention design and intervention research without a thorough appreciation of the demands of intervention theory and practice. Unfortunately, as a consequence, it may be hard to get policy-makers to reinvest in interventions and intervention research in areas where previous investigation has failed. Put crudely, the baby easily gets thrown out with the bathwater.

Skills in communication, policy and social analysis are vital.<sup>29</sup> Research has to be meaningful and convenient to the people and organizations with whom the researcher is working. Intervention research is about contributing directly to the implementation of actions to improve the population's health. Yet, too often researchers have been accused of designing and testing interventions that no one would be able to implement in real life, ignoring policy-makers' needs.<sup>30</sup> The field of utilization-focused evaluation is helpful here in increasing researchers' sensitivity to stakeholder or end-user needs.<sup>31</sup> Additionally, researchers need to gain the support of practitioners. This can be difficult. Not only does research

**Table 2.** Examples of the Diversity of Intervention Studies to Address Various Evaluation Questions

Evaluation Question of Interest	Authors	Examples
RELEVANCE: <i>How relevant is the program to targets of change?</i>	Bisset et al., 2004 <sup>38</sup>  Baker et al., 2007 <sup>39</sup>	Examines how decisions about the goal and mission of a community diabetes prevention program were informed by prevalence studies conducted in the community. Shows how a community prevention program to reduce childhood obesity was designed on the basis of community asset mapping and led to community engagement in the program.
COHERENCE: <i>How does the theory of change underlying the program relate to the theory of the problem?</i>	Hawe & Stickney, 1997 <sup>40</sup>  Levesque et al., 2005 <sup>41</sup>	Describes how, despite good will, an intersectoral food policy committee was lacking a mechanism to successfully pursue its goals. Examines the correspondence between the activities implemented in a community diabetes prevention program and the principles of the socio-ecological approach to health promotion.
RESPONSIVENESS: <i>How is program implementation responsive to local conditions?</i>	Ho et al., 2006 <sup>42</sup>  Corrigan et al., 2006 <sup>43</sup>	Examines how the local conditions prevailing in remote communities were related to changes in the implementation of a First-Nations Diabetes Prevention Program that had been successfully evaluated. Describes how the use of qualitative methods helped improve the fit between implementation variations in a randomized trial of secondary prevention and local needs and conditions
ACHIEVEMENTS: <i>What did program activities and services achieve?</i>	Wickizer et al., 1998 <sup>44</sup>  Cooke et al., 2007 <sup>45</sup>	Identified the critical factors for successful implementation of a community health promotion initiative in 11 communities randomly assigned to receive program grants. Examines the changes in aggressive and related behaviors as well as in discipline referrals following the successful implementation of a violence prevention program in six schools.
RESULTS/IMPACT: <i>With which changes in local conditions was the program associated?</i>	O'Loughlin et al., 1999 <sup>46</sup>  Wagenaar et al., 2006 <sup>47</sup>	Quasi-experimental study showing that although several implementation indicators revealed a high level of program penetration in the community, there was no improvement in health and behavioural indicators. Quasi-experimental study showing positive trends in many indicators in the 10 US States where the Reducing Underage Drinking through Coalition Project funded coalitions designed to change policy and normative environments.

take up practitioners' time but it can also attract resources that would have otherwise been spent on the intervention itself. Careful navigation is required when researcher and practitioner interests do not coincide at the outset.

There may be covert as well as overt reasons for programs and services, and insensitivity on the part of the researcher can fail to recognize this. One example comes from DARE, Drug Abuse Resistance Education in North America. This is a school-based substance abuse prevention program that has been delivered to more than 33 million school children at an annual cost of \$0.75 billion. Repeated evaluations have shown that it does not prevent substance abuse.<sup>32</sup> In 2001, a \$13.7 million program renovation was undertaken, but there has still been no evidence that the new DARE is effective.<sup>33</sup> However, a recent qualitative analysis has suggested that past researchers have possibly missed the point of the program. Its primary benefit is perceptual – principals and teachers like having police in schools making contact with children and youth.<sup>34</sup> On this basis, schools may wish the program to continue in spite of its failure to prevent drug use. From a population health perspective, there may be cheaper ways of building school collaborations with the police that could allow the bulk of DARE costs to be diverted to more effective programs against drug abuse. The point is that more astuteness on the policy analysis side might have anticipated this finding many years previously.

### Common myths in intervention research

In practice, intervention research has often tended to be associated with investigator-driven studies, and evaluation research has been associated with studies commissioned by or conducted with the research users, consumers or decision-makers. This means that a particular profile, or image, of intervention research has arisen that needs to be interrogated.

#### *Myth 1. Intervention Research Is Just About Intervention Effect*

We have defined intervention research in a way that emphasizes its role in understanding causal mechanisms, but showing that something is effective is only part of the task. Intervention research is about all parts of the process of designing and testing solutions to problems and about getting solutions into place. It can involve process evaluation of interventions (assessing reach, implementation, satisfaction of participants, quality). It can involve assessment of how interventions adjust to different contexts.<sup>35</sup> It can extend to examinations of how interventions are sustained over time or become embedded in the host institutions.<sup>36</sup> It includes diffusion research or understanding of how interventions are spread to new sites.<sup>37</sup> The WHO Task Force on Health Promotion Evaluation proposed five questions as points of entry for enquiring about an intervention with these multiple aspects in mind.<sup>37</sup> Table 2 presents examples of intervention studies conducted in relation to each of those five questions.

#### *Myth 2. Interventions Designed and Implemented With Communities Should Not Be Called Intervention Research*

The field of population and public health is interdisciplinary, eclectic and contested. In community-based intervention research some unhelpful schisms have grown up between studies primarily designed and controlled by researchers and those that are driven by communities. We believe that both types of interventions must be accountable for their logic, values and outcomes.

The whole spectrum of intervention research should be supported, from those interventions driven by hypotheses formulated in academia to those in which interventions are designed and implemented by local actors.<sup>48</sup> However, we stop short of the suggestion that, with respect to communities, the term "intervention" research be dropped in favour of terms like "community development" or "community-based action". The latter terms frame a tra-

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dition that is highly respected and characterized by particular ways of working.<sup>49</sup> We are not suggesting that these terms be replaced, but we suggest that it may be appropriate to use the term “intervention research” in conjunction with them when data are being collected by researchers, because the intervention terminology enshrines a dynamic that is important to remember: that of disturbing the regular order of things. A focus on disturbing, interrupting or changing an expected sequence of events draws attention to the ethical issues involved, the relationship between the researcher and the researched and the duty of care enshrined in the relationship.<sup>50</sup> These are neglected issues in population health research, which we believe could become even more neglected if inadvertently hidden by language that disguises the duties and responsibility of the researcher. When researchers become actors in local events, as opposed to being merely observers, many of us find ourselves untrained and unprepared. Preserving a language that alerts us to the special nature of this role is precautionary and vital.

### *Myth 3. Intervention Research Is Only About Controlled Trials*

A lot of intervention research *has* been about controlled trials in schools, worksites and communities, but it does not have to be. Many different types of study design can be used to build acceptable evidence in public health, although some scenarios are more desirable than others when it comes to making causal inferences.<sup>51</sup> Important work is advancing in the use of time series designs to illuminate the impact of policy<sup>52,53</sup> and in the use of observational methods to investigate the relationship between program implementation conditions and impact. There has also been an expansion of community-based participatory research, which has been critical for addressing social determinants of health in communities.<sup>54,55</sup>

### *Myth 4. Intervention Research Is About Controlled Interventions*

There is no reason for all interventions to be as tightly controlled as many investigators have imagined.<sup>56</sup> Indeed it has been observed that the reason so many interventions in schools, worksites and communities have failed may be because investigators have over-controlled the form of their interventions in the mistaken belief that this is a design requirement of randomized controlled trials.<sup>56</sup>

An alternative way of thinking about standardization has been proposed that can liberate the randomized controlled design and aid its use in more contexts.<sup>56</sup> The key issue is that interventions have to be well theorized and recognizable, so that the evaluation is valid and so that another person could replicate the intervention in another place. The essence of an intervention might be a process or set of functions.<sup>56</sup> This type of intervention follows recognizable principles (a standard function, like organizational development or community development) but necessarily takes a different form from place to place and in that sense owes its effectiveness to how it is tailored to context.<sup>56</sup> Alternatively, the intervention could be fixed or standard in form, like a leaflet based on the health belief model, which draws its benefit from being sufficiently effective overall, even though it is largely immune to local context and not effective in every place.<sup>57</sup> The point is that interventions standardized by form *or* standardized by function can be evaluated meaningfully in randomized controlled trials.<sup>56</sup> Theorizing this at the outset is part of trial design.

The myth that interventions have to be tightly controlled in terms of form unfortunately continues to be promulgated by

researchers who use analogies from drug trials to explain the efficacy of community health interventions.<sup>14,58</sup> In these analogies, the most efficacious interventions are framed as those designed by universities or expert authorities of some type. The effectiveness of interventions is then considered to be progressively diluted by the transfer of these technologies from the academy into the hands of local community practitioners.<sup>14,58</sup> The alternative view defines efficacy as starting with interventions designed or shaped by communities and practitioners. These may intersect with universities to the extent that such relationships may be required to strengthen intervention theory and to gather convincing evidence that such interventions work. These alternative views recognize the agency of the practitioners and the capacity of communities to foresee and shape the types of intervention that might work best.

So, by being well theorized and facilitated, it is entirely possible for community-based, context-adapted, flexible interventions to be evaluated usefully, even in randomized trials. This is a point that has been argued in theory<sup>56</sup> and recently demonstrated in practice.<sup>59</sup>

### *Myth 5. This Is Just Health Promotion Research With a Different Name*

There is an extraordinary legacy of work in health promotion research that informs the way in which we should conceive of and measure the process and impact of interventions in population health.<sup>60</sup> However, population health intervention research is wider.

The difference between health promotion research and intervention research in population health, as PHIRIC has defined it, is the *intentionality* of the intervention. Health promotion research is focused on interventions designed to improve health. Intervention research in population health is the umbrella term that also includes explorations of the health effects of interventions in sectors outside of health designed for other purposes, such as increased transport usage. This is commonly known as a health impact assessment. An advantage in bringing a closer alliance of the two domains is that methods from one can inform the other. For example, mathematical modelling with large secondary data sets is a common means to explore the health effects of economic policy.<sup>61</sup> Such methods are less well known in mainstream health promotion journals but could be better used. By contrast, exposure measurement with regard to an intervention, and all the subtleties enshrined in the notion of intensity of “preventive dose”, has been well developed in the health promotion literature.<sup>62</sup> However, it appears to be less well captured in fields outside of health promotion, where exposure may only be defined dichotomously (i.e., program deemed to be present or not).

### *Myth 6. Intervention Research Is Too Expensive*

It is common to deplore the high costs of intervention trials, demonstration projects or participatory research and to plea for resources to be spent in other ways, but the truth is that we do not know whether intervention research is any more expensive than descriptive or analytic research in population health. Certainly, when an intervention study fails to record a reduction in a health problem, there always seems to be attention drawn to how much it cost to find this out. But it is unclear whether, if one counted up the costs of all the cross-sectional studies and cohort studies that have been chasing various risk factors over the years, those results are any less costly or of any more value. Overall, we do not have a

system for monitoring the added value of *any* particular study or field of study to insights in population health. Perhaps it is time that some metric was devised.

### The promise ahead

This paper began with a reference to John Snow in the 1850s as an exemplar of a population health intervention researcher testing a theory. As it happened, his colleagues at the time thought that his theory of the source of the cholera was too exclusive, and it took another decade for more evidence to be gathered and for actions to be taken to control contaminated water sources.<sup>63</sup> We followed up with a reference to causal reasoning as it involved the decomposition of phenomena to mechanisms and sequences of events. That was an illustration of reasoning primarily attributed to the 16<sup>th</sup> century contributions of Renee Descartes. But by the mid-20<sup>th</sup> century, a new way of thinking called “systems thinking” emerged, emphasising the view of living organisms as integrated wholes whose properties cannot be reduced to those of the smaller parts.<sup>64</sup>

Our point is that intervention research has to extend itself to understanding and accelerating the uptake of new practices and recognizing that the reasoning processes we use in science are under constant interrogation. In intervention research, investigators are adopting system-thinking approaches,<sup>65</sup> and there are investigators putting “realist” views claiming that “theory-based” views can be contrasted with “scientific method”, which is presumed to not be based on theory sufficiently. Agent-based ways of conceiving interventions are being contrasted with expert models. Views are hotly contested.<sup>66</sup>

In the meantime, the ever-growing burden of disease demands that we design effective interventions and put them into practice. Our plea is for systems to be created in Canada that attract the best minds and the best energies in the country to solving these issues. There has never been a more stimulating or crucial time to act. There is no point in changing thinking in population health, if we cannot change history with it.

### REFERENCES

- Hawe P, Shiell A. Using evidence to expose the unequal distribution of problems and the unequal distribution of solutions. *Eur J Public Health* 2007;17(5):413.
- MacMahon B, Pugh TF. *Epidemiology: Principles and Methods*. Boston, MA: Little Brown, 1970.
- Institute of Population and Public Health, Canadian Institutes of Health Research. Population Health Intervention Research Initiative for Canada (“PHIRIC”) Workshop Report. Ottawa, ON: CIHR. Available online at: [www.cihr-irsc.gc.ca/e/33515.html](http://www.cihr-irsc.gc.ca/e/33515.html) (Accessed December 2008).
- Porter D. *Health, Civilisation and the State. A History of Public Health from Ancient to Modern Times*. London, UK: Routledge, 1999.
- Fassin D. *L'espace politique de la santé. Essai de généalogie*. Paris: Presses Universitaires de France, 1996.
- Wagenaar AC, Webster DW. Preventing injuries to children through compulsory automobile safety seat use. *Pediatrics* 1986;78:662-72.
- Mills JL, Signore C. Neural tube defects rates before and after food fortification with folic acid. *Birth Defects Res* 2004;70(11):8445-55.
- Mathee A, Rollin H, von Schirnding Y, Levin J, Naik I. Reductions in blood lead levels among school children following the introduction of unleaded petrol in South Africa. *Environ Res* 2006;100(3):319-22.
- Institute of Population and Public Health, Canadian Institutes of Health Research. Mapping and Tapping the Wellsprings of Health. Strategic Plan 2002-2007. Ottawa: CIHR.
- Rose G. *The Strategy of Preventive Medicine*. Oxford, UK: Oxford University Press, 1992.
- Mischen PA, Sinclair TAP. Making implementation more democratic through action implementation research. *J Public Admin Res Theory* 2009;19:145-64.
- O'Toole LJ. The theory-practice issue in policy implementation research. *Public Admin* 2004;82(2):309-29.

- Noble CH. The eclectic roots of strategy implementation research. *J Business Res* 1999;45(2):119-34.
- Nutbeam D, Bauman A. *Evaluation in a Nutshell*. Sydney: McGraw Hill, 2006.
- Foy R, Eccles M, Grimshaw J. Why does primary care need more implementation research? *Fam Pract* 2001;18(4):353-55.
- Hawe P, Degeling D, Hall J. *Evaluating Health Promotion. A Health Workers' Guide*. Sydney: MacLennan and Petty, 1990.
- Brown CA, Milford RJ. The stepped wedge trial design: A systematic review. *BMC Med Res Methodol* 2006;6:54.
- Suchman EA. *Evaluative Research*. New York: Russel Sage, 1967.
- Weiss CH. *Evaluation*, 2nd ed. Upper Saddle River, NJ: Prentice Hall, 1998.
- Zaza S, Briss PA, Harris KW. *The Guide to Community Preventive Services: What Works to Promote Health?* New York, NY: Oxford University Press, 2005.
- Spinks A, Turner C, Nixon J, McLure R. 'WHO Safe Communities' model for the prevention of injury in whole populations. *Cochrane Database Syst Rev* Issue 2, Art. No. CD004445.
- Sefton C. The NSW Safe Communities pilot projects – evaluation methodology. *N S W Public Health Bull* 2002;13(4):76-77.
- Jackson N, Waters E and the Guidelines for Systematic Reviews in Health Promotion and Public Health Taskforce. The challenges of systematically reviewing public health interventions. *J Public Health Med* 2004;26:303-7.
- Susser M. The tribulations of trials. Interventions in communities. *Am J Public Health* 1995;85:156-60.
- Leventhal H, Safer MA, Cleary PD, Gutman M. Cardiovascular risk reduction by community based programs for lifestyle change: Comments on the Stanford study. *J Consult Clin Psychol* 1980;48:150-58.
- Patton MQ. *Qualitative Research Methods*, 2nd ed. Newbury Park, CA: Sage, 1990.
- Stokols D. Translating social ecological theory into guidelines for community health action. *Am J Health Promotion* 1996;10(4):282-98.
- McLeroy K, Steckler A, Simons-Morton B, Goodman RM. Social science theory in health education: Time for a new model? *Health Educ Res* 1993;8(3):305-12.
- Ingle MD, Klaus R. Competency based program evaluation: A contingency approach. *Evaluation and Program Planning* 1981;3:277-87.
- Petticrew M, Whitehead M, Macintyre S, Graham H, Egan M. Evidence for public health policy on inequalities: 1. The reality according to policymakers. *J Epidemiol Community Health* 2004;58:811-16.
- Patton MQ. *Utilisation-Focused Evaluation: The New Century Text*. Newbury Park: Sage, 1997.
- Perry CL, Komro KA, Veblen-Mortenson S, Bosma LM, Farbaksh K, Munson KA, et al. A randomised controlled trial of the middle and high school DARE and DARE plus programmes. *Arch Pediatr Adolesc Med* 2003;157:178-84.
- Lord M. Truth or dare. A new drug course. *US News World Rep* 2001;130(8):30.
- Birkeland S, Murphy-Graham E, Weiss C. Good reasons for ignoring good evaluation: The case of the drug abuse resistance education (DARE) program. *Evaluation and Program Planning* 2005;28(3):247-56.
- Steckler A, Linnan L (Eds.). *Process Evaluation for Public Health Interventions and Research*. San Francisco, CA: Jossey Bass, 2002.
- Goodman RM, Steckler AB. A model of institutionalisation of health promotion programs. *Fam Community Health* 1987;11:63-78.
- Potvin L, Haddad S, Frohlich KL. Beyond process evaluation. In: Rootman I, Goodstadt M, Hyndman B, McQueen DV, Potvin L, Springett J, et al. (Eds.), *Evaluation in Health Promotion. Principles and Perspectives*. Copenhagen: WHO Regional Publications, European Series, 2001; No 92:45-62.
- Bisset S, Cargo M, Delormier T, Macaulay AC, Potvin L. Legitimizing diabetes as a community health issue: A case analysis of an Aboriginal community in Canada. *Health Promotion Int* 2004;19:317-26.
- Baker IR, Dennison BA, Boyer PS, Sellers KF, Russo TJ, Sherwood NA. An asset-based community initiative to reduce television viewing in New York State. *Prev Med* 2007;44:437-41.
- Hawe P, Stickney EK. Developing the effectiveness of an intersectoral food policy coalition through formative evaluation. *Health Educ Res* 1997;12:213-25.
- Levesque L, Guilbault G, Delormier T, Potvin L. Unpacking the black box: A deconstruction of the programming approach and physical activity intervention implemented in the Kahnawake Schools Diabetes Prevention Project. *Health Promot Pract* 2005;6:64-71.
- Ho LS, Gittelsohn J, Harris SB, Ford E. Development of an integrated prevention program with First Nations in Canada. *Health Promot Int* 2006;21:88-97.
- Corrigan M, Cupples ME, Smith SM, Byrne M, Leathem CS, Clerkin P, et al. The contribution of qualitative research to designing a complex intervention for secondary prevention of coronary heart disease in two different health care systems. *BMC Health Serv Res* 2006;6:90.
- Wickizer TM, Wagner E, Cheadle A, Pearson D, Berry W, Maeser J, et al. Implementation of the Henry J. Kaiser Family Foundation's Community Health Promotion Grant Program: A process evaluation. *Milbank Q* 1998;77:121-47.
- Cooke MB, Ford J, Levine J, Bourke C, Newell L, Lapidus G. The effects of city-wide implementation of “Second Step” on elementary school students' prosocial and aggressive behaviors. *J Primary Prev* 2007;28:93-115.
- O'Loughlin JL, Paradis G, Gray-Donald K, Renaud L. The impact of a community-based heart disease prevention program in a low-income inner-city neighbourhood. *Am J Public Health* 1999;89:1819-26.

## WHAT IS POPULATION HEALTH INTERVENTION RESEARCH?

47. Wagenaar AC, Erickson DJ, Harwood EM, O'Malley PM. Effects of state coalitions to reduce underage drinking: A national evaluation. *Am J Prev Med* 2006;31:307-15.
48. Potvin L, Goldberg C. Deux rôles joués par l'évaluation dans la transformation de la pratique en promotion de la santé. In : O'Neill M, Dupéré S, Pederson A, Rootman I (Eds.), *La promotion de la santé au Canada et au Québec : Perspectives critiques*. Québec: Presses de l'Université Laval, 2006;457-73.
49. Minkler M. *Community Organising and Community Building for Health*. Rutgers University Press, 2004.
50. Riley T, Hawe P, Shiell A. Contested ground: How should qualitative evidence inform the conduct of a community intervention trial? *J Health Serv Res Policy* 2005;10(2):103-10.
51. Cook TD, Campbell DT. *Quasi Experimentation: Design and Analysis Issues for Field Settings*. Chicago, IL: Rand McNally, 1979.
52. Biglan A, Ary D, Wagenaar AC. The value of interrupted time series experiments for community intervention research. *Prev Sci* 2000;1(1):31-49.
53. Zerger SL, Irizarry R, Peng RD. On time series analysis of public health and biomedical data. *Annu Rev Public Health* 2006;27:57-79.
54. Cargo M, Mercer SL. The value and challenge of participatory research: Strengthening its practice. *Annu Rev Public Health* 2008;29:325-53.
55. Minkler M, Wallerstein N. *Community Based Participatory Research for Health*. San Francisco: Jossey Bass, 2003.
56. Hawe P, Shiell A, Riley T. Complex interventions: How far 'out of control' should a randomised controlled trial be? *Br Med J* 2004;328:1561-63.
57. Hawe P, McKenzie N, Scurry R. Randomised controlled trial of the use of modified postal reminder card on the uptake of measles vaccination. *Arch Dis Childhood* 1998;79:136-40.
58. Flay BR. Efficacy and effectiveness trials (and other phases of research) in the development of health promotion programs. *Prev Med* 1986;15(5):451-74.
59. Patton GC, Bond L, Carlin JB, Thomas L, Butler H, Glover S, et al. Promoting social inclusion in schools: A group-randomized trial of effects on student health risk behavior and well-being. *Am J Public Health* 2006;96(9):1582-87.
60. Green LW, Kreuter MW. *Health Promotion Planning: An Educational and Ecological Approach*, 3rd ed. Mountain View, CA: Mayfield, 1999.
61. Morrell S, Taylor R, Quine S, Kerr C. Suicide and unemployment in Australia 1907-1990. *Soc Sci Med* 1993;36(6):749-56.
62. Bartholomew LK, Parcel GS, Kok G, Gottlieb NH. *Planning Health Promotion Programs. An Intervention Mapping Approach*. San Francisco: Jossey Bass, 2006.
63. Harrison M. *Disease and the Modern World: 1500 to the Present Day*. Cambridge: Polity, 2004.
64. Miller JH, Page SE. *Complex Adaptive Systems*. New Jersey: Princeton University Press, 2007.
65. Best A, Moor G, Holmes B, Clark PI, Brice T, Lieschow S, et al. Health promotion dissemination and system thinking: Towards an integrative model. *Am J Health Behav* 2003;27(Suppl):S206-S216.
66. Cook TD. The false choice between theory-based evaluation and experimentation. In: Rogers PJ, Hasci TA, Petrosino A, Huebner TA (Eds.), *Program Theory in Evaluation: Challenges and Opportunities*. *New Directions for Evaluation* 2000;87:27-34.

## RÉSUMÉ

Les interventions populationnelles de santé comprennent l'ensemble des actions qui visent à modifier la distribution des risques à la santé en ciblant les conditions sociales, économiques et environnementales qui façonnent la distribution des risques. Sous forme de programmes et politiques, ces interventions peuvent provenir du secteur de la santé mais sont aussi souvent pilotées par d'autres secteurs comme l'éducation, le logement ou l'emploi. La recherche sur les interventions de santé des populations poursuit l'objectif de documenter la valeur et les effets de ces interventions, les processus par lesquels les changements opèrent et les conditions qui favorisent les effets. Dans le domaine de la recherche en santé, des distinctions inutiles entre la recherche et l'évaluation ont retardé le développement des connaissances sur l'intervention de santé des populations et mené à une mauvaise intégration des données de recherche pour soutenir la pratique et les décisions concernant les programmes et politiques de santé des populations. Cet article déboulonne donc certains mythes pernicious concernant la recherche sur les interventions, notamment relativement aux coûts associés, à ses visées et à la croyance en un rôle nécessairement marginal des communautés concernées pour développer des interventions efficaces. Cet article retourne aussi comme arbitraire et injustifiée la distinction traditionnelle entre la recherche sur les interventions et la recherche évaluative. En fait cet article montre que la recherche sur les interventions a tout à gagner d'un rapprochement avec la recherche évaluative et d'une intégration des méthodes de recherche appliquée provenant d'une diversité de disciplines.

**Mots clés :** Évaluation; intervention pour la santé des populations; pratique fondée sur des données probantes; recherche sur les interventions; santé des populations

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