Splendor and misery of Epidemiology for the evaluation of health promotion

Esplendor e miséria da Epidemiologia para avaliação da promoção da saúde

Louise Potvin, PhD

Groupe de recherche interdisciplinaire en santé, Université de Montréal, Montréal, Canada

P.O. Box 6128, Station Centre-ville

Montréal, QC H3C 3J7

Canada

Louise.Potvin@UMontreal.CA

Patrick Chabot, PhD

Groupe de recherche interdisciplinaire en santé, Université de Montréal, Montréal, Canada

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Introduction

During the past 30 years, the field of public health has been under enormous pressure to move toward a more "social" approach to health. This is true of the two fundamental areas of the field: researching the "causes" of disease and ill health and intervening to improve health. In terms of research, social epidemiology has broadened the traditional domain of classic epidemiology to include social determinants[1] in studies looking at what causes unhealthy societies[2].

Given the realm of public health intervention, the Ottawa Charter[3] and health promotion were created with the specific goal of changing the way health professionals and decision makers think about health and "to transform the complex knowledge of social epidemiology into practice and at the same time be able to document an effect"[4]. Despite the growing support from research agencies and health decision makers [*], both social epidemiology and health promotion still struggle to put into practice their social and population perspectives on health. Both have yet to achieve their transformation from classical epidemiology for one, and disease prevention for the other, both being based on individualistic models of health and public health intervention. Social epidemiology has yet to demonstrate that unpacking the social determinants of health leads to a better understanding of health and health promotion. It also faces the need to demonstrate whether and how it improves health.

Underlying this paper is the proposition that the challenges facing both social epidemiology and health promotion are closely linked. Both areas are experiencing difficulties in developing a satisfying conception of the social aspects of health. Although social

* In Canada, the newly created Canadian Institute of Health Research's mission recognizes the "social and cultural factors that affect the health of population" as one of the four pillars on which health research is founded[5]. In addition, the Population Health Branch of Health Canada has published a series of documents that promote a population and health promotion approach to public health intervention[6].

epidemiology proposes innovative conceptualizations of health and disease[7,8], causality[9] and social categories as fundamental causes of disease[10], most studies make use of these social categories as just another layer of risk factors in predictive models[11]. There is little discussion on whether these categories are of the same nature as the risk factors that are usually produced by classical epidemiological studies[12].

Similarly, in the realm of public health intervention, from disease prevention to health education, and to health promotion, approaches to improving population health have evolved as well as our conception of health and disease[13]. Although some "avant garde" practices in health promotion are leading the way into radically new conceptions of health and public health interventions, these practices still lack proper tools to reflect on their process[14] and produce the much awaited positive results that will legitimate public spending[15].

In this paper, we propose that a careful examination of the barriers encountered by health promotion to complete its transformation away from disease prevention also provides insights that will help social epidemiology achieve its own transformation away from classical epidemiology. In so doing we identify two epistemological blind spots that are common to health promotion and to social epidemiology. These two blind spots are reflexivity and historicity, two notions that contemporary social theory has developed extensively to further our understanding of the complex relationship between human practices and the social structure. The former pertains to the absence of an absolute determinism between the social structure and human practices given the human capacity to reflect on its own experience with abstract categories, thus creating agency and capacity to transform the structure. The latter refers to the conception that at any time, the state of an object (program, health status or other) cannot be isolated from the contexts that give it meaning: its previous states and its transformation.

In addition to their relevance for an appropriate evaluation of health promotion, these two notions could help debug some of the issues in the study of health and place[11]. Our hope is that by achieving its own transformation from classical epidemiology, social epidemiology will contribute to freeing the evaluation of health promotion from the models that were designed to evaluate disease prevention and health education interventions.

The parallel evolutions of public health etiological models and intervention approaches

We propose that like any organized human practice, the field of public health can be modeled by its ontological, epistemological and practical dimensions. Those correspond respectively to: the nature of the object of practice; the type of knowledge practitioners can gain regarding this object; and practitioners' actions, when their action is understood as a dialectical relation between theory and the empirical world (practice). In public health, the ontological dimension is represented by the object that researchers try to understand and professionals try to modify. The epistemological dimension is denoted by the knowledge paradigm that allows a better understanding of the object. The practical dimension comprises the approaches to the intervention that are implemented to act upon the object.

In their view of the evolution of epidemiology, Susser and Susser[16,17] suggest that the field is undergoing a third revolution. They identify three past eras:

- sanitary statistics marked by the miasma theory;
- infectious disease marked by the germ theory;
- chronic disease epidemiology marked by a black box model of relating exposure to outcomes[16].

Expanding this evolutionary perspective to public health as a whole, and using the ontological, epistemological and practical dimensions as descriptors, the evolution of public health can thus be traced by follow-

ing the evolution of its contents along these dimensions, as in Table 1.

According to Rosen[18], in its original conception and until the hygienist movement, disease was a natural phenomenon arising from water, air and soil. It can be described through clusters of cases and acted upon by protective measures that insulate humans from contaminating sources. The elaboration of the statistical theory in the 18-19th centuries led to the development of vital statistics as a means to keep track of these clusters[19]. With the widespread acceptance of the germ theory, the object of public health became the bio-medical model of disease, in which a chain of causation progresses from infectious agents to diseases. Epidemiology was developed as the research paradigm with key concepts being exposure and risk factor. Intervention approaches adopted prevention strategies that aimed at interrupting this transmission chain.

The third and current era marked by chronic diseases can be divided into an early and late period. Still keeping individual biological processes at the heart of the definition of diseases, the conceptualization of disease in this bio-psycho-social model adds layers of individual and social factors. The early version is centered most exclusively on "intra" personal determinants of health behaviors, whereas the later version takes into account social factors that may support or impede these behaviors. Corresponding to the restricted model of the early period, classical epidemiology has expanded its conception of causality to include multiple causes and its notion of risk factor to encompass social categories. It remained, however, mostly centered on individual risk factors. In the early version, health education was added to disease prevention as an intervention approach. Recently, more emphasis was placed on the "distal" social environments that are not "directly" in contact with individual biological processes. The push to discover how social determinants impact on the health of the general population rather than on individuals, led to a distinct development now called social epidemiology[20]. At the same time attempts to design interventions to address those social and other non-individual risk factors and conditions conducted to the development of health promotion[21].

From our understanding of this evolutionary process, health promotion as an approach to intervention has encountered many of the limitations of the bio-psycho-social model of disease. Its actual form represents a transition towards a more socially integrated approach that will more closely correspond to a holistic model of health. Indeed, several new and exciting initiatives, such the programs developed by the Academic Health Centre of the Fiocruz Foundation to address health, poverty and human development issues in the surrounding

Table 1 - Parallel evolution of the ontological, epistemological and practical dimensions of public health

Conception of the Object (ontology)	Etiological Research (epistemology)	Intervention Approach (practice)
Contamination through air, water and soil	Geographical clusters	Protection (basic sanitation)
Biological model of disease	Classical epidemiology (risk factors)	Disease prevention (vaccination)
Bio-psycho-social model of disease	Social epidemiology (social determinants)	1: Health education 2: Health promotion
Holistic health		Health and human development

favela of Manguinhos[22]. These initiatives are pushing for the development of a new conceptualization of the object of public health and of a more socially integrated version of health promotion.

Throughout the rest of this paper, we will show that although health promotion has already ventured into a novel model of, and a new object for public health, it is still struggling to break away from the bio-psycho-social model of disease. We will also examine how taking into account the reflexivity and historicity of human action and public health interventions provides insight for unpacking the social aspects of health.

Health promotion and social epidemiology as innovative approaches in public health

Following the publication of the Ottawa Charter for Health Promotion[3], profound transformations marked the domain of public health intervention. Abandoning intervention models that were based on psycho-social theories of behavior, and proposed standardized, "ready to use" educational activities aimed at shaping behaviors, public health practitioners have explored new and multiple forms of interventions. These new types of interventions are more or less explicitly based on a set of values among which empowerment and citizen participation are most often quoted[23]. The variety of forms of health promotion intervention can be represented on a continuum with health education at one end and health promotion at the other.

Programs that target specific health behaviors in a determined group of at-risk individuals with pre-packaged standardized activities are more typical of health education. The effects of such interventions tend to level off. They cannot be distinguished from that of secular trends after early adopters operated the changes[24]. As a result, the most vulnerable sections of the population are often outside the reach of these interventions[25]. In addition, these interventions do not prevent the influx of people who become at-risk[26], which is why authors have proposed to broaden the traditional targets for public health interventions to include socio-environmental conditions that enable or impede these behaviors[13]. At the other end of the continuum are those multi-factorial and multi-sector health promotion programs based on citizen participation that target capacity-building so people can transform those conditions that improve their health.

This evolution that led to the adoption of health promotion models for public health interventions also induced a focus on "community" or more rightly so, on "local environments" as strategic settings for interventions[13]. This "New Public Health" not only suggests that interventions should aim at making health resources locally available for citizens so healthy choices are made available and valued, but also that such interventions should contribute to local capacity-building. Finally, these interventions should be based on the creation of new alliances for health. This means that existing social networks should be redesigned so local actors who are not traditionally associated with health will be part of health-related coalitions[27]. Two novel approaches to public health intervention are exemplary of these principles: the ecological model[28] and the community development model[29]. Despite their novelty and the integration of the social and health that these approaches represent, their full implementation into practice is slowed down by our conceptions of how health is socially produced. These conceptions seldom take into account the reflexivity and historicity that characterize the relationship between healthy human development and social structures.

Reflexivity and the ecological approach to intervention: Who has seen the agent?

The ecological approach to intervention[28] made immense progress in public acceptance when it was identified as the most appropriate approach to address issues of health inequalities by the American Institute

of Medicine[30]. The thrust of this approach is to focus health interventions on the individual's ecosystem. Based on a systemic view of health, the ecological approach conceives of the individual as the center circle in a series of inclusive circles, each one representing an aggregation level within the environment. All the outer layers around the individual at the center form the individual's ecosystem[31]. Characteristics at a given aggregation level constrain those at all the lower levels. For example, an individual's eating habits are determined by the food available in the family. This availability itself depends on what is on the shelves of accessible food outlets, which itself is determined by a series of policies, rules, and taxation systems that are enacted at the municipal and higher levels.

From the point of view of this ecological approach, public health intervention plays a dual role. While the intervention aims at transforming the resources and characteristics found at the higher levels of aggregation, it also develops educational activities to convince people to adopt new lifestyles and behaviors[13,31]. Within such an approach, environmental actions are instrumental to behavioral changes.

Despite the inclusion of the social environment, the ecological model is essentially "neo behavioral". Indeed, in this model, the individual and the modification of his or her risk factors and lifestyle constitute the principal foci of the intervention. At the end of the day, it is the modification of these behaviors and risk factors that will be used as criteria to evaluate the interventions. For evaluation purposes, when the timeframe or resources do not allow for the use of behavioral criteria, a causal chain of environmental characteristics that determine health behaviors, risk factors, and disease is constructed. The role of evaluation consists of showing that the causal environmental characteristics were changed by the intervention. The inference is that if the causal chain is broken at any point, the negative outcome will not materialize[32,33].

The ecological approach is founded on a deterministic model of the relationship between social conditions and human action and behavior. This model is characterized by the absence of "agency" in the individual at the center of the model, "agency" being the capacity to exercise freedom and to induce change in the structure. This model is more consistent with the Durkheimian concept of the role of the social structure than with contemporary social theory. Unfortunately, in health promotion as in social epidemiology, when sociology is called upon to explain how social determinants are linked to health, it is most often Durkheim's and the structuralist school's ideas of the early 1900s that are borrowed and adapted[34].

Current sociology is essentially based on a critique of such thinking that conceives human action as a reaction to an external social structure that surrounds the individual. For neo-structuralist sociologists, the social structure is located both within and around individuals whose reflexive action (practice) transforms and reproduces the structure. This internalization of society within the individual's own frame of reference through socialization provides clues to explain how human action both reproduces and transforms the social structure. Sociologists such as Touraine[35], Bourdieu[36] or Giddens[37] have used the concept of agency to take into account this reflexive relationship between human action and the social structure. While the structure provides general constraints and opportunity for action, the particular activation of these constraints and opportunities, in turn, reproduces and/or transforms the structure.

These concepts of social action and structure question the ecological approach to health promotion intervention. Causal chains that do not allow for a reflexive action of the agent are misleading as they enclose human actions in a set of reactions that appear determined, predictable and modifiable through environmental actions. This has proven false even in the most simple causal chains as in the MRFIT study. In this study, more than 12,000 volunteer men, each presenting at least one risk factor for cardiovascular disease, were randomized into two

groups. The experimental group was exposed to clinical preventive services and the control group was assigned to usual care.

Although early results have shown a significant decrease of tobacco consumption in the experimental group[38], the 16-year follow-up results showed that lung cancer mortality tended to be higher in the experimental group as contrasted with the control group[39]. There are indeed multiple plausible hypotheses to explain such a finding. It is possible that members of the control group stopped smoking at a later stage, or those of the experimental group who had stopped during the prevention intervention resumed smoking later. It is equally possible that neither explanation is true. In any case, these results illustrate that interventions on simple causal chains do not produce results that are simple to interpret. Such difficulties are more likely to arise when causal chains and intervention models do not provide room for the reflexivity of the human agent and the reciprocal relationship with the social structure.

Historicity in community development: When does a program start?

Another major innovation of health promotion is the integration of community development approaches that make deliberate attempts to transform existing social networks within local environments. Important concepts such as empowerment and citizen participation imply a change in the existing relationships between social agents (individuals or organizations) that share common space. Whether the goal is to increase social capital and social cohesion, or to enhance community empowerment, the means to achieve the goal is through the reconfiguration of existing social networks by creating and supporting a local forum for citizens and non health organizations to discuss and act upon the conditions that shape their health[29,40].

An advanced illustration of the forum is the community coalition for health[41]. These coalitions are new organizations according to the definition provided by the French sociologists Michel Crozier and Erhart Friedberg[42]. For Crozier and Friedberg, organizations are ensembles of operations performed in a coordinated manner in order to achieve objectives. This description includes loosely formalized groups such as coalitions. The formation of, and support given to, local coalitions which make concrete new partnerships between local agents are characteristics that distinguish community development programs from social planning, the latter being mostly associated with health education[40].

Another important characteristic of these coalitions is the congregation of social agents not traditionally related to health, around health issues. Typically, coalitions are formed by representatives of non-governmental associations, private sectors, public institutions from other sectors (for example, economic development, education), and by concerned citizens. Therefore, as an intervention strategy, coalition building is equivalent to creating a new organization.

Most coalition studies in health promotion look mainly at the relationships within the coalition (its functioning) or its impact on various aspects of the settings in which they were implemented. In these studies coalitions are equated to intervention packages and there is little understanding of how their functioning as new organizations represents the continuity or rupture of local history. Thinking of coalitions in terms of new organizations, however, makes more explicit the importance of this historical dimension.

Organizations are often conceived of as social, living systems. A characteristic of living systems is their capacity to partly reproduce and/or transform themselves as a function of their own dynamism, in a self-referential manner. The composition of the coalition partly determines its own functioning along with the form and content of its relationships with other local organizations. It is the events that occur within the coalition and those that mark its relationships with others that direct its own transformation. These transformations also take place in environments where other organizations are similarly transformed. In this sense, the evolution of an organization is the result of the

meeting of its own dynamism with that of the other organizations.

Thus, the evolution of a coalition cannot be planned in a strict sense for two reasons. First, even if deliberate actions by health organizations could induce the meeting of several local agents as a prelude to the creation of a local coalition, the functioning, achievements, and future of such a coalition cannot be subsumed by the actual circumstances and conditions in which it was created. The "pre-existing" (organizational) relationships between the coalition members, before the official creation of the coalition, also shape the coalition's present and future. In addition, refocusing on health issues regarding the relationships within the coalition, together with the development of inter-organizational relations must be taken into account to understand coalition evolution. Thus, coalitions are never "created" entirely *de novo*. Their life does not start with an external intervention although such interventions are often the trigger of the re-organization of local networks.

Second, their capacity to project themselves into the future, taking into account their past history and their capacity to act according to these projections, prevents a strictly deterministic, external orientation of a coalition. At any given time, the state of a coalition results from the convergence of its past and its projection in the future. Coalitions are reorganizations of the local action structure with the aim of reframing the meaningful relationships between existing social agents with reference to their past and future.

This self-referential dynamic process, like in any human organization, reproduces and generates history understood as the developmental process of human time and space dimensions. Like any biography, the history of an organization is made of the events that marked both the internal processes of its evolution and its relations with other organizations. The elaboration of such a history, however, proceeds with a double construction. First, events cannot be neutrally objectified, they must be constructed from the perceived meaningful ruptures in the usual flow of time. Deciding, for example, that the first meeting of a coalition is an event because it marked the agreement on the mandate by all members and the functioning of the coalition, while deciding that the 10th meeting was not eventful because nothing important happened, depends on the perspective of the historian. Second, the meaning of a chain of events with regards to the evolution of the coalition is also constructed into a coherent narrative that provides a basis with which to explore the range of possible continuities and/or transformations that lay ahead of the coalition.

This self-referential evolution of social systems created and supported by health promotion questions our usual conception of programs. One cannot conceptualize programs uniquely with regards to their structural dimensions and define evaluation as establishing relationships between elements of that structure[43] without taking into account the transformation of these structures through time. Documenting the events that marked the evolution of this relational system and constructing a coherent narrative to interpret the system's dynamism is as crucial for understanding health promotion intervention, as is the "evidence" about its efficacy.

With these two innovative practices, the ecological and the community development approaches, we illustrated that the evaluation and study of health promotion programs must first take into account and then interpret the continuities/transformations of the program/environment system into their socio-spatial (as in society) and socio-temporal (as in history) perspectives. We will now demonstrate that social epidemiology is also struggling to make sense of these contextual and temporal dimensions of social transformation and has yet to integrate reflexivity and historicity into its model.

Social epidemiology and the bio-psycho-social model of disease

The past 20 years have witnessed the development within public health research of a perspective on disease and the production

of health that increasingly borrows concepts and knowledge from social sciences. Since the publication of the Black Report[44], the issue of health inequalities has triggered a whole research program. This study showed the existence of a relationship between health status and the position in the social hierarchy. This relationship is monotonous ascendant, meaning that those at the pinnacle of the social ladder are in better health than those immediately following them, who are themselves healthier than those just underneath, and so on until the most impoverished people.

Health is not evenly distributed within a population. Inequalities are identifiable as a function of socially constructed categories such as socio-economic status, gender and ethnic groups. Health inequalities appear to be by-products of specific organizations of life and social relations[45]. This field of inquiry that blends social categories together with biological outcomes, proved very fruitful to rejuvenate epidemiological research. Studies in social epidemiology have burgeoned in a multitude of directions as illustrated by the wide range of subjects elaborated in the first textbook of social epidemiology, published in 2000[1]. Health has become a social concern[46] and public health a social science[47].

Health and place: Places or islands?

An area of investigation that triggers a growing interest for researchers in social epidemiology is the aggregation of health outcomes in neighborhoods or communities[48,49], over and above the level expected given that similar individuals, with similar risk factors often share the same geographical space. Contextual effects[50] result from the attribution of the geographical aggregation of health outcomes to contextual or ecological characteristics of the environment[51]. Thus, places or local environments can be characterized by attributes that transcend the aggregation of individual characteristics. Sally Mcintyre has coined the term "opportunity structure" referring to those contextual characteristics that promote or impede health[52]. Three groups of attributes form the opportunity structure.

The first group is made of the characteristics of the physical environment such as climate, quality of water and food supplies, and others. The relationship between this group of characteristics and health has been known for a long time. Indeed, action on these physical characteristics forms the traditional axis of intervention for public health[53].

The second group is made of the local configuration of resources that promote or impede health. In addition to health care services, recent work in community health has identified a variety of resources that are associated with health[54]. Quality of housing, access to recreational equipment and parks as well as restriction of youth access to tobacco products are all examples of health promoting resources that facilitate "healthy choices"[55]. Our studies in particular showed that local configuration of resources for youth tobacco smoking is associated with compositional characteristics of places[56] and to the initiation of youths smoking[57].

The third group of ecological characteristics pertains to the local organization of social life, to the local patterns of relationships between social actors and to the way social resources such as power and status are distributed; in brief, the social fabric. Recent literature abounds with studies that show ecological correlations between variables such as social capital, social cohesion, community participation[58] as well as many forms of discrimination[59] with health outcomes. Most of these studies however, treat local environments as if they were disconnected from society and from the global social process.

The social structure understood as the rules and resources mobilized for the reproduction/transformation of social action[37] is also associated with population health as shown by international comparisons[46,60]. For social geographers, neighborhoods and life settings represent local social spaces in which individual relations with the global social structure occur[61]. Thus, the model that

places individuals at the center of an ensemble of inclusive circles and that is present both in social epidemiology[62] and health promotion[63] reflects a truncated vision of what "social" means. In this model social is always located outside the individual and causality always goes from superior to lower levels of aggregation.

Epidemiological models of disease causation and health production do not make room for reciprocal or recursive actions between the elements in the causal chains. More to the point, the fundamental epidemiological notion of "exposure" suggests a passive object that reacts to environmental conditions instead of an agent whose reflexive, recursive actions transform the structure to which he/she belongs. Such reflexivity cannot be dismissed when examining the social processes involved in the shaping of the health of populations.

Another problematic corollary of this layered model of health production is the absence of a historical perspective essential to understand social transformations. In these models, the structure is given, and the transformation dynamics by which it is continuously reproduced or transformed are absent. All studies addressing health and place issues are cross sectional, whereas contemporary models of urban development show that the notions of space, population and time intertwine and cannot be understood independently[64,65]. Thus, the opportunity structure observable at a given time in a given place is not only a function of the social structure but also of its history or more precisely of its historical structuring process. Taking into account the history embedded in the narratives that provide meaning to transformations or continuities of human action seems indispensable to understand how the social affects health.

Conclusion

Our observation of social epidemiology through the lens of health promotion leads to the identification of two major blind spots in public health intervention and research. Reflexivity and historicity are two notions that need to be developed and integrated into our health models and public health interventions and evaluations, in order for health promotion to reflect on its action with relevant conceptual categories and for social epidemiology to unpack the relationships between society and health. It is also important that these developments occur in parallel.

Epidemiology has traditionally formed the methodological foundation for the evaluation of public health interventions[66]. The difficulties encountered by evaluation researchers to elaborate relevant empirical arguments about the effects of cutting-edge health promotion projects[67] may partly lie in the limitations of the methods used, especially considering their limited capacity to capture the social processes triggered and/or modified by those interventions. Classical epidemiology has proven its strength for understanding how behaviors become risk factors involved in diseases. It is thus the methodology of choice for evaluating the behavioral outcomes of health education interventions. Social processes, however, are not of the same nature as at-risk behaviors. They only acquire and produce meaning in relation with their spatial and temporal context. It is this network of social relationships that needs to be captured by the evaluation of health promotion thus evading the realm of classical epidemiology.

In conclusion, we think that establishing a dialogue between social epidemiology and health promotion will benefit both fields. While the former is trying to understand how society shapes health and the latter to intervene in that process, they both face the challenge of integrating social theory of reflexive practice within models of health and public health intervention approaches. The notions of reflexivity and historicity are only two examples of how the inclusion of a sound, up-to-date and fully developed social science discourse and practice in this dialogue may provide useful insight for the pursuit of their respective agendas.

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