

Health Impact Assessment: A Tool to Help Policy Makers Understand Health Beyond Health Care

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Abstract

Health impact assessment (HIA)—a combination of methods to examine formally the potential health effects of a proposed policy, program, or project—has received considerable interest over the past decade internationally as a practical mechanism for collaborating with other sectors to address the environmental determinants of health and to achieve more effectively the goals of population health promotion. Demand for HIA in the United States seems to be growing. This review outlines the common principles and methodologies of HIA and compares different approaches to HIA. Lessons learned from the related field of environmental impact assessment and from experience with HIA in other countries are examined. Possible avenues for advancing both the field and the broader goals of population health promotion are outlined.

Health impact assessment (HIA): a combination of methods to examine formally the potential health effects of a proposed policy, program, or project

HIA AS A NEW TOOL FOR AN OLD WAY OF DOING PUBLIC HEALTH

From the time of Hippocrates public health practitioners have looked to the environment to identify the causes of ill health and for potential opportunities to advance well being. The seminal “Report on a General Plan for the Promotion of Public and Personal Health” to the Massachusetts legislature, authored by Lemuel Shattuck (69) in the mid nineteenth century, and the writings of Rudolf Virchow (72, p. 72) in that same century suggest a continuing recognition of the centrality of social and physical environmental effects on health. Snow’s apocryphal removal of well pump handles to stem an outbreak of cholera, Gorgas’ efforts to control yellow fever and malaria during the building of the Panama Canal, the dramatic improvements in motor vehicle safety in the United States as a result of improved vehicle standards and roadway infrastructure, and reductions in tobacco use over the past several decades demonstrate the potential of an environmental approach for improving public health. Although a more individualistic approach, emphasizing biomedical and behavioral paradigms, has frequently dominated the field since the mid-twentieth century (72), concern about the environmental determinants of disease remains a vital principal of public health (45).

Over the past quarter century the World Health Organization has set forth a number of major declarations and initiatives calling for a return to an environmental approach to improving population health, including the Alma Ata Declaration (82), the Ottawa Charter on Health Promotion (82a), the Jakarta Declaration on Health Promotion (83), the Bangkok Charter for Health Promotion (86), and the Healthy Cities movement (5). Similar declarations have been made at the national level, including most significantly the Lalonde Report (39) in Canada and the Acheson Report (2) in the United Kingdom. Because the ability to modify many of the environmental

determinants of disease lies outside the traditional province of public health agencies, intersectoral cooperation in creating healthy public policy (46) has been a common theme throughout these declarations and initiatives. Questions remain, however, about how to put these principles into practice (68).

Health impact assessment (HIA), which is a combination of methods to examine formally the potential health effects of a proposed policy, program, or project, has received considerable interest over the past decade as a practical mechanism for collaborating with other sectors to address the environmental determinants of health and achieve more effectively the goals of population health promotion (52, 84). Support for HIA grew most rapidly in Canada (5), Europe (7, 65), Australia (87), and New Zealand (89), perhaps not surprisingly because other initiatives rooted in an environmental approach to public health promotion, such as Healthy Cities (5) and “healthy public policy” (46), also garnered considerable interest in these countries, in contrast with the United States, where a narrower, more individualistic approach to health promotion has been more prevalent.

Although interest in HIA in the United States has been relatively slow to develop, it is now growing. Formal HIAs have been conducted by a number of groups across the United States (see **Table 1**), examining the potential health impacts of a range of projects and policies, ranging from local land-use plans and wage ordinances to state funding for after-school policies and federal agriculture subsidies. In the past year proposals to mandate HIAs have been put forth in Washington State (79) and the U.S. Congress (75). As demand grows and HIA becomes more common, issues must be addressed regarding dissemination of technical capacity, standardization of protocols, and institutional arrangements for funding, coordination, and implementation.

This growing interest in HIA in the United States is driven by a combination of factors including the following:

Table 1 Health impact assessment in the United States: completed and in-progress HIAs (as of September 9, 2006)^{1,2}

Title or topic	Location of the proposed policy or project	Organization(s) involved	Date	Key impacts and pathways
Los Angeles City Living Wage Ordinance (16)	Los Angeles, California	UCLA school of public health	2003 (published 2005)	Income Health insurance
After School Programs—Proposition 49 (74)	State of California	UCLA school of public health	2003	Education Crime
2002 Federal Farm Bill (74)	United States	UCLA school of public health	2004	Subsidies/nutrition Biofuels/air pollution
Sacramento Safe Routes to School (74)	Sacramento, California	UCLA school of public health and CDC, Project Move	2005	Physical activity Injury Air pollutant exposure Social capital
Buford Highway/NE Plaza (74)	Atlanta, Georgia	UCLA school of public health and CDC, Project Move	2005	Physical activity Injury
Injury liability protection for recreational physical activity (74)	State of California	UCLA school of public health	2005	Physical activity
State physical education policies	State of California	UCLA school of public health	In progress	Physical activity
Modification of a public market	Trenton, New Jersey	UCLA school of public health	In progress	Nutrition Physical activity Social capital Economic development
Health Benefits of a Local Living Wage Ordinance (9)	San Francisco, California	San Francisco department of public health/UC Berkeley occupational and environmental health	2001	Income
Eastern Neighborhood Community HIA—Development & Urban Planning (14)	San Francisco eastern neighborhoods	San Francisco department of public health/UC Berkeley occupational and environmental health	2006	Land-use policy Housing Transportation Employment
Oak to Ninth Avenue (73)	Oakland, California	UC Berkeley, environmental health studies/school of public health	2006	Pedestrian safety Parks Housing Air quality Noise
Affordable Housing and Child Health—rental voucher program (13)	State of Massachusetts	Child Health Impact Assessment Working Group	2005	Housing
Puyallup City Planning (71)	Tacoma/Pierce County, Washington	Tacoma-Pierce County of Public Health and Puyallup	In progress	Physical activity Injury Crime Economic development
Housing Redevelopment (15)	North Minneapolis, Minnesota	Minneapolis department of health and family support	In progress	Housing, built environment

(Continued)

Table 1 (Continued)

Title or topic	Location of the proposed policy or project	Organization(s) involved	Date	Key impacts and pathways
Land Use and Health	Mid-Michigan area	Ingham county health department, Michigan department of community health and Michigan State University	In progress	Built environment
Coal-Fired North Florida Power Project (29)	North Florida Counties	Healthy Development Inc.	2005	Airborne pollutants Employment
School siting	Austin, Texas	School of Architecture, UT Austin	In progress	Physical activity Injury Air/water pollution

¹ HIAs identified through search of Internet, NLM PubMed, HIA listserv reports, and follow-up of requests for technical assistance to conduct HIAs received by UCLA HIA group and colleagues at the Centers for Disease Control and Prevention, National Association of City and County Health Officers and the American Planning Association.

² Abbreviations: CDC: Centers for Disease Control and Prevention; UC: University of California; UCLA: University of California, Los Angeles; UT: University of Texas.

1. the increasing importance of health and its underlying determinants as topics of public concern;
2. growing recognition of the influences of other sectors on public health coupled with a clearer recognition of the limits of traditional public health practice for promoting population health;
3. interest in bringing to bear the results of systematic reviews of research evidence, such as the Community Guide for Preventive Community Services (<http://www.thecommunityguide.org>), on policy decisions; and
4. the realization by groups in other sectors, such as housing developers and environmental housing groups, that findings from HIA can be used to support their proposals.

WHAT IS HIA?

Among the numerous definitions of HIA, a particularly useful one is provided by researchers at the Northern and Yorkshire Public Health Observatory in Great Britain:

A multidisciplinary process within which a range of evidence about the health effects

of a proposal is considered in a structured framework . . . based on a broad model of health which proposes that economic, political, social, psychological, and environmental factors determine population health (55).

This definition incorporates five generally accepted key characteristics of HIA:

1. a focus on specific policy or project proposals,
2. a comprehensive consideration of potential health impacts,
3. a broad, population-based perspective that incorporates multiple determinants and dimensions of health,
4. a multidisciplinary systems-based analytical approach, and
5. a process that is highly structured but maintains flexibility.

The general tenet underlying HIA is that by bringing consideration of health issues into decision-making in other sectors whose actions affect population health, HIA can provide a practical means for facilitating intersectoral action for health promotion (84). Its greatest value lies in its ability to identify and communicate potentially

significant health impacts that are under-recognized or unexpected, addressing, for example, the potential health effects of policies such as agricultural subsidies, wage laws, education programs, and urban redevelopment projects.

HIA has taken on a wide variety of forms depending on the sociopolitical environment of the different countries where it is conducted, the characteristics of the particular policy questions to which it is applied, the disciplinary backgrounds of practitioners, and the expectations of stakeholders who use its results.

From its very start HIA has evolved along two distinct, sometimes intersecting paths (35). Some of the earliest systematic efforts to develop HIA came from Canada (63) where HIA has been integrated into existing procedures for environmental impact assessment (EIA) (1). This more narrow approach to HIA (34) is typically, but not always, based on a biomedical model of health. It tends to be project focused. Reflecting the paradigmatic and methodological parallels of EIA, it is well suited for integration with existing EIA protocols. In contrast, the “broad approach” to HIA (34) draws from models that consider the social and behavioral, as well as physical, determinants of health. Correspondingly, it is the approach used by HIAs examining proposed policies, which typically impact health through a range of pathways. These narrow and broad approaches to HIA overlap but are not synonymous with the terms project HIA and policy HIA. For instance, Sweden’s approach to HIA, which is conducted by local government policy-makers, focuses largely on projects but considers a broad range of social and economic factors contributing to health (7, 24).

THE VALUE OF HIA

HIA could add value to public decision-making in several ways. First, it can provide a means for “bringing the public’s health to

the table” by adding health information to considerations of specific proposals in other sectors. For example, is it likely that a new highway will increase asthma rates for those living near its route? Will it affect walking or biking routes to school and within neighborhoods? What could be the health impact of the increased noise? It can highlight counter-intuitive and differential impacts, such as how a specific approach for funding after-school programs (e.g., California’s Proposition 49) could actually be detrimental to the health of low income residents (74) or how a plan to relocate a school from a town center to an outlying area to allow expansion of facilities for physical education and school athletics might actually decrease physical activity levels among the most sedentary children and low-income families with the least access to places for physical activity. Second, HIA provides an explicit method of assessing possible positive and negative health effects with a transparent audit trail for others who may want to question the methods or results or redo the analysis with different assumptions. Third, if carefully performed, it provides a reasonable projection of health effects over time that can be important in public justification of decisions by publicly accountable elected decision-makers. It can, for example, quantify the health benefits to future generations by improving walkability of neighborhoods or reducing the injury accident rate from requiring motorcyclists to wear helmets.

Besides contributing information that can bear on a specific decision, the HIA process can have more general, strategic effects. First, it can increase decision-makers’, planners’, and other stakeholders’ general awareness about health issues and the health effects of actions outside the health sector (20, 34, 68), much as EIA in general has succeeded in increasing awareness of environmental issues across sectors (18, 80). Second, HIA can also help build working relationships and alliances for health promotion among stakeholders and across sectors (20, 34).

EIA: environmental impact assessment

NEPA: National Environmental Protection Act

CEQ: Council on Environmental Quality

SHOULD HIA BE EMBEDDED IN EXISTING EFFORTS FOR EIA?

Some of the early interest in HIA in the United States focused on links between HIA and existing efforts in the field of environmental impact assessment (EIA). Our study of the state-of-the-art in EIA, which included consultation with a number of experts in that field, led us to conclude that at this point in time, while HIA can learn from EIA, efforts to advance HIA in the U.S. would yield the greatest dividend if focused on developing HIAs independent of existing EIA efforts (17, 19). This conclusion largely derives from how environmental impact assessment has evolved in the U.S.

The National Environmental Protection Act (NEPA) of 1969 mandated that federal agencies consider the environmental effects of their actions using explicit methods (53). NEPA requires the preparation of an environmental impact statement, which summarizes the findings of an environmental review to help inform agency decisions and make the process more transparent by making the statement a public document. Whereas the Environmental Protection Agency (EPA) in conjunction with the White House's Council on Environmental Quality (CEQ) establishes general guidelines for EIA, different lead agencies are chosen to coordinate each EIA, depending on which agency has the most direct responsibility over the project being examined.

Many volumes have been written about the shortcomings of EIA as it is currently practiced in the United States. The methods, which have been either mandated by individual agencies or accepted as appropriate by convention for a particular proposed project, are laborious. Environmental impact statements often take years to complete, ranging in cost from hundreds of thousands to millions of dollars (76). Completed documents are often thousands of pages in length. The EPA estimates that only 37% of federal environmental impact statements stay

within the guidelines of 150 maximum pages (77).

Furthermore, NEPA-mandated EIAs presently consider human health impacts tangentially at best, even though the stated purpose of the act is to protect the "human environment" and "stimulate the health and welfare of man" (53). The categories of impacts considered in EIAs in the United States are determined largely by other federal statutes, such as the Clean Air Act, which require that a particular environmental impact be considered in EIAs, and conventional practice, along with some guidance from state and federal committees, such as the federal CEQ. California is one of the few states to require a consideration of human health impacts, but this is typically limited to a consideration of cancers linked to exposures to chemical pollutants subject to EIA (17). Because of concern about potential legal challenges, and the fact that it is the project proponent whose employees or consultants prepare an EIA, it is a highly prescribed process not particularly open to investigating areas of impacts that are not explicitly mandated, such as human health (17).

Another important caution about embedding HIA primarily as part of an existing EIA processes is that EIA rarely considers impacts outside place-based projects (17). The CEQ itself has acknowledged that "NEPA is virtually ignored in formulating specific policies and often is skirted in developing programs" (18). The place-based focus of EIA persists despite NEPA and CEQ guidelines that call for the assessment of environmental impacts of most "major federal actions," including projects, programs, and policies (54). Thus, key nonplace-based policies, such as minimum wage laws, agricultural subsidies, and education policies, which are likely to have substantial effects on human health, would not be addressed by HIA incorporated into EIA as currently required and conducted.

In addition to specific problems related to the legal and methodological frameworks that support existing EIA practice, most of which

could be potentially ameliorated in the right political circumstances, a more fundamental problem may exist linking the variety of EIA extant in the United States with a robust, comprehensive approach to HIA. Because of the wide range of determinants of health and the variety of policies and sectors that affect these determinants, HIA needs to be open-ended, broadly focused, and highly flexible. Meshing HIA with a narrowly prescribed approach to EIA that is inherently conservative and deeply concerned about legal defensibility will lead to conflicts. Given that EIA has been in place in the United States for more than 35 years and that millions of dollars are invested every year in EIA, it is far more likely that HIAs linked to EIA will conform to the limits of EIA rather than HIA truly expanding the scope of EIA. The two are necessarily incompatible, however. Indeed, researchers have argued that HIA should be linked to EIA to help institutionalize HIA (89). Perhaps some HIAs can be linked to EIA when appropriate. In nations with other political and legal systems it may be easier and more feasible to link HIA with EIA. In fact, integrated HIA/EIA is the dominant approach to HIA being pursued in Australia and New Zealand (89).

TYPES OF HIA

Approaches to HIA can be categorized in numerous ways, such as Kemm's (34) categorization of HIA methodologies as "broad" (holistic, sociological, qualitative) or "tight" (limited, epidemiological, quantitative). A useful typology considers variants of HIA based primarily on the different fields from which they draw: epidemiology and risk analysis, evidence-based evaluation and practice guidelines, community-based health promotion, and environmental impact analysis. Although a given HIA may draw from all these fields, HIAs tend to emphasize one or another of these fields, clustering into three general approaches to HIA: (a) quantitative/analytic, (b) participatory, and procedural.

Each of these three approaches to HIA serves slightly different functions and reflects different paradigms, corresponding closely to Goulet's classification of alternative technological, political, and ethical rationalities for decision-making (26).

In the quantitative/analytic approach to HIA, effect estimates from the research literature and descriptive information on a target population are combined to estimate the range, direction, and magnitude of potential health impacts of a policy or project on a population. This approach draws heavily from the field of risk analysis; however, unlike risk analysis, HIA considers a broad range of potential health impacts, not just a single pathway (36). Among the many impacts examined by an HIA many may not lend themselves to quantification, but qualitative assessments using this approach will still follow the same logic, which requires a clear specification of an exposure, an outcome, and the dose-response relation between them for each of the pathways examined (85).

To date quantification in HIA has been relatively rare (78). Examples of this approach, which is not necessarily labeled "HIA," include work in the Netherlands on risks associated with airport siting (3); research in Germany on air pollution policy (23); and analyses in the United States of the potential effects of dietary modification (11), municipal "Living Wage" ordinances (9, 16), residential building codes (27), recommendations to increase fish consumption (60), alternatives for water treatment (64), and measures to decrease air pollution (50).

The strengths of this approach are the ease with which potential impacts can be compared across policy alternatives and scenarios and apparent objectivity of the approach and its fit with prevalent paradigms in health, environmental, and policy science. It is well suited for evaluating trade-offs between different policy options, such as requiring employers to provide health insurance in lieu of a marginal increase in wages (16). However, limited data on the effect estimates of interest and the

baseline characteristics of the affected population may make this approach infeasible. It is also highly time- and cost-intensive. Time, money, and data limitations often restrict its application to a consideration of single, unmixed, noncumulative exposure, whereas other impacts addressed in an HIA are examined descriptively. Although this type of quantitative assessment can be more objective than other approaches, it incorporates numerous value- and model-based assumptions that are not always explicit (4, 12, 38, 61). Among the potential pitfalls of HIA, Krieger et al. (37) identified erroneous impressions of precision and confidence in predictions, a problem exacerbated by quantification which may give an unwarranted patina of robust science to an HIA. It may also omit or de-emphasize stakeholder participation, which a number of HIA practitioners suggest is a core element of HIA (47, 67).

The participatory approach to HIA draws heavily from the field of community-based health promotion as outlined in the Ottawa Charter on Health Promotion (82a) and demonstrated in the World Health Organization's Healthy Cities Initiative (5). Most HIAs have some provision for soliciting stakeholder input, but this is emphasized particularly in this approach to HIA, in which stakeholder participation is the main input for analysis and is the primary rationale for conducting an HIA. Examples of this approach include much of the HIA work in the United Kingdom, such as Fleeman & Scott-Samuel's seminal HIA of the Merseyside Transport Strategy (25) and Winters' work on assessing the health impacts of a space exploration center (81), along with HIA in Sweden conducted through community councils (23) and Bhatia's work with community groups reviewing planning decisions in San Francisco (8).

The strength of this approach is that it provides a mechanism for public participation and the democratization of government decision-making. Whether this leads to "better" decisions or more efficient decision-making may be of secondary importance because the fo-

cus of this approach tends to be more process- rather than outcome-oriented (47). One of the chief limitations of this approach is that the information generated may be given little legitimacy in some social contexts, for instance in a litigious legal system that puts a premium on quantitative "scientific" data. Comparisons between alternatives and with standards are also difficult because they do not have common metrics. Because it draws on common knowledge, it may easily neglect unanticipated or long-term effects. Issues may also arise about who represents the "community" (44, 59, 88). As a result, this approach to HIA is probably better suited for the analysis of local projects, not for broad policies and programs that affect larger geopolitical units.

The procedural approach to HIA combines elements of the other two approaches to HIA. Like its progenitor, EIA, this approach to HIA puts a premium on efficiency and is typically driven by procedural concerns to comply with bureaucratic mandates to perform an impact assessment. This may range from a short impact checklist that must be completed prior to issuing a building permit to a comprehensive analysis of all potential impacts related to the physical and social determinants of health. When the level of required analysis is more extensive, this approach to HIA may be virtually indistinguishable from the quantitative/analytic approach to HIA. What sets it apart is the underlying imperative focusing on compliance and regulation. Differences between these two approaches to HIA are akin to those seen between the Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Safety and Health (NIOSH) in assessing workplace chemical hazards.

Many of the best examples of the procedural approach to HIA are efforts to couple HIA with existing EIA procedures, such as HIA initiatives in Canada (1) and Australia (22). In their proposal for incorporating workplace health impacts into EIAs, Rosenberg et al. (66) suggested a similar approach in the

United States. This approach gains efficiency by utilizing and adapting standardized protocols and models. For example, a highly technical predictive model of the effects of air pollution on health (50) can be used in a rapid assessment of transport policies (51).

Much of what can be said about the strengths and limitations of EIA (17, 70) applies to the procedural approach to HIA. Like EIA, the procedural approach to HIA utilizes whatever mix of methods is most expedient in producing information relevant to a particular regulatory mandate, whether the mandate specifies consideration of a specific impact, such as impacts related to air pollution, or the application of a specific technique, such as modeling traffic-related injuries.

The strength of the procedural approach to HIA is that the assessment can be performed in a relatively transparent, reproducible manner with methods that are broadly disseminated and understood. In theory, it can be relatively quick and efficient, but in practice, agency rules and regulations specifying content and methods in great detail could greatly increase resource requirements for this type of assessment, as has been the case with environmental impact statements in the United States (17).

The hybrid nature of this approach to HIA and its emphasis on bureaucratic expediency are at the root of many of its limitations: Bureaucratic imperatives may compromise analytic rigor; numbers may be used merely to give a patina of objectivity and expert sophistication (41); public participation may also be de-emphasized, becoming little more than a vetting of decisions already made; and whether these procedural assessments are really used in the decision-making process is questionable.

DETERMINING THE FEASIBILITY AND VALUE OF A PARTICULAR HIA

Although interest in HIA in the United States has surged in recent years, U.S. examples of

HIAs are still rare (19). The gap between interest and practice may be attributed partly to a lack of practitioners trained in HIA. This gap may also be due in part to a lack of precedent and imperatives for HIA. However, the term is increasingly used by public health leaders and planners and in some form is on the agenda of many public health and planning conferences. The UCLA Health Impact Assessment Group and the National Association of City and County Health Officers (NACCHO), in conjunction with the Centers for Disease Control and Prevention, have begun training public health agency staff and their counterparts in other agencies in the fundamentals of HIA methodologies. A Congressional bill introduced in 2006 (75) included requirements for HIA for certain kinds of federal projects and policies. Despite the growing momentum, HIA is still a tool whose highest value applications are still being defined. Its use to advance the goals of population health is not always technically feasible, valuable, or easily understood, nor is it the best approach to address all policy questions.

The technical feasibility of HIA depends, of course, on how it is defined. Some level of HIA is always possible, but to conduct a comprehensive HIA that yields information not readily known to policy-makers is challenging, especially if the aim is to estimate potential impacts quantitatively. Often, hypothesized pathways of health impacts are not well elucidated or supported by data from well-controlled studies. For example, although a strong body of research supports the multitude effects of housing on health, insufficient data exist to specify the magnitude of those effects in most circumstances. The number of relevant studies is often small. In conducting an HIA of the health insurance provisions of a living wage ordinance, we identified only two studies that estimated the effect of health insurance status on mortality (16). Sometimes uncertainty goes beyond simple data uncertainty. Divergent models with different assumptions may exist, each giving different results.

It is not just constructing models of the downstream effects of policies and finding and assembling relevant information that are difficult. Frequently, even getting baseline information on the prevalence of particular health determinants and risk factors in the affected population is challenging owing to small population sizes; differing administrative, geographic, and demographic definitions of population boundaries; and the lack of survey data on the specific determinants of interest. For example, while data may be available on the household incomes of residents in a certain area, information about the wages and insurance status of the population affected by a living wage ordinance—employees of certain types of municipal contractors—is much harder to obtain.

In another example, for an HIA related to physical education in schools, we were surprised to find that key baseline data on how much time children spend each week in physical education classes was not available at the state or school district level. Even relevant data may not be conducive to the required analysis. For example, data may be available on the number of days children meet a given threshold of physical activity (e.g., 30 min of moderate physical activity) but not on the total minutes of daily physical activity—information necessary for modeling the effects of interventions that increase physical activity.

Whether an HIA is worth performing depends on the potential value of the information it generates. The decision to proceed with an HIA is usually based on the HIA's potential to contribute new or previously unrecognized information that can be used by policy-makers and stakeholders to evaluate, modify, support, or reject a specific project or policy proposal. Although different HIA users, including policy-makers, impacted community stakeholders, regulators, and others, may value different kinds of information, they all need information that is understandable, actionable, and based on the strongest available evidence. Lack of evidence, a high de-

gree of uncertainty about whether and how a proposed policy could affect health, or poor timing with respect to the policy-making process can argue against performing an HIA at a particular time. In the political process, the timing of decisions, both in the executive and legislative branches, is difficult to predict. Some bills, for example, can be reintroduced every year or every legislative term, but they move only when a number of factors difficult to foresee converge to push an issue to a decision point. However, in some cases where there are prospects for proposals similar to one voted down or postponed, information from an HIA may still be of value. Also, likely health-relevant decisions in other sectors are worth assessing for HIA if they have a good chance of coming to center stage in the near future.

Even when an HIA is technically feasible, the value of the information may be insufficient to justify the expense of an HIA. High-quality HIAs are expensive. Therefore, a process for assessing which are likely to be most cost-effective is appropriate. Although HIA costs are highly variable—depending on the nature of the issue, the scope of the desired analysis, and the experience of the analysts—a comprehensive HIA, analyzing several different pathways, including a defensible quantitative estimation of impacts and a report, can easily cost \$100,000 to \$200,000.¹ Of course, if an HIA is completed in a single day by an assembled panel of experts, as some have suggested is possible (58), then costs will be significantly less, although commensurately such an HIA might not contribute much significant, new information to the decision-making process.

In deciding whether to conduct an HIA, analysts need to consult with policy-makers and stakeholders to assess whether the potential value of information produced from

¹Cost estimates for HIA are based on our experience working on eight different HIAs, not all of which contained all the elements listed in the estimate for the cost of a comprehensive HIA.

an HIA warrants the investment of resources. Sometimes the perceived added value of HIA information can be judged by whether policy-makers are prepared to provide or assist in procuring funding for the HIA.

WHICH IMPACTS SHOULD BE EXAMINED IN AN HIA?

The primary value of an HIA lies in its ability to provide to the policy-making process a thorough, credible assessment of evidence pertaining to potential health impacts of interest and highlight information about previously unrecognized impacts. The HIA needs to gather and assemble carefully the best available evidence linking potential health impacts with the policy decision under discussion. Early on in the HIA process, a determination needs to be made as to the scope of the analysis: which pathways and impacts and the range of policy alternatives to be examined, given available time and resources. As with the initial decision on whether to proceed with an HIA, this determination needs to consider both what is feasible and what is likely to add value for decision-makers.

In our experience, this scoping process is iterative, involving both standardized checklists of potentially impacted determinants of health and consultation with experts and stakeholders to focus the analysis on the most important potential impacts. Also during the scoping phase a logic framework, which may have been outlined earlier in screening discussions, is refined to represent graphically the specific causal pathways to be examined in the HIA (see **Figure 1**). Linking policy, proximate policy effects, determinants of health, and eventual health outcomes, logic frameworks for HIA are not comprehensive representations of all the determinants of health, but rather are change models focusing on the specific changes and pathways important to understanding the health effects of a particular policy (31). Besides helping organize the review of the research literature and guiding the analysis (33), logic frameworks are valu-

able for communicating the results of an HIA (16).

HOW SHOULD AN HIA BE CONDUCTED?

Once the focus of the HIA is determined and the pathways to be examined have been preliminarily mapped out, the actual impact assessment can begin. At a minimum this consists of describing the relevant existing health conditions in the affected population and assessing the research evidence on the putative causal pathways linking the policy or project with eventual health outcomes. Because many potentially significant impacts cannot be quantified for an HIA, evidence pertaining to these impacts will be assessed and described qualitatively (32).

Quantitative analysis in HIA can be either descriptive or predictive. Although many HIAs include quantitative information, often this information is used only to describe conditions and associations rather than to construct mathematical models to predict the potential effects of proposals. If feasible and if it adds sufficient value to justify the added costs, information on some effects can be quantified and combined in a model to estimate magnitude and likelihood of potential health impacts. Although information and resource needs for prediction are sometimes prohibitive, a sound, predictive model can illustrate the magnitude of different health effects, which is especially important when the posited effects include both health benefits and harm (17, 49). Regardless of the strength of the data, assumptions must be explicit; sensitivity analyses are needed to show outcomes under a range of reasonable assumptions.

The process of describing the prevalence and distribution of health conditions and risk factors in the affected population in an HIA is sometimes referred to as “profiling.” Its aim is to (a) provide a broad picture of health and sociodemographic conditions prevalent in the affected population, and (b) assess the prevalence or incidence of specific factors that

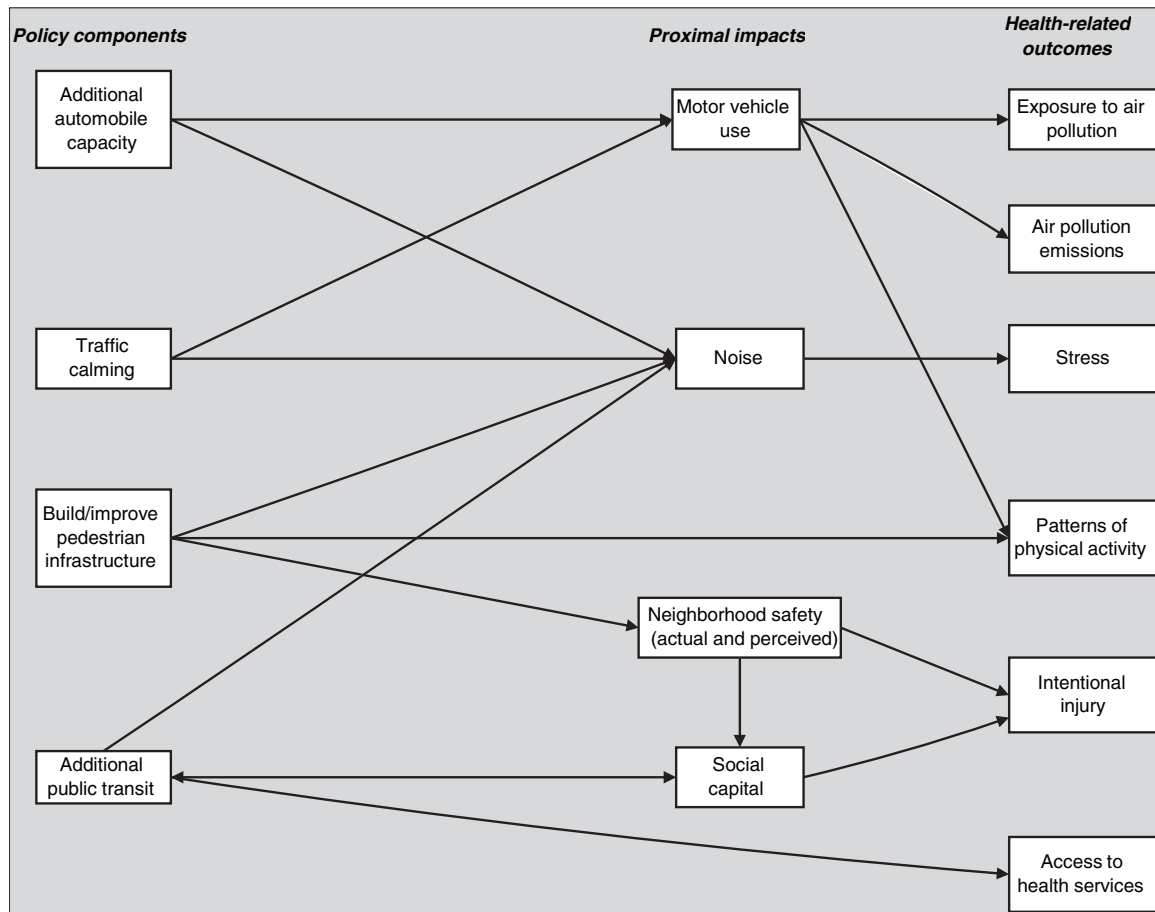


Figure 1

A typical logic framework for a policy or program that seeks to improve transportation infrastructure.

might be modified by the proposed policy or program, along with factors that may mediate key effects.

For instance, in an HIA that involves effects on children's physical activity, one would want to assess current physical activity levels, along with factors such as body mass index levels, education, income, and ethnicity in the target population, which from the research literature are known to mediate the effects of environmental and programmatic changes on children's physical activity levels.

Although profiling may seem straightforward, compared with trying other aspects of quantitative impact assessment, it is

often surprisingly challenging. One of the chief problems is that HIAs are often done on small or specially defined populations for which the relevant health, demographic, and other data may not be routinely collected. Improving, standardizing, and routinizing methodologies, such as small area estimation (56, 62) to make easier for analysts the estimation of the prevalence of various determinants of health for the population subgroups of interest to HIA, will be vital to advancing and disseminating HIA. Profiling is also complicated by particular data gaps and ways in which data are reported that inhibit incorporation into predictive models. HIA

practitioners need to encourage evaluators and epidemiologists to report effects in terms of relative (or attributable) risk and mean amount of change in outcomes more often, instead of levels of significance and change in percent meeting a particular outcome threshold.

The credibility of an HIA hinges on the quality and presentation of evidence. However, the evidence base is often quite thin owing to the intersectoral nature of most HIAs and uncertainty surrounding many of the socioeconomic and behavioral pathways of concern. In contrast to more traditional systematic reviews, such as those conducted by Cochrane and Campbell Collaborations and the U.S. Task Force for Community Preventive Services, HIAs must typically examine evidence from a wide range of fields and sources (30, 49), usually not collected with an HIA in mind, and which may be difficult to integrate quantitatively. The aim of evidence review for an HIA is also different. Systematic reviews typically examine the intended effects of carefully controlled interventions, whereas HIA is usually more concerned with unintended health effects of policies in other sectors (48). If the bar for high-quality evidence is kept as high for HIA as it is for systematic reviews, finding adequate evidence for HIAs would be a rarity (37); it would be virtually impossible to find any evidence on which to base any HIA, yet policy makers would still make decisions without the benefit of information that an HIA could make available. Still, the limitations of this evidence must be communicated to all stakeholders clearly in HIA reports, not just full reports but also policy briefs, which may be the only documents seen by policy-makers.

CHALLENGES

Two types of challenges confront prospects for more widespread use and acceptance of HIA here in the United States and in other developed countries: (*a*) challenges to the institutionalization of HIA, that is, get-

ting HIA accepted as an integral input into decision-making; and (*b*) technical challenges involving the methods of HIA design and conduct. However, these challenges are different for different types of HIAs (i.e., project-based versus policy-based HIA) and for different locales with different political and legal systems.

Achieving the larger population health promotion goals of HIA requires some degree of institutionalization, which in turn requires governmental support. But this support can be difficult to obtain and inconsistent. Experience from other countries shows that enthusiasm for HIA can quickly change to disillusionment if there are unmet (perhaps unrealistic) expectations, difficulties incorporating HIA into decision-making processes, or shortcomings in the credibility, significance, or utility of information that HIA contributes to the decision-making process. Canada, especially the province of British Columbia, which was one of the early innovators in HIA, largely abandoned efforts to institutionalize HIA following a change in government in the late 1990s (5). Support for HIA of local project proposals in Sweden (7) and of national policy proposals in the Netherlands (10, 65) has been tempered by recognition of the challenges of routinely incorporating HIA into decision-making, although both countries continue to have in place governmental policies that support using HIA. In the United Kingdom government support for project-based HIA also seems to be declining (42); however, some local U.K. governments, such as London (43), have made HIA a cornerstone of health promotion policy, promoting the use of both project- and policy-based HIA.

In contrast, HIA seems to be well incorporated in government decision-making and planning in New Zealand (40) and Quebec, Canada (6). Factors that seem to be associated with the viability of HIA in these jurisdictions include longstanding experience with coordinated government planning and legislation calling for a commitment to health promotion across sectors, such as Quebec's Public

Health Act (5) and New Zealand's Local Government Act 2002 (40). Indeed, acceptance of HIA across different sectors seems to have come less from specific mandates for HIA than from the attractiveness of the method for helping agencies fulfill other government requirements for promoting equitable, sustainable, health-promoting policies (40).

Where and how HIA is institutionalized will influence its credibility, responsiveness, viability, and visibility. Housing HIA in regulatory agencies or other government agencies that are not well insulated from political pressure could compromise its neutrality and long-term viability. Whereas health agencies may have the technical expertise to conduct HIAs, they may not have the broad mandate to consider impacts across bureaucratic boundaries. Agencies that conduct the kind of cross-cutting analysis required in HIA already exist, although analysis of health impacts may be beyond their current mandates. Most states have legislative analysts' offices (LAOs). Some states have legislatively sanctioned public policy institutes. At the federal level similar functions are served by the Congressional research service (CRS) and the general accounting office (GAO). Such agencies could coordinate HIA of policies within their purview. Depending on resources and the complexity of analysis, actual analysis could be done in-house or by partners in academia. At the local level, where resources are more limited and policy analysis offices are less common, options are more limited. Still, HIA would be well served by high-level partnerships between agencies

Regardless of whether government priorities are conducive to the institutionalization of HIA, inherent difficulties persist in getting policy-makers to routinely request and use HIA. Policy agendas are crowded with numerous decisions, goals, and interest groups. Public health is but one of many concerns that most policy-makers must weigh. Because HIAs by their nature cross sectoral boundaries, the health concerns raised by an

HIA may be discounted by policy-makers and stakeholders in other sectors who may feel that health is trying to encroach on their domain, that it is an attempt to trump their priorities with those of public health. Furthermore, the regulated community may perceive HIA as another onerous government-imposed burden, much like EIA (17). Sound analysis and a focus on health impacts of compelling public interest are necessary to minimize these obstacles to implementation.

Strategic issues in institutionalization co-exist with the more practical. An HIA can be considered infeasible, impractical, or too expensive relative to the value of information produced. The financial and other resource costs of conducting a high-quality HIA can be substantial. Pulling together different strands of evidence, consulting experts and stakeholders in various fields, using data to construct robust mathematical models, and synthesizing this information into understandable, credible reports require expertise, time, and money.

The long-term viability of HIA hinges on finding efficiencies in the process. Although each policy proposal, affected population, and corresponding HIA is unique, overlapping methods and common pathways suggest that mechanisms for systematically sharing analytic approaches and findings can make the HIA process more efficient, making it feasible for a wider group of practitioners and lowering the costs of conducting an HIA relative to the potential value of information from an HIA. One such tool that could facilitate dissemination of the technique and showcase practical examples of its application would be a central repository of HIAs performed in the United States and abroad that is easily searchable by issue, method, and results. Such a repository would provide information on specific pathways, analyses, and references that could substantially reduce the work and linear time needed to conduct an HIA on issues already addressed in related HIAs (31).

A common barrier to the wider use of HIA is lack of technical expertise. There is a strong

need for training for HIA analysts. Such training needs to be adapted to different levels and types of analytic needs. Potential users, including governmental decision-makers in both legislative and executive branches, need to know how health information from an HIA can be interpreted and how it can inform better decisions. Multidisciplinary analytic teams with the ability to crosswalk between health and nonhealth-sector research need to learn the HIA techniques and agree on common nomenclature to bridge the perspectives of different disciplines and sectors. Advocacy groups and other appropriate stakeholders also need to be familiarized with HIA and learn how they can contribute to the process.

Over time, demand needs to be generated from decision-makers. Funding may accompany individual requests, but it is also necessary to have some core funding to create and maintain centers of excellence, such as the intersectoral policy office set up by the Dutch Government (65), that can screen major policy proposals and respond quickly to ad hoc requests, while pursuing the broader set of HIA generic priorities as time permits. The inherent attraction on the part of HIA enthusiasts for promoting HIA by making it mandatory in some circumstances is balanced by the risk that approaches and methods will become rigid. Furthermore, if such mandates do not set up independent sources of funding, results could be influenced by the funders.

CONCLUSION

HIA could help bring attention to the broad determinants of health and suggest ways to promote healthy public policy across sectors.

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Although it is a promising tool, its ultimate value may be compromised by premature and unrealistic expectations. Despite its limitations, U.S. demand for HIA seems to be growing, in part owing to recognition that modifiable determinants of health in populations are rooted primarily in characteristics of the physical and social environments, thus requiring intersectoral analyses of possible health-promoting policies and projects.

The proper uses of HIA as well as its limitations must be well communicated to other public health professionals, policy-makers, and ultimately the larger public. It can provide helpful information to policy-makers and stakeholders about potential health impacts, but it cannot by itself create healthy public policy. Indeed, HIA seems to be most successful internationally in those places where governments have made a commitment to promoting public health by actions that cross all major sectors. Of course, this presents a bit of a "chicken and egg" problem: How can we advance understanding of intersectoral opportunities to improve public health without analyses of how changes in other sectors have affected health? At the current stage of diffusion of this technical tool, a limited number of high-profile analyses highlighting intersectoral health linkages could increase demand by policy makers. Wise choice of topics and efficiencies in the conduct of HIAs could also contribute to wider demand for them. As HIA becomes more common and moves are made to institutionalize HIA learning, the lessons provided by EIA and other types of institutionalized policy analysis in this country, as well as lessons from HIA in other countries, can help improve the likelihood that HIA can fulfill its long-term goals of promoting population health.

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