

Methodologies for Realizing the Potential of Health Impact Assessment

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Abstract: Health impact assessment (HIA), a systematic assessment of potential health impacts of proposed public policies, programs, and projects, offers a means to advance population health by bringing public health research to bear on questions of public policy. The United States has been slow to adopt HIA, but considerable strides have been made in many other countries, and under the auspices of the World Health Organization and World Bank. Varied applications in these diverse milieu have given rise to diverse approaches to HIA—quantitative/analytic, participatory, and procedural—each with distinct disciplinary foundations, goals, and methodologies. Suitability of these approaches for different applications and their challenges are highlighted, along with areas in which methodologic work is most needed and most likely to advance the field from theory and infrequent application to more routine practice in the United States.

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Introduction

Health impact assessment (HIA) has been advocated for use in government planning decisions by international organizations such as the World Bank¹ and the World Health Organization² and by health agencies in a number of countries, including Great Britain, Canada, Sweden, Australia, and New Zealand.³ It offers a practical means to increase the level of cooperation between health and other sectors to improve population health. The last half-dozen years have witnessed a growing interest in HIA. HIA is viewed as a means to systematically bring public health research to bear on questions of public policy with the goal of enhancing population health. The general tenet underlying HIA is that by bringing a consideration of health issues into decision-making in other sectors, HIA can provide a practical means for facilitating intersectoral action for health promotion.² Its greatest value lies in its ability to identify and communicate potentially significant health impacts that are under-recognized, unexpected, or marginalized, and addressing, for example, the potential health effects of policies such as agricultural subsidies, wage

laws, education programs, and urban redevelopment projects.

Despite the potential contributions of HIA, considerable questions remain about its feasibility.⁴ There is little uniformity in understanding what constitutes HIA, which is understandable given the dearth of exemplars of HIA. In this paper, we compare and contrast different approaches to HIA, discuss the methodologies we have found most useful, and offer suggestions for advancing the development and utilization of this approach.

What is HIA?

The most widely used definition of HIA, developed by the World Health Organization European Center for Health Policy (ECHP) and presented in the Gothenburg Consensus paper on HIA, defines it as “a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.”²

A somewhat more precise definition, given by researchers at the Northern and York Public Health Observatory in Great Britain, is that HIA is

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.⁵

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This latter definition incorporates five generally accepted key characteristics of HIA. First, HIA takes proposed policies, programs, or projects as the starting point for analysis. The goal is to provide unbiased information about potential health outcomes, enabling policymakers to make informed decisions about whether to proceed with a given proposal or make modifications to mitigate potential harm and increase potential health benefits. Second, HIA comprehensively examines potential health effects, both positive and negative. Unlike most scientific health research, which examines narrowly defined questions related to one specific health outcome using a single methodology, HIA places a high value on addressing all potentially significant outcomes, even if they are difficult to ascertain. Third, HIA is based on a broad model of population health—one that recognizes the complex, interacting patterns of determinants that shape the health outcomes of groups of individuals and the distribution of outcomes within those groups.⁶ Thus, HIA considers aggregate outcomes in the population, notes distributional effects of public initiatives, and takes a broad, systems-based perspective to understanding health outcomes and their determinants. Fourth, HIA is a multidisciplinary process. Because both the policies examined by HIA and the determinants of health through which these policies affect health are often outside the fields of public health and medicine, it becomes necessary to draw from expertise in disciplines outside of health—bringing other bodies of research literature, other paradigms and other methodologies to bear on the questions HIA seeks to address.

Finally, HIA uses a structured framework to evaluate a range of evidence pertaining to a range of pathways through which a proposed policy or project may influence health. HIAs need to be flexible, but nonetheless follow a sequence of phases that is more or less the same from one HIA to another. The systematic evaluation and synthesis of evidence is a central part of HIA, and here flexible structure is especially important. Although different kinds of criteria need to be employed to assess different kinds of evidence in different situations, making it impractical to use a single set of criteria, such as those used for evaluating evidence in evidence-based research reviews, it is essential that the process for gathering and evaluating evidence is explicit, transparent, and balanced.

Diverse Approaches to HIA: A Taxonomy

Health Impact Assessment has taken on a wide variety of forms depending on the sociopolitical environment of the place where it is conducted, characteristics of the particular policy questions to which it is applied, disciplinary backgrounds of practitioners, and expectations of stakeholders who use its results. Some of the earliest

systematic efforts to develop HIA came from Canada,⁷ where HIA has been integrated into existing procedures for environmental impact assessment (EIA).⁸ Currently the governments of England, Scotland, and Northern Ireland have taken major steps to make HIA a regular part of government planning. This “United Kingdom version” of HIA has varied in how closely it is tied to environmental assessment, but it has placed a strong emphasis on identifying impacts that affect health inequalities and facilitating participatory and intersectoral decision making.⁹ HIA in the United Kingdom tends to focus on projects rather than broad policies. Other countries where steps have been taken to introduce HIA into the public policy planning process include Sweden,¹⁰ Germany,¹¹ Australia,¹² and New Zealand.¹³ Like HIA in the United Kingdom, most examples of HIAs from these countries have examined the potential impacts of “bricks and mortar” projects, not policies. Approaches to HIA have also been shaped by major initiatives that address population health issues, such as the Acheson Report¹⁴ on socioeconomic inequalities in the United Kingdom, and the series of reports^{15–17} from the 1970s through the 1990s, focusing on the multiple determinants of health in health promotion efforts in Canada.¹⁸

Approaches to HIA can be categorized in numerous ways, such as Kemm’s³ categorization of HIA methodologies as “broad” (holistic, sociological, qualitative) or tight (limited, epidemiologic, quantitative). We have found it useful to think about the variants of HIA primarily in terms of the different fields from which they draw—epidemiology and risk analysis in quantitative/analytic HIA, community-based health promotion in the participatory approach to HIA, and environmental impact analysis in the procedural approach to HIA. Each of these approaches to HIA serve slightly different functions and reflect different paradigms, corresponding closely to Goulet’s classification of alternative rationalities—technological, political, and ethical for decision making.¹⁹ A fourth field, evidence-based evaluation and practice guidelines, such as those developed in medicine,²⁰ preventive health services,²¹ and social sciences,²² is an important component that is emphasized in both the procedural and quantitative/analytic approaches to HIA. Any particular HIA may incorporate elements of several different approaches, but usually one will dominate.

Risk Analysis and the Quantitative/Analytic Approach to HIA

By applying effect estimates from the research literature and descriptive information on a target population, the quantitative/analytic approach to HIA attempts to specify the range, direction, and magnitude of potential health impacts of a policy or project on a

population. Examples of work that use such an approach, some of which are more narrow than a comprehensive HIA as specified in the definition provided earlier, include analyses of risks associated with airport siting,²³ research on air pollution policy,¹¹ effects of dietary modification,²⁴ impact of municipal “living wage” ordinances,^{25,26} residential building codes,²⁷ recommendations to increase fish consumption,²⁸ and alternatives for water treatment.²⁹

The methodologies employed in this approach draw heavily from the field of risk analysis. Employed in a wide variety of fields including engineering, economics, toxicology, and epidemiology, risk analysis aims to generate probabilistic estimates of a specified outcome following exposure to a particular substance or event, which requires a clear specification of an exposure, an outcome, and the dose–response relation between them.³⁰ This approach to HIA differs from risk analysis in that it usually considers multiple “exposures” and health outcomes, many of which need to be dealt with qualitatively since sufficient dose–response and exposure data to support quantitative risk analysis are lacking.

From the viewpoint of policymaking, the strengths of this tool are the ease to which it lends itself to the comparison of alternatives and its apparent objectivity. This latter characteristic can in turn strengthen the legal defensibility of HIA, which can be essential in the face of contentious proposals, as demonstrated by the related field of EIA. However, the requisite assumptions and uncertainty in projections also make this approach vulnerable to legal challenge by competing experts.

In practice, the quantitative/analytic approach to HIA can be highly time- and cost-intensive. Time, money, and data limitations often restrict its application to a consideration of single, unmixed, noncumulative exposures, and only one or a few outcomes. Although it can be more objective than other approaches, this approach incorporates numerous value- and model-based assumptions that are not always explicit. In-depth discussions of the limits of quantitative risk analysis for decision making are presented by Anand and Hanson,³¹ Campbell-Mohn and Applegate,³² Kuehn,³³ and Powell.³⁴

Community-Based Health Promotion and the Participatory Approach to HIA

The community-based health promotion and participatory approach to HIA draws heavily from the field of community-based health promotion as outlined in the Ottawa Charter on Health Promotion,³⁵ and demonstrated in the World Health Organization’s Healthy Cities Initiative, which aims to develop comprehensive policy and planning solutions to health problems by involving local government agencies, citizens’ groups, and community organizations to build capacity and

take concrete steps to address health problems.³⁶ It is not surprising that the same WHO European Office that has been an instrumental force behind HIA also launched the “Healthy Cities” initiative in the late 1980s.³⁷

Most HIAs have some provision for soliciting stakeholder input, but this is particularly emphasized in this approach to HIA, as it is the main input for analysis; facilitating this participation is the primary rationale for conducting a HIA. Examples of this approach include much of the HIA work in the United Kingdom, such as Fleeman and Scott-Samuel’s³⁸ HIA of the Merseyside Transport Strategy, and Winters’s³⁹ work on assessing the health impacts of a space exploration center, along with HIA in Sweden conducted through community councils,¹¹ and Bhatia’s⁴⁰ work with community groups reviewing planning decisions in San Francisco.

The strengths of this approach are more process- rather than ends-oriented. It can provide a valuable mechanism for public participation and the democratization of government decision making.

One of the chief limitations, however, 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. It is also not very replicable or testable. Comparisons between alternatives and with standards are difficult since there are no common metrics. Issues may also arise about who represents the “community.” As a result, this approach to HIA is probably better suited for analyses of local projects, not broad policies and programs that affect larger geopolitical units.

Environmental Impact Assessment and the Procedural Approach to HIA

Combining elements of the other two approaches to HIA, the procedural approach to HIA, like EIA, puts a premium on efficiency and is driven by procedural concerns to comply with bureaucratic mandates to perform an impact assessment. Indeed, many of the best examples of this approach to HIA are those that couple HIA with existing EIA procedures, such as HIA initiatives in Canada⁴¹ and Australia.⁴² Rosenberg et al.⁴³ suggested a similar approach in the United States in their proposal for incorporating workplace health impacts into EIAs.

Much of what can be said about the strengths and limitations of EIA applies to the procedural approach to HIA, especially since internationally it has often been incorporated into existing EIA protocols. Steinneman⁴⁴ and Cole et al.⁴⁵ offer more in-depth consideration of the parallels and differences between HIA and EIA. Like EIA, the procedural approach to HIA uses 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. Over time, agency directives and professional guidelines may lead to a standardization of methods, as has been the case for EIA.

The primary 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 may greatly increase resource requirements for this type of assessment, as has been the case with environmental impact statements in the United States.⁴⁵

The hybrid nature of this approach to HIA and its emphasis on bureaucratic expediency are at the root of many of its limitations. Again, drawing lessons from three and a half decades of experience from EIA, bureaucratic imperatives may compromise analytic rigor, numbers may be used merely to give a patina of objectivity and expert sophistication,⁴⁶ public participation may also be de-emphasized, becoming little more than a vetting of decisions already made, and there is also some question as to whether these procedural assessments are really used in the decision-making process, or whether they are just conducted to fulfill a bureaucratic requirement.^{34,47}

Rationale for a Quantitative/Analytic Approach

While different policy questions and circumstances may call for varying combinations of approaches to HIA, we believe that a good starting place is the quantitative analytic approach, since it offers a powerful tool that can be adapted to a wide variety of situations to produce valuable information for decision makers that is often not otherwise available. It is an outgrowth of trends in a variety of areas that attempt to systematically bring evidence from scientific research studies to bear on questions of policy and practice.^{20–22} By placing an emphasis on research evidence, it follows that measurement, which facilitates the comparison of alternatives, and analysis of causal linkages specific to a proposal should be pursued in HIA. The quantitative/analytic approach to HIA excels at both of these characteristics. The downside of the quantitative approach is that it does not stress public participation. As HIA methodology becomes more robust and familiar to users it can be inserted into existing policymaking mechanisms that are more participatory. Some of the key methodologic challenges in conducting this approach to HIA are discussed below. Much of what is said about these challenges applies equally to other approaches to HIA.

When to (and Not to) Do HIA: Screening

One of the first and most important decisions in the HIA process is whether to conduct an HIA for a particular action (i.e., policy, program, or project). In our experience, we have found several criteria to be critical in determining whether to proceed with an HIA: (1) the significance of potential health impacts, (2) value of added information from an HIA, and (3) feasibility of conducting an HIA. The priority given to the different criteria will vary depending on the policy, decision context, and, of course, the preferred analytic approach. After some trial and error, we have found that a visual aid in the form of a decision algorithm (Figure 1) helps guide analysts' discussions about whether to proceed with an HIA. It may not be possible to come up with definitive answers for the different decision points in the algorithm; nonetheless, the algorithm can help structure, standardize, and document the decision process.

Evidence from the research literature is brought to bear on these screening questions after conducting a rapid, systematic review of the literature (including peer-reviewed journals, newspapers, Internet, and material from advocacy groups). At this point, experts from relevant fields will usually need to be consulted to interpret and evaluate this information, particularly on the proximal outcomes of the proposed policy or project, since these are often in areas outside the expertise of public health analysts conducting the HIA.

As all of this information is collected, it needs to be synthesized in a concise form that can be communicated to others; this is achieved using a "logic framework" illustrating the putative causal pathways and likely positive and negative health effects. Even if the pathways are tentative, we have found these frameworks to be invaluable tools for organizing and communicating information and for guiding analysis. An example of a logic framework that we developed for the Los Angeles Living Wage HIA is shown in Figure 2.

What to Assess in HIA: Scoping

The purpose of scoping is to outline the impacts, methodologic approach, expected challenges, and resources needed to conduct the impact analysis. The scoping process should produce a detailed roadmap for the analysis to follow, informed by the literature, experts in relevant fields, and the concerns of policymakers and stakeholders. If we accept that "the answer depends on the question that is asked," then it becomes clear that the credibility of an HIA will hinge in large part on the clear documentation and justification of decisions in the scoping process.

While scoping may proceed in a number of different ways, our experience suggests following the steps listed here. First, the policy and its direct, intended impacts

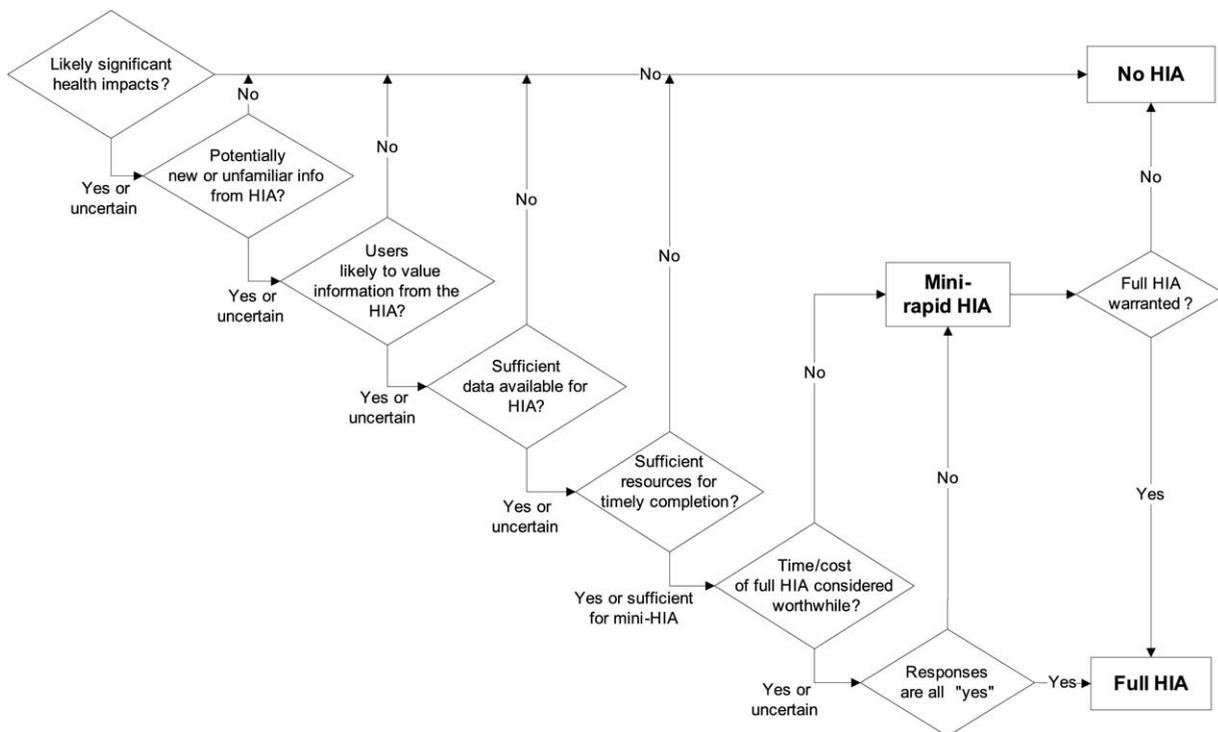


Figure 1. Screening algorithm to guide decisions on whether to conduct a health impact assessment. HIA, health impact assessment.

need to be precisely described. Second, the literature should be reviewed in more depth, and experts in the relevant fields need to be consulted to identify the health-related outcomes that might be associated with the policy. Third, the impacts to be assessed need to be specified, along with the assessment procedures. Fourth, the logic framework summarizing the relevant causal linkages needs to be re-evaluated and refined. Last, a detailed protocol for the analysis needs to be developed.

Selecting the focus and methodologies to be used requires addressing many of the same questions asked in screening about methodologic feasibility and value of information, but in a more specific way. For instance, are there sufficient data to quantitatively estimate changes in health outcomes, such as mortality or disability rates? Are there only enough data to support qualitative descriptions of impacts and their likely direction? Is the added information from more sophisticated analyses worth the additional time and resources?

One of the key issues to address during scoping is the extent to which the analysis should attempt quantitative prediction. Alternatives to quantitative prediction in HIA include descriptive quantitative analysis and qualitative analysis. Any one HIA can employ one or several analytic approaches. If, as is often the case, sufficient information is available to support quantitative prediction of impacts for one outcome but not others, the analysis needs to be carefully structured and presented so that nonquantified impacts are still thoroughly con-

sidered and communicated. Consideration also needs to be given to impacts on known determinants of health, such as education, air quality, and housing, even when it is difficult to predict changes in the downstream health outcomes, for instance the health effects of climate change.

An Agenda for Advancing HIA

Health Impact Assessment offers a promising approach for introducing information about potential health impacts into the policymaking process, but questions remain about the feasibility of HIA. Among the methodologic challenges are uncertainties about the final shape and implementation of policy proposals, thin evidence bases upon which to estimate health impacts, and small effect sizes of many policy interventions that are part of complex, poorly understood causal pathways. Even when HIAs are feasible, it is uncertain whether they can shape policy decisions in a way that benefits population health. Indeed, it is increasingly recognized that information from EIA and health services research have at best only a modest and at times an indirect effect on particular policy decisions.^{48–51} Of course, as HIA becomes more common it could, like EIA,⁴⁷ begin shaping the planning process by integrating consideration of health into the formulation of initiatives in areas where it was not considered before.

Less than a decade old, the field of HIA has grown tremendously. While the early literature on HIA was

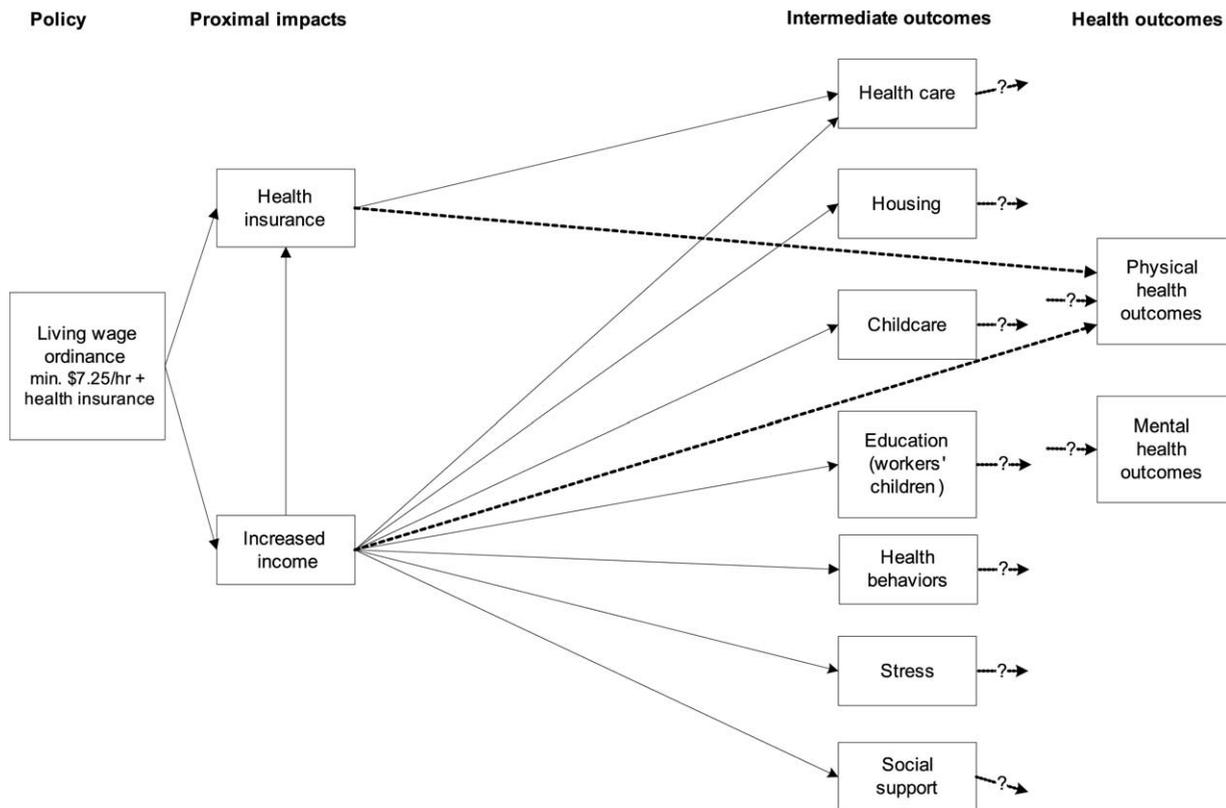


Figure 2. Logic framework for the City of Los Angeles Living Wage Health Impact Assessment. Dashed line indicates effect estimated in the quantitative analysis.

largely conceptual,^{3-5,7,9} recent work in Europe, especially in the United Kingdom, has begun providing an increasing number of examples of HIA in practice, and demonstrating the use of increasingly sophisticated methodologies in HIA.⁵²⁻⁵⁴ Still, a review of electronic journal databases and the major HIA clearinghouses (www.hiagateway.org.uk/; www.who.int/hia/en/) shows that HIA practice still lags behind its promise and potential.

If we accept that HIA can indeed contribute to more informed and coordinated decision making by increasing awareness of health impacts, especially where they are not currently considered, then there are several steps that can be taken to bring it from the theoretical realm into practice, particularly in the United States, where HIA has yet to stimulate the kind of interest and support for institutionalization it has in Europe. Some impediments, especially limited data, will remain a vexing problem, and progress will be made only incrementally with the combined contributions of many researchers over many years. The suggestions proposed below, however, address more tractable problems.

First, easy-to-use, transparent screening tools need to be developed to aid analysts in making determinations as to whether HIA is useful and feasible for a given policy question. This will streamline the analysis process and help efficiently allocate analytic resources. These screening tools could be decision algorithms similar to

what our research group has already developed, checklists to classify policies according to types that are likely to need or not need HIA, similar to what the U.S. Department of Energy uses to classify projects proposals for EIA.

Second, work needs to be done on how HIA results can be most effectively brought into the policymaking process and on how policymakers can be brought into the HIA process so that HIAs focus on issues where they can be of most benefit. For each of our HIAs, we have developed summaries designed so that policymakers will find them easy to use and understand, but we have yet to address the other issue of bringing HIAs into the policymaking process.

Third, a body of HIAs needs to be built up. It is difficult to gauge the feasibility of HIA, the appropriateness of screening criteria, the applicability of different methods, and whether HIA results actually make a contribution to the policymaking process based solely on theory and inferences from other fields. Internationally, some progress is being made in this respect by the European office of the World Health Organization, which has established a repository of HIA reports, but reports from the United States are still lacking, as are follow-up reports of how or whether these HIAs have contributed to policy decisions.

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