

Growing the Field of Health Impact Assessment in the United States: An Agenda for Research and Practice

Health impact assessment (HIA) methods are used to evaluate the impact on health of policies and projects in community design, transportation planning, and other areas outside traditional public health concerns. At an October 2004 workshop, domestic and international experts explored issues associated with advancing the use of HIA methods by local health departments, planning commissions, and other decisionmakers in the United States. Workshop participants recommended conducting pilot tests of existing HIA tools, developing a database of health impacts of common projects and policies, developing resources for HIA use, building workforce capacity to conduct HIAs, and evaluating HIAs. HIA methods can influence decisionmakers to adjust policies and projects to maximize benefits and minimize harm to the public's health. (*Am J Public Health*. 2006;96:XXX-XXX. doi:10.2105/AJPH.2005.069880)

Andrew L. Dannenberg, MD, MPH, Rajiv Bhatia, MD, MPH, Brian L. Cole, DrPH, Carlos Dora, PhD, Jonathan E. Fielding, MD, MPH, Katherine Kraft, PhD, Diane McClymont-Peace, MS, Jennifer Mindell, MBBS, PhD, FFPH, Chinwe Onyekere, MPH, James A. Roberts, PhD, CEP Catherine L. Ross, PhD, Candace D. Rutt, PhD, Alex Scott-Samuel, MB, ChB, MCommH, and Hugh H. Tilson, MD, DrPH

IN RECENT YEARS, AWARENESS

that how community design, land use, transportation systems, and other environmental and social factors affect the health of the public has increased.¹⁻⁴ But few health officials or urban planners have training or experience in each other's fields.

A health impact assessment (HIA) is commonly defined as "a combination of procedures, methods, and tools by which a policy, program, or project may be judged in terms of its potential effects on the health of a population, and the distribution of those effects within the population."⁵ An HIA can be used to improve communication between local health departments and community decisionmakers, enabling the latter to consider improved designs to favor health promotion or minimize adverse effects on health. For example, an HIA of a proposed airport in England focused on noise, air pollution, traffic congestion, and local employment and led to health-promoting changes in the developer's plans.⁶

The development of HIAs in recent years has grown in part out of assessments of the environmental and social impacts of large projects.⁷ Environmental impact assessments (EIAs) focus on air and water quality and other environmental consequences of proposals with little attention to health impacts.⁸ HIAs and EIAs both promote

public accountability for the consequences of decisions that affect communities; they differ in the scope of impacts analyzed and the implementation process.⁸

Interest in HIA at the Centers for Disease Control and Prevention (CDC) developed out of discussions at a 2002 workshop that led to a research agenda on issues to advance the field of public health in relation to community design.⁹ Numerous HIAs have been conducted in Europe and elsewhere,^{10,11} but few have been done in the United States.¹²

METHODS

In October 2004, the Robert Wood Johnson Foundation and CDC hosted discussions about HIA with invited experts at a 2-day workshop in Princeton, NJ. The workshop objectives were to explore key research questions regarding HIA methods and to advance the development of HIA instruments for use by community decisionmakers in the United States. Five workshop participants from the United Kingdom, Canada, and the World Health Organization had extensive expertise with HIA. US participants came from local health departments; transportation, environmental health, and urban planning groups; academia; the Robert Wood Johnson Foundation, and the CDC.

Before the workshop, a planning committee developed a set

of research questions regarding HIA methods. The workshop invitees helped revise these questions and then provided brief answers to the 12 questions that were used to initiate the discussions at the workshop. Although not representing a consensus of all persons involved, this article includes ideas from workshop participants and other interested individuals listed in the acknowledgments.

RESULTS

The key findings and recommendations for further research from the workshop are summarized in Box 1 and described in detail in the text.

Existing HIA Tools and Methods

Steps to conduct an HIA include *screening* to identify projects or policies for which an HIA would be useful; *scoping* to identify which health impacts should be assessed and which populations are affected; *assessing* the magnitude, direction, and certainty of health impacts; *reporting* of results to decisionmakers; and *evaluating* the impact of the HIA on the decision-making process.^{13,14} Many existing HIA methods and instruments^{10,11,15} are ready for pilot testing in the United States. Some HIA approaches focus on biomedical health outcomes (e.g., cardiorespiratory dis-

Box 1—Summary of Key Findings and Research Needs to Advance the Field of Health Impact Assessment (HIA) in the United States

Key Findings	Research Needs
<p>1. Existing HIA tools and methods</p> <ul style="list-style-type: none"> · Some biomedical in scope, some more social/holistic; range from checklists to multistep processes · Numerous HIA tools and methods exist; no single tool is best · Some local health departments in United States now ready to do HIA pilot tests 	<ul style="list-style-type: none"> · Review existing HIA tools and methods · Conduct HIA pilot tests in United States · Perform more systematic reviews of evidence used in HIAs in nonhealth sectors (e.g., housing, transportation)
<p>2. Context for HIA use: projects and policies</p> <ul style="list-style-type: none"> · Projects are part of continuum within policies · HIAs of place-based projects may have better defined target populations and activities, more readily involve stakeholders, and have shorter time frame · HIAs of policies may have broader scope of potential impacts, take more time, affect more people, involve more stakeholders, and be more complex 	<ul style="list-style-type: none"> · Develop social marketing strategy for improved visibility of public health in nonhealth sectors · Identify HIA methods best suited for evaluating specific types of projects and policies
<p>3. Resource needs and limitations of HIAs</p> <ul style="list-style-type: none"> · Need trained staff, time, and other resources to do HIAs · Demand for HIA affected by political context and severity of health outcomes of project or policy · Need political support and champions to build support for HIAs 	<ul style="list-style-type: none"> · Improve communication tools to inform decisionmakers about HIAs · Develop guidelines for selecting appropriate HIA tool based on context and resources available · Develop tool to estimate resource needs to conduct HIAs in US health departments
<p>4. HIA measures and HIA resource database</p> <ul style="list-style-type: none"> · Existing tools (e.g., geographic information systems) may be useful for conducting HIAs · Consensus on high value of HIA database and need for substantial resources to build and maintain it · Existing HIA Web sites from England (http://www.publichealth.nice.org.uk/page.aspx?o=HIAGateway) and UCLA (http://www.ph.ucla.edu/hs/health-impact) are good starts 	<ul style="list-style-type: none"> · Improve quantification of effects of changes in social determinants of health, such as specific health impacts of changes in housing, income, transportation, or access to recreation · Build and maintain database that includes inventory of HIA tools, guide to choice of HIA tools, systematic reviews of health impacts for range of policies and projects, links to completed HIAs, lists of HIA experts, and user-friendly search capacity · Consolidate existing HIA glossaries to reach common terminology
<p>5. International HIA experience</p> <ul style="list-style-type: none"> · HIA tools and methods from Europe and elsewhere should be adaptable for US use · European Strategic Environmental Assessment framework incorporates assessment of health impacts · Private sector plays more of role in project development in United States than in Europe 	<ul style="list-style-type: none"> · Examine how HIA achieved current levels of support and legitimacy in Europe and elsewhere to try to achieve similar levels in United States
<p>6. Voluntary vs regulatory HIA process</p> <ul style="list-style-type: none"> · HIAs as regulatory process may ensure legitimacy and build constituency · Existing EIA laws may now allow but not require HIA; Canada and other countries have integrated EIA and HIA processes successfully · Barriers to adding HIA to existing regulatory EIA processes include adequacy of HIA predictions in litigious EIA environment, political and legal challenges to changing EIA practices, and need for resources 	<ul style="list-style-type: none"> · Perform voluntary HIA pilot tests in United States to establish credibility and usefulness of HIAs before considering regulatory approach · Develop links of health impacts to overall planning processes
<p>7. HIA community involvement and environmental justice</p> <ul style="list-style-type: none"> · Community involvement promotes environmental justice and social equity, helps identify locally relevant issues, aids community empowerment, and improves transparency of decisionmaking · Community involvement requires time and resources and may delay completion of HIA · Local health disparities data may not be available 	<ul style="list-style-type: none"> · Develop guidelines and identify best practices to facilitate community involvement · Train HIA practitioners in skills for community involvement such as cultural sensitivity and accountable listening
<p>8. Timing and governance of HIA process</p> <ul style="list-style-type: none"> · HIA best done as early as practical in decision process during window of opportunity for usefulness · Participants in HIA process and interactions with decisionmakers vary by organization and topic · Planners can use HIA to educate public health officials about constraints in planning 	<ul style="list-style-type: none"> · Develop model timelines for HIA process · Develop model agreement for governance of HIA conduct · Explore potential for various groups to take lead on conducting HIAs, such as health officers, academics, and consultants

Continued

Box 1—Continued**9. Training public health professionals in HIA**

- HIA courses are well established in Europe
- Public health officials now have many of the necessary skills but need some additional training to conduct HIAs
- Public health officials presenting HIA results need to be credible and knowledgeable to influence decisionmakers

10. Training planners and decisionmakers in HIA

- Need to target decisionmakers who can use HIA results
- Need to consider methods to incorporate health into formal decisionmaking processes so that health officials will be at table

11. Evaluation of HIAs

- Major forms are process evaluation of HIA steps done, impact evaluation of effect of HIA on project or policy, and outcome evaluation of actual health impacts compared with those predicted
- Useful to evaluate stakeholder involvement
- Some HIA evaluations have been completed, but comparisons of HIAs are difficult because of variability in reporting

12. Communicating findings of HIAs

- Potential audiences include planners, politicians, project developers, health agencies, media, community stakeholders, and academics
- Nontechnical report, needed for political decisionmakers, community stakeholders, and lay audiences, should include background, health impact findings, and recommendations
- Report for technically trained audience should include executive summary, scoping, literature review, assumptions, major health impact findings, sensitivity analyses, levels of uncertainty, discrepant views, and recommendations

- Adapt existing and develop new HIA training resources for use in United States (e.g., guides, courses, Web sites, case studies, core curriculum, distance learning)
- Train multidisciplinary teams in HIA skills

- Educate community stakeholders about HIA process to increase HIA usefulness

- Develop briefings, seminars, short courses, and case studies about HIA for planners and decisionmakers
- Create media attention to HIA process

- Develop incentives for HIA use, such as involving decisionmakers in HIA process, promoting HIA as part of improved policymaking, and motivating communities to ask for HIA process

- Conduct further HIA evaluations

- Develop practical criteria for process, impact, and outcome evaluations of HIAs
- Develop staff capacity to conduct evaluations of HIAs

- Develop guidelines for HIA reporting formats to facilitate later comparisons and evaluation

- Create model HIA reports that can be used to educate decisionmakers about HIAs

Note. EIA = environmental impact assessment. Data are from Health Impact Assessment Workshop, Princeton, New Jersey, October 12–13, 2004, sponsored by Robert Wood Johnson Foundation and Centers for Disease Control and Prevention.

ease),^{16–18} some define health holistically to include social, economic, and environmental conditions,^{19,20} and others focus specifically on the equity impacts of policies and projects.^{21,22} HIA instruments range from simple checklists²³ to complex collaborative processes.²⁴

For a given project or policy, the choice of method depends on purposes of the HIA and available time and resources. A review of available HIA instruments is currently under way (Jennifer Mindell, e-mail communication, September 6, 2005). Guidelines for selecting

the best HIA method for various types of projects and policies and systematic reviews of the evidence used in existing HIAs are needed. A few local health departments (e.g., San Francisco^{25,26} and Los Angeles²⁷) now conduct HIAs; others have discussed with CDC staff a willingness to conduct HIAs when resources become available. HIA pilot tests could provide information on the usefulness of HIA methods in US settings, the availability of needed health impact data, and the acceptability of the process to local decisionmakers.

Context for HIA Use: Projects and Policies

The methods for conducting HIAs are similar for place-based projects (e.g., new residential developments), public policies (e.g., subsidized mortgages), and planning processes (e.g., transit system expansions). HIAs may include both policy and project components, such as zoning revisions needed to allow smart growth communities to be built. Although policies may have substantial impacts on public health, imprecise policy wording or inconsistent implementation (e.g., frequent use of variances) can

make it difficult to define and quantify changes in associated health outcomes. Projects typically affect geographic regions and populations for which it is easier to define potential health outcomes, identify stakeholders, and collect baseline data.

Health-related data may not be available for a small geographic region affected by a project or may represent a population different from the specific population affected by the project. The available evidence for a health impact (e.g., predicted trail use) may relate to a population ethnically different from the one



impacted by a project. Results of HIAs of projects may need to be disseminated to smaller but more intensely interested groups of stakeholders concerned about their neighborhoods than results of HIAs of policies do.

Resource Needs and Limitations of HIAs

Resource needs for HIAs vary by scope, depth of analysis, time available, and processes employed. For example, city council questions about a proposed policy may require a quick answer, using readily available evidence and expert opinion but with little stakeholder input or detailed data analysis. In contrast, an HIA conducted in parallel with a city planning process could include more impacts and more extensive literature review, data analysis, and stakeholder participation. An HIA on 1 specific policy or project may require fewer resources than a request to compare options to achieve a specific policy goal (e.g., reduced obesity, increased community walkability), particularly if the issue is controversial.

HIA resource needs are also influenced by the processes chosen. A mandatory HIA with defined minimum scope of impacts, rules for evidence, and procedures for community participation can require more resources than a voluntary HIA. Decisions to collect original data or hold stakeholder meetings have resource implications. HIA time and cost are also determined by analysts' experience

Q1: PE: See Au2 comment. He may not like this rewrite. Original rewrite lacked the word “do.”

and the availability of prior similar HIAs.²⁸ Whether health department staff, consultants, academics, or others are best situated to conduct HIAs depends on circumstances.

All HIAs have limitations. The quality of evidence connecting policies and projects to changes in environmental and social conditions may be strong or weak. Similarly, the causal link between such conditions and health outcomes may or may not be supported by strong scientific evidence. Some causal links are relatively clear (e.g., traffic congestion, air pollution, and respiratory disease), whereas others are difficult to document (e.g., airport noise, disturbed sleep, and physical illness).²⁹ For a place-based HIA, the outcome may balance the best available science, competing societal objectives, and local political considerations. Overall, HIA value is determined by timeliness, completeness, and decisionmaker interest.

HIA Measures Needed and Potential for an HIA Database

Measures to assess health impacts may be derived from knowledge of determinants of health (e.g., income or housing quality), from existing methods used in the natural and social sciences, or from measures identified through a community participatory process.^{25,30} Geographic information systems and health surveillance systems are useful for many HIAs. Gaps in the evidence both between proposals and determinants of health and between determinants and health outcomes may limit the precision of many assessments. For example, the relation between income and health is well documented, but the impact on health of in-

terventions designed to increase income is difficult to quantify.^{26,27}

HIA practitioners would benefit from the creation of a single easily accessible source of information about HIAs. Such a searchable database should contain an inventory of HIA tools, guidelines for choosing HIA tools, systematic reviews of health impacts for a range of policies and projects, links to completed HIAs on numerous topics, and lists of HIA experts. For example, it should contain reviews of quantitative evidence (exposure–effect estimates) of health impacts for specific projects when such exists³¹ and of qualitative evidence when quantitative data are lacking. Many such reviews need to be developed.³² The maintenance of such a database requires ongoing resources. The English HIA Gateway Web site¹⁰ is an excellent start for developing a more extensive database.

Adapting International HIA Experience for Use in the United States

Numerous HIAs have been conducted in Europe, Canada, and elsewhere in recent years, both linked to EIAs or as independent processes.³³ Europe is a leader in adopting HIAs to encourage sustainable decisionmaking, both within and between its borders. The European strategic environmental assessment framework includes evaluation of health impacts of policies, plans, and programs across different sectors.^{34–36} In Canada some HIAs are done within a strategic environmental assessment process under a cabinet directive. Australia, New Zealand, Thailand, and Canada have inte-

grated HIA into project-specific EIA legislation.^{16,37–39}

On the basis of HIA experience elsewhere, barriers to HIA use in the United States include the lack of domestic experience and the need for tools, documentation, training, and resources. HIA practitioners need better health information systems, knowledge of health impacts, and access to previous HIAs as models. Decisionmakers need clear information on the kinds of health impacts expected and measures to alleviate these impacts. Practical HIA guides developed in Europe and elsewhere could be adapted for use in the United States.^{11,20,40,41}

Voluntary vs Regulatory Process

Whether HIA should be integrated into existing regulatory EIA practices or should be conducted on a separate voluntary or regulatory basis is an important issue. In the United States, the National Environmental Policy Act allows the assessment of health impacts within the EIA process in the context of physical environmental changes.^{8,42,43} Some state laws (e.g., California⁴⁴) require the analysis of adverse impacts on humans resulting from such physical environmental changes. In practice, such assessments are usually limited to physical and chemical hazards (e.g., pollution of water may lead to gastrointestinal illness) and exclude sociobehavioral factors not mediated by toxicological mechanisms (e.g., construction of walking trails may lead to increased physical activity).^{43,45,46}

As a model for HIA, EIA includes rules for process transparency, quality of evidence, public participation, and accountability and may require

examination of strategies to mitigate environmental impacts. Conducting an HIA through an existing regulatory process may help build constituency and ensure legitimacy.

Several obstacles may prevent adding health impacts to existing EIA procedures in the United States. Laws or regulations that broaden the required scope of EIAs would face political and legal challenges. Some HIA predictions (e.g., the associations between sidewalks, walking, obesity, and heart disease) are insufficiently robust to withstand the litigious environment of EIA practice. Quantitative modeling of some HIA outcomes (e.g., mental health) is more difficult than modeling of EIA outcomes (e.g., air pollution). Changes in practices may have limited support from regulatory officials who oversee EIAs. Finally, conducting an HIA within the EIA process would require funding.

Using HIA on a voluntary basis to further develop methods and demonstrate its value seems most practical in the United States at this time. Where legal language is permissive, an HIA may be done voluntarily within an EIA if requested by a decisionmaker or a community. Guidance on including health in environmental assessments is available from the World Bank and other sources.^{20,47}

Role of Community Involvement and Environmental Justice

HIA processes in many countries incorporate active participation of interested stakeholders.^{48–51} Advantages of such participation include promoting social equity and environmental justice,^{52,53} identifying locally relevant issues, improving trans-

parency of decisionmaking, providing information for estimating or mitigating impacts, and facilitating community empowerment. Local participants also may help promote HIA recommendations to decisionmakers.

Community participants may be individuals or representatives of organizations, such as service providers, business or neighborhood associations, or advocacy groups. Meaningful participation in public agency decisionmaking may be difficult for persons with limited economic or political resources.^{54–56} Persons conducting HIAs need skills such as cultural sensitivity, accountable listening, and respect for community experience and should ensure that community participants understand the objectives of the process and their roles. Such roles could range from providing input for consideration to having a vote in the decision. The level of community participation may be influenced by the importance of the issue, scope of the assessment, and time and resource availability. Decisionmakers may need to judge the significance of information provided by community participants, such as a claim that a new trail would attract crime in the absence of evidence of crime near other trails.

Some HIA practitioners believe HIAs are incomplete without community stakeholder input. For an HIA of a policy affecting a large population, extensive participation is often appropriate, involving an advisory board that includes stakeholders and is empowered with oversight, direction of the assessment, and communication of its findings. Community involvement in HIAs may be integrated into other community input processes. For an HIA needed promptly to influence a

decision, community involvement may not be feasible.⁵⁷ Existing literature on community involvement in HIAs describes diverse approaches and their impacts in various settings.^{54,58} Best practices are needed.

Timing and Governance of HIA Process

The timing of an HIA affects the likelihood of influencing decisionmakers. An HIA early in the decisionmaking process enables greater involvement and buy-in of decisionmakers and stakeholders. The time available influences the depth and breadth of the HIA.⁵⁹ In this article, the term *HIA* refers to a prospective process. Opinion is divided on whether concurrent and retrospective assessments of projects and policies should be considered HIAs.⁶⁰ As with evaluation processes, nonprospective activities can influence a decisionmaker to modify a project only after the project has started.

HIA practitioners and decisionmakers should work together throughout the assessment process. Input from decisionmakers enhances understanding of the proposal and the scope for change; their involvement increases their “ownership” of the HIA activity and likelihood of accepting subsequent recommendations. HIAs can be used to educate health officials about planning constraints and planners about the health effects of their decisions.^{61,62}

Close involvement with decisionmakers, who may strongly support or oppose a proposal, could compromise the independence of the HIA. To help maintain credibility, decisionmakers and health impact assessors should have a written agreement defining the scope, governance, prod-

ucts, use, and dissemination of the HIA. Integrity of the HIA process is enhanced by adherence to the values of transparency, democracy, equity, sustainability, and the ethical use of evidence described in the Gothenburg and Merseyside guidelines.^{5,24}

HIA Capacity Building: Training of Public Health Professionals

Training of public health professionals is needed to build capacity to conduct HIAs. To influence decisionmakers, HIA professionals should be credible and knowledgeable. A training curriculum should include skills to understand the HIA process, identify stakeholders, analyze policies, identify and quantify health impacts, communicate results, and understand land use and transportation planning.⁶³ Although public health officials already possess many of these skills, the introduction of HIA requires training and continuing education of multidisciplinary teams including other public officials, planners, social scientists, epidemiologists, economists, and environmental health specialists. Training community stakeholders to provide informed input is also useful.

To build capacity, training opportunities should be developed, such as school of public health courses, state-level workshops, and distance learning modules.⁶⁴ Various HIA training materials and case studies are available online.¹⁰ In-depth training courses have been developed by the University of Liverpool, the London Health Observatory, and the World Health Organization.^{65–67} Existing European training materials can be adapted for use in US communities. As demand increases, development of “train the trainer” courses would be

valuable.⁶⁸ A certification process for HIA practitioners should be considered, similar to that for environmental professionals.⁶⁹

HIA Capacity Building: Training of Planners and Decisionmakers

Planners and decisionmakers would be more likely to request and use HIA processes if trained to understand their value. Existing training materials, such as the University of Birmingham manual⁷⁰ and others on the HIA Gateway Web site,¹⁰ cover the basics of HIA methods well and could be revised to incorporate examples from US communities. HIA seminars, briefings, short courses, case studies, and primers could be offered by national and state planning, public health, and environmental organizations.

HIA training for planners and decisionmakers should be interdisciplinary, problem-based, and not overly technical. Joint training programs could be established in which health professionals, planners, decisionmakers, and interested public participants could learn together. Familiarity with HIA basics would be enhanced if taught routinely in all schools of planning and of public health. Further work is needed to develop incentives to conduct HIAs so planners, decisionmakers, and communities will request health impact information as part of their decisionmaking processes. For example, the value of HIA for improving decision-making processes needs to be better documented.

Evaluation of HIAs

Evaluation of HIA effectiveness is important to advance the field, demonstrate value, document influence on deci-

sions, improve quality, facilitate training, enhance institutional relationships, raise awareness of health impacts for decisionmakers, and examine adherence of processes to underlying values.⁵ Three types of HIA evaluation have been described.⁶⁰ *Process evaluation* examines how the steps of the HIA process were done. *Impact evaluation* assesses the effect on decisions made; documenting the cause and effect of observed changes can be difficult.⁷¹ *Outcome evaluation* compares the health outcomes after implementation with those predicted by the HIA and may be complicated by differences between the initial proposal and subsequent implementation.

Most published HIAs are the reports presented to decisionmakers¹⁰ and lack documentation of subsequent outcomes.⁷² Some process^{6,19,73,74} and impact⁷¹ evaluations have been conducted; most found positive benefits of HIAs.^{75,76} Ideally, process evaluations should be done on all HIAs, and impact and outcome evaluations done where resources permit. A set of standards for the conduct and evaluation of HIAs would be useful. Despite methodological problems, outcome evaluations of recent HIAs could be conducted now. Criteria for evaluating HIAs have been developed.⁷⁷

Evaluating HIA as a field requires the synthesis of evaluations of individual HIAs. Long-term evaluations should consider the cumulative effects of HIAs on planning processes. One impact of the EIA process may be its influence over time in encouraging developers to propose more environmentally sound projects.⁷⁸

Communicating Findings of an HIA

To have an impact, HIA findings must be communicated to decisionmakers who require concise, synthesized information presented in a compelling fashion. Other interested audiences include community members, advocacy organizations, journalists, and public health professionals. In addition to study results, an HIA report in the United States should communicate the aims, rationale, and validity of HIA methods in general.

HIA reports should be based on quantitative and qualitative analyses. Consensus standards for evidence would support the legitimacy of HIAs.³² For political decisionmakers and community stakeholders, a nontechnical HIA report should include background, methods, health impact findings, and recommendations. For technically trained audiences, the report should include an executive summary, the scope of health impacts considered, a logic framework showing possible links between the proposal and health impacts,^{14,29} a literature review, analytic methods and assumptions, sensitivity analyses for quantitative results, discussion of analytic uncertainties, discrepant views, trade-offs, health equity issues, and recommendations for proposal changes to maximize positive and minimize negative health impacts. Development of HIA report format guidelines would improve communication to various audiences and facilitate evaluation of HIA analyses.⁷⁷

DISCUSSION

There is substantial potential to improve public health by bringing attention to decision-

makers, such as members of city councils and zoning commissions (who typically have little background in health), the health consequences of their actions. HIA is a new tool that could be valuable to improve communication between these decisionmakers and their local health departments.

Sufficient experience has accumulated in Europe, Canada, and elsewhere to demonstrate that HIAs can be a useful tool for advancing public health objectives. There was a clear consensus among the October 2004 Princeton workshop participants that now is the opportune time to move forward on the development and use of HIA methods in the United States.

One high priority is to conduct voluntary pilot tests^{26,27,79} of existing HIA methods to examine their usefulness in US settings and to educate planners, developers, health agencies, community advocates, and the media about the value of HIAs. Another priority is to develop training courses and materials to enable public health officials to conduct HIAs; such training materials can be adapted from those developed in Europe and elsewhere. Other priorities include developing a database for measuring health impacts of common projects and policies and conducting process, impact, and outcome evaluations of HIAs.

The potential value of HIA methods was recognized at a 2002 conference in Boston.⁸⁰ Participants at that conference also examined difficulties in HIA processes such as establishing an adequate theoretical framework, working with health impacts that are difficult to quantify, balancing health impacts with other societal outcomes in decision-making processes, and ensuring

that HIAs add value rather than barriers to decisionmaking processes.⁸⁰ These concerns should be addressed when HIA pilot studies are conducted.

After numerous publications in Europe, papers and presentations about HIA are beginning to appear in the American public health literature^{9,14, 26,79,81} and at national planning and public health conferences. The next steps to move the field forward in the United States have been identified. We believe planners and public health leaders should begin now to tap into the potential of HIA processes to improve the health of our communities. ■

About the Authors

Andrew L. Dannenberg is with the National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, Ga. Rajiv Bhatia is with the San Francisco Department of Public Health, San Francisco, Calif. Brian L. Cole is with the University of California, Los Angeles School of Public Health. Carlos Dora is with the World Health Organization Health Impact Assessment Programme, Geneva, Switzerland. Jonathan E. Fielding is with the University of California, Los Angeles School of Public Health and the Los Angeles Department of Health Services. At the time of the study, Katherine Kraft was with the Robert Wood Johnson Foundation, Princeton, NJ. Diane McClymont-Peace is with Health Canada, Ottawa, Canada. At the time of the study, Jennifer Mindell was with the London Health Observatory, London, United Kingdom. Chinwe Onyekere is with the Robert Wood Johnson Foundation. James A. Roberts is an environmental impact assessment consultant, Sacramento, Calif. Catherine L. Ross is with the Georgia Institute of Technology College of Architecture, Atlanta, Ga. Candace D. Rutt is with the National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. Alex Scott-Samuel is with the Liverpool Public Health Observatory, University of Liverpool, United Kingdom. Hugh H. Tilson is with the University of North Carolina School of Public Health, Chapel Hill, NC.

Requests for reprints should be sent to Andrew L. Dannenberg, National Center for Environmental Health, CDC, 4770 Buford Highway, Mail Stop F-30, Atlanta, GA 30341 (e-mail: acd7@cdc.gov).

This article was accepted August 29, 2005.

Contributors

A. L. Dannenberg, B. L. Cole, K. Kraft, J. Mindell, C. Rutt, and H. H. Tilson conceptualized and did the initial planning for the workshop. All authors participated in the workshop and contributed to the writing/revising of the article.

Acknowledgments

We thank the Robert Wood Johnson Foundation for its financial and logistical support of the October 2004 Health Impact Assessment workshop.

We gratefully acknowledge the contributions of the participants in the October 2004 workshop including Hugh H. Tilson, University of North Carolina School of Public Health, workshop moderator; Rajiv Bhatia, San Francisco Department of Public Health; David M. Buchner, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention; Brian L. Cole, University of California School of Public Health, Los Angeles; Andrew L. Dannenberg, National Center for Environmental Health, Centers for Disease Control and Prevention; Allen Dearry, National Institute of Environmental Health Sciences; Carlos Dora, World Health Organization Health Impact Assessment Programme; Jonathan Fielding, Los Angeles County Department of Health Services and University of California School of Public Health, Los Angeles; Katherine Kraft, Robert Wood Johnson Foundation; James W. Krieger, Seattle-King County Health Department; Diane McClymont-Peace, Health Canada; Dennis McDowell, Office of Strategy and Innovation, Centers for Disease Control and Prevention; Jennifer Mindell, London Health Observatory; Marya Morris, American Planning Association; Jill Muir, NHS Health Scotland; Chinwe Onyekere, Robert Wood Johnson Foundation; James A. Roberts, Environmental impact assessment consultant; Valerie N. Rogers, National Association of County and City Health Officials; Catherine L. Ross, Georgia Institute of Technology College of Architecture; Pamela W. Russo, Robert Wood Johnson Foundation; Candace D. Rutt, National Center for Chronic Disease Prevention and Health Promotion; Michael Savonis, Federal Highway Administration, US Department of Transportation; and Alex Scott-Samuel, Liverpool Public Health Observatory, University of Liverpool.

The authors also thank Margaret Douglas, Howard Frumkin, Roy Kwiatkowski, William Lyons, Anthony Moulton, Jayne Parry, and Michael Pratt for their contributions to this article.

References

1. Frumkin H, Frank L, Jackson R. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Washington DC: Island Press; 2004.
2. Frumkin H. Urban sprawl and public health. *Public Health Rep*. 2002; 117:201–217.
3. Jackson RJ. The impact of the built environment on health: an emerging field. *Am J Public Health*. 2003;93: 1382–1384.
4. Wilkinson R, Marmot M, eds. *Social Determinants of Health: the Solid Facts*. 2nd ed. Copenhagen, Denmark: World Health Organization; 2003. Available at: <http://www.who.dk/document/e81384.pdf>. Accessed October 19, 2005.
5. *Health Impact Assessment: Main Concepts and Suggested Approach*. Brussels, Belgium: European Centre for Health Policy, World Health Organization Regional Office for Europe; 1999. Gothenburg Consensus Paper. Available at: <http://www.who.dk/document/PAE/Gothenburgpaper.pdf>. Accessed October 19, 2005.
6. Aziz MIA, Radford J, McCabe J. The Fittingly Airport HIA: a case study. In: Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment*. Oxford, England: Oxford University Press; 2004:285–297.
7. Kemm J, Parry J. The development of HIA. In: Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment*. Oxford, England: Oxford University Press; 2004: 15–23.
8. Cole BL, Wilhelm M, Long PV, Fielding JE, Kominski G, Morgenstern H. Prospects for health impact assessment in the United States: new and improved environmental impact assessment or something different? *J Health Politics, Policy Law*. 2004;29:1153–1186.
9. Dannenberg AL, Jackson RJ, Frumkin H, et al. The impact of community design and land-use choices on public health: a scientific research agenda. *Am J Public Health*. 2003;93: 1500–1508.
10. National Institute for Health and Clinical Excellence. Health Impact Assessment Gateway. Available at: <http://www.publichealth.nice.org.uk/page.aspx?o=HIAGateway>. Accessed October 19, 2005.
11. World Health Organization HIA Web site. Health impact assessment. Available at: <http://www.who.int/hia>. Accessed October 19, 2005.
12. University of California Los Angeles School of Public Health, Partnership for Prevention. Health Impact Assessment: Information & Insight for Policy Decisions. Available at: <http://www.ph.ucla.edu/hs/health-impact>. Accessed October 19, 2005.
13. World Health Organization HIA Web site. The HIA procedure. Available at: <http://www.who.int/hia/tools/process/en>. Accessed October 19, 2005.
14. Cole BL, Shimkhada R, Fielding JE, Kominski G, Morgenstern H. Methodologies for realizing the potential of health impact assessment. *Am J Prev Med*. 2005;28:382–389.
15. McIntyre L, Petticrew M. *Methods of Health Impact Assessment: A Literature Review*. Glasgow, Scotland: Medical Research Council Social and Public Health Sciences Unit; 1999. Available at: <http://www.msoc-mrc.gla.ac.uk/Publications/pub/PDFs/Occasional-Papers/OP-002.pdf>. Accessed October 19, 2005.
16. New Zealand Ministry of Health. Public Health Advisory Committee. *A Guide to Health Impact Assessment: A Policy Tool for New Zealand*. 2nd ed. Wellington, NZ: National Health Committee; 2005. Available at: <http://www.nhc.govt.nz/PHAC/publications/GuideToHIA.pdf>. Accessed October 19, 2005.
17. Fehr R. Environmental health impact assessment: evaluation of a ten-step model. *Epidemiology*. 1999;10: 618–625.
18. Kemm JR. Can health impact assessment fulfill the expectations it raises? *Public Health*. 2000;114:431–433.
19. Bowen C. HIA and policy development in London: using HIA as a tool to integrate health considerations into strategy. In: Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment*. Oxford, England: Oxford University Press; 2004:235–242.
20. Health Canada. Environmental Health Assessment Services. *The Canadian Handbook on Health Impact Assessment*. 4 vol. Ottawa, Ont: Health Canada; 2004. Available at: http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/index_e.html. Accessed October 19, 2005.
21. Barnes R, Scott-Samuel A. Health impact assessment and inequalities. *Pan Am J Public Health*. 2002;11:449–453.
22. Douglas M, Scott-Samuel A. Addressing health inequalities in health impact assessment. *J Epidemiol Commun Health*. 2001;55:450–451. Available at: <http://jech.bmjournals.com/cgi/reprint/55/7/450>. Accessed October 19, 2005.
23. National Association of County and City Health Officials. Connecting Public Health with Land Use Planning and Community Design checklist. Available at: <http://archive.naccho.org/Documents/LandUseChecklist-03-10-03.pdf>. Accessed October 19, 2005.
24. Scott-Samuel A, Birley M, Arden K.

- The Merseyside Guidelines for Health Impact Assessment*. 2nd ed. Liverpool, England: International Health Impact Assessment Consortium; 2001. Available at: <http://www.ihia.org.uk/document/merseyguide3.pdf>. Accessed October 19, 2005.
25. San Francisco Department of Public Health. Eastern Neighborhoods Community Health Impact Assessment. Available at: <http://www.sfdph.org/phes/ENCHIA.htm>. Accessed October 19, 2005.
26. Bhatia R, Katz M. Estimation of health benefits from a local living wage ordinance. *Am J Public Health*. 2001;91:1398–1402.
27. Cole BL, Shimkhada R, Morgenstern H, Kominski G, Fielding JE, Wu S. Projected health impact of the Los Angeles City living wage ordinance. *J Epidemiol Commun Health*. 2005;59:645–650. Available at: <http://jech.bmjournals.com/cgi/content/full/59/8/645> (restricted access). Accessed October 19, 2005.
28. London Health Observatory Web site. Health impact assessment cost calculator. Available at: <http://www.lho.org.uk/HIA/AboutHIA.aspx>. Accessed October 19, 2005.
29. Joffe M, Mindell J. Diagrams specifying complex causal processes: use in analyzing the health impacts of policy interventions. *Am J Public Health*. In press.
30. Mittelmark MB. Promoting social responsibility for health: health impact assessment and healthy public policy at the community level. *Health Promot Int*. 2001;16:269–274.
31. Veerman JL, Barendregt JJ, Mackenbach JP. Quantitative health impact assessment: current practice and future directions. *J Epidemiol Commun Health*. 2005;59:361–370. Available at: <http://jech.bmjournals.com/cgi/reprint/59/5/361> (restricted access). Accessed October 19, 2005.
32. Mindell J, Boaz A, Joffe M, Curtis S, Birley M. Enhancing the evidence base for health impact assessment. *J Epidemiol Commun Health*. 2004;58:546–551. Available at: <http://jech.bmjournals.com/cgi/reprint/58/7/546.pdf>. Accessed October 19, 2005.
33. Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment: Concepts, Theory, Techniques, and Applications*. Oxford, England: Oxford University Press; 2004.
34. Dora C. HIA in SEA and its application to policy in Europe. In: Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment*. Oxford, England: Oxford University Press; 2004:403–410.
35. Wright J, Parry J, Scully E. Institutionalizing policy-level health impact assessment in Europe: is coupling health impact assessment with strategic environmental assessment the next step forward? *Bull World Health Organ*. 2005;83:472–427. Available at: <http://www.who.int/bulletin/volumes/83/6/472.pdf>. Accessed October 19, 2005.
36. United Nations Economic Commission for Europe. Protocol on Strategic Environmental Assessment: Implications for the health sector. Available at: <http://www.euro.who.int/Document/HMS/SEABudrpt.pdf>. Accessed October 19, 2005.
37. Kwiatkowski RE, Ooi M. Integrated environmental impact assessment: a Canadian example. *Bull World Health Organ*. 2003;81:434–438. Available at: <http://www.who.int/bulletin/volumes/81/6/en/kwiatkowski.pdf>. Accessed October 19, 2005.
38. *National Framework for Environmental and Health Impact Assessment*. Canberra, Australia: National Health and Medical Research Council; 1994.
39. Phoolcharoen W, Sukkumnoed D, Kessomboon P. Development of health impact assessment in Thailand: recent experiences and challenges. *Bull World Health Organ*. 2003;81:465–467. Available at: <http://www.who.int/bulletin/volumes/81/6/en/phoolcharoen.pdf>. Accessed October 19, 2005.
40. Abrahams D, den Broeder L, Doyle C, et al. *EPHIA—European Policy Health Impact Assessment: A Guide*. Liverpool, England: IMPACT, University of Liverpool; 2004. Available at: <http://www.ihia.org.uk/document/ephia.pdf>. Accessed October 19, 2005.
41. National Institute for Health and Clinical Excellence. Links to published short guides about health impact assessment. Available at: <http://www.publichealth.nice.org.uk/page.aspx?o=503177>. Accessed October 19, 2005.
42. US Department of Transportation, Federal Highway Administration Web site. National Environmental Policy Act of 1969. 42 USC §4321–4327 (1970). Available at: <http://www.fhwa.dot.gov/environment/nepatxt.htm>. Accessed October 19, 2005.
43. Steinemann A. Rethinking human health impact assessment. *Environ Impact Assess Rev*. 2000;20:627–645.
44. California Environmental Quality Act. California Public Resources Code. Division 13: Environmental Protection. §21000 et seq. Available at: http://ceres.ca.gov/topic/env_law/ceqa/stat. Accessed October 19, 2005.
45. Arquiaga MC, Canter LW, Nelson DL. Integration of health impact considerations in environmental impact studies. *Impact Assess*. 1994;12(2):175–197.
46. Davies K, Sadler B. *Environmental Assessment and Human Health: Perspectives, Approaches, and Future Directions*. Ottawa, Ont: Health Canada; 1997. Available at: http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/health-perspective-sante/index_e.html. Accessed October 19, 2005.
47. World Bank Environment Department. Health Aspects of Environmental Assessment. Environmental Assessment Sourcebook Update. Vol. 18, July 1997. Available at: <http://siteresources.worldbank.org/INTSAFEPOL/1142947-1118039106036/20526309/Update18HealthAspectsOfEJAJuly1997.pdf>. Accessed October 19, 2005.
48. United Nations Economic Commission for Europe. AARHUS Convention. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Aarhus, Denmark, 25 June 1998. Available at: <http://www.unece.org/env/pp>. Accessed October 19, 2005.
49. Dietz T. What is a good decision? Criteria for environmental decision making. *Hum Ecology Rev*. 2003;10(1):33–39.
50. Fung A, Wright EO. Deepening democracy: innovations in empowered participatory governance. *Politics Soc*. 2001;29(1):5–41.
51. Barnes R. HIA and urban regeneration: the Ferrier estate, England. In: Kemm J, Parry J, Palmer S, eds. *Health Impact Assessment*. Oxford, England: Oxford University Press; 2004:299–307.
52. US Environmental Protection Agency. Environmental Justice Web site. Available at: <http://www.epa.gov/compliance/environmentaljustice>. Accessed October 19, 2005.
53. Bhatia R. Towards equity in land use development using health impact assessment. *NACCHO Exchange*. 2005;4(1):1,4–5. Available at: http://archive.naccho.org/Documents/naccho_Exchange_Winter-05.pdf. Accessed October 19, 2005.
54. Arnstein SR. A ladder of citizen participation. *J Am Institute Planners*. 1969;35(4):216–224.
55. Narayan D, Patel R, Schafft K, Rademacher A, Koch-Schulte S. *Voices of the Poor: Can Anyone Hear Us?* New York, NY: Oxford University Press; 2000.
56. Wright J, Parry J, Mathers J. Participation in health impact assessment: objectives, methods and core values. *Bull World Health Organ*. 2005;83:58–63. Available at: <http://www.who.int/bulletin/volumes/83/1/en/58arabic.pdf>. Accessed October 19, 2005.
57. Parry J, Wright J. Community participation in health impact assessments: intuitively appealing but practically difficult. *Bull World Health Organ*. 2003;81:388. Available at: <http://www.who.int/bulletin/volumes/81/6/en/parry.pdf>. Accessed October 19, 2005.
58. Abelson J, Forrest PG, Eyles J, Smith P, Martin E, Gauvin FP. Deliberations about deliberative methods: issues in the design and evaluation of public participation processes. *Soc Sci Med*. 2003;57:239–251.
59. Parry J, Stevens A. Prospective health impact assessment: pitfalls, problems, and possible ways forward. *BMJ*. 2001;323:1177–1182.
60. Mindell J, Ison E, Joffe M. A glossary for health impact assessment. *J Epidemiol Commun Health*. 2003;57:647–651. Available at: <http://jech.bmjournals.com/cgi/reprint/57/9/647.pdf>. Accessed October 19, 2005.
61. Regeneration and Planning Task Group of the Health of Londoners Project. *A Guide to Health and Health Services for Town Planners in London*. London, England: East London and the City Health Authority; 2004. Available at: <http://www.lho.org.uk/viewResource.aspx?id=8006>. Accessed October 19, 2005.
62. Regeneration and Planning Task Group of the Health of Londoners Project. *A Guide to Town Planning for the Health Service in London*. London, England: East London and the City Health Authority; 2004. Available at: <http://www.lho.org.uk/viewResource.aspx?id=8007>. Accessed October 19, 2005.
63. Malizia EE. City and regional planning: a primer for public health officials. *Am J Health Promot*. 2005;19(5 suppl):1–13.
64. Université Laval, Faculté de médecine. Health Impact Assessment online training module. Available at: <http://machaon.fimed.ulaval.ca/medecine/hia/index.asp?Langue=EN&IdDiscipline=2>. Accessed October 19, 2005.
65. University of Liverpool. International Health Impact Assessment Consortium. Learning. Available at: <http://www.ihia.org.uk/elearning.html>. Accessed October 19, 2005.

Q2: Do you have update on this?

66. London Health Observatory. HIA training courses. Available at: <http://www.lho.org.uk/HIA/HIA1DayPage1.aspx>. Accessed October 19, 2005.
67. *Intersectoral Decision-Making Skills in Support of Health Impact Assessment of Development Projects*. Geneva, Switzerland: World Health Organization; 2000. Available at: http://www.who.int/water_sanitation_health/resources/wsh0009/en. Accessed October 19, 2005.
68. Mindell J, Boltong A. Supporting health impact assessment in practice. *Public Health*. 2005;119:246–252.
69. The Academy of Board Certified Environmental Professionals Web site. Available at: <http://www.abcep.org>. Accessed October 19, 2005.
70. University of Birmingham. *Health Impact Assessment Research Unit. A Training Manual for Health Impact Assessment*. Birmingham, England: University of Birmingham. Available at: <http://pcpoh.bham.ac.uk/publichealth/hiaru/files/training%20manual.pdf>. Accessed October 19, 2005.
71. Mindell J, Sheridan L, Joffe M, Samson-Barry H, Atkinson S. Health impact assessment as an agent of policy change: improving the health impacts of the mayor of London's draft transport strategy. *J Epidemiol Commun Health*. 2004;58:169–174. Available at: <http://jech.bmjournals.com/cgi/reprint/58/3/169.pdf>. Accessed October 19, 2005.
72. Davenport C, Mathers JM, Parry JM. Incorporating health considerations in decision-making—factors that help or hinder health impact assessment make a difference: a review. *J Epidemiol Commun Health*. In press.
73. Close N. Alconbury Airfield Development health impact assessment evaluation report. Cambridge, England: Cambridgeshire Health Authority; 2001. Available at: http://www.phel.nice.org.uk/hiadocs/alconbury_airfield_evaluation_report.pdf. Accessed October 19, 2005.
74. Opinion Leader Research. *Report on the Qualitative Evaluation of Four Health Impact Assessments on Draft Mayoral Strategies for London*. London, England: London Health Commission and London Health Observatory; 2003. Available at: <http://www.londonshealth.gov.uk/pdf/hiaeval.pdf>. Accessed October 19, 2005.
75. Quigley RJ, Taylor LC. Evaluation as a key part of health impact assessment: the English experience. *Bull World Health Organ*. 2003;81:415–419. Available at: <http://www.who.int/bulletin/volumes/81/6/en/quigley.pdf>. Accessed October 19, 2005.
76. Taylor L, Gowman N, Quigley R. Evaluating health impact assessment. London, England: Health Development Agency; 2003. Available at: http://www.iaia.org/Non_Members/Pubs_Ref_Material/Evaluating%20HIA%20pdf.pdf. Accessed October 19, 2005.
77. Parry JM, Kimm J. Criteria for use in the evaluation of health impact assessments: recommendations from a European workshop. *Public Health*. In press.
78. Karkkainen BC. Towards a smarter NEPA: monitoring and managing government's environmental performance. *Columbia Law Rev*. 2002;903–972. Available at: <http://www.columbialawreview.org/pdf/Karkkainen.pdf>. Accessed October 19, 2005.
79. Rutt CD, Pratt M, Dannenberg AL, Cole BL. Connecting public health and planning professionals: health impact assessment. *Places: Forum Environmental Design*. 2005;17(1):86–87.
80. Krieger N, Northridge M, Gruskin S, et al. Assessing health impact assessment: multidisciplinary and international perspectives. *J Epidemiol Commun Health*. 2003;57:659–662. Available at: <http://jech.bmjournals.com/cgi/reprint/57/9/659>. Accessed October 19, 2005.
81. Northridge ME, Sclar E. A joint urban planning and public health framework: contributions to health impact assessment. *Am J Public Health*. 2003;93:118–121.

3

Q3: PE: Author says there is no publication date on the copy he has.