

Health Impact Assessment (HIA) for Planners: What Tools Are Useful?

Journal of Planning Literature
XX(X) 1–15
© 2010 SAGE Publications
Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>
DOI: 10.1177/0885412209358047
<http://jpl.sagepub.com>


Ann Forsyth,¹ Carissa Schively Slotterback,² and Kevin Krizek³

Abstract

Health impact assessments (HIAs) provide an attractive approach for those interested in injecting health issues into planning processes. While HIAs have been mainly employed outside the United States and led by professionals from the public health field, they hold promise for addressing the important dimension of human health in planning. This article describes the history of HIAs and their relationship to other analogous tools, reviews current theory and practice of HIAs, and discusses the role of HIAs in current planning initiatives. The authors suggest it is important to modify existing HIA tools so that they are perceived by planners as a useful supplement to current planning processes rather than a burdensome additional requirement. The authors close by discussing how HIAs present distinct advantages, providing a more specific focus on the important topic of human health and a further opportunity to more closely partner with potential allies from public health and related fields.

Keywords

Public Health, assessment, impacts

The intersection between health and urban planning has attracted much interest as of late. Practitioners are seeking straightforward, systematic, and comprehensive means to incorporate health concerns into planning processes. There is considerable discussion about such matters, and a mounting literature points to relationships between the two disciplines. While the practice is long on rhetoric, it is unfortunately short on execution. Accurately and fully accounting for health in plans and policies remains a key challenge.

Health impact assessments (HIAs) provide an attractive approach for those wishing to incorporate health issues into planning processes. While they have been mainly employed outside the United States and led by professionals from the public health field, HIAs hold promise for those intending to explicitly consider human health in urban and regional planning processes. HIAs are defined by the World Health Organization (WHO) in its Gothenburg Consensus Paper 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,” and they are receiving considerable attention in planning and public health circles (WHO 1999, 4; also see Kemm and Parry 2004b, 2). This article examines the practice of HIA to date and evaluates its utility for the planning profession.

Much of the existing literature on HIA is boldly promotional, often focusing on a particular type of HIA. This article assumes a more critical approach by examining the history,

theory, and emerging concerns related to HIA, outlining related assessments and indicators already used in planning, and assessing the degree to which HIA really contributes something new. We suggest that to be of use to planners beyond a small group of eager advocates, it is necessary to modify a number of existing HIA processes. In the United States, environmental impact assessments (EIAs) perform many of the same functions as HIAs in other countries. Accordingly, HIAs performed by planners in the United States need to be simplified, given that planners already conduct a number of related assessment and participation processes that HIAs may complement rather than replace. The article concludes that HIA holds significant promise in addressing the important dimension of human health in planning processes. Collaborations with public health professionals can be a valuable way to achieve this aim.

Why HIA? Origins and Definitions

HIA emerged in the 1980s and 1990s in several different locales across the globe. HIAs are most commonly traced back

¹Cornell University, Ithaca, NY

²University of Minnesota, Minneapolis, MN

³University of Colorado, Boulder, CO

Corresponding Author:

Ann Forsyth, Cornell University, 106 West Sibley Hall, Ithaca, NY 14853
Email: af16@cornell.edu

to various efforts to better assess large infrastructure projects in developing countries and to other policies in Northern Europe and Australia in the late 1980s and early 1990s (Kemmm, Parry, and Palmer 2004; Ahmad 2004). In 1983 WHO published a process for “evaluating the positive health impacts of fully functioning water supply systems” (Mindell and Joffe 2003, 107). Also in the 1980s some EIA processes began examining health issues, particularly in Canada and in Central and Eastern Europe, drawing on a movement to promote “healthy public policies” (Laws and Sagar 1994; Kemmm 2000; Banken 2004, 165; Gulis 2004; McCaig 2005). Kemmm and Parry (2004b, 3) also point to another source: policy appraisal coming from political science and other social sciences.

These early efforts were mostly modeled on the practice of EIA or integrated into EIA. Public health professionals perceived EIA as a powerful and relevant tool (Davies and Sadler 1997; Bhatia and Wernham 2008). HIA was seen as a means to extend the health consequences assessed in such appraisals.

HIAs developed rapidly in the 1990s. The Liverpool Health Impact Programme was established by the British Overseas Development Administration in 1990. The Asian Development Bank developed a framework for HIA in 1992. This HIA program, designed to be integrated with EIA, involved identifying hazards and interpreting and managing risks (Mindell and Jaffe 2003, 107). Starting in 1993 the government of British Columbia required HIAs of all submissions by its cabinet to the government; soon after, the first HIA tool kit was developed by the British Columbia ministries for health and seniors (Mindell and Jaffe 2003, 108).

WHO has been active in supporting the development of HIAs; the 1999 Gothenburg Consensus Paper originating from the European Centre for Health Policy is to the HIA movement what the Bruntland Report is to the sustainability movement (World Commission on Environment and Development 1987). The Gothenburg Consensus Paper proposes four values for HIA—democracy, equity, sustainable development, and ethical use of evidence (WHO 1999, 4). While health is often seen as the absence or prevention of disease, HIAs typically take a broader definition, closer to that in the constitution of WHO, where “health is a state of complete physical, mental and social well-being not merely the absence of disease and infirmity” (quoted in Kemmm and Parry 2004b, 4).

Proponents have varied reasons for their interest in HIA; for example, some HIAs aim to improve public decision making, while others strive to involve more people in discussions about health (Kemmm and Parry 2004a, 16; Ahmad 2004). Both are important aims but lead to different approaches for such tools. Ahmad (2004, 2) claims that it is the participatory approach that “has captured the imagination of public health professionals and spurred publications and wider debate in public health literature and circles in the past few years.”

Both participatory and more technical approaches may well be attractive to planners. Planning already incorporates a range of participatory processes in plan making, plan and project review, EIA, and general equity planning and has developed a rich literature and practice in this area (Sanoff 2000; Sarkissian, Cook, and Walsh 2003; Nick Wates Associates 2008). This is an area where there is already significant interest and expertise in planning, but focus on health may help extend citizen interest in planning issues. More technical approaches, while less familiar, are likely to have a different attraction; they are the place where the intersection with health can expand the technical tool kit of planners.

For both more technical and more participatory approaches, an underlying motivation to date has been for public health professionals to create tools that contain some of the power that they perceive planners to have in influencing plan, policy, and project outcomes. Public health professionals have therefore been the main proponents of HIA in the United States and elsewhere; urban planners have only recently joined the fray. Many HIAs are conducted on topics where planners have little control such as tobacco sale regulations or proposals for an HIV/AIDS counseling program. However, HIAs have frequently involved public health departments examining projects typically dealt with by planners such as affordable housing redevelopments. In contrast, they have rarely involved planners looking at the work of public health departments. Proponents see HIA as a means to advance public health objectives and improve communication between local governments and their associated health departments (Dannenberg et al. 2006, 268). HIAs have been part of a strategy to expand the influence of public health professionals to a wider range of issues seen as relevant to health.

Impact Assessment in Planning

Planners have experience with a number of similar assessment techniques; these techniques were actually drawn on by public health professionals when developing early forms of HIA. Specifically, planners’ extensive involvement with environmental review, social impact assessment (SIA; which sometimes occurs within environmental review), and sustainability indicators provides them with a sense of the overall context and available methods to evaluate the impacts of proposed projects, plans, and policies. Other tools, such as ecological footprint analysis (Wackernagel and Rees 1996), carrying capacity analysis (Daily and Ehrlich 1992), and life cycle assessment, address related assessment strategies but are less widely used. They may be more focused on the environmental dimensions or might be more applicable at either the individual or jurisdictional (i.e., city, state, national) level or the product level rather than on projects or policies related to the built environment.

Because of HIA’s roots in these assessments, HIA tools have a similar look and feel. Table 1 summarizes key commonalities

Table 1. Comparing Planning Analysis Tools and Health Impact Assessment

	Scope	Content	Outcomes
Health impact assessment	Measures policies, plans, and projects at a variety of scales	Focuses on human health—some consider a very wide range of issues potentially related to human health and others a narrower range with more specific evidence	Public awareness about human health issues Public engagement in decision making about health Communication among stakeholders Mitigation measures
Environmental impact analysis	Measures impacts of projects, plans, programs, policies Measures impacts of large projects with potentially significant effects	Natural and built environment Human health Environmental sustainability Social environment Economy Cumulative impacts	Public awareness of environmental impacts Changes or abandonment of project Increases in perceived environmental quality Implementation of mitigation measures
Social impact analysis	Measures impacts of projects, plans, programs, policies conducted at various jurisdictional levels or affecting certain sectors of the population	Population characteristics Community and institutional structures Political and social resources Individual and family change Community resources	Extensive engagement of the public Provide information to assist marginalized groups in negotiating agreements Changes or abandonment of project
Sustainability indicators	Measures impacts of integrated or distributed set of projects, plans, programs, or policies, often conducted at various jurisdictional levels or system levels by a local government or nonprofit organization	Economic Environmental Social/equity	Increased awareness of environmental issues Inform changes to a policy or program Provide information to individuals to help them make decisions

and differences among types of assessment in terms of their scope, content, and outcomes. The distinctions among these tools and HIA are further illustrated in the section below.

EIA

In the United States, environmental review most often occurs under the National Environmental Policy Act (NEPA) passed in 1969. NEPA requires the assessment of environmental impacts associated with federally funded projects such as roadways and buildings, plans for federal lands, and federal programs and policies (Jain et al. 2001). At the state level, state environmental policy acts or “little NEPAs” may require environmental review for projects of a certain size or type or in sensitive locations (Mandelker 1998; Olshansky 1996a; Pearlman 1977; Pendall 1998; Renz 1984; Watts 1995). In addition, regional or local-level environmental review may be triggered by project characteristics as above as well as inconsistency with local plans or ordinances (Morris 1996; Pendall 1997, 1998).

Environmental review conducted under these varied policies may include assessments of impacts on the natural environment, built environment, human health, environmental sustainability, social environment, or the economy or of cumulative impacts (Bass, Herson, and Bogdan 2001; Jain et al. 2001). Health is addressed only indirectly in the NEPA statute, with the purpose of noting an intent to “promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man” and “[assuring] for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings” (NEPA 1969). More specific guidance to address health is sometimes provided in federal agency guidance related to NEPA implementation.¹ While health is to be addressed in environmental impact statements (EISs), studies have found that this topic is often overlooked or superficially addressed in environmental assessments in the United States (Steinmann 2000; Arquiaga, Canter, and Nelson 1992). As a public process with various opportunities for participation (Federal Highway Administration 2007), environmental review may

bring to light potential health and other impacts of concern to elected officials and/or the public, resulting in changes to or abandonment of a project, increases in perceived environmental quality, and adoption of additional measures to mitigate environmental impacts (Jain et al. 2001; Olshansky 1996a, 1996b).

Of course, environmental assessment is conducted not only in the United States. Ahmad, Pless-Mulloli, and Vizard (2005), for example, point to potential intersections between HIA and the 2000 English and Welsh pollution prevention and control regulations that regulate industrial pollution. More firmly integrating health and EIA has been a subject of discussion and advocacy (Cole et al. 2004; Dannenberg et al. 2006; Krieger et al. 2003; Mindell and Joffe 2003; Bhatia and Wernham 2008), but there have been no formal policy efforts to do so in either U.S. or international contexts.

SIA

A second impact assessment tool commonly used by planners is SIA. While there is a lack of agreement on a specific definition of SIA, Barrow (2000, 2) cites a commonly accepted one: "It seeks to help individuals, groups, organizations and communities understand possible social, cultural, or economic impacts of change, or better-still impacts of proposed change." As noted earlier, SIA is sometimes conducted as part of the environmental review process in U.S. and international contexts (Burdge 1998). However, SIA may be initiated at a number of levels, including micro (impacts of a proposed action on individual demographic processes such as mortality), meso (impacts on organizations and institutions), and macro (impacts on broader social issues such as gender relations) on a very wide range of projects, from prisons and military installations to the designation of sacred sites and land use (Burdge 1999; H. A. Becker 1997).²

In the United States, NEPA provides little specific guidance related to the analysis of social impacts; thus, an Interorganizational Committee on Guidelines and Principles for Social Impact Assessment convened in 1994 to do so (Burdge et al. 1994). The document specifies a number of social variables to be considered, including population characteristics, community and institutional structures, political and social resources, individual and family change, and community resources (Burdge et al. 1994).

While much of the literature focuses on methodological issues with SIA, limited research suggests that producing social impact information can assist marginalized groups in negotiating agreements (O'Faircheallaigh 1999). In addition, because SIA is typically highly participatory, the additional outcome of increased public involvement can also be achieved (D. R. Becker et al. 2003; Fortin and Gagnon 1999). To the extent that SIA is conducted as part of a more formalized environmental review process, there is also the opportunity to use social impact information to justify changes or

abandonment of a project. Overall, SIAs raise similar issues to HIAs.

Sustainability Indicators and Assessment

A third category of impact assessment tools, possibly considered a predecessor to HIA by U.S. planners, comes in the form of sustainability indicators. Emerging out of the growing interest in sustainable development in the late 1980s and early 1990s, indicators were seen as strategy to translate broad sustainability concepts, such as the Brundtland Commission's definition of sustainable development, into achievable goals and objectives.³

Sustainability indicators might be measured at the international, national, regional, local, and/or neighborhood levels (Phillips 2003; Bell and Morse 1999; Portney 2003). While the effects of sustainability indicators are not well measured, the literature points to some anticipated outcomes, including increasing awareness of environmental issues (Phillips 2003). Indicators might also provide information to decision makers and individuals that can help them make decisions (Innes and Booher 2000). By involving the public in developing indicators, there is also the potential to increase social capital and address community conflicts to achieve a mutual understanding (Phillips 2003).

Maclaren (1996) proposed a process to report four types of sustainability indicators, representing various goals inherent in sustainability, to help evaluate local efforts to promote sustainable development, which included (1) integrating (linking economic, environmental, and social dimensions of sustainability), (2) forward looking (measure progress toward intergenerational equity), (3) distributional (measure progress toward intragenerational equity and distribution of conditions across people and geographic locations), and (4) multistakeholder input (developed with input from participants). Innes and Booher (2000) provide a slightly different framework focused on the type of information to be produced, with three types of indicators: system performance indicators (e.g., vehicle miles traveled), policy and program indicators that measure outcomes (e.g., crime rates, complaints from residents), and rapid feedback indicators for individuals, agencies, and businesses (e.g., freeway speeds, household water use).

In a more recent application, the suite of rating systems provided by LEED (Leadership in Energy and Environmental Design) is an example of indicators that culminate in a numerical score based on different design and planning features. The system is not based on actual outcomes of those features but rather their expected outcomes, though the features are ones that experts judge as advancing sustainability. Health has been used as a factor in several LEED ratings. In particular, one of the background reports to LEED-ND (Neighborhood Development) explicitly dealt with the issue of health (U.S. Green Building Council 2007; Design, Community and Environment et al. 2006). Triple-bottom-line

assessments—evaluations in terms of economic, environmental, and social concerns—can also include health (Mahoney and Potter 2004).

Synthesis of Closely Aligned Assessment Tools

At a broad scale, the assessment tools discussed above, including EIA, SIA, and sustainability indicators, result from many of the same motivations as HIA; their lineage is similar as well. Planners already address many health and social issues through EIA, SIA, and sustainability indicators. HIA, however, provides additional opportunities, including a more specific focus on human health, as well as potential allies from public health and related fields.

HIA Explained

While HIA has strong links with common planning tools, it also has a unique landscape in terms of practice and its own emerging concerns. This section addresses these issues in turn and then outlines the current state of HIA practice in planning.

Current Practice in HIA

In an international context, primarily in Europe and Australasia, HIA has been used largely in the public health sector (Kemmm, Parry, and Palmer 2004). WHO has been influential in advancing HIA methodologies, developing an HIA process, holding numerous conferences and workshops, and establishing a network of practitioners.

An Internet search of HIAs shows centers of activity in Europe and Australia, with the WHO, specifically in its regional office for Europe in Denmark, also prominent. A number of conferences, networks, and informational Web sites spread the word about HIA. The IMPACT site (<http://www.liv.ac.uk/ihia/>) at the University of Liverpool in England for some time included an extensive collection of completed HIAs but has recently been redesigned. The HIA site of WHO still contains many example HIAs on topics ranging from energy, housing, and the environment to mining and culture (<http://www.who.int/hia/en/>). In the United Kingdom and Ireland, public health observatories are creating data and developing networks of health analysts who can provide data for HIAs as well as other health analyses (Hill et al. 2005; Mindell and Boltong 2005). These observatories draw on public health and statistical agencies to publish “reports, briefings, indicators and tools” and answer questions about health issues (Association of Public Health Observatories 2008).

To date, HIA methods have been applied primarily to assess the impacts of proposed health facilities and social programs rather than physical planning or urban design. For example, HIAs have been conducted for a hospital redevelopment in Manchester (Bendel and Owen-Smith 2005), a proposal to use

tires as fuel in a cement plant in England (Cook and Kemmm 2004), a national housing policy in the Netherlands (den Broeder, Penris, and Put 2003), and an assessment of a home winterization scheme (Laburn-Peart, Scully, and Parry 2004, 269). Some HIAs have also been conducted in the private sector as part of a risk management strategy (Birley 2003, 2005). These efforts have also been typically prospective, conducted before an intervention, but may include monitoring of impacts in situations where “their nature and severity is uncertain” (called concurrent HIA) or an outcome evaluation (called retrospective HIA; Kemmm and Parry 2004b, 2; Wismar, Blau, Ernst, et al. 2007).

The range of applications of HIA is also documented in a report by Dannenberg et al. (2008), which found twenty-seven different publicly accessible completed HIA reports in the United States. The study found that almost half were of policies and programs ranging from the farm bill to living wage ordinances, eight were of individual developments (e.g., senior housing, power plant), and eight were at a planning scale such as a corridor, transit village, or neighborhood. None of the HIAs was completed for a comprehensive plan, though one was for a community transportation plan (Dannenberg et al. 2008).

One alternative example is a health impact review of a long-range land-use plan in Cambridgeshire, England (France 2004). This process reviewed draft policies in relation to thirteen objectives. These included reducing housing and fuel poverty, targeting at-risk groups, creating safer roads, “improving landscapes and townscape and contact with nature,” minimizing pollution, and providing accessible health care (France 2004, 195). Two main issues were considered: (1) who would be affected in terms of places and community sectors and (2) the nature and size of the effect. The analyses influenced the final plan.

HIA Theory

A number of theoretical models are used in public health to examine the determinants or factors causing health or health problems. Typically these factors involve several key dimensions (Birley 2003, 317), including a recognition of biology, individual behavior, economic context, social dimensions, access to various services, and the built and natural environment. HIAs may consider all of these; however, they tend to focus on those issues later in the list, often termed the social determinants of health, where developments, plans, policies, and programs may have the greatest effects (WHO Commission on Social Determinants of Health 2007; Kelly et al. 2007; Diez Roux 2007). They draw on a growing literature on how the natural, social, and built environments affect physical and mental health (Maller et al. 2005; Transportation Research Board and Institute of Medicine 2005; WHO Commission on Social Determinants of Health 2007). Of course the policies and programs examined in HIAs may be

quite distant from planning—for instance, a smoking cessation program.

The overarching motivations for HIAs are similar—to assess the degree to which health is promoted in these plans, policies, and programs. Like many tools in urban planning, however, HIAs come in different shapes, sizes, and formats. The different formats require different levels of involvement or interaction among users. Some of the nomenclature employed in the HIA literature and commonly associated meanings include the following (WHO 1999, 3; Kemm and Parry 2004a, 16; Birley 2003):

Screening: Screening tools filter out projects that do not need an HIA.

Scoping: This kind of HIA process determines what should be assessed and how.

Desktop or mini HIA: Similar to a screening tool, desktop HIAs involve a quick assessment to aid decision makers. Sometimes this is called rapid appraisal, though this term is more often used for the more participatory approach below.

Rapid assessment or appraisal: A participatory workshop format, either fully open or with invited participants, is used. Participants read background materials in advance. This format adds expertise including local knowledge (Ison 2002, 2004) and potentially involves additional people in the HIA process to build a long-term constituency that can influence and monitor implementation (Greig, Parry, and Rimmington 2004).

Integrated HIA: HIA is integrated with other impact assessments, typically EIAs and SIAs. Such integration may consist of parallel reports or a fully integrated study (Birley 2003, 313-14; McCaig 2005).

Intermediate: This is HIA that incorporates some systematic analysis but does not require as much work as an EIA.

Full: This is the most involved form of an HIA, requiring vast amounts of data and analysis, and is roughly like a full EIA.

HIAs have the potential to identify likely health problems and help ameliorate or prevent negative effects or increase health benefits, particularly on vulnerable groups. Participatory HIAs typically involve community members engaging with more technical information about health effects—preliminary work that they review and discuss—which allows them to reflect on this work and supplement it with local knowledge (whether supporting the technical findings or contradicting them; Elliott and Williams 2004; Corburn 2005).

The simpler tools (earlier in the above list) rely on less information, and the more complex tools typically have greater data needs. We were surprised as we came to work in this area to find the wide range of information deemed adequate in HIA. Some is based on the general—or even

anecdotal—knowledge or opinions of professional staff in an agency with little additional analysis even in areas where additional information would be available. Other information draws on very specific research evidence, detailed investigations of a site, and substantial engagement with local knowledge. For example, a very quantitative assessment was completed for the expansion of Schiphol Airport near Amsterdam, examining noise, odor, and cardiovascular and respiratory diseases (Franssen, Staatsen, and Lebet 2002). Some HIAs are not so quantitative but demonstrate a rich understanding about the local situation, community perceptions, and prior research on health effects. For example, Gorman et al. (2003) analyzed Edinburgh's transportation policies mainly in terms of how they could be used to reduce health inequalities. This analysis incorporated a number of rich analytical matrices demonstrating connections between transportation and health for affluent and deprived populations including young families, adolescents, the elderly, working people, and the unemployed. However, other HIAs are quite brief and impressionistic and display comparatively little knowledge about planning problems or current health research. We return to this issue below.

Emerging Concerns

With increased discussions about HIAs, a second generation of issues and concerns has emerged. As Krieger et al. (2003, 659) explain, "Greater clarity is required regarding criteria for initiating, conducting, and completing HIA including rules pertaining to decision making, enforcement, and compliance." Specifically, the following issues are of concern.

Quality. Are HIAs of high enough quality to directly inform the policy and planning processes, or are they primarily used as "guides" to steer discussion? Do prospective HIAs accurately predict health consequences of the proposed action so that a clear judgment can be made about how to modify the proposal to minimize negative effects and maximize health benefits? Was the process transparent and inclusive (Kemm and Parry 2004b, 10-11; Parry and Kemm 2005; Mindell et al. 2004)? HIA evaluations are slowly cropping up, but there is considerable progress to be made, for example, with respect to establishing standards for required evidence and rates of participation (Bekker, Putters, and van der Grinten 2004, 2005; Mindell et al. 2001, 2004; Quigley and Taylor 2003, 2004; Wismar, Blau, and Ernst 2007). There is an urgent need to improve the quality of HIA from its capacity to predict health consequences to increasing the sophistication of participation efforts (Kemm 2005; Cole et al. 2004).

Costs and benefits of the HIA itself. HIAs take time and effort to prepare, and their results may be difficult or expensive to measure because they advance nebulous concepts such as awareness raising, interagency cooperation, and avoiding harm. The effects of a specific HIA on a larger policy may be direct (contributing to modification of a decision), general (raising awareness but not changing a proposal),

opportunistic (HIA was initiated because it was expected to support a proposal, which it did), or ignored (Wismar, Blau, and Ernst 2007; Elliott and Francis 2005). In addition, quantification of such effectiveness may be a challenge. Only recently have the costs and benefits of conducting an HIA been systematically analyzed, and such work is still in its infancy (e.g., Atkinson and Cooke 2005). Furthermore, HIA may be most useful in areas of the world where there is the most competition for resources (Northridge and Sclar 2003)—should HIA be prioritized over other uses of such funds?

Topics analyzed in HIA. While many HIAs are notable for their breadth, some have called for a wider range of topics, even extending to spiritual health (Chuengsatiansup 2003). There is also a trade-off to consider between importance and measurement. Some unimportant factors are amenable to measurement; some important factors are not easily measured. Without good protocols for measurement, the question remains as to how such issues should be included in an HIA, if at all (Mindell et al. 2001). If HIAs were to be integrated into existing EIA processes, there is a concern that some of the health measures used in HIA would not be able to withstand the potential legal challenges that can often follow environmental review (Dannenberg et al. 2006).

Pressure to have positive or negative findings. As HIA becomes more widely used and respected, there will likely be increasing pressure on the process to produce specific results. In addition, there may well be public disappointment when results reflect available evidence but do not fit with common understandings (Curtis et al. 2002; Cook and Kemm 2004). Who decides to conduct, fund, design, and undertake an HIA may well shape the outcomes; however, best practices to address these issues are lacking (Krieger et al. 2003, 660).

Link to policy. Once an HIA is completed, it remains unclear how it should best be linked to policies—an issue particularly relevant when HIAs are done by public health professionals on plans, projects, policies, and programs in other agencies (Kemm 2005 EIAR). Part of this issue entails uncovering ways to report the results of an HIA in a manner that is appealing, specific, and relevant.

Subpopulations. Health effects may vary among different populations, making it challenging to identify these groups, assess the impacts, and report them adequately and in a policy-relevant manner (Kemm 2005; Parry and Scully 2003). Key questions remain, including how such populations are identified (Krieger et al. 2003, 660), how relative risk is to be assessed (Nilunger et al. 2004), how traditional or local knowledge might be incorporated (Kwiatkowski and Ooi 2003), and how equity issues can be addressed (Simpson et al. 2005).

Administering body. HIAs are interdisciplinary tools requiring participation from multiple agencies, yet they often lack a home in any one agency. The most innovative ideas in the future will likely be a product of collaboration between disciplines that have not customarily forged connections to one another in the past. As in many progressive endeavors in

planning and public policy, an HIA requires a champion, and exactly who that champion is remains unclear.

The seven concerns raised above pose distinct challenges that generally apply to the range of HIA applications or tools that have historically been employed. The emergence of a number of new tools has the potential to address some of these issues.

HIA Practice in Planning

In U.S. planning and policy contexts, a variety of efforts have been completed under the banner of HIA, resulting in various types of outcomes. Some are quick checklists, others are lengthy reports, and others reflect rapid assessment-style workshops. This section focuses on three recent assessment tools or applications developed in the United States to incorporate health issues into planning assessment. Other people and places have certainly performed HIAs and related assessments; however, such applications have not been developed in a manner that can be replicated or made available to a broad range of users. As each of the HIA tools is still in development, Table 2 represents their status as of March 2008.

The Healthy Development Measurement Tool (HDMT) examines a wide variety of issues using both an online tool consisting of indicators and a relatively detailed checklist (San Francisco Department of Public Health 2007a). While the criteria outlined in the tool address planning issues, the tool covers a broader range of issues with potential health implications. While the tool's use has been integrated or combined with standard EIA processes, the clear strength of this tool is its breadth and systematic thinking about a variety of criteria (Bhatia and Wernham 2008). However, many topics are beyond the scope of urban planning (e.g., voting rates, access to child care subsidies, jobs providing sick day benefits). In addition, many are topics that may have some health effects but are in areas where there is not substantial current evidence, and, perhaps in the interest of coming up with a tool promoting overall good development, the tool often draws from general good planning practice for benchmarks. For example, benchmarks of ten acres open space per one thousand in population or rooftop gardens on 25 percent of usable roof space would make pleasant amenities for urban areas but may not rely on specific research evidence of health effects. The tool comes with some very informative Web-based examples including excellent maps.

Some of the issues described above are addressed via an environmental scorecard developed by LEED-ND (U.S. Green Building Council 2007), which many would consider to be a variation of a HIA. LEED-ND provides a lengthy checklist—almost fifty criteria in all—addressing multiple dimensions of four broad categories: location and connection to the community, neighborhood pattern and design, green construction and technology, and innovation and design process. Of the fifty specifically identified issues, most have a specific focus on planning- and land-use-related matters. The motivation

Table 2. Comparison of Health Impact Assessments (HIAs) as of Early 2008

	Healthy Development Measurement Tool	Leadership in Energy and Environmental Design—Neighborhood Development (LEED-ND)	Design for Health (DFH) suite
Release	First released in 2007; still under development	Postpilot version expected to launch in 2009	First released in 2007; still under development
Format	<p>Two versions: Online “tool” with 114 indicators and needs to be scrolled through. Not all indicators have benchmarks for measurement but rather some contain general aims and background.</p> <p>The “Development Project Checklist,” which is an easier to use checklist, contains approximately 100 benchmarks, many binary. Many checklist questions allow a simple assessment of whether a development meets a benchmark or does not; some questions have multiple options (i.e., a development needs to do some number of things from a larger list).</p>	<p>One version: Includes a checklist of almost 50 issues, divided into four categories (smart location and linkage, neighborhood pattern and design, green construction and technology, and innovation and design process). Within these categories are two levels: prerequisites and credits.</p>	<p>Four versions: “Preliminary Checklist” is a screening tool used to determine whether additional HIA is needed, based on the project or plan characteristics and some initial thresholds for a healthy community.</p> <p>“Rapid Assessment” is a participatory workshop-based HIA tool.</p> <p>“Threshold Analysis” is detailed point-based spreadsheet assessment focused on evidence-based health thresholds and associations.</p> <p>“Plan Review Checklists” for comprehensive plan and plan elements identify plan content that is essential and good for health.</p>
People Developers	San Francisco Department of Public Health	Green Building Council, the Congress for New Urbanism, and the Natural Resources Defense Council	University of Minnesota
Intended users	Developed for city of San Francisco agencies; Web site lists other potential users	Intended to be used as a certification process that would, in turn, spur and provide incentives for development closely aligned with smart growth, new urbanism, and green building	Urban or city planners, parks and recreation planners, transportation planners; initial use in Minnesota by local governments funded to incorporate health issues into planning
Role of public	The tool and checklist can be used as part of a planning process providing important technical input to public debates.	The rating system can be used as part of a planning process providing important technical input to public debates.	HIA Rapid Assessment is focused on a participatory workshop that includes public and other stakeholders. The DFH Web site includes a briefing paper on how to use the other tools in participatory processes in planning.

(continued)

Table 2. (continued)

	Healthy Development Measurement Tool	Leadership in Energy and Environmental Design–Neighborhood Development (LEED-ND)	Design for Health (DFH) suite
Approach			
Number of questions	6 elements or major themes, 27 objectives, and 114 indicators, of which 21 are in process as of March 2008	49 total issues in the checklist; 9 are prerequisites (baseline conditions that must be met), and the remaining are credits	9 health topics, 16 thresholds or associations in HIA Threshold Analysis; the preliminary checklist contains 16 questions; the plan review checklist has dozens of questions related to major plan elements such as transportation and parks. The rapid assessment is a more flexible workshop process
Question format	Tool has been evolving to more option questions as opposed to single benchmarks	Point based	Binary for Preliminary and Plan Review Checklist and point based for HIA Threshold Analysis
Evidence base	Research base incorporated into online tool with typically one or two research studies or policy reports backing up a threshold, although “some targets and indicators are borrowed from other indicators processes and criteria tools, such as the Healthy People 2010 objectives and the LEED-ND criteria” (San Francisco Department of Public Health 2007b).	Separate document provides background and rationale for the relationship between community design and a series of public health outcomes such as physical activity, traffic accidents, respiratory health and mental health (available from below Web site). The process to develop specific thresholds and targets was iterative with expert developers reaching consensus; the main lens for the tool rests on environmental impacts.	The Preliminary and Plan Review Checklists and the HIA Threshold Analysis are based on a review of the literature published on the DFH Web site as the “Key Questions” research summary series. The threshold analysis distinguishes between thresholds (strong evidence for a specific benchmark) and associations (strong evidence but not for a specific target). Typically this series requires multiple studies to converge on a finding before using it as a base.
Example topics			
Topics under the purview of urban or city planners in local government	Environment, transportation, housing, economic development, social planning	Smart location and linkage (e.g., brownfields, bicycle trails, wetland conservation) and neighborhood pattern and design (e.g., compact development)	Exclusive focus on topics of concern to urban planners—accessibility, air quality, environmental and housing quality, food, mental health, physical activity, safety, social capital, water quality
Other topics covered	Examples: voting rates, access to child care subsidies, jobs providing sick day benefits	None	None
Support			
Web site	http://www.thehdm.org/ The online version of the tool can be slow to load (uses multiple pages); the checklist is available as a PDF	http://www.usgbc.org/leed/nd	http://www.designforhealth.net/resources/hiatools.html
Training materials or workshops	Extensive background information online	Currently undergoing extensive pilot investigations	Extensive background information online; workshops presented to initial partners
Online examples	As of March 2008, two online examples from the developers of the HIA	Currently undergoing extensive pilot testing	Examples available in mid-2008 project working with 19 counties and cities

for many of the criteria has an environmental bent, as they are geared toward reduced emissions, land conservation, and decreased vehicle use. While the main focus is on ecological health, background work for the tool included an assessment of human health (Design, Community and Environment et al. 2006). Where the checklist addresses human health, the assessment is focused on issues of physical activity and related diseases. The tool uses a point-based system, scoring more points when a condition better satisfies a particular criterion. Like the HDMT, the varied criteria are based on a fairly broad review of published evidence and, given the general and multipurpose character of the tool, often reflect good planning practice rather than specific health evidence. The tool is currently undergoing extensive piloting in a wide variety of locations across North America.

The Design for Health project has created a suite of tools to fill several niches that appear to exist based on this review of research and practice. The tools tested by communities in Minnesota, are short and designed to minimize the burden to planners, are focused on issues where planning has influence, and very explicitly draw on research evidence about human health. The suite includes three HIA tools and a plan review checklist specifically targeted at planners and focusing on areas where there is significant evidence of health effects related to the built environment (Design for Health 2007b, 2007c, 2007d, 2007e). These include the following:

- A preliminary checklist, which is a two-page document combining screening and scoping functions, for use as a desktop exercise or in workshops. The checklist uses a scoring system to quickly assess if the plan or project is significant enough to assess and whether it triggers additional analysis on some key health issues.
- A rapid assessment workshop, a participatory version of an HIA, modeled directly on those conducted in Britain (e.g., Ison 2002).
- A threshold analysis, which functions as an intermediate HIA in a workbook format. It includes fifteen questions rated with sliding point scales to provide an overall health impact score. Some questions are “thresholds” and others “associations.” Where there is strong evidence from research for a specific numerical target, thresholds are identified; in other cases, associations are where the evidence is substantial but does not provide a quantitative threshold. The threshold analysis functions rather like a shorter version of the LEED-ND workbook, but specifically focused on human health and the work of planners.
- A plan review checklist summarizes much of the content of these materials into a simpler desktop reminder of key issues and outcomes to be addressed in comprehensive or other local plans. It is divided into typical plan element categories.

These four HIA tools are slightly different in the balance they strike between health and the connection to the field of urban and regional planning. Each has different strengths and weaknesses in terms of key challenges such as quality, costs and benefits, and links to policy. However, as a group they provide attractive options for those wishing to find a tool to suit a particular situation. They represent the leading edge of current applications of HIA in planning.

Do Planners Really Need HIA?

Having discussed both the current state of the research and practice on HIAs, we now step back to better inform dialogue about the utility of HIAs being adopted or perhaps even required as part of the day-to-day work of planners. In the interest of parsimony, we break down the below discussion into two camps, providing an itemized description of arguments in favor of and opposed to adopting HIAs (see Table 3).

Practicing urban planners are charged with accounting for a variety of issues in their daily work. Given concerns of obesity, air pollution, global warming, and other social ills, health is prominent among these topics. For many planners, however, accounting for health is considered a burden—an additional set of responsibilities without immediate and tangible results. On top of current workloads (e.g., developing and updating plans, advising planning commissions, working with other agencies), it can be difficult for planners to prioritize health among the range of possible issues and solutions they face.

Health, however, is a crucial issue in urban areas, and as the world continues to urbanize, the connection between cities and health will become increasingly important. HIAs are one mechanism to assist with these challenges, providing a rubric to incorporate health into planning. They can help planners systematically account for a variety of health concerns, serving as a tool to evaluate plans, policies, and development proposals. However, given the existing status of HIAs, there is still considerable uncertainty about how or when they should be employed and what they say in the end. In many cases, the applicability to planning is not immediately apparent. The urban planning community requires straightforward yet comprehensive tools that help planners advance this cause in a manner that is also nonthreatening and easy to use.

A number of potential tools are now available, and the base of practice knowledge is growing. LEED-ND, San Francisco’s HDMT, and the Design for Health suite of HIA tools provide several options for planners. The fact that they were all published in 2007 suggests a burgeoning field. Some tools are being deliberately designed to reduce the perceived burden of health assessment. HIAs can also be used in participatory processes from a full rapid HIA workshop down to inserting some health-related questions into standard planning processes, and there is increasing guidance on this matter (Design for Health 2007a). With the right tool used in the right setting,

Table 3. Arguments For and Against Using HIA in Planning

Dimension	For HIA	Against HIA
New arguments for planning	As urbanization and population growth continue in the coming century, health will only gain in public and political importance.	While HIA provides an attractive package, it may be seen as repackaging environmental impact assessment (EIA), social impact assessment, and sustainability indicators in a health wrapping.
Partners	HIA provides new allies and constituencies—providing political support and funding for planning. The process of conducting an HIA creates cross-departmental contacts where knowledge and expertise can be shared and where the ultimate product is widely owned and thus likely to be implemented (Hay and Kitcher 2004).	The health focus potentially marginalizes planners and makes public health professionals more central.
Breadth vs. depth	The wide range of health issues that are relevant to planners helps them look beyond the narrow range of typical planning concerns.	The most popular HIA process, rapid assessment, is essentially a workshop process tapping into existing knowledge. While it can be done in a way that allows participants to combine their local knowledge with technical knowledge to create a sophisticated analysis, this takes a lot of work from those preparing for the workshop and those participating in it (Kearney 2004; Kemm 2005).
Research	HIA, when properly designed and executed, taps into rigorous public health research literature and prompts planners to ask more sophisticated questions about the content and outcomes of their plans and policies.	The level of certainty in research on urban areas is low, and in many cases there are few or no studies about health effects of different plan and policy approaches. Thus, health research may provide only the appearance of increased rigor while masking very real uncertainties.
Social issues	A focus on social issues is particularly crucial at a time when public support for planning's traditional social equity concerns is uneven.	Urban planners already conduct many assessments related to environment, fiscal concerns, livability, and sustainability. These also have the potential to raise social issues.
Administration	Some forms of HIA provide a means to benchmark often discussed but rarely operationalized matters in urban planning. HIA therefore helps focus discussions around a common threshold while at the same time allowing competing viewpoints around a common point of reference.	HIA potentially adds yet more bureaucratic steps to an already cumbersome and often costly planning process.
Implementation	HIAs prepared with substantial collaboration may build a base of support for collaboration.	Planners already have numerous participatory processes to involve the public in community analysis and goal setting. HIA fails to add much to the substance of these activities while adding a number of meetings. As with EIAs, there is no guarantee that the findings of an HIA be implemented.

these HIA tools represent a valuable approach to move the field of urban planning front and center in assessing plans, policies, and projects relative to health. As tools are refined and information is made more available, these tools can provide new constituencies and justifications for planning as well as improve the planning process itself.

Acknowledgments

The authors would like to thank Aly Pennucci, Amanda Johnson, and Michael Huber for important conversations on this topic. Laura Baum, Ashley Miller, and Karen Roof provided valuable research assistance for related projects.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

Financial Disclosure/Funding

The authors received no financial support for the research and/or authorship of this article.

Notes

1. For example, the Federal Highway Administration (FHWA) lists a number of environmental consequences (e.g., land use, social, economic, pedestrians and bicyclists, air quality, noise, hazardous waste sites, visual impacts) to be addressed in environmental impact statements for transportation projects. Health implications are identified in the FHWA guidance for a number of these consequences beyond the obvious air and water quality impacts, such as neighborhood and community cohesion, changes in travel patterns and accessibility (especially for disadvantaged groups—elderly, transit dependent, handicapped), impacts on nonmotorized transportation facilities, noise impacts on sensitive areas such as residences and schools, public health impacts of hazardous waste sites, and noise and safety impacts during construction (FHWA 1987).
2. This range of applications is represented in the literature on social impact assessment (SIA), with studies of SIA in the context of projects and programs such as mining (Howitt 1989; O'Faircheallaigh 1999), amniocentesis (Rapp 1999), international biosafety measures (Stabinsky 2000), regional plans (Cramer, Dietz, and Johnston 1980), flood control policies (Brouwer and van Ek 2004), and national parks (Fortin and Gagnon 1999).
3. The definition of sustainability is, "Development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987, 8).

References

- Ahmad, Balsam. 2004. Integrating health into impact assessment: Challenges and opportunities. *Impact Assessment and Project Appraisal* 22 (1): 2-4.
- Ahmad, Balsam, Tanja Pless-Mulloli, and Catherine Vizard. 2005. HIA and pollution prevention control: What they can learn from each other. *Environmental Impact Assessment Review* 25 (7-8): 714-22.
- Arquiaga, M. C., L. W. Canter, and D. I. Nelson. 1992. Risk assessment principles in environmental impact studies. *Environmental Professional* 14 (3): 204-19.
- Association of Public Health Observatories. 2008. Who we are. http://www.apho.org.uk/default.aspx?QN=P_HIA.
- Atkinson, Phillip, and Anthea Cooke. 2005. Developing a framework to assess costs and benefits of health impact assessment. *Environmental Impact Assessment Review* 25 (7-8): 791-98.
- Banken, Reiner. 2004. HIA of policy in Canada. In *Health impact assessment*, ed. John Kemm, Jayne Parry, and Stephen Palmer, 165-76. Oxford, UK: Oxford University Press.
- Barrow, C. J. 2000. *Social impact assessment: An introduction*. Oxford, UK: Oxford University Press.
- Bass, R. E., A. I. Herson, and K. M. Bogdan. 2001. *The NEPA book: A step-by step guide on how to comply with the National Environmental Policy Act*. 2nd ed. Point Arena, CA: Solano Press.
- Becker, Dennis R., Charles C. Harris, William J. McLaughlin, and Erik A. Nielsen. 2003. A participatory approach to social impact assessment: The interactive community forum. *Environmental Impact Assessment Review* 23 (3): 367-82.
- Becker, Henk A. 1997. *Social impact assessment: Method and experience in Europe, North America and the developing world*. London: UCL Press.
- Bekker, Marleen P. M., Kim Putters, and Tom E. D. van der Grinten. 2004. Exploring the relation between evidence and decision-making: A political-administrative approach to health impact assessment. *Environmental Impact Assessment Review* 24 (2): 139-49.
- Bekker, Marleen P. M., Kim Putters, and Tom E. D. van der Grinten. 2005. Evaluating the impact of HIA on urban reconstruction decision-making. Who manages whose risks? *Environmental Impact Assessment Review* 25 (7-8): 758-71.
- Bell, Simon, and Stephen Morse. 1999. *Sustainability indicators: Measuring the immeasurable?* London: Earthscan.
- Bendel, Neil, and Vicci Owen-Smith. 2005. A prospective health impact review of the redevelopment of central Manchester hospitals. *Environmental Impact Assessment Review* 25 (7-8): 783-90.
- Bhatia, R., and A. Wenham. 2008. Integrating human health into environmental impact assessment: An unrealized opportunity for environmental health and justice. *Environmental Health Perspectives* 116 (8): 991-1000.
- Birley, Martin. 2002. A review of trends in health-impact assessment and the nature of the evidence used. *Environmental Management and Health* 13 (1): 21-39.
- Birley, Martin. 2003. Health impact assessment, integration and critical appraisal. *Impact Assessment and Project Appraisal* (21, 4): 313-321.
- Birley, Martin. 2005. Health impact assessment in multinationals: A case study of the Royal Dutch/Shell Group. *Environmental Impact Assessment Review* (25): 702-713.
- Brouwer, Roy, and Remco van Ek. 2004. Integrated ecological, economic and social impact assessment of alternative flood control policies in the Netherlands. *Ecological Economics* 50 (1): 1-21.
- Burdge, Rabel J. 1998. *A conceptual approach to social impact assessment*. Rev. ed. Middleton, WI: Social Ecology Press.
- Burdge, Rabel J. 1999. *A community guide to social impact assessment*. Rev. ed. Middleton, WI: Social Ecology Press.
- Burdge, Rabel J., Peter Fricke, Kurt Finsterbusch, William R. Freudenberg, Robert Gramling, Arnold Holden, Lynn Llewellyn, John S. Peterson, James Thompson, and Gary Williams. 1994. Guidelines and principles for social impact assessment. Silver Spring, MD: Interorganizational Committee on Guidelines and Principles for Social Impact Assessment.

- Chuengsatiansup, Komatra. 2003. Spirituality and health: An initial proposal to incorporate spiritual health in health impact assessment. *Health Impact Assessment Review* 23:3-15.
- Cole, Brian L., Michelle Wilhelm, Peter V. Long, Jonathan E. Fielding, Gerald Kominski, and Hal Morgenstern. 2004. Prospects for health impact assessment in the United States: New and improved environmental impact assessment or something different? *Journal of Health Politics, Policy & Law* 29 (6): 1153-86.
- Cook, Andrew, and John R. Kemm. 2004. Health impact assessment of proposal to burn tyres in a cement plant. *Environmental Impact Assessment Review* 24 (2): 207-16.
- Corburn, Jason. 2005. *Street science: Community knowledge and environmental health justice*. Cambridge, MA: MIT Press.
- Cramer, James C., Thomas Dietz, and Robert A. Johnston. 1980. Social impact assessment of regional plans: A review of methods and issues and a recommended process. *Policy Sciences* 12 (1): 612-82.
- Curtis, Sarah, Ben Cave, and Adam Coutts. 2002. Is urban regeneration good for health? Perceptions and theories of the health impacts of urban change. *Environment and Planning C* (20): 517-534.
- Daily, Gretchen C., and Paul R. Ehrlich. 1992. Population, sustainability, and earth's carrying capacity. *Bioscience* 42 (10): 761-72.
- Dannenberg, L., R. Bhatia, B. L. Cole, C. Dora, J. Fielding, K. Kraft, D. McClymont-Peace, J. Mindall, C. Onyekere, J. A. Roberts, C. L. Ross, C. D. Rutt, A. Scott-Samuel, and H. H. Tilson. 2006. Growing the field of health impact assessment in the United States: An agenda for research and practice. *American Journal of Public Health* 96 (2): 262-70.
- Dannenberg, A. L., R. Bhatia, B. L. Cole, S. K. Heaton, J. D. Feldman, and C. D. Rutt. 2008. Use of health impact assessment in the United States: 27 case studies, 1999-2007. *American Journal of Preventive Medicine* 34 (3): 241-56.
- Davies, Katherine and Barry Sadler. 1997. *Environmental assessment and human health: Perspectives, approaches, and future directions*. Health Canada.
- den Broeder, L., Manon Penris, and Gerard V. Put. 2003. Soft data, hard effects. Strategies for effective policy on health impact assessment—An example from the Netherlands. *Bulletin of the World Health Organization* 81 (6): 404-7.
- Design, Community and Environment, Reid Ewing, Lawrence Frank and Company, and Richard Kreutzer. 2006. Understanding the relationship between public health and the built environment: A report prepared for the LEED-ND Core Committee. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.
- Design for Health. 2007a. Building public understanding: The link between health and planning. <http://www.designforhealth.net/resources/hiaprimchecklist.html>
- Design for Health. 2007b. Health impact assessment level 1: Preliminary checklist. Version 2.1. <http://www.designforhealth.net/resources/hiarapidassessment.html>.
- Design for Health. 2007c. Health impact assessment level 2: Rapid health assessment toolkit. <http://www.designforhealth.net/resources/hiathresholdanalysis.html>.
- Design for Health. 2007d. Health impact assessment level 3: Threshold analysis. <http://www.designforhealth.net/resources/checklists.html>
- Design for Health. 2007e. Plan review checklists. <http://www.designforhealth.net/resources/participation.html>.
- Diez Roux, Ana. 2007. Neighborhoods and health: Where are we and where do we go from here? *Revue d'Epidemiologie et de Sante Publique* 55 (1): 13-21.
- Elliott, Eva, and Gareth Williams. 2004. Developing a civic intelligence: Local involvement in HIA. *Environmental Impact Assessment Review* 24 (2): 231-43.
- Elliott, Eva and Sarah Francis. 2005. Making effective links to decision-making: Key challenges for health impact assessment. *Environmental Impact Assessment Review* (25): 747-757.
- Federal Highway Administration. 1987. Guidance for preparing and processing environmental and section 4(F) documents—FHWA technical advisory T6640.8. <http://www.environment.fhwa.dot.gov/projdev/impTA6640.asp>.
- Federal Highway Administration. 2007. A citizen's guide to the NEPA: Having your voice heard. http://ceq.eh.doe.gov/NEPA/Citizens_Guide_Dec07.pdf.
- Fortin, Marie-Jose, and Christiane Gagnon. 1999. An assessment of social impacts of national parks on communities in Quebec, Canada. *Environmental Conservation* 26 (3): 200-211.
- France, C. 2004. Health contribution to local government planning. *Environmental Impact Assessment Review* 24 (2): 189-98.
- Franssen, Ellis, Brigit Staatsen, and Erik Lebet. 2002. Assessing health consequences in an environmental impact assessment: The case of Amsterdam Airport Schiphol. *Environmental Impact Assessment Review* 22 (6): 633-53.
- Gorman, D., M. J. Douglas, L. Conway, P. Noble, and P. Hanlon. 2003. Transport policy and health inequalities: A health impact assessment of Edinburgh's transport policy. *Journal of the Royal Institute of Public Health* 117:15-24.
- Greig, Sue, Neil Parry, and Barbara Rimmington. 2004. Promoting sustainable regeneration: Learning from a case study in participatory HIA. *Environmental Impact Assessment Review* 24 (2): 255-67.
- Gulis, Gabriel. 2004. Health impact assessment in CEE region: Case of the former Czechoslovakia. *Environmental Impact Assessment Review* 24 (2): 169-75.
- Hay, Laura, and Chris Kitcher. 2004. An analysis of the benefits of a cross-sectoral approach to prospective health impact assessment of a container port development. *Environmental Impact Assessment Review* 24 (2): 199-206.
- Hill, Alison, Helen Cooke, David Jenner, Lillian Somerville. 2005. Building public health skills and capacity in the English regions. *Public Health* (119): 235-238.
- Howitt, Richard. 1989. Social impact assessment and resource development: Issues from the Australian experience. *Australian Geographer* 20 (2): 153-66.
- Innes, Judith E., and David E. Booher. 2000. Indicators for sustainable communities: A strategy building on complexity theory and distributed intelligence. *Planning Theory and Practice* 1 (2): 173-86.

- Ison, Erica. 2002. Rapid appraisal tool for health impact assessment: A task-based approach. Eleventh iteration. Oxford, UK: Institute of Health Sciences.
- Ison, Erica. 2004. Rapid appraisal techniques. In *Health impact assessment*, ed. John Kemm, Jayne Parry, and Stephen Palmer, 115-30. Oxford, UK: Oxford University Press.
- Jain, Ravi K., L. V. Urban, Gary S. Stacey, and Harold E. Balbach. 2001. *Environmental assessment*. 2nd ed. New York: McGraw-Hill.
- Kearney, Matthew. 2004. Walking the walk? Community participation in HIA: A qualitative interview study. *Environmental Impact Assessment Review* 24 (2): 217-29.
- Kelly, Michael, Antony Morgan, Josiane Bonnefoy, Jennifer Butt, and Vivian Bergment. 2007. The social determinants of health: Developing an evidence base for political action. Final report to the World Health Organization Commission on the Social Determinants of Health. http://www.who.int/entity/social_determinants/resources/mekn_report_10oct07.pdf.
- Kemm, John R. 2000. Can health impact assessment fulfill the expectations it raises? *Public Health* 114 (6): 431-33.
- Kemm, John R. 2005. The future challenges for HIA. *Environmental Impact Assessment Review* 25 (7-8): 799-807.
- Kemm, John, and Jayne Parry. 2004a. The development of HIA. In *Health impact assessment*, ed. John Kemm, Jayne Parry, and Stephen Palmer, 15-24. Oxford, UK: Oxford University Press.
- Kemm, John, and Jayne Parry. 2004b. What is HIA? Introduction and overview. In *Health impact assessment*, ed. John Kemm, Jayne Parry, and Stephen Palmer, 1-14. Oxford, UK: Oxford University Press.
- Kemm, John, Jayne Parry, and Stephen Palmer, eds. 2004. *Health impact assessment*. Oxford, UK: Oxford University Press.
- Krieger, N., et al. 2003. Assessing health impact assessment: Multidisciplinary and international perspectives. *Journal of Epidemiology and Community Health* 57 (9): 659-62.
- Kwiatkowski, Roy, and Maria Ooi. 2003. Integrated environmental impact assessment: A Canadian example. *Bulletin of the World Health Organization* 81 (6): 434-38.
- Laburn-Peart, Catherine, Ed Scully, and Jayne Parry. 2004. HIA of the Health through Warmth Scheme. *Environmental Impact Assessment Review* 24 (2): 269-79.
- Laws, David W. and Ambuj D. Sagar. 1994. Perspectives on human health impact assessment. *Environmental Impact Assessment Review* (14, 5-6): 311-319.
- Maclaren, Virginia W. 1996. Urban sustainability reporting. *Journal of the American Planning Association* 62 (2): 184-203.
- Mahoney, Mary, and Jenny-Lynn Potter. 2004. Integrating health impact assessment into the triple bottom line concept. *Environmental Impact Assessment Review* 24 (2): 151-60.
- Maller, Cecily, Mardie Townsend, Anita Pryor, Peter Brown, and Lawrence St. Leger. 2005. Healthy nature healthy people: "Contact with nature" as an upstream health promotion intervention for populations. *Health Promotion International* 21 (1): 45-54.
- Mandelker, D. R. 1998. Melding state environmental policy acts with land-use planning and regulations. In *Modernizing state planning statutes: The growing smart working papers, volume 2*. Planning advisory service report 480/481. Chicago: American Planning Association.
- McCaig, Karen. 2005. Canadian insights: The challenges of an integrated environmental assessment framework. *Environmental Impact Assessment Review* (25): 737-746.
- Mindell, Jennifer, Anna Hansell, David Morrison, Margaret Douglas, and Michael Joffe. 2001. What do we need for robust, quantitative health impact assessment? *Journal of Public Health Medicine* 23 (3): 173-78.
- Mindell, J., L. Sheridan, M. Joffe, H. Samson-Barry, and S. Atkinson. 2004. Health impact assessment as an agent of policy change: Improving the health impacts of the mayor of London's draft transport strategy. *Journal of Epidemiology and Community Health* 58 (3): 169-74.
- Mindell, Jennifer, and Anna Boltong. 2005. Supporting health impact assessment in practice. *Public Health* 119 (4): 246-52.
- Mindell, Jennifer, and Michael Joffe. 2003. Health impact assessment in relation to other forms of impact assessment. *Journal of Public Health Medicine* 25 (2): 107-13.
- Morris, M. 1996. Approaches to regulating developments of regional impact. In *Modernizing state planning statutes: The growing smart working papers, volume 1*. Planning advisory service report 462/463. Chicago: American Planning Association.
- National Environmental Policy Act, Pub. L. No. 91-190, 42 U.S.C. § 4321 et seq. 1969.
- Nick Wates Associates. 2008. Community planning handbook: Methods. <http://www.communityplanning.net/methods/methods.php>.
- Nilunger, Louise, Finn Diderichsen, Bo Burstrom, and Piroksa Ostlin. 2004. Using risk analysis in health impact assessment: The impact of different relative risks for men and women in different socio-economic groups. *Health Policy* 67 (2): 215-24.
- Northridge, Mary, and Elliott Sclar. 2003. A joint urban planning and public health framework: Contributions to health impact assessment. *American Journal of Public Health* 93 (1): 118-21.
- O'Faircheallaigh, Ciaran. 1999. Making social impact assessment count: A negotiation-based approach for indigenous peoples. *Society and Natural Resources* 12 (1): 63-80.
- Olshansky, R. B. 1996a. The California Environmental Quality Act and local planning. *Journal of the American Planning Association* 62 (3): 313-30.
- Olshansky, R. B. 1996b. Evaluation of the California Environmental Quality Act. *Environmental Management* 20 (1): 11-23.
- Pearlman, Kenneth. 1977. State environmental policy acts: Local decision making and land use planning. *Journal of the American Institute of Planners* 43 (1): 42-53.
- Pendall, R. 1997. Environmental impact assessment: The state of the states, and some issues for local government. *Environmental Planning Quarterly* 13:9-14.

- Pendall, R. 1998. Problems and prospects in local environmental assessment: Lessons from the United States. *Journal of Environmental Planning and Management* 41 (1): 5-23.
- Parry, Jayne and Edward Scully. 2003. Health impact assessment and the consideration of health inequalities. *Journal of Public Health Medicine* (25, 3): 243-245.
- Parry, Jayne and John Kemm. 2005. Criteria for use in the evaluation of health impact assessments. *Public Health* (119, 12) 1122-1129.
- Phillips, Rhonda. 2003. Community indicators. Planning advisory service report 517. Chicago: American Planning Association.
- Portney, Kent E. 2003. *Taking sustainable cities seriously: Economic development, environment, and quality of life in American cities*. Cambridge, MA: MIT Press.
- Quigley, Robert J., and Lorraine C. Taylor. 2003. Evaluation as a key part of health impact assessment: The English experience. *Bulletin of the World Health Organization* 81 (6): 415-19.
- Quigley, Robert J., and Lorraine C. Taylor. 2004. Evaluating health impact assessment. *Journal of the Royal Institute of Public Health* 118:544-52.
- Rapp, Rayna. 1999. *Testing women, testing the fetus: The social impact of amniocentesis in America*. New York: Routledge.
- Renz, Jeffrey T. 1984. The coming of age of state environmental policy acts. *Public Land Law Review* 5:31-54.
- San Francisco Department of Public Health. 2007a. HDMT Development Project Checklist version 1.01. http://www.thehdmt.org/development_checklist.php.
- San Francisco Department of Public Health. 2007b. Healthy Development Measurement Tool. <http://www.thehdmt.org/tool.php>.
- Sanoff, Henry. 2000. *Community participation methods in design and planning*. New York: John Wiley.
- Sarkissian, Wendy, Andrea Cook, and Kelvin Walsh. 2003. *Community participation in practice: A practical guide*. Murdoch, Australia: Murdoch University, Institute for Sustainability and Technology Policy.
- Simpson, Sarah, Mary Mahoney, Elizabeth Harris, Rosemary Aldrich, and Jenny Stewart-Williams. 2005. Equity-focused health impact assessment: A tool to assist policy makers in addressing health inequalities. *Environmental Impact Assessment Review* 25 (7-8): 772-82.
- Stabinsky, Doreen. 2000. Bringing social analysis into a multilateral environmental agreement: Social impact assessment and the biosafety protocol. *Journal of Environment and Development* 9 (3): 260-83.
- Steinemann, Anne. 2000. Rethinking human health impact assessment. *Environmental Impact Assessment Review* 20 (6): 627-45.
- Transportation Research Board and Institute of Medicine. 2005. Does the built environment influence physical activity: Examining the evidence. Special report 282. Washington, DC: Transportation Research Board.
- U.S. Green Building Council. 2007. Pilot version: LEED for Neighborhood Development Rating System. <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.
- Wackernagel, Mathis, and William Rees. 1996. *Our ecological footprint*. Gabriola Island, Canada: New Society Publishers.
- Watts, J. 1995. Reconciling environmental protection with the need for certainty: Significance thresholds for CEQA. *Ecology Law Quarterly* 22:213-317.
- Wismar, M., J. Blau, and K. Ernst. 2007. Is HIA effective: A synthesis of concepts, methodologies, and results. In *The effectiveness of health impact assessment: Scope and limitations of supporting decision-making in Europe*, ed. M. Wismar, J. Blau, K. Ernst, and J. Figueras, 15-36. Copenhagen: World Health Organization. http://www.euro.who.int/InformationSources/Publications/Catalogue/20071015_1.
- Wismar, M., J. Blau, K. Ernst, and J. Figueras, eds. 2007. *The effectiveness of health impact assessment: Scope and limitations of supporting decision-making in Europe*. Copenhagen: World Health Organization. http://www.euro.who.int/InformationSources/Publications/Catalogue/20071015_1.
- World Commission on Environment and Development. 1987. *Our common future*. Oxford, UK: Oxford University Press.
- World Health Organization. 1999. Health impact assessment: Main concepts and suggested approach: The Gothenburg Consensus Paper. Brussels: WHO Regional Office for Europe. <http://www.who.dk/document/PAE/Gothenburgpaper.pdf>.
- World Health Organization Commission on Social Determinants of Health. 2007. Achieving health equity: From root causes to fair outcomes. Interim statement. http://www.who.int/social_determinants/resources/interim_statement/en/index.html.

Bios

Ann Forsyth is a professor of City and Regional Planning at Cornell University.

Carissa Schively Slotterback is an assistant professor in urban and regional planning at the Humphrey Institute of Public Affairs at the University of Minnesota.

Kevin Krizek is an associate Professor of Planning, Design, and Civil Engineering at the University of Colorado.