



Health impact assessment in the United States: Has practice followed standards? ☆



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ABSTRACT

As an emerging practice, Health Impact Assessment is heterogeneous in purpose, form, and scope and applied in a wide range of decision contexts. This heterogeneity challenges efforts to evaluate the quality and impact of practice. We examined whether information in completed HIA reports reflected objectively-evaluative criteria proposed by the North American HIA Practice Standards Working Group in 2009. From publically-available reports of HIAs conducted in the U.S. and published from 2009 to 2011, we excluded those that were components of, or comment letters on, Environmental Impact Assessments (5) or were demonstration projects or student exercises (8). For the remaining 23 reports, we used practice standards as a template to abstract data on the steps of HIA, including details on the rationale, authorship, funding, decision and decision-makers, participation, pathways and methods, quality of evidence, and recommendations. Most reports described screening, scoping, and assessment processes, but there was substantial variation in the extent of these processes and the degree of stakeholder participation. Community stakeholders participated in screening or scoping in just two-thirds of the HIAs (16). On average, these HIAs analyzed 5.5 determinants related to 10.6 health impacts. Most HIA reports did not include evaluation or monitoring plans. This study identifies issues for field development and improvement. The standards might be adapted to better account for variability in resources, produce fit-for-purpose HIAs, and facilitate innovation guided by the principles.

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Introduction

Health Impact Assessment (HIA) facilitates the consideration of public health in decisions about policies, plans and programs. The field is growing rapidly in the United States as a promising strategy for implementing Health in All Policies (HiAP) (Collins and Koplan, 2009; Gottlieb et al., 2011; Rajotte et al., 2011). Since the first HIA in the U.S. in 1999 (Bhatia and Katz, 2001), over 220 have been completed and more than 80 are currently underway (Pew Health Impact Project, 2014). HIA practitioners have advanced the field in the U.S. by organizing training (Schuchter, 2012), establishing funding priorities and programs, and developing guidance documents, professional organizations, and conferences. To operationalize a methodologically sound practice aligned with HIA principles (Quigley et al., 2006), and to define

and distinguish HIA from other forms of policy and decision analysis, a group of early practice leaders developed the North American HIA Practice Standards as a consensus document in April 2009 (North American HIA Practice Standards Working Group, 2009) and revised the document in November 2010 (Bhatia et al., 2010). Other guidelines have built on these standards to support best practices (Bhatia, 2011), stakeholder engagement (Stakeholder Participation Working Group of the, 2010 HIA in the Americas Workshop, 2011), equity (Heller et al., 2013), and evaluation in HIA (Seto et al., 2011). The consensus standards and additional guidelines have been refined and disseminated at conferences, trainings, and other forums, amid broader debates about the role of HIA (Krieger et al., 2003, 2010; Parry and Stevens, 2001).

Contemporary evaluations of HIA practice have focused on the effects on decision outcomes. These evaluations must account for the range of decision contexts and underlying values, purposes, and goals of the HIAs underlying the formative and process stages (Harris-Roxas and Harris, 2013). However, examinations of HIA processes and their alignment with practice standards are lacking. Only two studies have characterized the heterogeneity of HIA practice in the U.S. A 2008 study described the topical and methodological heterogeneity among 27 HIAs nationwide, finding that practitioners generally followed the

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commonly accepted steps for conducting HIAs (Dannenberg et al., 2008). Another evaluation outside the U.S. used a checklist to assess the completeness of HIA reports (Fredsgaard et al., 2009). A more recent study conducted by the U.S. Environmental Protection Agency examined 81 HIAs, but focused on specific topical categories of HIAs and included HIAs conducted prior to the publication of practice standards (Rhodus et al., 2014). Studies of procedural fidelity to practice standards could help elucidate practice challenges such as engaging communities (Parry and Wright, 2003) and preparing and presenting quantitative estimates (Bhatia and Seto, 2011). A deeper understanding of procedural fidelity may also help define and distinguish HIA relative to other complimentary practices and subsequently improve the rigor and relevance of HIAs and the practice standards.

As per the principle of transparency (Committee on Health Impact Assessment and National Research Council, 2011), practice standards call for complete documentation of the HIA, including limitations, uncertainties, and assumptions. Full disclosure provides an opportunity for debate about the pathways chosen and the validity of estimates, which is particularly important when impacts are quantified (Bhatia and Seto, 2011; O'Connell and Hurley, 2009) and can also help legitimate qualitative research. Complete reporting also facilitates systematic peer-review to advance the practice. HIA reporting should be accessible and appealing to a wide audience and be able to stand as credible scientific evidence. Moreover, HIA has a legitimate legal basis in the U.S. via the National Environmental Policy Act (NEPA) and other legislation (Rajotte et al., 2011). Full and transparent reporting of HIA processes can help them withstand scrutiny if called upon as evidence in courts (Hodge et al., 2012).

Evaluating reported HIA processes in the U.S. may yield insights into methodological challenges and inform the refinement of standards and training and development of the field. We review HIAs reported from 2009 to 2011 to assess how practice aligns with standards offered by the North American HIA Practice Standards Working Group. Our findings have implications for the quality of HIA practice and the standards themselves.

Methods

We queried the Pew Health Impact Project database for a list of HIAs conducted in the U.S. through June 2011 (Pew Health Impact Project, 2011). HIAs in this database were identified as such by the author and/or by Pew and were not categorized by type (e.g. rapid, participatory). This database was also utilized by the National Research Council in their 2011 review of the field (Committee on Health Impact Assessment and National Research Council, 2011). From an initial list of 83 reports, we excluded those published before 2009 (47), when the North American Practice Standards were first published.¹ We then excluded HIAs that were integrated into Environmental Impact Reports and Statements or provided as comment letters on Environmental Impact Assessments (5), or were identified as HIA demonstration projects or student exercises (8). A total of 23 reports met our inclusion criteria (Table 1). HIA reporting may entail comprehensive written reports, presentations, briefs, websites, multimedia, and other formats. Several of the HIAs included were published in these and other formats, including peer-reviewed journals (Hoehner et al., 2012; Perdue et al., 2012; Richardson et al., 2012; Witter et al., 2013). However, we abstracted data only from written final reports.

Referencing a comprehensive HIA evaluation framework (Harris-Roxas and Harris, 2013), we focused on procedural fidelity, involvement of decision-makers and stakeholders, and transparency. We defined

procedural fidelity as conformity with prescribed processes and standards of best practice (Harris-Roxas and Harris, 2013). Using North American Practice Standards, Version 1 (North American HIA Practice Standards Working Group, 2009) as a template, we abstracted data from HIA reports for all steps in the HIA process. We evaluated stakeholder participation in the screening, scoping, and assessment steps. We also examined the authorship, funding, and characteristics of the decision and pathways.

Assessment in HIA typically includes analyses of baseline health, social, and environmental conditions and qualitative or quantitative estimates of impact likely to result from the decision, followed by recommendations (Bhatia et al., 2010). For each HIA, we identified the assessed pathways from health determinants to health impacts. Health determinants include the social, economic, and physical environments, which are influenced by policies, plans, and programs. We categorized determinants and impacts in order to summarize the pathways. For example, determinants reported as “traffic”, “highway design”, “emissions”, “fuel efficiency”, or “transit” were grouped into a “transportation” category, while health impacts reported as “depression”, “stress”, or “anxiety” were grouped into a “mental health” category. In the cases where the impacts measured were well-established individual-level risk factors, for example physical activity, those outcomes were also classified as health impacts. We then summarized the pathways between health determinants and health impacts using these categories. To evaluate transparency, we checked for reported limitations, assumptions and uncertainties.

Results

Reports had a mean length of 76 pages (SD = 44). The reports displayed a range of formats for presenting results. Some included tables and figures throughout, while others were mostly narrative. Six reports did not contain an Executive Summary. Nearly half (12) of all HIAs were initiated by an author/assessor rather than the project proponent, decision-maker or stakeholder. Report authors and assessors were most frequently public (8) or non-profit (7) agencies or academic institutions (4). Philanthropies (10) and public agencies (8) were the primary funders of the HIAs. Nearly half (11) of the HIAs addressed proposed plans, including housing, transportation and land-use, while eight addressed policies. The decisions addressed by the HIAs most frequently concerned land use planning (8), transportation (6), and housing (4), primarily at a local level within a county or city jurisdiction (19).

In terms of procedural fidelity, there were major gaps in some reports. Most (19) of the HIAs involved some external participation in either screening or scoping. Community organizations, decision-makers and other stakeholders participated in screening and scoping to varying degrees (Table 2). The mean number of groups participating in screening was 2.6 and in scoping 4.8. This was lower for publically-funded HIAs (screening 1.6 and scoping 3.1) relative to projects funded by philanthropies and non-profits (screening 3.5 and scoping 6.4).

HIA objectives were described in all reports and in most cases clearly stated. While the purposes were generally clearly stated, the rationales for conducting the HIAs weren't. Some HIAs simply described their rationale for conducting the HIA in a few sentences, while others applied screening checklists. Several criteria for screening were frequently applied in HIAs (Table 3). The mean number of screening criteria was 2.3. However, four reports did not describe screening at all.

All but one report described using some scoping elements (Table 4). The mean number of scoping elements applied per HIA was 2.9. The scoping process should identify the most important pathways – comprised of determinants and impacts – linking the proposed decision to health. Practice standards suggest that “all potential pathways that could reasonably link the decision to health” be considered. However, the final scope should focus on impacts of the greatest likelihood, significance, and public concern. On average, the HIAs assessed 5.5 health determinants related to 10.6 health impacts. There was no clear

¹ North American Practice Standards were first published in April 2009. Five of the reports published in 2009 described HIAs initiated before April 2009. However, four of these (#1, 4, 13, and 20) included authors and one (#15) included advisors who were part of the practice standards working group. We therefore discerned that these HIA teams had some knowledge of the content and expectations of the standards before they were published.

Table 1
Included HIA reports.

	HIA
1	29th St San Pedro
2	Battlement Mesa
3	Clark County Bicycle and Pedestrian Master Plan
4	Concord Naval Weapons Station Reuse Project
5	Fort McPherson: Zoning during Interim Use
6	Gambling on the Health of the Public: A Rapid HIA for an Urban Casino
7	HB 2800 Oregon Farm to School and School Garden Policy
8	Health Effects of Road Pricing In San Francisco, CA
9	Healthy Tumalo Community Plan
10	HIA of California's Cap-and-Trade Greenhouse Gas Mitigation Policy
11	Accessory Dwelling Unit Policies in Rural Benton County, OR
12	California Assembly Bill 889 (domestic workers)
13	Healthy Families Act of 2009
14	NMRT's Request for a Special Use Permit (Albuquerque Waste Transfer)
15	Policies Reducing Vehicle Miles Traveled in Oregon Metropolitan Areas
16	Transportation Policies in the Eugene Climate and Energy Action Plan
17	South Lincoln Homes, Denver, CO
18	Interstate 75 Focus Area Study
19	Lake Oswego to Portland Transit Project
20	Page Avenue
21	Evaluating Affordable Housing Opportunity Sites Along the San Pablo Ave. Corridor
22	Impact of U.S. Highway 550 Design on Health and Safety in Cuba, N.M.
23	Zoning for a Healthy Baltimore: Transform Baltimore Zoning Code Rewrite

difference in the number of determinants per HIA by type of decision (adopting, implementing, or revising projects, plans and policies).

When looking at all pathways within the HIA reports, transportation was the most frequent determinant category assessed (Fig. 1). Other frequent determinants included zoning/land-use, employment, and decisions affecting air quality, food environment, social cohesion, and housing. The most frequent health impacts assessed were general chronic disease (38), obesity (36), mental health conditions and stress (35), and cardiovascular diseases (31). The quality of evidence for analysis of pathways varied widely. For example, the baseline analyses for some HIAs used only existing published data and included health conditions not related to the scope. Other analyses focused only on changes to the health determinants and the most proximate intermediaries to health. For example, a HIA examining a housing planning decision focused estimates on changes in housing conditions rather than health impacts such as respiratory conditions. Among the 127 determinants assessed, roughly two-thirds (83) used literature reviews to describe the relationship with the impact(s), while focus groups (28) and interviews (11) were used also used. In a subset of seven reports that scoped 75 health impacts, slightly more than half (40/75) provided a qualitative or quantitative estimate of the magnitude of those impacts.

Practice standards call for a clear documentation of uncertainties, limitations and assumptions; these were mentioned in three-quarters (17) of the reports (Table 5). Reports cited limitations of resources, scope, evidence, available methods and statistical power. We observed documentation of uncertainties ranging from adequate (e.g. a separate report section) to probably inadequate (e.g. a generic two-sentence

disclaimer). Exemplars included a “What we don't know” section (HIA #2), “Weight of evidence” criteria (HIA #7), and categories for classifying the likelihood of impacts (HIA #s 5, 8, 20) such as speculative, probable and definite.

Almost all (21) HIA reports included recommendations, some based on evidence and stakeholder and expert input, but less than half (12) of those clearly stated criteria for making or prioritizing recommendations. On average, 19.3 recommendations were made per report. Just over half (13/23) of HIA reports described intentions, plans or results of monitoring and evaluation.

Discussion

This study provides the first evaluation of U.S. HIA practice in terms of procedural fidelity to established standards for practice in North America, which are consistent with the practice described by the National Academies of Sciences (Committee on Health Impact Assessment and National Research Council, 2011). There are several implications for the steps of HIA and the process as a whole. The first step of HIA, screening, considers the characteristics of potential health impacts on populations and the opportunity to influence the decision and add value. It is essential for high quality HIA (Committee on Health Impact Assessment and National Research Council, 2011). Specific screening criteria were mentioned in the version 1 standards but not clearly enumerated until version 2. In our study, the most frequently cited screening criterion was stakeholder and decision-maker concerns, which is consistent with the ad-hoc nature of HIA practice initiated opportunistically or in response to external demands. Notably, four reports did not mention any screening criteria or provide a rationale for conducting the HIA. The limited documentation of screening may reflect the role of grant funding, whereby screening arguments are provided to the funder but not always articulated in the HIA report.

The second step of HIA, scoping, “ensures a balanced and complete examination of health risks, benefits, and tradeoffs” (Committee on Health Impact Assessment and National Research Council, 2011). Scoping elements are clearly defined in version 1 of the standards, including nine points for specifying the research, resources, and roles. Overall, HIA reports demonstrated higher fidelity with standards for scoping compared to screening. The fact that less than half of the reports stated the decision alternatives may reflect cases where the decision choice was binary (e.g. yes/no) and therefore considered obvious. While scoping can be an iterative process, the fact that less than one-third of reports clearly identified research questions highlights the need for improved documentation. The average number of health determinants assessed per HIA (5.5) suggests that the HIAs appropriately identified decisions relevant to a breadth of health issues.

HIAs examined multiple health impacts mediated via multiple health determinants. Assessment entails evaluating three things: baseline (existing) conditions with regard to both health determinants and impacts; associations between the decision and subsequent health determinants and impacts; and the estimated changes in health impacts given the baseline, decision alternatives and associations. We found a

Table 2
Screening and scoping participation (n = 23 reports).

Practice standard	Fidelity measure	# of HIAs	
		Screening	Scoping
The full HIA report should “... identify all the participants in the HIA and their contributions”. “Meaningful and inclusive stakeholder participation in each stage of the HIA supports HIA quality”	Any external participation (beyond assessment core team)	12	18
“Community stakeholders, decision-makers, and other individuals and organizations knowledgeable about and responsible for the health of a community [should] contribute to or critique the scope of the HIA”.	Types of groups participating		
	Community organization or residents	5	16
	Decision-maker	9	11
	Public agency	12	14
	Other stakeholders	6	10

Table 3
Screening description and criteria (n = 23 reports).

Practice standard	Fidelity measure	# of HIAs
HIA process should include at minimum ... screening to determine the value and purpose; "The full HIA report should document the screening process"	Process is described	19
"Screening should clearly identify how an HIA would add value to the decision-making process"	Use of any criteria	19
	Stakeholder and decision-maker concerns about effects	15
	Feasibility of assessment	13
	Potential for significant health effects	11
	Potential for inequitable effects	7
	Potential for timely changes	6

range of detail in the assessment step, with the methods and rigor of assessment varying by pathway. This is likely the result of varying strength of evidence available for each. A broad baseline analysis addressing determinants beyond the scope can bring attention to population health vulnerabilities and cumulative impacts. However, some reports did not measure baselines for the determinants included in their scope. Moreover, several of the HIAs commented generally on the relationship between determinants and impacts in the literature, but did not explicitly consider the relationship in the particular decision context. This could be due to concerns about the strength of evidence in the literature, lack of local data, and/or the complexity of gauging impacts. Alternatively, in some instances the goals of the HIA may have been achieved by simply presenting the links between the decision, health determinants, and health impacts based on the literature alone. Several HIAs were very methodical and organized in connecting determinants and impacts, drawing pathway diagrams and/or using tables to illustrate the pathways studied. This approach allows HIAs to better illustrate social determinants, cumulative impacts and life-course concepts to broader audiences. Regardless of the assessment characteristics, all HIAs should address the uncertainty of their estimates and conclusions. However, roughly one-quarter (6) of reports did not describe uncertainties, limitations and assumptions. Practitioners must be competent in identifying the many assumptions and characterizing uncertainties, whether their estimates are qualitative or quantitative.

Community participation generally supports health and social change outcomes (Butterfoss, 2006; Tamburrini et al., 2011; Wright et al., 2005) and there is consensus within international standards and guidelines as to its importance (Hebert et al., 2012). Participation of affected communities and other stakeholders is a minimum element and is encouraged throughout the practice standards. It is also a critical domain for evaluation (Parry and Kemm, 2005). Still, there are no explicit benchmarks for the quality and quantity of participation and the diversity of the participants and the manner of participation have not been comprehensively examined in previous research (Slotterback et al., 2010). We found substantial variation in stakeholder participation; this may have several explanations. At least five reports classified their approach as "desktop" or "rapid", where time and resources are extremely limited and in which a small team or individual focuses on analyzing readily available data and literature. While there is no standard

for this designation, many other reports also mentioned resource constraints. Still others were clearly participatory and involved larger teams and longer processes. We found that publically-funded HIAs reported less participation than those funded by philanthropies. However, this must be considered with an understanding of how resources matched the plans and intentions for participation up front.

There are several considerations for interpreting these findings. First, our measurement of procedural fidelity is dependent on comprehensive reporting. The ethical use of evidence principle of HIA emphasizes complete reporting. Subsequently, both North American (Bhatia et al., 2010; North American HIA Practice Standards Working Group, 2009) and international (Quigley et al., 2006) standards call for "transparent and rigorous processes" including a full report to document screening and scoping, identify all the participants in the HIA, and detail the methods and results for each health issue analyzed. Moreover, at the 2009–2011 HIA of the Americas meetings, working groups emphasized the need for transparent reporting and clear and full documentation to maximize the utility of evaluations already underway. We therefore expected that HIA processes would be fully documented in the reports. Second, while reports were drawn from the primary national HIA database/clearinghouse, we may have missed some if the authors did not share them publically or even consider them an HIA. Such reports may have been of lower quality. Third, some practitioners may not have been aware of the standards, considered them important, or sought guidance. The standards were routinely disseminated via conferences, trainings, and other forums. Still, only one-third (8/23) of the HIA reports referenced the standards.

Generally, our findings suggest that HIA practice varies considerably in the U.S., based on reports in comparison with practice standards. However, as discussed below, the standards were not intended to be rigid or enforceable rules. Variation and the limited conformity with standards may be expected given an emerging HIA field working in myriad decision contexts, for diverse audiences, and with constraints on resources and evidence. Variability in adherence to standards also likely reflects differences in HIA objectives. For example, although 17 reports identified vulnerable subgroups, only nine described having an approach to evaluate health inequalities. Although all HIAs should check for vulnerable groups, not every HIA starts with concern for a specific group. Debates regarding HIA typologies (Putters, 2005) and

Table 4
Scoping elements (n = 23 reports).

Practice standard	Fidelity measure	# of HIAs
"HIA process should include at minimum ... scoping to identify health issues and research methods" "The full HIA report should document the scoping process"	Process is described	22
"Scoping of health issues and public related to the decision should include identification of: 1) the decision and decision alternatives that will be studied; 2) potential significant health impacts and their pathways; 3) demographic, geographical and temporal boundaries for impact analysis; 4) research (e.g., data, methods, and tools) expected to be used for impacts analysis"	Use of any scoping elements	22
	Identifies decision alternatives	9
	Includes logic model or pathways	16
	Defines any analytic boundaries	17
	Identifies research questions ^a	7
"The scope should include data and methods to reveal inequities in conditions or impacts based on population characteristics, including but not limited to age, gender, income, place (disadvantaged locations), and ethnicity"	Includes an approach to evaluate inequalities	9
	Identifies vulnerable subgroups	17

^a This criterion is not in version 1 of the practice standards, but is in version 2 (step 3.1).

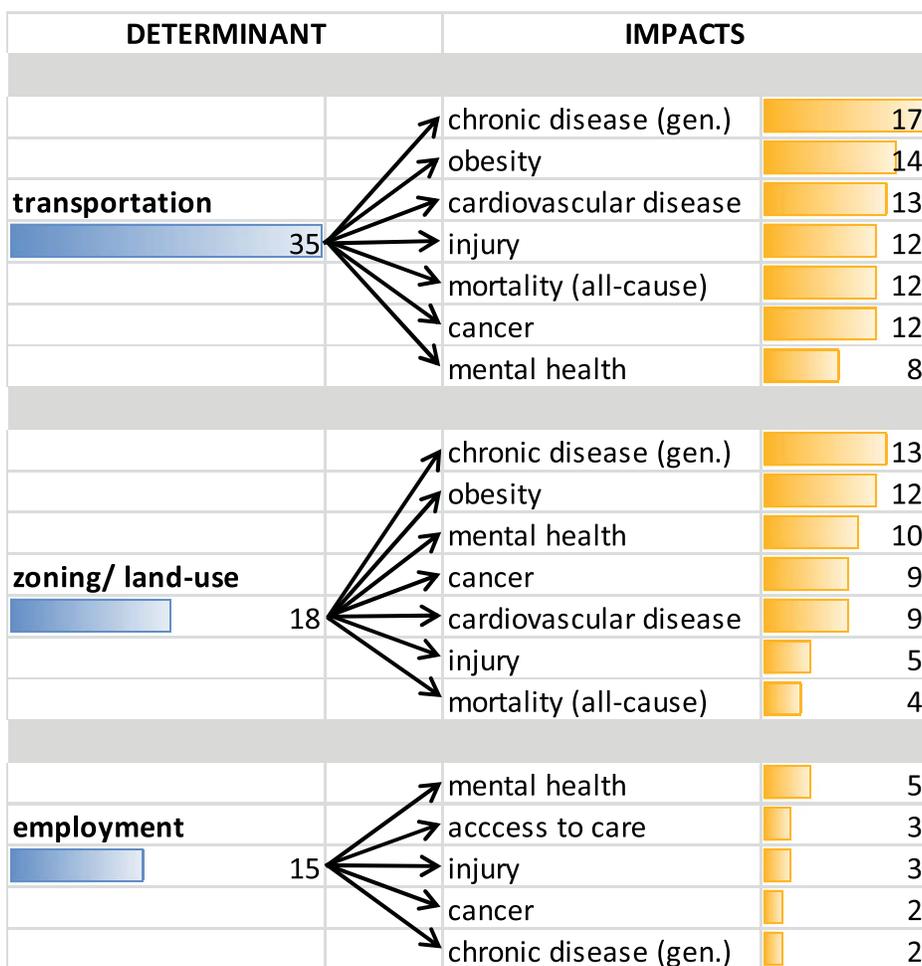


Fig. 1. Assessment pathways most frequently scoped^b. ^bThis graphic shows the pathways between the three most frequent determinants. Categories were created from 127 total determinants and 244 total impacts.

equity-focused HIA (Aldrich et al., 2005; Simpson et al., 2005) recognize this. Broad stakeholder involvement may be especially important in equity-focused HIAs and HIAs that are complex, and consider multiple decision alternatives, and different pathways. Such HIAs needing to deeply engage many stakeholders may focus more on standards regarding stakeholder participation. In addition, other HIAs may have conducted health equity analyses but not documented their null findings (no particular vulnerabilities identified) given the focus of their efforts. Recognition of other typologies might also emphasize certain standards. For example, the more an HIA makes quantitative estimates, the more standards for uncertainty analysis and statistical significance are needed.

Indeed, the standards were not intended to be applied wholesale or to grade HIAs indiscriminately. Rather they were created by HIA practitioners to be “relevant, instructive and motivating for advancing HIA quality rather than rigorous criteria for acceptable or adequate HIA.” (North American HIA Practice Standards Working Group, 2009). HIA can be practiced strategically (Winkler et al., 2013) using a “fit-for-purpose” (Milner et al., 2003; Joffe, 2003), “free-form” (Dora, 2012) or “a la carte” (Bhatia, 2013) approach and possibly incorporating other methods relevant to the context. Customized applications of HIA and a more strategic use of HIA components in policy development and enforcement may be warranted (Forsyth et al., 2010). Several reports mentioned alternative processes not described in the standards. Standards should not limit these and other practices that may enhance the HIA and/or add value to decision-making. Moreover, an aspirational quest for adherence to standards should not preclude the ubiquitous application of HIA principles. After all, HIA is premised on the idea that the

best available information – which may vary considerably recognizing resource constraints – is better than no information at all. Nonetheless, as HIA is institutionalized, a more standardized practice may be needed.

The research was designed to assess needs for an evolving practice, not to determine what is fit for purpose. While all of the reports we examined stated some objectives, many of these were generic, such as “to inform the decision”. Objectives were therefore not classified (Harris-Roxas and Harris, 2011) and it was assumed that there was a universal interest in influencing decision-making. The ability to do so depends on the quality of the process, including leadership, organizational structures, and partnerships within it (Ahmad et al., 2008) as well as practitioner competency and capacity, organizational influences, and the availability of resources (Harris-Roxas and Harris, 2013). This evaluation focused on HIA process, as recommended from experience in other countries (Quigley and Taylor, 2003, 2004). Further scrutiny of these process elements may inform the interpretation and application of practice standards. For example, practitioners have expressed the need for developing competencies in managing stakeholders (Schuchter, 2012). This in turn will influence the quality of participation and thereby the quality of assessment. The heterogeneity of HIA processes is amenable to continuous learning and improvement via a community of HIA practice.

In moving forward, while a written report may be just part of the dissemination strategy, it should encompass all activities including those planned. Full disclosure in written reports provides a credible, stand-alone document for public and peer-review. In addition, although few HIAs have been called upon as evidence in legal challenges (Hodge

Table 5

Assessment elements (n = 23).

Practice standards	Fidelity measure	# of HIAs
"Assessment should include at minimum ... a profile of baseline conditions	Measures baseline conditions	21
Documentation of baseline conditions should include documentation of both population health vulnerabilities (based on the population characteristics described above) and inequalities in health outcomes among subpopulations or places	Considers vulnerable populations in baseline measures	21
"Assessment should include at minimum ... an evaluation of potential health impacts (e.g., qualitative and/or quantitative analyses) including a qualitative or quantitative judgment of their certainty and significance and evaluation of any inequitable impacts	Evaluates impact, qualitatively or quantitatively	21
"Assessment should include at minimum ... management strategies for any identified adverse health impacts – in the form of decision alternatives, mitigation of specific impacts, or other related policy recommendations"	Made recommendations	21
Recommendations for decision alternatives, policy recommendations, or mitigations should be specific and justified. The criteria used for prioritization of recommendations should be explicitly stated and based on scientific evidence and, ideally, informed by an inclusive process that accounts for stakeholder values	Used criteria to prioritize recommendations	12
"An HIA should acknowledge limitations of data and methods"	Describes limitations and uncertainties	17
To support effective, inclusive communication of the principle HIA findings and recommendations, a succinct summary should be created that communicates findings at a level that allows all stakeholders to understand, evaluate, and respond to the findings	Executive Summary	17

et al., 2012), inclusive and deliberative processes with full reporting can help HIAs add value and avoid the pitfalls of EIAs (Kemmer, 2004). Exemplars demonstrating good reporting, rubrics for evaluating the rigor and relevance of HIA processes, and templates for reporting may be useful. The community of HIA practitioners might further develop tools to support the standards, including guidance on inclusive decision-making and application of available analytic tools. A survey of practitioners as to the relevance and the utility of the standards would also support their application. Guidelines for stakeholder participation (Stakeholder Participation Working Group of the, 2010 HIA in the Americas Workshop, 2011) should facilitate improved participation of both professionals and lay persons. Groups such as the Society of Practitioners of Health Impact Assessment are already supporting some of these efforts. Additional research on HIA practice is also needed. Such studies should examine recommendations and risk management and how procedural rigor influences decision-making and other outcomes, evaluating against the stated objectives. Further elaboration and precision in HIA objectives will allow better measurement and evaluation. Additionally, better tools are needed for process evaluations while principles of team science (Bennett et al., 2010) could help assessors from multiple agencies and disciplines to optimize their research efforts.

This study illustrated a diverse practice in the U.S. that varies considerably relative to the practice standards. Overall, this variation is expected and understandable given the emerging nature of the field and its diverse applications. Nevertheless, there were substantial gaps in some key elements of practice that may hinder the success of HIA. Development of further guidance for specific aspects of HIA, creation of replicable assessment tools, and training and capacity building may help align practice with the standards. However, the standards should not inhibit creative innovation guided by HIA principles.

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