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Advancing Health Impact Assessment:
A Study of Training, Practice and New Approaches in the United States

By

Joseph Schuchter

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requirements for the degree of

Doctor of Public Health

in the

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of the

University of California, Berkeley

Committee in charge:

Professor Edmund Seto, Co-Chair
Professor William Satariano, Co-Chair
Professor Malo Hutson

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ABSTRACT

Advancing Health Impact Assessment:
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by

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Doctor of Public Health

University of California, Berkeley

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In an era of growing interest in transdisciplinary collaboration, evidence-based decision-making, open government, and social impact strategies responding to political and economic challenges, Health Impact Assessment (HIA) is increasingly relevant. HIA sits at the juncture of a number of paradigms for democratic processes for dealing with uncertainty and adding value in decision-making. It draws from a rich history of impact assessment that has accounted for multiple bottom lines. While HIA has gained attention as a specific tool, it is also recognized as part of a suite of more ecological and equitable approaches to health. HIA developers are asking both how to make it work better, so that ultimately government will work better.

This research examines the state of HIA in the United States. It examines the earliest efforts to train a variety practitioners across the country, acknowledging multiple opportunities for capacity-building and many influences on effective HIA practice. More importantly, it identifies a broad definition of effectiveness. Research on HIA practice builds on this, finding that practice is not fully aligned with standards but not necessarily deficient. While objectives should guide HIA processes, the research on training and practice highlights resources as a key driver. The third component of this research considers the resource constraints of public health in general and the opportunities to leverage outside resources using the paradigm of HIA.

In moving the field forward, frameworks for community-based prevention and transdisciplinary education can inform HIA capacity-building. Evaluation of both processes and outcomes will be useful. While methodological challenges remain, the institutionalization of partnerships, processes, and indicators will support public health goals. The definition and standardization of HIA practice must be balanced with efforts to expand its utility in new areas such as community development. In such cases the HIA process and paradigm can leverage investments by estimating returns in health and social denominations. HIA also helps solve the "wrong pocket" problem by accounting for outcomes across sectors and institutions. If used wisely, HIA will be a critical component of health in all policy, sustainability agendas, and social impact strategies.

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Peace.

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CHAPTER 1: Introduction

"The causes that lie behind much sickness and human suffering are short-sightedness and greed. If your interest is your people's well-being, you must help them learn to share, to work together, and to look ahead. Health for all can be achieved only through the organized demand by people for greater equality in terms of land, water, services, and basic rights."

> \- David Werner

This statement underscores current events in the United States. Amid interconnected increases in unemployment, poverty and lack of access to healthy environments and healthcare, a movement focused on reigning in greed and building a fairer society emerged. The Occupy/ 99% events have reminded us that health and well-being depend on wealth and the ability to attain it. Meanwhile, long-standing disparities persist, as the health of poor and minority communities in the U.S. is akin to that in developing countries. In his book *Where There is No Doctor*, David Werner stresses that people in communities must be empowered to identify root causes and gain the resources they need for health.[1] These words are timely, considering that many people in the U.S. are indeed left with no doctor. This is a pivotal moment for public health. Health care reform and a convergence of movements present an opportunity to address root causes of health by helping people learn to share, work together and look ahead.

To help people share and work together connotes broad cooperation for collective impact. Those most focused on the goal of public health must address a vast array of policies, policy-makers and stakeholders across disciplines and sectors, jurisdictions and neighborhoods. They must do this through authentic and empowering partnerships that enable the sharing and working together to be sustained. To help people to look ahead and to address short-sightedness, public health agencies and advocates must embed new health and policy-making frameworks. Instead of a reactive, policy-at-a-time regulatory approach, public health must take a more proactive, precautionary, holistic, and sustainable tact. It must heed the call of evidence demanding a new approach to achieve public health. This is a story of one such approach.

The Need for and Promise of Health Impact Assessment

Decisions affecting the health of the public are mediated and/or made largely by politicians, either directly through public policy or indirectly by setting rules for private and non-profit efforts. Both elected and appointed officials must satisfy the immediate demands of diverse and seemingly competing constituencies if they are to maintain their position. This leaves many policy-makers prone to favoring short-sighted and stop-gap decisions with immediately-evident outcomes. Even when politicians can overcome politics to set in motion a long-term vision, their decisions may be based on conviction more than scientific evidence or community demands. Even when thinking ahead, their decisions and subsequent investments are often educated guesses,[2] if not napkin math. Healthier decision-making systems are needed.

There is in fact a deep history of accountable and informed decision-making. The most recent and profound changes have come about via the environmental movement. Since the 1970's, social, environmental, and fiscal/ economic impact assessment methods have been developed and applied to decisions in both public and private realms in the U.S. These practices offer examples of prediction and participation to build upon. Still, they do not address what most people are ultimately most concerned about: health, well-being, and quality of life.

Health Impact Assessment (HIA) fills this gap. It goes beyond environments to estimate impacts on human health and well-being. However, the prediction of downstream health outcomes from upstream decisions is not a simple matter. While advances in public health science have revealed a broad array of social, economic, and environmental determinants of health, the pathways from these determinants to health are complex and often difficult to measure. The pathways have many links and often contain less tangible constructs such as control of destiny, which are even more challenging to measure and lead to uncertainty in predictions. HIA addressed these complexities, intangibles, and uncertainties through both research methods and furthering participation and authentic engagement - opening up decision-making to deliberation. Public concern about uncertainty and their perception of it [3,4] can be alleviated through authentic (public) stakeholder participation.[5]

By enabling participation and making more holistic predictions, HIA adds value to decision-making. It promotes informed and accountable decisions. Though not necessarily operating in a high-stakes, high uncertainty realm of post-normal science,[6] HIA does rely on the precautionary principle, which places the burden of proof on those creating the health threat. HIA is premised on the idea that having incomplete information about potential health outcomes of decision-making is better than having no information at all. HIAs often examine complex pathways to inform decisions, but they are not crippled by uncertainty. HIA is at its core simply a means of overlaying a health lens on decision-making. Yet it explicitly addresses equity by digging into social determinants of health and disparities by class and race. Moreover, by engaging various stakeholders in the assessment process, HIA can create lasting partnerships. It therefore offers a networked approach to public health.

Indeed, HIA promises to be many things. HIA has been called upon to combat short-sightedness,[7] to promote health,[8,9] collaboration,[10] "civic intelligence",[11] "public sociology",[12]

social responsibility,[13] equity,[14] human rights,[15,16] and health in all policies.[17,18] Still, HIA is not a silver bullet, and questions remain about its universal application.[19] If the principles of HIA are not upheld, the field risks becoming just another fad. Most notably, HIAs *"must not degenerate into a theoretical exercise or be another piece of 'box ticking' paperwork"* [20] as has happened with other forms of impact assessment. Even worse, poor quality HIA practice could reinforce existing power structures.

In the U.S., principles-based practice standards for HIA were released in 2009 and a society for practitioners was formed in 2011; both will help to improve the practice of HIA. Still, new practitioners are entering the field in increasing numbers. New trainees must be able to transfer what they've learned to their workplace. More seasoned practitioners need support to continually improve and maintain their practice. To date, only cursory evaluations of single HIA trainings have been completed. A deeper and broader evaluation of HIA training and capacity building to date will help ensure the growth of high quality practice. Even if training is optimized, it's not clear that practice standards are practical and relevant. HIA may not be living up to its promise. Moreover, the term HIA is being used to describe a variety of practices. To that end, an evaluation of practice relative to standards will increase the utility of the standards, identify areas for improvement and growth, and further define the field.

Finally, HIA in the U.S. to date has focused on land-use and transportation policies. HIA is expanding to other policies and sectors, but is not being applied to decisions on massive investments in community development, for example. Community development addresses fundamental challenges in communities including education, housing and employment. Considering the health trajectories from these determinants, there are tremendous opportunity costs of not partnering with community developers. Moreover, the current political and economic climate has left many public health agencies in dire straits budget-wise. A new solution economy is afoot, and its primary investors are interested in health as a metric. New processes and partnerships can leverage community development investments for health impacts. A framework for collaboration between public health, community development and other sectors using HIA is needed. This is described further in Chapter 4.

This research examines the development and state of HIA practice, and opportunities for further development and application of HIA. The fundamental question of this dissertation is how to advance more accountable, informed and healthy decision-making using HIA.

What is Health Impact Assessment?

Health Impact Assessment: An Example

In San Francisco in 2011, the local transportation authority was considering implementing a three dollar congestion charge in the most heavily trafficked areas of downtown. The charge would be used to fund public transit, road maintenance, and bicycle and pedestrian street improvements. Knowing this was a potentially contentious decision, and realizing it would have impacts beyond just traffic, the transportation authority commissioned a HIA. Through a

year-long participatory process, the San Francisco Department of Health (SFDPH) analyzed potential health effects of a congestion charge. They estimated effects related to changes in air pollution, traffic noise, and active transportation. Starting with baseline conditions and making predictions using existing literature, SFDPH estimated the policy would yield positive health impacts. For example, looking at the relationship between traffic, air pollution, pedestrian safety, and health using quantitative models, they predicted that there would be 32 fewer pedestrian injuries by 2015 if the policy were implemented. SFDPH proceeded to make recommendations such as traffic calming that would help realize these health benefits. The transportation authority has yet to adopt the policy, but they now have a better understanding of and accountability to the consequences of their decisions.

Health Impact Assessment Defined

HIA is best thought of as an approach and orientation rather than a tool or method. Its primary purpose is to add value to decision-making. A key feature of HIA is prediction using a health lens to inform pending decisions. HIAs estimate how the decision alternatives at hand will change the existing health conditions. The HIA approach is based on five guiding principles: democracy, equity, ethical use of evidence, sustainable development, and a comprehensive view of health. Through stakeholder participation, transparent processes, and a focus on vulnerable populations, it promotes health for all people. By viewing healthy holistically and considering sustainability, it strives to achieve health in all policies. HIA addresses uncertainty, recommending decision alternatives and mitigations based on the best available evidence. HIA offers a powerful tool for estimating the health and social returns of decisions and holding decision-makers accountable.

HIA adds value to decision-making in several ways:
- It adds a health lens to policies, projects, and plans often outside the public health domain, thereby supporting the goal of health in all policies.
- By integrating health concerns into proposed projects across multiple agencies, disciplines and sectors, it facilitates a networked approach that can leverage much larger investments of partners to achieve a collective public health impact.
- It explicitly addresses social determinants of health and vulnerable populations, thereby promoting environmental justice.
- By making recommendations, it can mitigate negative and enhance positive health impacts of pending decisions.

History of Health Impact Assessment

HIA originated in part from Environmental Impact Assessment (EIA). EIA is a process whereby major development projects of federal agencies such as transportation and energy are assessed for potential effects on the natural environment. EIA practice was codified in the National Environmental Policy Act (NEPA) of 1969. Despite a new societal eco-consciousness at the time, human health was rarely assessed as part of EIA. This was due to political and technical limitations. Still NEPA and EIA set the foundation for HIA. NEPA and EIA

established the principle that externalities of development, especially when they affect public goods such as air and water, must be accounted for and accordingly controlled. NEPA also set up a proactive review process and a space for environmental science and justice to drive decision-making. Today, the methodology, statute, agency infrastructure and expectations of NEPA and EIA comprise an institution.

Although it has the potential to transform planning and development processes, EIA practice differs markedly from HIA. EIAs are often conducted by consultant experts hired by government agencies. Public participation is often limited to comment periods.[21,22] The assessment and resulting report are highly technical and therefore not very accessible to lay persons and the communities. The scope of EIAs is often limited to impacts in the physical environment. As originally conceived and implemented, EIAs do not account for multiple interacting and cumulative changes to the human habitat. Though there is specific language in NEPA about human health, its assessment is left to the discretion of the EIA practitioner. If and how HIA should be incorporated in EIA remains under debate.[23-25] Regardless, the history of NEPA and EIA are illustrative for contemporary practitioners of HIA.

Pre-NEPA: setting the agenda

While the historical build-up to NEPA is deep, the post-war 20th century period is most illustrative. Both the environmental movement and changes in public health set the stage for NEPA. During this period, there is a focus on framing as a form of agenda setting.[26] The environmental movement in the U.S. began with a cause of protecting simply "the environment". Figureheads such as Teddy Roosevelt helped bring awareness to the issue of resource conservation. He and others including Transcendentalists such as Thoreau helped move the public mindset from an exploitative capitalist paradigm to a romantic paradigm that encouraged harmony with nature.[27] While conservation was the mantra, founders of the early environmental movement articulated more holistic ideas. John Muir and other icons promoted conservation because they knew its immediate aesthetic and cognitive benefit, proximate role in health, and critical role in the lives of future generations. Unfortunately, it seems those ideas were not articulated clearly and often enough.

With the advent of antibiotics in 1940's, public health practice transitioned from focusing on *"mains and drains"* to *"bugs and drugs"*.[28] Large-scale environmental improvement projects were traded for narrower, bio-medical interventions. By the 1980's, a new epidemic of chronic disease was underway, which shifted public health epidemiology from a germ theory to black box paradigm.[29] The field began shifting from studying direct relationships between specific agents and diseases to a much more complex process of multiple risk factors and outcomes. Although interventions were often directed towards the individual, there was an increasing realization of a much broader risk environment. As science began to reveal the myriad connections of humans to their surroundings, the definition of environment evolved from just the physical aspects to the social, economic, cultural and political milieu as well.

Meanwhile, rising environmental concern shifted the focus of the environmental movement from conservation to regulation.[30] The period of the late 1940's to mid-1960's marked

the earliest federal legislation to protect air, water, land and wildlife. This includes the first iteration of the Clean Air Act in 1963, which with amendments in 1970 became a prominent federal environmental regulation. The period also saw a series of sentinel thought-pieces such as Silent Spring published in 1962 and high-profile crises including the Santa Barbara oil spill in 1969. Corporate exploitation and vast public works projects such as highway construction and dam building were threatening entire communities. *"Alarmist rhetoric"* was abundant.[31] There are many more stories of threats to the environment; *"a whole catalogue of symptoms can be arrayed"*.[31-34] Beyond the *"deterioration of certain easily perceived environmental conditions"*, the rise in environmental concern was also due to greater environmental aspirations - a result of improved living standards and recent media campaigns - as well as *"democratization of privilege"*.[31] Environmental issues were increasingly being seen as issues of human well-being.

The Great Society developments of the 1960's included the creation of sweeping social programs and the Departments of Transportation and Housing and Urban Development. Johnson's efforts recognized that societal well-being was highly dependent on a range of environmental and social conditions. His observations and concerns were relayed in a speech to Congress in 1965.[35] He spoke of trade-offs and alluded to the need for environmentalism to change: *"The society that receives the rewards of technology, must, as a cooperating whole, take responsibility for [their] control. To deal with these new problems will require a new conservation."* He also spoke of the need for a more proactive preservation of the environment: *"we can introduce, into all our planning, our programs, our building and our growth, a conscious and active concern for the values of beauty."* Although he used the word "beauty", Johnson was concerned with far more than the aesthetics. He had set the stage for NEPA.

NEPA Legislation: a policy for people

NEPA was written as a very loose statute. It was written at a period of a transition in the policy-making paradigm from incrementalism to *"comprehensive bureaucratic rationality"*.[36] NEPA authors did not discuss trade-offs required for environmental protection. Nor did they mandate specific regulatory thresholds like the Clean Air Act or stipulate specific outcomes. Rather, they created a general rule that gradually transformed processes. According to Taylor, *"NEPA is a case of substituting analysis for reorganization: since the statute's sponsors lacked sufficient power to change the decision premises of all agencies directly, they tried to change agency policies indirectly by requiring a different type of information to enter the decision-making process."* [37]

Other historians suggested that *"NEPA's mythic status, rests largely on the power of illusion."* [38] In essence, NEPA was simple legislation that only slightly changed the rules. NEPA authors saw that fragmented, narrow and short-sighted decisions were the biggest threat to the environment. Thus they set to changing how decision-makers could act, and to some degree how they think. They also wisely began to change the frame of the environmental movement. The architect of NEPA, Senator Henry Jackson (D-WA), articulated what many environmentalists to date had not: *"a public policy for the environment is basically not a public policy for those things out there. It is a policy for people."* [24]

Still, NEPA was simply powerful. It entailed *"both the ideals of the natural resources conservation movement preceding it, and the pollution and public health concerns substantively embodied in the air and water pollution laws enacted during the same period."*[39] The purpose of NEPA was: *"To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."*[40] NEPA passed the House 372-15 and passed unanimously in the Senate. It was signed into law by President Nixon on January 1, 1970. Despite its loose provisions, and lack of oversight, it opened up a new discourse and created space for healthier public policy.

Post-NEPA: implementing impact assessments

Whereas pre-NEPA legislation of the 1960's was very proscriptive, limiting negative effects such as air and water pollution, for example, post-NEPA policy was becoming more prescriptive, promoting positive changes.[41] NEPA was certainly a significant step in regulation. However, it regulated in a very indirect way. A key activity called for by NEPA was EIA. The EIA process offered a means of adding information to decisions about the environment. EIA was inherently about measuring trade-offs and externalities of transportation and energy projects, for example. In parallel, regulatory efforts such as the clean air and water acts were forcing private companies to internalize environmental costs. Loopholes were being closed. Corporations began to undertake EIAs voluntarily because their business plans demanded an accounting for long-term impacts.

As the science advanced, EIAs became increasingly complex. The trade-offs considered began to expand from strictly characteristics of the natural environment to social and economic environments and the people in them. Though the measurement of health effects in EIA was initially limited to toxic concerns [24] and was methodologically challenged,[2] it set the stage for measuring a more holistic set of outcomes including health. As well, this early practice helped to develop more robust methods for other impact assessment strategies to build on. EIA methods were being applied in large and complex projects in the nuclear industry, air transportation, and engineering projects.[42] Subsequently, these EIAs entailed "black-box" methods and 1000-page reports, which were often too dense and not useful for the average decision-maker. Public participation in the scoping, recommendations and final reporting of EIAs diminished as the process became increasingly complex. Moreover, because NEPA stated that the results and recommendations of an EIA were merely for consideration, in many instances these massive reports became simply a token of the supposed due diligence of project proponents.

In a survey of NEPA effectiveness and the EIA process, academics cited the following strengths: EIA compels decision-makers to acknowledge consequences, open up processes, and think before committing resources. However, the methodology was the key weakness.[43] The mean time for completing an EIA on Federal Highway Administration projects, for example, rose from 2.2 years in the 1970's to 5 years by the 1990's.[44] By 1994, federal agencies were conducting over 500 EIAs annually, with smaller versions of EIAs producing over 50,000

Findings of No Significance (FONSI's).[45] With these sorts of evaluations, EIAs were becoming *"not a particularly good device for informing anyone"*.[38] Moreover, EIAs were being used for the wrong reason. Karkkainen describes four views of NEPA effectiveness: optimist, monkey-wrencher, skeptic, and legalist critic. In particular, EIA suffered from the monkey-wrencher critique, being used as an obstruction/ roadblock/ paperwork exercise by groups wanting to stall projects. The offenders included environmental groups.

Post-NEPA: synergies of the environmentalism and public health science

As EIA was struggling, changes in the environmental movement and public health science were also setting the stage for HIA. Environmentalism was becoming a much more personal issue, as seen in the growth of Backyard Environmentalists[46] and the Erin Brokovich effect.[47] Environmental health problems were also being recognized as concentrated among specific groups, very often the poor and minorities. This lead to the creation of the environmental justice movement, which called for fair treatment and meaningful involvement of highly-effected groups in environmental policy.

Meanwhile, the role of public health continued to change. In the era of infectious disease, the earliest public works projects - for example water and sanitation projects eliminating typhoid - brought immediate and visible health benefits. In a new era of chronic disease, contemporary public works - for example public transportation - were also perceived to be beneficial to human health. However, few foresaw the long-term sequelae of disconnected, segregated, and car-dependent growth. Public health diverted their attention from systems to individuals left to deal with bad environments, often *"blaming the victim"*. While this view persisted for decades, new discoveries in human development, toxicology and epidemiology were forcing paradigm shifts. The life-course, cumulative impact, and eco-epidemiology frameworks, were instrumental in changing views on the nature of the connection between environment and human health.

These shifts in science were subsequently promoting new movements. Born from public health practitioners, movements such as Healthy Cities sprang up in parallel with the environmental movement, sharing many of the same goals. This movement was focused on *"continually creating and improving those physical and social environments and strengthening those community resources which enable people to mutually support each other in performing all the functions of life and achieving their maximum potential."*[48] Though Healthy Cities arose internationally in the mid-1980's, it had not gained prominence in American public health until recently.[49,50] "Health in All Policy" is another mantra of modern day public health. An environmental health movement was now being realized.

The Birth of Health Impact Assessment

The challenges of constructively utilizing EIAs prompted stakeholders to realize the opportunity in simplifying the process while making it more meaningful by extrapolating to human health outcomes. Proponents of HIA suggest that it offers a much more practical and meaningful assessment.[38] While HIA was a natural offshoot of the EIA process promoted by NEPA, the practice in the U.S. has several other antecedents. HIA was used since the 1970's in

the developing world on major projects of the World Bank. Australia and New Zealand began using HIA in the 1990's. In the U.S., the oil and gas industry incorporated health in impact assessments in the 1990's. In Europe, there was no legislative impetus similar to NEPA prior to the European Union Treaty in 1993.[51] Still, the UK and many countries in Europe rapidly adopted the practice in the late 1990's. The editorial "*HIA - an Idea Whose Time has Come*",[51] published in a 1996 issue of British Medical Journal, was immediately followed by an article entitled "*Climate change; not a threat but a promise: Doing nothing is no longer an option.*". There is no irony here. The establishment of HIA practice was timely, perhaps even overdue. HIA promised to bring a new perspective on complex problems and provide the best available evidence so that *something* could be done.

As mentioned earlier, ecological frameworks for health also created space for HIA. In Europe and internationally this interest was referred to as *Healthy Public Policy*, while in the U.S. it came to be known as *Health in All Policy*. These concepts stemmed from stakeholders in public health and welfare attempting to transform the thinking of their agencies and to expand the purview of their work. The San Francisco Department of Health was one of the first U.S. institutions to succeed in doing this is by using HIA. They saw that *"NEPA epitomizes the comprehensive and meaningful aspirations of the modern environmental era without neglecting the human element."*[39] Citing the *"inattention to health in EIA practice (that) stands in contrast to the interdependence among environmental change, societal conditions, and human health"*,[24] they were the first public health department in the U.S. to begin using HIA. They have since institutionalized HIA in their own agency and other city and county agencies and have led other initiatives to facilitate HIA, such as braided funding mechanisms. Today, HIA is practiced widely throughout the U.S. and continues to grow rapidly. I examine the state and future of HIA practice in the U.S. after first reviewing the principles and process itself.

Principles and Practice of Health Impact Assessment

Principles of Health Impact Assessment

The principles of HIA were formalized by the World Health Organization in the Gothenberg consensus paper [52] in 1999 and later reiterated by the International Association of Impact Assessment.[53] The five principles of HIA are:

Democracy: involve and engage the public, and inform and influence decision makers
Equity: consider the distribution of health impacts across the population, especially vulnerable groups
Sustainable development: judge short- and long-term impacts of a proposal and provide those judgments within time to inform decision makers
Ethical use of evidence: use evidence to judge impacts and inform recommendations; HIA should not set out to support or refute any proposal, and it should be rigorous and transparent.
Comprehensive approach to health: HIA should be guided by the wider determinants of health.

Definitions for operationalizing these principles are in Appendix 1.

HIA in the U.S. shares some principles with evidence-based decision-making (EBDM), which is increasingly relied on in many fields including public health. [54] EBDM sets the stage for rational decision-making and HIA by expanding the utility of data in public health. HIAs strive to provide quantitative estimates of potential health impacts. However, the culture of dependence on science and evidence may cause undue delays in mitigating negative impacts and protecting public health, even when outcomes are somewhat certain.[55] HIA relies therefore on the precautionary principle, which states that *"when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically"*.[56] Australia, New Zealand, and European countries espousing the precautionary principle were early adopters of HIA. Though some academic and scientific leaders in the U.S. have advocated for the application of the precautionary principle, in general it is not widely known or practiced in the US.[55,57,58]

Given this challenge, participatory approaches may go a long way in allowing communities and decision-makers to overcome their demand for complete evidence and apply the precautionary principle. HIAs require effect size data from studies showing relationships between the exposures and outcomes of interest. If those studies are incomplete or inconclusive, HIA estimates must rely on other data and/or make assumptions. Many HIAs also use qualitative data to examine exposures and outcomes. This sets up HIA as a potentially very diverse practice.

Steps of Health Impact Assessment

HIA consists of a series of steps to make predictions about positive or negative health outcomes of a decision at hand. The steps are: screening, scoping, assessment, recommendations, reporting, and monitoring and evaluation. After screening to ensure HIA will add value to the decision-making, scoping considers the range of health impacts and the extent of the analysis. Upon identifying specific exposure-outcome pathways, the baseline conditions are assessed and relevant literature is reviewed. Using primary and secondary qualitative and quantitative data, predictions are made. Based on the evidence from the assessment, recommendations are made. A report describes all of these processes. Finally, the monitoring and evaluation step entails a plan to check the processes and outcomes, including how the HIA has influenced the decision. Appendix 2 provides more details.

HIA is not common practice in most public agencies in the U.S. Even if HIA were mandatory, screening would provide an opt-out. Consideration of whether or not to conduct an HIA depends on feasibility, timing, stakeholder concerns and most importantly, the potential seriousness and distribution of health impacts. The link between screening and scoping is crucial. Once it is determined that a HIA can add value to a decision, scoping considers if and to what extent the conducting agencies – often health departments and consultants - have the capacity to conduct the HIA. This question of capacity is meant to be practical, but the types of pathways studied and the populations they effect have political implications. Hence, within the screening and scoping stage agencies must consider their own willingness and ability to engage in

potentially consuming discourse and action on social determinants of health. This is where stakeholder participation is critical.

Value in the process of Health Impact Assessment

Though it relies on prior research and uses an objective scientific method, HIA is also dependent on community needs and is intended to empower stakeholders. It is focused on problems rather than disciplinary departments,[59] and heeds calls for a science and knowledge production that responds to societal needs.[60] It utilizes technologies of humility, which are *"methods, or better yet institutionalized habits of thought". "Acknowledging the limits of prediction and control"*, they *"confront head-on the normative implications of our lack of perfect foresight. They require not only the formal mechanisms of participation but also an intellectual environment in which citizens are encouraged to bring their knowledge and skills to bear on the resolution of common problems."* [61] Hence, the HIA process itself is valuable if those habits of thought are further institutionalized and common problems are resolved.

Applying Health Impact Assessment

In making predictions, HIA draws out pathways from exposures to outcomes, determinants to impacts. Determinants are the changes in physical, social and economic conditions that would result from the decision at hand. Impacts are the changes in health behaviors and effects in communities. A single decision may influence a multitude of determinants and impacts. The scoping step prioritizes pathways, using criteria including: magnitude, certainty, permanence, stakeholder priorities, and equity.[62]

With increasingly robust evidence on the social determinants of health (SDOH), HIA presents an opportunity to address equity. However, the HIA process must be truly participatory if it is to shed light on injustices and inequities, speak truth to power, and hold decision makers accountable. During the screening and scoping states, lead HIA assessors such as health departments (HD's) must consider to what degree they can support the community in addressing SDOH, either as a direct provider or an advocate. Health departments and the community-based organizations (CBOs) they support must recognize their limitations in addressing SDOH via the HIA process. While SDOH can be highlighted, they cannot always be addressed and recommendations will not always be accepted. In other words, HIA practitioners should not over-promise to communities seeing HIA as the solution. HIA is part of the solution. It is a means of opening up new dialogues and partnerships for health, but not a means of securing already-established objectives for particular changes.

Health departments are institutions embedded in a larger political context of local government. HIA allows HD's to ask the tough but necessary questions to transform themselves and address SDOH. For example, addressing SDOH via HIA will likely require a restructuring of the budget. Since their budgets are generally static, HD's embarking on HIA are forced to reconfigure or cut other services. However, this does not mean that trade-offs are always necessary. For example, the costs of promoting community gardens could eventually be offset by the benefits of reduced restaurant inspection as consumers shift their food source. This is in

addition to decreases in obesity and chronic disease, which would eventually result in lower clinical services costs for HD's. Still, certain costs could not be offset and would have to come from other sources or a pooled fund. HD's must be able to recognize how their activities and budget are a small part of a complex system of costs and benefits, and a much broader ecological cycle. Beyond budgeting, there are many other important questions. Which health outcomes should be followed upstream, and how far? How to identify social determinants that are most impacting health and also the most actionable? At what point must the HD focus on leveraging other agencies such as housing and transportation? How much local evidence must be accumulated before doing this? How must strategic plans, organizational charts, surveillance systems, annual reports and staff performance evaluations change?

The shift from providing services to facilitating healthy environments may be slow and subtle, but public health cannot act alone. Part of this transformation requires public health agencies to expand and enhance partnerships with CBO's and other agencies whose projects influence health. As well, public health is on the front line of social issues and witness to injustice. Assuming this role as witness offers opportunities to change the conversation about the production of health. Unlike the other sectors also on the front line, public health has an explicit mandate to protect health. Given compelling new evidence on the relationship between inequity and health, public health also implicitly is called upon to create health equity. HIA can help to achieve this.

By addressing structural inequities through a health lens, HIA effectively reframes the production of health. It addresses poverty, class and race, either directly or directly as a determinant of health in vulnerable populations. The role of HIA in creating transparency and accountability in decision-making also cannot be over-emphasized. It is consistent with a participatory approach of starting where the people are, enabling communities to prioritize for themselves. HIA recognizes the inefficiency of decide-announce-defend approaches and prompts communities to ask for support early, ensuring every plan is a people's plan. However, the community will not be willing and able to focus on planning and SDOH until their immediate needs are met. Again by authentic participation, HIA provides a mechanism for public health to effectively turn off the tap (i.e. address SDOH) while still wiping the floor (i.e. meeting immediate needs, which are often health services).

Finally, many HD's are neither willing nor able to speak truth to power. In addressing SDOH, HD's are likely to encounter conflicts with developers, corporations and other private interests. HIA will be much more readily accepted if it can get in front of development, well before decision-making and planning have started, rather than appearing to interfere in projects that are already underway. The urban renaissance is underway, and many powerful groups, even those seemingly concerned about the quality of the human environment, may not be equally concerned about health equity.

Alternatives to Health Impact Assessment

There are several processes that are similar to elements of HIA, however none fully encompass the practice of HIA. Assessment methodologies such as comparative and cumulative

risk assessment (CRA) and lifecycle assessment are similar to HIA in predicting outcomes of determinant-impact pathways. However, risk assessments remain narrowly focused on a single determinant or set of determinants that can be measured quantitatively, such as toxic exposures in the environment. Risk assessments do not incorporate the same quantity and quality of stakeholders and health effects as HIA does.[63] Life-cycle assessment considers a broader array of determinants and more complex pathways, but does not account for differences in the local context and decision-making. Finally, cost-benefit and cost-effectiveness analysis offer another alternative to HIA, however they *"focus more on analytic than deliberative aspects of decision-making"* and do not facilitate the use of qualitative data.[64] Even by expanding and innovating the practices of risk assessment, life cycle assessment and cost-benefit and cost-effectiveness analysis, none will likely fill the role that HIA can. HIA, *"by its very nature, lies at the intersection of science, policy and stakeholder and community engagement"*.[64] The origins of HIA, its foundational principles and resultant practice that emerged, and its current uptake by a variety of practitioners and stakeholders make it ideal for growing.

How is the Field of Health Impact Assessment Growing?

The field of HIA is growing rapidly. Since the first HIA was conducted in the US in 1999, the practice has steadily grown to about 120 HIAs completed to date. HIA is now becoming mainstream, with a recent article in Health Affairs [65] and a report by the National Academy of Science [64]. The field is facing challenges as it is growing quickly. Funders and facilitators such as the Robert Wood Johnson Foundation, Pew Charitable Trusts, and the Centers for Disease Control and Prevention have tried to direct the growth and expand the practice to new geographies and disciplines. There have been many debates about how to grow the practice, and if and how it should be institutionalized. Institutionalization can occur in several ways. It might mean that the practice becomes more normal within agencies, whether voluntary or mandatory. It might also mean that the partnerships and indicators created by HIAs are established within agencies. This research cannot answer the question of institutionalization, but it will help to determine how to make the practice more ubiquitous.

Capacity-Building

To date, a variety of education and training activities have been used to develop HIA capacity. Well over 500 people were trained in 23 courses run by the CDC since 2006. In addition, organizations such as the San Francisco Department of Health and Human Impact Partners, as well nearly half a dozen universities sponsoring graduate level courses, have trained nearly 1000 more people. A cursory review of all of these trainings reveals a great diversity among the trainees, ranging from inexperienced students to seasoned professionals and area experts. Some work in progressive, well-resourced organizations that have adopted the HIA paradigm, while many others do not. Some trainees may have a very real issue for which they plan to use HIA, while others are simply interested in knowing about the concept. Given this scenario, and grounded in the mantra of health in all policies, the growth of HIA will require building capacity among many different actors across many different disciplines and sectors. HIA is not only for professionals. Lay persons in the community are also being trained as active

practitioners and authentic participants in HIA. Few of these HIA training activities to date have been evaluated beyond the immediate experience to assess long-term outcomes.

Quality Improvement

It is unclear if the quality of HIA practice has kept up with its growth to date. Practice standards[62] based on international principles [53] were introduced in the U.S. in 2009. Standards were first produced using a consensus process involving fourteen authors from seven organizations that had practiced HIA. The second revision (2010) involved five organizations, including four of the original authors and two new ones. The second revision also incorporated input from a conference – the HIA of the Americas. They were developed amid a wealth of guidance on HIAs internationally, but brief introductory and training materials in North America.[66] The standards helped give formal recognition to the field, setting up opportunities for funding and further promotion of HIA.

In general, standards and guidelines are a key component to quality improvement in any industry. In order to improve quality in the field, standards must be relevant and practical, defining norms and expectations, not just aspirational abstractions. Standards serve several related purposes. First, they identify the core elements of the field, thereby limiting the definition of HIA. Standards also create a culture of evaluation, by providing a shared goal and sense of belonging and professional identity.[67] However, professionalization may discourage practice by lay persons; this will be examined. Finally, standards represent innovation. They are not static, but dynamic, serving as the starting point for translating theory into practice. As evidence of new best practices is uncovered, it should be incorporated into ever-evolving standards.

However, the practice standards should not be confused with competencies. The standards describe the minimum elements and steps in conducting the HIA. Someone proficient in the core competencies – for example epidemiologic methods and community-based participatory research - may be more likely to practice quality HIA when using the standards. However, for someone without the core competencies, the standards alone will do little to improve the quality of the practice. Hence there is a clear link between HIA training and practice. Still, in lieu of data to precisely examine that link, an evaluation of the state of the practice will help identify needs and determine where competencies should be bolstered. To date, the field of HIA has been characterized and described,[68] but no one has fully evaluated the alignment of current practice with these principles and standards. Doing so will identify areas for improvement and mobilize the field to move further from theory into practice.

The Scope of the Field

Although HIA is being applied in partnerships with agencies beyond public health, questions remain about its utility in addressing health in all policies.[69] HIA is first and foremost a paradigm, not a method. It should be broadly applicable to a range of policies and contexts. However, HIA has been most often applied in areas such as transportation and land-use. These areas represent the low-hanging fruit where there is a good evidence to use in the HIA and partnerships are readily established. Continued practice and improvement in these areas will help

develop the HIA approach and improve its stature, but growth will primarily be in size, scale and geography, not scope. By promoting democracy and addressing vulnerable populations, this type of work will address some of the SDOH. However, the biggest challenge lies in growing HIA in areas where the evidence is not so clear and partnerships are not so well established. These areas may also hold the biggest benefit, since the fundamental social determinants lie in the more intangible arenas of social class and power.

One such fundamental social determinant is education. Schools have the potential to change the trajectories of children and the well-being of communities through well-known pathways such as transportation and housing, and more complex and lesser-known pathways such as control of destiny. As well, schools represent massive investments in public goods. When those public goods are not fairly distributed, the results may be catastrophic for certain communities. School closure is an example of a very clear and critical decision-point about health equity. In some instances, the scenario also reveals that the primary users of schools – the students – and do not have input on their development. Despite the fundamental nature of education and the potential resources to be leveraged and benefits to be realized, few HIAs have directly assessed decisions in the education sector. As of 2011, education was the topic of only 3 HIAs in the U.S. One possible reason is that certain organizational resources are needed to participate in and use HIA effectively. The growth of HIA in decision-making agencies such as planning and education must be cognizant of those needs. Hence, a HIA of decisions in the education sector may help elucidate a model for expanding HIA practice to that setting.

Another opportunity to expand HIA lies in the field of community development. Community developers invest billions of dollars annually into low-income communities, primarily in the form of housing. Community development espouses many of the same principles of HIA. However, some community development projects have focused on infrastructure rather than human capital. Also, there is not a routine or rigorous process for predicting the outcomes of community development projects. Therefore, a framework highlighting the potential collective impact of community development and public health – and more importantly how it can be realized via HIA – will be helpful in building a partnership to improve outcomes for a shared social justice mission.

The Big Picture

Ultimately, public health addresses the externalities of public and private investment. In general, current business plans are not fully accountable to the state of our water, air and other public goods. Although models such as cap and trade seek to valuate and thereby include the consideration of public goods in business, their use is not ubiquitous. Therefore, achieving public health is not just a matter of advocating for social justice, but also one of helping to close the loopholes in the cycle of economy and ecology. That is, the connections between the economy, the environment, and health must be elucidated. To do so, better methods are needed to project long-term health outcomes resulting from a wide array of investments in public goods and the community. For example, education is a key component of human capital, and therefore ultimately health. Education investments show some of the strongest returns. For example, considering the costs saved on incarceration and health-care and the benefits of an improved

employment trajectory into adulthood, investment in pre-school shows a return of 13:1.[70] Compared to more proximal health determinants such as health care, these upstream investments yield much greater returns, but are also much harder to measure.

Though measuring such returns has traditionally been challenging, it is now becoming more feasible. Life course, cumulative impact and SDOH findings have helped foster a more holistic understanding of health and its connection to a range of upstream factors. As well, the evidence on health and development has grown substantially, and many longitudinal studies are nearing completion. This new knowledge in public health science offers evidence that can leverage investments outside of public health. HIA incorporates this new knowledge to offer a form of measuring returns to guide investment. From a scientific standpoint, public health is poised to begin using HIA to effectively measure the health returns on a range of upstream investments.

This readiness is timely. Public health funding is insufficient to fully pursue interventions suggested by life-course, cumulative and SDOH evidence. As well, the economic downturn has revealed the volatile nature of public health funding. Public health is trying to do more with less, as agencies across the nation have experienced dramatic budget cuts. Major increases in revenues for public health via taxes are unlikely, at least until public health can more effectively frame its efforts and accomplishments. Meanwhile, alternative and supplemental sources of funding such as foundation grants are also harder to come by and are not sufficient to achieve health.[71]

The public health and philanthropic sectors alone cannot supply the capital needed to achieve a sustained public health. *"Our nation's investment portfolio with regard to health is weighted far toward short-term returns."*[72] However, resources cannot simply be shifted from care to prevention. The rule of rescue dictates that human nature will always opt for the emergent medical rather than preventive solution.[73] As well, since medical profits are dependent on downstream interventions, the scope of interventions supported by the healthcare sector is limited to the biomedical model. Public health would be best served by redefining its work, helping others look through the public health lens, and creating new partnerships outside of the health sector. HIA offers an opportunity for doing so.

How to Evaluate Health Impact Assessment?

HIA is primarily concerned with producing specific predictions, not generalizable knowledge.[74] HIA predictions are meant to apply to an immediate and specific decision-making context. HIA asks "What's happening?" types of questions.[75] It is inherently descriptive, estimating what the future might look like by using theory and causal evidence to extrapolate from existing conditions to future outcomes. Because HIA does not involve hypothesis testing through direct observation, the nature of the design and validity issues are markedly different. Veerman offers the most lucid and authoritative discussion of validity concerns in HIA: *"A HIA must be based on a theoretical framework that ultimately rests on research that is internally valid. HIA itself, however, is not primarily intended to investigate causal relationships; these*

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simply have to be assumed valid in order to make prediction possible. Therefore the concept of internal validity does not directly apply to HIA."[74]

The primary validity concern in HIA, according to Veerman, is plausibility. This concern focuses on the accuracy of the initial conditions assessment and the specificity of the theoretical framework/ relationships in the causal pathway. Additional attention should be paid to formal and predictive validity concerns, but again these are dependent on plausibility, difficult to assess, and must occur after the HIA is complete. Veerman offers a checklist for establishing validity in HIAs. Appendix 3 contains a brief overview of validity concepts per the HIA framework.

These validity concerns are important to consider, but my evaluation of both training and practice is focused on the processes. In evaluating training, I am interested in how people were trained and then able to transfer the learning and partnerships into practice. In evaluating practice, questions may be asked about the outcomes of decisions and whether the predictions held true, but these are not the focus of my research. The goal of my research is to improve the quality of the practice. Thus it will helpful to review briefly the few studies of the HIA process.

In terms of training evaluation, there has not been a comprehensive and systematic study of U.S. trainings to date. The Centers for Disease Control conducted in-depth qualitative studies of two specific trainings. The study gathered data from all of the roughly 30 participants, at periods of 6 and 12 months, using some combination of participant observation, surveys, focus groups and document review. The results provide valuable insights, however, these trainings were the very first two conducted by the CDC. Since then, nearly two dozen more have been conducted; anecdotally, the content and delivery has improved with each subsequent training. As well, the participants in these first two trainings were likely early adopters and not reflective of the type of participants in subsequent trainings.

Some of the subsequent trainings have been evaluated by brief survey conducted on-site immediately after the workshop. However, these evaluations are limited, focusing on affect rather than effect. That is, they address more the feelings and preferences rather than the outcomes. Given that they are conducted on site, there is also no opportunity to understand how the training was transferred to the workplace. Finally, groups such as Human Impact Partners (HIP) and the San Francisco Department of Health (SFDPH) have each trained an equally large if not greater number of participants. The profile of those participants, however, is slightly less professional and more community-based. Evaluations conducted by HIP and the SFDPH have also been limited to brief on-site surveys of affect. Given this limited scope of training evaluation, it is worth broadening the evaluation to include all of the trainings described.

In terms of practice evaluation, the field of HIA has been characterized but not fully evaluated against the standards and principles. The most study most relevant and similar to my own examined 27 HIAs published by Dannenberg and colleagues in 2008.[68] The study abstracted data on characteristics of the HIA process from both reports and unpublished sources. The study described briefly the topics, funders, methods and recommendations of the HIAs. However, the study examines HIAs conducted up to 2007, before practice standards were available. Hence, there was no benchmark by which to evaluate the quality of practice. Even so, the cursory

descriptions of the basic steps of HIA in this study do not provide enough detail to significantly improve practice. This study was the first of its kind and was generally more useful in helping direct decisions about the next HIA topics and contexts to fund. No other studies have been conducted since, despite the release of practice standards and the increasing growth of the field.
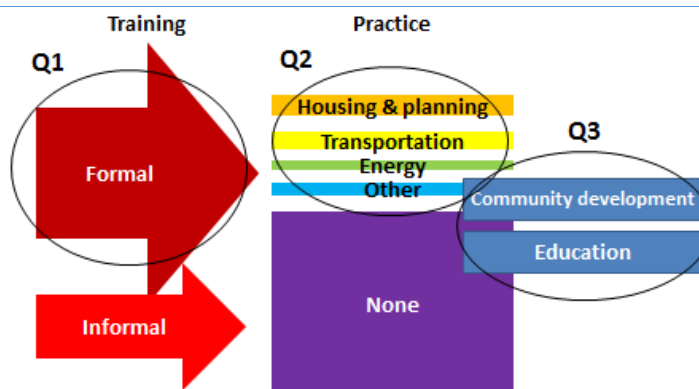
Finally, it should be noted that all HIAs are supposed to include a monitoring and evaluation component. This final step of HIA should not be confused with my proposed work. The HIA step calls for measurement of the implementation of recommendations and decisions and the realization of projected health impacts. It is focused on measuring the outcomes and validity of the HIA. Like the HIA step, my training and practice evaluations may ask about outcomes of the HIA. However, I am not seeking to fill in the evaluation data missing for many of the HIA conducted. Other evaluators are already doing this. My study focuses on HIA processes, seeking to make judgments about the quality of training and practice and ultimately the relationship between processes and outcomes.

Overall Conceptual Framework

The HIA paradigm draws from a number of frameworks, most notably the SDOH and healthy urban governance [76] frameworks. My research is focused on improving and expanding HIA training and practice. Therefore, general theories about training and practice are more relevant in helping to define my approach. Still, it is worth conceptualizing how my three questions will address the larger question of how to grow the field of HIA.

Training may be formal or informal, and lead to degrees of HIA practice or no HIA practice. Both training and practice have yet to be adapted to accommodate community development and education. Figure 1 represents estimates of the proportions of the types of training and practice.[64] My research focuses on three separate processes of formal training, reported practice, and opportunities in community development and education. However, the training evaluation will examine if trainees went on to practice, and there is the potential to examine the link between training and practice quality directly by merging data about training experiences (Q1) with data about HIA practice (Q2), although it is expected that relatively few trainees have gone on to conduct HIAs.

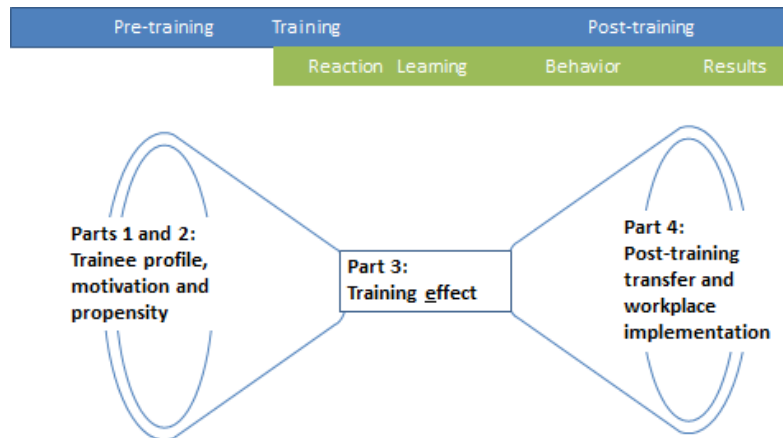FIGURE 1. OVERALL CONCEPTUAL FRAMEWORK

Building Capacity

Given the variety of backgrounds and motives of HIA trainees, the characteristics of the trainings must also vary to accommodate all learners. Still, there should be some general best practices for building HIA capacity. Lessons from other efforts to develop the public health workforce, for example around evidence-based practice, may be illustrative. However, many of these evaluations have been strictly quantitative and not fully focused on the application of what was learned.[77,78] Still, the general public health workforce is becoming increasingly diverse as the scope of public health activities broadens.[79] It includes professionals from many different *"feeder disciplines"*.[79] The development of HIA capacity faces similar challenges and can be served by these more general frameworks.

Koo and Miner offer a framework for professional development in public health that integrates three other conceptual approaches: adult learning theory; competency-based education; and the Dreyfus model of professional skills progression.[79] Adult learning theory recognizes that adults want their experience and knowledge to be valued and what they learn to be immediately applicable. Competency-based education specifies the outcomes of the learning into certain recognizable skills. Ideally these skills align with professional standards, for example those set by accrediting and certification bodies. Finally, an expanded Dreyfus model suggests that there are seven sequential stages between knowledge acquisition and application of competencies in skills, ranging from entry-level to expert to luminary. It also distinguishes and values leadership competencies and emotional intelligence as necessary for achieving higher competency. Koo and Miner's integrated model is an ideal to be applied and tested in future capacity-building efforts. However, since my research is retrospectively evaluating capacity-building across a range of education activities built on no specific theoretical framework, I can only probe on the ideas of the integrated model. For example, it might be useful to assess to what degree trainings have arranged the learning environment for adult learning and have set out competencies to be reached, and subsequently how that influenced the outcomes.

A more practical framework for this work is Kirkpatrick's 4-level evaluation model.[80] This framework considers sequential steps of reaction, learning, behavior and results. Most often the training itself is a single, time-limited event that must accommodate the trainee's profile, motivation and propensity for HIA to produce longer-term changes in practice in the workplace (Figure 2). The training is ideally a catalyst. My work focuses on the inputs and outcomes, no so much the outputs - the training affect - which has already been evaluated and does not always factor significantly in the longer-term outcomes. I hypothesize that though the conduct of the training itself is important, more critical is that the profile of the trainees match the type of training and that opportunities for continued learning and follow-up are available.

FIGURE 2. TRAINING EVALUATION: INTERVIEW PROCESS

Improving Quality

To improve quality in the field, standards must be relevant and practical, defining norms and expectations, not just aspirations. Standards serve several related purposes. First, they identify the core elements of the field, thereby limiting the definition of HIA in ways that can be both helpful and harmful. Standards also help create a culture of evaluation, by providing a shared goal and sense of belonging and professional identify.[67] Conversely, this professionalization may discourage HIA practice by lay persons. Finally, standards represent innovation. They are not static, but dynamic, serving as the starting point for translating theory into practice. As evidence of new best practices is uncovered, it should be incorporated into ever-evolving standards.

With the goal of assessing the state of the practice to identify future needs, this study will examine if practitioners have followed written HIA practice standards. It will also characterize, to the extent possible from HIA reports and data from the training evaluation that can be linked, the HIA practitioner and organization they work for. These characteristics may help explain why a certain level of practice quality was achieved. Concerned with the adoption of innovation, organizational theory helps to frame the role of HIA standards. Because many HIA practitioners belong to larger organizations whose mission does not fully align with HIA principles and budget does not accommodate HIA practice, organizational characteristics may be the key variable in determining the degree of adherence to HIA standards. Studies of organizational innovation and clinical practice guidelines, for example, demonstrate that myriad factors influence adherence to guidelines and standards. In a meta-analysis of innovation determinants, 13 variables related the structure, processes, resources and culture of the organization influenced innovation.[81] These organizational characteristics, which will also influence the workplace implementation of HIA from training, are asked about in the interviews of trainees.

Expanding the Scope

Given the promise of HIA, its role in addressing decisions in new topic areas should be evaluated. A number of theories will inform this question. These include theories of positive youth development [82] and social capital, [83] which consider the assets and social resources in the environment for development and well-being. Though community developers and educators might not be willing to prioritize health outcomes, youth development and social capital are within their scope of action.[84] The notion of leveraging resources is premised on theories of networked approaches.[85-87] That is, in a system of fixed resources, higher output can occur through efficiencies of cooperation and economies of scale.

Dissertation Chapters

This dissertation follows the three paper format. Each chapter represents a manuscript to be submitted for peer-reviewed publication (Appendix 6). Chapter 2 and 3 are research papers broadly evaluating the field of HIA in the United States. They examine the characteristics and quality of the rapidly growing field, recognizing that HIA is part of a strategy for achieving Health in All Policies as well as a set of principles and a paradigm that can be broadly applied to advance public health in other agencies and sectors. Chapter 4 builds on this notion by taking a critical look at opportunities to use the HIA paradigm as a new way of doing business with community development and other fields. It addresses many of the qualitative findings elucidated in Chapter 2. Chapter 5 briefly summarizes the results, makes further recommendations for advancing the field, and considers additional alternative applications of the HIA paradigm.

CHAPTER 2: Health Impact Assessment Training in the United States: A Study of Scope, Outcomes and Needs

Abstract

Context: The practice of Health Impact Assessment (HIA) is growing rapidly in the United States, yet there is relatively little information about the current state of HIA training or needs of HIA trainees.

Objective: To describe the scope of HIA training activity and assess the outcomes and needs among HIA trainees.

Design: A mixed methods approach employing quantitative data to characterize the scope of activity and qualitative data from trainee interviews to assess training outcomes and needs.

Setting and Participants: In-person HIA trainings conducted between 2006 and 2012 by four organizations: the Centers for Disease Control and Prevention, Human Impact Partners, the San Francisco Department of Health, and universities. From a sample of 74 trainees, 49 were interviewed by telephone.

Main Outcome Measure(s): Training outcomes were measured across a spectrum of reaction, learning, behavior and results. Measures examined the trainee's objectives, training format, networking opportunities, dissemination, participation in HIAs, and communication and collaboration with partners.

Results: The four organizations conducted at least 75 in-person HIA trainings in 29 states attended by over 2,200 people. Trainees worked primarily in health agencies (63%) and the public sector (60%). Trainees reported that their objectives were met, especially when relevant case-studies were used. New collaborations were established via the trainings and maintained. Many trainees disseminated what they learned and engaged in components of HIA in the absence of a funded HIA project. Training was often reported as the first step towards a more holistic public health practice. Trainees need assistance with quantitative methods, project management, community engagement, writing and framing recommendations, and evaluation.

Conclusions: HIA training has reached many stakeholders in public health and in many instances has catalyzed a range of HIA-related activities. Refined training and new opportunities are needed to engage the diversity of practitioners and stakeholders.

Introduction

Health Impact Assessment (HIA) is a systematic process to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.[64] As a cornerstone for Health in All Policy (HiAP), HIA promotes healthier decision-making.[18,39,88-91] HIA is a form of decision analysis to address uncertainty and reveal tradeoffs that also applies principles of democracy, equity, ethical use of evidence, and a comprehensive and sustainable view of health.[7-9,14,92] HIA can facilitate collaboration,[10] civic intelligence,[11] public sociology,[12] social responsibility,[13] and human rights.[15,16] The rapid growth of HIA in the United States reflects this optimism about the approach. Since the first HIA was conducted in 1999, nearly 170 HIAs have been completed in 35 states and 70 more are currently underway.[93] HIAs are being conducted by a variety of people, in a range of contexts, on many new topics.[93] While HIA appears to be fulfilling its promise in some instances,[94] myriad challenges and opportunities remain.[38,69,95] A key outstanding question is if and how HIA and related processes should be institutionalized.[23,24,94,96-99] To address these issues and advance the field, HIA capacity must be built.[100]

HIA capacity is built by micro-, meso-, and macro- strategies.[101] The micro-level focuses on building knowledge and skills of individuals within organizations, yielding competencies such as effectively partnering with stakeholders.[101] Micro-level strategies include workshops, courses, mentoring, and technical assistance. The meso-level focuses on building organizational resources and support for competent practitioners. Finally, macro-level strategies facilitate an enabling environment [102] by promoting HIA and HiAP approaches among an even broader group of stakeholders. All three levels are necessary for HIA practice to advance. Lack of support at the meso- and macro-level are often cited as barriers to HIA practice. However, strong leaders may work through these organizational and systemic barriers to promote and practice HIA,[94] achieve public health objectives,[103] and cultivate the meso- and macro- landscape for HIA. Micro-level strategies therefore warrant specific attention.

In-person training has been a primary micro-level strategy to date. The Centers for Disease Control and Prevention (CDC), National Association of City and County Health Officials (NACCHO), and American Planning Association (APA) facilitated the first formal in-person training in the U.S. in February 2006. At the time, only 17 HIAs had been completed in the U.S. Simultaneously, the University of California, Berkeley (UCB) began the first graduate-level HIA course. Organizations including the non-profit organization Human Impact Partners (HIP), the San Francisco Department of Health (SFDPH), and other universities began offering training in 2008. By 2010, an additional 69 HIAs were completed.[93] These organizations and others continue training as the field grows rapidly. However, there is no precise data describing the scope of training activity to date. Furthermore, the long-term outcomes among HIA trainees, in terms of the utility of their training in the workplace, have not been evaluated. Finally, no one has assessed the outstanding needs of HIA trainees. A better understanding of HIA training scope, outcomes and needs will help to optimize micro-level strategies and HIA capacity-building at all levels. This study is the first to comprehensively examine these questions.

Methods

Design: This was a mixed-methods exploratory study utilizing training documents and participant lists to describe the scope of training activity and semi-structured interviews to evaluate training outcomes and needs among trainees. A training evaluation framework developed by Kirkpatrick [80] was used to measure outcomes in terms of reaction, learning, behavior and results. Additional frameworks were employed to consider the role of adult learning, competency-based education, and skills progression in micro-level workforce development that addresses meso- and macro-level challenges.[79,101] (Figure 1)

Subjects: Four trainings models were examined: CDC, HIP, SFDPH and UCB (Table 1). Key staff from these organizations identified 75 in-person HIA trainings held in the U.S. between February 2006 and July 2012. Descriptions of the trainings and participant lists were requested from training staff and the training-site partners. Thirty-two participant lists containing 900 names were obtained. From these lists, interview participants were selected to identify best practices in HIA training while creating an illustrative yet representative picture of the broad range of trainee experiences, outcomes and needs. Thirty-four participants were selected purposefully based on one of two criteria. First, authorship or participation in a HIA served as proxies for experience with and knowledge of HIA. Other similarly illustrative cases were identified by training staff or referrals from experienced practitioners. Twenty-nine participants were selected this way. Second, five participants were selected based on geographic location as a proxy for macro-level factors such as political climate. Purposeful selection continued until reaching saturation regarding the challenges faced by trainees. Another 40 participants were selected randomly to ensure generalizability. Since CDC trainings were the earliest and initially most ubiquitous, more CDC trainees were selected. A total of 74 persons were included in the sample and invited for interviews by email, using three attempts if necessary. The study protocol was reviewed and approved by the UCB Office for the Protection of Human Subjects. Informed consent was obtained for all subjects.

Measurements and Analysis: A basic profile of all trainees including their sector and discipline of employment was obtained from participant lists. A semi-structured interview guide (Appendix 5) was developed from the evaluation framework. It asked about the trainee's background, pre-training motivation and propensity, the effectiveness of the training, and post-training transfer and workplace implementation. Effectiveness measures included whether trainees met their own objectives, were satisfied with the course format, and had valuable interactions with other trainees. Transfer and implementation measures included perceived usefulness of the training, passing on lessons, participating in or conducting a HIA, viewing policies through a health lens, and communicating and collaborating with partners. Other questions addressed determinants of on-the-job performance such as organizational climate and self-efficacy. The guide was field-tested on three HIA practitioners. Telephone interviews were conducted between December 2011 and July 2013 and recorded. Audio files were analyzed and coded directly in Nvivo 9 software. Codes were defined by the interview guide and derived from the data. A single author (J.S.) coded all interviews.

Results

<u>Training scope:</u>

The four course offerings differed in terms of purpose, access, participation, facilitation, format and follow-up (Table 1). CDC and HIP trainings often tailored objectives to the many different locales and audiences. Partially supported by foundations and staff time, they generally did not require enrollment fees and were held at local trainee sites. Access to SFDPH and UCB courses relied on fees and required more resources. All courses tried to mix trainees by agency and discipline. SFDPH and UCB courses were longer and involved preparation and work outside the course hours. All courses used case studies, often local scenarios that could be real HIA projects.

The four courses changed over time. The first trainings conducted by CDC/ NACCHO/APA were competitive, requiring applicants to have a HIA candidate project and a planner and public health professional dyad. A grant funded travel for the trainers and participants from across the country. After funding expired, there was no application process but sites had to support the CDC trainers' travel. Subsequently, some locations had no HIA background while others already had a specific project and/or funding. Sites were also responsible for recruiting participants, who sometimes came from single agencies such as Departments of Transportation. These changes required the CDC trainers to adapt and adjust their training model. Additionally, early feedback prompted the CDC to use fewer, more relevant cases and eventually a single case study; participants could use their own if they had sufficient baseline data. The other organizations also adapted their models. HIP began to incorporate formal mentoring and technical assistance, while the SFDPH course attracted an increasing number of practitioners looking for specific HIA skills, especially in quantitative analysis. By 2013, the UCB course incorporated elements of public policy, open data and design thinking.

All told, between the four models at least 2,200 people were trained in over 75 courses in 29 states between February 2006 and July 2012 (Table 2). Trainees worked primarily in health agencies (63%) and in the public sector (60%) (Table 3). Because employment information was available for only 18% (405/2228) of all trainees, changes in their profile over time were not examined. Students in the UCB course came from programs including public health, planning, public policy, environmental sciences, and others.

<u>Training outcomes:</u>

Study participation: Of the 74 trainees selected to participate, 48 completed interviews. Among the 26 not completing interviews, eight had expired contact information and could not be reached, 12 had apparently valid emails but did not respond, four initially responded but never scheduled, and two declined. The mean length of interview was 47 minutes (SD 7.7). The mean duration between the training and interview was 3.4 years (SD 1.7).

Pre-training profile, motivation and propensity: The 43 trainees from CDC, HIP and SFDPH who were interviewed - classified here as "professionals" to distinguish them from full-time

university students - were from 22 states and 20 different training courses. They worked primarily in health agencies (66%) and in the public sector (70%), similar to the universe from which the sample was drawn (Table 3). Three-quarters (32/43) of the professional trainees had obtained a graduate degree, generally before their first HIA training. Doctoral degrees (10) included PhD, MD, DrPH and EdD, while Master's degrees (22) included MPH, MS, MA, MBA, MLA, MPA, MSW, MURP, MUD, and MCP. Over one-third (16/43) of trainees had a master's degree in public health. At the time of training, at least 10 trainees were in roles that included "Director" or "Senior" in their job title, while 33 had roles that included coordinators, managers, associates, assistants and non-senior technical titles such as educator, epidemiologist and planner. There was no comparable data on education credentials for the universe of trainees.

Trainees pursued the training for a variety of reasons. Some, especially planners, were not initially motivated to attend but were prompted or invited by colleagues in public health. Others mentioned the need for planners and designers to stay updated on novel techniques, seeing HIA as something to stay apprised of. The training was generally viewed as an opportunity for building networks. Many simply realized the value of HIA in their existing or planned work. Some had specific projects in mind and proposals or funding to pursue them. Several were responding to community demands and saw it as a way to engage communities, while others were interested in HIA's ethical implications and its ability to address social determinants of health and environmental justice.

Post-training reaction: Trainees were generally positive about their experience (Table 4). They expressed optimism about the HIA concept, noting that the training was different from others (on other topics). Especially at the early trainings, they reported that using too many conceptual frameworks and too few examples was not effective; trainers subsequently made adjustments. Trainees appreciated the materials provided and often retained them. However, they wanted a more continuous and ongoing training process. Some trainees not in public health felt that they were not addressed, yet most had beneficial interactions with fellow trainees from other disciplines. Most trainees acknowledged that their basic objectives were met, although this was dependent on the stage of their project, knowledge about HIA, and career.

Trainee objectives were met especially when relevant case-studies were used. Early trainees realized the novelty of HIA and accepted the limitations in making progress on their own projects during the training. Subsequently, as case studies became available and were incorporated, their scale and type was not relevant for all. Trainees emphasized that the decision and jurisdictional features of cases were important. For example, trainees from rural areas wanted examples such as energy projects. In addition, several trainees couldn't work through their own case because they did not have the knowledge or support to pre-screen HIA projects. Trainees emphasized that adult learning must be practical and wanted more concrete examples specific to their needs and interests. They wanted more details on the practical application of HIA concepts and a realistic accounting of the human and financial resources required. Trainees often understood HIA as more than just analysis, seeing it as a means of operationalizing social determinants of health and health equity. Some sought training for that reason, while others believed they were learning a purely objective method. There was some dissonance in the

reactions of these two groups, each wanting more emphasis on their interests. Again, this required the trainers to continuously adjust and adapt the training.

Post-training Learning: While trainees were not assessed on particular knowledge acquired, they were asked about knowledge of HIA beforehand and additional training afterwards as a proxy for how much was learned and retained and their unmet needs. Most trainees had a basic understanding of the HIA framework and six steps. Afterwards, some trainees undertook further reading and learning on their own. Others received mentoring and/or technical assistance connected with a project. Still most trainees had not engaged in further formal HIA training themselves, but rather shared lessons with colleagues.

Post-training behavior and results: Trainees referred to their courses as catalysts of subsequent efforts and successes. They described impacts on their daily work and interactions with colleagues. The trainings provided new perspectives on old problems, helping trainees realize opportunities for health in their communities and their work. Some trainees mentioned that HIA is similar to existing processes such as neighborhood planning and cost-benefit analysis, but is just being called something else. At least 29 trainees conducted or participated in HIAs, several of which were published in peer-reviewed journals.[104-107] However, 21 of the 29 were purposefully selected, most of them because they were known to have participated in an HIA; therefore, only one-fifth (8/40) of those randomly selected had subsequently engaged in formal HIAs. Some trainees saw the practice standards as restrictive, but others reporting engaging in components of HIA in a free-form [108] manner without mention of the standards.

While trainees did not always report new methodological competencies or immediate applications, they still promoted the paradigm. Many trainees disseminated the HIA framework to colleagues and partners informally and via intra- and interagency training. New collaborations were established at the trainings and maintained. These and other new partnerships transformed the way public health and partners conducted their work. Trainees reported more frequently engaging their colleagues in other agencies and disciplines, and likewise be engaged by them. Trainees encountered challenges in promoting HIA as adding value vs. adding costs and barriers. Lack of resources was often cited as a barrier to HIA practice, but some trainees successfully worked through organizational and political challenges. Others discussed how to alleviate the need for HIA by institutionalizing HIA findings in policy and systems.

Training needs:

Trainees reported needing assistance with quantitative methods, project management, community engagement, writing and framing recommendations, advancing policy and evaluation. Trainees suggested that the literature review and quantitative analysis portion of the assessment can be supported by a national clearinghouse so that every HIA need not "reinvent the wheel". No trainees mentioned HIA-CLIC,[109] the Community Guide,[110] or the HIP evidence base,[111] all of which offer readily-accessible evidence for HIAs. Trainees discussed the challenges of community partnerships, especially when there is a precedent of poor relations or tokenism between professional and academic researchers and the community. They also discussed difficulties in engaging and coordinating multiple stakeholders. Trainees wanted more

skills in framing to make meaningful and politically palatable recommendations. They emphasized that training must encompass an array of community members, agencies, and decision-makers including developers and elected officials. This reflected in part the theme that trainees, especially those in public health, felt that their agency had done its part and others were required to step up, remarking *"it's not us, it's them"*. Still others acknowledged challenges in motivating their own organizational leaders to support HIA.

Discussion

The findings suggest that HIA training in the U.S. has developed competent practitioners across agencies and disciplines. The trainings have provided new skills and stimulated new ideas and thinking. The variety of experiences in subsequent HIAs and HIA-like work is encouraging. Trainees not conducting HIAs still shared what they learned and pursued elements of HIA. All of this may create space for HIA to be pursued. However, the results also suggest that training be more practical and directed to engage an even more diverse audience. Trainees identified how to continue building their own and others' capacity to promote and practice HIA. This includes specific competencies for practitioners and awareness and thinking among stakeholders.

Although there have been no comparable studies to date, these findings do corroborate and expand on unpublished evaluations of the first two CDC HIA trainings and are consistent with other research on public health training. Challenges of adult learning [112] and transferring learning to practice are not unique to HIA,[77,113] much less public health.[114] Resources and time constraints were cited as barriers to practice in this study as in studies of HIA practice [68] and evidence-based public health.[115] Trainees in this study likewise identified the need to sensitize stakeholders to HIA.[116] Finally, this study supports the notion that leadership is needed to address challenges to HIA practice,[117,118] similar to public health practice.[77,103,113]

This study is the first to characterize HIA activity in the U.S. and assess longer-term outcomes and needs. The study is reliable since saturation was reached using both a purposeful and randomized sample that matched the profile of the known universe of trainees. It encompassed most but not all of the HIA training opportunities in the U.S. during the study period. In order to examine longer-term training outcomes, activities of regional training centers in Georgia and Oregon were excluded. These centers began in late 2011, sponsored by the Network of National Public Health Institutes (NNPHI). While it is unclear if those trainees would have had different experiences, the diversity of trainees, trainings and context in this study make the results generalizable to the U.S. The findings are also credible because our interview guide was informed by relevant conceptual frameworks [79,101] and meta-analytic studies of training outcomes.[119-122] The authors and colleagues who helped design it were both HIA trainees and trainers, had extensively practiced HIA, and had previously conducted evaluations of HIAs and HIA trainings. Observation bias was limited by using an additional privacy protection clause in the informed consent.

This research acknowledges that successful practice depends on having appropriately screened projects, organizational capacity,[123] and other inputs and contextual factors.[124] However, it also recognizes limitations in attributing training experiences to practice outcomes

given the long period of recall and myriad contextual factors that influence outcomes, as well as the pitfalls in defining successful outcomes. The research therefore focused on understanding the types of trainee experiences, more proximate outcomes including a broad range of practices consistent with HIA principles, and perceived needs of HIA trainees, albeit in various contexts. Concepts and themes were identified, in lieu of making inferential comparisons across trainings, groups or periods of time. Still, recall and contextual issues were addressed by using appropriate prompts and reminders about the training events and avoiding leading questions. Variability in organizational resources and support available to trainees were addressed, but not organizational climate or readiness per se.

This study examined how trainings changed over time to illustrate the adaptations to them. In analyzing individual interviews, the time since the course and the changes made to the course over time were considered. The research also characterized the courses and their reach, but did not analyze training agendas and content. Although trainee objectives varied both within and between trainings, most reported that their objectives were met. Hence, it is likely that trainees were matched with the appropriate training through both application processes and self-selection. The lack of content analysis does preclude more detailed recommendations on how content should be modified. Therefore, the study relied on a clear set of questions asking about current needs. The stated needs generally corroborated the findings regarding training outcomes and provided a clear agenda for capacity-building. There was some variability in needs based on the trainee and training characteristics, but not significant enough that it be further discerned.

The findings suggest several areas for further developing the HIA workforce. First, HIA-involved agencies, funders and stakeholders should *refine and coordinate resources for HIA capacity-building.* They should practice continuous quality improvement by routinely measuring training outcomes and compiling, reviewing, comparing and updating course materials and methods, incorporating best practices such as adult learning principles [112] and active and cooperative learning approaches. This could yield training guidelines that include universal objectives to serve the growing number of state and local capacity-building initiatives. In addition, stakeholders should consolidate and further publicize resources for self-study and independent learning. Many of the tools and resources (identified by trainees) for HIA practice are already available, but no single entity is coordinating and curating them amid the growing number of state and local capacity-building initiatives. Ultimately, an umbrella organization such as the Society of Practitioners of Health Impact Assessment (SOPHIA) could serve as a Center of Excellence for HIA workforce development and capacity-building. If HIA is to be institutionalized, capacity-building must be tested, transparent and accessible. This in turn will require funding.

Earlier calls for HIA capacity-building did not identify competencies and strategies.[64,100] HIA stakeholders must *define competencies for HIA and the pathways to obtain them.* Based on interview findings and the authors' own involvement in a variety of HIA trainings, a set of HIA core competencies for different groups involved in HIA are proposed (Table 5).[79] These are intended to stimulate further discussion and assessment of trainee competencies. In terms of pathways, all four courses have evolved substantially over time yet still cater to different audiences. However, in-person training is just one component of the broad spectrum of activities,

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resources and audiences for capacity-building. Within the U.S., an online course offered by the American Planning Association (APA) and National Association of City and County Health Officials (NACCHO) has been viewed by approximately 6,000 people since going online in 2007.[125] This may be an ideal entry point for individuals seeking to understand the purpose and basic process of HIA. Aspiring HIA practitioners may then seek more advanced training in short or long-course form, depending on their organizational and personal goals and context.

The CDC's short courses address diverse professional audiences nationwide. Although this model has been curtailed due to funding, it has cultivated a wide range of practitioners. The SFDPH training requires the commitment to travel to a week-long course. It appeals to those who know HIA but seek rich experiential knowledge and methods. It may best serve other health departments, which prefer learning from a peer agency. Using both an initial short-course followed by technical assistance, HIP's model may best support organizations new to HIA in organizing, funding and conducting an HIA. Practitioners needing more in-depth training or an alternative starting point may also consult one of six university courses now available.[126] The UCB model emphasizes hands-on HIA practice and innovating methods, offering faculty mentoring and aiming to generate new practitioners and leaders in HIA.

Beyond the four models studied, regional HIA training centers in Georgia and Oregon must also be part of the workforce development pathway. Finally, more recent mentorship initiatives by NACCHO, NNPHI, the Pew Health Impact Project and SOPHIA offer further development opportunities. All HIA capacity-builders, including many others not studied here, will need to collectively discern training needs and define these pathways.

Another area for HIA capacity-building involves *leveraging complimentary models of workforce development.* This research revealed a diverse practice using the principles of HIA and the potential for a networked approach to HIA capacity-building. Evidence-based public health (EBPH) is a key area for exploring synergies. Following a call for *"radical change"* in educating public health professionals, EBPH uses an ecological and collaborative approach similar to HIA.[127] Subsequently, the core competencies for public health [128] align with many of the competencies for HIA (Table 5).

In addition, HIA could be integrated into competency-building, accreditation and certification processes within other fields such as planning.[129] The NACCHO online course, for instance, gives American Institute of Certified Planners (AICP) credits. Planners are reconsidering their own core competencies in addressing issues such as climate change.[130] Health care provides a model for this overlay of core competencies for collaborative practice.[131] Finally, newer initiatives such as the Environmental Protection Agency Action Model [132] and the National Park Services Community Assistance programs [133] share some HIA principles. Stakeholders can advance the practice and paradigm of HIA by identifying opportunities for HIA workforce development in these and other assessment and appraisal processes.

Finally, stakeholders should *emphasize community capacity for HIA.* This research demonstrates the value of new interactions and the need for reaching a much broader group of stakeholders. Applying team effectiveness [134] and team science [135] principles will help

researchers and practitioners from multiple disciplines share theories, methods and evidence in designing and conducting HIAs. However, only an increasingly broad collective of professional and lay actors can achieve public health.[5,136] HIA stakeholders should educate and sensitize community stakeholders and decision-makers on social determinants of health, HiAP and the value of HIA.[100] The interviews emphasized the need for creating awareness of and demand for HIA in communities. They reiterate that HIA capacity-building must create community stakeholders who are engaged, empowered, and prepared to advocate to equally aware decision-makers.[137] Shared language is a good starting point. Communities must have both the knowledge to understand when HIA can add value and the capacity to meaningfully contribute to it. While stakeholder engagement guidelines encourage community-capacity, details on how to do so are needed.[138] An authentic community of practice will help ensure that HIA follows its principles and related practice.[137,139,140]

Meso- and macro-level strategies may use state and federal policy to support capacity-building and institutionalization of HIA practice.[141] Targeted application of HIA [7] may influence single decisions while also establishing an evidence base, indicator systems, and policies that support HiAP. However, competent practitioners and leaders are needed for both of these tasks. In addition, given the relative novelty of HIA in the U.S., they must be proficient in demonstrating the value of HIA and HIA-like processes in a range of localities and decisions. Stakeholders should promote HIA framework in cross-training in universities and among professionals in public health, planning, policy and other fields. They should further define HIA competencies and training pathways while leveraging other workforce development efforts such as the public health accreditation process, which is moving 500,000 public health professionals to use best-evidence for policy-making.[115] Nonetheless, institutionalization will require investment and commitment of disciplines and sectors beyond governmental public health. Both the practice and paradigm must be owned broadly in a community of stakeholders. Competent practitioners must help communities and decision-makers realize HIA's value. Since many of the policies influencing health lie outside public health, so too must the HIA workforce.

Figure 1. Evaluation design and measures

	Reaction	Learning	Behavior	Results	
Pre-training participant profile, motivation and propensity	**Affect-Effect**		**Transfer and workplace implementation**		**Post-training needs**
prior knowledge of HIA	satisfied with the format		applied what was learned		decisions where HIA could add value
reason for seeking training	able to network		passed on lessons to colleagues		able to pursue HIAs in current role
personal objectives	own objectives met		viewed issues through health lens		organizational climate supports HIA work
specific application of HIA in mind	additional HIA training		communicated and collaborated with partners		internal and external resources available
			participated in or conducted a HIA		additional assistance and training needed
	training was useful				

Table 1. Training descriptions

	CDC	HIP	SFDPH	UCB
Purpose and context				
organizational type and mission	Federal government, to increase health security in the U.S.*	Non-profit, to transform the policies and places people need to live healthy lives	Local government, to protect and promote the health of San Franciscans	Public university with missions of teaching, research and public service.
stated goal	To advance the field of HIA within the U.S.	Familiarize participants with HIA process and tools, prepare them to engage in an HIA, bring together diverse stakeholders who will be involved in an HIA	Provide current and future practitioners of HIA experience using available procedures, regulations, and tools to implement an HIA	Hands-on practice, developing new methods and approaches in HIA, creating practitioners and leaders in HIA
linked to funded projects	sometimes	Often. HIA funders such as Pew's Health Impact Project rely on HIP to train groups funded to conduct HIAs	sometimes	Rarely. A few projects were funded, but most were not.
Access to the training				
application process	Sometimes, especially at early trainings. See narrative in Results section.	Sometimes, dependent on local partners	Always. Application asks about experience and objectives	Na. Course restricted to enrolled students
cost (course fee for participants)	none	none	$960 standard; $200 for community-based orgs.	tuition
location	varied	various nationwide	San Francisco-Oakland, CA	Berkeley, CA
Participation				
encourages participants from	dyads (one public health, one planning from same jurisdiction) required in	Seeks potential practitioners and stakeholders who want	Seeks diverse audience. No more than two participants per	The course is cross-listed between public health and planning.

complementary organizations	early trainings	to work together. Client-based.	organization. Requires organizational commitment.	
Facilitation				
lead trainers	CDC staff, American Planning Association	HIP staff, local partners, other guests	SFDPH staff, HIP staff, other guests	University faculty and adjuncts.
Training funders **	Funding: NCEH and RWJF, Staff: CDC/DNPAO & /NCEH, APA, ASTHO	Pew Health Impact Project, Minnesota BCBS, ASTHO, W.K. Kellogg, The California Endowment, Others	Fee-based	Fee-based
Format				
mean length (8 hr days)***	1.2	1.5	4	5.6
use of case studies	Earliest trainings used multiple cases and models. Later trainings used a single case or allowed trainees to use their own.	Case study identified by local partners used throughout the training	Originally California-based but expanding to other geographies and topics	Varied. Some were pre-screened, others screened by class. All were real cases but had different levels of stakeholder engagement.
reading assignments and preparation	varied	Generally none for participants, however HIP works closely with local partners to prepare for the training	Yes, 250+ pages of required readings and multimedia materials	yes
Follow-up				
linked to ongoing technical assistance	Sometimes. CDC did provide TA to some trainees but it depended significantly on staff capacity.	Often, especially when linked to funded projects. HIP provides initial training and then ongoing TA	Sometimes. Informal support often provided.	Rarely. Course alumni may consult the professors

* *"CDC works 24/7 to protect America from health, safety and security threats, both foreign and in the U.S. Whether diseases start at home or abroad, are chronic or acute, curable or preventable, human error or deliberate attack, CDC fights disease and supports communities and citizens to do the same. CDC increases the health security of our nation. As the nation's health protection agency, CDC saves lives and protects people from health threats. To accomplish our mission, CDC conducts critical science and provides health information that protects our nation against expensive and dangerous health threats, and responds when these arise."* http://www.cdc.gov/about/organization/mission.htm

** APA (American Planning Association), ASTHO (Association of State and Territorial Health Officials), BCBS (Blue Cross Blue Shield), CDC (Centers for Disease Control and Prevention), DNPAO (Division of Nutrition, Physical Activity, and Obesity), NCEH (National Center for Environmental Health), RWJF (Robert Wood Johnson Foundation).

*** based on 3 hour course in a 15 week semester. Activities conducted outside of class time were not included.

Table 2. Training cohorts and subject selection

	CDC	HIP	SFDPH	Universities *	Total
Trainings					
Date of first course	Feb 2006	Sept 2008	July 2008	Feb 2006	na
Date of last course in study	Dec 2010	Apr 2012	July 2012	Jan 2011	na
# conducted	23	34	5	11	75
# of different sites (states)	19	18	1	5	29 **
average # of participants	31	34	37	13	na
# w/ participant lists available	9	14	4	6	32
Trainees					
total # trained	713	1156 ***	185	174 ***	2228
# available from lists	258	495	147	67	900
# included in sample	40	11	12	11	74
# completed interview	26	9	8	5	48
% responding	*65*	*82*	*67*	*45*	*65*

* All known university courses were considered in identifying the parameters of the training type and calculating the numbers trained. However, participant lists were only obtained from UCB.

** Some sites were similar across courses. This is the total number of unique sites (states) between the four types.

*** Some trainings conducted by HIP and Universities did not have information on the number of participants. Therefore the total number trained is an estimate based on the number of trainings reported and the average number of participants in those trainings with the information available.

Table 3. Trainee Profile *

	CDC (n=258)		SFDPH (n=147)		Total (n=405)		Study participants (n=43) **	
Discipline ***	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Health	133	*52*	121	*82*	254	*63*	28	*65*
Planning	43	*17*	11	*7*	54	*13*	11	*26*
Environment	25	*10*	6	*4*	31	*8*	2	*5*
General government	17	*7*	4	*3*	21	*5*	0	*0*
Transportation	13	*5*	1	*1*	14	*3*	1	*2*
Other	27	*10*	4	*3*	31	*8*	1	*2*
Sector	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Government	167	*65*	78	*53*	245	*60*	30	*70*
Federal	19	*7*	3	*2*	22	*5*	0	*0*
State	25	*10*	17	*12*	42	*10*	5	*12*
Regional	28	*11*	3	*2*	31	*8*	3	*7*
County	54	*21*	44	*30*	98	*24*	13	*30*
City	41	*16*	11	*7*	52	*13*	9	*21*
Academic	33	*13*	33	*22*	66	*16*	8	*19*
Non-Profit	46	*18*	28	*19*	74	*18*	4	*9*
Private	12	*5*	8	*5*	20	*5*	1	*2*

* Information about discipline and sector of work for trainees from HIP and University courses was not included in this table, since that info was unavailable for more than half of the trainees on lists from HIP and since it was assumed that most University students were full-time students at the time of the training.

** University students were also not included in the N for study participants, since they were assumed to not be employed in full-time professional positions. Trainees from HIP who were interviewed were asked about their employment and included in this column.

*** Discipline refers to the primary mission/ function of the agency where the trainee was employed. General government includes elected and appointed positions in city or county councils, commissions and administrations.

Table 4. Themes and Illustrative Quotes *

Theme: Content and resources provided
The hard part was that there was no clear model – Local Health Department (LHD), 2006
The number of models presented, for somebody who knew nothing about it, was pretty overwhelming to start with. – LHD, 2006
The binder walked you through everything in the workshop, and was easy to refer back to. - Local Planning, 2007
I left with a lot of information, I remember that. – Non-profit, 2007
Theme: Scale and type of case studies
More examples similar to our (HIA) would really help us to get a sense of, what does this look like in different places, and what was the political framework. Were you able to implement some of your recommendations, did you get buy-in, were you able to move some of these ideas forward because of your HIA and the community engagement. – Local Planner, 2006
It was interesting to see how HIA varies geographically, how you have to fine-tune it to fit your community. Local Planner, 2007
The examples were far more quantitative. Having someone experienced with qualitative input would have helped. LHD, 2006
We would talk about something, then work on our own projects in our group. There is some definite positive to that so that you feel like you're working on something real. But, when you're brand new, it would have been better to have the group talking about one problem together, whether it's hypothetical or real, and working through issues together. LHD 2006
Being able to work an actual project that you're keenly interested in moving forward would have been really helpful. Going into that training I wasn't prepared to have a project in mind because I didn't have enough information about the method. – LHD 2008
Theme: Role of non-public health participants
It would be good having planners who have done these to come and talk about how they partnered with health. LHD 2006
I would get more professional planners or health department staff involved in running the training. So much of the training is provided by and for the public health profession. I was the only person in the room who was not a scientist by training. (Trainers) must understand that the world the public health profession moves in uses a language and a self-reinforcing process that is not transferable to many other circumstances, professions, and dialogues. Local Planner, 2007
The planners knew some of this, but not all of the health impacts. I said to one of them: "you have more influence on the lives and health of people than a physician does." That stunned them. Connecting the dots to health was a big step for planning. That awareness was really important for the planning department to start moving in a different direction. Local Planner, 2008
Theme: More continuous and ongoing training
We went through a ton of material. We felt like this was a semester's worth. An HIA training should be more than one day, especially if we're going to take it and use it. It would really be better as a (university) course. Local Planner, 2008
I received quite a few follow-ups. I thought that was positive. Perhaps the trainers could have offered a kind of booster shot, a mini-training to see if people were using HIA and to see where they could offer support. Non-profit, 2007
I felt that from an intellectual standpoint, the training was too short. It left me kind of flat, because I like to delve into more detail,

and think more about what the unintended consequences are, and implementation. I didn't get that piece of it. Non-profit, 2009

I think the one-off probably wasn't enough. Probably we could have used help along the way. Academic, 2009

Theme: Practical application of HIA concepts
I just wanted someone to say, here's a roadmap, more than just the broad five steps, because we knew what those were. LHD 2006
We had a limited amount of data to pull from, so we were gathering a lot of information from the community. We didn't do focus groups, but we had a ton of meetings, with teens, and Spanish-speaking members of the community, and residents in general, and we got GIS data from the city. It would have been helpful If we had a chance to massage all of that, how to put that into measured data to inform the HIA. We didn't know we were going to do that. We didn't have our workplan in place. Walking through that process to say here are some of the things you might get, and this is how you might use it, would have been helpful. LHD 2006
It's a very political world when you're doing HIAs. People need to learn well how to get things approved by a local government and see them through to implementation. It's important to have trainers who have done that and have walked through the local political process at different levels. Real life experiences walking through a process, being realistic about what you can accomplish, how you can get it done, and how you frame, so you can get things not just approved but then implemented, would be valuable. LHD 2006
We really could have used a little more help in terms of next steps. Academia, 2010
Perhaps more emphasis on the evaluation, because I don't think we did a good job on that. That would have a been good to say, OK, you need to put your evaluation in place up front, and here are some ways you can do it, given the fact that you're really looking at policy change. How do you measure that, what kind of outcomes are reasonable to evaluate? LHD, 2006

Theme: Using the principles of HIA
The training assisted me in using (the concept of HIA) practically every day, in the execution of my job. (The example in my HIA course) really helped me to see how in my community, there are some really grave health impacts. I've been thrust into a situation where I have to have a very analytical mind. If I had not had that training, I probably would not be able to get a proposal together. It might not be health-related, but I'm always able to use the principles of HIA. Non-profit, 2007
There were a lot of things I learned as a planner. When you work for a city or local government, you're thinking development, development, development, and sometimes forget about the health impacts. I think the training really opened up the door of communication for more sustainable and healthy development. That knowledge that started with the HIA training, that has advanced with the knowledge of everybody, that really comes into play, when you're talking to a transportation department, or a local developer, when you start talking to them about... whatever it might be. Local planner, 2007
The training was very powerful. It started some good dialogue. But who knows what products might come from it. Planner, 2007

Theme: Working through challenges
We had barriers to conducting our first HIA: no time, resources, money, skills for the particular topic we wanted to address, for example noise. We were trying to be very democratic in our process, but we live in a very conservative county and they were not ready to hear it. The political juggling was a challenge. I wasn't able to apply (the training) immediately by doing an HIA, but I

did get enough to be able to do some training. That opened the door with planning. We could communicate that we had something to offer, that health was important to consider in planning. The training made people aware. The planners knew some of this, but they didn't know all of the health impacts. At one point I said to one of the planners "you have more influence on the lives and health of people in this area than a physician does." That stunned them. Connecting the dots to health was a big step for planning. I don't think that whole concept had sunk in. That could have achieved more than anything. That awareness was really important for the planning department to start moving in a differernt direction. That led to everything. That led to our first HIA, which led to the grant, which led to us being asked to write the health element for the comprehensive plan. They're all connected. It wouldn't have happened if I hadn't gone to that training. In fact, the County Planning Department is now thinking about reorganizing their entire comprehensive plan and calling it a community health plan. Their focus has really shifted. LHD, 2006

We all went on to do more training (of others), and take on more HIAs. The training was a confidence builder. It intrigued us. We got a larger group interested. After that, we would get together to screen projects. I included HIA for a planning project in a proposal for stimulus funding, partnering with the health department. I don't think we would have done that if we didn't have that training. The training really tightened up our group, our commitment, and shared understanding. When the opportunity came up, I wrote HIA in the proposal. The health department said sure, we'll partner with an in-kind. The project was awarded. Local planner, 2008

* LHD = Local Health Department

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Table 5. Competencies and roles in HIA

COMPETENCIES	ROLE IN HIA *					
	Community member	**Key stakeholder**	**Decision-maker**	**Assessor**	**Supervisor/ Manager**	**Org. Executive**
Public health sciences (HIA concept)						
Social determinants of health	x	x	x	x	x	x
Principles and value-add of HIA	x	x	x	x	x	x
HIA Screening	x	x	x	x	x	x
Analytic/Assessment						
HIA Scoping		x	x	x	x	x
HIA Assessment		x	x	x	x	x
Literature review				x		
Epidemiology				x		
Quantitative analysis				x		
Qualitative analysis				x		
Legal standards				x	x	
Community Dimensions of Practice						
Working in multi-disciplinary teams				x	x	
Engaging stakeholders				x	x	
Community-based participatory research				x	x	
Cultural Competency						
Community language	x		x	x	x	x
Professional language		x	x	x	x	x
Political/ decision-maker language		x	x	x	x	x
Policy Development/Program Planning						
Decision (content, process, players)	x	x	x	x	x	x

HIA Recommendations		x	x	x	x	x
Framing recommendations				x	x	x
Policy development					x	x
Communication						
HIA Reporting				x	x	
Social and mixed media				x	x	
Financial Planning and Management						
Project management					x	
Local government budgeting	x				x	x
Grant writing and management					x	x
Community fiscal agency					x	x
Leadership and Systems Thinking						
HIA Evaluation				x	x	x
Collaborative/ interagency agreements					x	x
Indicator systems and open data					x	x
Design thinking					x	x
Organizational restructuring						x

* These roles may overlap.

Community – individuals or groups of organized individuals from the community who will likely be directly impacted by the decision. They may or may not have an interest or capacity in addressing the decision. Community may take other roles as well.

Key Stakeholder – the organizations, agencies and individuals who will be impacted by the decision. This may be a very broad group with some feeling the impacts more directly than others. For example, organizations targeting particular clients affected by a decision are also stakeholders. Community are by default part of this group, but not the whole group.

Decision-maker – private developers, public commissions, boards, supervisors, regulatory bodies and agencies. Decision-makers may also include elected or appointed officials or others who do not have immediate jurisdiction over the decision being assessed but may have political influence.

Assessor – someone who is participating in the HIA via a working group or contributing as staff, whether voluntary or paid, to all 5 steps of the HIA. This does not include technical advisors and others who are asked to support only specific components of the HIA such as the assessment. The assessor has some view of and contribution to the whole process, though they do not manage it.

Manager – the manager oversees the HIA project and coordinates all process, partnerships and communication.

Executive - the executive is in charge of the organization leading the HIA. They may or may not have any direct role in the project.

CHAPTER 3: Health Impact Assessment Practice in the United States: A Study of Alignment with Standards

Abstract

As a practice still emerging in the United States, the quality of HIA processes in a range of contexts and applications is uncertain. This has implications for its ability to add value to decision-making. No studies have comprehensively examined the quality of contemporary HIA processes in the U.S. Comparing the reality of practice against practice standards will identify areas for improvement. This study evaluated whether information reported in completed HIAs reflected objectively-evaluable criteria proposed by the 2009 North American HIA Practice Standards Working Group. A list of HIAs conducted in the US was compiled from all published reports (83). Those that were part of an EIR or comment letter (5), characterized as demonstration projects or conducted as student exercises (7), or published before 2009 (44) were excluded. For the remaining 27 reports, data was abstracted on the five steps of HIA, including the rationale, authorship, funding, decision and decision-makers, participation, pathways and methods, quality of evidence, and recommendations. Over half (15) of the HIAs were initiated by the assessor. There was broad participation in both in screening and scoping, though community organizations were included in less than half (14). An average of 5.2 health determinants were assessed per HIA. Data on health effects analysis show variability in the methods and level of rigor depending on the pathway. Most HIAs reported screening, scoping, and methods, but evaluation plans were often lacking. The specificity of recommendations varied. More guidance is needed so that standards account for the resources available and help produce HIAs that are fit for purpose. Standards should define the field and promote quality by also facilitating creative innovation guided by the principles. Further evaluation of the HIA process will improve the practice.

Introduction

Health Impact Assessment (HIA) facilitates the consideration of public health in decisions about policies, plans and programs. The practice is growing rapidly in the United States. Since the first HIA in the U.S. in 1999,[142] over 170 have been completed and nearly 70 are currently underway.[93] Realizing HIA as a promising approach for Health in All Policy (HiAP),[17,18,39] stakeholders have advanced the field by organizing training,[143] establishing funding priorities and programs, and creating guidance documents, professional organizations, and conferences. These developments have included efforts to improve quality. For HIA to add value, the practice must align with principles [53] and be methodologically sound. To ensure this, and to distinguish HIA from other forms of policy analysis, the principles of HIA were operationalized in North American Practice Standards in April 2009 [144] and revised in November 2010.[62] The standards were developed through a deliberative process involving many leading HIA practitioners. Additional guidelines have been created to support best practices,[145] stakeholder engagement,[138] equity,[146] and evaluation in HIA.[147] These standards and guidelines have been routinely debated, refined and disseminated at conferences, trainings, and other forums.[19,69,95]

While these standards may have supported better HIA processes, studies evaluating HIA practice in the U.S. are lacking. A 2008 study described the topical and methodological heterogeneity among 27 HIAs nationwide, finding that practitioners generally followed the commonly accepted steps for conducting HIAs.[68] Still, the alignment of a rapidly evolving U.S. practice with practice standards has not been examined. Contemporary HIA evaluations have focused on decision outcomes. However, HIAs can be successful even if they do not influence the decision and recommendations are not implemented. For example, community participation is an important intermediary in health and social change outcomes.[148] There is consensus within international standards and guidelines as to its importance.[66] Case studies of HIA in the U.S. have demonstrated the value of such engagement,[137] while a study in the UK found that time and resource constraints severely limited intended impacts on *"genuine ownership and empowerment"*.[149] Still, the diversity of the participants and manner of participation have not been comprehensively examined.[150]

While outcome evaluations must account for the range of contexts and underlying values, purposes, and goals of the HIAs and the formative and process stages,[124] comprehensive evaluations detailing crucial aspects of practice are lacking. Other existing evaluation tools are geared for HIAs of development and construction projects and use checklists of whether something was done or not. Detailed studies of procedural fidelity could help identify practice challenges such as engaging communities [151] and conducting and presenting quantitative estimates.[152]

Finally, no studies have examined the reporting step of HIAs. Per the principle of transparency,[64] practice standards call for complete documentation of the HIA, including limitations, uncertainties, and assumptions. A full disclosure provides an opportunity for debate about the pathways chosen and the validity of estimates, which is increasingly important as the level of quantification and certainty increases.[152,153] Complete reporting also facilitates systematic peer-review to advance the practice. HIA reporting should appeal to and be accessible

to a wide audience, yet be strong enough to stand as credible scientific evidence. HIA has a legitimate legal basis in the U.S.,[39] and HIA reports may be used as evidence in courts.[154] Full reporting will help to ensure that HIAs are sufficiently rigorous for all stakeholders and can withstand legal scrutiny. Hence, the quality of HIA reporting must also be examined.

A comprehensive and contemporary evaluation of HIA practice in the U.S. will yield insights into methodological challenges and inform refinement of standards, training, and development of the field. This study reviews HIA reports to assess how current practice aligns with standards offered by the North American HIA Practice Standards Working Group. Discrepancies between practice and standards were identified, and the context for stakeholder involvement in terms of funders of HIAs, variety of stakeholders involved, and breath of health determinants and impacts considered is described. Implications for improved processes and greater transparency in reporting HIAs are discussed. By focusing on intermediary processes, this study gauges both the relevance of practice standards and the potential for better outcomes.

Methods

A list of HIAs conducted in the U.S. was compiled from all reports published in the Pew Health Impact Project database through June 2011.[93] Drawing from a variety of sources, this database is the primary clearinghouse for HIAs conducted in the U.S. The HIA assessor's characterizations of the HIA type (e.g. rapid, participatory) was not considered in the selection process, since there were no benchmarks for delineating these types during the period studied. From the initial list of 83 reports, those published before 2009 when practice standards were released (46) were excluded. Environmental Impact Reports and comment letters (5) and HIA demonstrations and student exercises (7) were also excluded, since these may not reflect primary HIA practice. A total of 25 reports were included (Table 1). In HIA reporting, comprehensive written reports may be supplemented by presentations, briefs, websites, multimedia, and other formats. Several of the HIAs included were also published in peer-reviewed journals.[104,105,155,156] However, for comparability this study relied solely on written final reports.

This study used a comprehensive HIA evaluation framework[124] focused on components including procedural fidelity, involvement of decision-makers and stakeholders, and transparency. Fidelity refers to the conformity with prescribed processes and standards of best practice. North American Practice Standards, Version 1,[144] were used as a template for abstracting data for all steps of the HIA process, focusing on screening, scoping, and assessment. Screening determines if an HIA should be conducted, while scoping determines how it should be conducted. To evaluate participation and stakeholder involvement in these steps, the authorship, funding, and the type of decision and pathways were examined. Assessment should include analyses of baseline conditions and qualitative or quantitative estimates of impact due to the decision, followed by recommendations.[62] For each HIA, the assessed pathways, comprised of determinants and impacts were characterized. Determinants are the aspects of the policies, plans, programs or decisions that lead to the outcomes measured – the health impacts. Determinant and impact groups were created to help summarize the pathways. For example, determinants reported as "traffic", "highway design", "emissions", "fuel efficiency", or "transit" were grouped into a "transportation" category, while impacts reported as "depression", "stress", or "anxiety" were

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grouped into a "mental health" category. Where an HIA assessed the link between any of these determinants and impacts, a pathway ("transportation-mental health") was assigned. In cases where the outcomes measured were intermediates to health, for example physical activity, those outcomes were also classified as health impacts. To evaluate transparency, reported limitations, assumptions and uncertainties were checked.

Results

Reports tended to be long, with the mean length of 78 pages (SD=45). The reports displayed a range of formats for presenting results. Some included tables and figures throughout, while others were mostly narrative. Five reports did not contain an Executive Summary. Over half (14) of all HIAs were initiated by the assessor. Lead assessors and report authors were generally public (10) or non-profit (7) agencies or academic institutions (4). Primary funders included philanthropic (11) and public (9) sources. Half (13) of the HIAs addressed proposed plans, while 9 addressed policies. The decisions were most frequently in the domains of the built environment / land use planning (10) and transportation (6) and were being made at a county or smaller jurisdictional level (19). HIA objectives were described in all reports; in most cases they were clearly stated.

In terms of fidelity, there were major gaps in some reports. Only 16 reports had a distinctly-labeled screening section, 5 described screening elsewhere, and 4 did not describe screening at all. Some HIAs simply described their rationale for conducting the HIA in a few sentences, while others included screening checklists. Only 18 reports had a distinctly-labeled scoping section, 6 described scoping elsewhere, and 1 did not describe scoping at all (Table 2). Public agencies participated most frequently in screening and scoping. The mean number of group types participating in screening was 2.5 and in scoping 4.6. Some criteria for screening and elements for scoping were applied in most HIAs (Tables 3 and 4). The mean number of screening criteria was 2.3, while the mean number of scoping elements was 3.0. All but one report described some scoping elements, but only 10 reports identified decision alternatives and 8 clearly identified research questions.

The mean number of determinants assessed per HIA was 5.5. This number was slightly higher when adopting new projects, plans and policies (5.8) or implementing them (6.3) as compared to revising existing ones (4.9). There was no significant difference in the mean number of determinants by the domain of the policy decision (e.g. housing, transportation, and land-use). Transportation was the most frequent determinant assessed, used 38 times in 19 different HIAs (Figure 1). Other frequent determinants included land-use/zoning, employment, air quality, food environment, social cohesion, and housing. The mean number of impacts assessed per determinant was 1.7, or 9.4 per HIA. The most frequent impacts studied included chronic disease (37), obesity (35) and injury (28). Among the 138 determinants assessed, roughly two-thirds (88) used literature reviews to describe the relationship with the impact(s), while focus groups (31) and interviews (13) were used also used. In a subset of 7 reports that scoped 75 health outcomes, just fewer than half (40/75) actually detailed estimates of those outcomes.

Uncertainties, limitations and assumptions were mentioned in three-quarters (18/25) of reports (Table 5).Reports cited limitations of resources, scope, evidence, available methods and statistical power. However, the degree to which they were described varied greatly, from a generic two-sentence disclaimer to a separate section. Exemplars included a "What we don't know" section (HIA #2), "Weight of the evidence" criteria (HIA#7), and categories for classifying the likelihood of impacts (HIA #'s 5, 8, 21) such as speculative, probable and definite. Nearly all (23) HIA reports made recommendations, but only half (12) clearly stated their criteria for prioritizing recommendations. Criteria were generally based on evidence and stakeholder and expert input. A mean of 19.1 (SD 17.8) recommendations were made per report. Only one-third of HIA reports described a plan for or the results of monitoring and evaluating the process and/or outcomes.

Discussion

This study is the first comprehensive assessment of HIA practice in the U.S. using the North American Standards. It measured procedural fidelity, focusing on the screening, scoping, and assessment steps. It found that most HIA reports included basic descriptions of screening, scoping, and assessment. The study also examined contextual factors influencing the involvement of stakeholders. The results provide insights for improving HIA processes and reporting.

Screening, the first step of HIA, considers the characteristics of effects, populations affected, and the opportunity to influence the decision to determine if an HIA will add-value. It is essential for high quality HIA.[64] While screening criteria were not clarified in practice standards until 2010, they were identified in screening checklists and in many of the trainings prior to that. Therefore it was unexpected that four reports did not mention any screening criteria or provide a rationale for conducting their HIA. Among the 21 that did, the most frequently cited criteria was stakeholder and decision-maker concerns (16). This suggests that the HIAs reviewed were often initiated in response to demands. Screening deficiencies may also reflect the grant-driven HIA model, whereby pre-screening for the grant proposal by prospective assessors supplants more organic, real-time screening once the grant is secured. Funding that supports agencies to conduct HIAs generally and not on specific, singular decisions will facilitate more participatory screening to identify topics that are the most timely and relevant to communities.

The second step of HIA, scoping, *"ensures a balanced and complete examination of health risks, benefits, and tradeoffs"*.[64] Scoping elements are clearly defined in Version 1 Standards, including nine points for specifying the research, resources, and roles. Overall, scoping showed higher fidelity with standards compared to screening. The fact that less than half of the reports identified decision alternatives may reflect cases where the assessors assumed the alternatives were obvious, for example yes/no. The fact that only one-third of reports clearly identified research questions suggests that scoping was an iterative and ongoing process.

In terms of assessment, all HIAs examined multiple health effects mediated via multiple determinants. The high number of determinants assessed per HIA (5.5) suggests that screening, despite apparently limited application of criteria, appropriately identified decisions with a

breadth and complexity of health issues. The methods and rigor of assessment varied by pathway, likely the result of varying strength of evidence available for each. Assessment actually entails three analyses: baseline (existing conditions), causality (exposure-outcome relationship), and forecast (predictions from baseline per causality).

Among the HIAs reviewed, the quality of the evidence for each analysis varied widely. For example, the baseline analyses for some HIAs were essentially broad health profiles using available data and including impacts and health issues not in the original scope. Such thorough baselines can bring attention to potential cumulative impacts, especially when the other two analyses – causality and forecast – are equally robust. Other baseline analyses focused heavily on the determinants. For example, HIAs examining housing focused estimates on changes in housing conditions, rather than health outcomes such as respiratory and mental conditions. Subsequently, their analyses for causality or forecasting were often very basic or not done at all. This could be due to lack of causal evidence, the complexity of calculating changes in the determinants, or an assumption of adequacy with the estimates based on stakeholders understanding the link between determinants and outcomes. Other HIAs were very methodical and organized in connecting determinants and outcomes across the three types of analyses. While HIAs can reveal opportunities to modify determinants, the real value-add and credibility of HIA lies in the projection of health outcomes. To illustrate social determinants, cumulative impacts and life-course frameworks, HIAs must analyze each step in the pathway to health.

Public and non-profit agencies were the primary assessors. Roughly half of the HIAs involved participation beyond the primary assessor. Although the 2009-2011 study cross-section was not compared with earlier or later years, this likely reflects the expansion of practice to broader non-academic professional and community groups. In those HIAs with fuller participation, many types of stakeholders were involved. However, the actual number of stakeholders involved in both screening and scoping was limited. At least five reports classified their approach "desktop/rapid", often used when time and resources are extremely limited and in which a small team or individual focuses on literature review and existing data. Others mentioned resource constraints in their reports. On the other end of the spectrum are participatory approaches that generally involve a larger team, lengthened process, and expanded data collection. While stakeholder participation is a minimum element and is encouraged throughout the practice standards, there are no explicit benchmarks for the degree of participation.

While assessors may have limited participation deliberately, it is plausible that publicly - funded HIAs would have fewer resources, which could influence participation. Indeed, among primarily publically-funded HIAs, the average number of participants was lower for both screening (1.6) and scoping (3.1) when compared to projects funded by philanthropies and non-profits (3.4 and 6.1, respectively). Participation is a critical component of HIA and domain for evaluation.[157] The results suggest that there is much room for improvement for actions to meet intents.

HIAs address uncertainty. However, nearly one-third of reports (7) did not describe uncertainties, limitations and assumptions. It is unclear how many presented their assessment results and recommendation for comment in public forum, but appears to be few. While a written

report may be just part of the dissemination strategy, it should encompass all activities including those planned. This 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,[154] an inclusive and deliberative processes with rigorous reporting will help ensure that HIAs add value and avoid the pitfalls of EIAs.[158] Practitioners must be competent in identifying the many assumptions and characterizing uncertainties, whether their estimates are qualitative or quantitative. Well-timed and conducted HIAs ensure authentic stakeholder involvement and clear documentation of the strength of evidence linked to recommendations diminishes the chances for confrontation.

The measurement of procedural fidelity – how close the design and conduct of an HIA aligns with practice standards – requires good reporting. Otherwise, apparent shortcomings could actually be artifacts of under-reporting. The ethical use of evidence principle of HIA emphasizes complete reporting. Subsequently, both North American [62,144] and international [53] 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. To apply these standards, practitioners must be aware of them, understand them and consider them important. The standards were routinely disseminated via conferences, trainings, and other forums. 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. Still, only one-third (8/25) of the HIA reports referenced the standards. This does not mean that others did not use them, but that assessors may have reported selectively what they did and did not do. This calls for more careful documentation of methodological choices. Details are necessary, but clarity, organization and conciseness also support more transparent and accessible reports.

Additionally, while reports were drawn from the primary national HIA database/ clearinghouse, some may have been missed if the authors did not share them publically or even consider them an HIA. Such reports may have been of lower quality. Finally, this article's co-authors were also co-authors on 6 of the HIAs examined. However, this article's primary author and analyst (J.S.) was not involved in any of the 25 HIAs.

Generally, this study suggests that recent HIA practice in the U.S. does not fully meet the aspirations formulated in the practice standards. However, this does not mean that practice is deficient. Rather, it prompts questions about how standards should be used. These results may be normal and expected given an emerging HIA practice and impact assessment field more generally that struggles with to adapt to myriad process, content, audience, timing, and resource challenges. Successful HIAs depend primarily on inputs including the practitioner's competency and capacity, organizational arrangements, and the availability of resources.[124] Where these inputs are constrained, quality may suffer. For example, practitioners have expressed the need for certain competencies such as managing stakeholder groups.[143] This in turn will influence the quality of participation and thereby the quality of assessment. It is likely that few HIAs are conducted in contexts where all standards can be fully met.

Moreover, not all standards may need to be met. Variability in adherence to standards likely also reflects differences in HIA objectives. For example, although 19 reports identified

vulnerable subgroups, only 10 reports mentioned an approach to explicitly evaluate health inequalities. Not every HIA starts with concern for a specific vulnerable subgroup. Debates regarding HIA typologies [159] and Health Equity-focused HIA [14,160] recognize this. In addition, the 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 can also help highlight certain standards. For example, the more quantitative estimates an HIA makes, the more uncertainty analyses, including measures of statistical significance, are needed. HIAs needing to engage many stakeholders should weigh more heavily standards regarding stakeholder participation. Broad stakeholder involvement is especially important in equity-focused HIAs and HIAs that are complex, consider multiple policy alternatives, and different determinant-health pathways. While all HIAs should meet minimum elements, certain standards may be emphasized depending on the objectives and context.

Indeed, the standards are not intended to be applied wholesale nor to grade HIAs indiscriminately. The Standards were created by HIA practitioners to be *"relevant, instructive and motivating for advancing HIA quality rather than rigorous criteria for acceptable or adequate HIA."*[144] Once minimum elements are met, HIA can be practiced strategically [161] using a *"fit-for-purpose"*,[162,163] *"free-form"*,[108] or *"a la carte"*[164] approach focusing on the most important HIA processes and possibly incorporating other methods given the context. Customized applications of HIA and a more strategic use of HIA components in policy development and enforcement may be warranted.[165] Again, minimum elements are required and standards should be reviewed in full. Better alignment with standards may improve some outcomes. However, an aspirational quest for adherence to standards should not limit the effectiveness of HIAs or their conduct in the first place. After all, HIA is premised on the idea that the best available information - recognizing resource constraints - is better than no information at all. In addition, several reports mentioned alternative processes not described in the standards. Standards should also not limit other practices that may enhance the HIA.

The ability of HIAs to influence decision-making depends on the quality of the process, including leadership, organizational structures, and partnerships within it.[117] This evaluation focused on the HIA process, as recommended from experience in other countries.[166,167] This study affirms the variability of HIA processes across contexts and objectives, although HIA typologies were not applied.[168] The research was designed to assess needs for an evolving practice, not to determine what is fit for purpose. While all of the HIAs studied stated some objectives, many of these were generic, such as "to inform the decision". Objectives were therefore not classified and it was assumed there was a universal interest in promoting the principles of HIA, as reflected in the standards. The gap between the aspirations of the standards and the reality of practice points to the need for any combination of standards and guidelines accounting for different contexts, competencies and other resources for conducting HIAs.

In moving forward, the community of HIA practitioners should develop guidance on the resources needed to facilitate more democratic approaches to decision-making, while identifying better analytic tools and the types of ongoing support needed. Guidelines for stakeholder participation - which were drafted in 2011 and released in 2012 [138] - should facilitate improved participation of both professionals and lay persons. Additionally, principles of team science [169] will help assessors from multiple agencies and disciplines improve their research strategy.

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Rubrics that help practitioners evaluate the rigor and relevance of their HIA process and templates for reporting would also be useful. A survey of practitioners as to the relevance and the utility of the standards would also support their application. Groups such as the Society of Practitioners of Health Impact Assessment are beginning to support such efforts. Further study of HIA practice is also needed. Such studies should examine recommendations and risk management and how the rigor of the process 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.

HIAs must be of high enough quality to add value to decisions. This study illustrated a diverse practice in the U.S. that does not fully align with practice standards. There were substantial gaps in processes that have demonstrated positive outcomes, such as community participation. Advocates of HIA should therefore use discretion when promoting HIA as a community empowerment tool. There were also substantial gaps in reporting. If HIAs do not report fully the processes, the principle of transparency is violated and the ability to both achieve and evaluate outcomes is hampered. Robust and real-time documentation can serve as a means of monitoring. In light of these gaps, more guidance is needed so that standards account for the resources available and help produce HIAs that are fit for purpose. Standards should define the field and promote quality by also facilitating creative innovation guided by the principles. A more ubiquitous yet judicious use of HIA can help to achieve the goal of health of in all policy.

Table 1. Included HIA reports

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

Table 2. Screening and scoping participation (n=25 reports)

Practice Standard	Fidelity Measure	# of HIAs	
		Screening	Scoping
"HIA process should include at minimum… screening to determine the value and purpose; scoping to identify health issues and research methods" "The full HIA report should document the screening and scoping process and identify all the participants in the HIA and their contributions"	Process is described	21	24
"Meaningful and inclusive stakeholder participation in each stage of the HIA supports HIA quality"	Participation beyond the primary assessor	12	12
"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 org.	4	15
	Decision-maker	9	12
	Health official	0	7
	Public agency	12	15
	Other stakeholders	7	11

Table 3. Screening criteria (n=25)

Practice Standard	Fidelity Measure	# of HIAs
"Screening should clearly identify how an HIA would add value to the decision-making process"	Use of any criteria	21
	Stakeholder and decision-maker concerns about effects	16
	Feasibility of assessment	14
	Potential for significant health effects	12
	Potential for inequitable effects	8
	Potential for timely changes	6

Table 4. Scoping elements (n=25)

Practice Standard	Fidelity Measure *	# of HIAs
"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	24
	Identifies decision alternatives	10
	Includes logic model or pathways	18
	Defines any analytic boundaries	19
	Identifies research questions	8
"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	10
	Identifies vulnerable subgroups	19

* These criteria are not all listed in version 1 of the standards, but are in version 2 step 3.1

Table 5. Assessment elements (n=25)

Practice Standards	Fidelity Measure	# of HIAs
"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	23
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"	Uncertainty and assumptions described	18
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	19

Figure 1. Assessment pathways: determinant and impact groups scoped

DETERMINANT	IMPACTS	
	chronic disease (gen.)	18
	injury	14
	obesity	14
transportation 38	cardiovascular disease	14
	mortality (all-cause)	12
	cancer	12
	mental health	8
	respiratory	6
	chronic disease (gen.)	13
	obesity	12
	cancer	10
zoning 21	cardiovascular disease	10
	mental health	10
	mortality (all-cause)	5
	injury	5
	respiratory	2
	mental health	6
employment 17	care and services	3
	injury	3
	cancer	2
	chronic disease (gen.)	2

CHAPTER 4: Investing for Healthy Returns: Pursuing a Public Health and Community Development Partnership

Abstract

Public and non-profit agencies addressing public health issues face an increasingly challenging funding environment. Amid drastic cuts to public budgets and poor performance of philanthropic endowments, the needs have never been greater. While public health agencies should work to preserve their social mandate and philanthropic ties, they must adapt to a new environment to achieve their full mission. The public sector is moving towards a pay-for-performance approach, while philanthropy is also demanding more accountability in new models of funding. In addition, investors in the private sector are increasingly interested in balancing financial and social returns. Public health should further promote and measure the long-term health outcomes resulting from a range of investments in community development and public health, and connect formerly disparate disciplines, sectors, stakeholders and systems. Health Impact Assessment and Social Return on Investment Frameworks can guide this work. In doing so, public health can leverage capital from these other agencies and sectors, including private investors. It can achieve broader more sustained outcomes by expanding partnerships to tap these larger sources of capital and realize a collective impact. Community developers are especially promising partners, having a similar goal of public well-being and the expertise to secure capital. Community developers want to increase their returns on investments in housing and low-income neighborhoods by considering health outcomes. Expanding upon sentinel reports on the topic, this paper discusses how public health can partner with community developers and other social enterprises. It offers recommendations for attracting investors and leveraging resources beyond public health budgets. Ultimately, public health should learn to design, measure and market interventions to demonstrate returns on investments. Public health should convene community development and other partners to seek private capital at a level that endows philanthropies rather than fighting over the dividends.

Introduction

Public health agencies across the nation have recently experienced dramatic cuts.[170] Immediate options for dealing with these shortfalls within public health agencies include realignment, deferring or eliminating services, or a combination thereof.[171] Some public health agencies may be able to undertake such reforms and still meet standards for essential services.[171] However, public health agencies must address the root causes of the resource shortfalls if they are to tackle the most serious challenges such as climate change and chronic disease in an aging population. Health inequities depend on power inequities. This power differential is manifested in our current public policies and systems.

Public health still operates in a system where *"Our nation's investment portfolio with regard to health is weighted far toward short-term returns"*.[72] It is a system of treatment rather than prevention, spending disproportionately on downstream medical interventions. This in part reflects a fundamental human tendency to favor urgent needs and treatment over prevention.[172] Subsequently, taxpayer funding of - or willingness to pay for [173] - public health prevention will have limits. However, major commercial and economic interests are dependent on the current arrangements, with the health care industry generating annual revenues on the order of trillions of dollars [174] and expecting over 5 million new jobs by 2020.[175] Health care remains one of the fasting growing sectors of the United States economy.[175,176]

Meanwhile, national spending on public health prevention - at $75 billion annually – remains a fraction of the over one-trillion spent on treatment.[177] Over the past three decades, federal public health funding has not kept pace with other discretionary spending.[178] It comprises just 5% of discretionary spending, or less than 1% of all federal spending.[178] As public budgets have dwindled, so has access to the resources for health such as public parks.[179] Many politicians have traded off funding for these resources in favor of spending on short-term measures supported by the health care industry. Subsequently, health care investors have reaped considerable financial returns,[176] but societal returns of public health and well-being are still lacking.[180]

Health care industry profits coupled with a lack of political will continue to challenge public health prevention efforts. However, recent developments offer hope. The Affordable Care Act (ACA) is shifting the health care system towards prevention. In addition to direct funding for prevention, the ACA encourages providers to keep patients and communities healthier and out of hospitals. One strategy involves pushing non-profit hospitals to shift their community-benefit efforts from charity care to more community-based assessment and prevention. If the ACA succeeds, providers will be more accountable to population health, and profits will eventually be tied to prevention. Public health agencies and advocates should help steward the health care system to this new norm.

Public health agencies should simultaneously pursue resources outside of their traditional domain to supplement prevention efforts. This starts with connecting stakeholders to increase shared accountability. Interagency agreements and partnerships between public health agencies and planning departments, for example, can multiply the impacts of each agencies work.

Philanthropies offer additional resources. Leading philanthropies have recognized the changing landscape for health and are changing accordingly. They now incorporate *"convening, networking, communications, and policy initiatives with grant-making to drive social change."*[71] Public health agencies should also invest more in these strategies and work at the convergence of many issues with the support of philanthropy.

Still, the public and philanthropic sectors along may not be able to supply enough ready capital to meet modern public health challenges requiring policy and systems change.[71] Moreover, because many of the determinants of health originate in an unregulated private sector, partnerships can help identify and mitigate those impacts. Although public health has established limited public-private partnerships,[181,182] a new type of investor is developing new opportunities. In particular, corporations and investors wanting to "do well and do good" can provide resources and partnerships that advance public health goals. "Impact" or "Social" investors are trying to reorient private markets towards more sustainable, socially-beneficially outcomes.

At the forefront of this approach are myriad actors who see tremendous opportunities in convening stakeholders to jointly invest in human capital. This includes community developers and the increasingly broad collective of agencies and individuals working towards health and well-being in neighborhoods. Community developers have long held a similar mission and worked in the same neighborhoods as public health agencies. Community developers provide a ready ally to embark on a new model for public health funding and practice. Scholars and practitioners from multiple fields have discussed the need for partnership between community developers and public health.[183-189] This paper builds on those sentinel reports to further examine the need for this new approach, the work underway, and the opportunities for public health practitioners to secure a more sustained health and well-being.

"Perhaps the greatest threat is taking no action to better coordinate community development finance and health-care strategies, given trends of deteriorating health status, which undermine the benefits of traditional community development investments and generate debilitating health-care costs." - Lisa Richter, GPS Capital Partners [189]

The Social Enterprise of Health

Social enterprises are characterized by having a *"social mission and a business mind"*. They often use commercial strategies and have business plans that rely on private rather than public or philanthropic revenue to achieve their aims. Sometimes profits are involved. Public health is a social enterprise in that social aims are of primary concern. However, few observers would consider public health professionals, although resourceful, to be entrepreneurs. The 2008 recession, subsequent budget cuts and sequester, and contemporary political climate has hindered the ability of public health agencies to meet their mandate and mission. Amid this new landscape for health, public health leaders should consider their entrepreneurial role. They should think about business models to identify new sources of capital in other agencies and sectors that can be purposed towards public health.

Public health agencies must first recall that community development and the activities of many other agencies and sectors all culminate in health and well-being. The mission of community development is to build more resilient communities. It develops human capital by supporting housing, economic development and education. Community developers can also empower residents by allowing them to determine these futures. Community developers work in a unique social enterprise, leveraging financial capital from public, philanthropic and private sources and acting through non-profit Community Development Corporations (CDCs) and Community Development Finance Institutions (CDFIs). Public health agencies can initiate partnerships with community developers (and other agencies) by helping measure the (health) the returns of those upstream investments. They can become more entrepreneurial by seeking this shared understanding to bridge the "know-do" gap,[190] jointly shore up public funding, meet the demands of philanthropic funders, and open the door to new private investment.

The power of upstream investments

The word "health" comes from "weal" - the Old English root for "wealth", "welfare" and "riches". Today, in free-market countries such as the U.S. the words health and wealth have been disconnected. Wealth has become synonymous with economy, measured ultimately in financial terms, while health is too often considered at odds with economy. In reality, the growth, health and productivity of people - human capital - offers potentially high-yield returns. Human capital and (national) economic performance are intertwined.[191] Operationalizing this link between human and financial capital may lead to a sustainable public health.

Even conservative estimates of returns on investment in contemporary community-based disease prevention programs are competitive with the private market.[192] The further upstream, away from treatment towards primary prevention, the greater the returns (Table 1). For example, studies of investments in early childhood development have routinely demonstrated enormous economic returns, including costs saved on incarceration and health care.[70] Programs that empower communities to gain and maintain their health offer the greatest long-term returns. Many more example abound, and the history of public health is grounded in such ounce of prevention common sense.[193-195] Reconnecting agencies, sectors and missions will allow the collective to act on this common sense.

"To remedy all these conditions (an unhealthy urban environment) will cost money, but it will pay. It will pay not only in the satisfaction of having clean and healthful cities to live in, not only in the joy of having relieved the suffering and saved the dying, but it will pay in hard cash."
- George C. Whipple, 1908, Typhoid Fever, Its Causation, Transmission and Prevention [196]

The Networked Approach

Public health solutions must reach beyond what has traditionally been defined as health and health care. In other words, public health agencies should not only realign within their own organizations, but also align with the constellation of agencies and sectors that ultimately influence public health. Public health practitioners are redefining their work as convening and fostering new partnerships outside the health sector.[85-87,197] This networked approach is a tenant

of the "new" public health.[198] At the local, state and federal [72] level, public health agencies and organizations are expanding partnerships to address determinants of health not in their immediate control.

"Public health must weave itself into the larger fabric of societal decision making if we are to succeed." - Harvey Fineberg, Public Health in a Time of Government Austerity [199]

Comprehensive place-based initiatives are a contemporary networked approach. They address a range of social determinants of health. The highest-profile of such initiatives - Promise Neighborhoods - was born from frustration with *"years of piecemeal approaches to social problems and an unrealistic appreciation of the interconnections of economic distress and social maladies in the inner city"* that *"gave rise to inadequate social services and the fragmented infrastructure of providers"*.[200] While Promise Neighborhoods are focus on improved educational outcomes, they realize that health is a critical part of that equation and have partnered accordingly with myriad agencies. This model is being expanded, with President Obama's announcement of the Promise Zones initiative in the 2013 State of the Union address. At least six federal departments, including Health and Human Services, will work together *"to create jobs, boost public safety, improve public education and stimulate better housing opportunities."*[201]

Despite their potential, by attracting more resources to the neighborhoods they target, place-based projects increase the value of those neighborhoods. Without steps to prevent gentrification, the benefits to the local population may be limited and displacement may do even more harm.[202] Therefore, stakeholders should ensure that human capital, not just physical capital, is developed. Critics have also called into question the likelihood of scaling this approach given the intensity of resources required.[203] Community developers are realizing that place-based approaches must be cultivated in an ecosystem of activities and investments that not only leverages stakeholders, but also creates stakeholders through a system of accounting that aligns all partners toward investment in a common goal. Networking and convening must also entail shared measurement.

Fixing the "wrong pocket" problem

Public health often addresses conditions that are the externalities of private investment. When a corporation pollutes the air without penalty, they are creating a negative externality in the form of lung diseases, cancers, and/or and the health effects of climate change. Pollution regulations or strategies such as cap and trade help ensure that the costs in terms of public health are paid by those creating the problem. An example of a positive externality occurs between two of the largest federal government programs often at the center of political debate: Medicaid and Medicare. Investments in Medicaid – serving generally younger populations – yield savings in Medicare, which serves older populations. Still, these up-front investments are politically difficult, in part because the agencies' administrative accounting systems are not designed to allow potential savings in Medicare to be invested into Medicaid.[204] This is often referred to as the *"wrong pocket"* problem.

Achieving public health will require accounting across systems and lifecycles, connecting determinants and outcomes and connecting payers (investors) and payees (those seeing the returns) to fix the wrong pocket problem / close the loop / eliminate externalities / create a more realistic equation. More specifically, better methods are needed to measure and project long-term health outcomes resulting from a range of investments in community development and public health. Although upstream investments have been harder to measure, new knowledge in public health science, most notably life-course, cumulative impact and social determinants of health frameworks, has improved our understanding of pathways to health. The evidence-base has grown accordingly to include robust long-term longitudinal and experimental studies. This evidence can be used to demonstrate clearly the health and social returns from a range of public and private investments. It has facilitated a more comprehensive calculation of costs and benefits, what is ultimately return on investment (ROI). Networking will reduce the distance between payers and payees, allowing combined cost and benefit streams. By measuring impacts from start to finish, across beneficiaries, agencies and sectors, public health can address the "wrong pocket" problem, and capture returns on investments.

"The most promising models of community development going forward all include elements of integration, such as layered financing, joint development, shared accountability, or coordinated services. The dichotomy of "people versus place" and the rigid siloes separating housing, education, health, and other sectors must become a thing of the past in order to effectively address poverty in the future." – Laura Choi [205]

The Role of Health Impact Assessment

These frameworks and the concept of ROI are readily applicable via existing approaches. A key opportunity lies in health impact assessment (HIA). It proactively applies evidence from research and community input to estimate potential outcomes of decisions. It uses pathways, predictions, participation and partnerships to help integrate health into decisions where it wouldn't otherwise be valued. HIA also makes recommendations. It has added a health lens to decisions on projects, plans and policies in transportation, land-use, the built environment, housing, and many other areas. Many of the HIAs conducted to date have been in the domains of community development (Table 2), but not with community developers. HIA is now being used to address decisions in other areas such as education and mental-health environments.[206]

Because it estimates health impacts, it may ultimately serve as a prospectus for community developers and social impact investors. However, unlike other risk-assessment and efficiency indicators, HIA is not just an analysis. HIAs have routinely engaged community residents and organizations in helping research and recommend changes to decisions for their own health. HIA addresses uncertainty in decision-making using principles of democracy, equity, transparency, sustainability, and a comprehensive view (of health).[53] These principles are likely to resonate with partners including community developers and socially-minded investors. HIA is therefore likely to be very useful if not sufficient in securing these partner investments.

Securing the future of public health

Public health should first partner with agencies that can mobilize social capital and secure financial capital. Community developers are one such partner. Community developers and their partners understand the link between health and wealth and so invest in human capital. They do so by connecting with an array of lenders, foundations, and financing mechanisms to build low-income housing, improve education opportunities and create jobs. A key partner of community development is the Federal Reserve Banking System (FRB). In addition to be charged with improving the economy, it has Community Development divisions that interface with CDCs and CDFIs to build human capital. The FRB is also one of four institutions responsible for ensuring compliance with the 1977 Community Reinvestment Act (CRA), which facilitates provision of credit to low-income neighborhoods. A recent initiative by the FRB of San Francisco and the Robert Wood Johnson Foundation (RWJF) has highlighted the shared opportunities for community development and public health.[207] Community developers are now looking downstream to understand the health outcomes of their projects. They essentially need a better risk assessment system to optimize human capital outcomes in their projects. Public health can fill this role.

Recommendations

This presents a tremendous opportunity for a partnership to leverage existing resources and attract new ones. However, public health should be prepared to meet community developers halfway. How then does public health pursue this opportunity? What follows are nine recommendations for public health to build their network and enterprise to engage community developers, impact investors and other partners.

1. Frame for the public

Public health advocates should do a better job communicating concepts such as social determinants of health if stakeholders are to understand and value them. Understanding the root causes of public health problems is often undermined by the mass media.[208,209] Episodic reporting focuses attention on discrete events in individuals' lives rather than the system in which the individual lives. It paints a portrait rather than a landscape. In addition, a market justice rather than social justice orientation of the mass media again distracts consumers from ideas of shared responsibility and systems. Additionally, personal worldviews are codified in neural networks of the brain.[210] Messages on social determinants will not universally resonate and may in fact be polarizing.[211] Frames are necessary to ensure that messages speak to personal worldviews.

Framing entails *"selecting some aspects of a perceived reality to make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation."*[212] In other words, framing defines problems and lifts up what is most important. Equity and social justice frames are necessary, but not always sufficient to achieve public health goals. Both moral and practical arguments will create the most-buy-in. This acknowledges what Lakoff calls the *"trap of*

Enlightment reason" [210] and takes a new humanist approach where reason and emotion are not at odds, but co-exist." [213] Public health messages must resonate with multiple stakeholders and audiences. For example: *"As consumer goods, both education and health are extraordinary. They are not sought simply to satisfy human wants but are essential ingredients of human welfare."* [214] Additionally, *"In a modern society, social Darwinism is not acceptable. Our humanitarian instinct tell us it's wrong, and our economics reveals it also costs our society."* [214]

In many regards, public health is already active in this type of framing, using measures such as quality- and disability-adjusted life years to value human welfare. Still, these types of indicators have too often been treated simply as metrics for efficiency. Moreover, the complexity of measurement should not distract from *"explicit language about levels, pathways, and power."* [215] There has been relatively little research on how such messages are received and perceived by different audiences.[216] Public health must engage in this research and practice if it is to attract community developers and other investors managing multiple bottom lines. Public health and community developers can also learn from each other's deep experience in messaging to mobilize community members and allies.

2. Use a common language for colleagues

Many stakeholders contribute to health and social welfare outcomes. Public health should continue to build inter- and trans-disciplinary capacity to help these stakeholders understand and align their contribution to these outcomes. A common language will help.[140,197] The most basic vocabulary of public health is not so basic for those outside public health. For instance, "equity" in the finance world refers to ownership of an asset. Other terms can be translated more easily. For example, co-benefits in public health connote the double and triple bottom line in business. Again, community developers can be intermediaries here.

Beyond language, public health leaders should develop business acumen. While the missions of public health stakeholders may overlap, margins often do not. Community developers and investors - public, private and philanthropic - will be more amenable to supporting projects and implementing recommendations when presented a business plan describing the model, product, results, and market. ROI is a key component of the business plan. Plans must contain a sustainable revenue / funding model. Although financial calculations are helpful, at the very least public health proposals to partners must consider which benefits accrue where and the resources required to implement recommendations. In lieu of quantitative measures, estimates of an interventions direction, magnitude, and distribution of effects on certain populations can still be useful. Business plans help operationalize government and non-profit solutions to market failures. This type of thinking has been used at various levels of public health to reach otherwise unattainable goals.[217-219]

3. Expand on current methods

Cost-effective and cost-benefit analyses are important tools for quality improvement in health care and public health prevention. Cost-effectiveness analysis compares the cost vs. outcomes of different interventions. Cost-benefit analysis goes a step further to measure the

dollar value of the outcomes. With a big data movement underway and greater attention to and capacity for evaluation in numerous fields, there is a greater possibility that outcomes can be shared. ROI is one particular outcome indicator that is gaining increasing attention in public health.[192] It was the theme of the 2013 National Public Health Week: "Public Health is ROI".

ROI is a ratio of savings versus spending. ROI is similar to a cost-benefit analysis. However, ROI measures the sustained effectiveness of an intervention rather than short-term gain or loss. Public health has routinely calculated ROI for some disease management programs, such as asthma.[220] These and other ROI estimates of primary public health prevention can provide convincing evidence to decision-makers facing competing priorities. Efforts to improve public health systems – including quality improvement and accreditation – are supporting public health agencies in measuring and using ROI to better manage local health departments.[221]

More importantly, public health should address the macroeconomics of public health by assessing investment returns in the broader social welfare.[222] Although often calculated as the financial savings/ returns for every dollar spent, the ROI concept allows other interpretations. Social Return on Investment (SROI) is an emerging concept for capturing much broader outcomes.[223] Public health can move upstream by reframing and better measuring interventions and outcomes using the ROI and SROI concepts.

4. Consider Health Impact Assessment

Approaches such as Health Impact Assessment (HIA) already help decision-makers and investors by providing more concrete forecasts of project outcomes. All things end in health and well-being. Therefore, HIA can demonstrate the breadth and multiple levels and types of impact in a currency/ denomination that is meaningful for many. Strategic impact assessments using multiple lenses - environmental, social, health, and fiscal - could yield even greater buy-in.[98] As stated earlier, community developers are looking downstream, wanting a tool to measure how their projects impact health. HIA can provide both a projection of outcomes while also serving as a feedback mechanism. HIAs may also help support the use of social impact bonds, which uses private investment to front novel public health and community development efforts.[224]

While there is great potential in using HIA for community development,[107,225] there is some danger in using it as just a measurement tool. There are myriad challenges in measuring social value creation.[226] Measuring financial and social returns across multiple parties (public and private) and complex and often temporally lengthy (e.g. up to 40 years) pathways is often beyond the resources available and sometimes impossible. Precision, accuracy and certainty will be elusive. Thus, calculating ROI runs the risk of engaging in a "numbers game". Focusing on measurement may distract from important processes to ensure long-term health and well-being of the target community. In HIA, this includes processes for participation, ethical use of evidence, and equity. These principles of HIA [53] are nearly identical to those for *"capturing and valuing broader outcomes"* in prevention using SROI.[223,227] HIA and ROI applications will be limited, and possibly unethical, if treated solely as measurement tools. Success as measured by global outcomes such as ROI depends on all fields in the pathway of determinants, while processes are valuable and yield intermediate returns along the way. This may be missed in final ROI

measurements. Therefore, broader outcomes such as SROI must be included and the value of processes and outcomes should be evaluated balancing utilitarian and deontological ethics frameworks.[228,229]

5. First do no harm

In attempting to meet move upstream to meet new demands in this new era, public health should first consider reorganization and opportunities within its existing agreements, partnerships, and purview. Public health must first do no harm and ensure that current investments are done well. It is important to ensure that massive investments in federal, state, and local transportation, housing, employment and education projects maximize social outcomes. Often, this does not happen. For example, school facilities have widespread and long-standing impacts on communities. States routinely make capital investments in the billions of dollars to support school facilities. Yet public health's concern has been more downstream, on issues such as safe routes to school, school health centers, and healthy environments. Public health has not yet extensively collaborated with education and planning officials to ensure that schools are connected to transportation, housing and education. In a survey of 845 local planning agencies, only 27% of comprehensive plans explicitly addressed public health and neither local health departments nor local school boards were very engaged.[230] Public health must establish partnerships for this type of primary prevention. Community developers will often know the landscape of investments in communities, if they are not directly involved in them. Once opportunities are identified, a careful application of the ROI concept can support an evaluation overall project costs relative to its benefits in terms such as the permanence and potential reach in communities.

6. Start with human capital

The calculation of ROI must not detract from the need for stakeholder empowerment. Investment of financial capital must occur with investment in human capital. Financial investments in infrastructure alone will not work.[231] Indeed, as Nancy Andrews, President and CEO of the Low Income Investment Fund (LIIF) points out: *"Investments in physical infrastructure without investments in people run the risk of fleeting returns."*[186] Building human capital requires holistic approaches. Human capital and assets are not to be utilized, but mobilized. Communities are not commodities, or clients, but rather investment partners. ROI can guide investment ideas, but communities must guide investment decisions and implementation.

7. Understand intermediaries and investors

Public health agencies should first engage community developers by illustrating their own goals and scope of activities within communities. They can also offer public health metrics and methodologies such as Community-based Participatory Research (CBPR). This will help leverage and align resources already available to both parties. Public health must also understand community developers - their partner and intermediary to investors. The Community Reinvestment Act (CRA) of 1977 was a landmark event for community development, though the field arose well before then. The CRA mandated that federally-insured commercial banks and

savings institutions provide credit to low-income communities they receive deposits from. Community Development Corporations grew to support low-income communities in securing financial capital, often via Community Development Finance Institutions, from the government and other investors.

Once a partnership is established, public health and CDCs together must present a feasible business plan to potential investors. Even when the ROI may be promising and the networks and evidence are available to operationalize programs that achieve the ROI, many traditional investors are reticent to front money. Even impact investors also have a limited risk tolerance. Investors generally need several things in order to fund projects. First, they need platforms, or an understanding of the contours and structures of the projects. They also need standards and a common language and approach for assessing potential impacts. A public health and community development partnership must offer investors some assurance of positive outcomes. Finally, investors need intermediaries – accessible and trusted brokers to connect them with projects. CDCs can be intermediaries, and know better the infrastructure developing around impact investing.

8. Consider risk in innovative financing

Risk may affect many stakeholders and take many forms. This includes risk of failed projects and partnerships and the financial risk for communities invested in as well as the public at-large, since tax breaks and subsidies are often part of community development financing. Social impact bonds (SIBs) and Pay for Success (PFS) strategies help alleviate some of this risk by using private money to front public investments/interventions that would be otherwise difficult to make because of their novelty or political contentiousness. If those interventions are successful, public agencies will pay back the investors sometimes with additional return. To date, SIBs have been implemented in the U.S. in Massachusetts and New York, both addressing recidivism. Additional SIBs are being pursued across the country with support from federal and state governments and foundation.

Theoretically, investments in the poorest communities present the highest risk but also the greatest return if successful. Similarly, returns will depend on the complexity and distance between the determinants, interventions and outcomes. Investors seeking only profits might push investments that guarantee returns but not sustained outcomes, or use less than best-practice to achieve outcomes.[228] This can be mitigated by partnership agreements that ensure that the public health mandate to protect populations, especially the most vulnerable, is infused into the process for selecting and implementing projects for SIBs and other social enterprise strategies. Questions regarding the distribution of risk between public and private investors should also be explored as the SIB strategy is pursued.

9. Shift slowly and shore up the social contract

Trade-offs and risks must be examined when considering the ethics of partnering with community development to achieve shared goals. First, public health could compromise its mandate to protect by shifting resources to engage in these partnerships. Careful planning and

gradual realignment will help ensure public health agencies can deliver essential services while pursuing these opportunities. Second, the application of the ROI concept raises ethical concerns by making health a commodity,[232] possibly demeaning its value as a right.[233] However, ROI is not just a financial calculation but a rational approach for moving investments upstream. Whether using money or health and social outcomes as the denominator, ROI is a measure of effectiveness. Such utilitarian approaches focused on the end – producing the greatest good for the greatest number – run the risk of compromising the means.

However, the rule of rescue [73] means we will always still look downstream. According to Jonsen, *"a fact about the human psyche that will inevitably trump the utilitarian rationality that is implicit in cost-effectiveness analysis."*[172] Therefore, the principles of public health and community development and approaches such as HIA and SROI will help ensure both ethical and efficient partnerships and projects. They will facilitate dignity and power in communities where the healthy choice has always been the more difficult choice. As stated earlier, public health agencies must *"manage a social enterprise with business dimensions, rather than a business enterprise with social dimensions."* [229] An orientation towards human capital is critical.

A larger question pertains to concerns about pursuing these activities rather than directly fighting for a renewed and reinvigorated social contract. Engaging private investors in what has traditionally been a government responsibility runs the risks associated with privatization: challenges of ownership, decision-making and accountability. In addition, venture capitalists may support the wrong projects in search of profits. Some may argue it is a slippery slope. However, the social finance innovations described in this paper, including benefit corporations and impact bonds, can be pursued and contracted responsibly. Moreover, they may shore up the public sector. Connecting public agencies will make them more effective and valued. Public-private partnerships will utilize the power of private investment – which comprises 77% of National Gross Domestic Product. Private capital used in SIBs will support innovation that would otherwise not happen. These innovations are not about working around government, but making government work better. Entrepreneurship will support greater productivity and yield from government.[234] Case studies of networked approaches spurring successes in other areas such public housing should be examined.[235]

Conclusion

When Standard and Poor's downgraded the credit rating of U.S. federal government in 2011, it stated that *"the downgrade reflects our view that the effectiveness, stability, and predictability of American policymaking and political institutions have weakened"*.[236] Now in the September of 2013, the federal government is again facing gridlock and financial meltdown. These challenges to obtain and use credit are occurring amid a backdrop of incremental decision-making required by pay-as-you-go budgeting.[237] Serge Taylor, in his book *Making Bureaucracies Think*, describes the hurdles of *"pluralism and incrementalism of American politics"* and *"myopic and parochial agencies"*, resulting in *"political incentives against environmental foresight"* (pages 20-21).[37]

These and myriad other challenges of the public policy climate should not be the rate-limiter for public health action on social determinants of health, climate change, and other critical public health issues. Though these issues may be wicked and complex, they are not intractable. Too address them, public health prevention needs a new business model. Current resource constraints should prompt public health agencies to adapt to changing politics and markets. In the current economic and political environment, Health in All Policy approaches that incorporate HIA and ROI concepts will help bring new resources to beleaguered public health agencies. In the midst of political gridlock, new entrepreneurial approaches must be considered. For example, policies that monetize externalities, such as cap and trade, use market forces to achieve public health. Social impact bonds can bring broadly beneficial but politically unattractive interventions to reality. Collective impact strategies can improve outcomes among non-profits and public and private partners. Impact investing presents a tremendous opportunity to achieve health by addressing externalities and leveraging capital from the private sector. Public health agencies should use business plans, common language, and metrics to partner with community developers. Together they can engage in new strategies for impact and pursue networked and entrepreneurial approaches to shared social goals.

These strategies are part of a suite of approaches (Table 3), some more promising than others. They all have different features and are appropriate at different points. However, they are all part of shared accountability/ collective impact strategy. The recommendations put forward in this paper should not necessarily be followed in sequence. The best approach to securing new resources for modern public health challenges will likely involve several of these ideas and incorporate others not described here. Regardless of the strategy, the work of public health must be focused on investment, not just intervention. It must entail convening, with health as the common denominator. By framing and measuring public health in terms of ROI, public health can both partner with stakeholders and create stakeholders. ROI is really about connecting the dots, drawing out pathways, and identifying and valuing lifecycles within ecosystems. It holds all parties responsible. ROI can help public health do more with less and also help it do much more by expanding the margin for the mission.

Table 1. ROI for different human capital investments

	Intervention/ Investment	ROI ($s return on $1 invested)	Time to accrue (years)	Study
Upstream	Child care, housing, and education	20	unknown	Andrews and Kramer 2009 [186]
	Childhood vaccination	16.5	unknown	Zhou 2005 [238]
	Pre-school education	8.7 - 13	27 - 40	Schweinhart [70]
	Disease management (multiple risk)	6.8	1.4	Goetzel 2005
	Community-based health prevention	5.6	5	Levi 2009 [192]
	Disease management (single risk)	0.7 - 2.8	1 - 2.5	Goetzel 2005 [239]
	Community Health Worker outreach	2.3	unknown	Whitley 2006 [240]
	Tobacco cessation	2.1	unknown	Richard 2012 [241]
	Expanded HIV testing	2.0	1-5	Hutchinson 2012 [242]
Downstream	Overall health care services	1.5 - 1.9	unknown	Luce, 2006 [243]

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Table 2. Health Impact Assessments in housing, education and labor

Decision domain	Completed	In progress	# of states	Assessors		
				Gov	Non-profit	Academic
Housing	13	6	10 (+1 national)	10	5	3
Labor and Employment	11	0	7 (+1 national)	5	4	2
Education	12	7	5	3	3	6
Total	36	13	na	18	12	11

* This data came from the Pew Health Impact Project database, which contains the most comprehensive and contemporary list of HIAs conducted in the U.S.[93]

Housing:
Types of projects included: specific public housing redevelopment projects and redevelopment addressing vacancy, affordable housing plans, housing master plans, housing inspections, reorganizing of public housing management and funding structures, housing assistance and homeless prevention programs.
Partners included: U.S. Department of Housing and Urban Development's HOPE VI program, Local Housing Authorities and Financing Agencies, Health Departments, City Councils, Developers, State and Local assistance agencies and programs, and Community-Based organizations and Universities.

Labor and Employment:
Types of projects included: Living wage, pay equity and paid sick days ordinances and legislation, transitional jobs programs, layoff and bumping processes.
Partners included: Health Departments, Community-Based Organizations and Universities.

Education:
Types of projects included: Truancy and discipline policies, grade retention policies, learning academy models, after-school programs, physical education and school wellness policies, school siting policies, student bus passes, and school integration.
Partners included: School districts, Health Departments, Universities, Community-Based Organizations

Table 3. Strategies for Social Return on Investment

	Sector(s) participating			Mechanisms used			
	Public	Non-profit	Private	Partnerships	Measurement	Financing	Participation & Empowerment
Corporate social responsibility	Red	Red	Green	Red	Yellow	Yellow	Red
Comprehensive, place-based	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow
Social enterprises	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow
Collective impact	Yellow	Green	Yellow	Green	Green	Red	Yellow
Social impact bonds	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow
Inter-agency partnerships	Green	Red	Red	Green	Yellow	Yellow	Red
Impact assessment	Green	Yellow	Yellow	Green	Green	Red	Green

This table presents a conceptual framework for strategies for SROI. It illustrates the similarities and differences between them using the following color scheme:

Green: Heavy involvement
Yellow: Some involvement
Red: Little to no involvement

The color codes are not based on particular data or research, but rather a general understanding of literature on each. It may not reflect the recent innovations that have expanded the scope of the strategies. Although definitions treat them as separate strategies, they may overlap in practice and may be used together under a general theme of impact investing.

Corporate social responsibility: Modifications to conduct or contribution of organization, e.g. corporate philanthropy
Comprehensive, place-based initiatives: Neighborhood-focused from "cradle-to-career", e.g. Promise Neighborhoods
Social enterprises: Primary mission is social, may have double bottom-line and/or Benefit Corporation status e.g. KIVA
Collective impact: Coordination of non-profit activities, e.g. STRIVE [244,245]
Social impact bonds: Private investment in public projects, e.g. Pay for Success [224]
Inter-agency partnerships: Agreement between federal, state or local agencies, e.g. Sustainable Communities Partnership
Impact assessment: prospective analysis of plans, projects and policies, e.g. Health Impact Assessment

CHAPTER 5: Conclusion

This Chapter briefly summarizes Chapters 2-4 and builds on the insights acquired in deeply studying HIA and similar approaches addressing complex problems to make recommendations for advancing the practice and the paradigm of HIA. I also describe an agenda for research following-up the studies here. Finally, I discuss the direction of the field and my own role in it.

Summary and Recommendations

Use Additional Evidence and Metrics Supporting the HIA Paradigm

The research in Chapter 2 highlighted the need for more readily-available evidence for HIAs. Despite the wealth of evidence available for many pathways and a history of similar, applicable HIAs, practitioners expressed frustration with gathering evidence and "reinventing the wheel" during the assessment. This need was obviated in practice, detailed in Chapter 3, as the quantity and quality of evidence used in HIAs varied widely. Subsequently, Chapter 4 examined the wide range of evidence and approaches that could support both the practice and paradigm of HIA. Other social entrepreneurs are similarly trying to assemble evidence on social impacts for more widespread use.[246] These findings suggest that HIA leaders, funders and working groups must ramp up efforts to organize evidence for HIA practitioners while reaching out to other partners who can contribute to and benefit from the evidence base.

HIA entails three analyses in making estimates: baseline, causality/ effect size, and forecast. Therefore, myriad evidence and indicator systems are needed to support HIA. The most familiar metrics in public health - vital statistics [247] and population health [248] measures such as County Health Rankings [249] – are accessible for most public health agencies to use for baseline analysis in HIAs. In terms of measures of causality (between determinants and outcomes) for various pathways, several sites have either compiled the literature used in HIAs or conducted their own systematic reviews for use by subsequent HIAs. These include Community Guide,[110] UCLA-CLIC,[109] Human Impact Partners Evidence-Base [111] and others. They have generally organized their evidence by both health determinants (e.g. land-use) and outcomes (e.g. asthma). Human Impact Partners has also compiled a comprehensive list of evidence for all analysis components of HIAs.

It is unclear to what degree these resources overlap and/or contain gaps in the evidence needed for HIAs. Moreover, pathways will change as new evidence becomes available and new topics are addressed. Understanding how the existing evidence aligns with the needs of practitioners would be a useful area of inquiry. While this was explored in Chapters 2 and 3, further details will help identify priority areas. At the very least, HIA practitioners would benefit by having a single up-to-date resource for evidence.

Coordinating and refining this evidence base would also support the development of more advanced tools. For example, the Health Economic Assessment Tool (HEAT) was developed by the World Health Organization to help forecast the impacts of walking and cycling projects during planning and appraisal. HEAT relies on a single gold-standard study to *"estimate the value of reduced mortality that results from specified amounts of walking or cycling."* [250] It has been used over 20,000 times since it was launched in 2011. These calculator tools may inform both HIA and planning processes.

Other tools take an even more proactive approach, by establishing/ institutionalizing indicator systems that can be used for better planning. The Healthy Development Measurement Tool (HDMT) - the product of the Eastern Neighborhoods Community HIA - helps *"bring health considerations into urban development".* [251] Now called the Sustainable Communities Index, it is a set of tested metrics for healthier planning, policy-making and civic engagement. This approach is being used and customized in other jurisdictions. For example, Seattle uses a "Healthy Living Assessment" to incorporate health elements into planning. Indicator and scoring systems such as Aging in Place Indicators,[252] Leadership in Energy & Environmental Design (LEED) and Sustainability Tools for Assessing and Rating Communities (STAR) also support healthier public decision-making by setting benchmarks and scoring projects.

Additional indicator systems outside the immediate realm of public health can support public health objectives by expanding and intervening on the pathways to health. For example, in the world of social enterprise, Benefit Corporation (B Corp) certification scores the environmental and social contributions of businesses straddling the for-profit and non-profit divide. This system focuses on business processes in hopes of improving environmental and social outcomes. Much like HIA, the intent is to mitigate negative and promote positive social impacts in the business operations. This evidence-base for B Corp certification can serve HIAs addressing labor issues, for example living wage [142] and paid sick days decision-making. Conversely, literature reviews and research for HIAs of business and labor issues could inform the B-Corp certification indicators. Another promising opportunity lies in the Global Impact Investing Ratings System (GIIRS), which assesses the social and environmental impact of companies and funds. It is again more focused on business processes, but has the potential to address outcomes including health. Ultimately, is business processes are more socially and environmentally friendly, health will be improved and the need for HIA is mitigated.

Realizing that health has several meanings, on the outcomes end of the pathway HIAs are using a more holistic definition of health including for example mental health.[206] Still, additional alternative impact measures should be considered. For example, constructs such as control of destiny [253] and metrics such as the Genuine Progress Indicator (GPI) [254] should be explored in HIAs. While pathways studied in HIAs must be compatible with those scoped by stakeholders, these alternative measures reflect the principles of HIA and offer an opportunity to engage and create more stakeholders.

All of these alternative indicator systems could be referenced when making recommendations, and may ultimately mitigate the need for further HIAs. Indicator systems are a form of institutionalization. They offer transparency, standardization and benchmarks. The

possibility of merging and/ or concatenating these myriad indicator systems from upstream (determinants) to downstream (impacts) should be further explored. At the very least, HIA practitioners should consider these additional systems when conducting their assessment and making recommendations. Indicator systems ultimately serve the operationalization of the goals and standards in plans and regulations. Public health planning initiatives such as Healthy People 2020 set benchmarks that ensure the utilization of indicators. In addition, goals and standards often created new or expanded indicator and assessment systems that span the range of determinants and help spur the partnerships needed to achieve health.

Finally, evidence alone will not facilitate advancement of HIA practice or the paradigm. More readily-accessible sources of evidence will expedite and add rigor to HIA processes and open up to practitioners. However, those practitioners must be capable of applying the evidence consistent with the HIA approach. Similarly, certification processes in multiple sectors will address the meso- and macro-level organization and systems challenges to better health, but individuals within those organizations and systems must also be certified as capable of HIA and HiAP practitioners. The institutionalization of training and other capacity-building efforts serves as the foundation for advancing the practice and paradigm.

Refine and Frame HIA Recommendations

The ultimate goal of HIA is to create evidence-based recommendations to mitigate the estimated negative health impacts and promote the estimated positive health impacts. There will always be some degree of uncertainty and incomplete information in this process. Exemplar HIAs conduct thorough assessments and describe and classify the uncertainty around the estimates. While much work is needed to ensure that all HIAs meet this assessment standard, the recommendations stemming from the estimates present particular concern. Chapter 3 suggests that few HIAs have treated the recommendations step with sufficient rigor; recommendations are not routinely supported by evidence from the literature. HIA practitioners must shore up their recommendations with evidence. The Community Guide and the National Cancer Institute's Research-tested Intervention Programs offer resources for this.

The research in Chapter 3 also reveals that tradeoffs implicit in the recommendations are often not made explicit. When a series of possible interventions are available, it is not always clear why one was chosen over the others. While this is not a practice standard, and it is often left to the decision-maker to evaluate trade-offs, HIA practitioners can make more meaningful recommendations by proactively engaging decision-makers in that discussion. Short of identifying and adjusting for trade-offs, HIAs might better resonate with decision-makers if they acknowledge that trade-offs exist. Increasing rigor and transparency around the recommendations step will increase credibility and relevance of HIAs.

In addition, in order to always add value for decision-makers, HIAs should consider a tiered approach to recommendations. The specificity of the recommendations depend in part on the specificity and surety of the decision alternatives being assessed. Where decision alternatives are too narrow or broad, or unclear or uncertain, it is difficult to make relevant and practical recommendations. Many of the recommendations end up being focused on additional research.

While such recommendations are warranted, HIAs should also not miss the opportunity to engage stakeholders and add health to the decision even where there is significant uncertainty. A tiered approach might entail levels of activities and investment that track with levels of certainty, yet ensure that the most impacts of the most serious consequences are mitigated. This may entail recommendations for delaying implementation of the decision or taking extra precaution until greater certainty is reached. Moreover, the most fundamental/ upstream determinants often cannot be directly addressed by the recommendations. For example, assessment of a policy regarding school closure may not address the underlying decisions regarding school funding and neighborhood segregation. In this case, the tiered approach may entail priority recommendations to address the impacts of closures, and additional recommendations to address the context and prevent closures from happening again.

Recommendations should provide a clear set of health-producing alternatives for decision-makers. While they should not be tailored towards negotiating, they should provide enough detail for decision-makers and stakeholders to debate and further evaluate them. From the research in Chapter 3, it appears that not all HIAs do this. For example, in a decision regarding a request for a special use permit for a waste facility in New Mexico, the HIA recommended denial of the permit and no further actions. This singular, narrow recommendation does not provide any recourse for the stakeholders in support of the permit. In other words, the HIA offers no other insights or tangible opportunities for a group that is likely to continue their efforts by other means, including lobbying and legal action. While HIAs should provide an impartial and clear direction for decision-makers, they should also not alienate stakeholders with a singular yes/no decision. Again, making specific and substantive recommendations based on clear evidence and rationale would maximize the value-add.

Finally, a key theme that emerged from the study of HIA training was that framing is an important part of recommendations. While framing may be misconstrued as political, it is in fact often necessary to reach certain audiences that would otherwise outright disregard any recommendations, no matter how objective and evidence-based, because of the language used. Words and images can activate certain worldviews, or frames, which are essentially neural circuits in the brain. What is considered normal language for certain audiences may trigger a highly emotional (positive or negative) response in others. In addition, facts alone will not suffice. Hence, framing is necessary to break through that emotion and appeal to a more logical, reasonable part of the brain. As Lakoff states, *"a person must have a system of frames in place that can make sense of the facts"*.[210] HIA recommendations must avoid propaganda language, but still speak to the many different political and social worldviews of stakeholders.

Institutionalize the process and the products

Institutionalization refers to the establishment of both HIA processes and products. It may mean that HIA practice, screening, or even simply thinking/ application of the framework and principles is routinized within an agency or suite of agencies. It may also mean that the partnerships and indicators created by an HIA are embedded and maintained within the business of an agency. While formal HIA processes support such institutionalization, HIA training and

alternatives processes to HIA may be sufficient to change decisions and decision-making contexts.

This research revealed great diversity in the characteristics of HIA practice. Although this research did not focus on decision-making outcomes and other formative outcome evaluations are still underway, it is likely that outcomes will also vary widely depending on the objectives and characteristics of the HIA. While it is important to make this link between processes and decision-making outcomes, HIA must be valued as a process. Questions about institutionalization of HIA must consider not only the decision outcomes, but also the processes that lead to them. There is no fine line between these orientations towards the means (i.e. utilitarianism) versus the ends (i.e. deontology). Simply applying the principles of HIA, even in the absence of any real influence on immediate decision-making, has value. Yet even the best processes may not have demonstrable outcomes. Moreover, the principles of HIA can also promoted by alternative approaches, such as community-based participatory research (CBPR). HIA trainees illustrated the many variants of applying the principles of HIA (Chapter 2).

HIA is ultimately part of an array of strategies for achieving Health in All Policy. It may do this in many ways, including creating partnerships, establishing indicator systems, and changing policies.[111] In doing so, HIA and other HiAP strategies incrementally improve the context for healthy decision-making. Therefore, success in HIA must be defined by a range of process and outcome indicators. Moreover, capacity-building for HIA must be institutionalized. Findings in Chapters 2 and 3 suggest that larger teams are needed to fulfill the many competencies required for successful HIA. The HIA and SDOH frameworks must be understood by a broad range of stakeholders, even those who do not participate in the HIA. To do so, HIA practitioner should consider revising core competencies in public health and other disciplines such as planning to encompass an understanding of these frameworks.

Once policy and systems have been changed, it would seem that HIA has effectively worked itself out of a job. However, there will always be new decisions on new topics that have health outcomes. The life expectancy of HIA is therefore primarily dependent on both the perceived and actual utility and value of HIA. For HIA to remain viable, is must adapt to the changing political context; it will be a fad only to the degree that it does not. The key question then pertains to the relative contribution of an established HIA practice in changing not just single decisions, but systems and the decision-making context for achieving HiAP. Debates on institutionalization consider whether HIA should be mandatory or voluntary, if decisions should be routinely screened for HIA opportunities, and subsequently what workforce investments are needed.

These issues will not be quickly resolved, but it appears that a model of HIA institutionalization erring on the side of being more flexible will be needed. Lessons from institutionalization of impact assessment strategies via federal legislation (e.g. NEPA) and state and local counterparts such as the California Environmental Quality Act (CEQA) will be illustrative. For example, legislative amendments to CEQA now underway suggest that thorough assessments are not incompatible with business and economic development. Analysis of attempts

to support HIA at the federal level will also be useful.[255,256] Nonetheless, the findings in Chapter 2 should spur further examination of institutionalization in a variety of contexts.

Understand the link between training, practice and expanded application of HIA

Recommendations for further examination of each research question are described in the individual chapters. However, there are also important research questions spanning the three chapters. These questions pertain to how, in the current political and economic climate, HIA can best support public health goals. Explicitly linking training experiences to practice quality, and subsequently HIA outcomes, will ensure that investments in capacity-building are appropriately targeted. Efforts to first link the training and practice data from this research and then with outcomes data from other evaluations underway was not successful for lack of overlap of cases.

A more deliberate coordination of HIA evaluations and selection of cases will help establish the pathways for best practices in HIA. Moreover, further detail is needed to understand what sort of revisions to training/capacity-building and practice standards will support an expanded application of HIA. There is a need for clearer understanding of precisely who should be trained and how they should be trained if they are to engage in the type of networked public health solutions described in Chapter 4. In addition, it is important to know which particular processes and products of HIAs support a networked public health approach. The nodes in the potential network – community developers and others – will need to be consulted in this research.

How Else can the Health Impact Assessment Paradigm be Advanced?

Chapter 4 described opportunities for incorporating HIA processes into fields such as community development and using HIA thinking in the larger field of social enterprise. To apply HIA processes for community development, the practice should be modified in several ways. First, given that community development and education projects entail such massive resources, HIA screening criteria should be supplemented to include criteria that give weight to the potential resources leveraged from partnerships. This idea is further explored here in the concept of HIA as agenda-setting. Furthermore, baseline and causal evidence specific to community development topics could be compiled for HIA practitioners and investors alike. This information and estimated of impact could serve as a prospectus for social investors.

The HIA paradigm also presents many other opportunities to create prospective, principled approaches to population health and well-being. It can serve as a means of empowerment, agenda-setting, informing investors, and giving back. It may well have countless other applications. In all cases, it must be considered both science and art.

HIA as empowerment

It is clear from my research that the participatory aspect of HIA is highly valued, and valuable. Still, while there is much interest in this deliberative and democratic aspect of HIA, and

some practitioners have supported communities in co-producing HIAs, the practice has largely been the craft of adult professionals. In other words, while communities may participate, they do not fully own the process. The places limits on the use of HIA in addressing inequities in health and the systems that create them. However, HIA is still evolving and being defined. My research revealed that methodological challenges often precluded definitive estimates of the most important health outcomes. Similarly, these challenges of lacking the data, analysis tools and indicators may affect the ability to identify and characterize inequities and solutions to them. To begin addressing this, existing guidelines for authentic stakeholder engagement and participation [138] should be folded into existing practice standards and funding mechanisms. Additional resources providing guidance for addressing equity through HIA should be consulted as well.[14,146,160]

In addition, now is an opportune time to test alternative applications of HIA. If HIA is to be truly empowering, it must be turned over the stakeholders it most directly affects. Lessons from participatory planning [257] and healthy urban governance [258,259] can help inform this evolution of HIA. Moreover, HIA is forward-looking and many of the estimated impacts may take years to accrue. Therefore, it only makes sense for young people to be not only involved in HIAs, but part of the community of practice. My own experience engaging in urban planning with youth, on projects in their neighborhoods, revealed the power of envisioning the future together.[260] For many youth, it was transformative. HIA practitioners should explore how the practice can contribute to youth development,[82,261-264] even if it means turning it over to them to interpret and build their own practice.

Finally, using HIA for agenda-setting and giving back, as described here, will help to address the equity issue. Using HIA in a more anticipatory way may help disenfranchised communities elevate the decisions that are most important to them. In addition, the notion of HIA as applied science will ensure that all communities receive the benefit of public health research.

HIA as agenda-setting

HIAs are often considered as "interventions" in decisions. A frequently-mentioned challenge to HIA practice was the acquisition and scheduling of resources to conduct the HIA around a moving decision target. This should not restrict HIA practice. While some decisions have clear and static deadlines, others are less predictable and occur within a broad window of opportunity (to influence the decision). Moreover, some decisions are indeed predictable, although they may not be announced. HIAs inherently set agendas by highlighting certain decisions. HIAs may also act to push topics towards a decision-making stage, thereby highlighting the opportunity for a decision.

Several HIAs, most prominently the series of paid sick days HIAs in several states, have used this anticipatory approach to highlight the opportunities for stakeholders. In lieu of a specific decision point, certain topics that were "in play" were assessed. HIAs often require many resources and should not be conducted if there is no real possibility of adding value to decision-making. However, one approach to institutionalizing involves the replication of HIAs

across geographies and jurisdictions, relying on the evidence base created by the original, sentinel HIA and substituting with local data as needed. HIA practitioners should consider adding screening criteria that also value critical decisions that have large opportunity costs and although not yet formalized, are in play and ripe.

HIA as a give back

HIA entails community-based participatory research (CBPR). In fact the principles of CBPR - acknowledging, empowering, co-learning, and being assets-based, practical, holistic, comprehensive and sustainable [265] – are quite similar to HIA. Many distinguishing features of CBPR have come about because of the threats that top-down, disconnected research often presents. Although CBPR is bound by the ethical standards for research and further espouses more beneficent principles, it is still research and is therefore susceptible to an imbalance between the give and take, be it real or perceived. It is still often the researcher and scientist asking for the help of the community. Because HIA must be tied to a local decision at hand, the give back to the community is very direct and overt. HIAs are often commissioned by local stakeholders when a there is a pending controversial decision. The community is asking for the help of science. An HIA must translate or it is not an HIA. Because HIAs always address decisions, they are inherently translational and applied.

Related to the direction of the conception of the research activity is the direction of the translation, the give back. Research in its traditional sense is often (but not always) obligated to translate to the scientific community first. This is called generalizability. HIA, however, is always primarily obligated to the community being studied. In this case, lack of generalizability is not of such concern (as compared to research). HIA relies on existing research. Their take is often more benign than traditional research, as HIAs rely on secondary rather than primary data and do not study interventions. HIA gathers studies of environmental exposures and health outcomes. Intervention studies are also reviewed when formulating recommendations. In that sense HIA is giving back by using the results of much of the previous research. HIA starts not with a research question, but with the intent of community development by addressing a health concern within a decision. It convenes allies from other sectors when health is not high on the decision-makers priority list. HIA can help further translational and applied research paradigms in the scientific community by identifying opportunities to get ahead of decisions and look at multiple issues concerning all parties in a transparent and objective way.

COMPARISON OF COMMUNITY BASED PARTICIPATORY RESEARCH AND HIA

	(CBP)Research	HIA
Has clear future decision target	sometimes	always
Examines multiple health determinants and outcomes	rarely	often
Uses primary data collection	often	sometimes
Assesses baseline conditions	sometimes	always
Makes predictions / estimates	rarely	always
Creates generalizable knowledge	often	sometimes
Makes policy recommendations	sometimes	always

HIA as a prospectus

A prospectus is something that forecasts the course or nature of something else. In business terms, a prospectus provides information describing an enterprise to prospective buyers, investors, or participants. It is fundamentally a means of disclosure so that investors can understand the value and risk of their investments. The "do well and do good" sector includes not only private investors, but increasingly philanthropies, non-profits, ventures and governments involved in innovative financing and pay for performance approaches. They need better information to make better decisions when leveraging and investing billions of dollars annually. HIAs can forecast the course of particular decisions. Scenario-based analysis of existing and additional decision alternatives can provide both a lens and hard metrics for investors to ensure their projects will yield health and social impacts.

While HIA recommendations should focus on furthering the health and social impacts of the investment, the assessment can reveal the link to financial impacts as well. Fiscal/ financial impact assessments may be added to the process to create specific financial estimates and recommendations. However, financial ROI metrics for efficiency must not degrade the rest of the HIA process. This free-form approach must still incorporate all HIA principles. In many cases this will improve the chances of positive social and financial outcomes. For example, applying the principle of democracy will ensure that communities own and maintain the investments to become stewards of their own social impacts.

HIA as science and art

A theme from interviews was that many existing processes are similar to HIA. Some even remarked that they were doing HIA, just not calling it that. Another theme was that HIA can succeed in many ways. Therefore, while minimum standards must be met, judgments of quality and success must derive from the principles of HIA. Addressing all five principles should be necessary and sufficient. In that regard, a crosswalk of standards with principles would be useful for practitioners to re-orient themselves to their objectives. In addition, the benchmark for quality must be relative to the starting point. Typologies are one option for categorizing the expectations of the HIA. Ultimately, however, the merits and value of each HIA must be judged relative to its unique objectives and context. Given that objectives and context can vary widely, a free-from approach is warranted. HIA components may be sourced from a variety of different methods and approaches. For example, community engagement processes within screening and scoping need not be standardized, but rather fit to the context. As a post-normal science imperfectly dealing with uncertainty, HIA must be both an art and science.

The Direction of the Field

The paradigm-shift embodied in the full realization of NEPA into HIA is still underway. The lens with which "environmental" problems are viewed is ever expanding. Beginning in the late 1960's, environmentalism shifted from conservation to regulation. According to Van Jones, the third wave of environmentalism *"will be framed around investment."* [266] This connotes an

intent among both wonks and politicians to expand their own lenses on the environment. Whether for posterity or profit, progressive decision-makers and entrepreneurs are seeing the value in using ecological frameworks that extend thinking about the environment beyond its physical resources. Simply extracting from it is no longer a plausible business model. A more holistic understanding of both the environment and health has fostered a mutual respect for their interdependence. Environmentalism is now more than ever synonymous with concern for human health. Ecology, equity, and economy must also become synonymous. HIA is a powerful tool for further disseminating this understanding and rectifying the problems all of the misunderstanding, fragmentation and false dilemmas have created.

HIA must not trump other impact assessment processes. HIA and other impact assessment strategies have supplemented, but not supplanted EIA. While the principles of each type may not be congruent, each provides a different lens on the same issue. In fact the new frontier of impact assessment lies in accounting for social environments.[267] Addressing this area will help to combat the *"reductive logic", "category mistakes",* and other framing faux pas committed by the early environmental movement.[266] The social determinants frame addresses many of the most fundamental root causes, which are either directly or indirectly about morality and ethics. Subsequently, approaches such as HIA are combined with moral framing around social determinants.[39] It puts them on the offensive, rather than the usual defensive proscriptive side. Still, emotional politics will always factor into decision-making, as we have seen in President Obama's recent overturn of EPA air quality standards.[268]

Contemporary discourse in the HIA field considers expanding the process to many different types of decisions. HIA practitioners must avoid being *"just another special interest",* like orthodox environmentalism came to be.[266] They must also be aware of the critiques of HIA [19] and vulnerabilities of NEPA.[38,269] All stakeholders concerned with human habitat must take advantage of the new science available and realize that despite the growth of evidence-based decision-making,[270] narratives still influence policy. Ecological, life course, and cumulative effects frameworks are continuing to change public health practice. Similarly, life-cycle assessment [271] and ecosystems services [272] approaches are brining fuller environmental analyses to the forefront. These concepts must inform policy through both science and narrative.

Ideally, this expansion is voluntary as stakeholders see the value of HIA. There is no specific interest in making HIAs mandatory. Public health and environmental agencies are reasserting themselves through performance measurement and framing. As well, there is a small but growing interest in public health in economic framings and forecasts such as ROI as an impetus for community development partnerships to create resilient urban communities.[188] Finally, methods such as HIA facilitate a full and vibrant democracy and civic participation. HIAs can be very local and participatory, measuring the effects deemed most important by the community. Democratic approaches used in HIA can modify resources and the policy environment, both elements for rational policy-making. A burgeoning interest in participation in HIA may reflect the broader national concern regarding civic engagement. Again, HIA must be view as not just a process for HiAP, but also a paradigm for a new way of doing business and making decisions about public goods.

Doing Something

In 1972, Anthony Downs, a former member of Lyndon Johnson's National Commission on Urban Problems, suggested that the American public was already halfway through the issue-attention cycle in regards to environmentalism.[31] They had already become aware of the problem and had enthusiasm to do something about it, and were now at the stage of realizing the trade-offs involved in that "doing something". However, Downs suggested that the doing something was very challenging and ambiguous. He believed that the public would not quickly move to the pre-problem stage because environmental issues such as pollution are often visible and clearly threatening, are threatening to the majority of the population, can be blamed on villains, and are susceptible to many different technological improvements. Down's assessment seems to have held up. For over four decades, since the passage of NEPA, the environmental movement has persisted. From another perspective, the American public is still stuck in trying to do something. Serious environmental threats remain, perhaps the result of a movement pursuing policy without fully engaging in politics and advocacy.[41]

Today, debates about energy and climate change pervade our news media. Their universal theme is, of course, about the trade-offs. What is different now is the broader scope yet greater specificity of the conversation, including topics across the spectrum, each with more evidence and a reference to health. The World Health Organization defines health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."* [273] Our health is dependent on everything outside ourselves. It is simply the sum of the ecological equation, the result of all that happens in the environment. Given this perspective, *"Almost everyone can plausibly claim that his or her particular cause is another way to upgrade the quality of our life."* [31] Though there is much room for improvement, framing has shifted from the protection of environment to protection of environment for human health and well-being, signaling the birth of a new environmentalism.[266] Environmentalism, especially in the context of climate change, may still be the undercurrent of a new social impact movement. The new public health entails working with community developers, environmental justice advocates, and many others who share an interest in the environment - because of its impact on humanity. We are nature; we are the environment.[274] HIA has tremendous potential to do something in this new ecological movement.

My Role in All of This

I joined the DrPH program to solve big problems. Complex, wicked, intractable ones. Realizing that everything is connected to everything else,[275] I suspected that solutions would require dynamic leaders who were curious and collegial and knew a little bit about a lot of things. They should be able to convene fragmented professions and roles to solve problems together. I still believe this. I will have to define the profile of the work I plan. I will blend art and science, use leadership and learning, and merge economy and ecology to change hearts and minds. Health starts with hope, dignity, and gratitude. I will explore that pathway with many others to understand how, together, to realize a better world.

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APPENDICES

Appendix 1. Acronyms and Abbreviations

ACA	Affordable Care Act
AICP	American Institute of Certified Planners
APA	American Planning Association
ASTHO	Association of State and Territorial Health Officials
B Corp	Benefit Corporation
BCBS	Blue Cross Blue Shield
CARS	CDFI Assessment Rating System
CBO	Community-based Organization
CBPR	Community-based Participatory Research
CDC	Centers for Disease Control and Prevention
CDCs	Community Development Corporations
CDFIs	Community Development Finance Institutions
CEQA	California Environmental Quality Act
CRA	Cumulative Risk Assessment **or** Community Reinvestment Act
CSR	Corporate Social Responsibility
DNPAO	Division of Nutrition, Physical Activity, and Obesity (at the CDC)
EBDM	Evidence-Based Decision-Making
EBPH	Evidence-Based Public Health
EIA	Environmental Impact Assessment
ESG	Environmental, Social and Governance
GIIRS	Global Impact Investing Ratings System
HD	Health Department
HDMT	Healthy Development Measurement Tool
HEAT	Health Economic Assessment Tool
HIA	Health Impact Assessment
HiAP	Health in All Policy
HIP	Human Impact Partners
LEED	Leadership in Energy & Environmental Design
LIIF	Low Income Investment Fund
NACCHO	National Association of County and City Health Officials
NCEH	National Center for Environmental Health
NEPA	National Environmental Policy Act
NNPHI	National Network of Public Health Institutes
PFS	Pay for Success
ROI	Return on Investment
RWJF	Robert Wood Johnson Foundation
SDOH	Social Determinants of Health
SFDPH	San Francisco Department of Public Health
SIBs	Social Impact Bonds
SOPHIA	Society of Practitioners of Health Impact Assessment
SROI	Social Return on Investment
STAR	Sustainability Tools for Assessing and Rating Communities
UCB	University of California, Berkeley

Appendix 2. Principles of HIA

* from the International Association for Impact Assessment [53]

Democracy: Emphasizing the right of people to participate in the formulation and decisions of proposals that affect their life, both directly and through elected decision makers. In adhering to this value, the HIA method should involve and engage the public, and inform and influence decision makers. A distinction should be made between those who take risks voluntarily and those who are exposed to risks involuntarily.[102]

Equity: emphasizing the desire to reduce inequity that results from avoidable differences in the health determinants and/or health status within and between different population groups. In adhering to this value, HIA should consider the distribution of health impacts across the population, paying specific attention to vulnerable groups and recommend ways to improve the proposed development for affected groups.

Sustainable development: emphasizing that development meets the needs of the present generation without compromising the ability of future generations to meet their own needs. In adhering to this value, the HIA method should judge short- and long-term impacts of a proposal and provide those judgments within a time frame to inform decision makers. Good health is the basis of resilience in the human communities that support development.

Ethical use of evidence: emphasizing that transparent and rigorous processes are used to synthesize and interpret the evidence, that the best available evidence from different disciplines and methodologies is utilized, that all evidence is valued, and that recommendations are developed impartially. In adhering to this value, the HIA method should use evidence to judge impacts and inform recommendations; it should not set out to support or refute any proposal, and it should be rigorous and transparent.

Comprehensive approach to health: emphasizing that physical, mental and social well-being is determined by a broad range of factors from all sectors of society (known as the wider determinants of health). In adhering to this value, the HIA method should be guided by the wider determinants of health.

Appendix 3. Steps of HIA

* from the National Research Council of the National Academies [64]

STEPS

OUTPUTS

Screening
- Describes proposed policy, program, plan, or project, including timeline for decision and political and policy context.
- Presents preliminary opinion on importance of proposal for health and the opportunities for HIA to inform the decision, and states why the proposal was selected for screening.
- Outlines expected resource requirements to conduct HIA.
- Provides recommendation on whether HIA is warranted.

Scoping
- Summarizes pathways and health effects to be addressed, and provides rationale for those included and excluded.
- Identifies affected populations and vulnerable groups.
- Describes research questions, data sources, the analytic plan, data gaps, and how gaps will be addressed.
- Identifies alternatives to the proposed action to be assessed.
- Summarizes stakeholder engagement, issues raised by stakeholders, and responses to those issues.

Assessment
- Describes the baseline health status of affected populations.
- Analyzes and characterizes beneficial and adverse health effects of the proposal and each alternative.
- Describes data sources and analytic methods used.
- Documents stakeholder engagement and integrates input into analyses.
- Identifies clearly the limitations and uncertainties of the analysis.

Recommendations
- Identifies alternatives to proposal or actions that could be taken to avoid, minimize, or mitigate adverse effects and to optimize beneficial ones.
- Proposes a health-management plan to identify stakeholders who could implement recommendations, indicators for monitoring, and systems for verification.

Reporting
- Provides clear documentation of the proposal analyzed, the population affected, stakeholder engagement, data sources and analytic methods used, findings, and recommendations.
- Communicates findings and recommendations to decision-makers, the public, and other stakeholders in a form that can be integrated with other decision-making factors (technical, social, political, and economic).

Monitoring and Evaluation
- Tracks changes in health indicators or implementation of HIA recommendations.
- Evaluates (a) whether the HIA was conducted according to its plan and applicable standards (process evaluation), (b) whether the HIA influenced the decision-making process (impact evaluation), and (c) when practicable, whether implementation of the proposal changed health indicators (outcome evaluation).

Appendix 4. Validity in HIA

* adapted from Veerman [74]

Validity type	Key question	HIA application (generic)
Internal	do the results support or refute a causal relationship?	HIA must be based on a **theoretical framework that ultimately rests on research that is internally valid**. HIA itself, however, is not primarily intended to investigate causal relationships; these simply have to be assumed valid in order to make prediction possible
External	can the results be generalized to other populations?	in a HIA, **we are trying to do the reverse**: established generalizable knowledge is applied to a specific population.
Face	is the theoretical framework is understandable, applicable and plausible? (plausibility, credibility)	**causality of the relationships in a HIA must be credible**, both qualitatively (is there a likely mechanism between cause and effect?) and quantitatively (is the strength of the association plausible?)
Content	are all aspects of the phenomenon to be measured represented in the appropriate proportions? (relevance)	**have all the relevant determinants and health effects been included** in a plausible order of magnitude. This is a matter of judgment and can therefore be considered part of plausibility
Criterion	to what degree are the outcomes confirmed by a ''gold standard''?	for HIA studies as a whole, **there are no such standards**, but there may be for measurement instruments used in HIA
Construct	do the outcomes correlate with those of other instruments that measure the same construct?	HIA should reflect the current scientific understanding, and so would, in principle, avoid using methods or concepts of which the construct validity has not been established in other research.

Appendix 5. Semi-structured Interview Guide for Training Evaluation

Hi, my name is Joe Schuchter. I'm calling from the University of California at Berkeley on behalf of the Centers for Disease Control and Prevention. I'd first like to confirm that I have received your consent form, and you (have given permission/ have NOT given permission) for your name or other identifying information to be included in all final reports, publications, and/or presentations resulting from this research. I also want to confirm that it is OK to record our conversation. Finally, I remind you that all information you provide will be confidential and you are free to refuse to answer any particular questions and/or stop this interview at any time.

We're following up on a (HIA training/ HIA) that you participated in back in (<u>month and year</u>) in (<u>location</u>).

Part 1: Background

1. Please confirm the training that you attended.

2. Have you attended any other trainings or engaged in any other learning around HIA since then? Please describe.

3. At the time of training, we have you listed as working for _____. Is that still the case? Please describe any changes in your employer or role.

Part 2: Pre-training motivation and propensity

Thinking about the period before the training, please recall:

4. Why did you seek the training in the first place?

So (let me restate), the primary reason you sought training was…

5. Where there any other reasons? For example…
- *you heard about HIA and thought it might be generally useful in your work?*
- *someone suggested/ asked that you attend? If so, who was this?*
  - *manager*
  - *colleague*
  - *partner in another agency*
  - *someone in your community*
  - *other*
- *you had a specific issue you wanted to apply HIA to? If so, what was the issue?*

6. What did you want to get out of the training? Were there particular things you wanted to learn? (for DC participants, also state the reasons from the application).

7. Could these (list summary of responses from above) be considered your objectives for the training?

8. Please describe your level of knowledge prior to the training.

Part 3. Effectiveness of Training

9. Did you feel like the training helped you meet those objectives? How?

10. Were there ways the training could have been improved? How? What was the format?

11. Was there any other ways that the training could have helped you to meet your objectives?

12. How did you feel about your colleagues/ fellow participants at the training, not including the formal instructors? Did you learn from them? Were there people who should have been at the training but weren't?

13. In general, has the training served you well and been useful? How?

14. In general, has the training increased your ability to conduct HIAs?

Part 4. Post-training transfer and workplace implementation

Thinking about the period since the training

Please describe briefly what happened after the training.

15. Were you able to apply what you learned immediately upon returning from the training? Please explain.

16. Have you passed on any of the lessons from the HIA training to your colleagues?

17. Have you conducted or participated in an HIA since the training? Was it a full HIA? How many HIA screenings have you participated in?

(If respondent has conducted or participated in an HIA since the training, proceed to question 18. If they have not, proceed to question 25). Probe on questions 18-24 for each HIA participated in.

18. How long was it between the training and your first HIA?

19. Please describe the HIA. Describe the decision, context, etc.. How long did each step of the HIA take? Was it a rapid or a comprehensive HIA, and what made it either rapid or comprehensive?

20. What was your role in the HIA(s)? Some roles include initiated process, leader, committee member, reviewer, researcher/expert.

21. Please describe any barriers you encountered and how they were overcome.

22. What resources were required for the HIA? Consider time, staff and other costs to enable the HIA process to move forward and to actually conduct the HIA. Please describe any technical assistance (related to the HIA process) that you received or sought.

23. Please describe the impact of these HIAs. How did it affect the decision(s) at hand?

24. Please tell me anything else about how the particular HIA(s) process and how it was received. Please describe the best practices/ lessons learned from your experience. What about the HIA do you think was most important in terms of the way it had the outcomes it did (i.e. relationships with stakeholders, the actual data from HIA, etc)?

Please think about how the training might have influenced <u>your</u> practice in general:

25. Has it facilitated use of a health lens in areas traditionally not influenced by public health?

27. Communicating w/ partners from other agencies? (for dyad trainees, mention that specific partner)

28. Working on joint projects w/ partners from other agencies? (for dyad trainees, mention that specific partner). For example, are you working more closely w/ partners from planning, transportation and housing? Please describe.

Please think about the context in which you work:

29. Are there decisions being made in your community that HIA would add value to?

30. Does your current job description allow you to pursue such opportunities?

31. Does your organizational culture or climate supports you HIA work? Consider especially the support of your manager and peers.

31.5. What internal resources do you have for HIA? Have you sought external resources? If so, describe.

Part 5. Next steps

32. What additional assistance is needed? What would be a useful next training? Think about what skills and competencies you have and which you might need.

33. We don't have complete participant lists for all of the training. Do you recall/ can you share the names of your colleagues at the training so we can also follow-up w/ them?

34. Is there anything else you'd like to share?

Thanks for your time. We'll be compiling these discussions into a report and would be happy to send it to you. I'd like to confirm your contact information…

Appendix 6. Target Journals

Health Impact Assessment Training in the United States: A Study of Scope, Outcomes and Needs
> Journal of Public Health Management and Practice

Health Impact Assessment Practice in the United States: A Study of Alignment With Standards
> PLOS One

Healthy Returns on Investment: Pursing a Public Health and Community Development Partnership
> Public Health Reports