HEALTH IMPACT ASSESSMENT

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Contents

Summary

Health impact assessment (HIA), as suggested by the name, assesses potential impacts on health. The techniques can be applied to virtually anything – policies, programs or

projects. The main aim of HIA is to predict health issues before any policy, program, or project is implemented and hence influence the decision-making process, with the objective that negative impacts can be mitigated and positive impacts enhanced.

This chapter, which draws on the book entitled "Health Impact Assessment for Sustainable Water Management", provides an introduction to HIA and outlines determinants of health, the values behind HIA, the use of qualitative and quantitative data and the HIA process. It illustrates these with two case study examples relating to water management in very different settings.

1. Introduction

Health impact assessment (HIA) is a relatively straightforward concept; it aims to predict health impacts *prior* to the implementation of a project, program or policy, with the aim of minimizing negative health consequences and maximizing the positive ones. In the past, development was generally undertaken without even an informal assessment of possible health impacts; largely because health was considered to be the exclusive responsibility of the health sector. This issue is surprising because there is strong evidence that improvements in overall health outcomes are directly related to improvements in non-health infrastructure areas, such as housing, water and sanitation, transportation, and information and communication (e.g. as much as 44% of the burden of disease in sub-Saharan Africa). As a result, a range of negative health impacts added a preventable burden of ill-health to the lives of vulnerable population groups. In addition, development projects failed to capture the enormous community and population health benefits that could be harnessed by tapping the cross-linkages between health and key non-health sectors. As noted more than a decade ago, in 1995 at the Pan American Conference on Health, Environment and Sustainable Development: "*Health cannot be attained by the health sector, either alone or even primarily*".

Negative health impacts include, for example, the spread and intensification of vector-borne disease transmission, particularly schistosomiasis, and to some extent dengue, lymphatic filariasis and malaria, associated with hydropower projects and irrigation schemes, intensification of dengue transmission following the introduction of storage jars for drinking water in Viet Nam, arsenic poisoning as a result of using naturally contaminated boreholes for supplying drinking water in Bangladesh and psycho-social disorders resulting from forced resettlement out of reservoir or irrigation scheme areas. With increasing demands for 'sustainable development' and the acknowledgement that the greatest scope for improving public health lies outside the traditional medical profession (which tends to focus on individual-level illness management), HIA has become an important instrument to manage and mitigate possible health implications in advance of any development.

HIA aims to provide an estimation of possible health impacts (positive or negative; intended or unintended; direct or indirect; single, multiple or cumulative). While HIA is predominantly qualitative, for certain issues and if resources allow, it is possible to provide quantitative estimates (see Sections 3.2 and 4.1.4) of impact (with varying levels of uncertainty). It can be used to define health safeguards, mitigation measures and health promotional activities for the design, construction and operational project

phases. Moreover, a sound HIA of a project, program and policy can guide subsequent public health management plans. Thus, HIA supports minimization and mitigation of predicted health risks and makes it possible to take optimal advantage of health opportunities.

2. Definitions of Health and Health Impact Assessment

2.1. Health

The definition of health adopted greatly affects the subsequent HIA. There are two broad paradigms:

- the reductionist 'biomedical' approach, where health is considered within a series of disease categories (e.g. communicable disease, non-communicable disease, nutrition, injury, mental disorder, etc.) and the health sector structure and operations deal with these through the delivery of health services; and
- the 'social model' where health is considered to be "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*".

The philosophical differences in these definitions have important ramifications in the practical application of HIA to infrastructure development projects, particularly in developing world settings. Impact assessment, whether environmental or social, tends to focus on specific effects that arise out of, or because of, a proposed project, program or policy. Impact assessment of health, faces a similar problem of defining the range and scope of potential effects as a function of the underlying paradigm used to frame the definition of health. The social model leads to a far more expansive consideration of health determinants; however, there is a strong likelihood of considerable overlap with existing environmental and social assessments. In addition, many industrial project proponents and lending institutions have balked at what is perceived to be an overreaching and redundant assessment of "health" impacts. This debate is far from settled and is primarily focused on the social determinants of health, since a range of complex factors (i.e. determinants) are acknowledged to play a role in community health. It is these determinants that are affected by proposed policies, programs and projects. HIA aims to readily predict the changes in determinants. At issue is how broad the consideration of determinants should be across the universe of proposed projects, programs and policies.

2.2. Determinants of Health

The broad definition of health, outlined above, adopted by the World Health Organization (WHO) some 60 years ago can be illustrated by considering the determinants of health as outlined in Table 1. From this Table it can, however, be seen that virtually every area of human activity influences health.

Determinant	**Examples**
Fixed	Genes

	Gender
	Age
Social and economic	Poverty
	Employment
	Social exclusion
	Community structure and infrastructure
Lifestyle and behavior	Diet
	Physical activity
	Smoking
	Alcohol
	Sexual behavior
	Drugs
	Coping skills
Access to services	Education
	Health services
	Social services
	Transport
	Leisure
Environment	Air quality
	Noise
	Housing
	Water quality
	Social environment
	Risk of injury

Table 1. Example determinants of health

In the systematic approach used in an HIA, the existing health hazards and health promoters are identified, as well as new hazards/promoters that may be introduced as a result of a project, program or policy. Changes in the determinants of health have an impact on the probability (i.e. risk, or in the case of health promoters: opportunity) that the hazard or promoter leads to a change in health status. Individual and community vulnerability, environmental receptivity (both physical and social environment) and the capacity of the health services are the main categories of determinants under which items from Table 1 can be grouped. Using work initiated by the World Bank in the mid-

1990s, a focus on environmental health and non-health sector linkages has been applied to HIA. The 'environmental health areas' (EHAs) are an attempt to combine the biomedical and social models of health. There is a strong public health focus on the cross-linkages between health and non-health sectors. The EHA framework is illustrated in Table 2. In 2008, the EHA framework has been adopted by the International Finance Corporation (IFC) within their "Good Practice Notes" for community health project performance standards.

	Environmental health area
1	Housing and respiratory issues – acute respiratory infections (bacterial and viral), pneumonias, tuberculosis; respiratory effects from housing, overcrowding, housing inflation
2	Vector-related diseases – malaria, schistosomiasis, dengue
3	Veterinary medicine/zoonotic issues – brucellosis, rabies, bovine TB, bird- flu etc.
4	Sexually transmitted infections – HIV/AIDS, syphilis, gonorrhea, Chlamydia, hepatitis B
5	Soil, water and sanitation related diseases – giardiasis, worms, water access and quality, excrement management
6	Food and nutrition related issues – stunting, wasting, anaemia, micro-nutrient disease (including folate, Vitamin A, iron, iodine), changes in agricultural and subsistence hunting/fishing/gathering practices, gastroenteritis (bacterial and viral), food inflation
7	Accidents /injuries – road traffic related, spills and releases, construction (home and project related) and drowning
8	Exposure to potentially hazardous materials – pesticides, fertilizers, road dusts, air pollution (indoor and outdoor related to vehicles, cooking, heating or other forms of combustion/incineration), landfill refuse or incineration ash, any other project related solvents, paints, oils or cleaning agents, by-products or release events
9	Social determinants of health – psychosocial, resettlement/relocation, violence, security concerns, substance misuse (drug, alcohol, smoking), depression and changes to social cohesion
10	Cultural health practices – role of traditional medical providers, indigenous

	medicines and unique cultural health practices
11	Health services infrastructure and capacity – physical infrastructure, staffing levels and competencies, technical capabilities of health care facilities at district levels; Program management delivery systems – coordination and alignment of the project to existing national and provincial level health programs (e.g. TB, HIV/AIDS) and future development plans
12	Non-communicable disease – hypertension, diabetes, stroke, cardiovascular disorders and cancer

Table 2. Environmental Health Areas used in HIAs

All of these systems are designed to create some type of matrix that can be composed that sets hazards against determinants and provides qualitative insights as to whether or not, for each hazard, risk levels will be increased, reduced or remain the same (see Section 4.2).

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Biographical Sketches

Lorna Fewtrell is a senior research fellow within the Centre for Research into Environment and Health at Aberystwyth University in Wales. She has built on her background of biochemistry and toxicology by extending into the health and environment field and specializes in drawing together information from a wide range of sources. She has worked on the Global Burden of Disease and also with the World Health Organization on risk harmonization in relation to water-related guidelines. Her recent work involves HIA (with an emphasis on using quantitative approaches) in relation to sustainable water management and she has recently co-edited an IWA book on this subject.

Gary R. Krieger has been involved in multiple public and environmental health evaluations, HIA and risk assessments in an international setting. Krieger has collaborated on, and contributed to, key International Finance Corporation (IFC) guidance on HIA for industrial projects in developing country settings, including the 2007 Good Practice Notes for Performance Standard #4 "Community Health," 2008 "HIA Toolkit" for environmental and social specialists, and the 2008 Good Practice Note on "Influx Management." He co-authored the 2005 International Petroleum Industry Environmental Conservation Association (IPIECA) Guidelines for HIA in the oil and gas industry. Krieger has co-authored, edited and published two editions of a large textbook on medical toxicology of hazardous materials. In addition, Krieger has edited both editions of the book on environmental practice for the National Safety Council. He has also co-edited the text on Occupational Health for the Safety Council. He has been a co-editor of three additional Occupational Safety and Health books for the National Safety Council and a guest editor of the Medical Clinics of North America, Occupational and Environmental Medicine. He is certified in Toxicology, Occupational Medicine, Internal Medicine and has a Diploma in Tropical Medicine and Hygiene (DTM&H) from the London School of Hygiene and Tropical Medicine.

Jürg Utzinger is a Tenure-Track Assistant Professor in Epidemiology and heads the Ecosystem Health Sciences Unit at the Swiss Tropical Institute in Basel, Switzerland. He received his PhD degree in epidemiology in 1999 at the University of Basel with a thesis on the epidemiology and control of human schistosomiasis in Côte d'Ivoire. Utzinger was a post-doctoral research fellow with Professor Burton Singer's group at the Office of Population Research, Princeton University from 2000 to 2004. Utzinger's research, teaching, and training pertains to the epidemiology and control of tropical parasitic diseases, particularly schistosomiasis, soil-transmitted helminthiasis, food-borne trematodiasis and malaria. He has ongoing collaborative projects in China, Côte d'Ivoire, and elsewhere in Africa and Asia. Over the past five years, Utzinger has also been engaged in HIA of large infrastructure development projects in the developing world and assisted with the initial HIA of the Nam Theun 2 hydroelectric project in Lao PDR and longer term follow-up. Utzinger has done consultancies for the World Health Organization, the Consultative Group on International Agricultural Research and other international organizations. Utzinger has published over 150 scholarly articles and contributed to book chapters. He is deputy editor on PLoS Neglected Tropical Diseases and Geospatial Health, and serves on the editorial board of Acta Tropica and Expert Opinion on Pharmacotherapy.