Health impact assessment (HIA) has many advocates for its use to identify and optimize the health effects of non-healthcare interventions. It is an assessment of the health effects, positive and negative, of a project, programme, or policy. Expertise developed in the United Kingdom from a realization that health impacts are often overlooked during the planning stages of development projects but prior planning can avoid detrimental effects. Considering health impacts is now recommended in all continents; the focus has moved from less to more developed countries and upstream from projects to policies. Health impact assessment shares certain concepts and methods with risk assessment, environmental impact assessment, strategic environmental assessment, social impact assessment, and economic assessments. This paper describes the development of health impact assessment and its relation to these other forms of impact assessment.

Keywords: health impact assessment, environmental impact assessment, environmental health impact assessment, risk assessment, social impact assessment, integrated impact assessment

Introduction

Health impact assessment (HIA) has become a widely used phrase,1–3 with many advocates for its use to identify and optimize the health effects of non-healthcare interventions.4 It is an assessment of the health effects, positive and negative, of a project, programme, or policy. The aim is to gather and interpret evidence about potential health impacts to help decision-makers select how best to mitigate harm and increase benefit to health. Winters described health impact assessment as ‘a tool to analyse a programme’s impact on [the] wide range of factors that affect human health’.5 This paper describes the development of health impact assessment and its relation to other forms of impact assessment.

Development of health impact assessment

The World Health Organization (WHO) published procedures in 1983 for evaluating the positive health impacts of fully functioning water supply systems. By this, they meant the intended health benefits that were assumed to follow improved sanitation.6 In parallel with this, an international panel of experts on environmental management was formed in 1981. Their aim was to facilitate the recognition during planning stages of opportunities for environmental management of water resource development projects, which could otherwise increase vector-borne diseases.6

In the United Kingdom, health impact assessment expertise arose from this realization that health impacts are often overlooked during the planning stages of development projects. Although most such projects are expected to be beneficial for health, indirect impacts may be negative. The unexpected adverse effects often affect the most vulnerable.7 Prior planning can avoid these detrimental effects, so in 1990, the British Overseas Development Administration funded the Liverpool Health Impact Programme to investigate health impacts prospectively.6 They also developed a training course for government officials in less economically developed countries.8

In 1992, Birley developed for the Asian Development Bank a three-step framework for health impact assessment. This comprised identification of health hazards, interpretation of the risks from those hazards, and managing those risks. (A ‘hazard’ has the potential to cause harm; the ‘risk’ is the likelihood of that occurring.) He proposed that health impact assessment should not be a separate procedure but should be incorporated within environmental impact assessment (EIA)7 to avoid duplication of procedures.6 Environmental impact assessment is supposed to include consideration of effects on health but this is seldom done (see below). When health is explicitly examined, the term environmental health impact assessment (EHIA) is sometimes used.

Birley and Peralta identified health impact assessment as a multidisciplinary activity, crossing the boundaries between public health, healthcare, and environmental and social sciences.6 The underlying concern was with health hazards (communicable and non-communicable disease, malnutrition, injury, and mental disorder) because of the many adverse linkages between
Health and development projects. These could be valued for economic assessments as the additional cost of restoring each affected individual to his/her previous health status plus loss of production. They stated that health impacts refer to both positive and negative changes in community health that are attributable to a development project but they emphasized the negative impacts in order to seek methods by which they could be anticipated and managed.

Despite this apparent focus on mitigating unintended negative effects, a health impact assessment of a women’s market garden project in West Africa identified several fortuitous openings to improve health. Recommendations included using the profits to purchase impregnated bednets to reduce the risk of malaria and a community-based health education project using village volunteers. These are examples of what Konradsen et al. called ‘opportunities’: health benefits that are part of neither the original intentions nor proposals but that provide a chance to improve health and well-being further by adjusting the design or adding new project components.

Health impact assessment in the context of policy

Some suggest that conducting a health impact assessment on a specific project is too late in the decision-making process – it should be undertaken at the level of a policy or programme or set of related activities used to achieve the policy objectives. Considering the health impacts of policies has been encouraged across Europe. Target 14.2 of Health 21 requires all countries in the WHO Europe Region to have a mechanism for health impact assessment. The Amsterdam Treaty of the European Union states that: ‘A high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities.’ The European Commission is required to check that proposals do not have adverse impacts on health. A checklist approach has been suggested by the European Commission.

Health impact assessment has been used in other continents for many years. In British Columbia, health impact assessment was recommended in 1991. From 1993, all Cabinet submissions to the provincial government there had to include health impact assessment. The British Columbia Ministry of Health and Ministry Responsible for Seniors then developed the first health impact assessment toolkit. Unusually, it was not based on environmental impact assessment but developed in conjunction with work by the Canadian Institute of Advanced Research on the broader determinants of health. The toolkit was intended for policy analysts in the different ministries; guidelines were also developed for lower-level planning. However, a change in government in 1996 reversed many of the previous administration’s initiatives. The guidelines for including health implications when preparing Cabinet submissions became interpreted as optional. A 1998 review of the lower-level planning guidelines recommended they should not be revised or promoted as there was no evidence from elsewhere that health impact assessment led to changes in determinants of health.

The Netherlands implemented health impact screening of all documents produced by Parliament, the annual budget proposals, and reports of advisory committees. Where screening identified health relevance, detailed health impact assessments were commissioned from research institutes, involving systematic reviews or specially commissioned research. Examples include tobacco policy, housing forecast, and energy tax regulation. However, this policy has now been stopped with transfer of health impact assessment from national to local government level.

In Sweden, policy proposals at local and regional government levels are now assessed for health impacts using the existing knowledge of local government officials and politicians.

Recent developments in the United Kingdom

In 1996, health impact assessment was hailed in the UK as an idea ‘whose time has come’. Joffe and Sutcliffe concluded in 1997 that health policy would benefit from a process analogous to environmental impact assessment. Despite the proliferation of guidance for conducting health impact assessment, little has been published in peer-reviewed journals. However, there are now more than 100 examples of health impact assessment on the English Health Development Agency’s website, at http://www.hiagateway.org.uk/.

Lock described health impact assessment as ‘a structured way of bringing together evaluation, partnership working, public consultation, and available evidence for more explicit decision making’. Although many toolkits and guidelines exist, they share a number of concepts and procedures. After agreeing the scope of the health impact assessment (geographical, population(s), and topics), information is obtained from three sources: published scientific evidence (both quantitative and qualitative), local data (from routine sources, specially commissioned, or extrapolated from elsewhere), and the views of affected people. In a prospective assessment, these are combined to yield recommendations to enhance positive and mitigate negative proposals. Unlike other impact assessments, health impact assessment can also be conducted concurrently with or retrospectively following implementation of a project or policy. These determine the actual health impacts in order to propose post-hoc modifications and to inform future project development and health impact assessments.

At present, there is no legal obligation to conduct health impact assessment, other than the requirement for EU policies to consider health, nor are there any legal definitions regarding what constitutes an adequate health impact assessment. They vary in depth from a quick, desk-top appraisal by experts, through time-limited reviews of evidence and stakeholder workshops, to lengthy resource-intensive special studies. In general, the degree of community participation is proportional to the duration of and resources for the health impact assessment. The views of health used in health impact assessments have also varied across the range from a biomedical model (Kemm’s ‘narrow focus’) to a socio-economic model (‘broad
focus\textsuperscript{36}), considering determinants of health as well as disease.

We have proposed that a resource should be established, to make the evidence base available for topic areas that recur frequently.\textsuperscript{37} This would involve a division of labour: the technical aspects of assembling robust evidence from systematic literature reviews can be performed centrally and made available ‘off-the-shelf’.\textsuperscript{37} The expertise and local knowledge of health impact assessment practitioners could focus on engaging the communities that may be affected, characterizing the local situation, and applying the evidence.

Other approaches to assessing health impacts

Risk assessment

Risk assessment was defined in 1983 as: ‘the use of the factual base to define the health effects of exposure of individuals or populations to hazardous materials and situations’ (ref. 38, cited by Samet\textsuperscript{40}). It is used to set standards limiting exposure to toxic substances.\textsuperscript{39} It is a standard four-stage procedure\textsuperscript{40} in which three elements are combined to generate the assessment of the existing risk.\textsuperscript{36} Hazard identification involves identifying the types of health effect that a particular exposure can cause. The ‘dose–response’ assessment quantifies this: for a given level of exposure, a certain effect (or probability of an effect) will result. In practice, this is seldom a dose in the familiar sense, which applies to an individual, but is an ambient level to which the population is exposed. These are derived from the scientific literature in the fields of epidemiology and/or toxicology. Exposure assessment identifies the specific agent(s), determines the route(s) of exposure, and quantifies the amount and duration of exposure.\textsuperscript{39} These are combined to characterize the risk or to estimate the burden of disease attributable to the current exposure.\textsuperscript{41,42} This is different from the change in the burden of disease attributable to a policy or other intervention, which has been called the Policy/Risk Assessment Model (PRAM).\textsuperscript{36}

Risk assessment generally refers to situations where there is good quantitative information about a system.\textsuperscript{43} It is used primarily for assessing the impact of chemicals on human health.\textsuperscript{44} This was the main focus of WHO early work on environmental health impact assessment (EHIA).\textsuperscript{45} The WHO has produced guidelines on evaluating and using epidemiological evidence for environmental health risk assessment.\textsuperscript{46,47}

The effects of chemicals were first noted in epidemiological studies of occupational cohorts. Risk assessment more recently has depended on animal toxicological studies because they can be smaller and much shorter:\textsuperscript{48} official US guidance in 1990 ignored epidemiological evidence.\textsuperscript{35} However, there are many problems in extrapolating from animals to humans, for example equivalence of dose or exposure and species-specific effects. There is therefore increasing support for the use of epidemiological studies in risk assessment.\textsuperscript{39} Risk assessment for carcinogenicity previously used a ‘positive evidence’ approach, in which one positive study would outweigh a number of negative ones. It has moved towards the ‘weight of evidence’ approach, in which information from all good-quality studies, whether experimental or epidemiological, is considered when considering carcinogenicity.\textsuperscript{49} Shore cautioned against the use of low-dose studies and preferred occupational exposures\textsuperscript{48} yet there are problems in extrapolating from these higher concentrations to the lower levels to which the general population would be exposed.

Environmental impact assessment

Environmental impact assessment has been required in the USA since the National Environmental Policy Act (NEPA) of 1969.\textsuperscript{10,49} The 35th World Health Assembly passed a resolution on environmental health impact assessment in 1982.\textsuperscript{50} In the EU, Directive 85/337/EEC required environmental impact assessment for certain large projects, for example, large construction projects. This was incorporated into UK law in the 1988 Town and Planning Act.\textsuperscript{10} By 1997, more than 100 countries used environmental impact assessment. The new UK Environmental Impact Assessment Regulations, which became law in 1999, increased the number and type of developments requiring this.\textsuperscript{51}

About 250 such assessments are conducted in the United Kingdom each year for submission to local authorities as part of planning procedures.\textsuperscript{52} The objective is to determine the potential environmental, social and health effects of a proposed development in a form that permits a logical and rational decision to be made. The underlying assumption is that attempts to reduce or mitigate potential adverse impacts can be made by the identification of other sites and/or processes.\textsuperscript{53}

However, there are a number of recognized problems with the environmental impact assessment process.\textsuperscript{54} In particular, although environmental impact assessment must ‘identify, describe and assess … the direct and indirect effects of a project on … human beings’,\textsuperscript{55} consideration of potential impacts on human health is seldom performed,\textsuperscript{10,53,56} particularly for road transport.\textsuperscript{57} One survey found that 28 per cent of environmental impact assessments examined had covered potential health impacts adequately.\textsuperscript{58}

A 1978 WHO seminar on environmental health impact assessment considered how the health component should be incorporated into the overall process.\textsuperscript{45} The fourth and final stage of environmental impact assessment is to explain the measures that are proposed to compensate for or reduce negative effects.\textsuperscript{45} This explains why environmental health impact assessment focused on mitigating adverse impacts before the concept of health impact assessment broadened to encompass the potential for increasing beneficial effects on health.

Although a toxicological and disease-based view of health impacts has generally been taken within environmental impact assessment, a 1986 WHO meeting considered psychological well-being as an example of impacts to consider.\textsuperscript{59}
Strategic environmental assessment

There have been other criticisms of environmental impact assessment (and environmental health impact assessment). Such assessment is generally performed when the project has already been decided upon, so is too late to influence the choice of possible options to achieve a given objective. Assessment is needed at earlier (strategic) stages.60 Whereas environmental impact assessment applies to single projects, strategic environmental assessment (SEA) applies to policies, plans and programmes. The environmental impacts considered are more general, relating to global and regional impacts, but less detailed compared with environmental impact assessment of a local project. In 1992, the UK government published guidance on policy appraisal and the environment.51 The objectives of strategic environmental assessment are to:

1. Ensure the full consideration of other policy options, including the ‘do-nothing’ option, at an early stage;
2. Allow consistency across different policy sectors, facilitating trade-offs;
3. Ensure that more complex, distal and unintended consequences are considered, so that adverse impacts can be prevented;
4. Assess the environmental impact of policies without an overt environmental dimension;
5. Include environmental as well as economic and social concerns in decision-making.60

The EU has recently adopted a Directive on strategic environmental assessment (Com/96/0511 FINAL–SYN 96/0304). Unlike environmental impact assessment, there is a requirement to monitor implementation of both the plan and environmental protection measures to assess the accuracy of predictions and effectiveness of mitigation measures.62 In general, health has not been considered in strategic environmental assessment.63 The WHO Regional Office for Europe is supporting a protocol on strategic environmental assessment to the Espoo Convention, which incorporates health impact assessment.64

Social impact assessment

Social impact assessment (SIA) also developed in the USA to fulfil legal requirements under NEPA, which required assessment of impacts on the human environment. Social impact assessment, usually a part of environmental impact assessment in the USA, is concerned with estimating prospectively the likely social consequences of specific policy or government actions.49

‘By social impacts we mean the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society’.49 As this covers the determinants of health and the holistic view of health most often employed in health impact assessment, it is not surprising that, in the USA, the need for health impact assessment as a separate entity has not been felt.65 In Australia and the United Kingdom, social impact assessment is also used for proposals not requiring environmental assessment.

Social impact assessment resembles environmental impact assessment in both the process and the assumption that the purpose is to identify potential adverse impacts in advance so as to mitigate these.49 It usually includes public involvement69 and consideration of the distribution of impacts in the population and the effects on vulnerable groups.49 The main impacts considered are population characteristics, community and institutional structures, political and social resources, individual and family changes, and community resources.49

Other approaches

Well-being impact assessment has been proposed as an alternative to health impact assessment. This is similar to broad focus health impact assessment. Although health status depends primarily on factors outside the health services,66 it is still a common fallacy that health is the responsibility only of the health services (or of the individual). Well-being impact assessment has the potential advantage of the salience to local authorities being more explicit. Under Section 2 (1) of the Local Government Act 2000, local authorities are empowered to promote the economic, social or environmental well-being of their areas.67

Economic assessments, such as cost-benefit, cost-effectiveness, or cost-utility analysis, are sometimes advocated. To include health outcomes, such analyses first require assessment of the health impacts so these can be costed or valued. For example, a WHO project estimated the health effects in three countries of particulate exposure by applying effect estimates from the literature68 to modelled population exposure data.69 The costs of those effects were then valued.70

Integrated assessment

Many proposals require or could benefit from a number of assessments. These include potential impacts on the environment, health, inequalities, small and medium-sized enterprises, and for groups distinguished by ethnicity, sex, or age. The methods used overlap, with interrelationships between the various endpoints examined. There is now growing interest in the concept of integrated impact assessment, with some progress towards integration at the screening stage at least. The Health Development Agency is currently exploring the extent to which integrated assessment is being undertaken.

An important advantage of integrated assessment is that it could lessen the burden on officials, who would otherwise be required to carry out a large number of impact assessments before their proposals could be considered for a decision. There is therefore likely to be pressure to consolidate the numerous impact assessments and move towards a form of integrated assessment.

The other problem faced by those required to conduct impact assessments as part of their policy development role is that they will often have little knowledge of health or of the other areas. Currently, a checklist approach is generally used,
but this depends on the level of understanding of the person using it. We suggest that the idea of a central evidence base could be extended outside the health arena, and that experts in each topic area could make available a set of ‘off-the-shelf’ guides to their evidence base, covering those policy situations that frequently recur, as has been done for housing. A useful tool to promote understanding is to provide a visual aid that ‘maps’ the pathways connecting policy options with the various types of outcome, through all the intermediate links.

A move towards integrated assessment could be an opportunity to reassess existing practices. For example, a criticism of environmental impact assessment is that it is usually funded and often also commissioned by the developer, which may limit its independence. On the other hand, it is generally well funded, at least in comparison with health impact assessment. The different traditions need to learn ‘best practice’ from each other.

Acknowledgements

We thank Erica Ison and Caron Bowen for helpful comments on an earlier version of this paper.

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Accepted on 18 January 2003