

Appendix 1: The Australian Experience with Health Impact Assessment - HIA in Tasmania

The need for HIA was strongly endorsed by the NHMRC in 1992. Although other Australian states require some form of HIA, to date Tasmania is the only Australian jurisdiction to have introduced legislation requiring formal HIA. The incorporation of HIA in the resource management and planning system in Tasmania was a major initiative resulting from the review of public health legislation in Tasmania.

The *Environmental Management and Pollution Control Act, 1994* (EMPCA), was proclaimed in January 1996, and empowers the Director of Public Health to require that an Environmental Impact Assessment include an assessment of the impact of an activity on public health. The power of the Director of Public Health to require HIA applies to all activities which by law require Environmental Impact Assessment (EIA). HIA is fully integrated with EIA processes, in accordance with the principles identified in the *National Framework for Environmental and Health Impact Assessment*⁶. In practice, all activities requiring an EIA now also must have a HIA.

Since 1996, HIA in Tasmania has been based on draft *Guidelines for Health Impact Assessment* prepared by the then Tasmanian Public and Environmental Health Branch, in accordance with the broad principles identified in the *National Framework for Environmental and Health Impact Assessment*.

Legislative background

Subsection 74(5) of the EMPCA provides for the Director of Public Health to direct that an EIA include a HIA. HIAs are required to be conducted in accordance with the EIA Principles contained in the EMPCA Section 74.

It is intended that HIA be fully integrated with the overall EIA process. Applicants, in preparing Environmental Impact and Health Impact Statements, are not required to repeat general

material or address shared issues separately, unless addressing such issues or material independently is the most effective way to represent them accurately. The Tasmanian draft HIA guidelines are used in conjunction with the Environmental Impact Assessment Manual produced by the Tasmanian Department of Environment and Land Management.

EMPCA establishes 3 categories of proposed developments or activities, based on their potential to cause environmental harm, which is defined very broadly in the legislation. The categories are:

- Level 1 activities, which are likely to cause minor environmental harm;
- Level 2 activities, which are more significant (examples are outlined in a schedule); and
- Level 3 activities, which are of “statewide significance”.

The Environmental Assessment Manual distinguishes EIA as carried out by the Board of Environmental Management (the Board) for Level 1 referred activities and Level 2 activities, from environmental assessment as carried out by planning authorities for Level 1 activities. In a similar manner, HIA is carried out by the Director of Public Health for Level 1 referred activities and Level 2 activities and, where relevant, health assessment should be carried out by a planning authority for Level 1 activities.

When assessing health impacts it is important to consider the immediate effects of foreseeable events upon the health of the community and to also consider the effects of events and increased demands upon existing and planned community, health and emergency services.

Criteria for activities likely to require HIA or health assessment

Assessment (either HIA or health assessment) should be required for activities which exhibit any of the following characteristics:

- the possibility of substantial change to the demographic or geographic structure of a community;
- potential exposure of individuals to hazardous products and processes, including substances that are clinical or infectious;
- changes to the environment that may impact on disease vectors or parasites;
- the potential to render recreational facilities or water resources unsafe;
- potential impact on land productivity for horticultural and/or pastoral activities;
- impact on the microbiological or chemical safety of food chains and food supplies;
- substantial increase in the demands on public utilities;
- increased traffic flow with increased risk of injury or significant increase in the release of pollutants;
- generation of a high level of public interest in and/or concern about public health issues;
- identified ecosystems which are vulnerable, and damage to which may cause health effects;
- potential exposure of the public to contaminants;
- potential impacts on the incidence of illness or infection in the community, especially in relation to populations such as children and the aged.

Process for HIA

Level 1 activities can be “called in” to the EIA/HIA process, if the Director of Public Health is concerned about potential health impacts.

All level 2 and 3 activities are subject to EIA and HIA (the EMPCA requires that all EIAs include explicit HIA).

HIA and EIA are undertaken in accordance with various principles detailed in the legislation:

- the level of assessment should be consistent with the health and environmental significance of the activity, and the likely public interest;
- the Director of Public Health can specify requirements for the contents of a proposal;
- the Director of Public Health should provide the proponent with guidance on potential health impacts/issues of concern, and the level of assessment required;
- there must be public consultation during the assessment; and
- information on health and environmental impacts should be publicly available.

In Tasmania, the sequence of events in undertaking health impact assessment is essentially the same as described in the body of these guidelines.

Perspectives arising from HIA in Tasmania

1. HIA is not a separate discipline but a focussing of many existing disciplines on particular issues and projects.

HIA involves using a range of public health and related skills in new ways, rather than being a new discipline itself. It is also more of an exercise in lateral thinking involving health concepts than following checklists.

It is helpful if those carrying out HIA have a broad experience with health, environment, regulatory, and land use planning issues so that as many issues as possible are considered in the screening/scoping process. For some larger projects special expertise in a particular discipline may be sought.

2. HIA is a decision support tool and not a decision making tool.

Because HIA is part of the EIA process, health authorities reviewing the HIA will not usually have any statutory power of veto over a development. Health authorities will provide advice and recommendations to whatever statutory body is ultimately responsible. Other components of the EIA will need to be considered by the community and the decision-making authority, along with HIA, in deciding whether a development proceeds or has special conditions attached to it.

3. Consult widely before calculating deeply.

There are detailed tools available for numerical assessment of human health risks from contaminants in ground, water and air. The base data and resources to use such tools may not be available or appropriate for smaller projects which have a HIA component. Screening and scoping are always required to ensure that important health issues are not overlooked before carrying out such calculations.

In practice, it seems that the most useful information more often comes from the screening and scoping rather than from the calculations.

Appropriate local consultation is important. For example, most municipal council environmental health officers have a wealth of experience and knowledge about the history of particular areas, industries and local health problems and local attitudes. This form of consultation should be standard practice, even where it is not formally required by legislation.

4. Scoping is the essence of HIA.

The possible health consequences, direct and indirect, of a development may be numerous. In the preparation of HIAs it is usually preferable to scope the significant health issues and to have the bulk of the HIA related to assessment of these issues. If not, the HIA may be dominated by a long list of possible health issues which are of little consequence. It is important to show that other issues were considered however, and this might be done in association with any environmental checklists in the rest of the EIA, where there would be some overlap. Community involvement in scoping is also highly desirable.

5. Consult early with the proponent.

This will enable consideration of alternatives and modifications so that the likely impacts are minimised. In practice this has been found to be important by reducing time delays and extra costs, if changes are requested later in the assessment process. It is important that this sequence of consultation, be it with government or the public, together with any project modification, is described in the HIA.

In some cases consultation may involve the PHA assisting the proponent to undertake the HIA

component of the EIA. This assistance has generally been appreciated and to date there have been no major problems or objections to a requirement for HIA.

6. Consider positive impacts on health also.

Environmental impact assessments often focus on negative effects or risks. However, there may be significant positive health impacts and it is important that these be effectively assessed.

For example, a new sewage treatment plant would lead to better water quality downstream from the discharge point and this would affect health in relation to the suitability of the water for swimming or possibly drinking purposes. Increased employment and income in a community would also have beneficial health impacts.

7. HIA does not add greatly to the cost of developing EIA.

The experience so far has been that HIA does not increase greatly the size or cost of an EIA. Almost always the consultant preparing the EIA has been able to prepare the HIA component, with some assistance, and has not needed to engage additional consultants. However, as acceptance of HIA and further evolution of the methodology occurs, HIA may become more detailed and there may also be a greater role for specialist HIA practitioners.

Appendix 2: The Australian Charter for Environmental Health

Australians are entitled to live in a safe and healthy environment. The Charter identifies the basic entitlements and responsibilities required to maintain and improve the quality of health for all Australians.

The *National Environmental Health Strategy* (1999)¹ emphasises that people share responsibility for securing good health with their government, and cannot merely depend on others for their own protection. No single organisation has the capacity to fulfil the Charter's objectives. Recognising environmental health as an entitlement helps encourage stakeholders to become involved in the cooperative management of problems.

Although not all of the entitlements can be met at this stage, it should be the aim of the Australian people that strategies are developed to ensure that all aspects of the charter are eventually met.

Environmental health entitlements cannot be absolute, as the total absence of risk is not possible. The entitlements spelt out in this charter only extend to what can be practically achieved. The principles that underpin this charter and guide actions arising from the Strategy are shown in Box 1 on the following page.

Box 1

The Australian Charter for Environmental Health's Guiding Principles (NEHS 1999)¹

- **Protection of Human Health**
Protect human health by identifying threats posed by environmental hazards as early as possible and by introducing appropriate safeguards. Ideally, these should be sustainable and cost-effective.
- **Interrelationship between Economics, Health and Environment**
Economic development, human health and environmental protection are inextricably linked. Economic development should proceed hand-in-hand with measures to protect the environment and promote high standards of environmental health.
- **Sustainable Development**
Future human health requires that development meets the needs of the present without compromising the ability of future generations to meet their own needs.
- **Local and Global Interface**
Changes to local and global environments are interactive and have a significant ability to impact on human health. Environmental health programs need to take into account that global environment protection requires local action and that local actions impact globally.
- **Partnership**
Planning, implementing and evaluating environmental health programs requires that all involved work together: the general public, Commonwealth, Local, State and Territory governments, industry and business, non-government agencies, and the health and scientific communities. This cooperation should extend to include policies and programs that are not environmental health specific, but which have an environmental health component or impact.
- **Risk-based management**
Risk assessment and management are tools used to address existing or potential environmental threats to human health and the adverse effects on people, communities and economic interests. It includes assessing the likely impact of these threats and the development and implementation of strategies for their prevention, minimisation or removal.
- **Evidence-based decisions**
Decisions and deliberations must be based on a careful analysis of available scientific evidence about potential environmental risks to human health. However, absence of conclusive evidence is not an excuse for inaction.
- **Efficiency**
Improving the delivery of environmental health services, encouraging innovation, and careful examination of how environmental health services are provided – including the relative costs and benefits of each alternative – are important considerations for optimal environmental health outcomes.
- **Equity**
Socioeconomic status and other social factors such as access to community networks, family support and education, are key determinants of health. Providing all Australians with access to appropriate environmental health services will help reduce the gaps in health status between different population groups.

Charter of Entitlements and Responsibilities for Individuals, Communities, Business and Government (NEHS, 1999)¹

1 Individuals and Communities

Entitlements – Individuals and communities are entitled to live in a safe and healthy environment. This includes:

- safe and adequate supplies of water;
- safe and nutritious food;
- safe and adequate sanitation;
- clean air;
- safe and sustainable shelter;
- urban and housing designs that promote environmental health;
- environmental management systems that protect environmental health;
- safe occupational environments and work practices;
- safe and adequate recreational facilities, including water;
- information about environmental health issues; and
- being consulted on plans, decisions, and activities likely to affect both the environment and health, and to open and transparent decision making on these issues.

Responsibilities – Individuals and communities are responsible for:

- ensuring their own actions contribute to the protection of the environment in the interests of their own health and the health of others;
- participating in decision-making processes on matters likely to affect both the environment and health; and
- ensuring their environmental health services are delivered to a high standard.

2 Business and Industry

Entitlements – Business and industry are entitled to:

- Management systems (legislative, regulatory and other) that:
 - promote health and the environment while recognising business interests;
 - recognise industry capacity for self-management in a co-regulatory environment;
 - provide access to appropriate support, advice and information on environmental health; and
 - provide information on environmental hazards.
- Consultation on environmental health decisions that affect business; and
- Guidelines and standards which:
 - place a reasonable regulatory burden on industry;
 - support industry capacity to manage environmental health;
 - are developed transparently; and
 - are consistently and fairly applied.

Responsibilities – Business and industry are responsible for ensuring that they:

- use opportunities and practices that minimise adverse impacts on human health;
- seek and use alternatives to hazardous agents and practices wherever possible;
- reduce levels of pollution and waste wherever possible;
- maintain a high level of occupational health and safety;
- ensure consumer and product safety;
- have a contemporary knowledge of the potential environmental health risks arising from their processes; and
- recognise that they are an integral part of the community and therefore have community obligations.

2.3 Government

Responsibilities

While the charter recognises the responsibilities of individuals, communities and business, government has an obligation to make a major contribution to progressing this Charter. Government has been and remains responsible for most of the investment in the infrastructure that underpins the delivery of environmental health services.

Government at all levels is responsible for providing direction and leadership in environmental health policy and management through:

- setting clear management standards that are consistent across governments;
- ensuring effective mechanisms for linkages between agencies to achieve improved environmental health outcomes;
- ensuring appropriate environmental health infrastructure and services are available and effective;
- ensuring seamless transition between jurisdictions and agencies, especially in management of environment and environmental health issues;
- ensuring that planning and regulatory decisions recognise that the integrity and sustainability of the ecosystem must be maintained;
- transparent and consultative decision-making processes;
- development of consistent legislation, standards, and approaches to enforcement;
- planning, preparing and responding to environmental health challenges;
- aiding community involvement; and
- facilitating investment in strategic environmental health research.

Appendix 3: The HIA Screening Tool developed by the UK Department of Health³

The screening tool comprises four parts:

1. Examines the parameters of the proposal. It should be used to reach a provisional decision about whether a proposal has sufficient organisational/partnership significance (within the parameters outlined) to justify an appraisal.
2. Considers the potential health impacts. It should be used to qualify the provisional decision, to ensure that those proposals which seem to have insufficient organisational /partnership importance, but nevertheless have potential negative impacts of some import, are passed through screening to appraisal.
3. Should be used to qualify or confirm the provisional decision made about which type of appraisal to use (when applying the first part of the tool).
4. Focuses on the organisation/partnership capacity to conduct the HIA.

Screening tool: Part 1

Investigating the parameters of the proposals

Important parameters to consider are listed below.

For each parameter it is recommended that officers identify a set of levels or thresholds for the following situations:

- (1) do not conduct HIA;
- (2) conduct a rapid appraisal;
- (3) conduct an intermediate appraisal;
- (4) conduct a comprehensive appraisal.

As HIA becomes a regular feature of decision-making, and processes and outcomes are monitored and evaluated, it will be possible to develop screening guidelines relevant to, and appropriate for, the type of proposals an organisation/partnership regularly implements.

Parameters for all types of proposal (policies, programs or projects):

- The relative importance of the proposal within the organisation's/partnership's priorities;
- The extent of the population affected by the proposal;
- The existence of at-risk groups within the population affected (because of age, nutritional status, etc);
- Stage of development of proposal (i.e. the potential to make changes).

Parameters for proposals about programs and projects:

- The size of the proposal;
- The cost of the proposal;
- The nature and extent of the disruption to the population affected.

Screening tool: Part 2

A checklist of questions about the nature of potential health impacts

Bias towards HIA	To your knowledge:	Bias against HIA
Yes/don't know	Are the potential negative health impacts likely to be serious?	No
Yes/don't know	Are the potential negative health impacts likely to be disproportionately greater for some groups in the population, eg. because of age?	No
Yes	Are there community concerns about potential health impacts?	No
No/don't know	Is there a robust evidence/experience base readily available to support: • appraisal of the impacts?	Yes
No/don't know	• the recommendations that could be made to ameliorate those impacts?	Yes
Yes/don't know	Could any of the actions to ameliorate the potential negative health impacts of the proposal actually have a negative effect on health?	No
No/don't know	If allowed to occur, could the potential negative health impacts be easily reversed through current service provision?	Yes
Yes	Is there a need to increase social capital in the community or population affected?	No

Screening tool: Part 3

A checklist of questions about the circumstances in which the HIA must be conducted

Bias towards rapid appraisal	To your knowledge:	Bias towards intermediate or comprehensive appraisal
Yes	Is there only limited time in which to conduct a HIA?	No
Yes	Is there only limited opportunity to influence the decision?	No
Yes	Is the timeframe for the decision-making process set by external factors beyond your control?	No
Yes	Are there only very limited resources available to conduct a HIA?	No

Screening tool: Part 4

A short checklist of questions about the capacity within an organisation or partnership to conduct the HIA

Bias towards commissioning the assessor(s)	To your knowledge:	Bias towards appointing an internal assessor(s)
No	Do personnel in the organisation or partnership have the necessary skills and expertise to conduct the HIA?	Yes
No	Do personnel in the organisation or partnership have the time to conduct the HIA?	Yes

Appendix 4: Community Consultation and Risk Communication

Health can encompass many quality of life and well-being issues that cannot always be effectively captured in public health statistics and projections. It is essential to consult with the community to identify these factors (eg. social and cultural needs).

Consultation is not only important to allay community concerns but may also lead to improvements in the development proposal. It is essential that communication be just that, ie. a two way process with a willingness to listen to and act upon community views, not simply informing the community what decisions have been made or just going through the motions of meeting the minimum legislative requirements because one has to.

Health impact assessment is a part of impact assessment more generally and therefore the legislative requirements for HIA will be those of impact assessment in the particular jurisdiction. The proponent may have already consulted with the community, or have plans to consult with the community during the process, in addition to any statutory requirements. Proactive community consultation is encouraged irrespective of the minimum legislated requirements of environmental or health impact assessment.

Some of the key principles of effective risk communication⁹ are:

- accepting and involving the public as a partner and stakeholder;
- carefully planning and evaluating the nature and content of the risk communication undertaken so that it is relevant and understandable;
- listening carefully to the public's concerns and acting on them. Trust, credibility, competence, fairness and empathy are often as important to the community as statistics and scientific details. Trust and credibility are very difficult to regain if lost (experts do not command automatic trust);

- being honest, realistic and open;
- appreciating that intentional communication is often only a minor part of the message actually conveyed. The manner of delivery and its tone may be more important than its content;
- ensuring that information is accurate, consistent between agencies, and not speculative;
- effectively communicating with the media;
- acknowledging the concerns of the public and the effects on the community; and
- focusing on issues and processes rather than people and behaviours.

The extent of community consultation will largely depend on the nature of a proposed development. Large developments that may generate considerable controversy will generally require a greater degree of community consultation than smaller developments.

Community and health authority input during scoping, if sought, may augment the proponent's own ideas about the degree and form of the health impact assessment.

Benefits of community consultation and public participation include:

- better decision-making, by obtaining input from the community as to its values, priorities and concerns, including matters known only to local residents;
- identifying and addressing public concerns before they become significant issues in the review process;
- providing useful local information and knowledge for completing the required impact assessment studies;
- identifying ways to avoid or mitigate adverse impacts (a key element of the review process);

- avoiding or minimising unnecessary delays in the project review and permitting processes;
- preparing local communities and residents for managing the social, economic and land-use impacts of a project;
- preparing workers and suppliers for training, employment and business opportunities related to the project; and
- developing overall community and public understanding of the project.
- non-negotiable aspects of the consultation process should be identified early in the process;
- communities are likely to lose faith in the consultation process if it appears that they have no power to affect unwelcome outcomes of a proposed development;
- using methods that encourage responses from right across the community; and
- targeting those who are most likely to be adversely affected.

Community consultation methodology

The extent of community consultation should be consistent with the size and potential impact of a development.

The methods used for community consultation will vary according to the size of the project, with particular statutory requirements for some project types, and with the preferences and experience of the proponent. However, as a minimum it is recommended that consultation involve:

- informing the community of the proposed development details, the nature and likely magnitude of both potential and possible impacts and their associated risks and benefits;
- allaying concerns by correcting misunderstandings; and
- providing the opportunity to comment in a way that ensures the comments are taken into account when finalising the proposal, by modifying it if necessary.

When consulting with the community a number of particular issues may require consideration, including:

- benefits, risks and other adverse effects associated with a proposed development are unlikely to be evenly distributed across the community;
- the ability of individuals to voice concern or recognise issues may not be evenly distributed in the community;
- communities should be informed about the reasons for consultation;

Communication of complex issues such as risk can be difficult. The community's understanding of risk is likely to be affected not only by the actual magnitude of the risk but also by factors such as the nature of the danger and who will be subject to the risk. In communicating an appreciation of risk to the community care should be taken to use the most effective methods.

Proponents may have consulted with the community outside of the impact assessment process, especially where the development is likely to be controversial, in an effort to achieve the best possible outcome for both the community and the development. Early consultation has the benefit of:

- encouraging community trust;
- identifying problems earlier in the process; and
- assisting investigation of health issues associated with concerns raised by the community.

In addition to community consultation prior to a development proceeding, ongoing consultation is likely to be required; this could involve:

- periodic meetings between the proponent and community;
- information presented via the media; and/or
- visible acknowledgment of, and response to, comments and concerns from the public.

Appendix 5: Bibliography of Sources of Key Impact Assessment Information

Lists mainly electronic sources of information and the key impact assessment websites for each Australian jurisdiction. Not all relevant sites are listed, but many sites give links or references to other sites (eg. the UK papers give numerous links to other UK work).

Australian Legislation

Commonwealth legislation is at:
<http://scaleplus.law.gov.au>

Legislation for most States and Territories is at:
<http://www.austlii.edu.au>

Health Impact Assessment in comparable countries – key sites

Canada

<http://www.hc-sc.gc.ca/ehp/ehd/oeha/hia>

New Zealand

General site at www.moh.govt.nz and search for Health Impact Assessment or go to:

<http://www.moh.govt.nz/moh.nsf/wpgIndex/Publications-Online+Publications+Contents> (then to 1998 and go through the list).

United Kingdom

<http://www.doh.gov.uk/london/healthia.htm>

(Section 7 of the Resources for Health Impact Assessment provides numerous other UK web addresses including the well known University of Liverpool site).

WHO (Gothenburg Consensus Paper)

<http://www.who.dk/hs/ECHP/index.htm>

Impact Assessment in Australia – government sites

Queensland

<http://www.env.qld.gov.au> (search for impact assessment and/or integrated planning act).

New South Wales

<http://www.duap.nsw.gov.au>

See also <http://www.epa.nsw.gov.au>

ACT

http://www.palm.act.gov.au/planning_and_development/environmental_planning/eia.htm

Victoria

<http://www.doi.vic.gov.au/doi/internet/planning.nsf>

(see Impact Assessment under Environment in the A-Z index).

and <http://www.epa.vic.gov.au>

Tasmania

<http://www.dpiwe.tas.gov.au/env>

South Australia

<http://www.planning.sa.gov.au>

See also <http://www.dehaa.sa.gov.au/epa>

Northern Territory

<http://www.lpe.nt.gov.au/enviro/EIAinNT.htm>

Western Australia

<http://www.environ.wa.gov.au>

Commonwealth

<http://www.ea.gov.au/epbc/>

**Australian Environmental Impact
Assessment network**

<http://www.ea.gov.au/assessments/eianet>

**International Impact Assessment
websites**

The Environmental Impact Assessment Preliminary
Index of Useful Internet Web Sites

<http://www.iaia.org/eialist.html>

**International Association for Impact
Assessment**

<http://www.iaia.org/>

Community Consultation and Risk Communication

Ewan C, Young A, Bryant E, Calvert D. (1994) National Framework for Environmental and Health Impact Assessment. NHMRC, pp 81-87.

EnHealth Council. (2001). Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards (in press). enHealth Council: Canberra. Once published will be available at: <http://enhealth.nphp.gov.au/council/pubs/ecpub.htm>

Rutgers University Center for Environmental Communication, Publications List, June 1999 At: <http://www.cook.rutgers.edu/~cec/PUBS/publist.html>

Connor, D. (1997) Public Participation – A Manual – How to Prevent and Resolve Public Controversy. Connor Development Services Ltd, Victoria, BC, Canada. At: <http://www.islandnet.com/connor/>

Chapple, K. (1997) From conflict management to conflict resolution, The Tongariro Way, A pathway for the working party concept. Royal Forest & Bird Protection Society. Paper presented to the 24th Hydrology and Water Resources Symposium, November 1997, Auckland. (details conflicts resolved by the introduction of a consultative process involving two projects in New Zealand).

Peter Sandman publications (<http://www.psandman.com>):

- Responding to Community Outrage: Strategies for Effective Risk Communication.
- Risk = Hazard + Outrage: A Formula for Effective Risk Communication (Video).
- Quantitative Risk Communication: Explaining the Data (Video).
- Implementing Risk Communication: Overcoming the Barriers (Video).

ATSDR A Primer on Health Risk Communication Principles and Practices, USA Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. At: <http://www.atsdr.cdc.gov/> and search for Health Risk Communicator.

Covello VT, McCallum DB, Pavlova MT. (1989) Effective Risk Communication, The Role and Responsibility of Government and Non-government Organisations. Contemporary issues in risk analysis. Plenum Press, New York and London.

Covello, Vincent T., Peter M. Sandman, and Paul Slovic, (1988) Risk Communication, Risk Statistics and Risk Comparisons: A Manual for Plant Managers. Chemical Manufacturers Association: Washington, DC.

Covello, Vincent T., Detlof von Winterfeldt and Paul Slovic, (1986) Communicating Scientific Information About Health and Environmental Risks: Problems and Opportunities from a Social and Behavioral Perspective. The Conservation Foundation: Washington, DC.

Ruckelshaus, William D. (1987) Risk, Science and Democracy: Part 1. Chemtech, November 1987, pp. 658-662; Part 2 Chemtech, December 1987, pp. 738-741.

Appendix 6: Health monitoring

Generally, the potential health risks posed by a development will be controlled to the extent that health monitoring of the public is unnecessary. However, in a small number of instances such monitoring may be required.

It may, of course, be more necessary for workers as they may receive much higher exposure than a member of the public. Occupational health has not been explicitly considered in these Guidelines but there may be areas where the public and occupational health issues overlap. In such circumstances the issue needs to be addressed, possibly in collaboration with other agencies.

Monitoring health impact, and the difficulties it may present, is also extensively discussed in section 8 of the *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards*⁹.

Monitoring programs are necessary only when developments are known to be, or likely to be, associated with ongoing health impacts of concern. It is essential to define in advance what action will be taken if the indicator being monitored reaches a certain pre-defined point. If no specific action is necessary or possible, then there is no point in monitoring. Similarly, monitoring is only of use if the regulatory authority has the power and will to act on the results in order to protect health.

The indicators that require monitoring need to be outlined at or before the time of approval.

Key steps in monitoring include:

- identifying parameters to be monitored and defining the correlation between those parameters and effects on health;
- developing monitoring protocols;
- ensuring monitoring is conducted;
- receiving and assessing results regularly;

- responding to results; and
- reviewing monitoring procedures and the need to continue monitoring.

Administrative considerations

Monitoring should be:

- undertaken or paid for by the proponent;
- performed transparently and reliably (on time, using standardised equipment, trained operator, etc);
- reported publicly, including advice to local residents. Communities should be involved in as many aspects of the monitoring as possible, including planning, sampling, analysis and interpretation; and
- conducted efficiently. It is important that monitoring costs be in proportion to the scale of a proposed development (which includes minimising required monitoring) and that it be conducted as efficiently as possible.

Individuals and organisations overseeing monitoring should have adequate technical expertise and be (and be seen to be) independent.

It is assumed that monitoring will be overseen by the decision-making agency in most cases. Where a development could potentially have a significant impact on health, the public health authority (PHA) may wish to be directly involved in overseeing the monitoring (eg as a member of a monitoring committee).

The PHA should review and assess the results of monitoring on a regular basis (eg. yearly). Should the results suggest the potential for an adverse health impact in excess of that described in the Health Impact Statement, the PHA should alert the decision-making authority and initiate action to reduce the risk. Such action should involve

consultation with stakeholders, particularly the proponent and decision-making authority.

It may be appropriate that a committee of stakeholders (including community representation) oversee the monitoring of some developments, particularly those with a significant potential for adverse health impact or where the development is controversial.

General guidelines for monitoring

Parameters to be included in a monitoring program should:

- be of reasonable cost;
- be technically reliable;
- be scientifically valid, with high sensitivity and specificity;
- be easily interpreted;
- provide reassurance to the population;
- assist with undertaking protective responses; and
- provide timely indication of a problem.

Periodic review may indicate that a more modest monitoring program would be adequate. If a monitoring program is to be scaled-down it is important that this be done in such a way as to preserve the comparability of the new and old monitoring data (if those data continue to be collected).

Monitoring indicators of health effects or health effects themselves?

It is often much easier, more economic and effective to measure indicators of health effects rather than health effects themselves.

Health effects may be difficult to assess on a population-wide basis, incidence/prevalence may fluctuate independently of environmental changes, there can be time lags between event and outcome, and one does not want to wait until harm is done before taking action.

As the WHO Guideline *Evaluation and use of epidemiological evidence for environmental health risk assessment* (WHO, 2000.) states, “epidemiological studies that report associations

between measures of health of populations and the presence of hazardous factors in the environment are difficult to interpret”. Nevertheless, epidemiology does have a place in monitoring and in health risk assessment generally.

Measuring environmental or biological surrogates for health effects also has its difficulties. It may be difficult, for example, to demonstrate an actual correlation between the indicator and a specific health outcome, even when one is expected to closely follow the other in time, such as asthma from airborne dust or gases such as sulfur dioxide.

Monitoring the health of small populations can be a considerable task, involving significant technical difficulties. The following should be considered when developing a methodology:

- health monitoring using epidemiological tools may be possible where the affected population is large enough to yield reasonable confidence intervals and the geographic boundary of the population coincides with that of the statistical local area(s);
- monitoring should commence as early as possible so as to optimise the likelihood of recognising trends. Ideally, monitoring would commence before a development proceeds, thus providing a baseline against which to compare results obtained during (and possibly after) the development activities;
- it may be practical for only a small number of parameters to be monitored. Parameters can be health conditions (eg diseases) or bio-indicators (eg blood lead concentrations or antibodies) or environmental parameters (eg concentration of polychlorinated biphenyls in biota, concentration of phosphates or dissolved oxygen levels in water). An ideal parameter is one where easily measured changes in its value indicate small changes in health impact;
- the number of parameters to be monitored will depend upon the potential likelihood and magnitude of the health impacts and should be no more than is consistent with providing adequate protection of public health;
- every effort should be made to ensure comparability of results of sampling and analysis over the whole monitoring period (eg. by retaining the same method, or parallel running of

new methods of obtaining samples, sampling locations, analytical technique);

- monitoring of health impacts with long latency periods may not be effective in preventing adverse health outcomes eg. although cancer rate monitoring may be worthwhile in the future, monitoring of biological or environmental markers would be more effective in predicting increased risk and preventing higher cancer rates (although the emission of a known carcinogen is likely to be approved only in very special cases eg. extremely low levels of benzene or a polycyclic aromatic hydrocarbon);
- the collection and analysis of human biological samples (blood, urine, hair etc) can be used as a marker to detect concentrations of contaminants in people. While it may be ethically or socially unacceptable to routinely collect such samples, it may be possible to sample opportunistically from reasonably representative groups who are being otherwise tested. It may also be practical to test a sensitive sub-population (eg all pregnant mothers or school children, or perhaps to collect samples from sensitive animal populations). Collection and analysis of samples should be done with ethical approval, confidentially and with the least possible disruption and discomfort to those providing the samples;
- environmental samples (water, soil etc) and samples of animal or plant tissue may be used as effective markers of environmental contamination and as such can be used as predictors of some health impacts;
- while environmental parameters or biological markers may be the most efficient and timely means of assessing negative health impacts, whether actual or likely, the community may be more interested in whether health is being directly affected and therefore may be interested in periodically being advised about health indicators for the area; and
- indicators of social, economic and cultural change could also be monitored.

Monitoring that relies on the provision of data without financial reward (eg sentinel data collections) may fail unless those collecting the data are rewarded in some way, including being linked into the process and/or kept informed about the trends indicated by the data being collected.

Monitoring health indicators

Monitoring of health indicators will usually be confined to large developments and should be considered if:

- the potential effects are likely to be significant and obvious;
- the potentially affected population is large enough to yield reasonable confidence intervals for rates;
- data pertinent to the area can easily be compiled, collected or obtained;
- there are few or no other means of indirectly monitoring an important potential health impact; and
- the community demands reassurance that their health will be unaffected by the development and the monitoring methods are adequate.

Identifying a change in community health status will require knowledge of the population being assessed, particularly the baseline health status. Identifying an increase in the number of cases of asthma for example, without an understanding of changes in the population, may lead to incorrect conclusions. A lack of baseline health status data diminishes the value of monitoring.

Disease rates which may be influenced by age or gender are best standardised against a reference population (eg. the Australian population), unless it is clear that the age and sex structure of the population in the area has remained largely unaltered (in which case crude rates may be acceptable).

Additionally, it should be borne in mind that many indicators are likely to relate only to specific diseases, so they will only give a narrow picture of the health status of a population.

Some strategies for monitoring health

Monitoring of health can be achieved by:

- using standard data collections such as Australian Bureau of Statistics mortality data, midwives data collection, cancer registries and other data collections to track disease incidence over time. As mentioned above, one of the several disadvantages in using these data for health

monitoring is that the data are frequently old and impacts may only become apparent some time after exposures occur;

- establishing sentinel data collections involving local clinicians tracking particular diseases or their markers (confidentiality and continuity issues may be a problem);
- a series of surveys over time to track the indicators of health status and/or the prevalence of disease, conditions or markers. This method of monitoring will frequently require significant funding;
- routine health checks of sections of the population which may be accepted as indicators of community health (eg workers, school children etc). Alternatively, testing of high risk populations, such as pregnant women or the frail elderly;
- monitoring specific incidents, for example injuries involving vehicles or equipment associated with a large development. These data could be provided through workers' compensation data, hospital data, or police and/or transport authority data; and
- the public health authority notifiable disease database may be useful for monitoring infectious diseases. While this database may provide timely data, isolating the data for small areas is generally difficult and complicated by confidentiality issues.

Guidelines for monitoring biological indicators

Often it will be impractical to monitor health. Monitoring of biological indicators may be a preferable alternative and can be more effective in protecting health, especially where an indicator reveals damage is occurring (eg blood lead concentrations) or the potential for damage (eg vaccination status), as opposed to damage actually done (eg impaired neurological function or cases of measles).

Measuring blood lead levels is an example of monitoring a biological indicator; the health impact of most interest being impaired neurological function. Monitoring of blood lead concentration is a more feasible approach and a much earlier indicator of people at risk, compared to assessing neurological

function – the results being more useful if concern arises that lead contamination may be a problem.

Biochemical and/or microbial assessment of blood, urine, hair, teeth and other tissue can provide useful indicators. Monitoring could include analysis of samples:

- collected during one-off surveys conducted at regular intervals (eg 5 yearly);
- collected for other tests eg. blood collected for other tests could, with consent, be analysed for contaminants of interest; and/or
- collected during routine screening of population subgroups (eg screening of school populations, workers or other populations which are periodically screened).

When designing a monitoring program using biological indicators consider:

- is funding adequate to ensure the program will continue for as long as necessary;
- is the indicator a good measure of the health impact of interest;
- are there possible biases in the selection of individuals providing samples, and if so, in what way will the bias operate and will the results still be useful;
- is the analysing laboratory accredited and does it have a good reputation for analysing the samples for the contaminant or material of interest;
- will relevant standards be followed in sample collection and analysis;
- has contamination been considered and prevented (eg. contamination of skin, collection equipment and sample storage equipment); and
- are the collection and analysis methodologies well-defined. Changing these methodologies can render comparisons over time invalid or difficult (thus possibly masking trends) and may render critical information useless, possibly to the community's disadvantage.

Guidelines for health indicators

As discussed, it will often be unacceptable or difficult to monitor community health status and/or human biological samples. Consequently it will often be more appropriate to monitor aspects of the physical or social environment.

When (time of day, season and how often, etc) and where (geographical location, depth, altitude etc) samples are collected, the method of sampling and analysis and who is to collect and analyse the samples are issues that may require consideration by the community, the proponent, the health agency, the environmental agency and other key stakeholders.

Frequency of sampling and spatial distribution of sampling points can be critical for the success of a monitoring program. Measurement of contaminants associated with ill health may be undertaken in soil, water, air, dust or other organisms.

It may also be necessary to measure non-biological indicators of health to assess the impact of a large development on a community – the health impact may be positive and/or negative, and the justification for a development may have been dependent upon one or more of these health determinants improving.

Some measurable indicators of health include:

- proportion of people of working age who are in work;
- indicators of success in tackling poverty and social exclusion;
- people in employment working long hours;
- working days lost through illness, work fatalities and injury rates;
- index of Local Deprivation;
- long term unemployment;
- qualifications at, say, age 18;
- expected years of healthy life;
- people without qualifications;
- health inequalities;
- health indicators for heart disease, cancer, accidents, mental health;
- respiratory illness;
- hospital waiting lists;

- road traffic measures such as average journey length by purpose;
- homes judged unfit to live in;
- temporary accommodation; and
- household and population growth.

Monitoring employment and proponent commitments

During an environmental impact assessment process a proponent may make commitments by way of mitigation, for example, of compensation, employment, modifying the development and continuing community consultation. It may be necessary to monitor the undertaking of these commitments.

Appendix 7: enHealth Council Membership and Terms of Reference

The enHealth Council is the premier advisory body on environmental health in Australia. It provides national leadership on environmental health issues, sets priorities, coordinates national policies and programs and provides a pivotal link between international for a and environmental health stakeholders in Australia. It is also responsible for implementation of the National Environmental Health Strategy and is a sub-committee of the National Public Health Partnership.

Membership

Chair – Professor Christine Ewan, Pro Vice-Chancellor (Education), University of Western Sydney.

Members

State and Territory Health Department representatives:

Australian Capital Territory – Manager Health Protection Service

New South Wales – Director Environmental Health

Northern Territory – Program Director Environmental Health

Queensland – Manager Environmental Health

South Australia – Director Environmental Health

Tasmania – Director Environmental and Public Health

Victoria – Manager Environmental Health

Western Australia – Director Environmental Health service

New Zealand – New Zealand Health Ministry

Commonwealth Dept. of Health and Aged Care – Director of Environmental Health

Australian Institute of Environmental Health – National President

Environment Australia

Public Health Association of Australia

Australian Consumers' Association

National Indigenous Environmental Health Forum

Secretariat

Services provided by the Environmental Health Section of the Commonwealth Department of Health and Aged Care.

Terms of Reference

1. Provide national leadership on environmental health issues by:
 - i) coordinating and facilitating environmental health policies and programs;
 - ii) establishing strategic partnerships between environmental health stakeholders;
 - iii) setting priorities for national environmental health policies and programs;
 - iv) providing an open consultative system for policy development; and
 - v) facilitating cost effective use of environmental health resources.
2. Drive the implementation of National Environmental Health Strategy;
3. Advise the Commonwealth, States and Territories, Local government and other stakeholders on national environmental health issues;
4. Coordinate the development of environmental health action plans at local, state and national levels;
5. Promote and develop model environmental health legislation, standards, codes of practice, guidelines and publications;