

Part III

SECTION 6

**Models of
health impact assessment**

Overview

This section helps you consider general approaches to HIA, from a broad and a tight perspective, and goes on to provide information about five selected models:

- 1) The Merseyside model*
- 2) The British Columbia model*
- 3) The Kirklees Metropolitan Council model*
- 4) The Swedish County Councils model*
- 5) The Bielefeld model of Environmental Health Impact Assessment*

The section ends with a brief overview of other forms of impact assessment and their relationship to HIA.

6.1 Approaches to health impact assessment

In the document *Developing health impact assessment in Wales* (1), the approach to HIA has been categorised into two general streams:

- **broad perspective**
- **tight perspective**

The characteristics of each perspective are shown in *Inset 6.A*. Models of HIA in which a broad perspective is taken tend to be based on a social model of health and highlight the importance of qualitative evidence. Models of HIA in which a tight perspective is taken tend to have been derived from environmental impact assessment (EIA), and, in the main, are founded on the use of quantitative evidence. However, for most models of HIA, whether of broad or tight perspective, some element of the characteristics of the other are incorporated.

Inset 6.A:

Characteristics of broad and tight perspective health impact assessment

[Source: Ref.1]

	BROAD PERSPECTIVE	TIGHT PERSPECTIVE
<i>View of health</i>	Holistic	Emphasis on defined and observable aspects
<i>Disciplinary roots</i>	Sociology	Epidemiology; toxicology
<i>Ethos</i>	Democratic	Technocratic
<i>Quantification</i>	In general terms	Towards measurement
<i>Types of evidence</i>	Key informants; popular concern	Measurement
<i>Precision</i>	Low	High

In the models of HIA that follow, those from Merseyside (*Section 6.2*), British Columbia (*Section 6.3*), Kirklees Metropolitan Council (*Section 6.4*) and Swedish County Councils (*Section 6.5*), are **broad** in perspective, and that from Bielefeld (*Section 6.6*) is **tight** in perspective.

Another model that is tight in perspective is the one developed by the Ministry of Health in New Zealand; this model was used in *Case-study 8.5.2*.

6.2

The Merseyside model

Document: *The Merseyside Guidelines for health impact assessment (2)*

Document date: 1998

Model development

The Merseyside health impact assessment programme was commissioned by the four Merseyside health authorities from the Liverpool Public Health Observatory in April 1997. The local directors of public health were in part seeking support for work on regeneration projects. The authors of the guidelines are Alex Scott-Samuel, Martin Birley and Kate Ardern.

Model design

The guidelines were written for those who might commission or carry out HIA in the following sectors:

- Central or local government;
- Health;
- Voluntary;
- Other organisations whose work influences or is influenced by public health.

Description of the model

A useful feature of this model is the clear distinction made between the procedures and the methods for HIA.

Procedures for HIA

- Screening, to select policies, programmes or projects for assessment (*see Inset 6.M.1*)
- Establishing a Steering Group and agreeing Terms of Reference (*see Inset 6.M.2*)
- Carrying out the health impact assessment using the Methods (*see below*)
- Negotiating the favoured option(s) for achieving optimal health impact
- Monitoring and evaluating processes and outcomes of the HIA and providing feedback to influence continuing review.

Methods for undertaking HIA

- Policy analysis.
- Profiling the areas and communities affected.
- Involving stakeholders and key informants in predicting potential health impacts using a predefined model of health (*see Inset 6.M.3* for the key areas influencing health; *see Inset 6.M.4* for the sheet on which potential health impacts are recorded). If possible, participants should be encouraged to prioritise or rank the health impacts when they identify them.
- Evaluating the importance, scale and likelihood of predicted impacts. The evaluation involves the quantification and valuation of health impacts. In this model, impacts are rated according to their measurability (qualitative, estimable or calculable) and the risk of occurrence (definite, probable or speculative). These predicted impacts are then checked against the available evidence base, to identify the most important impacts which are then ranked in order to inform the consideration of alternative options and recommendations made for the management of priority impacts.
- Considering alternative options and making recommendations for action to enhance or mitigate impacts.

See *Inset 6.M.5* for stages in the process of HIA, and the relationship between the procedures and methods for HIA.

For further information:

- see the Liverpool University website: www.liv.ac.uk/~mhb/index.htm
- see Case-study 8.3.1 (heading 6, Principles of HIA) for the advantages of using an HIA approach as confirmed by work in Merseyside.

Inset 6.M.1:

Health impact assessment screening procedure				
<i>[Source: Ref.2]</i>				
<p>The term “project” is used for brevity to refer to projects, programmes or policies. The issues are not ranked in priority order.</p> <p>Economic issues</p> <ul style="list-style-type: none"> • The size of the project and of the population(s) affected • The costs of the project, and their distribution <p>Outcome issues</p> <ul style="list-style-type: none"> • The nature of the potential health impacts of the project (crudely estimated) • The likely nature and extent of disruption caused to communities by the project • The existence of potentially cumulative effects <p>Epidemiological issues</p> <ul style="list-style-type: none"> • The degree of certainty (risk) of health impacts • The likely frequency (incidence/prevalence rates) of potential health impacts • The likely severity of potential health impacts • The size of any probable health service impacts • The likely consistency of “expert” and “community” perceptions of probability (i.e. risk), frequency and severity of important impacts - this could be described via a simple matrix (a completed example is given below). The greater the likely consistency - i.e. the greater the likely agreement between expert and lay perceptions of important impacts - the greater the need for a HIA. 				
		ASPECT OF POTENTIAL IMPACT		
		<i>Probability</i>	<i>Frequency</i>	<i>Severity</i>
EXPERT / LAY CONSISTENCY	<i>High</i>		X	X
	<i>Low</i>	X		
<p>Strategic issues</p> <ul style="list-style-type: none"> • The need to give greater priority to policies than to programmes, and to programmes than to projects, all other things being equal. (This results from the broader scope – and hence potential impact - of policies as compared to programmes and to projects) • Timeliness: <ul style="list-style-type: none"> - re ensuring that HIA is prospective wherever possible - re Planning Regulations and other statutory frameworks • Whether the project requires an Environmental Impact Assessment • Relevance to local decision making 				

Inset 6.M.2:

Terms of reference (TOR) <i>[Source: Ref.2]</i>	
<ul style="list-style-type: none"> • Steering Group membership should be listed in the TOR, together with members' roles, including those of Chair and Secretary. • The nature and frequency of feedback to the Steering Group should be specified. • The methods to be used in the assessment should be described in adequate detail. • The TOR should outline the form and content of the project's outputs, and any conditions associated with their production and publication. Issues associated with publication of outputs include ownership, confidentiality and copyright. • The scope of the work should be outlined – what is to be included and excluded, and the boundaries of the HIA in time and space. • An outline programme – including any deadlines – should be provided. • The budget and source(s) of funding should be specified. 	

Inset 6.M.3:

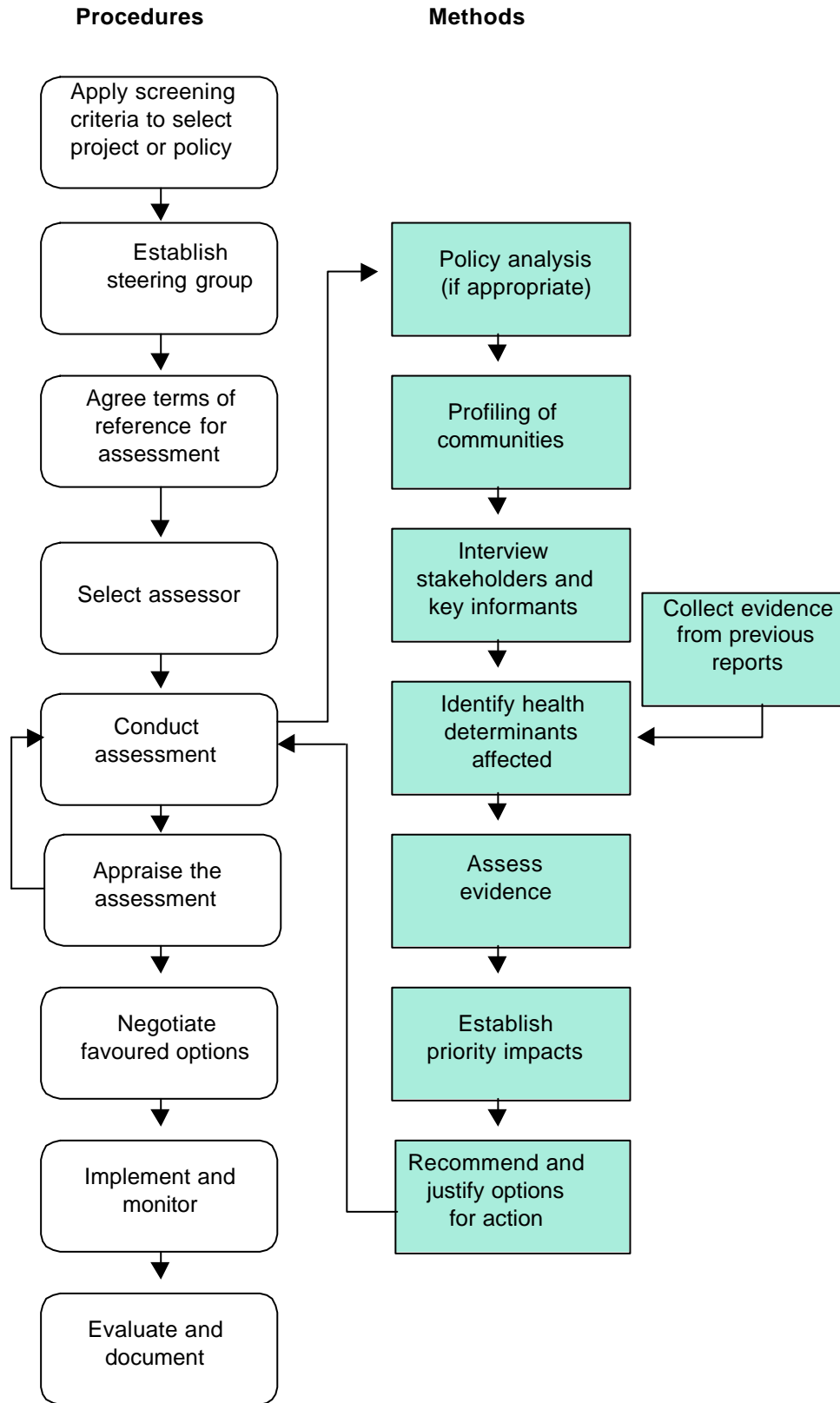
Key areas influencing health <i>[Source: Ref.2]</i>	
CATEGORIES OF INFLUENCES ON HEALTH	EXAMPLES OF SPECIFIC INFLUENCES (health determinants)
Biological factors	Age, sex, genetic factors.
Personal/family circumstances and lifestyle	Family structure and functioning, primary/secondary/adult education, occupation, unemployment, income, risk-taking behaviour, diet, smoking, alcohol, substance misuse, exercise, recreation, means of transport (cycle/car ownership).
Social environment	Culture, peer pressures, discrimination, social support (neighbourliness, social networks/isolation), community/cultural/spiritual participation.
Physical environment	Air, water, housing conditions, working conditions, noise, smell, view, public safety, civic design, shops (location/range/quality), communications (road/rail), land use, waste disposal, energy, local environmental features.
Public services	Access to (location/disabled access/costs) and quality of primary/community/secondary health care, childcare, social services, housing/leisure/employment/social security services; public transport, policing, other health-relevant public services, non-statutory agencies and services.
Public policy	Economic/social/environmental/health trends, local and national priorities, policies, programmes, projects.

Inset 6.M.4:

Identification of potential health impacts <i>[Source: Ref.2]</i>				
<p>In the first column of the table, list the categories (e.g. physical environment) and health determinants (e.g. noise) which may be affected by the project's development/operation.</p> <p>In the second column, list all the activities likely to cause these effects during the project's development/operation.</p> <p>In the third and fourth columns, identify all predicted health impacts during project development/operation, separating positive from negative health impacts, and assessing their measurability (see below).</p> <p>In the final column, estimate the degree of certainty (risk) of the impact.</p>				
Categories / specific influences on health	Project development / operation activity	Predicted health impacts (nature, and where possible, size of impact, and how measurable impact is - ie, is it qualitative (Q), estimable (E), or calculable (C))		Risk of impact - is it: definite (D), probable (P), or speculative (S)?
		<i>Positive impacts</i>	<i>Negative impacts</i>	

Inset 6.M.5:

Stages in the health impact assessment process
[Source Ref. 2]



6.3

The British Columbia model

Document: *Health Impact Assessment Toolkit: A Resource for Government Analysts (3)*

Document date: 1994

Model development

The Ministry of Health in British Columbia commissioned the tool from the Population Health Resource Branch following the publication of a report by the Royal Commission on Health Care and Costs entitled *New Directions for a Healthy British Columbia*.

Model design

The tool was designed to analyse the health impacts of public non-health policy.

Description of the model

The tool consists of eleven questions (*See Inset 6.BC.1*) about key factors that affect health; each question has a health enhancement bias. When using the tool, impacts on both individuals and communities should be considered.

For each of the eleven key factors affecting health featured in this tool, there is a set of “probing” questions to facilitate stakeholder responses. These have been reproduced in full in:

Winters, L. (1997) *Health Impact Assessment: a Literature Review*.
Observatory Report Series No. 36. Liverpool Public Health Observatory, Liverpool.

For further information:

- see the Health Canada Website:
www.hc-sc.gc.ca/hppb/healthpromotiondevelopment/pube/impact/impact.htm
- For *The Canadian Handbook on Health Impact Assessment* (3 volumes) (English language version), see:
www.hc-sc.gc.ca/oeha/

Inset 6.BC.1:

British Columbia health impact assessment checklist		
Will the given option have an impact on:	Possible impact	Information required
1. The creation of income and/or wealth? Will specific income groups or communities be impacted positively or negatively?		
2. The distribution of income and/or wealth? Will specific income groups or communities be impacted positively or negatively?		
3. Employment opportunities for individuals and/or communities? What is the impact on the nature and distribution of jobs and/or working conditions?		
4. Learning opportunities, particularly for young people and/or unemployed? Will the training/education support tomorrow's jobs?		
5. Healthier beginnings for children? This includes meeting their basic physical needs, building self-esteem and developing a sense of connectedness with others.		
6. The number and quality of healthy personal connections, such as those with friends, families, colleagues and community groups (as distinct from professional support services)? Will it segregate or isolate individuals or groups?		
7. Physical safety and security among individuals and communities?		
8. People's sense of control over their own lives in the decision-making affecting their income, working and living conditions, support systems, local government programs, services and/or resources?		
9. Physical and/or mental health? Which individuals or groups are most affected?		
10. The provision of fair, equitable and respectful access to government programs, services and/or resources?		
11. The environment? Will these environmental changes affect health?		

6.4

Kirklees Metropolitan Council (MC) model

Document: *Achieving Health Outcomes through Best Value: A Toolkit to Assess Health Impact*
An approach to the identification and specification of anticipated effects on health and health determinants.

Date of document: 1998

Model development

This model was commissioned by Kirklees MC and developed by Adrian Ward. The source document (see above) from which this text was written was prepared by Feisal Jassat, Health Policy Co-ordinator of Kirklees MC.

Description of the model

The model has two phases.

Phase 1: A transitional model, comprising the core steps, intended for use by practitioners/employees (*see Inset 6.K.1*)

Phase 2: The final model to be used as part of a consultative and participative process for HIA (*see Inset 6.K.2*).

PHASE 1 – Core steps

There are five basic or core steps to the model (*see Inset 6.K.1*), as follows:

Step 1: The definition of health.

Step 2: Specification of the direct effects on health (physical, mental and social – *see Inset 6.K.3*), and the effects on the determinants of health (*see Inset 6.K.4*)

Step 3: The assessment of impacts, comprising three sub-steps:

- (a) pre-assessment information – (i) identification and specification of the target group(s) and the wider community, (ii) the primary objectives of the HIA, (iii) the intended outcomes, actions, processes and resources, and (iv) the legal framework;
- (b) assessment of impacts using the direct effects on health and the effects on the determinants of health, as specified in Step 2;
- (c) weighting and selection – identification of the significant health impacts in preparation for Step 4 (*see Inset 6.K.5* for a set of criteria that could be used in the process of weighting).

See Inset 6.K.6 for a proforma for recording the outputs from Step 3, sub-steps (b) and (c).

Step 4: Writing explicit health objectives – the definition of an appropriate objective, focused upon the direct effects on health or the effects on the determinants of health, for each of the priority health impacts selected under Step 3.

Wherever possible, objectives should be framed to be “**SMART**” to make the process of evaluation easier.

- **Specific** (to the intended achievement)
- **Measurable** (using quantitative or qualitative methods)
- **Achievable**
- **Realistic** (in the context of the starting position, and resources available)
- **Timebound**.

A baseline position should also be established for each objective to ensure that it is possible to evaluate performance and to inform decisions about what is realistic and achievable.

Step 5: Activity review and planning, comprising two sub-steps:

- (a) **Activity review** – includes activities undertaken to achieve primary objectives and those undertaken to meet the new health-related objectives generated during Step 4. Key review questions are shown in *Inset 6.K.7*;
- (b) **Action planning** – the translation of objectives and activities into direct action. The action plan should include the information shown in *Inset 6.K.8*.

PHASE 2

The additional steps in Phase 2 of this model are conducted for two main reasons:

- To ensure the process is consultative and participative;
- To ensure that service delivery matches identified priority health needs.

To this end, the following steps are conducted **before** the HIA (*see Inset 6.K.2*).

Health needs assessment (HNA)

To identify specific priority health needs, using the community as a primary source of information.

Stakeholder identification:

To identify all stakeholders relevant to the priority health needs; such stakeholders should be encouraged to participate in the process.

Specification of desired health outcomes:

Drafting outcome objectives in relation to the priority health needs, to be validated by key stakeholders. A baseline position should be established for each objective.

Audit of current service delivery/other agency activities:

To inform the options for service delivery; the focus of the audit should be those activities that may already have an impact on the priority health needs.

Identification of service delivery options:

To identify options that have the capacity to deliver the health outcomes as specified in relation to priority health needs, to include outputs, processes and inputs.

Consultative/participative impact assessment:

i.e. Steps 1-3 of the Phase 1 model. However, the focus of the impact assessment in Phase 2 is the identification of service delivery options that confer the best net health gain.

As service delivery options are identified **before** the impact assessment in the Phase 2 model, Step 4 becomes the **Writing of service delivery objectives** which specify the optimal option identified in the impact assessment, to cover outputs, processes and inputs. A baseline position should be established for each objective.

The audit of current service delivery/other agency activities **before** the impact assessment in the Phase 2 model obviates the need for an activity review at Step 5 but not the need for **Action planning**.

Procedural points to note

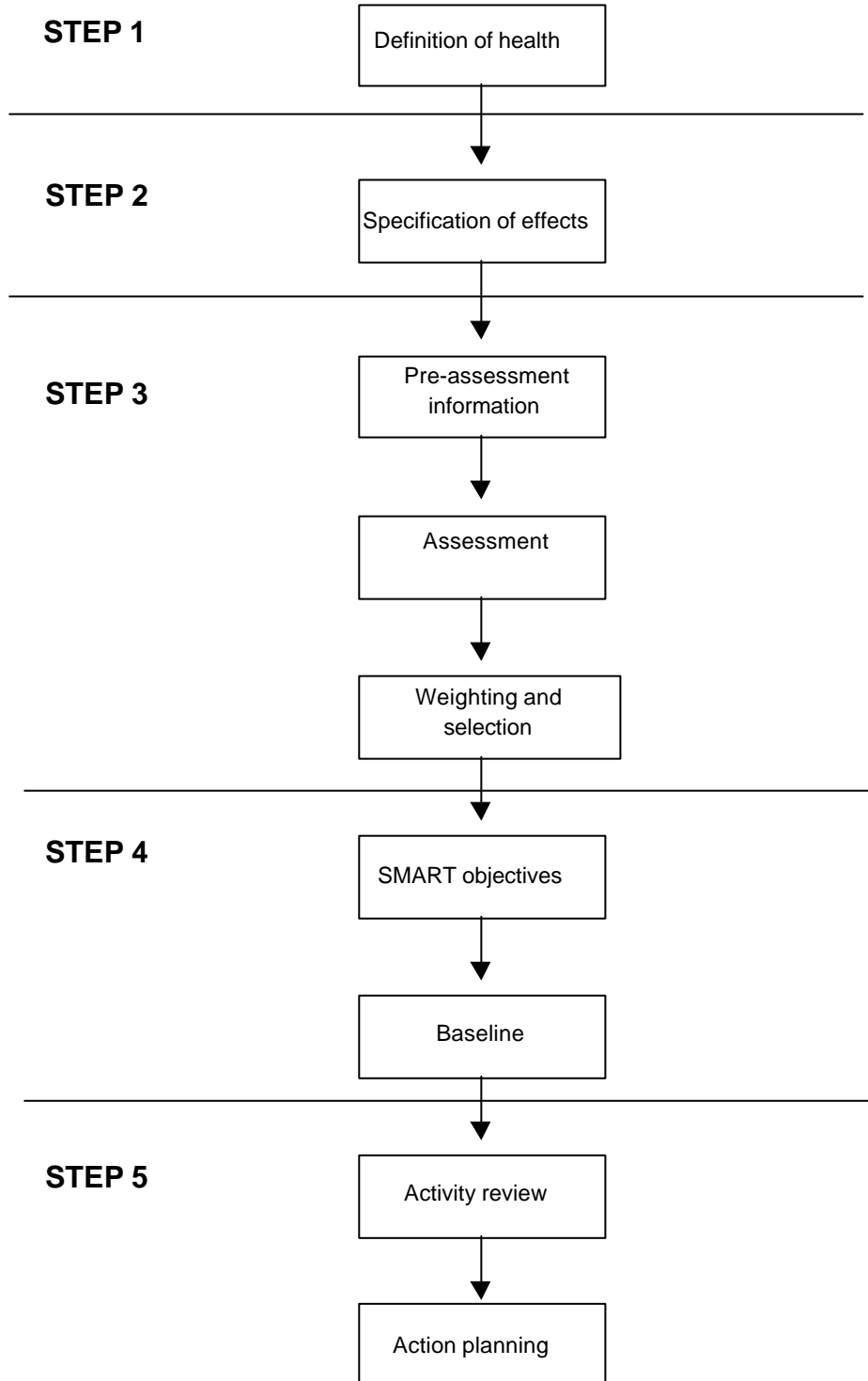
- The definition of health used to identify the priority health needs should be the same as that used for the impact assessment.
- The set of direct effects on health and the determinants of health used in the health needs assessment should be the same as those used for the impact assessment.
- Priority health issues may be identified during the HNA which should form a core for the impact assessment.

However, it is important to be aware of the following:

- health needs are different to the potential impact on health of a particular policy, programme or project;
- the health needs assessment may not identify all the potential negative health impacts;
- a consideration of impacts on health, and therefore the assessment, has additional benefits (organisational and political) other than meeting priority health needs.

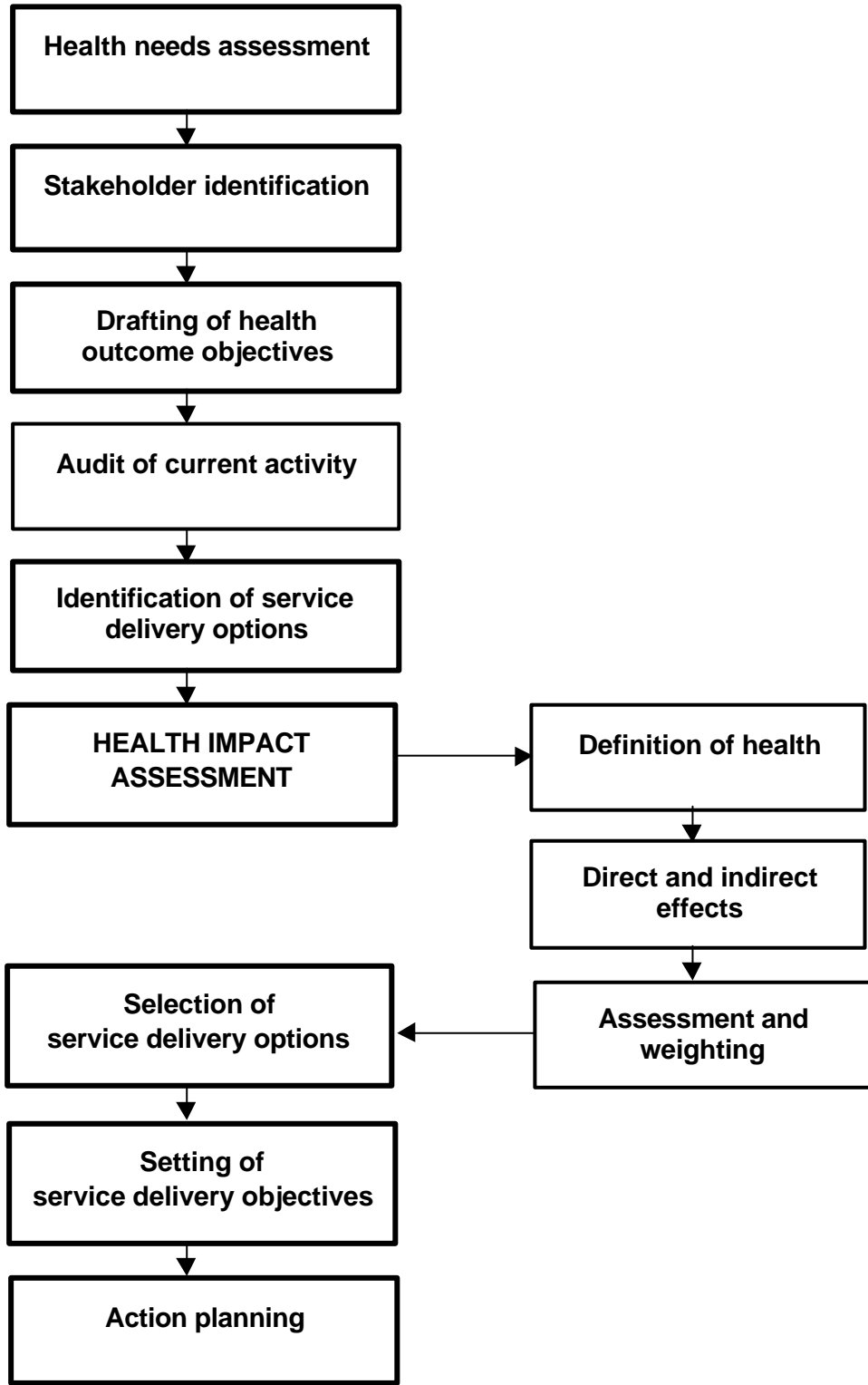
Inset 6.K.1:

Kirklees health impact assessment model – Phase 1



Inset 6.K.2:

Kirklees health impact assessment model – Phase 2
(Note: **bold boxes** indicate options for consultation/participation)



Inset 6.K.3:

Direct health effects

Will the proposal have positive or negative effects on:

Physical

- The incidence or severity of acute or chronic illness.
- The likelihood or severity of injury.
- Personal fitness levels.
- Other aspects of physical health.

Mental

- The incidence or severity of mental illness.
- Stress levels.
- Feelings of anxiety, fear or distress.
- Self-esteem and confidence.
- Other aspects of mental health.

Social

- Opportunities for meaningful and valued social contact.
- Individuals' feeling of control over their lives.
- Social exclusion.
- Other aspects of social health.

Inset 6.K.4:

Determinants of health

(Greater detail about each determinant is given in the Kirklees MC document)

Will the proposal have positive or negative effects on:

Political and economic

- National, regional or local health-related policy goals, programmes, projects.
- Creation and distribution of wealth or levels of disposable income.
- Business activity and economic growth.
- Employment levels.
- Housing market activity.
- Effectiveness of local democracy.

Social

- Actual or perceived personal and property safety.
- Possession of a home.
- Development and maintenance of dynamic and positive communities.
- Opportunities for lifelong learning.
- Opportunities for active and passive leisure activities and experiences.

Technological

- The amount or quality of domestic technology.
- The creation of opportunities or threats arising from the level or application of commercial or industrial technology.
- The availability and suitability of, or access to, infrastructure technology.
- Development in, availability of, or access to, medical technology.

Equitable

- Equal opportunities in relation to gender.
- Equal opportunities in relation to race.
- Equal opportunities in relation to disability.
- Equal opportunities in relation to age.
- Access to information, services, facilities, buildings or opportunities.
- Access to advice, care, support mechanisms or means of redress.
- Respect for diversity.

Environmental

- The quality of water, land or outdoor and/or indoor air.
- The quality and/or utility of the built environment.
- The availability or quality of open space and environmental amenity
- Natural habitats and/or bio-diversity.
- The number, type or significance of environmental hazards.

Geographical

- Sites or locations which have significance in peoples' lives.
- Real or perceived differences in area/district/regional characteristics.

Individual

- Peoples' lifestyles.
- Knowledge and skills held in the community.
- Attitudes or beliefs.

Organisational

As most interventions will involve some form of organisational input, the effects of service delivery on health of the employees is equally important.

- Pay or conditions.
- The working environment.
- Management style and decision making.
- Development and advancement opportunities.

Inset 6.K.5:

Criteria suggested for use during the weighting of impacts
<ul style="list-style-type: none"> • Numbers of people likely to be affected. • Geographical area likely to be affected • Amount of benefit/detriment of likely health effects. • Likelihood of impacts. • Policy priority. • Target and community priority. • Cost/benefit. • Time to deliver benefits. • Community capacity/availability of community-based skills and resources. <p><i>Assign scores on a scale of 1 to 5 to one or more criteria to form a ranked list, from which priorities can be selected.</i></p>

Inset 6.K.6:

Proforma for recording the outputs of Step 3 (a) – (c)					
Assessment questions (step 3)	Target group(s)		Wider community		Weighting
	Positive impacts	Negative impacts	Positive impacts	Negative impacts	

Inset 6.K.7:

Key review questions
<ul style="list-style-type: none">• Could health impacts be improved by doing different things?• Could health impacts be improved by doing the same things differently?• What other things need to be done to meet the new health objectives?

Inset 6.K.8:

Suggested contents for the action plan
<ul style="list-style-type: none">• Objectives to which the actions relate.• Actions to be undertaken.• Person or people responsible• Criteria by which the completion of actions will be identified.• Times by which actions are to be completed.

6.5

The Swedish County Councils model

Document: *Focusing on Health: How can the health impact of policy decisions be assessed?* (4)

Document date: 1998

Model development

This model was developed as part of the Public Health Program run jointly by the Federation of Swedish County Councils and the Association of Swedish Local Government Authorities. The scientific underpinnings for this model are based on the work of Finn Diderichsen.

Model design

The model is designed to appraise the health impacts of non-health policies in support of daily decision-making by politicians.

Key features

The particular focus of this model is assessing the impacts on those suffering health inequalities in the affected population. A key question asked is:

“How is the health of different groups affected by the proposed policy decision in question?”.

Tools for health impact assessment

There are three tools within the model:

- **the health question** – an itemised list of health impacts (*see Inset 6.S.1*), the use of which is supported by a set of key determinants of health (*see Inset 6.S.2*);
- **the health matrix** – the use of which helps to identify the consequences of a policy proposal on the key determinants of health (*see Inset 6.S.2*); impacts are identified in qualitative terms (signified by the use of one or more plus or minus signs, as appropriate; 0 = no impact) and recorded in the proforma shown in *Inset 6.S.3*;
- **health impact analysis** – key questions that provide a foundation for HIA prior to decision-making (*see Inset 6.S.4*).

The health question can be applied to:

- individual policy proposals;
- proposals for collective decision-making at council committees.

Different authors report the use of the health question as a policy audit tool (5), or as a screening tool and starting point for scoping (1).

The health impact matrix can be viewed as a rapid appraisal tool (5).

Different authors report the use of health impact analysis as a comprehensive HIA (5), or as a tool for screening and a starting point for scoping (1).

For further information:

- see The Federation of Swedish County Councils Website
www.lf.se/hkb/engelskversion/enghkb.htm (English language version)

Inset 6.S.1:

The health question	
A. Will the proposal promote health development for various groups/the population in relation to the social environment (e.g. opportunity to exert influence, mutual work and support)?	
Yes	No
B. Will the proposal promote health development for various groups/the population with regard to certain risk factors (e.g. the physical environment or living habits)?	
Yes	No
C. Is the proposal consistent with overall municipality/county health targets and objectives?	
Yes	No
Comments/justification:	
.....	
Alternative proposal:	
.....	
Our assessment is that:	
.....	

Inset 6.S.2:

The determinants of health	
<i>Democracy/ Opportunity to exert influence/ Equality</i>	Good public health is dependent on a functioning representative democracy, and also on participation, comprehensibility, and contextuality in close relations.
<i>Financial security</i>	Financial insecurity, experienced by many in the case of rapid and major societal changes, and involving unemployment and forced relocation for example, is of major importance for health.
<i>Employment/ Meaningful pursuits/ Education</i>	People's opportunities to develop by means of involvement in work and training are of major significance in terms of how long we live and how we feel.
<i>Social network</i>	The social network – of families, relatives, friends, neighbors, and so on – is of major significance to health.
<i>Access to health care and welfare services</i>	Access to good and fairly administered health care is of importance for health, especially for children, the elderly, the sick, and the disabled.
<i>Belief in the future/ Life goals and meaning</i>	The sense that everyday life is comprehensible and manageable, and also offers challenges that will promote personal development, is of great importance for health, as too is a positive future outlook.
<i>Physical environment</i>	The physical environment encompasses many issues of considerable significance to health; these range from community planning to sorting waste at source.
<i>Living habits</i>	Living habits, e.g. with regard to food and drink, sexuality, drugs, and exercise, have major importance for health, and are highly influenced by social and cultural conditions.

Inset 6.S.3:

The health matrix				
	Prioritized Group		Entire Population	
	Long Term	Short Term	Long Term	Short Term
Democracy/ Opportunity to exert influence/ Equality				
Financial security				
Employment/ Meaningful pursuits/ Education				
Social network				
Access to health care and welfare services				
Belief in the future/ Life goals and meaning				
Physical environment				
Living habits				
<p>Is the proposal in accordance with the overall targets of the municipality/county council?</p> <p style="text-align: center;">Yes No</p> <p>Comments/justification:</p> <p>.....</p> <p>Alternative proposal:</p> <p>.....</p> <p>Our assessment is that:</p> <p>.....</p>				

Inset 6.S.4:

Health impact analysis

General questions

1a: What does the local Public Health Report show regarding the health conditions of different groups within the municipality/county? Are there groups which are particularly vulnerable or already exposed to numerous health risks, or are there groups with evident health-trend problems?

1b: Are there defined health-policy targets?

Questions linked to the matter at hand

2: Are there particular health risks which can be expected to decrease or increase as a result of the proposal? Will impacts become apparent in the short term (within 5 years) or in the long term?

3: For the distribution of ill-health within a population, it is of decisive importance which groups are subjected to decreased/increased health risks, and whether any decision will affect these groups' capacity either to deal with difficulties or, by contrast, increase their vulnerability.

4: In what way will the social environment in the local community be affected by the proposal?

5: Is there a risk that a proposal may have a "double" impact on certain groups, i.e. that both their health risks increase and their social environment deteriorates?

6: Are there alternative policies which might result in better health for exposed groups and the population as a whole?

7: Summary

6.6

The Bielefeld model of environmental health impact assessment

Model development

Workers at the University of Bielefeld, in co-operation with those at the Institute of Public Health for North Rhine-Westphalia, developed the concept of environmental health impact assessment (EHIA) in order to improve the coverage of human health in the process of environmental impact assessment (EIA).

Model design

This model is designed for the evaluation of **projects** of different types, and can be applied in various local situations. The emphasis is on the impact of changes in the physical environment. The model is applied to projects that must be assessed under the legislation governing EIA in Germany.

These workers identified three components as key elements of an integrated EHIA model:

- analysis of the status quo;
- prediction of impact;
- assessment of impact.

Description of model

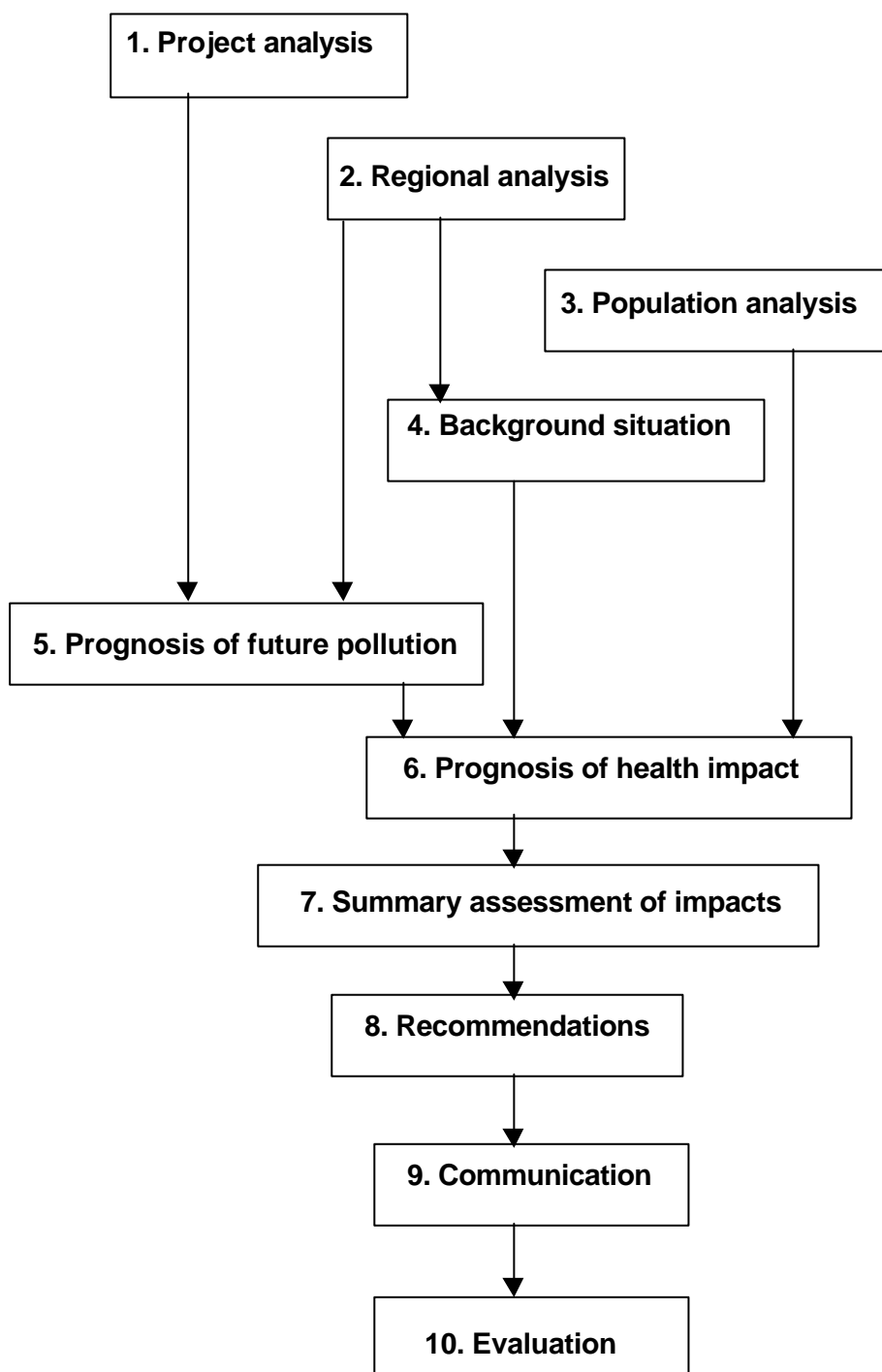
The Bielefeld Model comprises ten steps, as follows.

1. **Project analysis**
2. **Regional analysis**
3. **Population analysis**
4. **Background situation**
5. **Prognosis of future pollution**
6. **Prognosis of health impact**
7. **Summary assessment of impacts**
8. **Recommendations**
9. **Communication**
10. **Evaluation**

The relationship of these steps, and how they build on each other, is shown in *Inset 6.B.1*.

Inset 6.B.1:

**Environmental health impact assessment:
10-step model approach**



The ten steps:

1: Project analysis:

includes project specification (in qualitative and quantitative terms), normal operation and expected emissions during accidental releases in order to characterise expected hazards, including acute toxicity, and carcinogenicity.

2: Regional analysis:

encompassing physiogeography, meteorology, natural features, and land use. The study area for investigation is also defined.

3: Population analysis:

includes the population structure in terms of size, age, sex, etc., health status of the population, and behavioural patterns (e.g. diet, and activity).

4: Background situation:

includes environmental monitoring, existing pollution levels, and the identification of additional data needs.

5: Prognosis of future pollution:

uses dispersion modelling based on data obtained from similar plants/facilities; dispersion patterns of chemical and physical agents from point sources are modelled in the various environmental media, and the food chain (as appropriate).

6: Prognosis of health impact:

a pivotal step in the procedure that comprises three inter-related components:

- qualitative assessment of changes to neighbourhood features, and quality of life, including “citizen concerns”;
- for agents that have a threshold of exposure, a comparison is made between predicted values and appropriate (e.g. medium-specific) limit values to determine the hazard index/quotient for each target organ/system affected by the combination of threshold agents which act on that organ/system;
- for agents that do not have a threshold of exposure (for example, carcinogens), quantitative risk assessment is undertaken, including all relevant pathways and agents, to determine the additional risk.

7: Summary assessment of impacts:

involves a summary of the predicted impacts, and their assessment; for threshold agents the assessment is implied in the comparison between predicted and limit values, but for non-threshold agents the level of “acceptable additional risk” needs to be determined.

8: Recommendations:

can be framed in two main ways: as planning alternatives, or as modifications to the proposal, for example, the need for emission control, monitoring, public information, and post-project analysis.

9: Communication:

recognised as an essential step that requires special efforts if the results of EHIA are to be disseminated correctly and efficiently to all parties involved, including the public. Suggested aids to communication are risk comparisons and visualisation methods.

10: Evaluation:

involves the use of monitoring to compare the predicted impacts against the actual situation, with respect to the state of the environment, human exposures and health outcomes.

The opportunity to consider community concerns occurs during Step 6 *Prognosis of health impact*.

For further information:

- For an evaluation of the Bielefeld Model, which includes an illustration of the use of the model in two applications (the extension of a waste disposal site, and a planned major road bypass), *see*:
Fehr, R. (1999) Environmental Health Impact Assessment: Evaluation of a Ten-Step Model. Epidemiology 10; 618-25.

6.7

Other forms of impact assessment and their relationship to health impact assessment

Impact assessment is a standard component of policy appraisal. Some of the impacts of policies usually assessed are those relating to:

- economics - known as economic appraisal or economic and fiscal impact assessment (EFIA), which employs the techniques of cost-benefit or cost-effectiveness analysis;
- the physical environment - known as environmental impact assessment (EIA);
- social factors - known as social impact assessment (SIA).

These forms of impact assessment all originated during the 1960s, although the techniques of environmental impact assessment and latterly those of social impact assessment were developed in part to counteract:

- the emphasis on economic criteria in impact assessments;
- the neglect of social and environmental factors affecting the quality of life;
- the deficiencies of economic appraisal – in particular, there did not appear to be the capability within cost-benefit analysis to deal with either:
 - impacts (costs and benefits) that might arise across different sectors in society; or
 - unquantifiable effects.

The development of environmental impact assessment successfully incorporated concerns about the need to assess impacts to changes in the physical environment in relation to policies, programmes or projects. Attempts were also made to incorporate socio-economic factors into the assessments to ensure that they were comprehensive, but not with as much success. As a consequence, the development of social impact assessment, in which the demographic, social and economic aspects of a policy, programme or project are assessed, became distinct from but complementary to environmental impact assessment.

In a similar way, health impact assessment has been developed in part to counteract the perception that environmental impact assessment may not fully address the impacts on human health. Moreover, some models of health impact assessment are based on models of environmental impact assessment.

However, health impact assessment is also closely related to social impact assessment, especially those HIA models based on a social model of health (*see Section 5.2.2*), in which many of the same socio-economic determinants of health may be investigated.

References – Section 6

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5. Lehto, J. and Ritsatakis, A. (1999) Health Impact Assessment as a Tool for Intersectoral Health Policy. A discussion paper for a conference on “Health Impact Assessment: from Theory to Practice”, Gothenburg, 28-31 October 1999. WHO Regional Office for Europe.