Human health:
Ensuring a high level of protection

A reference paper on addressing Human Health in Environmental Impact Assessment

As per EU Directive 2011/92/EU amended by 2014/52/EU

December 2020

IAIA International Association for Impact Assessment

EUPHA EUROPEAN PUBLIC HEALTH ASSOCIATION

Contributors

(in alphabetical order)

Name	Member of	Organisation
Cave, Ben	IAIA/EUPHA	BCA Insight Ltd (Ireland)
Claßen, Thomas	EUPHA	NRW Centre for Health (LZG.NRW)
Fischer-Bonde, Birgitte	IAIA	BCA Insight Ltd (Ireland)
Humboldt-Dachroeden, Sarah	IAIA	Roskilde University
Martín-Olmedo, Piedad	EUPHA	Andalusian School of Public Health (Spain)
Mekel, Odile	EUPHA	NRW Centre for Health (LZG.NRW)
Pyper, Ryngan	IAIA	BCA Insight Ltd (Ireland)
Silva, Filipe	IAIA	Public Health by Design
Viliani, Francesca	IAIA	International SOS
Xiao, Yina	IAIA	ENI

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International Association for Impact Assessment

IAIA is the International Association for Impact Assessment, the leading global network on best practice in the use of impact assessment for informed decision making regarding policies, programs, plans, and projects. IAIA brings together researchers, practitioners, and users of various types of impact assessment from all parts of the world.

IAIA has thirteen Sections covering different aspects of impact assessment: Agriculture, Forestry, & Fisheries; Biodiversity & Ecology; Climate Change; Corporate Stewardship & Risk Management; Cultural Heritage; Disasters & Conflict; Governance and Implementation Systems; Health; Impact Assessment and Emerging Technologies; Indigenous Peoples; Public Participation; Social Impact Assessment; and Students & Young Professionals.

IAIA seeks a just and sustainable world for people and the environment. It provides the international forum to advance best practice and innovation in impact assessment and advocates for its expanded use for the betterment of society and the environment.

For more information, see www.iaia.org.

European Public Health Association

The European Public Health Association (EUPHA) is an international scientific organisation, bringing together 79 associations and institutes from 47 countries, with a clear interdisciplinary, integrative and cross-cutting approach towards public health. EUPHA seeks to improve health and well-being while narrowing health inequalities across Europe, facilitating an active and strong voice of all public health networks, and by strengthening the capacity of public health professionals. EUPHA supports its members, adding value to the efforts of stakeholders in regions and states, and in national and international organisations.

The Health Impact Assessment (HIA) section within EUPHA focuses on promoting the exchange of practical experience and expertise on HIA as a tool for implementing the 'Health in All Policies' principle and for addressing health inequalities in the formulations of policies, projects and programs. It intends to transform the health-research findings into improved policy and practice.

For more information, see https://eupha.org/.

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Foreword to ***Human health: Ensuring a high level of protection***

… the objective of [the Environmental Impact Assessment (EIA)] Directive [is] to ensure a high level of protection of the environment and of human health …
—From recital 41 of EU Directive 2014/52/EU, source (1).

The COVID-19 outbreak has … become the most severe pandemic in the last one hundred years. The public health crisis has led to a major economic crisis which will have serious consequences for societal well-being now and in the future.

The staggering impact of COVID-19 on our society and economy has abruptly brought public health back to the top of the policy agenda. COVID-19 mortality has a clear social gradient, which is a bleak reminder of the importance of the social determinants of health.
—From *Health at a glance, 2020*. Executive summary (2).

This reference paper provides health authorities with a guide to the EIA Directive to assist in navigating the EIA process.

The EIA Directive is a crucial tool for sustainable development (3). It applies to a wide range of projects in European Union (EU) Member States, including those co-financed by the EU through its Cohesion, Agricultural and Fisheries Policies. It also applies to projects funded by the financial institutions of the EU, which operate globally and beyond the 27 EU Member States.

EIA is *ex ante*: it refers to the future. It is a forward-looking instrument. EIA provides information about a project to a decision maker before any effects have occurred. This allows for environment and health to be hard-wired into the design of a project.

Ensuring a high level of protection of the environment and of human health requires appropriate consideration of the overlapping activities of health protection, health promotion, disease prevention and health services.

Prevention also looks into the future. It too is forward-looking. It typically leads to lower rates of morbidity and mortality as well as being cheaper and more efficient than dealing with adverse effects (4) and, by keeping people healthier, it reduces demand on health services.

In *Health at a glance, 2020* (2) the Organisation for Economic Cooperation and Development (OECD) and the EU give a biennial overview of the health status of EU citizens, including trends in life expectancy, the main causes of death, health inequalities, the occurrence of communicable and chronic diseases and mental health issues. Each of these can be linked to stressors in local communities, indeed, in 2016 the World Health Organization (WHO) estimated that environmental stressors are responsible for 12–18 % of all deaths in the 53 countries of the WHO Europe Region (5).

It is increasingly understood that sustainability is not simply a concern of the physical environment. In 2019 the European Commission identified opportunities and risks for the Sustainable Development Goals (SDGs) (6). For SDG 3 *good health and well-being* the opportunities include societal involvement and participatory politics, behavioural change, corporate social responsibility and prevention and health promotion. Threats include poverty, social and health inequalities, climate change and environmental risks, ageing population, unhealthy habits and health security threats.

To build on these opportunities, and to negate these threats, we need to work together and across sectors to develop evidence-based solutions that combine the application of science with local contextual knowledge. Indeed, achieving SDG 3 will only be possible if action in other sectors and settings is also advancing (7).

EIA brings stakeholders together. It requires joint work between developers taking projects forward, Competent Authorities and other decision makers, communities that may be affected for good or bad, academia and others. EIA can foster interagency working and whole-of-government approaches.

This 'multisectoral action' is recommended by organisations such as the WHO (8) and in European Commission and Joint Research Centre guidelines for sustainable urban development (9). The European Green Deal requires transformations across economy, society and environment (10).

This is central to the healthy and green solutions needed for recovery from COVID-19 (11), and to the WHO's strategic priority of promoting healthier populations with 1 billion more people enjoying better health and well-being (12). It is also central to achieving the SDGs (13).

The European Commission calls for responsible business conduct. It calls for policy coherence involving planning, evidence-based policies, inclusiveness, effectiveness, respect for subsidiarity and proportionality, and measurement and monitoring (6).

Impact assessment in general, and EIA in particular, plays an important role in meeting these vital and challenging goals.

The WHO supports impact assessment and names it as a tool for Health in All Policies (14). The WHO has supported the proper consideration of health in EIA and in Strategic Environmental Assessment (SEA) since the first Ministerial Conference on Environment and Health in 1990 (15) and also through diverse resolutions of the World Health Assembly. Guidance for health in SEA is available from the UNECE (16, 17).

This reference paper focusses on human health in EIA.

This reference paper is a collaboration between the International Association for Impact Assessment and the European Public Health Association.

It is a contribution to sustainable development and to ensuring a high level of protection of human health.

Ben Cave
Piedad Martín-Olmedo
Odile Mekel
and
Francesca Viliani
on behalf of the writing team

December 2020

1. A reference paper for health in Environmental Impact Assessment

1.1 The amended EIA Directive

1.1.1 Environmental Impact Assessment (EIA) is governed in the European Union (EU) by EIA Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (18), as amended by 2014/52/EU (1) (hereafter the 'EIA Directive'). Article 3 of the amended EIA Directive names human health among the topics to be addressed when conducting an EIA. The amended EIA Directive also includes issues that are relevant to human health, for example, climate change and vulnerability (exposure and resilience) to major accidents and/or disasters.

1.1.2 These amendments are relevant not only for European Member States but beyond EU borders through, for example, the policies of the European Investment Bank (19) and the European Bank of Reconstruction and Development (20).

1.1.3 The EIA Directive identifies various actors, including the Developer bringing forward the project application and the Competent Authority responsible for performing the duties arising from the EIA Directive.

1.1.4 This reference paper complements European Commission (EC) guidance on EIA (21-23) and regional and national guidance for health in EIA (for example, 24, 25-27). It complements guidance for Health Impact Assessment (for example, 28, 29). It builds on previous joint action between the International Association for Impact Assessment (IAIA), the European Public Health Association (EUPHA), and the WHO Regional Office for Europe (30) and on meetings hosted by WHO Regional Office for Europe (31) which identified opportunities for health in environmental assessment in different Member States. It is informed by international good practice (32-36).

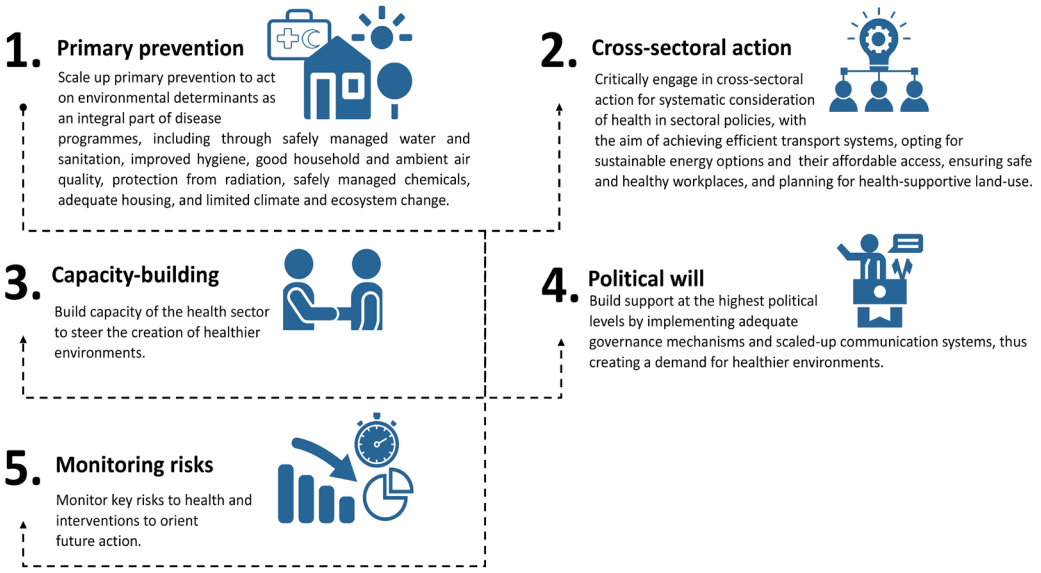
1.2 Aims

1.2.1 This reference paper provides health authorities with a guide to the EIA Directive to assist in navigating the EIA process. It provides principles and good practice for proportionately addressing health in EIA. Whilst this reference paper is structured around compliance with the EIA Directive, the principles and approaches have broad application to health in impact assessment globally.

1.2.2 This reference paper focusses on the process of EIA according to the EIA Directive. It contributes towards a consistent coverage of human health within an EIA and will assist health authorities in reviewing the coverage of health in EIA. It will assist other parties in addressing health in EIA.

1.2.3 This reference paper contributes to each of the strategies and the actions to combat environment-related disease as set out by WHO in Box 1-1.

Box 1-1: Strategies to combat environment-related disease



WHO actions

Leadership: provide leadership on environmental health matters and define policy positions, coordinate global and regional policy processes, and catalyse action for environmental health protection.

Capacity building: build capacity of, and strengthen, the health sector with knowledge and tools (for example Health in All Policies, health impact assessments) to engage with other sectors and provide leadership in health matters, and guide policies with health relevance.

Monitoring: guide, define and monitor exposure, health indicators and interventions to measure results and help track attainment of the Sustainable Development Goals (SDGs).

Knowledge generation: ensure knowledge generation and synthesis and provide evidence-based guidelines on health impacts of sustainable strategies, technologies and interventions.

Emergency response: provide timely and effective response to environmental health emergencies.

Reproduced from the World Health Organization (37)

Process

1.2.4 The process by which this reference paper has been prepared is set out in Box 1-2.

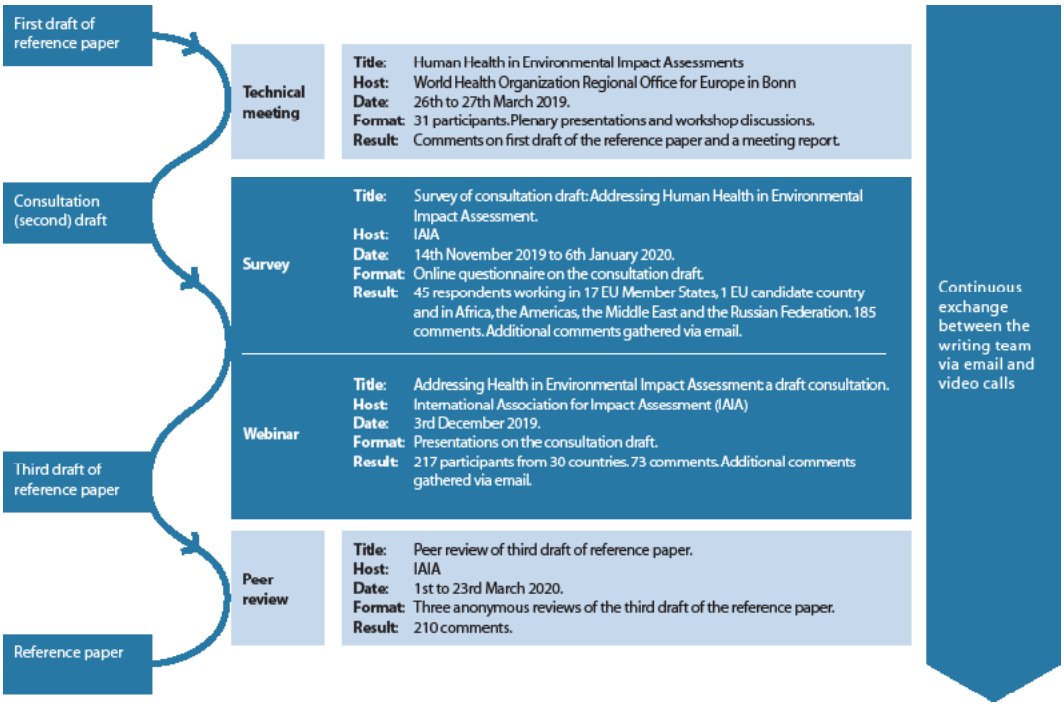
Box 1-2: Preparing the reference paper

In September 2018 IAIA and EUPHA initiated a joint action for supporting practitioners and other stakeholders through a reference paper to better address human health in EIA.

The WHO Regional Office for Europe held a technical meeting on 26-27th March 2019. Participants discussed a first draft of the reference paper. Comments were also submitted after the meeting.

A second draft was issued in October 2019. This was discussed at the EUPHA conference (Marseilles, November 2019). An online survey was conducted to gather comments on the second draft. This ran from 14th November 2019 to the 6th of January 2020. In December 2019 IAIA held a webinar to introduce the second draft and to invite comment. Comments were also sent by email.

All comments were taken into account in preparing a third draft which was submitted to IAIA for peer review. The peer review comments were used to update and finalise the reference paper.



Structure

1.2.5 This reference paper is not meant to be read right through in one sitting but to provide a guide to each stage of the EIA process. The reference paper falls into two main parts and it then has a set of technical appendices.

1.2.6 The first part of the reference paper provides key concepts and definitions.

- Section 2 opens with definitions of key concepts relating to health, environment and the EIA Directive.
- Section 3 defines EIA, the parties that are involved in EIA and its stages. This section also defines human health and population. This is to address the immediate need for health professionals to become familiar with, and to engage in, the EIA process.
- Section 4 sets out principles to be considered when integrating human health in EIA.

1.2.7 The second part of the reference paper works through the stages of EIA describing the process as set out by the EIA Directive and addressing methodological challenges for human health within EIA:

- Section 5: screening
- Section 6: scoping
- Section 7: EIA Report - assessment
- Section 8: consultation – stakeholder engagement
- Section 9: monitoring

1.2.8 In Section 10, the reference paper looks at the competence and the expertise needed to conduct and to review health assessment within EIA. This brings the main body of the reference paper to a close.

1.2.9 The technical appendices provide additional information as well as tables and checklists for the stages of the assessment.

2. Key concepts

2.1.1 Definitions of the concepts and the terminology that underpin 'human health' and EIA are provided in Table 2-1. These are important to understand the process of EIA and to determine what is an appropriate and acceptable consideration of human health effects within EIA.

2.1.2 The sources for each definition are provided so that further information can be sought.

2.1.3 The terms explained in Table 2-1 are printed in ***bold italics*** the first time they appear in the main text after this point.

Table 2-1: Key concepts for health in EIA

Term	Definition
The Competent Authority	is the authority which the Member States designate as responsible for performing the duties arising from the Directive (22).
Competent Expert	is not defined by the EIA Directive. Developers need to ensure that the EIA Report is prepared by Competent Experts. Different systems are used in different Member States to ascertain the competence of EIA experts. (From source 22). See Sufficient Expertise below.
Determinants of health	see health determinants below.
The Developer	is the applicant for Development Consent on a private project or the public authority which initiates a project (22).
Development Consent	is the decision of the Competent Authority or Authorities which entitles the Developer to proceed with the project (22).
Disease prevention	covers measures to prevent the occurrence of disease, such as risk factor reduction, and to arrest its progress and reduce its consequences once established (38). There are three levels of prevention: primary - improving the overall health of the population; secondary - improving early detection of illness; and tertiary - improving treatment and recovery. Each has an important role to play. Upstream approaches, e.g. primary prevention, tend to be cheaper and more efficient, and entail lower morbidity and mortality rates (4).
Epidemiology	is the study of the distribution, and determinants, of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems (39).
The EIA Report	is the document prepared by the Developer that presents the output of the assessment (22). Prior to the 2014 amendment to the Directive this document was known as an Environmental Statement and, at the time of writing, this term continues to be used by EIA practitioners.
The environment as defined by the amended EIA Directive	is made up of: population and human health; biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; land, soil, water, air and climate; and material assets, cultural heritage and the landscape (set out in Article 3 of the EIA Directive).
Environmental Impact Assessment as defined by the amended EIA Directive	is a process to examine the likely significant effects of a project whereby the Developer prepares an EIA Report, this and any other information is consulted upon and examined by the Competent Authority which then forms a reasoned conclusion. (Set out in Article 1(2)(g) of the EIA Directive. See Box 3-1 for the verbatim definition.)
Equity in health	refers to fair, just and unavoidable differences in exposure to health risk factors and status, among groups of people. As an example, significant differences in mortality or environmental risk exposure between low and high-income groups would be considered unfair and avoidable, and therefore considered an equity challenge. (From source 40.)

Term	Definition
Health and human health	is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (41).
The health authority	is defined in this reference paper as the local, regional or national health department that by reason of their specific health competencies and responsibilities is likely to be concerned by the health effects of the implementation of the project.
Health determinants	are biological, behavioural, socio-economic, cultural or environmental factors which contribute to the health status of individuals or populations (adapted from source 38). Figure 3-2 on page13 is a diagram of the determinants of health. Box 3-3 on page 14 looks at the relation between health determinants and risk factors.
Health in All Policies (HiAP)	is an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies and avoids harmful health impacts in order to improve population health and health equity. It improves accountability of policymakers for health impacts at all levels of policy-making. It includes an emphasis on the consequences of public policies on health systems, determinants of health and well-being (42).
A **health indicator**	is a characteristic of an individual, population, or environment which is subject to measurement (directly or indirectly) and can be used to describe one or more aspects of the health of an individual or population (quality, quantity and time) (38).
Health inequality	is a descriptive measure of difference in exposure to health risk factors, and to differences in health status, between groups of people (40).
A **health outcome**	is a change in the health status of an individual, group or population which is attributable to a planned intervention or series of interventions, regardless of whether such an intervention was intended to change health status (38).
A **health priority**	is defined in this reference paper as a determinant of health or risk factor that has been identified, and given priority, by public health teams at local, regional, national or international levels.
Health promotion	is the process of enabling people to increase control over, and to improve, their health (43). It focusses on population health and well-being by addressing inequalities and the broader social and environmental determinants … action is needed across many sectors to create healthy environments and to reduce inequalities and risk factors in social and environmental determinants of health (4).
Health protection	consists of policies and activities based on legislative or other means designed to promote healthier environments, within which healthy choices are easier to make (44). It makes use of intelligence from surveillance and monitoring to develop services that protect health from communicable diseases and environmental risks and hazards (4).
The **health sector**	consists of organised public and private health services, health departments and ministries, health-related non-government organisations and community groups and professional associations (adapted from source 38).
Health services	include health promotion, disease prevention and diagnostic, treatment and care services (adapted from source 38).
Health status	is a description and/or measurement of the health of an individual or population at a particular point in time against identifiable standards, usually by reference to health indicators (38).

Term	Definition
Impact assessment	is the process of identifying the future consequences of a current or proposed action. The 'impact' is the difference between what would happen with the action and what would happen without it (45).
Mental health	is a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community (46).
Mitigation	describes measures that are envisaged to avoid, prevent or reduce any identified significant adverse effects on the environment (22).
Pathway	is the route by which changes to determinants of health lead to changes in health outcomes (47).
Population	is defined in this reference paper as any group of people with shared characteristics. This could be the entire population of an area, or a population defined by relevant characteristics that make them more vulnerable to a project change e.g. age or socio-economic status. Health in EIA considers the effects on such populations rather than on individuals.
Population health	is the health outcomes of a group of individuals, including the distribution of such outcomes within the group (48).
Public health	is a theoretical and practical discipline in its own right and is the science and art focussing on: 1. population health; 2. human systems and interventions intended to improve population health; and 3. interactions between these two systems (adapted from source 44).
A **Project**	is the execution of construction works or of other installations or schemes, and/or other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources (22). The assessment of a project is typically divided into the consideration of effects during Construction, Operation and Decommissioning.
A **risk factor** for health and/or disease	is social, economic or biological status, behaviours or environments which are associated with, or cause, increased susceptibility to a specific disease, ill health, or injury (38). Box 3-3 looks at the relation between health determinants and risk factors.
The **Reasoned Conclusion**	is the explanatory statement made by the Competent Authority on the significant effects of the project on the environment. The Reasoned Conclusion is based on the Competent Authority's examination of the Developer's EIA Report, the consultation responses, the Developer's application and, where appropriate, the results of its own supplementary examination (adapted from source 22).
Scoping	is the process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process (22).
The **Scoping Opinion**	is the Competent Authority's decision on the Scoping process (22).
Screening	is the process of determining whether a project listed in Annex II of the EIA Directive, or referred to in case law of the Court of Justice of the European Union, is likely to have significant environmental effects (adapted from source 22).
Screening Decision	is when the Competent Authority makes a decision about whether EIA is required stating the reasons for either requiring or not requiring EIA and this should be made available to the public (22).
Significance	relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the project in question (21, 23).

Term	Definition
Stakeholders	are people involved in, or affected by, a proposed project drawn from public, private and voluntary sectors and the communities or groups affected (49).
Sufficient Expertise	in the relevant field of the project concerned, is required for the purpose of its examination by the Component Authorities in order to ensure that the information provided by the Developer is complete and of a high level of quality (Recital 33, EIA Directive). See Competent Expert above.
Vulnerable groups	are not vulnerable *per se* but are vulnerable in a given context and can include groups such as ethnic minorities, migrants, disabled people, the homeless, the poor, those struggling with addiction and substance abuse, and isolated elderly people (adapted from source 50).
Well-being	is multi-dimensional and incorporates each, and all, of the following (51): i. Material living standards (income, consumption and wealth); ii. Health; iii. Education; iv. Personal activities including work; v. Political voice and governance; vi. Social connections and relationships; vii. Environment (present and future conditions); viii. Insecurity, of an economic as well as a physical nature. It is subjective and is typically measured with self-reports (52).

3. Environmental impact assessment

Key messages

EIA follows a structured process and it is a legal requirement for certain types of public and private ***projects***.

EIA informs an application for consent to proceed with a project.

EIA is required where the EIA Directive requires it (Annex I projects), or when a ***Competent Authority*** believes a proposed project is likely to have a significant effect on the ***environment***, including human ***health*** (Annex II projects).

EIA is required to identify, describe and assess in an appropriate manner the 'likely significant effects' of a project on human health and the environment.

Health in EIA requires cross-sectoral working by both the ***Developer*** and by the Competent Authority. Good practice is to involve the ***health authority*** throughout the EIA.

3. 1 What is EIA?

3.1.1 EIA is the form of ***impact assessment*** that is conducted on projects that are likely to have a significant effect on the environment. It contributes to a high level of protection of the environment and human health. This is set out in Recital 1 and Recital 41 in the preamble to EU Directive 2014/52/EU, source (1). This requires appropriate consideration of the overlapping activities of ***health protection***, ***health promotion***, ***disease prevention*** and ***health services***.

3.1.2 EIA is applied to a wide range of public and private projects. These are typically large and include:

- infrastructure projects, such as: power stations, industrial estates, railways, airfields, roads, ports, inland waterways, flood-relief works, dams, pipelines, coastal and marine works or groundwater abstractions;
- industry projects in the agricultural, extractive, energy, metals, minerals, chemicals, production and foods sectors; and
- other projects, such as waste management, treatment or disposal facilities, projects related to the leisure and tourism industries and urban development e.g. housing/ residential development.

3.1.3 The complete list of project types that may require an EIA is set out in Annex I and Annex II of the EIA Directive (2011/92/EU (18)). Case law from the Court of Justice of the European Union (CJEU) (53, 54) has indicated that the EIA Directive has a 'wide scope and broad purpose' and thus its decisions have led to a wider range of projects being considered than those directly set out in Annex I and II. For example, the following types of project are not listed in the EIA Directive, but are required to undergo EIA, according to extant CJEU case law: solar energy projects, desalination projects, demolition projects, and recycling centres.

3.2 Who conducts an EIA and what are the stages?

3.2.1 Box 3-1 sets out key outputs of the EIA process and in doing so defines EIA as per the amended EIA Directive. This is followed by Figure 3-1 which shows the EIA process and entry points for health authorities.

Box 3-1: The EIA process as set out in Article 1(2)(g) of the EIA Directive

For the purposes of this Directive, the following definitions shall apply:

[...]

(g) 'environmental impact assessment' means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

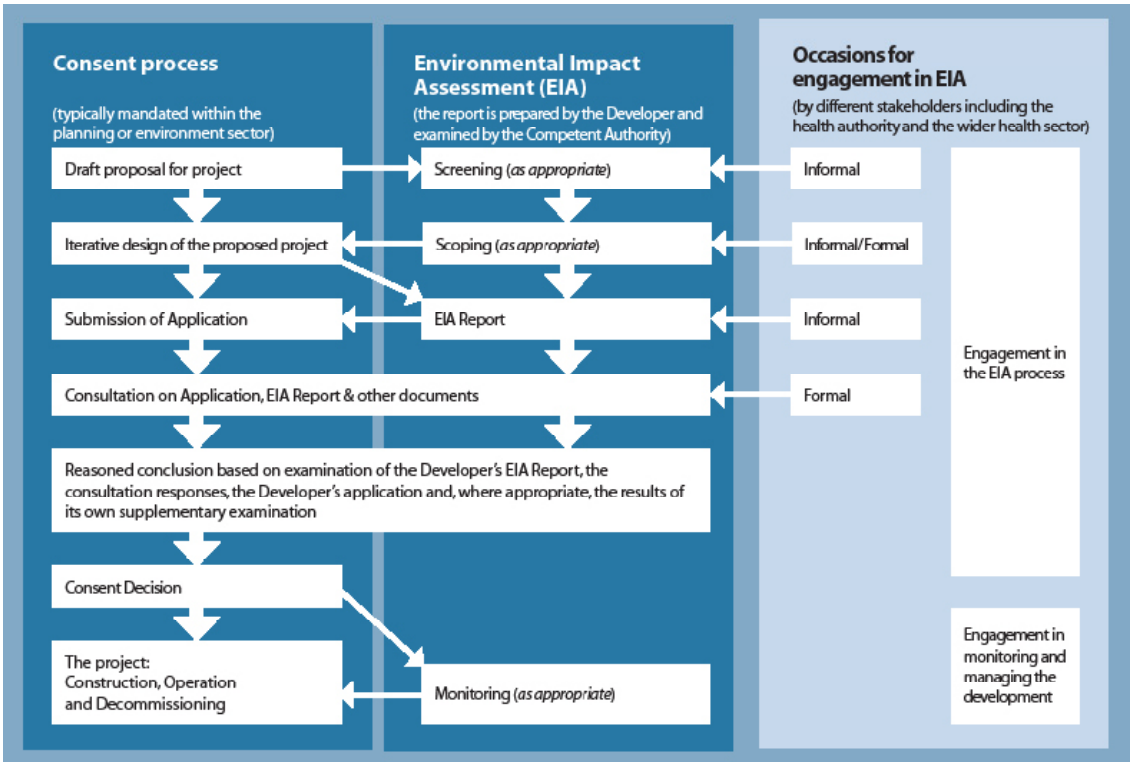
(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.

From Directive 2011/92/EU as amended by Directive 2014/52/EU (1)

Figure 3-1: The EIA process and entry points for health authorities



Adapted from Cave et al. (27)

3.2.2 Many of the responsibilities in the EIA process fall to the Competent Authority. The ***EIA Report*** is prepared by the party that is seeking consent for a project. This party is referred to as the Developer. The EIA Report is examined by the Competent Authority which then reaches a ***reasoned conclusion*** based on its examination of the Developer's EIA Report as well as the consultation responses, the Developer's application and, where appropriate, the results of its own supplementary examination.

3.2.3 Figure 3-1 shows how the process for getting consent for a project is linked to the EIA process. The left-hand column shows the consent process which is typically mandated through the planning or the environment sector. The middle column shows the stages of the EIA process and the fact that the EIA Report will be prepared by the Developer and examined by the Competent Authority. The right-hand column shows informal and formal opportunities for ***stakeholders*** to engage in the EIA process and it shows that health authorities, and the wider ***health sector***, can take up these opportunities. Early and consistent engagement is recommended as it allows for a more constructive dialogue.

3.2.4 In summary, EIA informs a decision about consent for a project. It evaluates the likely direct or indirect significant environmental impacts of planning decisions within a project on factors including ***population*** and human health (Art. 3 (1)).

See Figure 5-1 on page 18 for a cartoon summarising good practice and key activities for screening.

3.25 Figure 3-1 shows how the design process is closely linked to the assessment. The assessment informs the design and thereby identifies measures to avoid or reduce negative effects. These measures may then be the subject of negotiation between the Developer and the Competent Authority and may become commitments monitored during the construction, operation and decommissioning phases of a project.

See Figure 6-1 on page 24 for a cartoon summarising good practice and key activities for scoping.

3.2.6 The mitigation hierarchy should be used. In the first instance seek to prevent or avoid adverse effects, if this is not feasible then minimise or reduce adverse effects. Compensation is a last resort. It is good practice, though not an EIA Directive requirement, to include measures that enhance positive effects.

See Figure 7-1 on page 31 for a cartoon summarising good practice and key activities for assessment.

3.2.7 In some cases, health and other issues may already have been addressed at a strategic level for example through the Strategic Environmental Assessment of the plans and programmes that set the framework for granting consent. Apart from making appropriate links to those assessments, the EIA need not assess such issues further. In other cases, issues raised at the strategic level may need addressing through project level EIA. The strategic assessments can therefore inform EIA ***screening*** and ***Scoping Opinions*** (26).

3.3 What factors does EIA cover?

Table B-2 on page 65 provides a scoping tool for health determinants.

3.3.1 Box 3-2 lists the factors to be identified, described and assessed in an EIA as set out in Article 3 of the EIA Directive. The Directive does not define these factors.

The assessment of cumulative effects is covered on page 34.

3.3.1 This reference paper provides a definition for human health and below it looks at the way human health is linked to population. The EIA Directive requires the interaction of the factors in Article 3 to be considered.

Box 3-2: Text of Article 3 in the amended EIA Directive 2014/52 EU

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
   (a) population and human health;
   (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
   (c) land, soil, water, air and climate;
   (d) material assets, cultural heritage and the landscape;
   (e) the interaction between the factors referred to in points (a) to (d).
2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.

Population

3.3.3 In EIA, *population* is typically covered through the consideration of socio-economic and/or social factors, e.g. in the socio-economics chapter of an EIA Report. This can include (55):

- economic impacts such as local and regional employment and expenditure opportunities; and
- social effects such as the impact of a construction workforce on local services, and impacts on quality of life and ***well-being*** issues, often reflected in social problems such as crime, poor health, community stress and conflict.

3.3.4 There may also be issues with regards to participation, human rights and environmental justice. These impacts can be significant in terms of whether a new project is considered acceptable by people living in that area (55).

3.3.5 In the context of EIA, *population* and *human health* are two distinct factors that each need to be addressed, e.g. in the health chapter and in a separate but cross-referenced socio-economics chapter of an EIA Report. It is good practice to ensure that the relation between these two factors is considered in the assessment. The EIA Directive also requires the interaction between each of the factors listed in Article 3 to be examined (see paragraph 1e in Box 3-2). The text of Article 3 places *population* and *human health* together. We note this juxtaposition because ***population health*** is a field of study in its own right and because the term *population health* is close to ***public health***. Both *population health* and *public health* characterise the recommended approach to *human health* in EIA. These terms are defined in Table 2-1.

Human health

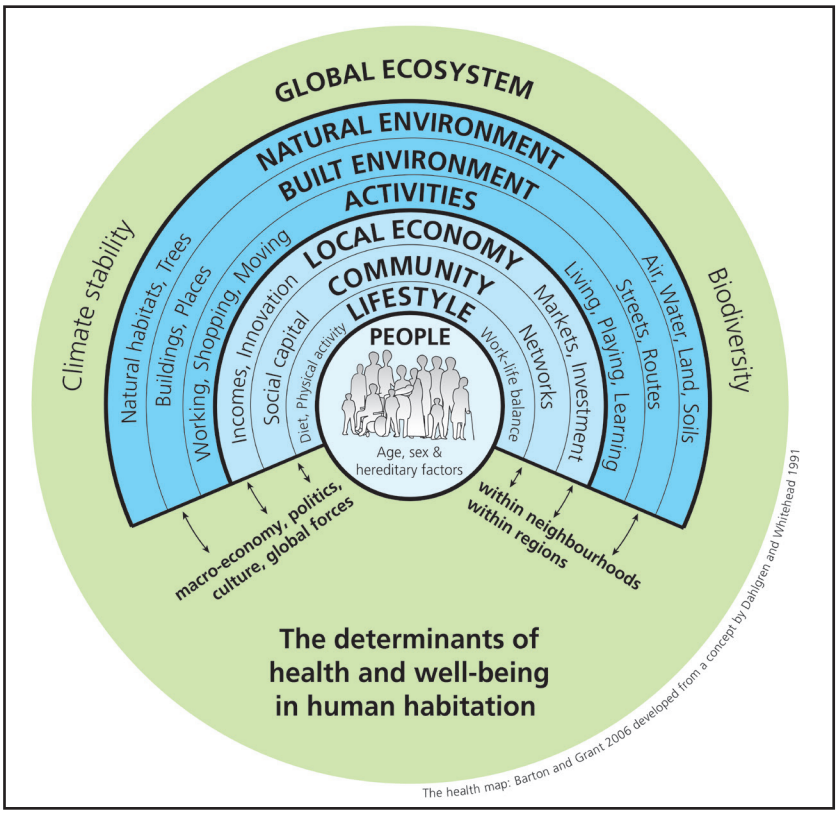
3.3.6 The EIA Directive does not define human health. Its references to human health are typically examples from the physical environment, such as the Annex III references to water contamination or air pollution (see also footnote 2, page 37 of source 23). These ***risk factors*** could be important for any given project and they need to be considered.

3.3.7 This reference paper uses the definition of human health as set out in the constitution of the WHO. This follows good practice for health in impact assessment (24-36). The WHO defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (41). This definition has two parts.

- The first part emphasises how human health is a positive concept that encompasses physical health, ***mental health*** and social well-being.
- The second part of the WHO definition emphasises the importance of reducing disease and infirmity.

3.3.8 Addressing health in the short-, medium- and long-term means reducing ***health inequality*** between population groups. This requires measurement and monitoring. Addressing health means working towards ***health equity*** so that unjust and avoidable differences are eliminated. This requires incorporating social and subjective understanding into assessments and holding meaningful dialogue with people who are affected by, or who may be vulnerable to, changes from a project.

Figure 3-2: The determinants of health and well-being in human habitation



Barton and Grant (56) developed from the model by Dahlgren and Whitehead (57) and accessible in Dahlgren and Whitehead (58)

3.3.9 Addressing health means tackling the complex issues in society that span different sectors such as public services; transport; housing; economy. Figure 3-2 above shows how these environmental, social and economic aspects are known collectively as ***health determinants***. Box 3-3 looks at the relation between health determinants and risk factors.

3.3.10 WHO strategies to combat environment related disease, as shown in Box 1-1, link actions that are the domain of national, regional and municipal government with those of the health sector. Action is needed at all levels, from local to national to global. Cross-sectoral action is vital. The over-arching term for this is public health and in the EU this is a competence for Member States.

3.3.11 As noted above, EIA contributes to a high level of protection of the environment and human health. This requires appropriate consideration of the overlapping activities of health protection, health promotion, disease prevention and health services.

3.3.12 The health sector is responsible for health services and a key advocate for, and source of knowledge on, each of the other activities. To be successful health protection, health promotion and disease prevention rely on collaboration between the Developer and sector authorities and stakeholders in terms of the planning, design and management of the project. The type of project will determine the sectors and stakeholders to be involved, e.g. transport authorities or energy regulators. Furthermore, health services have to be able to cope with any changes resulting from the project and will need re-direction and re-allocation of resources to be able to adequately deal with the new situation post-development. The EIA identifies and generates the evidence for appropriate actions to these ends (59).

3.3.13 The comprehensive definition of health does not restrict the scope of human health in EIA to the physical environment. It acknowledges the vital role played by social and economic factors. Strengthening the focus on promoting health and on preventing disease helps to reduce the burden of many diseases and to avoid a large number of premature deaths across all EU Member States (60).

Box 3-3: Health determinants and risk factors

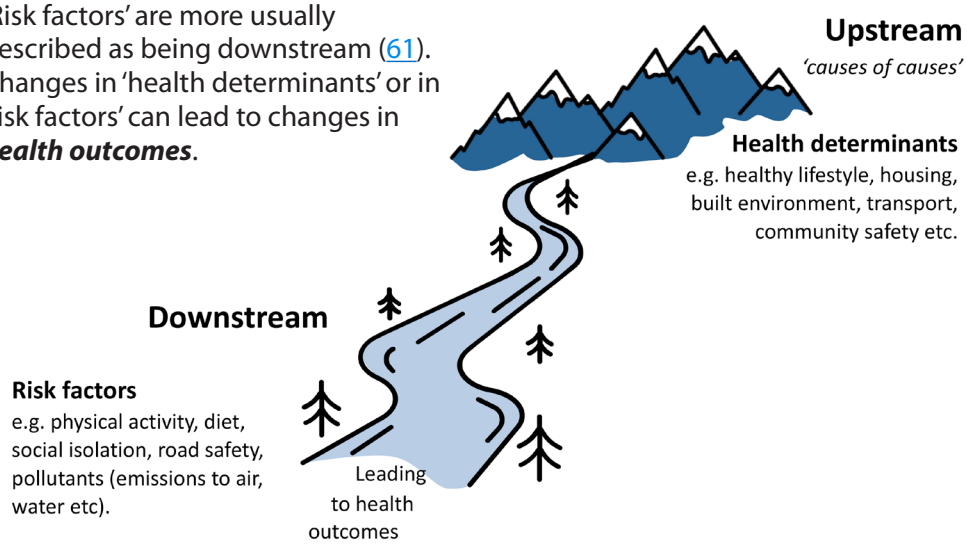
In Section 2 we provide the definitions for 'health determinants' and 'risk factor' that are used throughout the reference paper.

The terms 'health determinants' and 'risk factors' are sometimes used differently by specialisms within the health sector, such as risk assessors and health promotion practitioners. In some contexts, the two terms can overlap.

In this reference paper the focus is on aspects that may be subject to change due to any given project, and which are thus of interest to EIA.

'Health determinants' shape the distribution of, or level of exposure to, a broad range of 'risk factors' in the population (61). Health determinants' are described as being upstream (61, 62) with those operating at the highest levels also known as the 'causes of causes' (62). In general, 'health determinants' place the responsibility for health and illness beyond the individual's control (62).

'Risk factors' are closer to, but not necessarily within the control of, the individual (62). 'Risk factors' are more usually described as being downstream (61). Changes in 'health determinants' or in 'risk factors' can lead to changes in ***health outcomes***.



A project may cause one or more 'risk factors' to change within the analysis of a particular 'health determinant'.

Table B-2 provides 'health determinants' to scope in or out and considerations, including 'risk factors', to discuss in the EIA Report as relevant.

3.3.14 Box 3-4 summarises the ***health status*** of EU citizens, including trends in life expectancy, the main causes of death, health inequalities, the occurrence of communicable and chronic diseases, and mental health issues (2). Each of the factors in Box 3-4 can be linked to stressors in local communities, indeed, in 2016 the WHO estimated that environmental stressors are responsible for 12–18 % of all deaths in the 53 countries of the WHO Europe Region (5).

Box 3-4: Health status of EU citizens

Life expectancy: Life expectancy has increased in EU countries over the past decades, but progress has slowed in recent years in many countries and inequalities persist by gender and socio-economic status (2).

Main causes of mortality: The main causes of death in EU countries are circulatory diseases and various types of cancer, followed by respiratory diseases and external causes of death. The cost of circulatory diseases to the EU economy was estimated at EUR 210 billion in 2015.

Infant health: Poor living conditions and other socio-economic factors affect the health of mothers and newborns, but the quality of health care can greatly reduce the number of infant deaths, particularly by addressing life-threatening issues during the neonatal period (i.e. the first month of life).

Vaccine-preventable diseases: Communicable diseases, such as measles, hepatitis B and many others, pose major threats to the health of European citizens, although vaccination can efficiently prevent these diseases.

Childhood and adolescent health: Childhood and adolescence are fundamental phases in human development, when young people develop knowledge and skills to deal with critical aspects of their health, and are also the period during which many mental health problems first emerge … Mental health problems can be associated with major risk factors, such as heavy episodic drinking, tobacco or illicit drug use, unhealthy nutrition and lack of physical activity. Behavioural risk factors such as excessive drinking or drug use can both worsen adolescents' mental health, and be used as a coping mechanism in the absence of more effective mental health support, as well as contributing to lasting effects on physical health across the life course (e.g. circulatory diseases and some cancers).

Adult mental health: In 2015, the overall costs related to mental ill-health are estimated to have exceeded 4% of GDP across the 28 EU countries which equates to more than EUR 600 billion (60). This highlights the need for greater efforts to prevent mental ill-health and to provide timely and effective treatments when it occurs.

Chronic diseases and disabilities among older people: Life expectancy has increased greatly in EU countries over the past few decades, but many years of life in old age are lived with some chronic diseases and disabilities. The EU approach to addressing the challenge of chronic diseases involves an integrated response focusing on prevention across sectors, combined with efforts to strengthen health systems to improve the management of chronic conditions.

Diabetes prevalence: Diabetes prevalence among adults (diagnosed and age standardised) was 6.2% on average in EU countries in 2019. The economic burden of diabetes is substantial. The health expenditure allocated to treat diabetes and prevent complications are estimated at about EUR 150 billion in 2019 in the EU, with the average expenditure per diabetic adult estimated at about EUR 3,000 per year (IDF, 2019). Type 2 diabetes is largely preventable. A number of risk factors, such as overweight and obesity, nutrition and physical inactivity, are modifiable through effective preventive strategies and lifestyle changes.

From OECD and EU (2, 60).

4. Principles for human health in environmental impact assessment

Key messages

Good practice in addressing human health within EIA, and the public health perspective, is underpinned by four principles: a comprehensive approach to health, equity, proportionality and consistency.

4.1.1 The four principles below carry equal weight. Their application, including the resolution of any tensions between them, should be based on the best available evidence and on sound judgment. Sources: Informed by (1, 26, 32, 33, 63).

Comprehensive approach to health

4.1.2 Physical, social and mental health and well-being are determined by a broad range of factors from all sectors of society. Consideration of these wider determinants of health and their inter-relationships should inform the assessment of human health. Inter-sectoral collaboration, between public health and other sectors, should be a feature of coherent coverage of health in EIA.

Equity

4.1.3 The distribution of changes, that are attributable to the project, in health outcomes across the population should be considered, paying specific attention to ***vulnerable groups***. Where changes that are unfair and avoidable are identified appropriate measures should be included to avoid or reduce adverse health outcomes, or to improve health and other outcomes for vulnerable groups.

Proportionality

4.1.4 Human health is a broad topic so its assessment should be carefully scoped. ***Scoping*** should focus on whether the potential impacts are likely to be significant. Effort should then focus on identifying design changes to tackle adverse health effects and to enhance potential health benefits and to securing commitment to these changes. The assessment findings should be presented in a concise and precise manner, giving appropriate weight to health as a factor that influences the project.

Consistency

4.1.5 The assessment process should follow an acceptable, explicit logical path and retain common sense in applying relevant guidance. As policy and emerging evidence can be in conflict, the assessment, its process and its conclusions, should be transparent and in accordance with up-to-date policy, guidance and scientific consensus. The assessment should show awareness of good practice in previous impact assessments of human health (including stand-alone HIAs). The reporting of health in EIA should be amenable to auditing and review processes to confirm legislative compliance and appropriate alignment with guidance, including these principles. However, consistency does not imply unquestioning adherence to guidance and precedence at the expense of local context and/or the need for innovation. Divergence from accepted practice should however be explained.

5. Screening

Key messages

Screening is the process of determining whether a project listed in Annex II of the EIA Directive, or referred to in case law of the Court of Justice of the European Union, is likely to have significant environmental effects.

Screening is the process that is used to determine whether an EIA is, or is not, required. The Competent Authority undertakes screening. This is informed by specific criteria and by information about the project. Project information is provided by the Developer. Health authorities may informally advise on screening.

The term *likely significant effect* is introduced at this stage. ***Significance*** relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the Project in question.

At the screening stage the task is to determine a simple 'yes' or 'no' answer, with brief justification, as to whether a project is likely to significantly affect health at a population level. This means reaching a preliminary conclusion as to whether the project is consistent with providing 'a high level of protection to human health'.

At screening, the level of detail may be low and the level of uncertainty may be high.

Where health is likely to be significantly affected by a project then it should be central to case-by-case Screening Decisions.

5.1 What is it?

5.1.1 The screening process is the formal step that determines whether a proposed project is required to be subject to the EIA process or not.

5.1.2 The Competent Authority undertakes screening, determining either that:

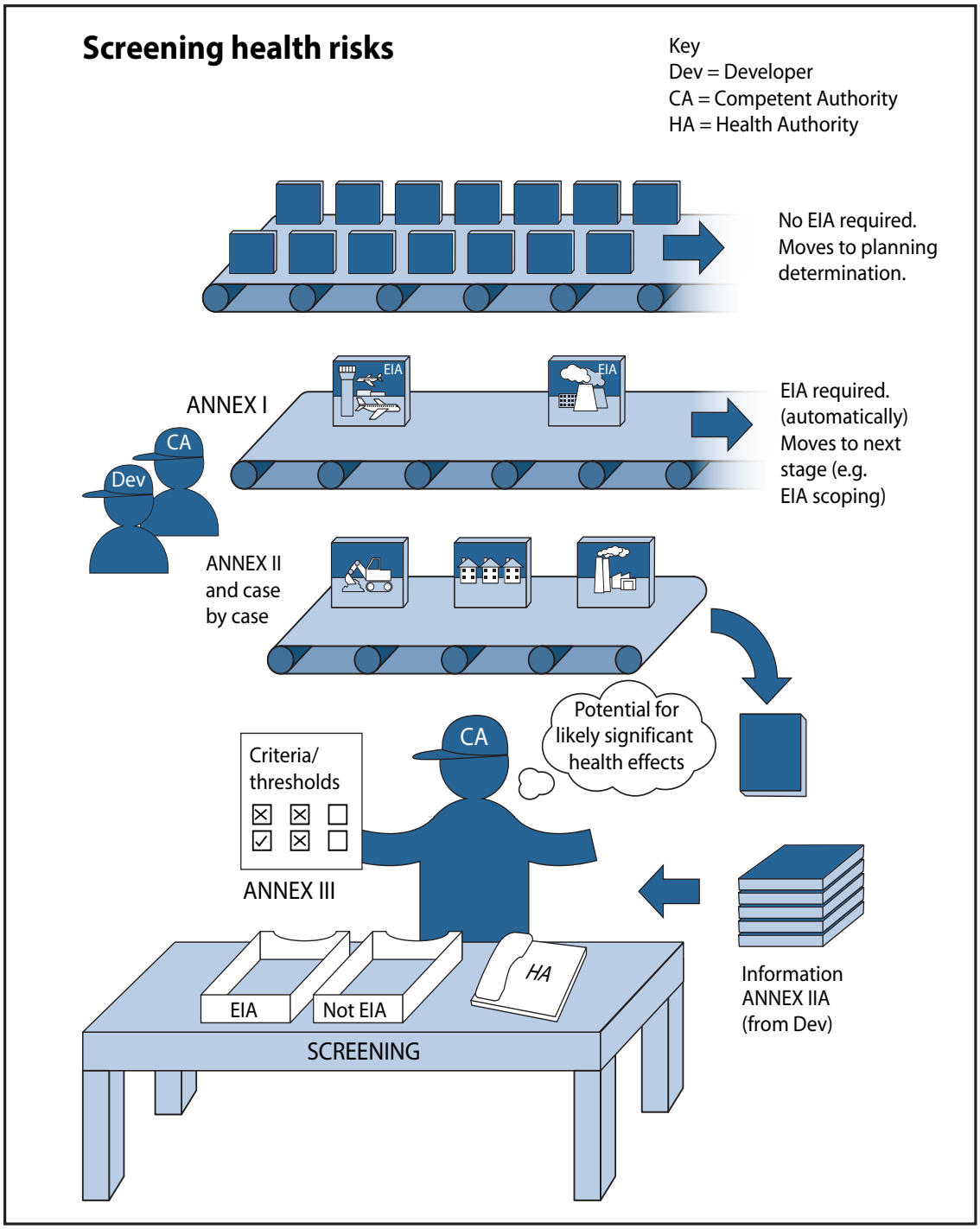
- an EIA is not required; or
- the full EIA process must be completed and an EIA Report must accompany the application.

5.1.3 At the screening stage, there are gaps in information, so the analysis is preliminary. The health authority, if consulted, can advise in broad terms on whether the project activities and the resulting effects on determinants of health are likely to lead to significant changes in population health outcomes.

5.1.4 When it is clear that an EIA is required, a formal screening procedure between the Developer and Competent Authority is not always required.

5.1.5 Figure 5-1 summarises key health related activities and good practice during EIA screening.

Figure 5-1: Screening, key activities and good practice



What is a significant effect for human health in EIA?

5.1.6 The EIA Directive requires *likely significant effects* to be assessed. A determination of *significance* should be based on professional judgement and best available evidence. It means that a given effect is considered important, desirable or acceptable (21, 23). It is worth noting that in most cases, evidence on health effects and their significance is incomplete. This can lead to differences in public, political and expert opinions. The way in which a decision is reached should be transparent.

5.1.7 The use of *significance* in this reference paper, and in EIA, is distinct from *statistical significance*. Statistical significance indicates whether an effect is due to chance or to a specific factor of interest.

5.1.8 Significance is an overarching concept that is relevant to all stages of EIA. The granularity with which significance can be determined increases as the EIA progresses from screening, to scoping, assessment and examination.

5.1.9 From the health perspective, the judgment made at screening is a simple 'yes' or 'no' as to whether the project is likely to significantly affect health. This judgement is usually made without reference to supporting studies and a brief justification is provided. Screening therefore provides a preliminary conclusion as to whether the project is consistent with providing 'a high level of protection to human health'. This wording is based on the purpose of EIA as described in Recital 41 of the preamble to Directive 2014/52/EU.

5.1.10 Screening can be carried out with reference to pre-defined criteria, or to thresholds set by national legislation. These may not include a specific health criterion so health may not feature explicitly within the screening process or decision. For example, a project may require EIA because it is over a certain size or scale. The decision will turn on the scale of the project rather than its implication for health.

5.1.11 Screening can also be done on a case-by-case basis. Here it is relevant to understand what a significant health effect means. While detail does not need to be articulated, the thought process around health significance should take into account:

- physical, social and mental health and well-being of current and future populations, including vulnerable groups and those who would be most affected by the project;
- health inequalities, healthy lifestyles, safe and cohesive communities, socio-economic conditions including education and employment, environmental conditions and health and social care services; and
- the importance, desirability or acceptability (21) for population health.

5.1.12 In line with proportionate screening, only the likelihood of clearly important or unacceptable changes to population health should screen a project in for EIA on health grounds. Whilst the focus is on 'risks to human health', this could extend to the opportunity cost if health benefits differ substantially between unresolved alternatives within the project.

5.1.13 The ***Screening Decision*** justification may broadly link the most relevant project features, through the most relevant health determinants, to the most relevant health outcomes. For example, a significant health effect may arise from fossil fuel combustion altering air quality conditions and inducing an increase in cardiovascular and respiratory diseases.

5.1.14 The screening justification referring to health does not need to be exhaustive of all the ways health may be affected. Similarly, if health is not explicitly considered during screening there are no subsequent restrictions on the way that health is considered at the scoping stage. Health significance is discussed in more detail in the scoping and assessment stages of this reference paper.

5.2 Process

Step 1: When is screening required?

5.2.1 EIA is mandatory if the project is the type of development that is included in EIA Directive Annex I. In this situation screening is not undertaken.

5.2.2 EIA screening is required in relation to EIA Directive Annex II developments, or where referred to in case law of the Court of Justice of the European Union, usually supported by thresholds set by Member States' national legislation on EIA, which may include special circumstances for environmentally sensitive areas. These decisions on whether an EIA is required are determined at the Member State level, based on whether significant environmental effects are likely to occur. In these cases, the information required is set out in national legislation transposing EIA Directive Annex IIA, informed by selection criteria set out in EIA Directive Annex III.

5.2.3 Refer to the applicable national legislation to determine whether the proposed project should undergo screening. Check whether the project is included in a list in national legislation that corresponds to the EIA Directive's Annex II. As noted in paragraph 3.1.3, on page 10, decisions made in the Court of Justice of the European Union have added to the types projects required to undergo EIA and expanding upon those directly set out in Annex I and II.

Step 2: Thresholds and criteria

5.2.4 EIA Directive Annex III requires that "*The characteristics of projects must be considered, with particular regard to: … the risks to human health (for example due to water contamination or air pollution)*".

5.2.5 As noted in the preamble to EIA Directive 2014/52/EU, the screening procedure should ensure that EIA is only required for projects likely to have significant effects. The preamble also notes that the EIA Directive Annex III criteria should be adapted and clarified as appropriate.

5.2.6 Permission cannot be granted for an EIA Directive Annex II project (as transposed into national legislation) unless it has been screened for likely significant effects on the environment. This screening is based on the criteria in Annex III which are presented under the following headings:

- characteristics of projects;
- location of projects; and
- characteristics of the potential impact (including the risk to human health).

5.2.7 Thresholds and/or criteria set by national legislation are intended to ensure that every project that is likely to have significant effects on the environment, including human health, is subject to an EIA, and that those that are not likely to have significant effects on the environment, including human health, are not subject to an EIA. National legislation will determine the relevant thresholds/criteria for a project. There is usually a 'catch-all provision' so that a Competent Authority is able to decide on a case-by-case basis whether EIA is required for an EIA Directive Annex II project.

Step 3: Case-by-case examination

5.2.8 According to EIA Directive Annex IIA, the developer of an Annex II development must provide information on the characteristics of the specific project and its likely significant effects on the environment, including human health (in very broad terms). The Competent Authority uses this information to develop its Screening Decision, i.e. to reach a conclusion about whether the project should be subject to an EIA. The information to be provided by the Developer is specified in national legislation transposing EIA Directive Annex IIA.

5.2.9 Relevant information on health should inform the Screening Decision, for example, in very broad terms the key ***health priorities*** set for the affected population such as tackling obesity. Consequently, input from health specialists is advisable for this step. The level of health information should be proportionate to the preliminary nature of assessment at screening. A broad-brush approach is needed.

5.2.10 Pursuant to the last sentence of EIA Directive Article 4(4), both the Developer and the Competent Authority should consider how to tailor the project to avoid or prevent what

might otherwise result in significant adverse effects on the environment, including human health.

> **Good practice action by the Developer:** Seek input from those with public health knowledge in an EIA context when determining the information to submit on the characteristics of the project and its likely significant effects (including measures to avoid or prevent significant adverse health effects).
>
> **Good practice action by the Competent Authority:** Where decisions are made on a case-by-case basis, seek relevant public health advice before making the Screening Decision. Seek advice on measures to avoid or prevent significant adverse health effects.

Step 4: The screening decision and its justification

5.2.11 The Competent Authority issues a Screening Decision to the Developer indicating whether EIA is or is not required. The Screening Decision must state the reasons for either requiring or not requiring EIA. Box 5-1 sets out the rights of the public to see the Screening Decision and its justification (this is also required by EIA Directive Article 4(5)).

5.2.12 The Screening Decision should make appropriate reference to human health. This may involve two scenarios:

- The EIA is screened in due to other issues, which are linked to human health, e.g. criteria or thresholds for project scale, or the potential for likely significant effects in relation to population, air quality, water, land quality etc.
- Health is the issue on which the Screening Decision turns. In this case, the screening exercise finds that a project only has the potential for likely significant effects in relation to health. This occurs when the project does not meet other criteria/thresholds and when the screening finds no potential for likely significant effects for other EIA topic areas such as population, air quality, water, land quality etc. This may be very unusual, but such projects should not slip through the EIA screening net.

5.2.13 The first scenario is the most likely. The Screening Decision should make the links to human health in broad terms i.e. linking the most relevant determinants of health to the most relevant health outcomes as well as environmental outcomes or limit values, as appropriate.

5.2.14 For the second scenario the Screening Decision should have regard to determinants of health and risk factors that are not usually included within purely environmental considerations of project effects, e.g. understanding of risk or lifestyle and behaviour changes.

> **Good practice action by the Competent Authority:** Where population health outcomes are likely to be significantly affected by a project (including due to changes in population, air quality, water, land quality etc) health should be central (not peripheral or secondary) to the Screening Decision justification.

Box 5-1: Participatory rights

> Screening procedures under the EIA Directive are influenced by the participatory rights established by the Aarhus Convention (64). The public now have a legal right to know the reasoning behind the decision on whether a project will be subject to an EIA procedure or not.
>
> This requirement can become the basis of a legal initiative, in case the decision is challenged by the affected public and/or the public at large. This will most likely be relevant in cases where the Competent Authority has decided to screen the project out of the detailed requirements in Articles 5-10 of the EIA Directive.

From the EC (22)

5.3 Guidance questions

5.3.1 The EC provides a two-part screening checklist tool to support case-by-case Screening Decisions. The first part of the tool is a series of questions to help determine the potential for a project to have likely significant effects and, in so doing, to decide whether an EIA is required (22, pages 54-58). The second part of the tool is a checklist of criteria to help answer these screening question (22, pages 59-60). These are provided in Appendix A: Table A-1 and in Table A-2.

5.3.2 The first part of the screening checklist tool (22, pages 54-58) asks questions about factors in the physical environment, all of which are determinants of health (see Table A-1). These questions help to identify where there is potential for interactions between a project and its environment. This helps to frame decisions about whether those interactions – the impacts of the project - are likely to be significant. The following additional health-related questions have been added to Table A-1 to be considered in addition to the EC's checklist. These require an answer of 'yes' or 'no' and a brief description:

- Would the project result in a widening of inequalities in society through differential or disproportionate environmental, social or economic changes to people who are more vulnerable?
- Does the project have the potential to affect population health (through changes in determinants of health)?

5.3.3 The second part of the EC's checklist provides prompts to support the screening stage's preliminary evaluation of likely significance (22, pages 59-60) (and see Table A-2). The following additional health-related prompts have been added to Table A-2 to be considered in addition to the EC's list.

- Will the health of the population, and of sections of the population (particularly vulnerable groups), be affected?
- Will the effect be influential to the achievement of key health priorities set for the affected population (e.g. in relation to obesity)?

5.3.4 If the conclusion of using the EC screening checklist tool is 'yes' (i.e. 'significant' population health effects are 'likely' having taken into account the Developer's committed ***mitigation***) and appropriate justification for this view can be provided, then an EIA is likely to be required.

6. Scoping

Key messages

Scoping is the process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process.

Scoping is not mandatory in EIA, but it is good practice and most EIAs will undertake this step because it enables better planning and costing of the assessment stage and it reduces the risk of delays. Developers can determine their own scope or can ask the Competent Authority for a Scoping Opinion. Health authorities may formally or informally advise on scoping.

Scoping should determine the potential for health effects to be both 'likely' and 'significant'. If this is the case, then these determinants of health should be 'scoped-in' for further assessment.

Scoping health should be proportionate. Health effects that are not likely to significantly affect population health should be 'scoped-out'. A record should be kept of the reasons for scoping determinants of health out and of mitigation that informs that decision. Good practice is to consult the health authority.

6.1 What is it?

6.1.1 Scoping refers to the early and interactive process of determining the major environmental issues and impacts that will be important in decision-making on the proposal and which need to be addressed in an EIA. The view that is taken is still quite high-level as to the likely significant effects of the project.

6.1.2 Where requested by the Developer, the Competent Authority shall provide an opinion on the scope and level of detailed information that the Developer has to include in the EIA Report (EIA Directive Article 5(2)). The Developer is required to provide the Competent Authority with appropriate information on the project to support this process.

6.1.3 The broad principles and practices of scoping are set out in generic EIA guidance (21, 23).

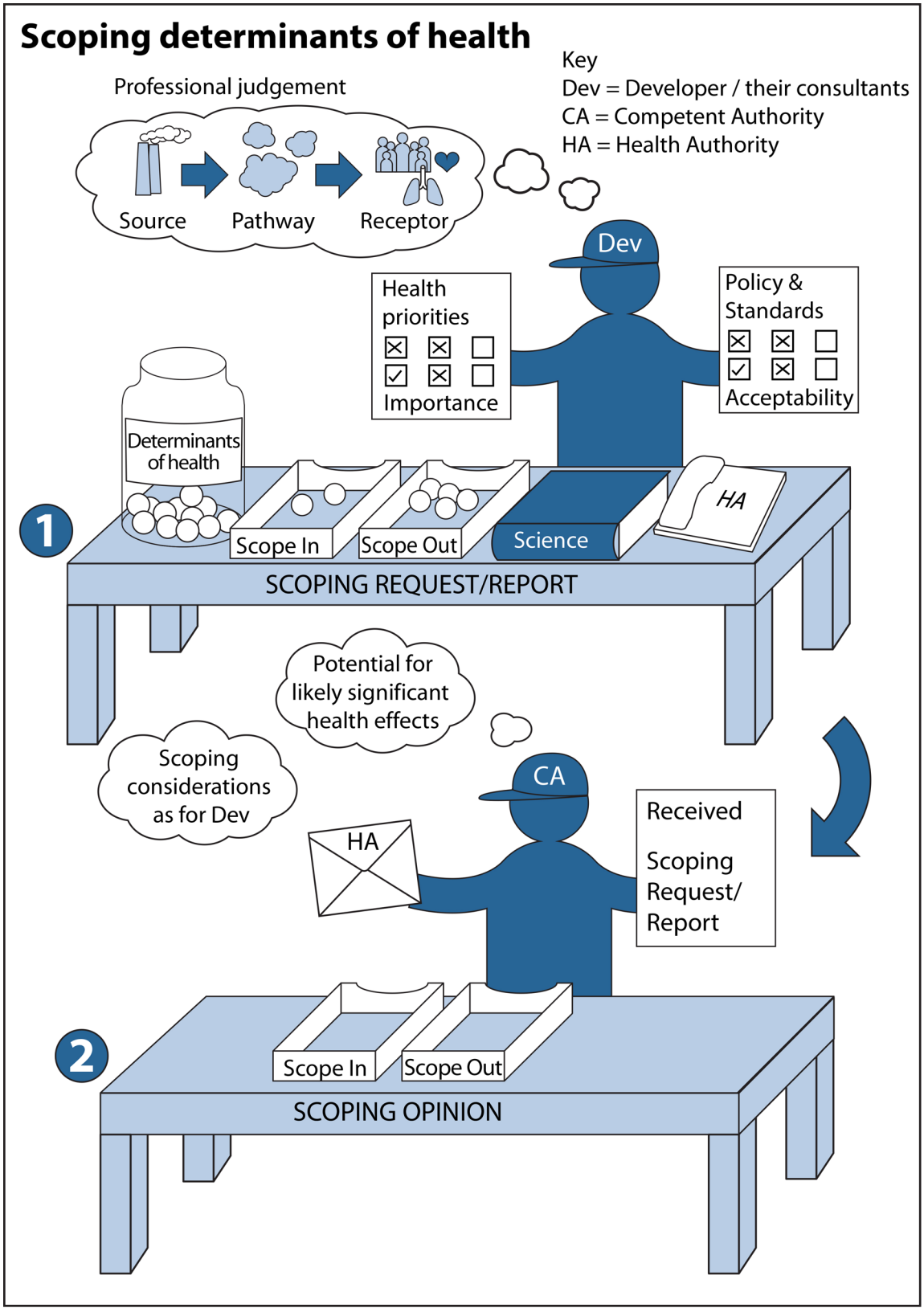
6.1.4 Scoping the assessment is a process that the Developer will always undertake, in most cases they voluntarily include the step of requesting a Scoping Opinion from the Competent Authority as good practice. Scoping enables better planning and costing of the assessment stage and it reduces the risk of delays to a project by seeking early input from key stakeholders (including the health authority). Identifying and scoping-in issues late in the EIA process may delay the assessment and require project design decisions to be revisited.

6.1.5 Under the terms of the EIA Directive scoping is a voluntary step but EIA scoping may be prescribed by national legislation (as allowed by the last sentence of EIA Directive Article 5(2)).

Table B-2 on page 65 provides a tool for proportionately scoping health determinants.

6.1.6 Figure 6-1 summarises key health related activities and good practice during EIA scoping.

Figure 6-1: Scoping, key activities and good practice



6.2 Process

6.2.1 Making a scoping request is an iterative process which involves a dialogue between the Developer and the Competent Authority. Typically, the Developer prepares a Scoping Request (which may be a short letter, or is increasingly in the form of a report) to set out its views and to identify the likely significant effects that should be subject to further assessment. The EIA Directive requires the Competent Authority to consult with authorities designated by Member States. The Competent Authority then responds with a Scoping Opinion in which it sets out its views. This can discretionally include the views of other authorities, such as health authorities, if they have not been formally designated.

6.2.2 If the Competent Authority issues a Scoping Opinion, then the Developer must base the EIA Report on that Scoping Opinion (Article 5(1) of EIA Directive).

6.2.3 Following the format of the EC Scoping Guidance (21) we look at scoping in four steps:

- Step 1: Initiating scoping;
- Step 2: Information needed to undertake scoping;
- Step 3: Scoping consultations; and
- Step 4: The scoping outputs.

6.2.4 The four steps raise relevant considerations for health authorities. They are not procedural steps. This format facilitates cross-reference to generic EIA scoping guidance (21).

Step 1: Initiating scoping

6.2.5 The specific procedures to be followed when carrying out scoping vary between Member States and between different EIA regimes within Member States.

> **Good practice action by the Developer:** In preparing an EIA Scoping Request/ Report seek input from those with public health knowledge in an EIA context. This particularly applies when scoping the likely significant effects of a project. This includes advice on measures to avoid or prevent significant adverse health effects, as well as measures to realise health opportunities. It also includes advice on ***health indicators*** and health data (see Section 7, 'Health Baseline Scenario').
>
> **Good practice action by the Competent Authority:** In preparing an EIA Scoping Opinion, seek inputs, as appropriate, from the national, regional or local body responsible for public health.

Step 2: Information needed to undertake scoping

6.2.6 The Scoping Opinion must consider the information provided by the Developer on the specific characteristics of the project (Article 5(2) of the EIA Directive).

6.2.7 Consistent with the principles set out earlier (see page 16), EIA scoping should be informed by the wider determinants of health. Scoping should establish whether human health needs to be a focus of the Developer's assessment, and if so, focus on a proportionate number of determinants of health to be considered for further assessment.

> **Good practice action by the health authority:** Support the Developer and Competent Authority during EIA scoping by introducing the wider determinants of health and then helping to focus the EIA on any likely significant health effects of the project e.g. working through Table B-2 on page 65 with them.

6.2.8 The EIA Directive requires a focus on health effects that are 'likely' and 'significant' (Recital 27 of the preamble, Annex II.A point 3 and Annex IV point 5 of the EIA Directive). In theory, every project can affect health in many ways so it is important to be proportionate when scoping for health in EIA. Categories and examples of determinants of health are listed in Table B-2 on page 65 which provides a tool for proportionately scoping health determinants.

6.2.9 The first step is to consider whether potential health effects are 'likely'. The second step, which arises from the EIA Directive, is to consider in broad terms the potential for the effect to be 'significant'. We consider these in turn below.

Is a potential health effect 'likely'?

6.2.10 It is good practice to establish how any given effect might occur (65). This route between changes in a determinant of health and changes in one or more health outcomes is known as a health ***pathway*** (see Table 2-1 on page 5). Appendix B on page 61 provides an example of a health pathway.

6.2.11 Is there a plausible theoretical link between source–pathway–receptor that can lead to a health effect? Information can be found in:

- the project description, which is used to describe the source;
- the scientific literature, which underpins the pathway; and
- the baseline data on health, which sets out the receptors, including data collected for the baseline in other EIA chapters. Where a Scoping Request is minimal this information is unlikely to exist until the Scoping Opinion is produced, or possibly until the EIA Report is submitted so this will be based on available sources of information and on professional judgement.

6.2.12 Once the theoretical link between source–pathway–receptor has been considered it is possible to state how 'likely' (or probable) it is that an effect would occur. This will be a professional judgement. At the scoping stage most decisions to scope out a potential health effect will be because it is not deemed to be likely.

6.2.13 It is important also to take account of the EIA Directive Article 3(2) requirement to consider the vulnerability of the project to risks of major accidents and/or disasters where relevant to health. Such emergency preparedness considerations may sit in a separate EIA chapter to human health and link to specific regulatory requirements for emergency planning set by legislation. Emergency preparedness should include plans by the health authority and the impact assessment should determine whether such plans are in preparation or existence.

Is a potential health effect both 'likely' and 'significant'?

6.2.14 Are those effects that are considered likely also considered to be significant? This requires defining 'significance' for human health. At scoping this judgement is made for a specific context and as to whether any given effect is 'important, desirable or acceptable' (21). A likely effect of the project should be scoped-in if the effect on population health outcomes is clearly:

- important: a positive or negative effect;
- desirable: a positive effect; or
- unacceptable: a negative effect.

6.2.15 This judgement depends on the quality of the evidence sources and on the transparency of the criteria used to guide the judgement. For example, the importance of the change in population health can be considered in terms of the public health agenda in a given jurisdiction. The scale of change may be peripheral to the public health agenda or central to it. Similarly, the potential health effect can be uncontroversial, and thus acceptable in a given jurisdiction or it may be contentious and thus unacceptable. A more detailed discussion of health significance is included in the EIA Report section of this paper (see page 30).

> **Good practice action by the health authority:** In supporting the Developer or Competent Authority during EIA scoping establish a proportionate health scope with reference to a transparent and consistent process for determining the potential likelihood and significance of health effects.

Step 3: Scoping consultations

6.2.16 In cases where scoping is required by national legislation, or where the Developer has requested a Scoping Opinion, the EIA Directive Article 5(2) further establishes specific consultation requirements.

6.2.17 The following scenarios may arise for health authority scoping inputs:

- No involvement with the EIA, Competent Authority or Developer at scoping. Proactive and collaborative working between health authorities and planning colleagues can help to avoid this scenario.

- Informally contacted by the Developer for views on the likely significant health effects of the project. Such involvement would be good practice.
- Formally consulted by the Competent Authority to inform a Scoping Opinion (if it has been requested by the Developer). Such involvement would also be good practice.

6.2.18 Additional points on EIA consultation are discussed in Section 8.

Step 4: The scoping outputs

Reaching a conclusion about scoping

6.2.19 When making, or advising on, a scoping decision (the latter may be the health authority role), a commentary should be provided to explain the conclusion. When judging whether an effect is significant for human health (i.e. important, acceptable or desirable) it may be helpful to recall that the EIA Directive uses the phrase "… *contributes to a high level of protection of the environment and of human health* …" (Recital 1 of the preamble). A rule of thumb is thus to consider whether the effect should be brought to the attention of the Competent Authority.

- An effect might be brought to the attention of the Competent Authority because the professional judgement concludes that the effect does provide a high level of protection to human health including as appropriate health protection, health promotion, disease prevention and health services. The effect is a potentially significant positive effect of the project on population health that should be scoped-in e.g. employment arising from the project which could have a beneficial effect on health.
- It might also be brought to the attention of the Competent Authority because the professional judgement concludes that the effect does not provide a high level of protection to human health including as appropriate health protection, health promotion, disease prevention and health services. The effect is a potentially significant negative effect of the project on population health that should be scoped-in e.g. demands on health services arising from the project which could reduce people's access to health services or the capacity or the quality of the health services.

Reporting the conclusion: The Scoping Request/Report and the Scoping Opinion

6.2.20 If made, the Developer's Scoping Request/Report should include the project's location, technical capacity, and its likely impact on the environment. The Competent Authority's corresponding Scoping Opinion should set the scope and level of detail of the information to be included in the EIA Report (Art.5(2) of the EIA Directive).

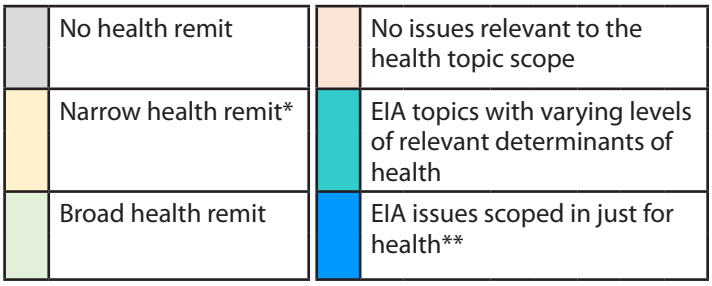
6.2.21 Scoping is primarily focused on identifying the impacts to be assessed (setting a proportionate topic scope), but it may address other matters, including:

- the EIA Report's Terms of Reference;
- the level of detail necessary for the assessment;
- an estimate of the time needed to prepare the EIA Report and its possible length;
- the types of alternatives to be considered;
- the methods used to predict the significance of effects; and
- the types of mitigation and monitoring measures to be considered.

6.2.22 Figure 6-2 shows how the EIA Directive topic requirements are typically structured during the EIA process (first two columns). Figure 6-2 illustrates the range of other EIA topic areas that it may inform scoping of human health (third column) and thus be appropriate to cross-reference in a proportionate way in any Scoping Request/Report and Scoping Opinion.

Figure 6-2: Health as a cross-cutting topic within the EIA process

This figure shows hypothetical projects where *likely significant* effects for health have been identified and it shows links to the other topics.

Directive 2011/92/EU as amended by Directive 2014/52/EU Article 3 (1) and Annex IV (the latter in parentheses)	Typical EIA topics	Health scoping examples (columns)
		
cultural heritage	Historic environment	
biodiversity	Ecology	
air	Air quality (and Transport)	
(noise, vibration,)	Noise and vibration (and Transport)	
land, soil, (soil pollution)	Land quality	
material assets,	Land use, Transport and Waste	
water,	Water environment and Flood risk	
(light) and the landscape	Landscape and visual	
(radiation)	Radiation	
(heat) and climate	Climate change	
population	Socio-economics	
human health	Health	EIA health section***
the interaction between the factors above	Cumulative (intra-project or in-combination)	Cumulative effects usually only outlined at scoping and informed by all EIA topics including health.

* potentially relevant to health scoping but likely these other topics would focus on outcomes other than population health. Typically includes people, communities, services or dwellings as receptors.

** e.g. understanding of risk, lifestyles and behaviour or operational benefits to public health.

*** health elements drawn together into (or cross-referenced in) an EIA health section linking the likely significant effects to population health outcomes, primarily for a health stakeholder audience.

6.2.23 Scoping health may include cross-references to other EIA topics to explain why many potential determinants of health or risk factors have been scoped-out due to the technical scoping conclusions of those other EIA topics. Coverage of a potentially significant determinant of health within another EIA topic area (e.g. scoping-in air quality as an EIA Report chapter) should not be a reason for scoping-out the need for an EIA Report health chapter where there are population health implications to discuss and the principles set out earlier (see page 16) indicate it would be appropriate.

Good practice action by the Developer and the Competent Authority: Use a 'health section or chapter' so that the health authority (notably national, regional or local public health teams) can navigate to the relevant information and can then advise on the determinants of health and risk factors across the EIA scope.

Good practice action by the health authority: As part of formal and informal consultation responses request a health chapter or health section, within the Scoping Request/Report and a health chapter within the EIA Report that brings together or cross-references the likely significant health effects.

6.3 Guidance questions

6.3.1 Overarching questions for determining, in broad terms, the significance of likely health effects (most relevant to scoping stage) include:

- Is the expected change in health important? For example, is the expected change central to, or influential for, the public health agenda of the relevant jurisdiction? This includes both positive and negative effects. Take account of the scientific literature, baseline conditions and health priorities.
- Is the expected change in health acceptable? For example, is the expected change controversial or a developing agenda e.g. an emerging public health issue? This covers negative effects. Or is the expected change strongly desired and one that must be secured? This covers positive effects. Take account of any consultation responses, regulatory standards and the health policy context for the jurisdiction.

6.3.2 The EC provides a two-part scoping tool. The first part of the tool is a checklist with a series of questions to be considered in scoping and, in so doing, to decide whether the effect is likely to be significant. The second is a series of questions to support completion of the preceding checklist. This scoping tool is not reproduced in this paper. The approach has been to capture the key considerations for health scoping in a series of tables that focus on the EIA health considerations. These tables are intended to be proportionate and practical. They should be adapted as appropriate. The tables are presented in Appendix B.

Appendix B, on page 61, looks at scoping health as an EIA topic.

6.3.3 During the process of reviewing other EIA topic chapters, key health questions are:

- what do the findings of other EIA topic chapters mean for health; and
- do the study areas of the other EIA topic chapters reflect the likely distribution of effects on health.

7. EIA Report – assessment

Key messages

The EIA Report is the document prepared by the Developer that presents the output of the assessment. The EIA Report is submitted by the Developer to the Competent Authority. Health authorities may informally advise during the production of the EIA Report and may then be formally consulted on the final EIA Report.

An EIA Report should present the likely significant effects of the project, including those affecting health. It also includes a health baseline, the reasonable alternatives considered and measures to mitigate (avoid, prevent or reduce) or to monitor significant adverse effects. Good practice is to include a health chapter in the EIA Report.

EIA takes a population health approach. Inequalities are a key feature of population health, so where there is potential for significant health effects consider differences between the general population and vulnerable groups.

Deciding whether an effect is significant relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the project in question.

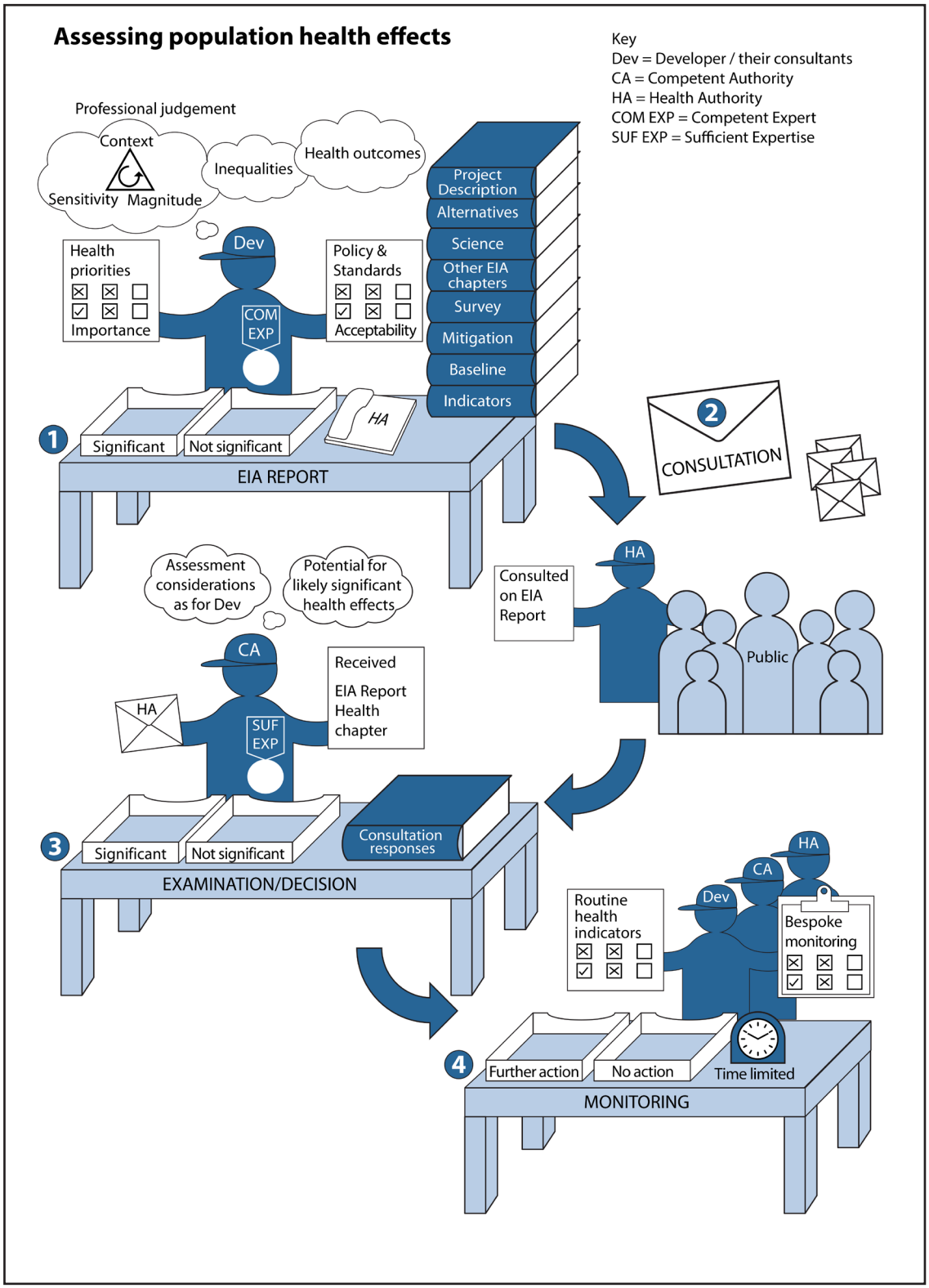
A range of criteria is used to reach a conclusion on the significance of health effects. The criteria include, but are not limited to, the sensitivity of the population and the magnitude of the effect.

7.1 What is it?

7.1.1 The EIA Report is the written output of the Developer's assessment. The EIA Report should provide information to enable the Competent Authority to reach a reasoned conclusion on the likely significant effects of the project.

7.1.2 Figure 7-1 summarises key health related activities and good practice during the EIA assessment. Assessment focuses on the production and examination of the EIA Report. Consultation, monitoring and competence are also key to the assessment of health effects. Figure 7-1 is therefore also relevant to Sections 8, 9 and 10 of this reference paper.

Figure 7-1: EIA Report, Consultation, Examination, Monitoring and Competence, key activities and good practice



7.2 Process

7.2.1 The Developer and the Competent Authority each have roles in the EIA process (see EIA Directive Article 1(a)). The following process is required:

- the preparation of an EIA Report by the Developer;
- the carrying out of consultation in a prescribed fashion by the Developer;
- the examination of the information by the Competent Authority;
- the determination of significant effects by the Competent Authority; and
- the use of those reasoned conclusions in the ***Development Consent*** decision by the Competent Authority.

7.2.2 An EIA Report includes at least:

- a project description;
- the current and future baseline;
- the environmental factors affected (such as human health) that are specified in Article 3(1);
- the likely significant effects (including risks to human health);
- the reasonable alternatives considered;
- mitigation measures;
- monitoring measures;
- a non-technical summary; and
- a reference list of evidence sources.

7.2.3 Further information about the steps in preparing the EIA Report are covered in generic EIA guidance (21, 23). Those steps are shortly addressed below.

Project Description

7.2.4 EIA Directive Article 5 and Annex IV set out the requirements for describing the project. There may be limited direct reference to health in the project description unless the project is a health service development.

7.2.5 The project description may include features that are specifically to avoid, or to mitigate, what would otherwise be likely significant health effects. This link between the project description and the health assessment should be made in the EIA Report including where determinants of health were scoped-out of further assessment on this basis (see EIA Directive Annex IV point 7). The Competent Authority is required to reference such features within any decision to grant Development Consent (Art.8a(1)(b) of the EIA Directive).

Health Baseline scenario

7.2.6 The EIA Report will include a description of the relevant aspects of the current state of the environment (baseline scenario) (EIA Directive Annex IV) and an outline of the likely changes as far as natural changes from the baseline scenario can be assessed. Reasonable effort must be taken to prepare this and it is based on the availability of environmental information and scientific knowledge.

7.2.7 A health baseline may use routinely collected indicator data spanning demographic, socio-economic, environmental, public health and health service sources. The baseline is used in two ways:

- It presents the characteristics of the receptor population(s), i.e. the affected population(s), and thus allows an understanding of their vulnerability to changes associated with the project.
- It is also the benchmark from which changes due to the project are predicted by the assessment (part of determining significance) and then monitored.

7.2.8 The health baseline should be specific and proportionate in length. It should use indicators that are expected to change due to the project. The resolution of indicators will be relevant e.g. national indicators are unlikely to be sufficiently sensitive to detect project change at local level. The regularity with which indictor data is refreshed is also relevant.

7.2.9 It may be appropriate to supplement routine health baseline sources with additional information gathering, such as a survey of community attitudes. If undertaken robustly such studies can fill information gaps in knowledge about community cohesion and community identity from a non-self-selecting sample of the public. Bespoke surveys and other forms

of consultation can solicit input from groups who would typically not engage with formal public consultations.

7.2.10 The collection of relevant data is critical to a robust assessment of the baseline. Data should be identified and assessed by qualified experts. This process can start at the Scoping stage.

> **Good practice action by the health authority:** In supporting the Developer to describe a health baseline, it is necessary to provide advice on appropriate health-related indicators, e.g. public health indicator sets, that the project should include to facilitate assessment and future monitoring. Where feasible also provide advice on how the area's future health baseline may evolve with, and without, the project, e.g. data sources identifying relevant health trends.
>
> **Good practice action by the health authority:** support the Developer and Competent Authority to understand whether a project has implications for health services. The health authority can also provide guidance on planning health services. Useful information can include design parameters, unit costs of key services and service specifications.

Environmental factors

7.2.11 EIA Directive Article 3(1) sets out the environmental factors that EIAs must consider. Human health is specifically mentioned, as is its interaction with population, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, the landscape and the vulnerability of the project to risks of major accident and/or disasters.

Assessing effects on the environment including human health

7.2.12 It is appropriate to define specific criteria for health significance as the preamble to Directive 2014/52/EU notes that Competent Authorities should identify the most relevant criteria to be considered "*when determining whether significant effects on the environment are likely to be caused by a project …*".

7.2.13 What does it mean to "*identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on … population and human health*" (as required by Article 3 (1))? We set out below some considerations when reaching a judgement on significance. Our starting point is the statement in the EC Guidance that: *"the assessment of significance relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the project in question"* (21, 23).

7.2.14 An analysis of multiple criteria is an established approach to determining significance in EIA (23) and typically involves consideration of the *sensitivity* of a receptor and the *magnitude* of the effect that the project will have.

- Sensitivity is understood as the sensitivity of the receptor (e.g. population) to change, including its capacity to accommodate the changes the project may bring about; and
- Magnitude considers the characteristics of the change which would affect the receptor as a result of the project (adapted from (23)).

7.2.15 Appendix C on page 71 illustrates three steps for determining significance for health. The steps involve characterising criteria relevant to *sensitivity*, *magnitude* and contextual considerations. Contextual considerations include:

- scientific literature;
- baseline conditions for the population;
- consultation for the project;
- health priorities in the jurisdiction;
- regulatory standards in the jurisdiction; and
- health policy context in the jurisdiction.

Appendix C, on page 71, provides tools for analysing multiple criteria to establish significance in EIA.

Table C-4 on page 80 provides an illustrative narrative for reporting the assessment of a determinant of health.

7.2.16 A robust reasoned conclusion on significance relates the evidence to the specific context of each determinant of health within the scope. The reporting should include a structured narrative that draws together the range of relevant information to support the professional judgment

(see Table C-4 on page 80). Reporting may use qualitative and quantitative information. Appendix G on page 91 looks at ways in which results can be reported and some quantitative approaches.

7.2.17 Health in EIA takes a population health approach. Inequalities are key to understanding population health. A balanced conclusion requires a consideration of two or more populations e.g.:

- the general population in a defined area; and
- groups within that population which are more sensitive to changes in determinants of health, for example, due to young or old age, poor health status, poverty and other low social status.

7.2.18 In describing the likely significant effects on human health the EIA Report should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project (EIA Directive Annex IV point 5). Transboundary health effects (across national borders) could for example include ***epidemiological*** considerations in relation to pollutants and infections.

7.2.19 The consideration of likely significant health effects requires a statement on the way in which a change in a determinant of health can be expected to lead to a change in health outcomes e.g. respiratory health or mental well-being. EIA health analysis should therefore, where possible, describe the predicted health outcomes. This can be qualitatively or quantitatively and should refer to existing scientific evidence. In some cases, other measures may be appropriate, e.g. health service metrics such as ambulance response times or hospital admissions.

Cumulative effects

7.2.20 The coexistence of impacts may increase or decrease their combined impact. Effects that are not considered to be significant, when assessed individually, may become significant when combined with other effects. The coexistence of several exposure pathways, through several stressors or affected health determinants can result in an increased or decreased combined health impact that needs to be addressed. When considering significance, the cumulative effects of all relevant projects in the area, both spatial and temporal, should be considered. For the project being assessed, this may also include considering the in-combination effect between determinants of health.

7.2.21 Cumulative assessment can be facilitated by using a common set of geographic and vulnerable population group definitions. Describing the geographic and population scope for each determinant of health with reference to a common set of definitions allows the assessment to quickly identify all determinants of health relevant to either a geographic level (e.g. local population) or vulnerable group (e.g. young age). Being clear on geographic extent also facilitates determining the cumulative study area of other projects for a given determinant of health. For example, if the project's noise impacts affect only the site-specific population (neighbouring community) other projects further afield would be unlikely to cumulatively interact for that determinant of health. Care should be exercised in concluding on net or overall health effects across determinants of health or across projects as effects may be experienced by different people within a population.

Table B-3 provides a tool for setting technical, temporal and spatial scopes.

Column 3 looks at study area.

Column 5 looks at vulnerable population groups.

Good practice action by National Policy Makers: Consider setting an EIA policy context, at local, regional and national level, that sets specific project level expectations for the protection and improvement of population health, including being explicit about links to relevant determinants of health. This would support reaching robust professional judgements on EIA health significance, particularly around the acceptability or desirability of particular changes from the baseline that are attributable to a particular project. The role of regulatory thresholds should be clear.

Good practice action by the health authority: When drafting policy documents or other publications that set out local, regional or national health priorities consider specifying the role that development projects, particularly EIA projects,

can play in addressing these priorities. This would provide a clear direction in the context of EIA health significance, particularly around the importance of changes arising from a particular project. This might include specifying the links to relevant determinants of health as well as appropriate summaries of the local health baseline, identifying groups that may be vulnerable and reference to scientific literature.

Good practice action by the health authority: In supporting the Developer or Competent Authority to identify the likely significant health effects of a project, use a transparent and consistent process. This should encompass a proportionate but sufficiently broad range of evidence sources to establish the sensitivity of the affected population and the magnitude of changes arising from a particular project, as well as the importance, desirability or acceptability of the change in population health. This is in accordance with providing a high level of protection to human health, including as appropriate health protection, health promotion, disease prevention and health services.

Assessment of alternatives

7.2.22 EIA Directive Article 5(1) requires the Developer to include a description of the reasonable alternatives studied by the Developer, relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen taking into account the effects of the project on the environment. The reasonable alternatives may be in terms of project design, technology, location, size and scale.

7.2.23 This is an important opportunity to modify the design of the project but, at the time of writing, the involvement of health experts in this stage is often limited.

Good practice action by the health authority: Be explicit in consultation responses to the EIA project that the Developer should clearly set out how health has been taken into account in the consideration of the reasonable project alternatives.

Good practice action by the Developer: Involve health authorities and ***Competent Experts*** in health in the assessment of alternatives.

Mitigation measures

7.2.24 The Developer is required to include a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment (EIA Directive Article 5(1)). This covers the construction and operation of the project.

7.2.25 A long-term approach should be promoted and priority should be given to avoiding adverse impacts (prevention measures). Remediation and compensatory measures should only be considered as a last resort. This is in accordance with the precautionary and preventive action principle (as noted by EC Guidance (13).

7.2.26 All health-related mitigation measures should be clearly secured within the legal agreements that accompany the EIA Report or the decision of the Competent Authority. Mitigation measures should, where appropriate, link to monitoring provisions that are also secured. The titles of the documents that secure the measures vary between projects and between Member States but may include:

- a Code of Construction Practice;
- a Code of Operational Practice;
- a Workforce Management Plan;
- a Workforce Accommodation Plan;
- a Transport Plan; and
- a Health and Well-being Strategy and/or a legal agreement for financial payments to the relevant municipality, including contributions to support community service improvements (including health services).

7.2.27 Mitigation measures that are relevant to health, and that are used in the assessment, should be cross-referenced within the health chapter so that the influence on the significance of health effects is clearly described (see EIA Directive Annex IV point 7).

> **Good practice action by the Developer:** In addition to mitigation in relation to the likely significant negative effects of the project on health, also include enhancement measures in relation to optimising the likely significant positive effects of the project for health.
>
> **Good practice action by the health authority:** In supporting the Developer and Competent Authority in relation to producing or reviewing the EIA Report set a clear expectation for the proportionate enhancement of the likely significant positive effects of the project for health. This may include advising on the opportunities for health protection, health promotion, disease prevention and health services. Enhancements should relate to the project and not be unconnected inducements.

Monitoring

7.2.28 The intended purpose of EIA monitoring is to determine appropriate procedures to follow up on the significant adverse effects of a project. This applies to construction and operation and has the potential to enable appropriate remedial action to be undertaken. This should include identifying unforeseen significant adverse effects. This is set out in Recital 35 of the preamble to the EIA Directive.

7.2.29 Further points in relation to EIA monitoring are discussed in Monitoring (see page 40).

7.3 Guidance questions

7.3.1 The EC provides a review checklist to support the preparation of the EIA Report (21, pages 99-102). The part of the checklist relating to assessment (section 3 of the checklist) is reproduced in Table D-1 on page 81. These questions have been colour-coded to emphasise those that are most relevant to health.

Table D-1 on page 81 provides an assessment checklist: description of the likely significant effects of the project.

7.3.2 A question has been added to the EC's list to ensure that the issue of health inequalities is considered explicitly: '*Has the potential for health inequalities been appropriately articulated within the assessment so it is clear to the Competent Authority if there are likely to be significant effects (positive or negative) for a vulnerable sub-population that differ from the finding for the general population?*'. This reflects the challenge for health assessment that the same project change may have different health outcomes for different populations over different time frames.

Table C-3 on page 78 sets out contextual factors to consider when judging health significance in EIA.

8. Consultation – stakeholder engagement

Key messages

Consultation is a fundamental aspect of EIA, both for the Developer in informing the scope and the assessment and for the Competent Authority in reaching its decision.

The health authority, e.g. national, regional and local public health teams, should be consulted as a matter of good practice, ideally as a requirement of national EIA legislation.

Scoping stage consultation with the health authority is the key opportunity for public health resources to be used efficiently in steering the project towards positive health outcomes.

8.1 What is it?

8.1.1 Consultation is both a stage of the EIA process but also a way to generate information and evidence for the assessment of the likely significant health effects.

8.1.2 Consultation procedures are detailed in national legislation, and also fall under international legislation (Aarhus Convention (64) and the Espoo Convention (66)). European Directive 2003/4/EC sets out the need for public access to environmental information (67).

8.2.13 The Aarhus Convention, established in 1998 and entered into force in 2001, was initiated by the United Nations Economic Commission for Europe (66). At the Fourth Ministerial Conference, rights were established regarding access to environmental information as well as justice in environmental matters and public participation in environmental decision-making (68). The Aarhus Convention established that information should be available, transparent and participatory.

8.1.4 The EIA Directive requires consultations throughout the EIA process (see Table 8-1). It requires consultation with three different groups on the content of the EIA Report:

- the public concerned must always be consulted;
- public authorities must be consulted when they are likely to be concerned; and
- other Member States for projects with transboundary impacts.

Table 8-1: EIA Directive references to the need for a consultation process

EIA Directive	
Article 5(2)	requires that during the scoping stage the Competent Authority shall consult relevant authorities before giving a Scoping Opinion. The relevant authorities are defined by national legislation pursuant to Article 6(1).
Article 6(1)	sets out requirements for consulting with relevant stakeholders on the information supplied by the Developer and on the request for Development Consent. Stakeholders are identified by legislation by reason of their specific environmental responsibilities or local and regional competences.
Article 6(2)	sets out requirements for consulting with the public, with the detailed arrangements for consultation set by each Member State.
Article 6(4)	requires early provision of information to ensure effective participation of the public concerned in the decision-making procedures.
Article 7(5)	clarifies that the consultation arrangements should enable the public to participate effectively in the decision-making procedures.

8.11.5 Consultation responses from both the public and from the health authority should inform the Competent Authority in coming to their reasoned conclusions on the project's significant effects, as a result of their examination of the environmental information. Where consultation responses are available to inform the EIA Report these can be taken into account as part of the Developer's assessment.

8.2 Process

Screening

8.2.1 Dialogue between the Developer and the Competent Authority is helpful for the Competent Authority when they are making a Screening Decision (21). Competent Authorities may also find it useful to consult with, and to take advice from the health authority.

Table C-3 on page 78 sets out contextual factors to consider when judging health significance in EIA which includes

Scoping

8.2.2 In cases where Scoping is required by national legislation, or where the Developer has requested a Scoping Opinion, the EIA Directive Article 5(2) further establishes specific consultation requirements.

8.2.3 The Directive sets minimum requirements for consultation, requesting that environmental authorities and local and regional authorities are given an opportunity to comment on the scope of the EIA Report. In some Member States, EIA legislation extends consultation to all interested parties including the general public, while in others this is not required by law, but it remains a good practice.

8.2.4 Member States through national legislation must ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities or local and regional competences are given an opportunity to express their opinion (EIA Directive Article 6(1)). Despite this provision there is a lack of clarity in many Member States as to whether health authorities should be consulted at EIA scoping (and subsequently). This ambiguity seems to arise from the consultation requirement specifying authorities with 'environmental responsibilities'. This has been interpreted narrowly rather than in the context of the EIA Directive where health is one of several prescribed Article 3 considerations within environmental assessment.

8.2.5 Dedicated and consistent public health input at the scoping stage is often the greatest opportunity for ensuring good coverage of health within EIA and consequently health gain from the EIA process. This is an efficient use of limited public health resources.

Good practice action by National Policy Makers: Specifically include relevant national, regional and local public health teams as consultees for all EIA Scoping Opinions and EIA Reports ('authorities to be consulted in general terms' pursuant to EIA Directive Article 6(1)).

Good practice action by the health authority: Be proactive in setting a clear expectation to be consulted at the scoping stage of all EIAs even if this is not clearly prescribed in national EIA legislation. Resources to support personnel time, inter-sectoral/administration working and training relating to EIA should be ringfenced.

Good practice action by the Developer and the Competent Authority: Include relevant national, regional and local public health teams as EIA consultees as a matter of course.

EIA Report

8.2.6 The EIA Report is ultimately an informative decision-support tool. Once it has been prepared by the Developer, the public and concerned authorities have to be consulted upon it and can provide comments on it. The EIA Report is examined by the Competent Authority.

How should the health authority participate in the EIA process?

8.2.7 To improve the assessment and review of health the health authority should be involved at all stages in the EIA process as shown in Figure 3-1, and not only in later stages. EIA Directive Article 5(3)(b) establishes that *the Competent Authority shall ensure that it has, or has access as necessary to,* ***sufficient expertise*** *to examine the EIA Report*, including those aspects affecting population and human health. This requirement indicates that, a health authority should be provided with appropriate resources to provide the sufficient expertise, if requested to act in this capacity by the Competent Authority.

8.2.8 For meaningful input to EIA the health authority needs additional funding; ring-fenced personnel time for input to consultation; clarity on intersectoral/administration working to coordinate the EIA health response; and specific training relating to EIA. The health authority has a duty to develop and/or acquire the required competences and skills to meaningfully contribute to the EIA process.

8.2.9 To engage the health authority efficiently and at an early stage, Member States have the option to include the health authority (e.g. public health teams) in their national EIA legislation as formal consultees. This would legitimate the necessary resource allocations. This is the case for Strategic Environmental Assessment under the Espoo Convention (66).

8.2.10 Involving an interdisciplinary team can improve practice, and expertise can be exchanged across all disciplines of the team. The context of the project will inform the team composition. The health authority can provide EIA consultation input on health outcomes, pathways, effects, mitigation and monitoring. National and regional health authorities should play a significant role in reviewing EIAs.

8.2.11 For any approach, the coherence of the country's legislation and political background must be considered. For some countries, soft governance might not be possible. An approach could be to give the Ministry of Health (or equivalent) an active role in the EIA consultation process.

8.2.12 The risk in neglecting to engage the health authority within the EIA process is forgoing the benefits that public health professionals from various disciplines can bring to discharging the EIA Directive requirements in relation to health. There is a risk of a non-compliant EIA Report or a non-compliant Competent Authority decision.

> **Good practice action by National Policy Makers:** Require regular training of those with EIA responsibilities to facilitate good practice regarding health in EIA. Training can clarify the process and build links between sectors. This will enhance the ways in which health effects are understood and in which solutions are identified.

8.3 Guidance questions

8.3.1 The EC provides a review checklist to support the preparation of the EIA Report (23, pages 90-109). This poses two questions about consultation. Two further questions have been added to this checklist to ensure consistent involvement by the relevant health authority. See Table E-1 on page 87. These are:

- Has the health authority (including but not limited to national, regional and local public health teams) been consulted at the scoping stage?
- Has the health authority (including but not limited to national, regional and local public health teams) been consulted on the EIA Report?

9. Monitoring

Key messages

Monitoring should be included in a proportionate way. This should cover significant adverse health effects or the implementation / effectiveness of mitigation to manage such effects.

EIA health monitoring should avoid duplicating other legally required monitoring systems. It should also, wherever feasible, use existing routine public health indicators.

Establish clear governance arrangements for monitoring and follow-up action (if required).

9.1 What is it?

9.1.1 The EIA Report must include a description of mitigation measures relating to significant adverse effects and, where appropriate, of any proposed monitoring arrangements, for example the preparation of a post-project analysis (EIA Directive Annex IV point 7).

9.1.2 The Competent Authority's decision to grant Development Consent should include, where appropriate, measures and procedures for monitoring (EIA Directive Articles 8a(1)(b) and 8a(4)). The types of parameters to be monitored and the duration of the monitoring should be proportionate to the nature, location, size of the project, and the significance of its effects. There is, therefore, a requirement to undertake monitoring but it should be undertaken where appropriate i.e. not in every case and not for every health effect and it should be proportionate including the duration for which it is carried out.

9.1.3 Generally, monitoring measures are early warning systems that allow for intervention if the effects are not as predicted during and after the construction, operation and decommissioning of the project. Monitoring helps to ensure that projects meet their legal requirements and that impacts are in line with the projections set out in the EIA Report. Monitoring also ensures that any mitigation or compensation measures for expected significant effects are carried out as planned and deliver their anticipated outcome.

9.2 Process

9.2.1 Monitoring regimes should be set out clearly so they can be implemented. This can include defining roles, responsibilities, and resources for collecting data, processing the information and acting upon the results. Monitoring regimes should make use of, and not duplicate other, monitoring regimes that are required by law.

9.2.2 EIA projects should have an appropriate and proportionate monitoring framework agreed between the Developer and Competent Authority through the Development Consent process. Monitoring typically focuses on local environmental protection administration responsibilities e.g. for air quality and noise nuisance. However, where significant adverse health effects are identified it can be appropriate to include wider social, economic and service-related health indicators within the agreed monitoring framework.

9.2.3 This can include process indicators that look at the way in which the stages of the project are progressing or at the way the assessment is conducted – this can also be a mechanism of quality assurance; and it can include outcome indicators that show changes in health outcomes once the project has been implemented – this is more challenging.

9.2.4 Wherever feasible, existing routine public health indicator sets (and their associated analysts) should be used in preference to developing bespoke monitoring regimes. If bespoke analysis is required then this can be supported by an appropriate financial contribution from the Developer to the health authority. This could be for monitoring specific indicators relevant to likely significant effects of the project over a defined period of time. Bespoke analysis

might include information that is only available to the health authority such as health service records with patient identifiable data.

9.2.5 The governance, responsibilities and triggers for health monitoring and any subsequent action should be explicit within the EIA Development Consent process and its associated legal agreements.

> **Good practice action by the health authority:** Support the Competent Authority and Developer in relation to health monitoring by defining an appropriate and proportionate set of health indicators. Establish clarity on:
>
> - use of existing indicators or the need for bespoke monitoring;
> - governance arrangements (including where anonymised or sensitive data is involved);
> - resource requirements and responsibilities (including any payments);
> - sharing of information between parties, departments and authorities;
> - duration of monitoring;
> - analysis methods;
> - trigger levels; and
> - actions in response to monitoring.

9.3 Guidance questions

9.3.1 The EC provides a review checklist to support the preparation of the EIA Report (23, pages 90-109). The part of the checklist relating to monitoring (section 6 of the checklist) is reproduced in Table F-1 on page 89. A question has been added to the EC's list to ensure integration with existing public health monitoring systems and the appropriate use of health-related data: 'Have existing public health indicators been considered and is it clear how any sensitive health data would be managed?'.

10. Competence and expertise

Key messages

The health content in the EIA Report must be prepared by 'Competent Experts'.

The Competent Authority's review (examination) requires 'sufficient expertise'.

Competencies for assessing health in EIA have yet to be formally defined.

Good practice is for those involved in health in EIA, on behalf of the Developer and on behalf of the Competent Authority to have knowledge of impact assessment, public health and environmental sectors.

10.1.1 The effectiveness of the EIA procedure relies upon high-quality EIA Reports that can contribute to sound decision-making. In Recital 33 of the preamble and in Articles 5(3)(a) and (b) the EIA Directive requires:

- experts involved in the preparation of EIA Reports to be qualified and competent; and
- Competent Authorities to have sufficient expertise to ensure that information provided by the Developer is complete and high quality.

10.1.2 The EIA Directive uses different terms to describe the requirements for the Developer and the Competent Authority: the experts informing the Developer must be *qualified and competent* while the Competent Authority must have *sufficient expertise*. These terms are not defined and interpretation is left to Member States. The amendment to the EIA Directive has increased the number of EIA legislative systems with an expectation related to professional expertise (69) so there are established practices across European Member States for ensuring that the right level of competence and expertise is used in most EIA topics. However, the topic of human health is a new formal requirement and ensuring there is a body of professionals that have sufficient competence or expertise is a challenge: a global survey conducted from 2018-2019 found that the most frequently cited barrier to preparing health assessments is an absence of technical expertise (70). We look at four areas where competence for health and impact assessment can be examined (after source 71).

The process by which the health assessment is undertaken, and the chapter is prepared

10.1.3 Competence includes a requirement to understand the ways that human health needs to be addressed within the EIA process and how these fit into the process of preparing an EIA Report.

10.1.4 National and local health authorities must be proactive to ensure that this competence requirement is met by the Developer or their consultants, and the health authority is engaging within the EIA process. There must be a strong understanding of the EIA process and an awareness of legal and ethical requirements.

The competence of the individuals, and their role within the team, preparing the health chapter

10.1.5 The technical competencies for preparing the 'human health' assessment component within the EIA, and the means of assuring them, have not been widely specified but public health competencies require knowledge and skills that are relevant to assessment. Public health competencies comprise of soft skills, such as leadership and advocacy, and technical skills, ranging from epidemiology and natural sciences to ethics and sociology. Both public health and impact assessment (IA) competencies are relevant to health in EIA competency, i.e. being a competent expert or having sufficient expertise.

Table 10-1: Competencies in public health

ASPHER's European List of Core Competences for Public Health Professionals (44)	WHO Essential Public Health Operations (4)	CompHP core competencies framework for health promotion handbook (72)	Public Health Agency of Canada: Core Competencies for Public Health in Canada (73)
A. Methods in public health. B. Population health and its social and economic determinants. C. Population health and its material - physical, radiological, chemical and biological - environmental determinants. D. Health policy; economics; organisational theory, leadership and management. E. Health promotion, health protection and disease prevention. F. Ethics. And ... annexes on core competences for Communicable Disease Prevention and Control	1 Surveillance of population health and well-being. 2 Monitoring and response to health hazards and emergencies. 3 Health protection, including environmental, occupational and food safety and others. 4 Health promotion including action to address social determinants and health inequity. 5 Disease prevention, including early detection of illness. 6 Assuring governance for health. 7 Assuring a competent public health workforce. 8 Assuring organisational structures and financing. 9 Information, communication and social mobilisation for health. 10 Advancing Public Health research to inform policy and practice.	1. Enable Change. 2. Advocate for Health. 3. Mediate through Partnership. 4. Communication. 5. Leadership. 6. Assessment. 7. Planning. 8. Implementation. 9. Evaluation and Research.	1. Public Health Sciences. 2. Assessment and Analysis. 3. Policy and Program Planning, Implementation and Evaluation. 4. Partnerships, Collaboration and Advocacy. 5. Diversity and Inclusiveness. 6. Communication. 7. Leadership.

10.1.6 Table 10-1 summarises competences for generalist public health professionals according to different organisations. These are *generic, based on general public health theory and practice*. They have general cross-border applicability but as public health services vary considerably across Europe, it is not possible to comprehensively define competencies within public health systems (44).

Box 10-1: Competencies for impact assessment

Competencies
1. hold a relevant degree from an accredited university and/or be a member in good standing of a relevant professionally accredited organisation; 2. have sufficient experience in undertaking or reviewing IA studies (number of years of experience reflecting seniority); 3. have a good or thorough working knowledge of IA methods, including cumulative and strategic IA; 4. have a capacity to effectively lead IA studies or reviews (or carry them out effectively under direction) and to look beyond compliance to develop and promote best practice; 5. have a good understanding of the structure, functioning and interrelatedness of ecological, socio-economic, health and political systems that support sustainable development and the ability to apply this understanding to sound impact assessment, review or decision-making; 6. have a working knowledge of IA administrative systems, institutions and guidelines in the country(s) in which s/he works (including related legislation and polices), and a demonstrated ability to effectively interpret and fulfill their requirements; 7. have an ability to evaluate the adequacy of IA documents, and if appropriate to craft (and follow-up on) practical project approval conditions; and 8. have an active commitment to best practice and continuing professional development through readings, publications/presentations, training, and/or mentoring.

10.1.7 Box 10-1 presents competencies across the field of impact assessment that are relevant for those who produce, and for those who examine, EIA Reports (74). Health professionals should be responsible for, and engaged in, the health assessment of the EIA. That includes public health professionals, officers, officials and health authorities.

10.1.8 Technical competencies must reflect an expertise within the topics of IA, environment and health. A public health background is desirable with knowledge and skills across relevant health determinants. Assessments of human health are inter-disciplinary so there is a need for a flexible aptitude to engage in various topics. Experts with a high degree of specialisation can provide focus on specific topics.

10.1.9 A team should have mixed skills and the ability to translate and adapt to the technical demands for different sectors that bring forward EIA projects, i.e. projects of different natures. This ensures a comprehensive coverage of relevant health determinants and avoids a one-size-fits-all approach to scoping and assessment.

10.1.10 Public health and IA competencies should be evident across the team undertaking the health assessment, i.e. good practice would be for both the EIA Report health chapter author and technical reviewer to be competent experts. Competencies should also be evident across the team required to have sufficient expertise to examine the EIA Report and reach reasoned conclusions, i.e. the Competent Authority.

The organisational context within which the health chapter is commissioned and prepared

10.1.11 The organisational context frames the process of assessment including agreed standards by which the assessment should be completed e.g. regulations, guidance and frameworks for review. Guidance exists for reviewing completed HIA reports (75, 76) and this advice can aid the review of a health section within EIA Reports.

10.1.12 This organisational context includes ensuring that there is a workforce able to prepare and review health assessments. As with all specialist competences for public health it is recommended that professionals undertake training to gain expertise on health in EIA (73). Some Member States, such as Lithuania and Slovakia, have requirements for licensing or training programmes (77, 78). In Wales training is provided in HIA to ensure an up-to-date knowledge of assessment and a high quality of the assessments (79). This is based around knowledge and skills for HIA (80).

The health chapter itself

10.1.13 This should be well presented, technically and scientifically sound and focused on key and relevant aspects.

Good practice action by the health authority: Promote extended specialisation on impact assessment in the training curricula of the university studies of Public Health; and extended specialisation on public health in the training curricula of the university studies of Environmental Science.

Good practice action by the health authority: In supporting the Developer and Competent Authority in understanding health competence requirements, articulate expectations about soft and technical skills required for a valid assessment of health effects.

Good practice action by the Developers: In establishing the competence of those producing the EIA Report, ensure competent health experts are included in the team of consultants, as appropriate.

Good practice action by Competent Authorities: In establishing the competence of those reviewing/examining the EIA Report, clarify requirements for experts with sufficient expertise in examining 'human health' effects and enforce such requirements when appraising EIA Reports.

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12. Technical appendices

Appendix A: Screening checklist

Table A-1: Screening checklist

Key

Green highlight:	Highly relevant to health screening.
Yellow highlight:	Potentially relevant to health screening (but likely screening would focus on another EIA discipline).
Grey highlight:	Unlikely to directly relate to health screening.

Questions to be Considered. For further guidance on factors to be considered see the more detailed questions listed in the Scoping Guidance	**Yes / No /Don't know** Briefly describe	**Is this likely to result in a significant impact?** Yes/No/? – Why?
1. Will construction, operation, decommissioning or demolition works of the Project involve actions that will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)?		
2. Will construction or the operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or are in short supply?		
3. Will the Project involve the use, storage, transport, handling or production of substances or materials which could be harmful to human health, to the environment or raise concerns about actual or perceived risks to human health?		
4. Will the Project produce solid wastes during construction or operation or decommissioning?		
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air or lead to exceeding Ambient Air Quality standards in Directives 2008/50/EC and 2004/107/EC)?		
6. Will the Project cause noise and vibration or the releasing of light, heat energy or electromagnetic radiation?		
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal wasters or the sea?		
8. Will there be any risk of accidents during construction or operation of the Project that could affect human health or the environment?		
9. Will the Project result in environmentally related social changes, for example, in demography, traditional lifestyles, employment?		
10. Are there any other factors that should be considered such as consequential development which could lead to environmental impacts or the potential for cumulative impacts with other existing or planned activities in the locality?		

Questions to be Considered. For further guidance on factors to be considered see the more detailed questions listed in the Scoping Guidance	**Yes / No /Don't know** Briefly describe	**Is this likely to result in a significant impact?** Yes/No/? – Why?
11. Is the project located within or close to any areas which are protected under international, EU, or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the Project?		
12. Are there any other areas on or around the location that are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other water bodies, the coastal zone, mountains, forests or woodlands, that could be affected by the Project?		
13. Are there any areas on or around the location that are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the Project?		
14. Are there any inland, coastal, marine or underground waters (or features of the marine environment) on or around the location that could be affected by the Project?		
15. Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the Project?		
16. Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the Project?		
17. Are there any transport routes on or around the location that are susceptible to congestion or which cause environmental problems, which could be affected by the Project?		
18. Is the Project in a location in which it is likely to be highly visible to many people?		
19. Are there any areas or features of historic or cultural importance on or around the location that could be affected by the Project?		
20. Is the Project located in a previously undeveloped area where there will be loss of greenfield land?		
21. Are there existing land uses within or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying that could be affected by the Project?		
22. Are there any plans for future land uses within or around the location that could be affected by the Project?		
23. Are there areas within or around the location which are densely populated or built-up, that could be affected by the Project?		

Questions to be Considered. For further guidance on factors to be considered see the more detailed questions listed in the Scoping Guidance	**Yes / No /Don't know** Briefly describe	**Is this likely to result in a significant impact?** Yes/No/? – Why?
24. Are there any areas within or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, that could be affected by the Project?		
25. Are there any areas within or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, that could be affected by the Project?		
26. Are there any areas within or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, that could be affected by the Project?		
27. Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the Project to present environmental problems?		
28. [New] Would the project result in a widening of inequalities in society through differential or disproportionate environmental, social or economic changes to people who are more vulnerable?		
29. [New] Does the project have the potential to affect population health (through changes in determinants of health)?		

From European Commission (22, pages 56-58) with additional questions (#28-29) explicitly covering human health.

Table A-2: Screening questions

Key

Green highlight:	Highly relevant to health screening.
Yellow highlight:	Potentially relevant to health screening (but likely screening would focus on another EIA discipline).
Grey highlight:	Unlikely to directly relate to health screening.

Questions
1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the impact be unusual in the area or particularly complex?
4. Will the impact extend over a large area?
5. Will there be any potential for transboundary impact?
6. Will many people be affected?
7. [NEW] Will the health of the population, and of sections of the population (particularly vulnerable groups), be affected?
8. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
9. Will valuable or scarce features or resources be affected?
10. Is there a risk that environmental standards will be breached?
11. Is there a risk that protected sites, areas, features will be affected?
12. Is there a high probability of the effect occurring?
13. Will the impact continue for a long time?
14. Will the effect be permanent rather than temporary?
15. Will the impact be continuous rather than intermittent?
16. If it is intermittent will it be frequent rather than rare?
17. Will the impact be irreversible?
18. Will it be difficult to avoid, or reduce or repair or compensate for the effect?
19. [NEW] Will the effect be influential to the achievement of key health priorities set for the affected population (e.g. in relation to obesity)?

From European Commission (22, page 60) with additional questions (#7 and #19) explicitly covering human health and inequalities in health.

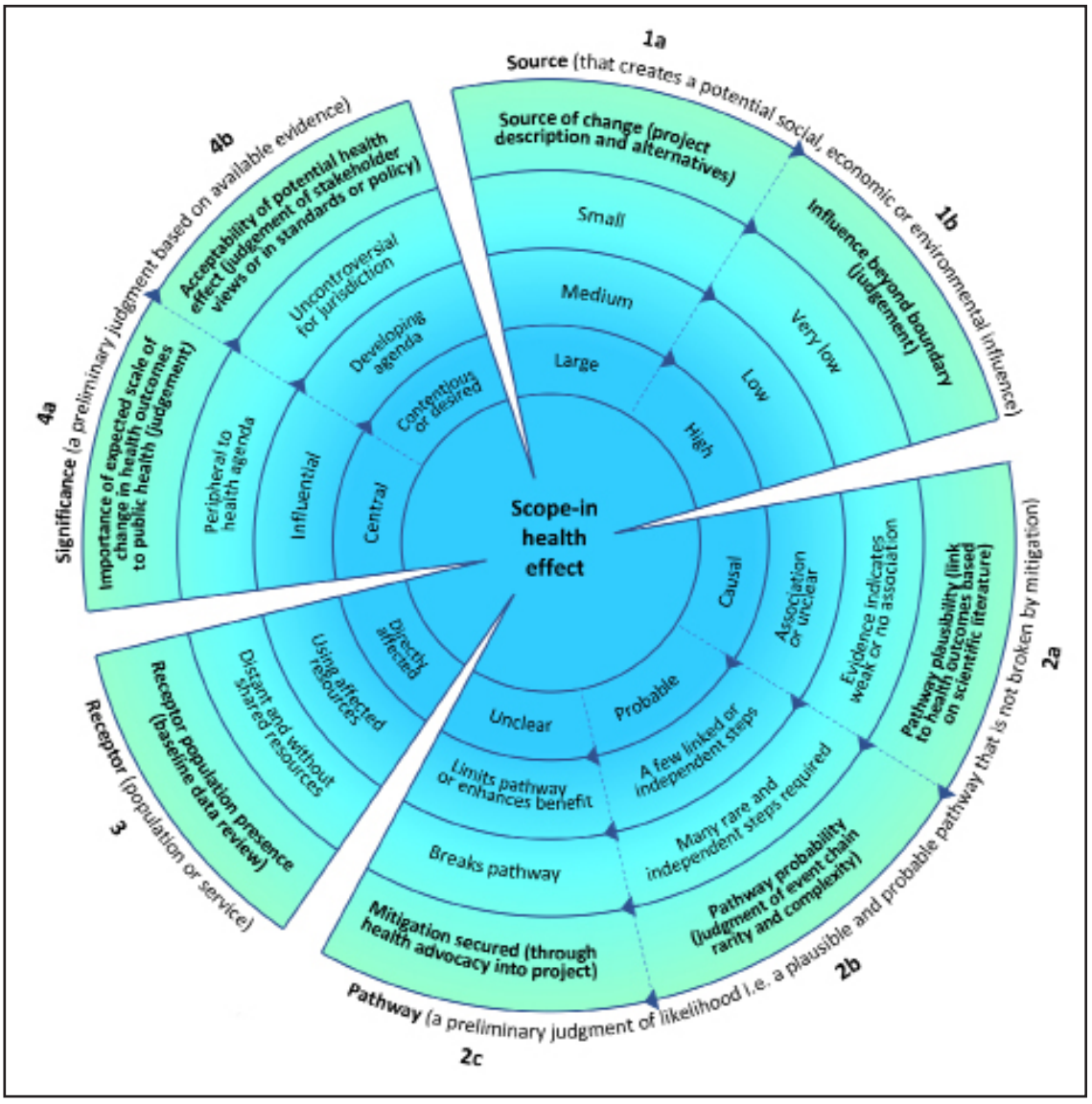
Appendix B: Scoping health as an EIA topic

Health pathway

B1. This appendix provides additional discussion of concepts and tools to inform health in EIA scoping. The aim is to provide an option that can be used or adapted, other approaches could also be used. Figure B-1 provides a conceptual model of steps (1a to 4b) and indicative decisions. It should be read clockwise (starting on the outside with the 'Source').

B2. Each segment of the figure is a step in the proportionate scoping of health in EIA, i.e. Source–Pathway–Receptor–Significance.

Figure B-1: Example of considerations during the scoping of health effects in EIA



B3. Figure B-1 could be used as a basis for a common understanding and proportionate scoping should the Developer informally engage with the health authority (e.g. a workshop tool). It could also be used by the health authority internally as a tool to support consistent and proportionate scoping advice if asked to input to the Scoping Opinion by the Competent Authority.

B4. Some steps (segments in Figure B-1) have more than one consideration (e.g.

- Source considers both the source itself (1a) and
- its effect beyond the project boundary (1b), which often differ).

B5. The circular format shows how the process can be iterative. For example, if a likely significant health effect is identified, further action should be considered at each step before the final conclusion is reported. This would typically be mitigation to break the pathway (2c).

B6. The project may include features that are purposefully included to avoid or mitigate likely significant health effects. If these features are included when scoping is conducted then determinants of health may be scoped-out of the assessment. Links between the project description and the health assessment should be made in the EIA Report (see EIA Directive, Annex IV point 7). The Competent Authority is required to reference such project features within any decision to grant Development Consent (Art.8a(1)(b) of the EIA Directive).

B7. The layers within each segment (working from the outside towards the centre) illustrate differentiating conclusions for each element of the preliminary assessment (e.g. whether a 'source' is small, medium or large).

B8. Layers closer to the centre indicate that the determinant of health should be scoped 'in' for further assessment. Layers towards the outside indicate a conclusion supporting scoping the determinant of health 'out'. The segment conclusions need to be considered together before a scoping decision is made. For example, a determinant of health that should clearly be scoped 'in' would have a combination of the following:

- a 'large source' that has a 'high influence beyond the boundary';
- a link to health outcomes that is 'causal' (as indicated by scientific evidence), 'probable' (as indicated by the project activities) and that is not broken by 'mitigation';
- that 'directly affects receptors', e.g. a population very close by; and
- an effect which is judged to be clearly important e.g. 'central to the public health agenda'.

B9. An example of such a determinant of health could be 'health and social care services' affected by the influx of construction workers to a community which could place a high demand on primary care services. It may be possible to scope this determinant of health 'out' if the Developer agrees commitments for additional health service arrangements.

B10. Often it would not be so clear-cut and there would be a range of conclusions at different levels across the segments. The overall decision on scoping is a professional judgement. Figure B1 is transparent about the underlying reasoning for making a scoping decision. Following this process should allow most conceivable health effects of a project to be scoped out with confidence and with a shared understanding between the Developer, the Competent Authority and the health authority. A successful health scoping exercise is proportionate, transparent and reasoned. The terms used in scoping, and in Figure B-1, are explained in Table B-1.

Table B-1: Terms used in scoping

Term	Definition
Source	The project feature from which the change originates. This may be a facility, structure, process, activity, vehicle fleet or workforce.
Influence beyond boundary	A source in the centre of a large development boundary (or within an enclosed structure) that would not be publicly accessible (even when operational) may have limited effect on population health even unmitigated (though occupational health considerations may be relevant).
Pathway plausibility	The aetiology reported in scientific literature (i.e. whether there is established causation between the source and health outcomes, or the level of known association (including emerging or inconclusive evidence). Only a brief literature review is proportionate at scoping.
Pathway probability	Whether the source directly leads to a change in health outcomes, or whether it would depend on a chain of events (some steps of which could be rare) for the effect to occur. This is a qualitative professional judgment based on available information.
Mitigation secured	Whether the project has committed formally to measures that break the source-pathway-receptor linkage. Typically, mitigation acts on the pathway, introducing some environmental, social or economic mediating measure between the source and receptor. This is because the source is usually fundamental to the project (i.e. removing it would negate the project – though alternative technology or timing changes may be relevant). Project alternatives may be a more relevant influence on the source than mitigation. Similarly, the receptor population is usually not removed (though they may be compensated as a last resort). As well as mitigation, secured enhancements may also be relevant to scoping positive health effects, confirming positive effect optimisation without requiring detailed assessment. Also note paragraph B.6 in relation to reporting and securing mitigation relied on at scoping.
Receptor population	For health, receptors usually equate to population groups. Typically, this means community populations, but occupational, service users and service providers may also be relevant. Scoping typically establishes the presence of relevant receptors. It can be relevant to note the potential for a vulnerable receptor population to be present (as a sub-group of the general population receptor). Consideration should be given, not only to those populations directly affected by the project (typically the most affected) but also to the population that shares resources affected by the project (e.g. who use affected services).
Importance of expected scale of change in health outcomes	As part of determining health significance, it can be relevant to consider if the expected change in population health is important given the scientific literature, baseline conditions and health priorities (local, regional or national as appropriate). More detail on this is discussed in the assessment section of this resource, at scoping only a high-level data review and answer is needed.
Acceptability of potential health effect (or desirability for a positive effect)	As part of determining health significance, it can be relevant to consider if the expected change in population health is acceptable for the setting given any consultation responses, regulatory standards and the policy context. Typically, there will be limited or no formal consultation views available at this stage of the EIA. However, a judgement can be made on the likely acceptability, including informed by the health authority's formal or informal views expressed to the Developer or Competent Authority (see paragraph 6.2.17). More detail on this is discussed in the assessment section of this resource, at scoping only a high-level data review and answer is needed.

B.11 Other health pathway models can be used to illustrate the mapping and the logic behind a scoping analysis. For example, the DPSEEA framework was developed by the WHO (81, 82) and refers to Driving forces, Pressures, State, Exposures, health Effects and Actions. The modified and enriched DPSEEA model (83) (which incorporates social, economic and behaviour aspects alongside environmental exposures) is an alternative that can support this process. It displays the way in which various forces generate pressures that affect the state of the environment and ultimately human health. Action can be taken on all levels to minimise adverse health effects.

Scoping tools

B.12 The following tables provide some illustrative scoping tools based on the main considerations for health that arise from the EC scoping tool (21). These tables should be adapted as appropriate.

B.13 Table B-2 is for scoping determinants of health. A proportionate approach may be to scope by determinant of health (e.g. housing), then within this consider a number of relevant considerations, e.g. affordability and the outdoor environment around housing, rather than scoping these in as separate health determinants. Thus, determinants of health are scoped in or out; and the relevance of considerations, including risk factors, within determinants of health are indicated with a tick or a cross. Good practice would be to also include a rationale for key scoping decisions.

B.14 Table B-3 is for scoping population groups. Again, a proportionate approach may be to scope by broad population or vulnerability category, then within this consider a number of relevant characteristics, rather than scope these in as separate populations. Table B-3 is a reference Table

B.15 Table B-4 summarises the technical, temporal and spatial health scope. This is informed by Table B-2 and Table B-3, as well as available project information.

B.16 The tables can be used as a basis for a common understanding and proportionate scoping should the Developer informally engage with the health authority (e.g. a workshop tool). They can also be used by the health authority internally as a tool to support consistent and proportionate scoping advice if asked to input to the Scoping Opinion by the Competent Authority.

Table B-2: Scoping tool for health determinants

This table provides health determinants to scope in or out and considerations, including risk factors, to discuss in the EIA Report as relevant. It is adapted from Nowacki (84).

Scoped In / Out [1]	**Determinant of health:** and considerations, including risk factors, within each determinant of health	Relevance of considerations, including risk factors [1]	**Rationale**: summary [2]
In / Out	**Healthy lifestyles:**		
	open space (green and blue) and physical activity (including in natural habitats)	✓ / X	
	sports, leisure and recreational amenities and facilities (including play)	✓ / X	
	sports, leisure and recreational connectivity and access (including safety)	✓ / X	
	sports, leisure and recreational age, sensory and mobility considerations	✓ / X	
	health promotion (including smoking cessation)	✓ / X	
	substance misuse (including alcohol)	✓ / X	
	problem gambling	✓ / X	
	communicable illness (including sexually transmitted infections (STIs))	✓ / X	
	diet (including production and access to affordable healthy food options)	✓ / X	

1 Delete as appropriate

2 Text to summarise the scoping decision. This should include mitigation that is secured and that is relied upon in making a decision, for example, when scoping a determinant out of consideration

Scoped In / Out [1]	**Determinant of health:** and considerations, including risk factors, within each determinant of health	Relevance of considerations, including risk factors [1]	**Rationale**: summary [2]
In / Out	**Housing:**		
	dwelling mix for community needs (supply)	✓ / X	
	community cohesion and social isolation	✓ / X	
	indoor environment (indoor air quality, safety, hygiene and level of crowding)	✓ / X	
	residential segregation	✓ / X	
	outdoor environment (safety, green and blue spaces and proximity to disease vector habitats)	✓ / X	
	affordability	✓ / X	
	connectivity and access	✓ / X	
	community services (including childcare and social services) accessibility and quality	✓ / X	
	social housing	✓ / X	
	specialist adaptations (e.g. age or disability)	✓ / X	
	flood risk	✓ / X	
	loss of existing housing	✓ / X	
In / Out	**Built environment:**		
	spatial planning, zoning and land allocations (including streets and routes, places, urban green space, parks, landscape)	✓ / X	
	injury risk (including drowning and falls)	✓ / X	
	waste management (including sanitation systems and wastewater reuse)	✓ / X	
	access to shops, retail food resources, financial and commercial services	✓ / X	
	susceptibility to major accidents and/or disasters (including earthquake, water surge, wildfire, landslide, pandemic etc)	✓ / X	

Scoped In / Out [1]	**Determinant of health:** and considerations, including risk factors, within each determinant of health	Relevance of considerations, including risk factors [1]	**Rationale**: summary [2]
In / Out	**Transport:**		
	road or route safety	✓ / X	
	active travel (pedestrians and cyclists)	✓ / X	
	public transport (access, connectivity and quality)	✓ / X	
	health, education and social care journey times	✓ / X	
	emergency response times	✓ / X	
	community severance	✓ / X	
	age, sensory and mobility considerations	✓ / X	
In / Out	**Community safety:**		
	police/security and emergency response	✓ / X	
	actual and perceived crime (including violence)	✓ / X	
	safeguarding and modern slavery	✓ / X	
In / Out	**Community identity and society:**		
	population in-migration (including effects on minorities, community cohesion and social isolation)	✓ / X	
	population out-migration (including effects on minorities, community cohesion and social isolation)	✓ / X	
	visual landscape/townscape change	✓ / X	
	visual lighting change (night lighting, overshadowing or reflections)	✓ / X	
	social networks and culture (including meeting spaces for voluntary, social, cultural or spiritual participation or sites of cultural significance)	✓ / X	
In / Out	**Education:**		
	school accessibility, capacity and quality	✓ / X	
	adult skills development	✓ / X	
	transitional arrangements (e.g. during construction)	✓ / X	

Scoped In / Out [1]	**Determinant of health:** and considerations, including risk factors, within each determinant of health	Relevance of considerations, including risk factors [1]	**Rationale**: summary [2]
In / Out	**Socio-economic status:**		
	employment (including quality and income)	✓ / X	
	unemployment (including job insecurity)	✓ / X	
	procurement and investment	✓ / X	
	working conditions (rewards, controls and occupational hazards)	✓ / X	
	family structure and relationships	✓ / X	
	health inequalities, social exclusion and poverty	✓ / X	
In / Out	**Climate change:**		
	extreme weather, heat stress and flood and fire injury risk	✓ / X	
	exacerbation of chronic cardiovascular and respiratory conditions	✓ / X	
	exposure to food, water and vector borne infection or toxins	✓ / X	
	food production and malnutrition	✓ / X	
	population displacement, labour productivity and economic loss	✓ / X	
In / Out	**Air quality:**		
	dust, particulates and aerosols (indoor and outdoor)	✓ / X	
	plant, processes and vehicle emissions	✓ / X	
	odour	✓ / X	
In / Out	**Water:**		
	drinking water quality (including biological and chemical agents)	✓ / X	
	drinking water quantity or access	✓ / X	
	bathing water quality (including biological and chemical agents, disease vectors)	✓ / X	
In / Out	**Soil:**		
	mobilisation of historic pollution	✓ / X	
	risk of new ground pollution (e.g. industrial agents or accidental spills)	✓ / X	
	food resources and safety (e.g. agricultural land availability and quality)	✓ / X	
In / Out	**Noise:**		
	plant, processes and vehicle disturbance	✓ / X	
	vibration	✓ / X	

Scoped In / Out [1]	**Determinant of health:** and considerations, including risk factors, within each determinant of health	Relevance of considerations, including risk factors [1]	**Rationale**: summary [2]
In / Out	**Radiation:**		
	electro-magnetic fields, actual risk	✓ / X	
	electro-magnetic fields, understanding of risk (risk perception)	✓ / X	
	ionising, actual risk	✓ / X	
	ionising, understanding of risk (risk perception)	✓ / X	
In / Out	**Health and social care services:**		
	primary care[3]	✓ / X	
	secondary care (including hospitals)[3]	✓ / X	
	ambulance service[3]	✓ / X	
	social services (including use of community centres)[3]	✓ / X	
	health protection (including screening and epidemic response)[3]	✓ / X	
	occupational health services[3]	✓ / X	
	dental service[3]	✓ / X	
	pharmacy[3]	✓ / X	
	sexual health services[3]	✓ / X	
	mental health services[3]	✓ / X	
	transitional arrangements (e.g. during construction)	✓ / X	
	recruitment and retention of staff	✓ / X	
	preparedness for emergency scenarios (major accidents and/or disasters)	✓ / X	
In / Out	**Wider societal benefits:**		
	energy infrastructure	✓ / X	
	transport infrastructure	✓ / X	
	waste management infrastructure	✓ / X	
	water infrastructure	✓ / X	
	communication and IT infrastructure	✓ / X	
	economic	✓ / X	
	climate change (including improved air quality and preparedness for extreme weather events such as heat and/or flooding)	✓ / X	
	natural environment (including biodiversity, natural spaces and habitats)	✓ / X	

3 Consider accessibility, capacity and quality of the service

Table B-3: Scoping tool for population groups

Population groups to consider when completing Table B-2 including associated characteristics to discuss in the EIA Report as relevant, particularly in relation to potential inequalities.

Population and associated characteristics within population
General population:
residents
construction workforce
operational workforce
decommissioning workforce
service providers
visitors to the area
road users
users of the project's services
Young age vulnerability:
children
young adults
unborn children (and their mothers)
Older age vulnerability:
older people
frail elderly
Income vulnerability:
unemployed people
people on low incomes
people with regular shift work
people with low job security or with few progression prospects
people unable to work due to poor health
Health status vulnerability:
people with existing poor physical or mental health (including where related to disabilities)
carers of people with existing poor physical or mental health
Social disadvantage vulnerability:
people who experience social isolation
people who are discriminated against, for example, due to their gender; sexuality; disability; membership of ethnic group; nomadic peoples or membership of faith and belief groups.
Access and geographic vulnerability:
people experiencing barriers in access to services, amenities or facilities (including barriers experienced by service providers)
people living in areas known to exhibit high deprivation or poor economic and/or health indicators
people in close proximity to the location of changes occurring as a result of project activities. Although these groups may not be 'vulnerable' they are likely to be more sensitive to the changes

Table B-4: Tool for setting the technical, temporal and spatial scopes

Select one or more terms from each row for each determinant of health that is scoped in (i.e. one row per determinant of health). Aim to keep a focused scope in all columns.

Determinant of health	Stage	Study area	General population characterisation	Vulnerable population groups	Indicative health outcomes / measures
Healthy lifestyles Housing Built environment Transport Community safety Community identity and society Education Socio-economic status Climate change Air quality Water Soil Noise Radiation Health and social care services Wider societal benefits	All stages Construction Operation Decommissioning	Neighbouring community (site specific population) Wider community (local population) Regional population National population International population	Residents Construction workforce Operational workforce Decommissioning workforce Service providers Visitors to the area Road users Users of the project's services	Young age Older age Income Health status Social disadvantage Access and geographic	Quality of life Morbidity risk Mortality risk Cardiovascular risk Respiratory health Mental health Communicable illness incidence Non-communicable disease prevalence Injury risk Toxicology Obesity Life expectancy Hospital admissions Cancer risk Time to diagnosis Time to treatment Well-being Sleep disturbance Cognitive performance Nutrition
E.g. Housing	Operation	Wider community (local population)	Residents	Older age Income Health status	Injury risk Quality of life Respiratory health

Appendix C: Analysing multiple criteria to establish significance in EIA

C.1 This appendix provides additional discussion of concepts and tools to inform EIA health assessment. This provides options that can be used or adapted. Other approaches could also be used. Figure C-1, Figure C-2 and Figure C-3 collectively provide a conceptual model with criteria and indicative decisions that examine what it means for a health effect to be significant or not-significant. Table C-4 suggests how health information could be presented as a reasoned narrative that concludes on significance.

C.2 These concepts and tools can be used as a basis for a common understanding of methods for consistently and transparently determining EIA health significance across a wide range of determinants of health. A common understanding and approach between the health authority, Developer and Competent Authority would be beneficial (and could be agreed at the scoping stage). The approach could also be used by the health authority internally to support consistent and proportionate feedback on the EIA Report's health assessment if requested. Feedback could be informally requested by the Developer (e.g. review of a draft EIA Report) or formally by the Competent Authority (e.g. as a consultee to the final EIA Report).

C.3 Analysis of multiple criteria is an established approach to determining significance in EIA (14,16). *Sensitivity* and *magnitude* are two criteria that are used across EIA topics. These are part of determining health significance but need to be broken down for each determinant of health to properly show how a finding has been reached. The *sensitivity* of the population and the *magnitude* of effect need to be considered in the context of other sources of evidence such as:

- scientific literature;
- baseline conditions for the population;
- consultation for the project;
- health priorities in the jurisdiction;
- regulatory standards in the jurisdiction; and
- health policy context in the jurisdiction.

C.4 Figure C-1 (sensitivity criteria), Figure C-2 (magnitude criteria) and Figure C-3 (contextual criteria informing significance) collectively illustrate one option for an analysis of multiple criteria. Not all criteria within these figures will be relevant in every case. The EIA health analysis should focus on the most relevant criteria within each figure.

C5. The terms within each figure are not exhaustive and can be adapted to the specific context of the project. There is no clear cut-off between effects that are significant and those that are not significant. It is a matter of professional judgement. This approach supports all parties to reach a consensus.

C.6 Figure C-3 shows that there are many opportunities to act on potentially significant health effects of a project. The Developer can adapt the design and put other forms of mitigation in place. National governments and local administrations can formulate health priorities that give importance to particular issues or formulate polices that determine acceptability. Significance may also be influenced by baseline changes (other than the project) and by the scientific literature that is published.

C.7 Figure C-1, Figure C-2 and Figure C-3 show how different evidence sources could inform a professional judgment on EIA significance. Each figure has a set of concentric circles. These could correspond to EIA categories of high, medium, low and negligible (sensitivity and magnitude) or major, moderate, minor and negligible (significance) if appropriate.

C.8 Each set of concentric circles is an analysis of multiple criteria. 'Sensitivity' (Figure C-1) and 'magnitude' (Figure C-2) feed into the analysis of 'significance' (Figure C-3). The layers allow for a different conclusion for each criterion (segment) of the analysis. For example, in relation to 'life stage' is the population best characterised as 'independant', 'providing care' or 'dependant'?

C.9 Points that are closer to the centre indicate a 'high sensitivity', 'high magnitude' or a 'significant health effect' depending on the figure. Layers towards the outside indicate a conclusion supporting a 'low sensitivity', 'low magnitude' or a 'not significant health effect'.

C.10 When using the figures, all the relevant segment conclusions need to be considered together before a decision is made. The overall decision on significance is a professional judgement, which may be informed by contextual factors as well as be sensitivity and magnitude.

C.11 Figure C-1, Figure C-2 and Figure C-3 are transparent about the underlying reasoning for making a significance decision. Whilst this is not intended to be used formulaically, broadly following such an analysis should support a consistent approach to presenting a written narrative of the reasoned conclusions describing whether a likely health effect is significant.

C.12 A narrative approach offers more nuance by contextualising sensitivity and magnitude alongside relevant importance and acceptability (or desirability) considerations. This can be beneficial as sensitivity and magnitude alone can at times offer limited differentiation between project alternatives or mitigation options. Furthermore, there is usually resistance or caution to the case for health sensitivity being characterised as 'low' and for the magnitude of project change that affects health being characterised as 'low'. Where such resistance or caution is encountered this tends to push the assessment towards concluding that most health effects are significant, even with mitigation. A narrative that encompasses a proportionate but sufficiently broad range of evidence sources to establish not only the sensitivity of the affected population and the magnitude of changes arising from the project, but also the importance, desirability or acceptability of the change in population health enhances the ability of the Competent Authority to identify the health issues that are material to the planning decision (i.e. which should play a key part in the decision on Development Consent).

C.13 The health authority, Developer and Competent Authority will want to reach a shared understanding of the range of project specific and contextual issues that may be relevant to concluding on health significance. The conceptual model, comprising of Figure C-1, Figure C-2 and Figure C-3, is one way in which this shared understanding can be reached. A successful health assessment is proportionate, transparent and reasoned.

Considering *sensitivity*

C.14 Sensitivity is understood as the sensitivity of the receptor (e.g. population) to change, including its capacity to accommodate the changes the project may bring about (adapted from (23)). Figure C-1 breaks down sensitivity in terms of criteria (segments) and indicative classifications (levels) to transparently explore what it means to have a high, medium, low or negligible health sensitivity.

Figure C-1: Health sensitivity: conceptual model

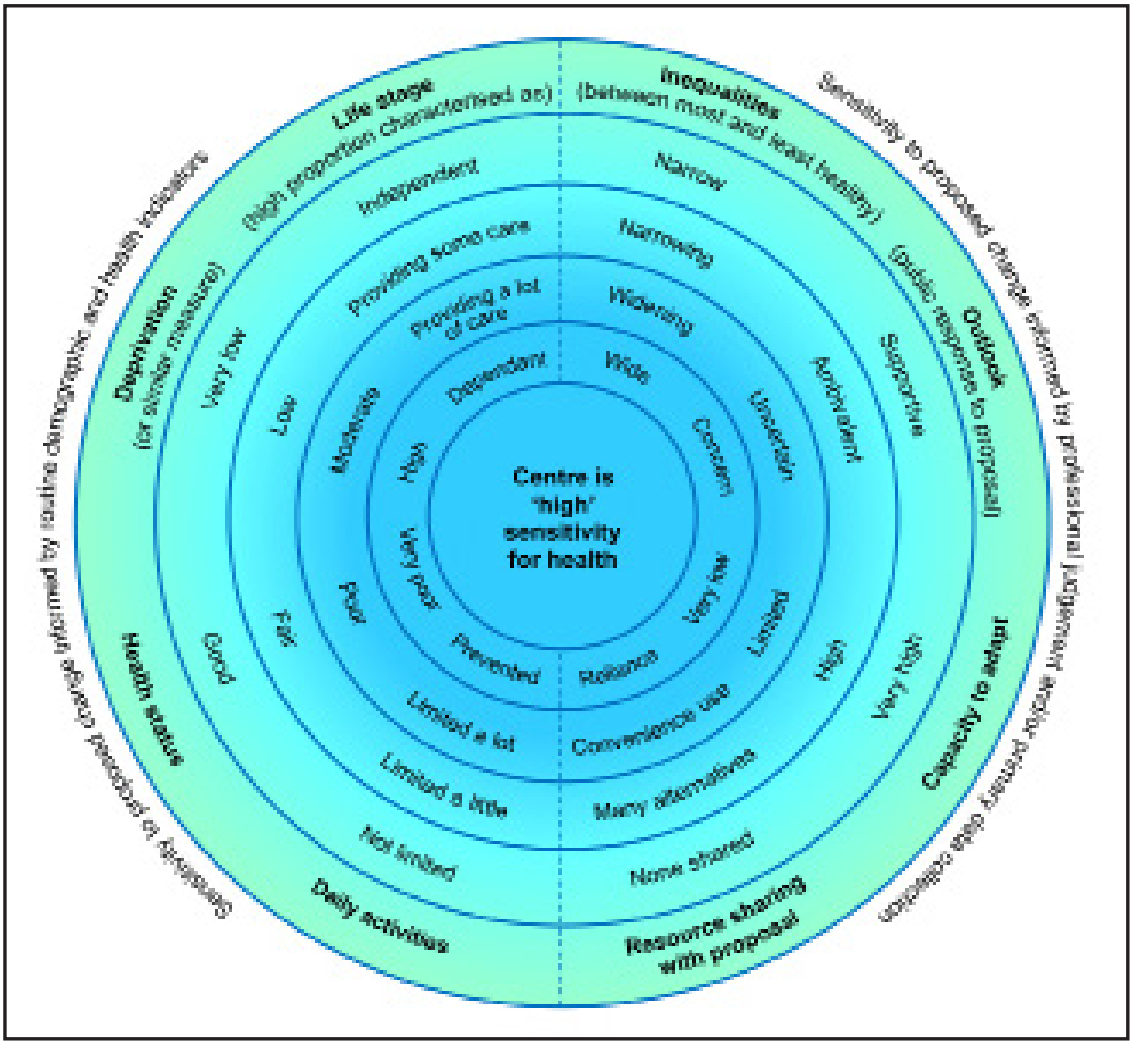


Table C-1: Terms to define sensitivity

Term	Definition
Life stage	Life-course analysis is often used in public health and reflects differing health sensitives and needs at different ages. Typically, children and elderly are particularly sensitive to change, including due to being dependants. Those providing care may also be more affected by project changes or less able to take advantage of project opportunities. Consider if particular age groups are likely to experience effects more strongly, e.g. pregnant women and their unborn children; the very young; the very old; or working age people (benefiting from jobs). Also consider if some groups are more likely to be at home during the day, (for example, due to low economic activity or shift work); or whether people with higher levels of dependence on carers or public transport can access alternatives to, or respite from, project effects.

Term	Definition
Deprivation	Deprivation is a term with different indicators in different Member States. Common distinctions are between material and social deprivation or between absolute and relative deprivation. Regardless of the appropriate measure for the context, deprivation reflects an increased sensitivity due to lack of ownership of or access to assets, including those that support good health. Deprivation differences between areas are indicative of social gradients, which are central to the consideration of health inequalities. The potential for localised high deprivation within wider areas showing average or low deprivation should always be considered. Consider if the population is already stressed by limited resources or high burdens as well as if groups are affected that have reduced access to financial, social and political resources.
Health status	An overall measure of population health, either self-reported within routine statistical surveys/censuses or using an empirical public health measure such as life expectancy at birth. Areas with a poor health status are typically of higher sensitivity. Consider the degree to which the population includes those with pre-existing conditions and/or disability that would make them more susceptible to the change (particularly multiple or complex long-term health conditions).
Daily activities	Similar to health status, the ability of people to perform day-to-day activities is relevant to their sensitivity, particularly where there are changes in access to services or community amenities. If not part of routine statistics this can be a professional judgement. Consider the extent to which people affected are particularly reliant on access to health service facilities, staff or resources.
Inequalities	Refers to descriptive measures of difference in exposure to health risk factors, and to differences in health status between groups of people (40). Where inequalities between areas or populations are wide (or at risk of widening), this indicates greater sensitivity. Principles of equity may also be relevant. Consider if the population experiences a high degree of inequalities (disproportionate effects between groups, not only those defined in relation to discrimination such as age and gender, but also in relation to other factors that may affect health outcomes, such as socio-economic status).
Outlook	People's understanding or views of the project can be highly influential to their psychological and even physiological response to project changes. Such views may change through the project and depend on trust in the Developer and regulators. Where there are strong and persistent concerns, sensitivity, particularly to mental health effects, is higher. Consider if there are people with strong views (or high degrees of uncertainty) about the project who may anticipate risks to their health and well-being and thus be affected by not only actual changes, but also by the possibility of change.
Capacity to adapt	Also known as resilience, the ability of the population or service to absorb the change or voluntarily (consciously or unconsciously) make small changes to their behaviour that lessen its effects. For example, a minor increase in use of health services where a small non-home-based project workforce is present may be within the usual capacity of the services. If this is the case it will have no adverse effect on service quality for the resident population (or service providers). It should be noted that in line with the mitigation hierarchy, expecting behavioural change as a formal way to avoid or reduce an adverse effect is not recommended.
Resource sharing with the project	Where a project affects a resource (service, power supply, water supply, highway capacity, school places etc.), the effects may extend a great distance from the development boundary, e.g. regional hospital capacity being affected by a workforce who move to an area for a project. Where there is high resource sharing and a lack of easily accessible alternatives, the population sharing the resource may be more sensitive.

Considering magnitude

C.15 Magnitude considers the characteristics of the change which would affect the receptor (population) as a result of the project (adapted from (23)). Figure C-2 breaks down magnitude in terms of criteria (segments) and indicative classifications (levels) to transparently explore what it means in health terms to have a high, medium, low or negligible magnitude.

Figure C-2: Health magnitude: conceptual model

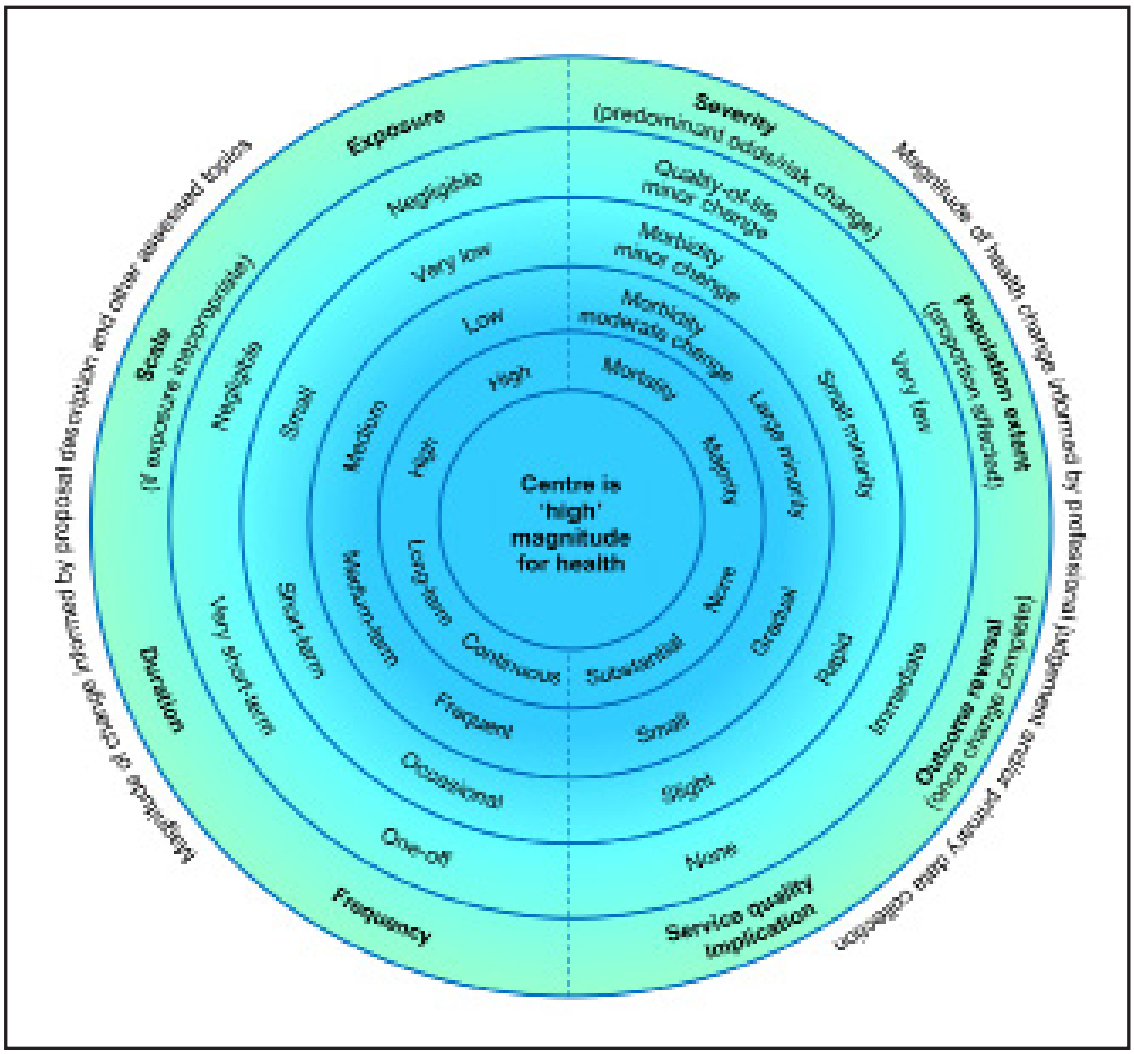


Table C-2: Terms to define magnitude

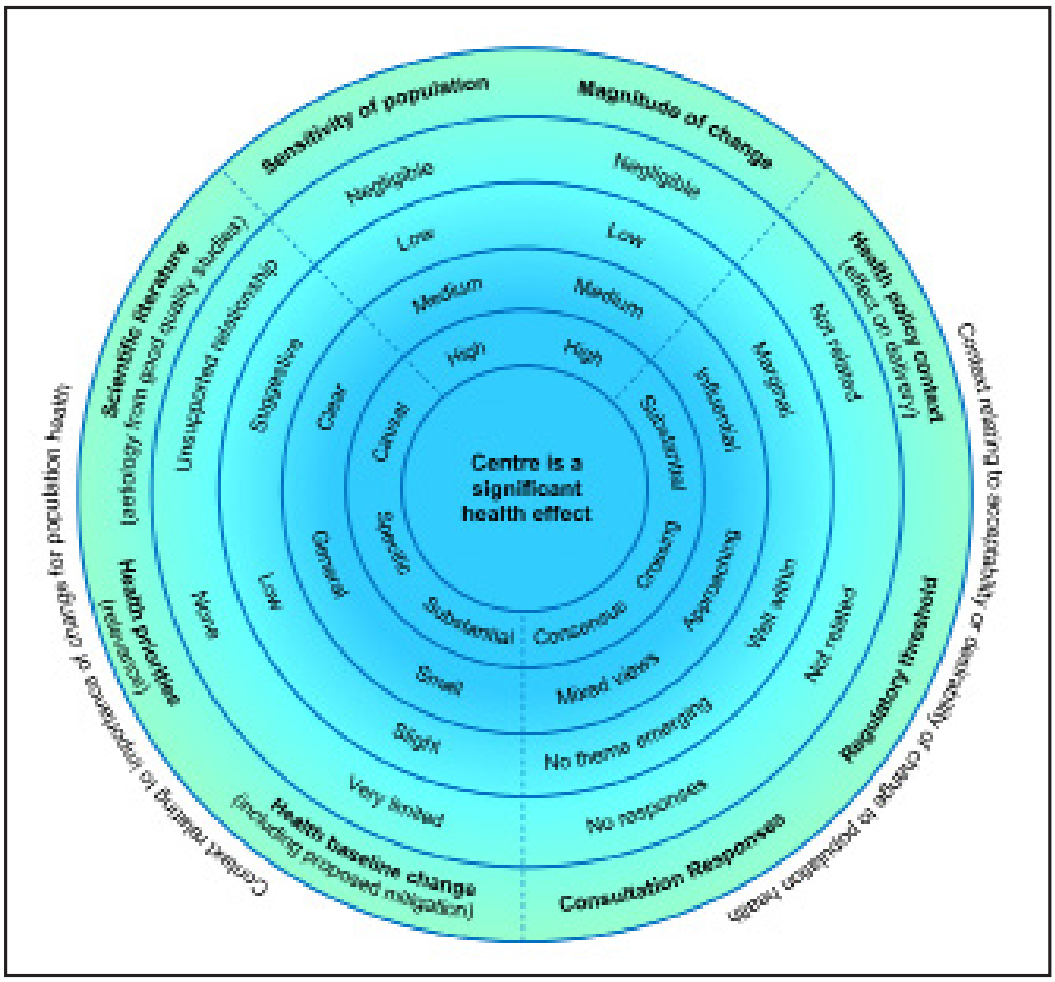
Term	Definition
Exposure	Exposure tends to vary with proximity of the population to the source, but also has an important time dimension relevant to health e.g. low concentrations over a long period, or high concentrations over a short period.
Scale	The scale of change is a useful characterisation, particularly when 'exposure' is not a relevant descriptive for the type of effect. For example, the scale of change in open space available for physical activity.
Duration	The length of time an effect occurs for is a key consideration for health. Typically, effects that continue for a long duration are of greater magnitude (including inter-generational effects). Where effects are best characterised as short-term, other factors such as scale or exposure may still indicate that the change is of high magnitude (i.e. short-term effects are not automatically low magnitude). Appropriate reference periods for duration should be selected as some projects' activities can span weeks whilst others span decades.
Frequency	How often the population or service would be affected should be characterised. Effects that are frequent or continuous are likely to indicate greater magnitude. However, even where the effect would be occasional, other factors such as scale or exposure may still indicate that the change is of high magnitude (i.e. occasional effects are not automatically low magnitude).

Term	Definition
Severity	Health severity relates to the type of health outcome affected (for example, if the change is predominantly related to mortality, disease, nuisance or well-being). It may also relate to the type of change relative to the baseline conditions (for example, onset of new conditions, affecting existing conditions or change to day-to-day functioning). Whilst there is not a rigid hierarchy of health severity, changes in mortality (i.e. death) indicate a higher magnitude than changes in only well-being or quality of life (less severe). However, this should not exclude a change in quality of life from being a high magnitude effect. This underlines the importance of using this analysis of multiple criteria as a guide for writing a narrative that contextualises each decision and the interrelationship between factors.
Population extent	How much of the population (defined by the assessment) is affected is influential to the magnitude decision? Where most of the study area's population is affected this would indicate a higher magnitude. This is not to downplay cases where only a few people are affected to a high degree. However, given that a population health conclusion is being reached it is helpful to understand how widespread the change may be. E.g. where only a few people are affected this may indicate greater potential for targeted mitigation. Where feasible the size of the affected population should be estimated quantitatively. It is noted that this measure is influenced by how the 'population' is defined. Also consider if there is likely to be substantial population displacement or influx. Where the effect is best characterised as only affecting a few individuals, this may indicate that a population health effect would not occur. Such individuals should still be the subject of mitigation and discussion, but in EIA and public health terms the effect may not be a significant population health change.
Outcome reversibility	Some changes in health outcomes rapidly reverse once the source is removed (e.g. many short-term nuisance related effects on well-being). In other cases, health effects may reverse at a slower rate (e.g. gradual returns to physical activity levels once access is resorted to amenities). However, in some cases health effects should be considered permanent indicating a higher magnitude.
Service quality implication	As well as direct changes to population health, there may be an associated or independent change in the quality of services that support or facilitate good health (including health services, schools, social care etc…). For example, where direct population health reductions (or population influx) increase demand on services that consequently reduce in quality, the magnitude of the effect on health is amplified. Appropriately supporting services to avoid this can be an important aspect of mitigation.

Judging significance

C.16 Significance relies on informed, expert judgement about what is important, desirable or acceptable with regards to changes triggered by the project in question (21, 23). Figure C-3 breaks down significance in terms of criteria (segments) and indicative classifications (levels) to transparently explore what it means for a health effect to be significant or not significant.

Figure C-3: Health significance: conceptual model



C.17 **Sensitivity**: The sensitivity of the population affected as informed by the analysis of multiple criteria discussed in Figure C-1. Including consideration of both the general population for an area and for vulnerable groups as a sub-population relevant to sensitivities for the determinant of health being assessed. Conclusions on sensitivity may be influenced by contextual factors discussed below.

C.18 **Magnitude**: Can refer to the magnitude of changes arising from the project and/or the magnitude of the health change. It is informed by the analysis of multiple criteria discussed in Figure C-2. Conclusions on magnitude may be influenced by contextual factors discussed below.

C.19 Table C-3 sets out some questions to consider about evidence sources used to inform the professional judgment on significance.

Table C-3: Contextual factors to consider when judging health significance in EIA

To consider	Questions to be adapted as appropriate
Scientific literature can indicate if there is evidence to support an association between changes arising from the project, a relevant determinant of health and a relevant health outcome. It may be relevant to note well evidenced thresholds, prerequisite conditions or population groups identified as being particularly susceptible. If appropriate the type of relationship can be described, e.g. linear, exponential etc. Databases such as PubMed can be searched for systematic reviews and meta-analyses. Scientific literature can indicate the aetiology and potentially degree of change, but careful consideration should be given to the internal validity (quality of the study), the external validity (the generalisability of those findings to the particular context) and to the strength of evidence (including emerging evidence since the last systematic reviews or meta-analyses). Recognised hierarchies of study quality should be followed (i.e. searches for and use of systematic reviews, meta-analyses in the first instance and only resorting to grey literature where no better-quality studies are available).	What do good quality studies tell us? Is there a causal relationship, or clear association of sufficient effect size, between the changes that would result from the project and changes in health outcomes? Does scientific literature provide thresholds at which effects occur or describe conditions that are necessary for effects to occur? Does scientific literature identify any population groups as being particularly susceptible to the potential changes?
Baseline conditions can establish if relevant sensitivities or inequalities identified in the scientific literature are present. It may be relevant to note if conditions differ from local, regional or national comparators, or if geographic or population features may amplify effects. Public health profiles and indicator sets can be used. The change in the health baseline will be informed by not only the magnitude of project change and the sensitivity of the population, but also by external factors affecting the future baseline (including cumulative effects of other projects) and project specific committed mitigation and enhancement.	How does the baseline for the population that is likely to be affected by the project compare with the local, regional or national baseline? Are population groups that are identified in the scientific literature as being particularly susceptible to the potential changes due to the project, present in the population of interest? Could the project (taking into account secured measures to improve it, e.g. mitigation) result in an important change in the health baseline, this could be a substantial change or even a small change in a large or highly vulnerable population?
Health priorities can identify if relevant determinants of health or health outcomes have been identified as particularly important locally, regionally or nationally. Health and well-being strategies, health needs assessments or similar can be reviewed.	Have health priorities been set by health authorities for the relevant study area that are of specific or general relevance to the determinant of health or population group affected by the project?
Consultation response themes can indicate the extent to which stakeholders and the public support, or have concerns, uncertainty or ambivalence on relevant determinants of health or health outcomes. Where there is consensus on a health issue (particularly between the affected community and the health authority) this may be influential to the reasoned conclusion as to whether that effect is significant for the context.	Reflecting on the consultation for the project, have themes emerged on relevant determinants of health or health outcomes, including either consensus or mixed views between stakeholders?

To consider	Questions to be adapted as appropriate
Regulatory standards (if applicable) can identify where there would be formal monitoring by regulators. Discussion may include EIA modelling results on the extent to which regulatory or statutory limit values would be met. It may also be relevant to discuss advisory guidelines. Limit values for occupational exposure tend to differ from non-occupational exposure. Where thresholds have been set these do not mean that there would be no health effect below these levels. For example, in the case of fine particulate matter and nitrogen dioxide there are non-threshold health effects (i.e. no known limit below which health effects may not occur). In such cases an informed discussion about what is acceptable for the jurisdiction is appropriate. For example, giving the public confidence in thresholds set by government for the purpose of health protection having taken into account other social, economic and environmental considerations.	Would the change in the determinant of health be formally monitored by regulators? Are there regulatory, or statutory, limit values set for the determinant of health in the relevant jurisdiction? Is there other, e.g. international, guidance on the determinant of health in question? Has EIA modelling predicted a change that exceed thresholds identified in the scientific literature, set by regulators or in other guidance? Where there is a regulatory threshold or standard, could the change due to the project result in that threshold being crossed or nearly crossed (approached)?
Health policy context can identify published local, regional or national government position statements that raise particular expectations for the relevant project change, determinant of health or health outcome. The project may also affect existing health policy delivery to varying degrees (e.g. a substantial, influential or marginal effect on health policy delivery). The health policy context may include adopted local area development plans or references (implicit or explicit) to health in published planning policies. Wider international health policies or treaties may also be relevant. Where government policy has specific reference to delivering local health benefit in the project's study area (in contrast to a policy agenda of geographically unspecified or wider societal benefits) this can be partially relevant at the project level (i.e. the acceptability of certain effects may depend on whether the project supports delivery of those policy expectations or not).	Does policy, at local, regional, national or international level, set particular expectations for the change in determinant of health or health outcome? Could the changes due to the project have a substantial or influential effect on the ability to deliver current health policy?

Based on reviews of relevant health guides (24, 28, 29) and EC guidance (23)

C.20 Reporting the likely significant health effects of a project should aim to present the professional judgment as a narrative (rather than a formulaic checklist or matrix) setting out the reasoned conclusions and supporting evidence. Table C-4 provides a guide script for assessment authors to illustrate how various criteria could be introduced and integrated. This is for the assessment section only and excludes introductory sections.

Table C-4: An illustrative narrative for assessing a determinant of health

The points below set out a structure for reporting a determinant of health that is scoped in, e.g. Transport.

1. Source of change [project feature or activity description (including any alternatives), define temporal scope]
2. Population(s) affected, including vulnerabilities [scientific literature on susceptible populations, define spatial study area]
3. Main population health outcome(s) or measure(s) [scientific literature reference]
4. Any known thresholds for effect [scientific literature reference]
5. Causal pathway likelihood
    - Plausibility [aetiology scientific literature reference, baseline presence of population groups]
    - Probability [qualitative statement about number and independence of steps involved in pathway]
6. Context in which professional judgement is reached:
    - Contextual factors relating to importance of change in determinant of health for the setting [scientific literature that this is a key or emerging public health issue, health priorities for the study area]
    - Contextual factors relating to acceptability of change in determinant of health for the setting [alignment with health policy, compliance with regulatory standards, health stakeholder consultation themes]
7. Mitigation secured to limit effect or break pathway (or enhancements to increase positive effects or reinforce beneficial pathway – noting responsibilities and securing mechanisms)
8. Residual baseline change [including reasoned statement about any future baseline trend]
    - Sensitivity to project change – [as relevant: baseline demographics (life stage, deprivation, health status, daily activities), inequalities, outlook (public consultation themes if available), capacity to adapt, resource sharing with the project]
        - o Characterise general population and vulnerable group population
    - Magnitude of project change [project description/other assessment summaries – exposure, scale, duration, frequency]. And/or magnitude of health change [reasoned statement – severity, extent, reversibility, service quality]
        - o Characterise effect on general population and on vulnerable group population
9. Professional judgement on significance, including any differences between the general population and vulnerable group population and how these may change over time [briefly drawing together sensitivity and magnitude, as well as importance of expected change for public health/health services and/or the acceptability (or desirability) of the potential health effect (e.g. in the context of health policy and regulation)]
10. Describe any monitoring and adaptive management of likely significant adverse effects

Appendix D: Assessment checklist

D.1 The checklist can be used by the health authority internally to support consistent and proportionate feedback on the EIA Report's health assessment if requested. Feedback could be requested informally by the Developer (e.g. review of a draft EIA Report) or formally by the Competent Authority (e.g. as a consultee to the final EIA Report). Instructions on use of this checklist are provided in the source document (23, p 88).

D.2 Notably, in considering whether the information is complete and sufficient the reviewer should consider whether there are any omissions in the information and whether these omissions are *vital* to the consultation or decision-making processes.

D.3 If these omissions are not vital, then it is likely unnecessary to identify or request Further Information (which is a formal process lead by the Competent Authority that could delay the EIA process).

Table D-1: Assessment checklist: description of the likely significant effects of the project

Key

Green highlight:	Highly relevant to assessment.
Yellow highlight:	Potentially relevant to assessment (but likely issue would focus on another EIA discipline or be a general point across the EIA).
Grey highlight:	Unlikely to directly relate to assessment.

No.	Review Question	Relevant?	**Adequately addressed?**	What further information is needed?
Prediction of Direct Effects				
3.5	Have the direct, primary effects on land uses, people, and property been described and, where appropriate, quantified?			
3.6	Have the direct, primary effects on geological features and characteristics of soils been described and, where appropriate, quantified?			
3.7	Have the direct, primary effects on biodiversity been described and, where appropriate, quantified? (if relevant, are references made to Natura 2000 sites? (Directive 2009/147/EC and Directive 92/43/EEC))			
3.8	Have the direct, primary effects on the hydrology and water quality of water features been described and, where appropriate, quantified?			
3.9	Have the direct, primary effects on uses of the water environment been described and, where appropriate, quantified? (if relevant, are references made for River Basin Management Plans/Programmes of Measures under the WFD (2000/60/EC))			
3.10	Have the direct, primary effects on air quality been described and, where appropriate, quantified? (if relevant, are references made to Air Quality Plans under Directives 2008/50/EC and 2004/107/EC))			

No.	Review Question	Relevant?	**Adequately addressed?**	What further information is needed?
3.11	Have the direct, primary effects on climate change been described and, where appropriate, quantified?			
3.12	Have the direct, primary effects on the acoustic environment (noise or vibration) been described and, where appropriate, quantified? (if relevant, are references made to Action Plans/Programme under the Environmental Noise Directive (2002/49/EU))			
3.13	Have the direct, primary effects on heat, light or electromagnetic radiation been described and, where appropriate, quantified?			
3.14	Have the direct, primary effects on material assets and depletion of natural resources (e.g. fossil fuels, minerals) been described?			
3.15	Have the direct, primary effects on locations or features of cultural importance been described?			
3.16	Have the direct, primary effects on the quality of the landscape and on views and viewpoints been described and, where appropriate, illustrated?			
3.17	Have the direct, primary effects on environmentally relevant demography, social, and socio-economic condition in the area been described and, where appropriate, quantified?			
3.18	Have the secondary effects on any of the environment's aspects, above, caused by primary effects on other aspects been described and, where appropriate, quantified? (e.g. effects on biodiversity, including species and habitats protected under Directives 92/43/EEC and 2009/147/EC caused by soil, air or water pollution or noise; effects on uses of water caused by changes in hydrology or water quality; effects on archaeological remains caused by desiccation of soils)			
3.19	Have the temporary, short term effects caused only during construction or during time limited phases of Project operation or decommissioning been described? (e.g. emissions produced during the construction)			
3.20	Have the permanent effects on the environment caused by construction, operation or decommissioning of the Project been described?			
3.21	Have the long-term effects on the environment, caused over the lifetime of Project operations or caused by build-up of pollutants, in the environment been described?			

No.	Review Question	Relevant?	**Adequately addressed?**	What further information is needed?
3.22	Have the effects that could result from accidents, abnormal events or exposure of the Project to natural or man-made disasters been described and, where appropriate, quantified?			
3.23	Have the effects on the environment, caused by activities ancillary to the main Project, been described? (ancillary activities are part of the Project but usually take place at a distance from the main Project location e.g. construction of access routes and infrastructure, traffic movements, sourcing of aggregates or other raw materials, generation and supply of power, disposal of effluents or wastes). For further guidance and explanation concerning ancillary works assessment see the note provided by the European Commission (85).			
3.24	Have the indirect effects on the environment caused by consequential development been described? (consequential development is other Projects, not part of the main Project, stimulated to take place by implementation of the Project e.g. to provide new goods or services needed for the Project, to house new populations or businesses stimulated by the Project)			
3.25	Have the cumulative effects on the environment of the Project, together with other existing or planned developments in the locality, been described? (different future scenarios including a worst-case scenario should be described, as well as the effects on both climate change and biodiversity). For further guidance on the assessment of cumulative impacts see the European Commission (86) and EC DG XI Environment (87).			
3.26	Have the transboundary effects on the environment of the Project, either during construction or operation, been described?			
3.27	Have the geographic extent, duration, frequency, reversibility, and probability of occurrence of each effect been identified as being appropriate?			

No.	Review Question	Relevant?	**Adequately addressed?**	What further information is needed?
Prediction of Effects on Human Health and Sustainable Development Issues				
3.28	Have the primary and secondary effects on human health and welfare described and, where appropriate, been quantified? (e.g. health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups).			
3.29	Have the impacts on issues such as biodiversity, marine environment, global climate change, use of natural resources and disaster risk been discussed, where appropriate?			
Evaluation of the Significance of Effects				
3.30	Is the significance or importance of each predicted effect clearly explained with reference to legal or policy requirements, other standards, and the number, importance, and sensitivity of people, resources or other receptors affected?			
3.31	Where effects are evaluated against legal standards or requirements, have the appropriate local, national or international standards been used and has relevant guidance followed?			
3.32	Have the positive effects on the environment been described, as well as the negative effects?			
Impact Assessment Methods				
3.33	Have the methods used to predict the effects described, and the reasons for their choice, any difficulties encountered, and uncertainties in the results been discussed?			
3.34	Where there is uncertainty about the precise details of the Project, and its impact on the environment/climate change, have worst-case predictions been described?			
3.35	Where there have been difficulties in compiling the data needed to predict or evaluate effects, have these difficulties been acknowledged and their implications for the results been discussed?			
3.36	Has the basis for evaluating the significance or importance of impacts been described clearly?			
3.37	Have the impacts been described on the basis that all Mitigation Measures proposed have been implemented i.e. have the residual impacts been described?			

No.	Review Question	Relevant?	**Adequately addressed?**	What further information is needed?
3.38	Is the level of treatment of each effect appropriate to its importance for the Development Consent decision? Does the discussion focus on the key issues and avoid irrelevant or unnecessary information?			
3.39	Is appropriate emphasis given to the most severe, adverse effects of the Project with lesser emphasis given to less significant effects?			
Other Questions relevant to Description of Effects				
	Have, with a view to avoiding duplication of assessments, the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report been taken into account? If so, how was this done?			
	[NEW] Has the potential for health inequalities been appropriately articulated within the assessment, so it is clear to the Competent Authority if there are likely significant effects (positive or negative) for a vulnerable sub-population that differ from the finding for the general population?			

Appendix E: Consultation checklist

E.1 Please see paragraphs D.1 to D.3, which also apply to this checklist.

Table E-1: Assessment checklist: references to consultation

Key

Green highlight:	Highly relevant to health consultation.
Yellow highlight:	Potentially relevant to health consultation (but likely consultation would focus on another EIA discipline).
Grey highlight:	Unlikely to directly relate to health consultation.

No.	Review Question	Relevant?	Adequately addressed?	What further information is needed?
Scoping of Effects				
3.3	Was consultation carried out during Scoping?			
3.4	Have the comments and views of consultees been presented?			
	[NEW] Has the health authority (including but not limited to national, regional and local public health teams) been consulted at the scoping stage?			
	[NEW] Has the health authority (including but not limited to national, regional and local public health teams) been consulted on the EIA Report?			

Appendix F: Monitoring checklist

F.1 Please see paragraphs D.1 to D.3, which also apply to this checklist.

Table F 1: Assessment checklist: description of monitoring measures

Key

Green highlight:	Highly relevant to health monitoring.
Yellow highlight:	Potentially relevant to health monitoring (but likely monitoring would focus on another EIA discipline).
Grey highlight:	Unlikely to directly relate to health monitoring.

No.	Review Question	Relevant?	Adequately addressed?	What further information is needed?
Scoping of Effects				
6.1	Where adverse effects on any aspect of the environment are expected, has the potential for the monitoring of these effects been discussed?			
6.2	Are the measures, which the Developer proposes implementing to monitor effects, clearly described and has their objective been clearly explained?			
6.3	Is it clear whether the Developer has made a binding commitment to implement the proposed monitoring programme or that the Monitoring Measures are just suggestions or recommendations?			
6.4	Have the Developer's reasons for choosing the monitoring programme proposed been explained?			
6.5	Have the responsibilities for the implementation of monitoring, including roles, responsibilities, and resources been clearly defined?			
6.6	Where monitoring of adverse effects is not practicable, or the Developer has chosen not to propose any Monitoring Measures, have the reasons for this been clearly explained?			
6.7	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to monitoring, including Monitoring Measures covering all existing environmental legal requirements, Monitoring Measures stemming from other legislation to avoid duplication, monitoring of Mitigation Measures (ensuring expected significant effects are mitigated as planned), Monitoring Measures capable of identifying important unforeseen effects?			
6.8	Have arrangements been proposed to monitor and manage residual impacts?			

No.	Review Question	Relevant?	Adequately addressed?	What further information is needed?
	[NEW] Have existing public health indicators been considered and is it clear how any sensitive health data would be managed?			

Appendix G: How should changes in health be reported in EIA?

G1. Any judgment should be based on best available scientific evidence. The way in which changes are reported will depend on the methods used. If additional cases of disease or death are quantified then the report should include a detailed description of the data and algorithm used; if a semi-quantitative method is applied, the report should include the primary evidence that was used for judgment or weighting. To facilitate the decision-making process, data should be as precise as possible having regard to the need for a proportionate assessment. Transparency and robustness of qualitative and quantitative methods is important.

G.2 An EIA Report will include commitments towards mitigation and maybe enhancement. The effects that are reported in EIA are residual i.e. these are the effects that are predicted to occur once mitigation or enhancement is applied. This means that all those involved in EIA, including health teams, should work to ensure that measures receive formal commitment. This includes identifying the financial implications of the mitigation or enhancement. The EIA Report will only leave issues unresolved if they are picked up in committed monitoring plans.

What outcome measures constitute a consideration of human health?

G.3 The scoping process will identify which effects, in EIA terms, are likely and potentially significant. The assessment should report only on those health outcomes for which there is a strong scientific evidence of association with a change in a health determinant or risk factor, e.g. asthma related to housing quality, or a group of diseases such as respiratory diseases related to certain air pollutants. Where monitoring is appropriate (see discussion on monitoring in Section 9), indicators relevant to the affected health outcomes should be selected e.g. a pollutant concentration over a set time period or respiratory related hospital admissions over a set time period. Often the monitoring will focus on the determinant of health, e.g. traffic noise, rather than the health outcomes themselves. The regulation of outcome measures differs across Member States.

G.4 Capturing inequalities should be a key feature when assessing health effects in EIA. Specific population groups can be at higher risk due to different factors including socio-economic status, age, gender, ethnicity or pre-existing conditions or use of specific settings, e.g. schools or geriatric care.

G.5 Where health services are affected it may be appropriate to focus the discussion and any monitoring on health service metrics e.g. ambulance response times hospital admissions, rather than the consequent health outcomes.

How should scientific literature be identified, interpreted and used when considering human health in EIA?

G.6 Identifying relevant scientific literature is a public health competence (44) and guidance has been produced for using scientific literature in HIA (88, 89). Public health professionals can ensure the integration of evidence-based public health approaches.

What counts as evidence for changes in health?

G.7 The assessment is *ex ante* i.e. it predicts change and it is not a study of actual changes. Evidence needs to be relevant to the context of the current project and the population that would be affected. This involves taking account of a range of evidence sources. Typically, it would be appropriate to provide a narrative for each determinant of health within the assessment scope.

G.8 Evidence sources are introduced in Figure C-3 and the supporting text (see page 82). The use of these evidence sources within an analysis of multiple criteria describes the change in health outcome, and the different risk factors. The analysis of significance takes into account the importance and acceptability (or desirability) of that change in the context of a specific project. The quality and impartiality of the evidence sources from which the data itself is drawn is relevant to increasing the objectivity of the professional judgement reached.

G.9 Prioritisation can facilitate the selection and use of evidence, starting with scientific and peer reviewed literature. Depending on the context, different methods can be applied to assess and examine impacts. People who are potentially affected by the project can further provide valuable insight and health implications to consider especially with regards to mental health. Particularly, where social participation is high, the inclusion of studies or information produced by groups of local associations may be appropriate and required by the Competent Authority.

G.10 Public engagement in the early stages of EIA, especially in the screening and scoping stages, though not required, may raise issues that have not been considered. These issues must be tested and verified in a proportionate way to maintain focus on effects that have the potential to be likely significant effects. Consultation is discussed in more detail in Section 8.

G.11 It is likely that the final judgement on a potential change in health will be a professional judgement. It is therefore crucial to consider what data sources are available, the reliability and completeness of the data sources and how they can be used within the context of the project. Additional sources for evidence of health changes can be exposure scenario analysis, health risk assessments and project conditions based on the project proposal.

Criteria for using quantification

G.12 The narrative may be supported by quantitative health methods for those occasions where:

- robust exposure-response functions obtained from high quality epidemiological studies are established;
- effect size and population size make this appropriate; and
- it is proportionate to undertake such analysis.

G.13 Quantification provides an indication of the magnitude of health effects, it allows for comparison with existing numerical criteria or thresholds that inform the significance of particular effects and it allows more direct comparisons among alternatives (36). Those risk factors most amenable to quantification in EIA are environmental exposures, such as air quality and noise. The level of uncertainty should be clearly stated particularly when considering small populations exposed to small changes in emissions. Bespoke surveys may be required to look at health effects arising from socio-economic factors. Quantitative estimates of health have value and should be provided when the data and resources allow and when they are responsive to the needs of the Competent Authority and those of other stakeholders. This does not imply exclusion of health effects from the assessment for which likely significant effects have been identified but quantification is impractical (36).

G.14 Quantified estimates of potential health effects have been described as more desirable for, or influential with, decision-makers (67). Examples of health effects that can be quantified using data that is usually collected in EIA include health effects associated with changes to air quality, the noise environment or levels of physical activity.

G.15 There are a number of concerns and caveats with the use of quantitative methods to estimating potential health effects in the context of project-level impact assessment (90). Firstly, not everything that can be quantified is important and not everything that is important can be quantified. Secondly, while various quantitative methods are available to estimate many health outcomes, they may not be readily applicable within EIA. This is because of the validity implications of applying methods usually employed at the population level, i.e. to large populations, to smaller populations that are affected by a project. Furthermore, there are resource requirement considerations, e.g. cost, time and expertise, that can render the applications of quantitative methods for the estimation of health effects disproportionate to the potential project-related effects. While there are examples of EIAs that included quantitative estimates of health effects, these are the exception to the norm. Box G-1 provides references on the use of quantitative methods within EIA. It is beyond the scope of this paper to describe in detail the use of quantitative health methods in EIA.

G.16 There are several quantitative methods available to estimate health impacts, but mostly they are grouped in two main categories: human health risk assessment (HHRA) and comparative risk assessment (CRA) or burden of diseases.

G.17 HHRA, especially where based on toxicological scientific evidence, can be conducted quite quickly at modest expense, providing direct information on the urgency of intervention to protect the health of population, remediate exposure, or identifying appropriate public health actions such as medical monitoring, health education, and/or health surveillance and substance-specific research. HHRA estimates could inform whether or not the population might be at risk of being affected by non-carcinogenic or carcinogenic health effects,

but does not quantify the number of health events (in terms for morbidity and mortality) associated to such exposure (91). A wide variety of other guidance on how to conduct HHRA in contaminated sites is offered by different international, national, and regional health and environmental agencies (see Box G-1).

G.18 CRA involves calculating the population attributable risk, or where multi-level data are available, a potential impact fraction, defined as the proportion of future burden of disease or injury that could be avoided if current or future exposure levels to a risk factor or group of risk factors were reduced to hypothetical scenarios. This is a population-based approach, which aims to assess changes in the specific studied population, using epidemiological methods and evidences (92). Such approaches may not be readily applicable within EIA due to the small populations regularly affected by a project, quite different to those for which the exposure-response functions were defined. However, if the risk characterisation highlights a need for assessment using the population-based approach, the Competent Authority should be explicit about it and the deadline should accommodate this.

Box G-1: Quantitative methods for assessing health effects

Useful considerations on the use of quantitative methods for assessing health effects in the context of EIA can be drawn from similar discussions within the field of HIA, such as those described by Mindell and colleagues (90) or Veerman and colleagues (93). Mindell and colleagues recommended a framework for robust quantitative HIA that is applicable to the health assessment of an EIA:

1. Profile affected populations;
2. Identify potential impacts;
3. Obtain evidence for impacts;
4. Determine how impacts are affected by differences in subgroups' exposures and susceptibilities;
5. Draw up causal pathway;
6. Select impact measures;
7. Select (or develop) statistical model;
8. Test statistical model against empirical data & sensitivity analyses;
9. Consider economic analysis (cost-effectiveness).

Established quantitative health methods can be used for estimating health effects. These methods, and their underlying evidence base, may inform the use of quantitative approaches for estimating health effects in the context of EIA. Examples include:

- Health risks of air pollution in Europe – HRAPIE project: Recommendations for concentration–response functions for cost–benefit analysis of particulate matter, ozone and nitrogen dioxide (94);
- Introduction and methods: assessing the environmental burden of disease at national and local levels (95);
- Methodological guidance for estimating the burden of disease from environmental noise (96); and
- Health economic assessment tool (HEAT) for walking and for cycling: Methods and user guide on physical activity, air pollution, injuries and carbon impact assessments (97).

Disclaimer

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International Association for Impact Assessment

INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT

Headquarters Office: 1330 23rd Street South, Suite C, Fargo, ND USA | +1.701.297.7908
Executive Office: 1200 18th Street, Suite 700, Washington, DC USA | +1.202.567.7410
info@iaia.org | www.iaia.org