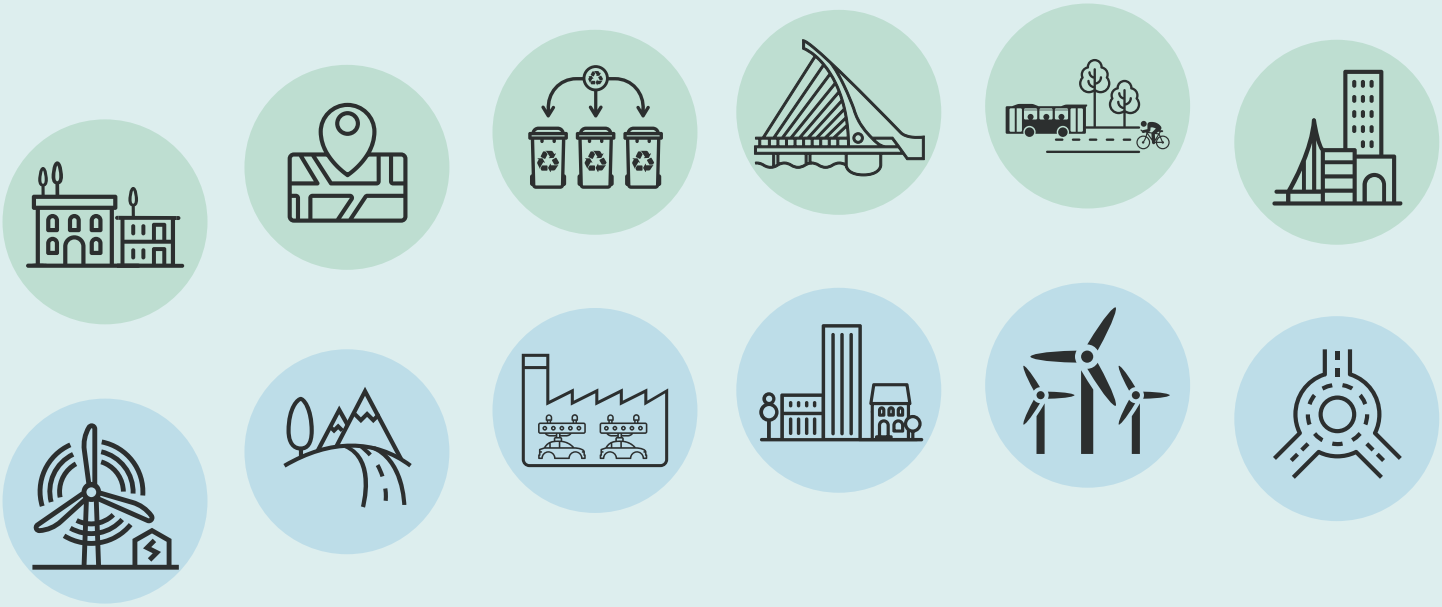
World Health Organization
REGIONAL OFFICE FOR Europe

Learning from practice

Case studies of health in strategic environmental assessment and environmental impact assessment across the WHO European Region



UNIVERSITY OF LIVERPOOL
Environmental Assessment and Management RESEARCH CENTRE

WHO Collaborating Centre on Health in Impact Assessments

Abstract

Health is routinely considered in strategic environmental assessment (SEA) and environmental impact assessment (EIA), following requirements of European Union directives and the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). Policy-makers and other sources report that these assessments mostly adopt a biophysical perspective and that few cases consider or define health in a manner which is consistent with the WHO Constitution, by considering the wider social, economic, behavioural and institutional aspects of health. This systematically conducted review of over 333 SEA and EIA cases in the WHO European Region shows that while about 80% of assessments pursue a narrow, biophysical interpretation of health, around 10% consider wider determinants when defining health, and another 10% consider wider determinants of health in the actual assessment. Twelve case studies are presented, literature is reviewed and implications for practice are considered.

Keywords

STRATEGIC ENVIRONMENTAL ASSESSMENT
ENVIRONMENTAL IMPACT ASSESSMENT
HEALTH IMPACT ASSESSMENT
EIA DIRECTIVE OF THE EUROPEAN UNION
SEA DIRECTIVE OF THE EUROPEAN UNION
PROTOCOL ON SEA TO THE ESPOO CONVENTION ON EIA
CASE STUDIES

WHO/EURO:2022-4889-44652-63378

Suggested citation: Learning from practice. Case studies of health in strategic environmental assessment and environmental impact assessment across the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2022. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at http://apps.who.int/iris.

Sales, rights and licensing. To purchase WHO publications, see http://apps.who.int/bookorders. To submit requests for commercial use and queries on rights and licensing, see http://www.who.int/about/licensing.

Design by 4PLUS4

World Health Organization
REGIONAL OFFICE FOR Europe

Learning from practice

Case studies of health in strategic environmental assessment and environmental impact assessment across the WHO European Region

UNIVERSITY OF LIVERPOOL
Environmental Assessment and Management RESEARCH CENTRE

WHO Collaborating Centre on Health in Impact Assessments

Contents

Acknowledgements

This report was prepared by:

- Ryngan Pyper (Ben Cave Associates Ltd, and WHO Collaborating Centre on Health in Impact Assessments, University of Liverpool, United Kingdom);
- Thomas B Fischer (WHO Collaborating Centre on Health in Impact Assessments, University of Liverpool, United Kingdom);
- Tara Muthoora (WHO Collaborating Centre on Health in Impact Assessments, University of Liverpool, United Kingdom);
- Ben Cave (Ben Cave Associates Ltd, and WHO Collaborating Centre on Health in Impact Assessments, University of Liverpool, United Kingdom).

WHO would like to thank the reviewer, Dr Gabriel Gulis, University of Southern Denmark, for his input and helpful comments on drafts of the publication.

Julia Nowacki and Sinaia Netanyahu, WHO Regional Office for Europe, supported designing the scope of the project at an early stage, provided comments on various drafts and coordinated the production of the report. Comments were also provided by Francesca Racioppi, WHO Regional Office for Europe.

This report was produced with financial assistance from the German Federal Ministry of Health.

Abbreviations

ADB	Asian Development Bank
BMW AG	Bayerische Motoren Werke Aktiengesellschaft
EA	environmental assessment
EIA	environmental impact assessment
EIS	environmental impact statement
EqIA	equality impact assessment
EU	European Union
HIA	health impact assessment
HUP	healthy urban planning
IA	impact assessment
IAIA	International Association for Impact Assessment
IFC	International Finance Corporation
MoLHSA	Ministry of Labour, Health and Social Affairs of Georgia
MRDI	Ministry of Regional Development and Infrastructure of Georgia
NA	not applicable
NOx	nitrogen oxides
NSW	New South Wales
OECD	Organisation for Economic Co-operation and Development
PPPP	policy, plan, programme or project
SA	sustainability appraisal
SDoH	social determinants of health
SDZ	strategic development zone
SEA	strategic environmental assessment
SIA	social impact assessment
SOx	sulphur oxides

Executive summary

Human health and the environment are inextricably linked, and can be affected by human activities, such as in agriculture, infrastructure and industry. There is a well-consolidated body of national and international instruments that govern the conduct of assessments of the potential impacts that prospective projects, plans and programmes may have on human health and the environment, with the aim of identifying, preventing, mitigating and managing such impacts.

While the assessment of environmental impacts is by and large well established, both in regulatory terms and in practice, the assessment of the impacts on health remains less clearly defined and regulated. One key dimension relates to the definition of "health" adopted in these assessments, often restricted only to its biophysical aspects, and ignoring other important determinants, including health inequalities, healthy lifestyles, safe and cohesive communities, socioeconomic conditions, and health and social-care services.

This report is the first review to focus on the way that human health is considered in environmental assessment reports across all the Member States of the WHO European Region. It investigates how human health is interpreted and covered in strategic environmental assessment (SEA) and environmental impact assessment (EIA) within the 53 Member States of the Region *(1)*. It presents a set of good practices that document the benefits of adopting a "broad" definition of health in these assessments to reach better informed decisions and to improve the identification of health impacts and opportunities to prevent, mitigate and manage them.

Audience

The report is intended for practitioners from environmental, health and planning sectors at all levels of governments. It can also support intergovernmental processes related to relevant conventions and protocols. This report does not discuss basic terminology in impact assessment.

Research question

The primary research question asks how statutory SEA and EIA requirements for the coverage of human health are interpreted and expressed through practices across the WHO European Region.

A key aim is to identify whether SEA and EIA cases adopt a "broad" definition of health, which is consistent with that in the WHO Constitution.[1] "Broad" or "wide" is used to describe

1 "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Constitution of the World Health Organization *(2)*.

a perspective that considers the social, economic, behavioural and institutional aspects of health, as well as the biophysical. “Narrow” is used to describe a perspective that is limited to the biophysical.

Method

The work includes a search for SEA and EIA reports that address human health.

A total of 106 separate searches – 53 on EIA and 53 on SEA – were undertaken across the 53 Member States of the Region. Typically, 50–500 results per Member State were reviewed. The review aimed to identify a sample of cases, not an exhaustive list of all cases. The timeframes for the SEA and EIA reports were dictated by the relevant legislation. SEA reports were included if they were published after the country became subject to the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention), hereafter the “Protocol on SEA”, that is July 2010 or the date of ratification if later. EIA reports were included if they were published after the country’s implementation of the 2014 European Union (EU) EIA Directive, that is post 16 May 2017.

This report also includes a literature review of academic articles on the consideration of health in SEA and EIA.

Results

The team reviewed content from across the WHO European Region in multiple languages. In total, 136 SEAs and 197 EIAs were identified as being suitable for inclusion in further review. Each of these 333 candidate case studies was analysed in relation to the “meaning” of health within the assessment. Finally, 12 cases were purposively selected to be written up to reflect good practice for the coverage of health in SEA and EIA across a range of countries, sectors and scales of proposal.

Overall, around 10% of the 333 candidate cases showed a “broad” wider determinants of health interpretation within the assessments (i.e. assessing social, economic, behavioural and institutional drivers of health, as well as environmental factors). Another 10% provided definitions of health that acknowledged wider determinants.

Of the12 case studies written up, 6 were SEAs and 6 were EIAs.

SEA case studies have been written up in this report for Belgium, Estonia, France, Ireland, Sweden and the United Kingdom. The relevance of the EU SEA Directive 2001/42/EC and the Protocol on SEA is noted in each case. Case studies cover spatial plan making at municipal and neighbourhood scales, regional waste policy and national transport plan making.

EIA case studies have been written up for Finland, Georgia, Hungary, Ireland, Lithuania and Portugal. The relevance of the EU EIA Directive 2014/52/EU is noted in each case. Case studies cover energy, industry, transport and urban development.

A search was also made of academic databases to inquire how health is considered in SEA and EIA. This identified 35 articles which were reviewed for this report.

Discussion

The case studies show current practice, and they provide examples of the ways in which determinants of health are being considered in SEA and in EIA across countries and sectors, for both public and private sector proposals. The case studies and the literature review demonstrate that SEAs and EIAs use wider determinants of health to define human health within their scoping and assessment. They also show how defining health in a way that is consistent with the WHO Constitution allows a proportionate assessment[2] to be conducted. Furthermore, it is proportionate for guidance on human health in SEA and EIA to require the consideration of health inequalities, healthy lifestyles, safe and cohesive communities, socioeconomic conditions, environmental conditions and health and social-care services. The case studies indicate that this approach is consistent with current practice. It is also consistent with:

- the EU EIA Directive *(3)*, which has a key objective to "ensure a high level of protection of the environment and of human health";
- the EU SEA Directive *(4)*, which states a key aim that "policy on the environment is to contribute to, inter alia, the preservation, protection and improvement of the quality of the environment, [and] the protection of human health…";
- the emphasis on health under the United Nations Economic Commission for Europe (UNECE) Protocol on SEA, as expressed by the objective that "environmental, including health, considerations are thoroughly taken into account in the development of plans and programmes" *(5)*.

The use of a definition of health that is consistent with the WHO Constitution enables the range of likely significant health effects of any given proposal to be properly understood.

The EU SEA and EIA directives are silent on how to meet their respective requirements to consider human health. The authors of this report note that use of the wider determinants of health supports good practice in other aspects of the assessment, for example:

- The EIA Directive requires assessment of "the direct and indirect significant effects of a project on … human health".
- The SEA Directive requires assessment of "the likely significant effects [including secondary effects] on the environment, including on issues such as … human health".

2 A proportionate assessment is one that focusses on those factors that are important. From a health perspective, this means focusing on the determinants of health that are relevant to the assessment of a particular plan, programme or project and keeping that focus on determinants that have the potential for likely and significant effects on population health.

The EU SEA and EIA directives require health to be considered in its own right as a factor affected by the proposal and in terms of the interaction between health, population and listed environmental factors. There is discrepancy within practice as to whether a narrow or broad interpretation of health is appropriate within SEA and EIA. The case studies presented show that a broad approach is successfully being taken in current practice in a range of countries, sectors and scales of proposal.

The broad interpretation of health provides decision-makers with information on how health is affected directly by environmental change, and indirectly by the social, economic, behavioural and institutional consequences of environmental change. It also allows decision-makers to identify any trade-offs that will potentially be made between environmental, social, economic, behavioural and institutional determinants of health. Responding to any such trade-offs is an essential element of delivering the key objectives of SEAs and EIAs, which can be summarized as the protection of the environment and human health.

The focus of this review is on the 10% of SEAs and EIAs that took the consideration of wider determinants of health through to the full assessment. The authors note that 64% of SEAs and 45% of EIAs acknowledged the importance of social and economic aspects of the proposals in addition to considering environmental impacts. Linking these existing social and economic elements of the assessment to a discussion of population health outcomes would be consistent with the aims of environmental assessment *(3–5)*. Protecting and improving population health has intrinsic value and it is ultimately cost saving for society and governments *(6,7)*.

Changes in the design of a proposal, or delays arising from challenges to a proposal, are expensive to address when they come late. The early adoption of a broad meaning of health within SEA and EIA, and a consideration of likely significant health effects, is likely to be cost saving for the proponent and for wider society. Assessments are conducted while the proposal is being developed and so this broad definition supports better decision-making and, therefore, health improvement, health protection and sustainable development that is just and inclusive. It also ensures that the scope of the health component of the assessment is responsive to present and future challenges, such as the changing climate and pandemics.

The findings of this report suggest that the following actions to build capacity for health in environmental assessment will be beneficial:

- promoting international and national good practice on health in environmental assessment which aligns with recent publications on health in SEA *(8)*, health in EIA *(9)* and health impact assessment *(10)*;
- increasing public health knowledge and experience within the private sector that conducts impact assessment, including through education, training and competency requirements;
- clarifying the mandate for national health stakeholders' formal engagement in SEA and EIA.

Introduction

It is well established that human health and the environment are inextricably linked in numerous ways and that human health can be affected by a wide range of human activity often lying outside the health sector itself. Examples can be found in exposure to air, soil and water pollution, for instance through industrial activities or different types of transportation; or changes in food quality or security, and exposure to new vector-borne diseases, due to climate change, to mention just a few. To address the effects that prospective projects, plans and programmes may have on human health, health impact assessments (HIA) have been developed in the public health domain as a tool specifically to assess potential health impacts. In addition, there is a well consolidated body of national and international instruments that govern the conduct of environmental assessments, such as strategic environmental assessments (SEA) and environmental impact assessments (EIA), of the potential impacts that prospective activities may have on the environment including human health, with a view to identifying, preventing, mitigating and managing such impacts.

While the assessment of environmental impacts is by and large well established, both in regulatory terms and in practice, the assessment of health impacts remains barely regulated and less clearly defined. Often the health assessments are restricted only to environmental and biophysical impacts on human health, representing a very narrow definition of health, and ignoring other important determinants, including health inequalities, healthy lifestyles, safe and cohesive communities, socioeconomic conditions, and health and social-care services.

This report investigates how human health is interpreted and covered in SEA and EIA within the 53 Member States of the WHO European Region *(1)*. It presents a set of good practices that document the benefits of adopting a "broad" definition of health in these assessments to reach better informed decisions and to improve the identification of health impacts and opportunities to prevent, mitigate and manage them.

Across the countries of the European Region there are a range of national requirements for environmental assessment. Environmental assessments include SEA, supporting strategic-level decision-making, and EIA, supporting project-level decision-making. At the international level in the European Region, environmental assessment is framed by three legal instruments, each of which requires a consideration of human health. These are:

- Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (hereafter EU SEA Directive) *(4)*;
- Directive 2014/52/EU of the European Parliament and of the Council – of 16 April 2014 – amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter EU EIA Directive) *(3)*;

- United Nations Economic Commission for Europe (UNECE) Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) (hereafter the Protocol on SEA) *(5)*.

National legislation on environmental assessment in the 53 Member States of the WHO European Region has been influenced by these instruments and other national approaches to environmental assessment. Interpretation, and thus practice, continues to vary even where there is alignment between countries, for example in the transposition of the SEA and EIA directives within different member states of the EU. This trend of variability for environmental assessment in general also holds true for the requirement to consider human health specifically. Across most Member States of the Region it is established that environmental assessments address human health in some form, but this is not done in a consistent manner.

The way in which health is defined in an environmental assessment is central to the methods that are used in that assessment, the topics chosen and even the stakeholders that are involved *(11,12)*. The definition of human health is clearly established by the WHO Constitution *(2)* as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". This definition has been adopted by all WHO Member States and it has been in use since 1946, longer than environmental legislation that requires environment and human health to be considered *(11)*. The WHO definition can be considered "broad", as physical, social and mental health and well-being are influenced by a range of factors often termed the "wider determinants of health". The wider determinants of health encompass environmental, social, economic, behavioural and institutional determinants of human health. The term "social determinants of health" *(13)* is a related term. In this report, we use both terms to indicate when an assessment does not confine itself to environmental determinants of health.

This report uses the term "narrow definition of human health" to describe those assessments that focus on environmental or biophysical determinants of health, such as noise or pollutants to air, water and soil. Neither the EU directives nor the Protocol on SEA require an assessment to use a "narrow" definition of health. The EU directives list the topics that must be considered in an assessment but neither directive specifies how these topics should be defined. While each directive requires "human health" to be considered, neither sets out how this should be done (see boxes 1 and 2). The directives also require consideration of a proposal's "direct" effects and its "secondary" or "indirect" effects. The direct effects may be environmental changes. The secondary or indirect effects logically should include the social, economic, behavioural and institutional consequences for population health arising from the environmental change. The EU directives do not stipulate that human health be considered only in terms of its interaction with environmental factors, but they require consideration of human health as a factor affected by the proposal and in terms of the interaction between human health and other listed factors. In this context, it is important to be proportionate, that is, to focus on those determinants of health that are relevant in a particular assessment situation and have the potential for population health effects that are likely and significant. This report does not review the basis for national environmental assessment legislation.

Environmental assessment has tended to adopt a "narrow" definition of health, even though the directives do not require this. Various authors have considered why this may be the case *(11,12,14,15)* and provide different explanations including the absence of guidance on health in environmental assessment and the practice of seeking advice on human health from environmental protection agencies rather than public health bodies, which are not systematically or not always part of the regulatory assessment process.

Box 1. Example of SEA requirements to consider human health

The SEA Directive *(4)* states that "policy on the environment is to contribute to, inter alia, the preservation, protection and improvement of the quality of the environment, [and] the protection of human health…".

It requires identification, description and evaluation of "the likely significant effects [including *secondary* effects] on the environment, including on issues such as… human health" [emphasis added].

The emphasis on health under the Protocol on SEA *(5)* includes the objective that "environmental, including health, considerations are thoroughly taken into account in the development of plans and programmes".

Box 2. Example of EIA requirements to consider human health

The objective of the EIA Directive *(3)* is to "ensure a high level of protection of the environment and of human health".

The EIA Directive requires assessment of "the direct and *indirect* significant effects of a project on… human health" [emphasis added].

This report looks at the extent to which human health is considered within SEA and EIA. This means reviewing whether any given assessment adopts the "narrow" meaning of human health, (i.e. focusing on environmental determinants of health) or whether the assessment also considers the wider determinants of health affected by the proposal. The extent to which health stakeholders were engaged in the assessment is also of interest.

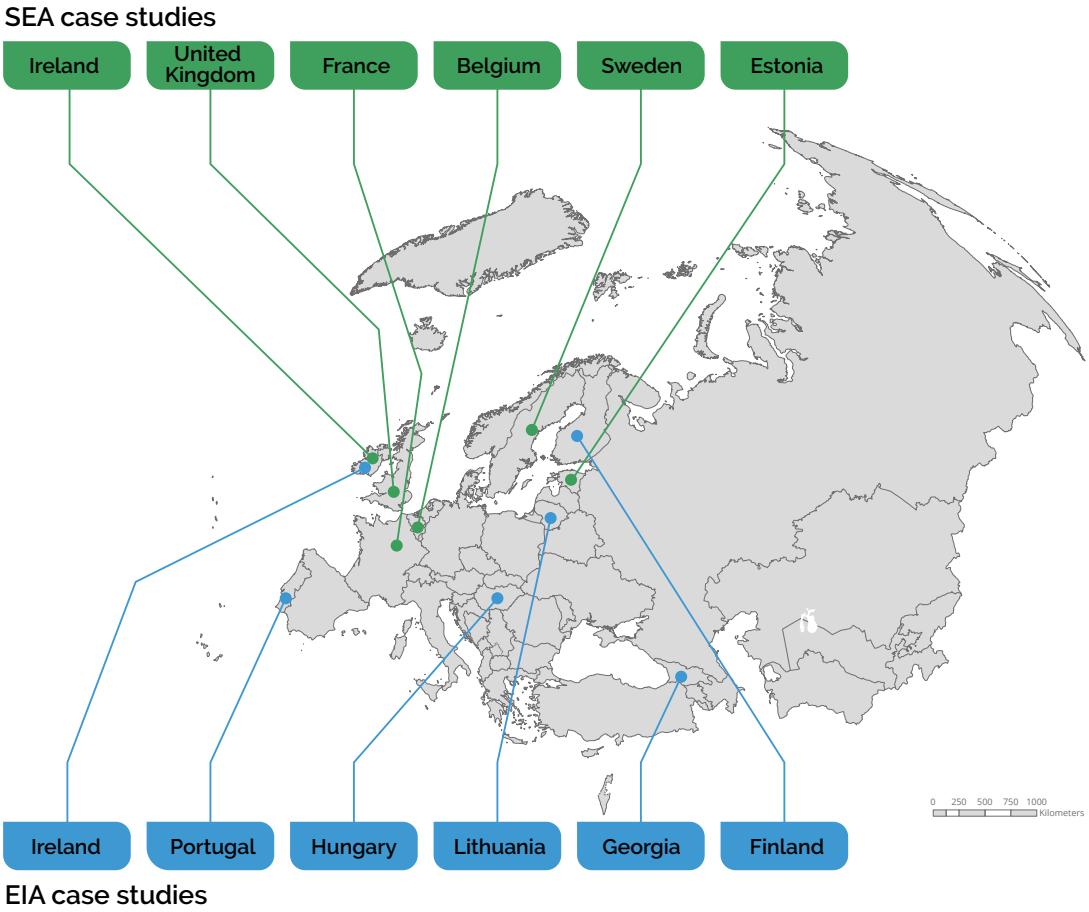
This report also describes a mapping exercise looking for examples of "good practice". Good practice has been determined through a review of the academic literature on the way that health has been considered in SEA and EIA. Good practice is not a fixed or clearly bounded concept. In general, good practice for human health in SEA and EIA is met when health stakeholders are engaged in the process; when the focus is on assessing the likely significant effects of a proposal on population health outcomes; when the wider determinants of health are considered (i.e. a broad meaning of health); and when the potential effects on health inequalities are identified.

In this report we examine SEAs issued in, or later than, 2010, as this was the year that the Protocol on SEA was ratified. We examine EIAs issued after 2017, as this follows the first

year of implementation of EU EIA Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment *(16)*, as amended by 2014/52/EU *(3)* (the EIA Directive). The EIA Directive was used as it plays an important role beyond the EU member states; for example, through projects financed by EU development banks, such as the European Investment Bank. In this context, we consider how human health is conceptualized in SEA and EIA reports. A key aim is to identify SEA and EIA cases that align with the definition of health in the WHO Constitution, and that not only focus on biophysical determinants of health but also social, economic, behavioural and institutional aspects in the assessment of options and alternatives.

Twelve case studies are presented so as to provide vignettes of health in SEA and in EIA. Fig. 1 shows the countries in which these case studies are located.

Fig. 1. Locations of case studies by country



Data Source: World Health Organization.

Map Production: Public Health Information and Geographic Information Systems (GIS), World Health Organization

The report is based on two sources of information: an internet search for SEA and EIA reports in the WHO European Region; and a review of international literature on health in SEA and EIA.

Each of the selected case studies implicitly, or explicitly, defines health in a way that aligns with the definition of health in the WHO Constitution. These examples support the improvement of the consideration of health in SEA and in EIA and the implementation of recent advisory documents on health in SEA *(8)* and in EIA *(9)*.

Methodology

Research question

How are statutory requirements for the coverage of human health in SEA (post 2010 or later ratification of the Protocol on SEA) and EIA (post implementation of the 2014 EU EIA Directive) interpreted and expressed through SEA and EIA practice across Member States of the WHO European Region?

Subsidiary questions:

- To what extent does SEA and EIA practice consider human health with regards to social, economic, behavioural and institutional determinants, as well as to biophysical determinants?
- How can insights from case studies that do align with the definition of health in the WHO Constitution inform professional practice and future guidance?

Approach

The overall aim is to show what good health in SEA and EIA practice looks like and to establish learning points arising from the literature and from practice case studies. Furthermore, the report reflects on the integration of health in SEA and EIA based on observations from real case examples.

A high-level review of a selected number of publicly available SEAs (post 2010) and EIAs (post 2017) was carried out. Furthermore, a literature review was conducted on the consideration of health in SEA and EIA.

Cases were identified by a systematic internet search to find SEA and EIA reports that include coverage of human health. Cases were selected in an attempt to identify good practice, and these were written up for the current report.

SEA and EIA report search strategy

Highlights

A review identified SEAs and EIAs across the 53 Member States of the WHO European Region.

In total, 106 separate searches were undertaken.

A convenience sampling approach was adopted when a large number of results were found. This was supported by the search engine default of displaying results by relevance. Typically, 50–500 results per Member State were reviewed with the aim of identifying 3–5 examples each for SEA and EIA practices.

The use of Google Translate, in addition to team members' language skills in Dutch, English, French, German, Portuguese and Spanish, enabled cases on websites in all Member States of the Region to be reviewed.

In total, the search resulted in 136 SEAs and 197 EIAs across the Region.

Each of these 333 documents was analysed at a high level in relation to the primary research question of this project, namely the "meaning" of health within the assessment.

A purposive sampling framework was developed to inform the selection of the 12 case studies. Three main categories were used as the basis for selection: type of assessment, level of assessment and coverage of human health within the assessment.

How SEA and EIA reports with coverage of human health were identified

The methodology below was used to identify a long list of SEA and EIA reports. Case studies were then selected to be written up for this report.

The main parameters at the search stage of the review were as follows:

- Geographic: WHO European Region;
- Temporal: post EU EIA Directive 2014/52/EU implementation (May 2017) and post implementation of the Protocol on SEA (July 2010) or later country-specific ratification;
- Access: publicly available information, including using Google;
- Language: translatable by the research team and using Google Translate;
- Nature of assessment: any SEAs and EIAs of typical scales applied to, for example, spatial and other sectoral strategies, policies, plans, programmes or projects. Professional judgment was used to exclude SEAs and EIAs that were not "routine". For example, larger projects were considered to be atypical in terms of the resources required for the EIA and the level of stakeholder involvement.

Secondary considerations included diversity by sector (e.g. energy, transport, housing etc.) and factors that enable or impede intersectoral work (e.g. across ministries or departments). Special interests were taken into account during case selection (e.g. sustainable cities/urban development and sustainable energy transition).

SEA and EIA reports across the 53 Member States were identified through the Google search engine. The following parameters were included within the search string:

- Date range relating to the SEA or EIA temporal bounding for that Member State (e.g. limiting results to after the date of ratification of the Protocol on SEA (2010), or the transposition date for the amended (2014) EIA Directive.

- File type limited to pdf documents. This focuses on completed reports rather than discussion of the topic area in general.

- Country internet domain restriction (e.g. websites with the ".al" domain suffix for Albania). The country of origin of the search (in this case the United Kingdom) can skew the results returned by the search engine. Requiring specific domain suffixes forces a focus on results from a specific country. This is particularly relevant to identifying routine assessments (i.e. those that are not publicized internationally). For this reason, ".com" and other non-country-specific domain suffixes were excluded. This is likely to have reduced the number of potential cases, but it is considered to have allowed greater prominence to domestic practices. Excluding non-country-specific domain suffixes was also a pragmatic decision, to ensure the results of each individual search were recorded against the correct country.

- Search terms were based on "environmental impact assessment" and "strategic environmental assessment" in English and the relevant local language. In some cases, multiple local languages were included to reflect the official languages in use within a single Member State. The local language terms were initially produced using Google Translate. This translation software provides a technical equivalent rather than literal translation. Additional research was undertaken when the search returned a small number of results as we recognized that this was a crucial parameter and that there is diversity in the terminology used to describe the SEA or EIA final report. In most cases the additional research identified appropriate terminology in the local language to add to the search strings. This was a rapid review and it was not possible to determine all the appropriate terminologies. Future WHO work could be undertaken to refine the ability to identify published SEAs and EIAs.

These four parameters were constructed into search strings that were loaded into the Google search field. For example, the EIA search string for Bulgaria was:

> *after:2017-05-17 filetype:pdf site:*.bg "Environmental Impact Assessment" OR "Оценка на въздействието върху околната среда"*

In total, 106 separate searches were undertaken – one on SEA and one on EIA for each of the 53 Member States of the Region.

A convenience sampling approach was adopted when a large number of results were found. This was supported by the search engine default of displaying results by relevance. Typically, 50–500 results per Member State were reviewed with the aim of identifying 3–5 examples each for SEA and EIA practices.

The use of Google Translate, in addition to team members' language skills in Dutch, English, French, German, Portuguese and Spanish, enabled cases on websites in all Member States of the Region to be reviewed.

In total, the search returned:

- 136 SEAs across the Region; 13 of the 53 Member States were not represented in the results;
- 197 EIAs across the Region; 7 of the 53 Member States were not represented in the results.

The Member States not represented for either SEA or EIA were Andorra, Azerbaijan, Luxembourg, Monaco, San Marino and Turkmenistan. In addition: Kazakhstan, Kyrgyzstan, Norway, Russian Federation, Tajikistan, Turkey and Uzbekistan were not represented for SEA; and Poland was not represented for EIA. The small sizes of Andorra, Luxembourg, Monaco and San Marino are likely to have been a factor in the failure to identify relevant results. This review does not inquire further into why these Member States returned no results. Limitations in the search strategy are discussed below and were likely a contributory factor.

A summary of search results by country and by broad sector is provided in Annex 1, Table A1.1 for SEAs and Table A1.2 for EIAs. These are for additional information. The authors caution that these do not necessarily reflect the true patterns of environmental assessments as they are based on convenience samples.

Each of these 333 documents was analysed in relation to the primary research question of this project, namely the "meaning" of health within the assessment. The steps in this analysis are set out in Table 1.

Table 1. Candidate case studies: steps in the analysis

No.	Step
1.	The result was recorded within a Microsoft Excel spreadsheet set out with countries by columns and unique reference numbers as rows. Each result cell contained a hyperlink to the internet location of the file and summary title of the type or sector the assessment related to.
2.	A copy of the report was downloaded to the local hard drive in a file structure mirroring the Excel spreadsheet.
3.	Adobe Acrobat software was used to reduce the file size of the document to less than 10MB to enable it to be automatically translated. Typically, this involved optimization to degrade the quality of images, and removal of some images; splitting of documents into multiple files was also required at times.
4.	The document was uploaded to the online Google Translate platform for translation from automatically detected local language to English.
5.	Key word searches were conducted within the translated online document. This primarily used the search term "health", but secondary searches were also undertaken in cases of few results (e.g. "well-being", "recreation", "cycling", "walking", "socio-eco" and "employment".

Table 1 contd

No.	Step
6.	The instances and context of the uses of these terms was reviewed at speed to get an indication of whether the "meaning" of health in the SEA or EIA was a narrow, intermediate or broad interpretation. Instances of no coverage of health were also noted. The analysis was a professional judgement based on rapid review.
a.	The main criterion for a narrow health interpretation was a coverage of only biophysical health determinants (e.g. air quality, noise, water, soil and radiation).
b.	An intermediate interpretation reflected that in addition to biophysical determinants there was also a discussion of other determinants of health (e.g. lifestyle, social and economic) though the links to health were limited or not explicit.
c.	A judgement that there was a broad interpretation of health indicated that there were explicit links made not only to biophysical factors, but also to lifestyle, social and economic determinants. This could also include discussion around community understanding of risks, health-care service implications and communicable disease.

Selecting case studies

The original intention was to prepare 8–10 case studies, and the 333 candidate case studies were reviewed on that basis. As explained above, 35 cases (26%; 20 EIAs and 15 SEAs) were identified as being suitable for further review, and so it was decided to increase the number of case studies to 12 (i.e. approximately one third of possible cases). The selection criteria are shown in Table 2.

Table 2 provides a purposive sampling framework to inform the selection of the case studies. Three main categories were used as the basis for selection: type of assessment, level of assessment and coverage of human health within the assessment.

Within each of these there are further differentiating characteristics. "X" indicates a potential case study based on the intersection of the three primary dimensions.

Additional dimensions such as "whether public or private sector led" could also have been applied. It was decided that the additional considerations would introduce too many permutations for a workable framework.

Additional dimensions are discussed within the write-up of the selected cases.

The researchers took a pragmatic approach to ensure diversity between cases (e.g. in relation to sectors and special interest areas).

Table 2. Sampling framework for the selection of case studies

Common bounding for the case studies

Geographic bounding	WHO European Region
Temporal bounding	After the requirement to consider health[a]
Access	Information that is published and publicly available. This includes final assessment reports.
Language	Ability of research team to review the report[b]
Nature of assessment	"Routine"[c]

Type and level of assessment

	EIA	**SEA**	
Coverage of human health in assessment	Project	Policy or legislation	Plan or programme
None			
Narrow meaning			
Intermediate meaning			
Broad meaning			
Broad definition reflected in assessment	X	X	X

Other guiding considerations

Sector	Shows diversity (e.g. transport, energy, urban, waste, water, infrastructure)
Countries and administrative levels	Shows diversity in countries and administrative levels

[a] For EIA post 16 May 2017 and without an exemption considering "population and human health". For SEA after the country became subject to the Protocol on SEA (i.e. July 2010 or the date of ratification if later).

[b] Using Google Translate where necessary.

[c] The case has no special reasons for extended health consideration that makes it exceptional. The case is judged a suitable example of good practice.

Presenting the case studies

The framework for extracting case study data from the selected SEA and EIA reports is based on qualitative approaches and facilitates a thematic analysis of the results. The framework is structured and flexible.

Table 3 and Table 4 set out the criteria that were used to structure the data collection. These criteria ensured that data was extracted consistently from the reports and other contextual materials.

Table 3. Characteristics of the SEA or EIA report

Data	Distinctions
Title of assessment	
Proposal being assessed	
Date of publication of assessment	
Who commissioned the assessment	Public/private sector
Who produced the assessment	In-house or national/international consultants
Who was informed by the assessment	The public/health authorities/regulatory bodies
Type of assessment report	SEA or EIA
Assessment level	Legislation and/or PPPP (policy, plan, programme or project)
Method for covering human health	Integrated assessment or standalone health impact assessment
"Meaning" of health (quote any definition)	Narrow biophysical or broad social determinants
Reporting of health	Health chapter or integrated throughout report
Types of health issue assessed	
Types of population assessed	
Types of mitigation/monitoring included	
Summary of conclusions drawn	
Whether health authorities were consulted	At all stages At scoping As consultees on the report

Table 4. Context in which the assessment was undertaken

Data	Distinctions
Country, region and community	
Sector	
Reason for the assessment	Required by statute, policy or lending criteria
Timing of assessment in relation to proposal	Prospective, concurrent or retrospective
Health context	Key challenges and priorities for the proposal

Each case study opens with a summary table. A citation for the report is provided in the reference list.[3] Each case study has a health profile to provide some context. These summaries were extracted from 2019 WHO/Organisation for Economic Co-operation and Development (OECD) country health profiles *(17)*. The health profile for Georgia is from the 2017 WHO *Highlights on health and well-being* country profile *(18)*.

A summary is given of the sector of the case study, the language of the original report and applicable international legislation.

Literature review search strategy

A rapid literature review was conducted to answer the research question "How has health been considered in SEA and in EIA to date?"

Scopus and Google Scholar were used, focusing on English language journal articles, book chapters and project reports. Other limiters such as date, discipline and country were not applied. This ensured wide search parameters. The following search terms defined the parameters of the returns, terms found in the title, abstract and/or the key words – "health in SEA" AND/OR "health in Strategic Environmental Assessment" AND "health in EIA" AND/OR "health in Environmental Impact Assessment".

This search returned 93 papers in total: 71 for health in SEA and 22 for health in EIA.

A preliminary analysis was conducted to remove duplicates, partial documents and off-topic papers, leaving 35 articles for review *(11,19–52)*.

The articles were published between 2008 and 2020. This is close to the 2010–2021 date range for the case study search. There was judged not to be a need for closer publication date alignment between the case studies and the academic literature review.

The literature review articles were assessed using the criteria set out in Table 5, establishing details about the author/s, the type of article and the understanding of health.

Further information about the literature review is provided in Annex 2.

3 Please note that the URLs are not static links and reports may be moved without notice.

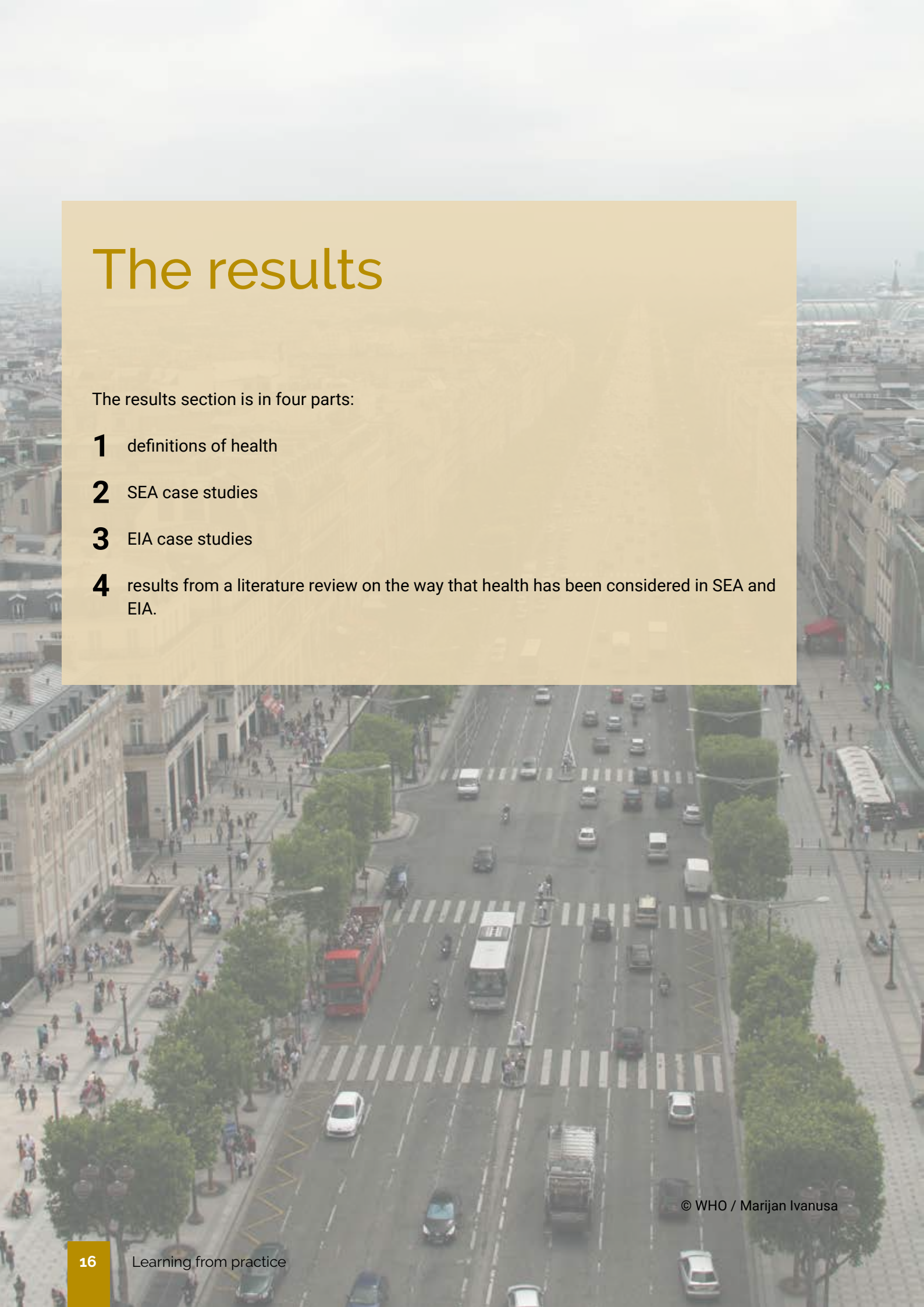
Table 5. Evaluation criteria for the literature review

Year	Distinctions
Author's institutional setting	Private/public/university
	Region/country
Type of article	Theoretical/conceptual discussion
	Empirical research
	Research funder (list)
	Focus: SEA, EIA or both
If empirical research, then	What sectors/areas does the article consider?
	How many real-life cases are evaluated/assessed/ described? (list)
	Geographical focus
	Research underlying the publication
Understanding of health as reflected in the article	Social (social, behavioural…)
	Research aim
	Are connections made to HIA?
	Use of guidance documents and/or legislation
	Summary/conclusions

The results

The results section is in four parts:

1. definitions of health
2. SEA case studies
3. EIA case studies
4. results from a literature review on the way that health has been considered in SEA and EIA.



© WHO / Marijan Ivanusa

1

Definitions of health

Table 6 shows the ways in which health is expressed in the candidate case studies (but not necessarily applying this meaning in assessment).

As shown in Table 6, 26% of SEAs and 41% of EIAs adopt a narrow, biophysical, definition of health. The intermediate and the broad categories cover those reports that address more than biophysical aspects, with the latter category making an explicit link to human health. These represent 64% of SEAs and 45% of EIAs, respectively.

Table 6. Indication of the range of definitions of health within the sample

Level		SEA	EIA
Meaning of health (see Table 1, 6a–c)	None	7 (5%)	14 (7%)
	Narrow	35 (26%)	81 (41%)
	Intermediate	40 (29%)	53 (27%)
	Broad	47 (35%)	35 (18%)
No translation[a]		14 (7%)	7 (5%)
Total		136 (100%)	197 (100%)

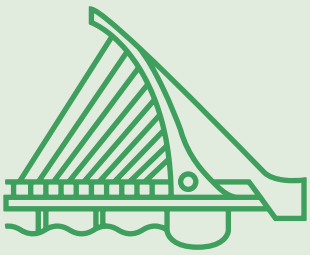
[a] Not translatable by Google Translate.

2

Case studies: health in SEA reports

Six SEA case studies are presented in this section. These comprise cases from Belgium, Estonia, France, Ireland, Sweden and the United Kingdom. The reports cover spatial plan making at municipal and neighbourhood scales, regional waste policy and national transport plan making. Each case study starts with a summary table.



Belgium: *Strategisch-MER Verbeteren van de leefbaarheid voor de bewoners van de woonwijk Klein-Rusland (Zelzate). Ontwerptekst* [Strategic EIA Improving the quality of life for the residents of the residential area Klein-Rusland (Zelzate). Draft text]

Table 7. SEA Belgium case study summary

Title of assessment	Strategic EIA Improving the quality of life for the residents of the residential area Klein-Rusland (Zelzate)
Country/region	Belgium
Administrative level	Municipal
Assessment level	Plan
Sector	Urban development
Assessment done by	A private sector consultancy
Main health determinants discussed	Air quality, soil, groundwater, landscape, heritage and architecture, resettlement of the residents, housing quality and liveability
Citation	*(53)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	–
EU ratification of Protocol on SEA	12 November 2008
Protocol on SEA in force	11 July 2010
EU SEA Directive implementation	21 July 2004

Belgium has a higher preventable mortality than many other western European countries (albeit lower than the EU average), indicating that further progress can still be made in reducing premature deaths through public health and prevention policies. This suggests that there are opportunities to strengthen prevention, which requires strong collaboration across federal and federated entities. Around 40% of all deaths in Belgium can be attributed to behavioural risk factors *(54)*.

This is a small-scale master plan SEA which is urban design focused. It was prepared in order to assess different options for a run-down neighbourhood (Klein-Rusland) in the harbour area of Gent, a city of about 260 000 inhabitants located near the Dutch border. The neighbourhood was built about a century ago and is of heritage value as it was planned and built according to garden city ideas. At the time of conducting the SEA, the area was home to some 250 residents. Of a total of 220 housing units in the neighbourhood, 60 were empty/abandoned. All housing units failed many modern housing standards. Furthermore, the neighbourhood is cut off from other housing areas to the north by a motorway and to the east by a railway line. A former landfill (taking the shape of a small hill) is located to the south of the area.

The SEA environmental report was prepared in 2017 by a consultancy on behalf of East Flanders Province (Provincie Oost-Vlaanderen, projectbureau Gentse Kanaalzone). The scheme was allocated the status of a "complex" project, meaning it is running through a number of phases: (i) the "establishment that there is a problem" phase: (ii) the examinations phase (of which the SEA is a part); (iii) the design and project consent phase; and (iv) the implementation phase. Throughout these phases there are a number of consultation and participation opportunities for statutory bodies, stakeholders and citizens.

The main aim of the master plan is to improve the living situation of current residents (mostly elderly), so that they can keep living in affordable homes, but in better quality housing as soon as possible. In this context, current plans for the areas surrounding the neighbourhood were taken into account. Heritage and architecture played particularly important roles in this SEA, alongside housing quality and liveability.

The SEA considered various alternatives that came with further sub-alternatives. These can be summarized under the headings "conservation and improvement/upgrading of the current buildings" with some new building (either with or without original materials); "new construction", either taking into account existing street patterns or designing new street patterns; and "complete removal of the current buildings and a resettlement of the residents into several other (new) neighbourhoods" in the main town (Zelzate) north of the motorway. In the SEA, financial implications of the different alternatives were also considered.

Human health and well-being were key aspects considered in the SEA, taking into account the main aim of the master plan (to improve housing quality and liveability for residents). In this context, the SEA reflected on soil and groundwater, landscape, heritage and architecture in dedicated chapters. One chapter (ch.9) also focused exclusively on "human beings" (focusing on aspects of mobility, space, nuisances and environment quality (spatial quality and health)).

The neighbourhood is located next to a motorway and so noise and air emissions (particulate matter, nitrogen oxides (NOx) and sulphur oxides (SOx), dioxins and heavy metals) received close attention. In this context, the implications of the proximity to two major chemical factories, across the Gent canal, were also evaluated.

A number of aspects were assessed that are wider determinants of health, revolving around well-being. These include a lack of services (e.g. no neighbourhood centre, bakery or school), safety issues (e.g. hazardous pavements and general transport safety), as well as the quality of living spaces and recreational areas nearby.

The SEA environmental report does not advise on a preferred option. Rather, it establishes the pros and cons of different development options. This approach is connected with the project's "complex" status, as the SEA was prepared at the "examinations phase". A decision on how to proceed will only be taken during the next "design and project consent phase".

The case study demonstrates an SEA, for an urban development plan, which uses a definition of health consistent with the WHO Constitution. This was conducted in an EU member state, that is a signatory to, but has not ratified, the Protocol on SEA, and which is covered by the EU's approval of the Protocol.

Estonia: *Põlva valla üldplaneeringu keskkonnamõju strateegiline hindamine* [Strategic environmental assessment of Põlva municipality master plan]

Table 8. SEA Estonia case study summary

Title of assessment	Strategic environmental assessment of Põlva municipality master plan
Country/region	Estonia
Administrative level	Municipal
Assessment level	Plan
Sector	Urban development
Assessment done by	A private sector consultancy
Main health determinants discussed	Radon, air quality, noise, climate change, walking and cycling, social aspects of the green network, recreation and healthy lifestyles
Citation	*(55)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	12 April 2010
EU ratification of Protocol on SEA	12 November 2008
Protocol on SEA in force	11 July 2010
EU SEA Directive implementation	21 July 2004

Estonia has made greater gains in life expectancy since 2000 than any other EU country. However, these gains are not experienced equally across gender, age and income groups. Nearly half of all deaths in Estonia result from behavioural risks. Mortality from both preventable and treatable causes is high, despite the fact that death rates for many diseases, including ischaemic heart disease and stroke, have decreased. Unhealthy diet is a major public health issue in Estonia *(56)*.

This case study is a local spatial-plan SEA for the municipality of Põlva in south-eastern Estonia, published in 2017. Põlva municipality is located in the central part of Põlva county. At the time of the assessment Põlva municipality had a population of around 9400 in an area of 234 km^2; since the assessment there have been municipality mergers. The SEA process was started in 2015, one year after the municipal plan process had been initiated. The underlying master plan was developed on the basis of previously prepared national, county and local planning documents. The SEA was prepared by a consultancy and supervised by the Southern Region of the Environmental Board.

The SEA report (95 pages) assesses two alternatives. These include alternative 0 (no master plan; current development directions based on existing local plans) and alternative I (master plan as prepared will be implemented). Overall, no significant negative environmental impacts are predicted to result from master plan implementation.

One of the objectives, which frame the assessment, is for the existing green network to stay fully in place. This includes the conservation of valuable landscapes and of protected areas. Development is enabled through densification of existing developed areas. There are also plans to improve existing utility and infrastructure networks.

Human health is covered in a dedicated section on "human health and property". This has subsections on "radon risk", "companies with potentially hazardous activities", "impacts of industrial activities and heating on air quality", "impact of traffic on air quality", "impact of industrial activities on noise", "road noise", "noise in future planning" and "impact of climate change".

The headings imply a biophysical focus but behavioural elements and well-being are covered too, in particular in the traffic-related sections, where a desire to reduce car traffic is associated with alternatives that support healthy lifestyles (walking and cycling).

Furthermore, the section on climate change establishes an associated potential increase in problems with population health.

Human health is also mentioned when indirect effects are discussed, such as with regards to the planning of recreational areas that promote outdoor activities. In this context, when referring to the Põlva County Plan 2030, it is also stated that "the [further] development of a green network in the vicinity of urban settlements as a recreational area requires [the consideration of] ecological aspects, but also [needs to] take into account the social aspects of the green network and create [associated] opportunities (e.g. health trails taking into account the needs of different population groups)". The Health Board Authority is listed as one of the interested parties of the master plan. Views from that authority were actively sought during the SEA process.

The SEA comes with a number of recommendations for future development applications (marked as "mitigation measures"). Most of these are directly relevant for health – for example, noise and emissions and the green network, and associated with that recreation and healthy lifestyles.

The case study demonstrates an SEA, for an urban development plan, which uses a definition of health consistent with the WHO Constitution. This was conducted in an EU member state, that is a signatory to, and has ratified, the Protocol on SEA. It is also covered by the EU's approval of the Protocol.

France: *Projet de plan regional de prevention et gestion des dechets – rapport environnementale* [Île-de-France Regional Plan for the Prevention and Management of Waste – SEA]

Table 9. SEA France case study summary

Title of assessment	Île-de-France Regional Plan for the Prevention and Management of Waste – SEA
Country/region	France
Administrative level	Regional
Assessment level	Policy
Sector	Waste
Assessment done by	Public agency
Main health determinants discussed	Biodiversity, landscape, climate change, land take, soil, water, flood risk, air pollution, unemployment and inequality, attractiveness of areas, energy and resource dependency
Citation	*(57)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	–
EU ratification of Protocol on SEA	12 November 2008
Protocol on SEA in force	11 July 2010
EU SEA Directive implementation	21 July 2004

France has the third highest life expectancy among EU countries (after Spain and Italy). However, improvements in life expectancy have lessened since 2011 because the gains in old age have slowed down or even reversed in some years. Preventable mortality is higher than in many EU countries, but below the EU average. Prevention has traditionally been a neglected aspect of health policies in France. The first priority of the National Health Strategy 2018–2022 is to put greater focus on health promotion and prevention at all ages and across all socioeconomic groups through a wide range of interventions *(58)*.

This case study is a waste management strategy (policy) SEA for the Île-de-France (Paris) region. It is different from the two previous case studies in that it was prepared for a "policy" rather than a plan or programme, and therefore the requirements of the EU SEA Directive do not apply. It was published in 2018 and was prepared by the Institut d'aménagement et d'urbanisme de la région d'Île-de-France (L'Institut Paris Région), a public agency of the Paris region.

The Île-de-France region has over 12 million inhabitants and covers an area of about 12 000 km^2. It is the economic powerhouse of France with nearly 30% of the national gross domestic product (GDP) being produced here. The waste management strategy is set within the context of the transition to a green and circular economy. The priorities of the strategy follow a waste management hierarchy, the main aim of which is waste prevention, followed by reuse, recycling, other usage and disposal. Five types of waste are considered: construction, household, bulky, hazardous and organic waste.

In the SEA, a total of 13 themes were used to assess two main options, the do-nothing option and the strategy-implementation option. The themes are:

1) biodiversity/natural environment
2) landscape and heritage
3) climate change/carbon emissions
4) land take/urbanization
5) soil/soil pollution
6) energy consumption/transition
7) water resources/pollution
8) deposits and material consumption
9) flood risk
10) land slide risk
11) technological risks
12) air pollution
13) other nuisances/cumulative risks.

With regards to their importance to waste management, these themes were given the following levels of priority:

- high: 3. climate change/carbon emissions; 4. land take/urbanization; 6. energy consumption/transition; 8. deposits and material consumption; 12. air pollution;
- medium: 5. soil/soil pollution; 10. land slide risk;
- low: 1. biodiversity/natural environment; 2. landscape and heritage; 7. water resources/pollution; 9. flood risk; 11. technological risks; 13. other nuisances/cumulative risks.

Two time horizons were considered, 2025 and 2031.

The themes indicate a biophysical focus, however, socioeconomic and socioenvironmental issues were used as points of reference.

They were derived from established "structural weaknesses" in the Paris region, including:

- unemployment and inequality
- low attractiveness of certain areas of the region
- high energy and resource dependency of certain economic activities.

The SEA scored impacts as very positive, positive, neutral, negative and very negative, and also established whether a particular issue required closer monitoring.

Health was considered in the SEA in different ways. Importantly, the objectives of the regional health environment plan were used as a reference point (Plan Régional Santé Environnement 3 – PRSE 3). These include:

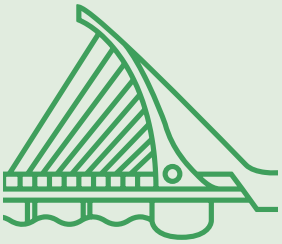
- creation of an environment that enables good health;
- monitoring of human activities and their health impacts;
- working towards a reduction of social and environmental inequalities and their health consequences;
- protection of the most vulnerable populations.

The SEA established that with regards to the waste management strategy, consideration of inequalities and vulnerable populations need to be a priority. It was shown that residents of poorer areas consume less and are therefore responsible for the generation of less waste. However, it is people in those areas that are considered to be at a particularly high risk of climate change impacts, which are expected to be more serious in areas with a high population density with much concrete and little green space. It is in this context that connections were made between the waste management strategy and human health effects (with a focus on climate change mitigation), that is, health and vulnerability arguments were used to recommend a particular waste strategy.

Avoiding waste means driving down carbon emissions (4% of which were said to be generated by waste treatment in the Paris region) and therefore contributing to climate change mitigation. This in turn is thought to have the potential to reduce heatwaves, which in turn could have a positive effect on human health (e.g. reducing heat stress, allergic reactions and infections) in particular of poorer and more vulnerable populations. A similar logic is applied to other harmful emissions (e.g. NOx and SOx) that will be reduced through implementation of the waste management strategy. Maps were used to further explain the pathway by which change is expected to happen.

The SEA concludes by introducing follow-up measures. In this context there is an emphasis on monitoring development on the basis of environmental indicators reflecting the assessment themes, in particular those with a high priority. Furthermore, recommendations are made on the priority of actions and further development.

The case study demonstrates an SEA, for a waste policy, which uses a definition of health consistent with the WHO Constitution. This was conducted in an EU member state, that is a signatory to, but has not ratified, the Protocol on SEA, and which is covered by the EU's approval of the Protocol.



Ireland: North Lotts & Grand Canal Dock Planning Scheme SEA Environmental Report (Dublin)

Table 10. SEA Ireland case study summary

Title of assessment	North Lotts & Grand Canal Dock Planning Scheme SEA Environmental Report
Country/region	Ireland
Administrative level	Municipal
Assessment level	Plan
Sector	Urban development
Assessment done by	Local planning authority
Main health determinants discussed	Biodiversity, air quality and noise, climatic factors, water, transport and waste management, cultural, landscape, employment, residential density, access to educational facilities and amenities, walking and cycling
Citation	*(59)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	–
EU ratification of Protocol on SEA	12 November 2008
Protocol on SEA in force	11 July 2010
EU SEA Directive implementation	21 July 2004

Ireland's life expectancy has increased by nearly six years since 2000, this being the strongest of gains among western European countries, and is now above the EU average. Mortality from preventable and treatable causes in Ireland is lower than the EU average, signalling that public health policies and health-care interventions are generally effective. The main causes of premature death that could be further avoided through a range of public health and prevention measures in Ireland include ischaemic heart disease, lung cancer and road traffic incidents. A number of public health initiatives in recent years have aimed to reduce preventable deaths. Adopted in 2013, the Healthy Ireland initiative currently provides the national framework to improve the health and well-being of the population *(60)*.

This case study is a medium-scale planning scheme SEA for the regeneration of 66 ha of the 300-ha Dublin docklands, marked as a strategic development zone (SDZ). The scheme sets out a number of high-level themes, including sustainability, economic renewal and employment, quality of living, identity, infrastructure, and movement and connectivity.

The SEA was conducted by Dublin City Council (also the responsible planning authority) in 2012–2013. It ran in parallel with the planning scheme preparation process.

Dublin is the capital of Ireland, with an urban area population of about 1.2 million, covering 318 km^2. The docklands overall are one of the fastest growing areas in Dublin. Between 2006 and 2011 they experienced a population increase of over 36% to 27 000 (the city growth rate in the same period was 4%). In 2011, there were 2759 housing units within the SDZ (these are not affected by the regeneration scheme).

The SEA was integrated with a flood risk assessment and a Habitats Regulations Assessment. Habitats Regulations Assessments are also known as Appropriate Assessments. Three alternatives for development were considered, including high-, medium- and low-density development. In accordance with the EU SEA Directive, impacts on population and human health were assessed alongside impacts on biodiversity, flora and fauna, air quality and noise, climatic factors, water (including flooding), material assets (transport and waste management), cultural heritage (including architectural and archaeological heritage), and landscape (including soil).

In the SEA, human health was assessed in terms of the environmental protection objective "to protect and enhance people's quality of life based on high-quality residential, working and recreational environments and on sustainable travel patterns". This objective is associated with three indicators (each coming with specific targets): (i) the status of drinking-water and drinking-water sources, (ii) the average density of new residential development, and (iii) the numbers employed on site in the construction stage and the operations stage. The necessity of good access to educational facilities and other amenities is stressed. In terms of health impacts, walking and cycling are explicitly mentioned along with improved air and water quality. Furthermore, improved mental health (in general terms) was associated with the planned economic growth in the area.

Other assessment objectives that are also directly and indirectly connected with health include the reduction of air pollution, the enhancement of water quality, and the protection of biodiversity and natural heritage. In the SEA, impacts were scored with regards to "very significant positive", "significant positive", "neutral", "significant negative" and "very significant negative", as well as "unknown" categories.

The assessment results in the medium-density alternative being brought forward as the preferred alternative. Further mitigation measures were devised that revolve around a proactive avoidance of negative impacts. A monitoring programme with regards to, for example, air and water quality and the transport modal split (walking, cycling, public transport and motorized individual transport) was also devised. This is integrated with city-wide monitoring.

The case study demonstrates an SEA, for an urban development plan, which uses a definition of health consistent with the WHO Constitution. This was conducted in an EU member state, that is a signatory to, but has not ratified, the Protocol on SEA, and which is covered by the EU's approval of the Protocol.

Sweden: *Miljökonsekvensbeskrivning av förslag till Nationell plan för transportsystemet 2018–2029* [Environmental impact statement of proposals for the National plan for the transport system 2018–2029]

Table 11. SEA Sweden case study summary

Title of assessment	Environmental impact statement of proposals for the National plan for the transport system 2018–2029
Country/region	Sweden
Administrative level	National
Assessment level	Plan
Sector	Transport
Assessment done by	A private sector consultancy
Main health determinants discussed	Noise, emissions, pollution, road safety, walking and cycling – these include accessibility, regardless of socioeconomic status, gender, age or ability
Citation	*(61)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	30 March 2006
Protocol on SEA in force	11 July 2010
EU ratification of Protocol on SEA	Not applicable
EU SEA Directive implementation	21 July 2004

Sweden has low rates of mortality from preventable and treatable causes, which points towards a generally effective public health and health-care system. The low preventable mortality rate is largely due to low rates of premature deaths from cardiovascular diseases, alcohol-related causes and lung cancer. Sweden's low levels of preventable deaths can partly be explained by strong public health policies. Reduction of health inequalities has been a long-term goal in Swedish public health policy *(62)*.

This is a national transport plan SEA which also includes policy and programme aspects. In Sweden (population 10.4 million; country size 450 000 km^2), plans for the national transport system are produced every four years with planning horizons of 12 years. The SEA considered here was prepared for the Swedish Transport Administration by a consultancy and published in 2017, in parallel with a draft plan. In addition to national transport plans there are county transport plans that also involve SEA.

The draft plan published by the Swedish Transport Administration underlying the SEA aims at responding to six main societal challenges:

1) conversion to one of the world's first fossil-free welfare states
2) investments for further housing development
3) improved conditions for businesses
4) strengthening of employment throughout the country
5) meeting opportunities of digitalization
6) an inclusive society.

The plan sets the framework for investment over a 12-year horizon of kr 622.5 billion (about €62 billion, or just over €5 billion per year). The plan aims at meeting several objectives, some of which are directly relevant for human health, including: the promotion of safe and functional roads with improved safety of unprotected road users; functional and sustainable environments in cities and basic standards in rural areas; and the reduction of environmental impacts of transport.

The SEA had two main steps. Firstly, the main components of the plan were assessed individually in terms of the (anticipated) plan and zero alternative, plus some sub-alternatives (connected with investment levels) for each component. These components were:

- maintenance;
- major investments;
- adjustments (for improving accessibility, road safety and environmental performance) and environmental measures;
- urban environment agreements;
- other measures and metropolitan agreements.

Secondly, a cumulative assessment was carried out. Impacts were assessed in terms of four main themes: climate, landscape, health and quality of life, and resources available.

The outcomes of assessment are presented in terms of whether stated goals can be achieved. The theme "health and quality of life" is divided into three main categories: physical (noise, emissions/pollution); road safety; and behavioural (walking, cycling).

Overall, "health and quality of life" was approached through the three categories mentioned above. Importantly, the WHO definition of health was provided. As a consequence, other aspects of health were also mentioned when explaining the goals of the different assessment components in annex 2 of the report ("in-depth methodology and assessment criteria"). For "health and quality of life" these include accessibility, regardless of

socioeconomic status, gender, age and ability. In this context, mental health benefits are mentioned.

The SEA report lists over 100 consultation bodies that commented on the SEA, some of which are health related.

Recommendations and suggestions are made in the concluding chapter of the SEA. Importantly, these include a recommendation to clearly assess strategic choices in future rounds of planning. Furthermore, they include a suggestion to also assess environmental effects of transport investment plans.

The case study demonstrates an SEA, for a national transport plan, in an EU member state that is a signatory to, and has ratified, the Protocol on SEA and that uses a definition of health which is consistent with the WHO Constitution.

United Kingdom: Hull Local Plan. Publication Consultation Document. Sustainability Appraisal Report

Table 12. SEA United Kingdom case study summary

Title of assessment	Hull Local Plan. Publication Consultation Document. Sustainability Appraisal Report
Country/region	United Kingdom
Administrative level	Municipal
Assessment level	Plan
Sector	Urban development
Assessment done by	A private sector consultancy
Main health determinants discussed	SEA: air quality, biodiversity, climatic factors, water, socioeconomic factors, cultural heritage, landscape/townscape, housing and crime, population, health care and education HIA: access to open space and local food growing, access to health and social care activities, healthier built environments, sustainable transport, community cohesion, noise and light pollution, vibrations and odours
Citation	*(63)*
Signatory to Protocol on SEA	21 May 2003
Ratification of Protocol on SEA	–
EU ratification of Protocol on SEA	12 November 2008[a]
Protocol on SEA in force	11 July 2010
EU SEA Directive implementation	21 July 2004[a]

[a] Superseded by United Kingdom–EU Withdrawal Agreement 31 January 2020 *(64)*.

The improvement in life expectancy at birth for the United Kingdom has slowed since 2011, mainly due to a slowdown in mortality improvements at older ages. Disparities in health status highlight important socioeconomic inequalities. Although below the EU average, mortality rates from preventable and treatable causes are higher than in other high-income EU countries and have not improved in recent years. Tackling inequalities in health outcomes remains a challenge *(65)*.

This case study is a city-wide spatial plan SEA. The SEA is integrated with other assessments, namely, HIA, equality impact assessment (EqIA) and habitats regulations assessment. The SEA is presented as an overarching sustainability appraisal (SA). It covers a range of policy-related and site development issues, reflecting on what is covered in the underlying Local Plan. The SA was published in 2016 and has a planning horizon of 15 years.

Hull City Council serves a population of about 260 000 inhabitants in an area of 73 km^2 and is one of over 300 authorities responsible for the preparation of local plans in England. The SEA was prepared by a consultancy on behalf of Hull City Council. The Local Plan has 12 strategic priorities. Most of these are associated with health and well-being and one is specific to health service infrastructure: to "provide fit-for-purpose health, education and community facilities in accessible locations". In the early stages of drafting the Plan, the Director of Public Health undertook an HIA to inform the SA, setting out the factors that can influence health and well-being.

In the SA report (532 pages), Local Plan policies and site allocations are assessed, individually and as a whole, on the basis of 21 environmental, social and economic objectives. The Director of Public Health was one of the consultees who advised on the 21 objectives. They include one explicit health objective, "encourage healthy lifestyles and reduce the health impacts of new developments", along with various other objectives with direct relevance to health. The report also addresses how any potential negative effects could be mitigated.

The Local Plan "themes" revolve around how to accommodate economic growth; housing growth; city, district, local and neighbourhood centre development; education, health and community facilities; design and heritage; transport; water management; open space and the natural environment; environmental quality; and infrastructure and delivery. Its site assessment criteria include proximity to schools, town and district centres, railway stations, green space, general practitioner (health) surgeries, and community facilities, as well as whether the site is within one of the city's 10 most deprived wards. The level of disability in the wards is also mentioned.

At the scoping stage, key environmental issues were identified. Alongside biophysical aspects (air quality, biodiversity, climatic factors and water), a range of socioeconomic issues (that are important determinants of health) were also identified, including cultural heritage, landscape/townscape, housing and crime, population, health care and education. When writing about challenges to these issues, there is mention of "health inequalities within Hull by gender and deprivation".

Each policy and site allocation was assessed, using the 21 objectives with regards to the potential impact, mitigation and any possible residual effects (looking at short-, medium- and long-term effects). A total of 52 policies were assessed along with nearly 100 housing development sites, 45 employment development sites, 21 mixed use allocations and two open space allocations.

An HIA was conducted, considering how health (social and physical well-being) may change as a result of the implementation of the Hull Local Plan. Mental health and well-being were included with regards to access to open space and local food growing, as well as access to health and social care activities, healthier built environments, sustainable transport, community cohesion, noise and light pollution, vibrations and odours. Reasons for selecting particular options were provided from a health point of view. In this context, vulnerable populations, such as travellers and the disabled were considered.[4]

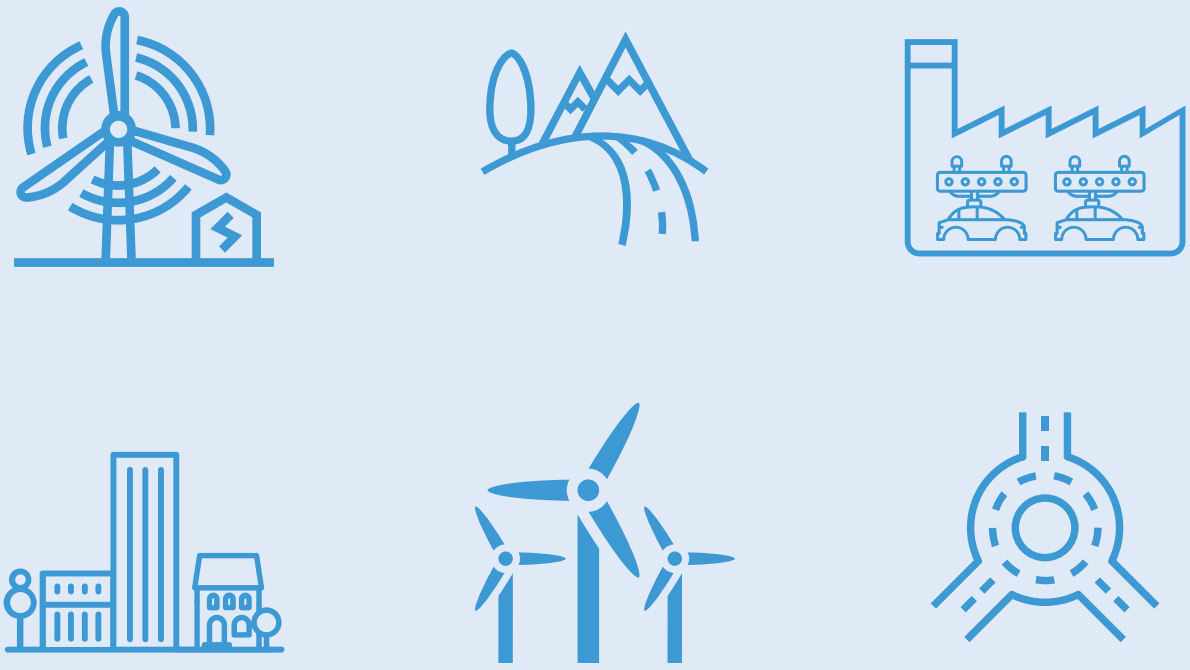
The conclusions establish a range of recommendations for local plan themes. These include, with regards to the "district, local and neighbourhood centres" theme, the "support [of] healthy communities through the promotion of access to fresh food and social interaction"; for the "open space and natural environment" theme, "benefits to health and promotion of social inclusion"; and for the "infrastructure and delivery" theme, the maintenance of "a healthy lifestyle (for walking or exercising)".

The case study demonstrates an SEA for an urban development plan, which uses a definition of health consistent with the WHO Constitution. This was conducted in a non-EU member state, that is a signatory to, but has not ratified, the Protocol on SEA.

4 In the United Kingdom, the term "travellers" is used to describe people with a nomadic lifestyle and includes Gypsy, traveller, Roma, showman and boater communities.

Case studies: health in EIA reports

Six EIA case studies are introduced in this section. These comprise cases from Finland, Georgia, Hungary, Ireland, Lithuania and Portugal. The reports cover cases from the transport, energy, industry and urban development sectors. Each case study starts with a summary table.



Finland: *Puutionsaaren tuulivoimapuiston yleiskaava ja ympäristövaikutusten arviointi* [Puutionsaari Wind Farm Master Plan and Environmental Impact Assessment]

Table 13. EIA Finland case study summary

Title of assessment	Puutionsaari Wind Farm Master Plan and Environmental Impact Assessment
Country/region	Finland
Administrative level	Municipal
Assessment level	Project
Sector	Energy
Assessment done by	A private sector consultancy
Main health determinants discussed	Noise, lighting, shading and flicker effects, electromagnetic effects, climate change, employment and investment, tourism, landscape effects on well-being and recreation
Citation	*(66)*
EU EIA Directive implementation	16 May 2017

In Finland mortality that could be prevented through public health interventions is slightly higher than the EU average. Life expectancy has increased by nearly four years since 2000, and the gender gap has narrowed slightly as gains among men have exceeded those among women. However, Finnish people report more physical activity limitations than other Europeans, resulting in a lower number of healthy life years than their EU counterparts. That preventable mortality is slightly above the EU average, suggests that investing more on prevention might reduce premature deaths *(67)*.

This EIA from December 2020 concerns the master plan for the construction of 49 new wind turbines and a transmission line. The project is located in Puutionsaari, west of the city of Haapavesi, in Finland.

The EIA was commissioned by a private sector company, VSB Uusiutuva Energia Suomi Oy, and the EIA report is co-badged with the City of Haapavesi. The EIA was produced by consultants and was intended to inform the City of Haapavesi. The requirement for the EIA arises from Finnish EIA legislation transposing the EU EIA Directive. The EIA references the Land Use and Building Act, the Land Use and Building Regulation, the EIA Act and the EIA Regulation consent requirements. The extent to which health authorities were consulted in the preparation of the EIA report is unclear. The EIA states that municipalities and other key authorities in the project area will be given the opportunity to provide an opinion on the EIA report.

The coverage of human health is integrated within the EIA, rather than as a standalone report. The assessment of health is presented within its own chapter entitled “Effects on human health, living conditions and well-being”. The section assesses biophysical determinants including noise, lighting, shading and flicker effects, and electromagnetic effects. It also includes consideration of the health effects of climate change and of the social and economic impacts of the project on health. Economic impacts relate to positive effects from employment and investment, and potentially negative effects in relation to tourism. Social effects include changes to the landscape affecting well-being, mediated through the attractiveness and value of residential and natural areas.

In addition to regulatory standards, the assessment also acknowledges that perceived and subjective experiences of the project affect health. Lifestyle-related effects are noted including the potential impact on recreational uses of the forest area, including berry picking and hiking. Enhanced accessibility due to road improvements is also noted as benefiting recreation in the wider area. The assessment discusses how concerns (e.g. ice falling from turbines) could affect the enjoyment of recreation. The assessment is informed by a residents survey, including exploring attitudes to wind power and anticipated beneficial and adverse effects. The health impact on the local population is described as the cumulative product of everything that residents experience about the project.

Populations assessed include permanent residents of the area, as well as those that occupy the holiday homes in the area. Furthermore, the assessment acknowledges that effects may be experienced or anticipated by, not only those in close proximity, but also those more distant.

Health-related mitigation includes transparent and up-to-date information on the project for residents; meetings for residents and landowners to voice concerns; design measures to reduce noise and operational measures to reduce flicker; local advertising and training for employment opportunities; and a monitoring group to support ongoing consultation of local stakeholders.

The EIA conclusion finds that overall, the effects on health, living conditions and well-being were assessed to be minor and in some places at most moderate. The conclusions consider objective measures of change in health determinants, but also acknowledge the influence of subjective and preconceived attitudes, concerns and fears. Economic employment benefits are considered significant, but the assessment acknowledges uncertainty in the extent to which the local community would directly benefit from employment.

The case study demonstrates an EIA of an energy sector project, in an EU member state, that uses a definition of health which is consistent with the WHO Constitution.

Georgia: Environmental Impact Assessment of Section F4 of the Khevi–Ubisa–Shoropani–Argveta Road (E60 Highway)

Table 14. EIA Georgia case study summary

Title of assessment	Environmental Impact Assessment of Section F4 of the Khevi–Ubisa–Shoropani–Argveta Road (E60 Highway)
Country/region	Georgia
Administrative level	Municipal
Assessment level	Project
Sector	Transport
Assessment done by	A private sector consultancy
Main health determinants discussed	Air quality, noise, occupational health and safety, worker–community interactions, in-migration, lifestyles and behaviours, health-care resources, community severance, road safety, emergency response times and economic benefits
Citation	*(68)*
EU EIA Directive implementation	Not applicable because Georgia is not an EU member state. EIA is required by Georgia's Environmental Assessment Code as well as the Safeguard Policy Statement of the Asian Development Bank (ADB).

Over recent decades, the Government of Georgia has shown a commitment to health policy that embraces the value of equity. As a result, Georgia has made notable progress in improving the health status of the entire population while addressing major risk factors and threats to health. It is estimated that the highest burden of disease in Georgia is associated with dietary risks, high systolic blood pressure, high body mass index and tobacco smoking *(18)*.

This EIA from October 2019 concerns construction of a 14.7 km section of the E-60 highway located in Imereti region, central Georgia. The assessment was financed by the ADB.

Georgia's East–West Highway is an integral part of one of the corridors connecting central Asia with Europe and east Asia. The project is to address one of the bottle-neck sections of this highway.

The EIA was prepared by consultants for the Roads Department of the Ministry of Regional Development and Infrastructure of Georgia (MRDI) and for the ADB.

The EIA was intended to inform the Roads Department in relation to ensuring compliance with Georgian legislation and with the environmental and social requirements of the ADB.

The requirement for the EIA arises from Georgia's Environmental Assessment Code (2017) and the lending criteria of the ADB Safeguard Policy Statement (2009). The extent to which health authorities were consulted as part of the EIA is unclear. There is reference to the Ministry of Labour, Health and Social Affairs (MoLHSA), which is represented in a Trilateral Commission of Social Partnership together with the Ministry of Justice and Ministry of Education and Sport. The role the MoLHSA has played in relation to the health elements of the EIA is unclear. The Trilateral Commission's role appears to relate mainly to labour safety.

The coverage of human health is integrated within the EIA, rather than as a standalone report. A wider determinants of health approach is evident in the scope of the assessment.

The assessment of health is presented within a number of sections, but is focused in a section entitled "Community health and safety". This sits alongside a section on "Workers' rights and occupational health and safety" and within a broader section on "Social and cultural aspects".

In addition to biophysical assessments of health within the discussion of air quality and noise, the assessment also explores worker–community interactions and in-migration to the area.

The assessment considers how increased incomes in the local community may change lifestyles and behaviours, including risk taking in relation to drugs, alcohol and prostitution. These effects are traced through to potential increased pressure on health-care resources. Social tensions and potential conflict between the local population and an influx of skilled workers to the area is also noted. Other topics discussed include community severance and road safety. Occupational health and safety is assessed in terms of workers' rights, injury risk, labour abuse, and work and living conditions.

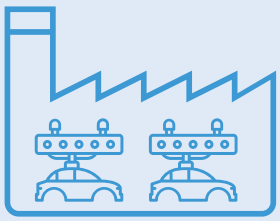
Populations assessed encompass local communities (including those with low skills and low income), workers (in relation to occupational health), and schools and children (in relation to road safety).

Mitigation is set out in terms of management or action plans by topic. This includes the requirement for the contractor to provide on-site accommodation and medical facilities for the construction workforce and develop an environmental, health and safety method statement. Monthly community meetings would be held as a forum for locals to discuss specific issues and a grievance redress mechanism would be provided. Workers would be provided with an occupational health promotion programme. Coordination is also required with local public health officials regarding the use of hospitals and other community facilities.

The EIA conclusions note the health benefits of the road improvements, including reduced dust levels, faster emergency response times and an improved pedestrian environment. The economic benefits of more than 600 direct employment opportunities for approximately 30 months are also highlighted in relation to social and cultural aspects and occupational health. Indirect, or induced, impacts of the project are also discussed including the potential for commercial, industrial and residential development along the improved road section and how this could place stress on social services including hospitals.

On the basis of the mitigation proposed, the construction stage impacts on community health and safety were assessed to be “minor”. The operational phases were assessed as “beneficial” for community health and safety, particularly in terms of segregation of traffic and pedestrians and benefits to urban areas.

The case study demonstrates an EIA of a transport infrastructure project, in a non-EU member state, that uses a definition of health which is consistent with the WHO Constitution.



Hungary: *BMW közútigépjármű-gyártó üzem Debrecen. Környezeti Hatástanulmány* [BMW road vehicle manufacturer plant Debrecen. Environmental Impact Assessment]

Table 15. EIA Hungary case study summary

Title of assessment	BMW road vehicle manufacturer plant Debrecen. Environmental Impact Assessment
Country/region	Hungary
Administrative level	Municipal
Assessment level	Project
Sector	Industry
Assessment done by	A private sector consultancy
Main health determinants discussed	Air quality, noise, communicable disease risks, road safety, economic benefits for health, living conditions and poverty, in-migration affecting institutional infrastructure and unemployment
Citation	*(69)*
EU EIA Directive implementation	16 May 2017

Life expectancy in Hungary is lower than in most of its EU neighbours, and disparities across gender and socioeconomic groups are substantial. Lifestyle risk factors account for half of all deaths in Hungary. In response to high levels of mortality from preventable causes recent policy measures have tried to promote healthier lifestyles *(70)*.

This EIA from January 2019 concerns a new road vehicle manufacturing plant with annual production in excess of 10 000 vehicles. The project is located on the outskirts of Debrecen, between Kismacs, Nagymacs and Józsa, in Hungary.

The EIA was commissioned by the private sector corporation, Bayerische Motoren Werke Aktiengesellschaft (BMW AG), and produced by consultants. The EIA was intended to inform, among others, the local government of Hajdú-Bihar county and the government office of Debrecen district. The requirement for the EIA arises from EIA legislation transposing the EU EIA Directive. The EIA references the Act on Environmental Impact Assessment and Unified Environmental Use Permitting Procedure 314/2005, as amended. The extent to which health authorities were consulted during the EIA or on the EIA report is unclear.

The coverage of human health is integrated within the EIA, rather than as a standalone report. The assessment of health is presented within its own section entitled “Social and economic, environmental health impacts”. Within this there are subsections for “Socioeconomic impacts” and “Effects on the health of the population”. The assessment covers biophysical considerations in relation to regulatory air quality and noise limits, including discussion of the effects on recreation and amenities. There is also an assessment of communicable disease risks in relation to workers arriving from other countries. Accident risks are discussed in relation to road safety. The economic benefits of the project are specifically related to health in terms of improving living conditions, reducing poverty and greater community spending on health-improving resources. The potential for in-migration of workers to affect local institutional infrastructure is also noted. The discussion of the plant’s ultimate closure after its period of operation acknowledges the potential for adverse effects of unemployment on health, including due to social exclusion.

Populations assessed include the employees of the factory and those living in the vicinity of the factory. The wider local and reginal population of eastern Hungary is also considered in terms of investment benefits.

Health-related mitigation includes occupational health care to monitor and respond to risks of infectious disease in the project workforce. This will be delivered in collaboration with local public health bodies.

The EIA conclusions note that from a public health point of view the construction and operation effects on the health of the surrounding population relate primarily to air pollution and noise emissions. The effects of construction dust and transport air pollution are considered potentially significant, but regulatory limit values would not be exceeded, and chronic health effects are not expected. The EIA concludes that socioeconomic benefits are expected to population health from job opportunities, with community revenues and earnings supporting health care and population health improvement.

The case study demonstrates an EIA of a project in the industrial/manufacturing sector located in an EU member state that uses a definition of health which is consistent with the WHO Constitution.

Ireland: Mixed Use Development – Opera Site

Table 16. EIA Ireland case study summary

Title of assessment	Mixed Use Development – Opera Site
Country/region	Ireland
Administrative level	Municipal
Assessment level	Project
Sector	Urban development
Assessment done by	A private sector consultancy
Main health determinants discussed	Open space, air quality, noise, contaminated land, neighbourhood amenities, accessibility, active travel, access to work and training, social cohesion, crime reduction and lifetime neighbourhoods
Citation	*(71)*
EU EIA Directive implementation	16 May 2017

The life expectancy of the Irish population has increased by nearly six years since 2000, the strongest of gains among western European countries, and is now above the EU average. Mortality from preventable and treatable causes in Ireland is lower than the EU average, signalling that public health policies and health-care interventions are generally effective. The main causes of premature death that could be further avoided through a range of public health and prevention measures in Ireland include ischaemic heart disease, lung cancer and road traffic incidents. A number of public health initiatives in recent years have aimed to reduce preventable deaths. Adopted in 2013, the Healthy Ireland initiative currently provides the national framework to improve the health and well-being of the population *(60)*.

This EIA from March 2019 concerns the redevelopment of an existing city block the “Opera Site”, located on the south side of the River Abbey in Limerick, Ireland. The Opera Site baseline is of a brownfield site at the heart of Limerick city centre. The project comprises a mixed-use scheme including office, retail and residential elements, as well as civic/cultural uses and three new public plazas.

The EIA was commissioned by the public sector, Limerick City and County Council, and was produced by consultants. The requirement for the EIA arises from EIA legislation transposing EU Directive 2011/92/EU as amended by EU Directive 2014/52/EU. The EIA references the EU Planning and Development Regulations and Environmental Impact Assessment Regulations (2018). The Environmental Health Service and Environmental Protection Agency were consulted as part of the EIA.

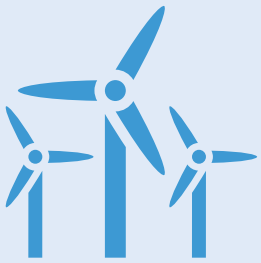
The coverage of human health is integrated within the EIA, rather than as a standalone report. The assessment of health is presented within its own chapter entitled “Population and human health”. The EIA health chapter provides a qualitative assessment and professional judgements on significance of access to health-care services and other social infrastructure; access to open space and nature; air quality, noise and neighbourhood amenities; accessibility and active travel; access to work and training; social cohesion and neighbourhoods; crime reduction and lifetime neighbourhoods; and contaminated land. This range of health determinants covers biophysical, social and economic drivers of population health.

Populations assessed include residents, shoppers and commuters, including vulnerable road users.

Health-related mitigation includes air quality and noise measures during the construction stage. The report identifies that no mitigation is required in relation to contaminated land. Historic soil pollutants would be largely removed during excavation for basement areas and other areas would be sealed with hardstanding before raised planting areas were added.

The EIA concludes that health benefits are found in terms of job creation, with explicit links made to positive health impacts associated with increased income, the establishment of networks, job satisfaction and a sense of self-worth. The provision of improved communal areas with a high amenity value is linked to health through increased social cohesion and social interaction. Improvements to the public realm are expected to result in health benefits from higher levels of active travel by encouraging more people to walk or cycle. Potential adverse impacts are described in relation to pedestrian and cyclist accessibility during construction.

The case study demonstrates an EIA of an urban development project, in an EU member state, that uses a definition of health which is consistent with the WHO Constitution.



Lithuania: *Vėjo elektrinių parko Šilutės r. sav. Juknaičių sen., Domaičių k. įrengimo poveikio aplinkai vertinimo ataskaita* [Wind farm in Šilutė d. sav. Juknaičiai sen., Domaičių village. Environmental impact assessment report for the installation]

Table 17. EIA Lithuania case study summary

Title of assessment	Wind farm in Šilutė d. sav. Juknaičiai sen., Domaičių village. Environmental impact assessment report for the installation
Country/region	Lithuania
Administrative level	Municipal
Assessment level	Project
Sector	Energy
Assessment done by	A private sector consultancy
Main health determinants discussed	Noise, shadow flicker, infrasound, electromagnetic radiation, vibration, air quality, quality of life, housing conditions, leisure and recreation, employment, potential for stress and conflict, occupational risk factors
Citation	*(72)*
EU EIA Directive implementation	16 May 2017

Lithuania had the highest preventable mortality rate in the EU in 2016. Lifestyle-related risk factors account for more than half of all deaths in Lithuania. This highlighted a substantial need to develop more effective public health policies. The adoption of the National Health Strategy 2014–2025 aims to encourage intersectoral action to promote healthy lifestyles *(73)*.

This EIA was issued in August 2017 and it assesses the construction of five new wind farms, equivalent to 15–18 MW, in the Šilutė district of Lithuania.

The EIA was commissioned by private sector company, UAB SV projektai. It was produced by consultants whose team included specialists in public health impact assessment. The EIA was intended to inform the Lithuanian Environmental Protection Agency, who were the responsible authority in determining the application. The requirement for the EIA arises from Lithuanian legislation transposing the EU EIA Directive. The Lithuanian regulation on EIA makes specific reference to the need to assess the effects on public health. Klaipeda Public Health Centre was consulted on the EIA report, in addition to the district municipality administration and Ministry of Environment. The report states that Klaipeda Public Health Centre indicated agreement with the EIA and provided no additional comments.

The coverage of human health is integrated within the EIA, rather than as a standalone report. The assessment of health is presented within its own chapter entitled “Public health”, and is described as a “public health impact assessment”. The section assesses biophysical health determinants in terms of noise, shadow flicker, infrasound, electromagnetic radiation, vibration and air quality. Wider determinants of health were also assessed in terms of socioeconomic factors and psychological health effects for the population. Assessment of socioeconomic factors included quality of life of the population, housing conditions, leisure and recreation, and employment. Psychological factors included potential for stress and conflict. Occupational risk factors were also assessed.

Populations assessed include the local, district and national populations. Vulnerable groups considered included children, older people and people with existing poor health.

Health-related mitigation is primarily addressed through project design. Some additional measures include surface and ground water protection measures and blinds and vegetation planting for residents to reduce flicker effects.

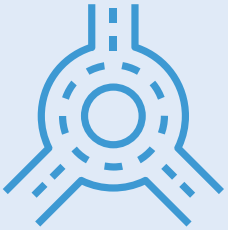
The EIA conclusions explore tensions between regional/national priorities and local interests and values, including differing views on risks and benefits, as well as disruption of established social norms.

The way in which health is affected by community identity is discussed, noting that the identity of the individual and the community is shaped by social, cultural, visual and environmental factors. Aspects of primary and secondary stress to individuals and communities are discussed in terms of acute and chronic outcomes. Links are made to specific health outcomes, including anxiety disorders, cardiovascular disease and endocrine function. Stress is associated with visual impact, noise, perceived risks and public reaction during construction and operation.

The conclusion of the assessment is that the project has a minimal influence on environmental and social risk factors, but uncertainty is acknowledged. Compliance with regulatory standards for health protection is noted. Economic benefits are expected for the district municipality. The potential positive and negative effects on quality of life are

assessed as not significant. The assessment concludes that recreational facilities and activities will not be affected.

The case study demonstrates an EIA of an energy sector project, in an EU member state, that uses a definition of health which is consistent with the WHO Constitution.



Portugal: *Ligação do interface Rodoferroviário/ EN14 (Santana), incluindo Nova Ponte sobre o Rio Ave* [Connection of the road–rail/EN14 interface (Santana), including a new bridge over the Rio Ave]

Table 18. EIA Portugal case study summary

Title of assessment	Connection of the road–rail/EN14 interface (Santana), including a new bridge over the Rio Ave
Country/region	Portugal
Administrative level	Municipal
Assessment level	Project
Sector	Transport
Assessment done by	A private sector consultancy
Main health determinants discussed	Air quality, noise, accessibility, economic development, quality of life, cycling, mobility and road safety
Citation	*(74)*
EU EIA Directive implementation	16 May 2017

Portugal has a lower rate of preventable mortality than the EU average, however inequalities by gender and by socioeconomic status are prevalent. People live longer than the EU average, but often with chronic diseases and disabilities. In January 2019, the government decentralized some competencies to the municipal level. Local health councils are expected to have a primary role in defining local health policy, developing responsive health promotion programmes and promoting cooperation between all relevant bodies *(75)*.

This EIA from December 2018 concerns a new road (approximately 2.4 km), including 4 new roundabouts and their connections to the existing network and the construction of a new bridge over the Ave River. The project spans the municipality of Trofa, in the district of Porto and the municipality of Vila Nova de Famalicão, in the district of Braga.

The EIA was commissioned by the public sector limited company Infraestruturas de Portugal, whose sole shareholder is the Portuguese state. It was produced by Portuguese private sector consultants, and was intended to inform the Portuguese Environment Agency (Agência Portuguesa do Ambiente). The requirement for the EIA arises from Portugal's EIA legislation, transposing the EU EIA Directive. The extent to which health authorities were consulted is not clear.

The coverage of human health is integrated within the EIA, rather than as a standalone HIA report. The human health assessment has a focus on narrow biophysical health determinants, but also links to wider determinants of health within the assessment. The assessment of health is presented within its own section entitled "Human health". The section assesses air quality, noise and accessibility effects on health protection measures and on quality of life. In addition, there is discussion of the well-being benefits to the population from the project in terms of regional economic development and improved accessibility.

A broad "meaning" of health is evident in the assessment of quality of life, as well as from the discussion of the impact of cycling on physical health, mobility and road safety. Promoting cycling is also linked to the sustainable development of the wider society and cities.

Populations assessed include residents of local communities near to the project's construction works, as well as the wider communities and region in relation to the operational benefits of the road improvements.

Health-related mitigation includes measures to reduce construction noise. The recommended inclusion of cycle lanes within the design is presented as an enhancement measure to benefit health and road safety.

The EIA conclusions note positive effects in terms of direct and indirect employment, investment, and demographic change. The positive effects on walking and cycling are discussed, including the benefits for physical health, accessibility, mobility and road safety. While the assessment focuses on air quality, noise, access and road safety, there is also an assessment of quality-of-life effects. There is a recognition, at times implicit and at other times explicit, that the population's health is affected by a broad range of lifestyle, social and economic impacts, as well as the environmental changes, of the project.

The case study demonstrates an EIA of a transport infrastructure project, in an EU member state, that uses a definition of health which is consistent with the WHO Constitution.

4

How health has been considered in SEA and EIA: a review of the research literature

This section sets out the results of a review of articles (n = 35) published in 2008–2020.

Twenty-five articles report empirical research.

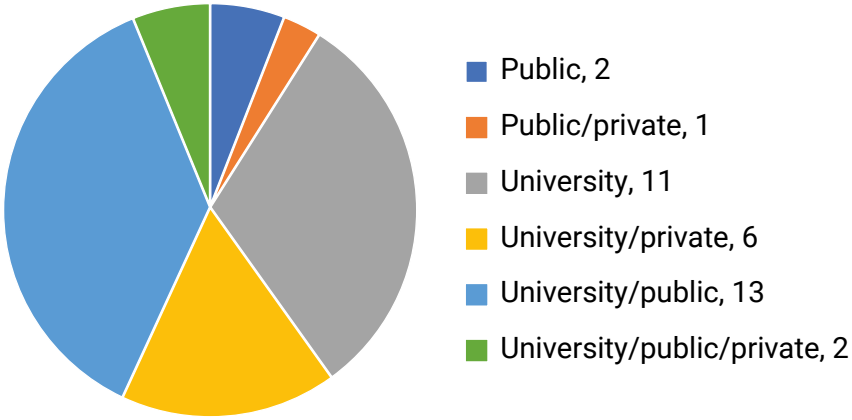
Eleven articles were theoretical or conceptual discussions which critiqued guidelines and offered new guidelines, briefing notes and conceptual frameworks.

Eighteen articles were solely concerned with the consideration of health in EIA, also called environmental impact statements (EIS). There were 11 articles that considered SEA and EIA collectively and six that focussed on SEA.

Ten of the empirical research articles were dedicated to supporting practitioners (public health, spatial planners and assessors) in understanding health in environmental assessment.

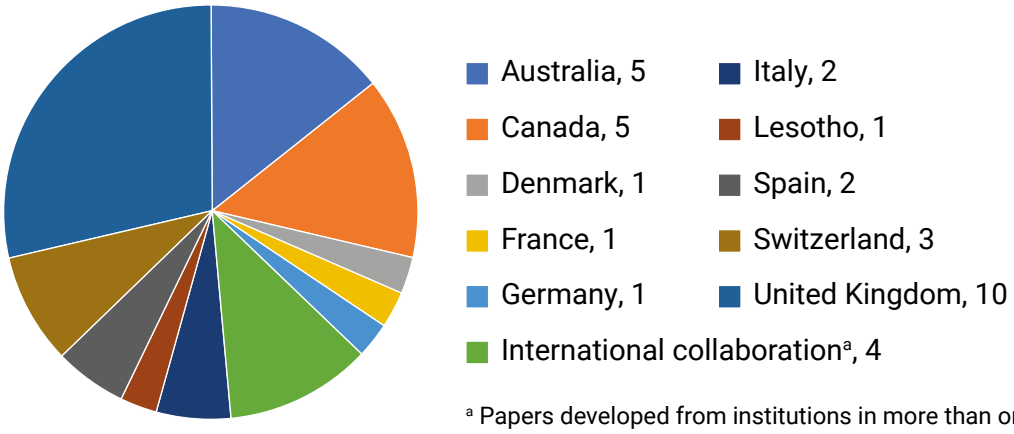
Authors mainly represent universities, although three articles had no academic input. Most academic collaborations are with the public sector (n = 15), of which two cases also included the private sector. Following that, most research is undertaken by universities alone (n = 11) or in partnership with the private sector (n = 6). Finally, reviewed articles included those that were research led by the public sector (n = 2), one of which was in partnership with the private sector (see Fig. 2).

Fig. 2. Authors' institutional contexts



Ten of the authors are based in United Kingdom institutions, followed by Australian and Canadian institutions (n = 5 each); four papers were produced by international collaborations and three were from authors of Swiss institutions. Spanish and Italian institutions produced two articles each, and institutions from Denmark, France, Germany and Lesotho one article each (see Fig. 3).

Fig. 3. Institution/author location

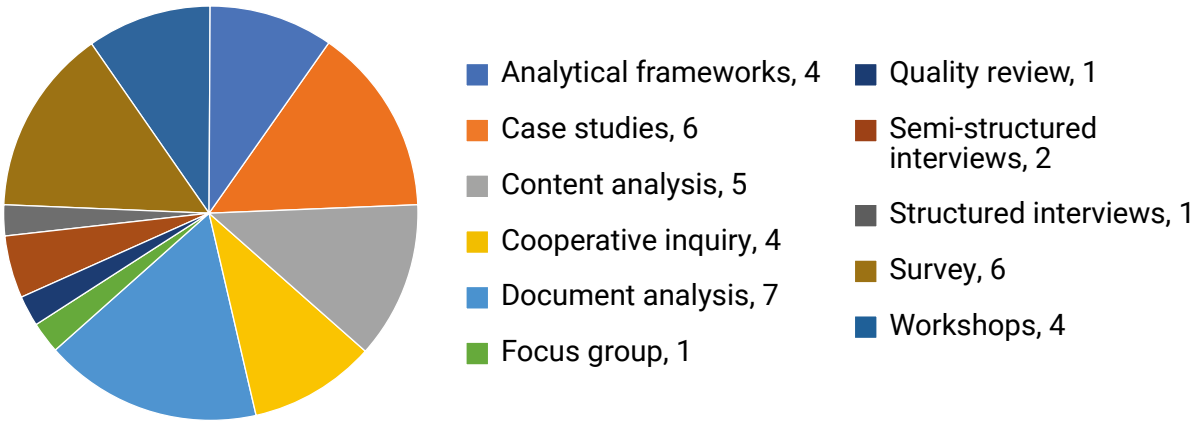


[a] Papers developed from institutions in more than one country.

Of the 35 papers, 15 declared their funders, 14 made no explicit declaration and 6 stated that they were not funded. Of the 15 articles that declared funding, 8 were funded by research councils and 7 were funded by a government department or WHO.

The researchers used a mixture of qualitative research methods, for example: document analysis (n = 7), surveys and case studies (n = 6 each) and content analysis (n = 5). Other methods used included: analytical frameworks (n = 4) and workshops and cooperative inquiry techniques (n = 4 each). Authors used semi-structured (n = 2) and structured interview methods (n = 1) and in one case a focus group approach (see Fig. 4).

Fig. 4. Research methods



Fourteen articles discuss the EU EIA Directive *(9,11,26,28,31,32,34,38,40,42–44,52,76)* and 15 articles discuss the EU SEA Directive *(22,23,25,26,29–34,40,43,50,52,76)*.

Other authors focus on health in environmental assessment in a specific country, for example, Denmark, Scotland and the United Kingdom *(29,34,40)* or national EIA policies, for example, Lesotho, Mongolia, Australia and Brazil *(35,39,47,51)*.

Articles for Wales and England *(34)* and Lombardy *(43)* discuss guidance on HIA and its integration with SEA and EIA. Brown et al. *(21)* review the Canadian Impact Assessment Act 2019, and the Canadian Environmental Assessment Act 2012 and the way these pieces of legislation facilitate the consideration of health in impact assessment.

Authors discuss, for example, the World Bank or Asian Development Bank's use of the International Finance Corporation's performance standards *(77)* to ensure community health, safety and security for bank investment for Lesotho *(27)*, Mongolia *(47)* and Vietnam *(48)*.

The research makes linkages with SEA, EIA or environmental assessment as a collective term, and to WHIA both implicitly and explicitly. This included noting:

- that HIA supports SEA and EIA to integrate health into impact assessment from a public health perspective *(11,19,41,42,45–48,52)*;
- that increasing the use of HIA can lead to an increase in public health being involved in environmental planning *(21)*;
- that HIA can analyse the SDoH and add to the scope of environmental assessment *(28,31,34,37,51)*;
- how SEAs are integrated with health without using the term HIA *(33)*.

Further information on the articles reviewed and on literature citing other case studies is provided in Annex 2.

© WHO / Malin Bring

Discussion

The discussion reflects on the extent to which human health is considered within SEA and EIA. The implication is considered of their being a pool of examples of such assessments that adopt a "broad" meaning of human health, across Member States, administrative levels, assessment levels and sectors. The implications of this for "good practice" are noted.

Case studies from SEA and EIA reports

Trends

This is the first review to focus on the way that human health is considered in environmental assessment reports across all the Member States of the WHO European Region. We look across the sample of 333 case studies and identify some trends in relation to the "meaning" of health for both SEA and EIA, but we do not name individual countries. We state that these trends should be interpreted with caution: when a large number of results were found we used a convenience sampling approach, which was supported by the search engine default of displaying results by relevance. We typically reviewed 50–500 results per Member State with the aim of identifying 3–5 examples each of SEA and EIA practice. The sample of reports is therefore small with respect to the level of assessment activity across, and within, the Member States. Further research would be required to explore these trends and patterns.

Looking at trends between countries, some Member States showed greater consistency in adopting a broad interpretation of health which is consistent with that in the WHO Constitution *(2)*. This may be related to enhanced in-country legislative requirements or working practices. Similarly, based on this sample, some Member States showed greater consistency in adopting a narrow interpretation of health. This may indicate an embedded narrow viewpoint by health actors within SEA and EIA, and that there are other separate processes beyond the SEA or EIA that consider broader health issues with a spatial focus.

Looking at trends within countries, the sample revealed a high degree of diversity within most Member States in terms of the interpretation of health. This may partially reflect different sectors and types of plans, programmes or projects, but even where these are similar diversity emerges. This suggests a strong influence from practitioners and perhaps local stakeholders.

There was a high degree of variability in terms of methods and depth of discussion of health across both SEA and EIA practice. In up to 80% of the 333 cases the discussion and analysis of health outside of biophysical determinants was limited, meaning that in around 20% of the cases it was not. However, it should be noted that where there was limited discussion and analysis of health, in many cases there was a separate discussion of socioeconomic and quality of life effects within the SEA or EIA. Those discussions could have, but did not, make links to population health outcomes. The transition to better practice, in terms of adopting a

broader interpretation of health, at least for some health determinants, therefore need not be prohibitive in terms of cost.

Finally, a strong mediating factor in relation to the meaning of health within assessments was the type and scope of the policy, plan, programme or project that was being assessed. Typically, transport SEAs acknowledged the health benefits of active forms of travel, such as walking and cycling, and spatial plan SEAs the health benefits of green spaces. On a few occasions the health of different groups of people (minorities) were also acknowledged and at times the beneficial effects of a strong economy for mental health were stressed. Access to health services/hospitals tended to be routinely covered in spatial plan SEAs, even if that may just mean acknowledging what the plan itself says. Healthy food was also approached, but usually in terms of, for example, "non-polluted" food (similar with water).

Limitations

The sample collected is primarily from publicly available sources accessed by the Google search engine. These are not all official government sites and the reason for the reports being published at these locations was not investigated. Authenticity was not established.

The search did not extend to any in-country databases of SEAs and EIAs where these were not accessible as part of the Google search. This is likely to explain why in many cases only a relatively few SEA or EIA reports were identified compared to known levels of SEA and EIA activity. There is variation in the extent to which there are publicly available databases of SEA and EIA reports within countries. Indeed, even where there are maintained databases, they may be held as a series of separate databases by different regional administrative or sectoral bodies.

The precise terminology for the SEA and EIA final report is highly variable, and more than one terminology may be in use within a single country. This rapid review did not identify and verify all local terminologies in local languages. This may also contribute to a relatively low number of results compared to known levels of SEA and EIA activity.

The case studies are not necessarily representative of SEA and EIA practice. A convenience sampling approach was taken to identify a pool of candidate case studies. This was stratified by Member State to ensure geographic representation and temporally bounded as discussed above. Purposive sampling was used to select cases that were written up.

The Google translation software does not always follow a sentence when translating Adobe Acrobat documents. The translation does not therefore consistently follow the meaning of a sentence across a line break. This affects the contextual algorithms of the translation software so that a more literal rather than nuanced translation is presented. However, for the purposes of this review this was considered an acceptable constraint and the researcher was able to interpret the gist of the discussion of health. For sections of text where the nuances were important the researcher was able to take the sections of text and place them into the Google Translate free text field (rather than full document translation) and manually remove the line breaks to arrive at a more precise translation. Furthermore, in addition to English,

researchers were able to read documentation in Dutch, French, German, Portuguese and Spanish.

Whether the SEA or EIA was accompanied by a standalone HIA was of interest. However, the search strategy and the candidate case studies themselves did not consistently or reliably indicate whether or not a standalone HIA had been produced. Even if a standalone HIA was produced, it was not necessarily available. The search strategy therefore took a pragmatic approach of searching in the first instance for SEAs and EIAs and then within these searching to identify whether a standalone HIA was referred to.

The analysis does not provide any indication of the quality of the SEAs and EIAs. It also does not provide any indication of the appropriateness of methods or depth of analysis.

Literature review

This was a rapid review that shows that health is considered in SEA and EIA. Human health is still a relatively new topic in SEA and EIA, even though the relevant EU directives were passed in 2004 and 2014, respectively.

A high proportion of articles are looking at SEA and EIA prepared under requirements of the EU directives. This is to be expected given the terms of the search.

In reviewing coverage of health in EIA, Cave et al. *(11)* note that different meanings of health are used by those working in public health and those working in EIA. This divide is not attributed to procedural compliance with the regulations and legislation which provide a mandate for EIA. Cave et al. *(11)* cite Bhatia & Wernham *(12)* who found that the absence of health expertise in the EIA practitioner community and entrenched EIA practices meant that health professionals were not involved in EIA, and Humboldt-Dachroeden et al. *(40)* who found the absence of guidance documents addressing the particularities of health in EIA was a barrier to the inclusion of health in environmental assessments. There are very similar issues with the consideration of health in SEA *(30)*. Fischer et al. *(32)* note that while EIAs and SEAs are usually prepared in parallel to PPPP preparation processes, HIAs tend to be prepared in response to final PPPP drafts and therefore often appear to be “bolted on” rather than integrated. In this context, for those cases that included both – a human health SEA/ EIA chapter and an HIA in an annex – the two were found to be disjointed with few obvious connections.

Conclusions

Highlights

A systematic review across the 53 Member States of the WHO European Region identified 333 SEA and EIA reports that consider health. While 80% of these were subsequently found to pursue a narrow interpretation of health, around 10% explicitly considered wider determinants when defining health, and another 10% considered wider determinants of health in the actual assessment. Based on the review of 12 written-up good practice case studies (6 EIAs and 6 SEAs) and a review of the literature on health in SEA and EIA, we conclude that the consideration of wider determinants of health is both feasible and beneficial. In this context, it is important to be proportionate, that is, to focus on those determinants of health that are relevant in a particular assessment situation and have the potential for population health effects that are likely and significant.

This report investigates how statutory requirements for the coverage of human health in SEA[5] and EIA[6] are interpreted and expressed across the Region. Through a systematic review using Google, 333 SEA and EIA reports that consider health were identified. From this set of SEAs and EIAs, 12 examples are presented to show how health is integrated within SEA and EIA. A literature review was also conducted, which found 35 articles published in 2008–2020 that describe case studies of health in EIA and SEA.

This report considered two subsidiary questions. The first examined the extent to which SEA and EIA practice considers the social, economic, behavioural and institutional determinants of human health, as well as the biophysical determinants. The "broader" perspective is consistent with the WHO Constitution. As shown in Table 6, 64% of SEAs and 45% of EIAs cover more than biophysical aspects. Furthermore, around 10% explicitly considered wider determinants when defining health, and around a further 10% took the consideration of wider determinants of health through to the full assessment. This means that cases where SEAs and EIAs align with the definition of health in the WHO Constitution are in the minority; but, at about 20% of the 333 cases considered, they can easily be found and are far from exceptional. The 12 case studies presented cover a range of countries and sectors and include both public and private sector proposals. They show current good practice examples, for both SEA and EIA. The examples found in the literature review also show that SEAs and EIAs routinely use a definition of health which aligns with that set out in the WHO Constitution.

The second subsidiary question asked how insights from case studies that do align with the definition of health in the WHO Constitution can inform professional practice and future guidance. The case studies indicate that it is proportionate for guidance on human health in SEA and EIA to require the consideration of health inequalities, healthy lifestyles, safe and

5 Post 2010 or later ratification of the Protocol on SEA
6 Post implementation of the 2014 EU EIA Directive

cohesive communities, socioeconomic conditions, environmental conditions, and health and social-care services. The case studies also indicate that this is consistent with current practice.

The case studies also show how defining health in a way that is consistent with the WHO Constitution allows a proportionate assessment to be conducted. Each of the case studies take a subset of determinants of health through to the full assessment stage.

Furthermore, the case studies illustrate situations where the decision-makers were provided with a broad understanding of the likely significant population health effects of a proposal, not just those linked to environmental determinants of health. The outcomes of decision-making were not reviewed as part of this study, but it is reasonable to assume that the fuller picture of the potential health effects of the proposal supported better decision-making, improved population health and made communities more sustainable. Such outcomes are consistent with the aims of environmental assessment *(3–5)*.

From both this current review of case studies, and the case studies already cited within the literature, it is evident that SEAs and EIAs can and do use an approach to human health that aligns with the WHO Constitution. This includes considering direct effects to human health from environmental change, and indirect or secondary effects to human health from the social, economic, behavioural and institutional consequences of environmental change. This is appropriate and proportionate and has been shown in both the scoping and assessment stages of the SEAs and EIAs.

Protecting and improving population health has intrinsic value, it is also ultimately cost saving for society and governments (6,7). Adopting a broad meaning of health within environmental assessments supports evidence-based insight into the complex health pathways and trade-offs inherent within all decisions. It allows these complexities for population health to be responded to with clear recommendations and conclusions. This benefits not only the proposal itself but may also increase support for the proposal by aligning with health-related mandates and goals across diverse stakeholders. A key outcome is the raising of awareness about the population health implications of decisions, particularly decisions that are outside of the health sector. Ultimately this contributes to wider societal gain, including well-being, economic development and environmental sustainability.

The findings of this report suggest that the following actions to build capacity for health in environmental assessment will be beneficial:

- promoting international and national good practice on health in environmental assessment, which aligns with recent publications on health in SEA *(8)*, health in EIA *(9)* and HIA *(10)*;
- increasing public health knowledge and experience within the private sector which conducts impact assessment, including through education, training and competency requirements;
- clarifying the mandate for national health stakeholders' formal engagement in SEA and EIA.

References

1. Countries. In: WHO Regional Office for Europe [website]. Copenhagen: WHO Regional Office for Europe; 2021 (https://www.euro.who.int/en/countries, accessed 17 November 2021).

2. Constitution of the World Health Organization. In: Basic documents. Forty-ninth edition. Geneva: World Health Organization; 2020 (https://apps.who.int/gb/bd/, accessed 17 November 2021).

3. European Parliament, Council of the European Union. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Official Journal of the European Union. 2014;L124/1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052, accessed 17 November 2021).

4. European Parliament, Council of the European Union. Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. Official Journal of the European Union. 2001;L197 (http://data.europa.eu/eli/dir/2001/42/oj, accessed 17 November 2021).

5. Protocol on Strategic Environmental Assessment of the Convention on Environmental Impact Assessment in a Transboundary Context. Geneva: United Nations Economic Commission for Europe (https://unece.org/environment-policy/publications/protocol-strategic-environmental-assessment-convention, accessed 28 March 2022).

6. The case for investing in public health. A public health summary report for EPHO 8. Copenhagen: WHO Regional Office for Europe; 2014 (https://www.euro.who.int/__data/assets/pdf_file/0009/278073/Case-Investing-Public-Health.pdf, accessed 17 November 2021).

7. McGuire F, Vijayasingham L, Vassall A, Small R, Webb D, Guthrie T et al. Financing intersectoral action for health: a systematic review of co-financing models. Glob Health. 2019;15. doi: 10.1186/s12992-019-0513-7.

8. Draft guidance on assessing health impacts in strategic environmental assessment. Geneva: United Nations Economic Commission for Europe; 2020 (https://www.unece.org/fileadmin/DAM/env/eia/documents/WG.9_2020/Final_documents/2004508E.pdf, accessed 17 November 2021).

9. Cave B, Claßen T, Fischer-Bonde B, Humboldt-Dachroeden S, Martín-Olmedo P, Mekel O et al. 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. Fargo: International Association for Impact Assessment and European Public Health Association; 2020 (https://www.iaia.org/uploads/pdf/Human%20Health%20Ensuring%20Protection%20Summary.pdf, accessed 17 November 2021).

10. Pyper R, Cave B, Purdy J, McAvoy H. Health impact assessment guidance: a manual and technical guidance. Dublin and Belfast: Institute of Public Health in Ireland; 2021 (https://publichealth.ie/hia-guidance/, accessed 17 November 2021).

11. Cave B, Pyper R, Fischer-Bonde B, Humboldt-Dachroeden S, Martin-Olmedo P. Lessons from an international initiative to set and share good practice on human health in environmental impact assessment. Int J Environ Res. 2021;18. doi: 10.3390/ijerph18041392.

12. Bhatia R, Wernham A. Integrating human health into environmental impact assessment: an unrealized opportunity for environmental health and justice. Environ Health Perspect. 2008;116:991–1000. doi: 10.1289/ehp.11132.

13. Social determinants of health. In: Health topics [website]. Geneva: World Health Organization; 2021 (https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1, accessed 17 November 2021).

14. Kim J, Haigh FA. HIA and EIA are different, but maybe not in the way we thought they were: a bibliometric analysis. Int J Environ Res. 2021;18:9101. doi: 10.3390/ijerph18179101.

15. Harris-Roxas B, Harris E. Differing forms, differing purposes: a typology of health impact assessment. Environ Impact Assess Rev. 2011;31:396–403. doi: 10.1016/j.eiar.2010.03.003.

16. European Parliament, Council of the European Union. Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment. Official Journal of the European Union. 2011;L26:1–21 (http://eur-lex.europa.eu/eli/dir/2011/92/oj, accessed 17 November 2021).

17. Country profiles: regional facts and figures. In: Topics [website]. Paris: Organisation for Economic Co-operation and Development; 2021 (https://www.oecd.org/regional/regional-policy/country-profiles.htm, accessed 17 November 2021).

18. Georgia. Highlights on health and well-being. Copenhagen: WHO Regional Office for Europe; 2017 (https://apps.who.int/iris/handle/10665/344134, accessed 17 November 2021).

19. Baumgart S, Hartlik J, Machtolf M. Improving the consideration of human health in environmental planning and decision-making – perspectives from Germany. Impact Assess Proj Apprais. 2018;36:57–67. doi: 10.1080/14615517.2017.1364020.

20. Bond A, Cave B, Ballantyne R. Who plans for health improvement? SEA, HIA and the separation of spatial planning and health planning. Environ Impact Assess Rev. 2013;42:67–73. doi: 10.1016/j.eiar.2012.10.002.

21. Brown JA, Gorman M, Kim H, Schober K, Vipond J, Nykiforuk C. Scoping Population Health in Impact Assessment (ScopHIA) realist review: identifying best practices for equity in scoping of major natural resource and large-scale infrastructure projects. Edmonton: School of Public Health, University of Alberta; 2020 (https://era.library.ualberta.ca/items/3b517d35-4600-47b4-aeba-d9b541a3253a, accessed 17 November 2021).

22. Burns J, Bond A. The consideration of health in land use planning: barriers and opportunities. Environ Impact Assess Rev. 2008;28:184–97. doi: 10.1016/j.eiar.2007.06.001.

23. Carmichael L, Barton H, Gray S, Lease H, Pilkington P. Integration of health into urban spatial planning through impact assessment: identifying governance and policy barriers and facilitators. Environ Impact Assess Rev. 2012;32:187–94. doi: 10.1016/j.eiar.2011.08.003.

24. Cave B, Fothergill J, Pyper R, Gibson G, Saunders P. Health in environmental impact assessment: a primer for a proportionate approach. Lincoln: Ben Cave Associates Ltd, IEMA and the Faculty of Public Health; 2017 (https://www.bcainsight.com/resources, accessed 18 November 2021).

25. Diallo T, Cantoreggi N, Simos J, Christie DPTH. Is HIA the most effective tool to assess the impact on health of climate change mitigation policies at the local level? A case study in Geneva, Switzerland. Glob Health Promot. 2017;24:5–15. doi: 10.1177/1757975916686920.

26. Diallo T, Cantoreggi N, Simos J, Christie DPTH. The inclusion of health in impact assessments: a case study in Geneva, Switzerland. Impact Assess Proj Apprais. 2018;36:45–56. doi: 10.1080/14615517.2017.1364015.

27. Dietler D, Lewinski R, Azevedo S, Engebretsen R, Brugger F, Utzinger J et al. Inclusion of health in impact assessment: a review of current practice in sub-Saharan Africa. Int J Environ Res Public Health. 2020;17. doi: 10.3390/ijerph17114155.

28. Domínguez-Ares E, Martín-Olmedo P, Iglesias-Merchan C. Perception survey on the relevance of main categories of health determinants for conducting health impact assessment. Environ Impact Assess Rev. 2020;85:106445. doi: 10.1016/j.eiar.2020.106445.

29. Douglas MJ, Carver H, Katikireddi SV. How well do strategic environmental assessments in Scotland consider human health? Public Health. 2011;125:585–91. doi: 10.1016/j.puhe.2011.06.005.

30. Fischer T. Health in SEA. In: Fehr R, Viliani F, Nowacki J, Martuzzi M, editors. Health in impact assessments: opportunities not to be missed. Copenhagen: WHO Regional Office for Europe; 2014:23–46 (https://apps.who.int/iris/handle/10665/137369, accessed 18 November 2021).

31. Fischer TB, Cave B. Health in impact assessments – introduction to a special issue. Impact Assess Proj Apprais. 2018;36:1–4. doi: 10.1080/14615517.2017.1363976.

32. Fischer TB, Jha-Thakur U, Fawcett P, Clement S, Hayes S, Nowacki J. Consideration of urban green space in impact assessments for health. Impact Assess Proj Apprais. 2018;36:32–44. doi: 10.1080/14615517.2017.1364021.

33. Fischer TB, Martuzzi M, Nowacki J. The consideration of health in strategic environmental assessment (SEA). Environ Impact Assess Rev. 2010;30:200–10. doi: 10.1016/j.eiar.2009.10.005.

34. Fischer TB, Muthoora T. Research report on HIA practice in England. London: Public Health England; 2020.

35. Gwimbi P, Lebese P, Kanono K. Mainstreaming health impact assessments in environmental impact statements into planning obligations in post dam construction in Metolong, Lesotho: a qualitative investigation. Heliyon. 2020;6:e04362. doi: 10.1016/j.heliyon.2020.e04362.

36. Hackett P, Liu J, Noble B. Human health, development legacies, and cumulative effects: environmental assessments of hydroelectric projects in the Nelson River watershed, Canada. Impact Assess Proj Apprais. 2018;36:413–24. doi: 10.1080/14615517.2018.1487504.

37. Harris P, Riley E, Sainsbury P, Kent J, Baum F. Including health in environmental impact assessments of three mega transport projects in Sydney, Australia: a critical, institutional, analysis. Environ Impact Assess Rev. 2018;68:109–16. doi: 10.1016/j.eiar.2017.09.002.

38. Harris PJ, Haigh F. Including health in environmental impact assessments: is an institutional approach useful for practice? Impact Assess Proj Apprais. 2015;33:135–41. doi: 10.1080/14615517.2015.1006417.

39. Hresc J, Riley E, Harris P. Mining project's economic impact on local communities, as a social determinant of health: a documentary analysis of environmental impact statements. Environ Impact Assess Rev. 2018;72:64–70. doi: 10.1016/j.eiar.2018.05.009.

40. Humboldt-Dachroeden S, Fischer-Bonde B, Gulis G. Analysis of health in environmental assessments—a literature review and survey with a focus on Denmark. Int J Environ Res Public Health. 2019;16. doi: 10.3390/ijerph16224570.

41. Iglesias-Merchan C, Domínguez-Ares E. Challenges to integrate health impact assessment into environmental assessment procedures: the pending debate. Impact Assess Proj Apprais. 2020;38:299–307. doi: 10.1080/14615517.2020.1716161.

42. Roué Le Gall A, Lemaire N, Jabot F. Lessons learned from co-constructing a guide on healthy urban planning and on integrating health issues into environmental impact assessments conducted on French urban development projects. Impact Assess Proj Apprais. 2018;36:68–80. doi: 10.1080/14615517.2017.1364018.

43. Linzalone N, Assennato G, Ballarini A, Cadum E, Cirillo M, Cori L et al. Health Impact Assessment practice and potential for integration within Environmental Impact and Strategic Environmental Assessments in Italy. Int J Environ Res Public Health. 2014;11:12683–99. doi: 10.3390/ijerph111212683.

44. Linzalone N, Bianchi F, Curzio O, Serasini L, Natali M. Theory and practice to integrating health in environmental assessment: synthesis of an experience with stakeholders to deliver a national HIA guideline. Environ Impact Assess Rev. 2019;77:49–59. doi: 10.1016/j.eiar.2019.03.004.

45. Mahboubi P, Parkes MW, Chan HM. Challenges and opportunities of integrating human health into the environmental assessment process: the Canadian experience contextualised to international efforts. J Environ Assess Policy Manag. 2015;17:1550034. doi: 10.1142/S1464333215500349.

46. McCallum LC, Ollson CA, Stefanovic IL. An adaptable Health Impact Assessment (HIA) framework for assessing health within Environmental Assessment (EA): Canadian context, international application. Impact Assess Proj Apprais. 2018;36:5–15. doi: 10.1080/14615517.2017.1364026.

47. Pfeiffer M, Vanya D, Davison C, Lkhagvasuren O, Johnston L, Janes CR. Harnessing opportunities for good governance of health impacts of mining projects in Mongolia: results of a global partnership. Glob Health. 2017;13:39. doi: 10.1186/s12992-017-0261-5.

48. Pham T, Riley E, Harris P. Inclusion of health in environmental impact assessment of major transport infrastructure projects in Vietnam. Int J Health Policy Manag. 2018;7:828–35. doi: 10.15171/ijhpm.2018.36.

49. Riley E, Sainsbury P, McManus P, Colagiuri R, Viliani F, Dawson A et al. Including health impacts in environmental impact assessments for three Australian coal-mining projects: a documentary analysis. Health Promot Int. 2020;35:449–57. doi: 10.1093/heapro/daz032.

50. Guidance on consideration of human health in strategic environmental assessment. Stirling: Scottish Environment Protection Agency; 2019 (https://www.sepa.org.uk/media/219433/lups-sea-gu5-consideration-of-human-health-in-sea.pdf, accessed 22 November 2021).

51. de Souza Hacon S, Périssé ARS, Simos J, Cantoreggi NL, Winkler MS. Challenges and prospects for integrating the assessment of health impacts in the licensing process of large capital project in Brazil. Int J Health Policy Manag. 2018;7:885–8. doi: 10.15171/ijhpm.2018.58.

52. Vohra S, Orenstein M, Viliani F, Cave B, Harris-Roxas B, Silva F. Environmental assessment and health impact assessment. In: van den Bosch M, Bird W, editors. Oxford Textbook of Nature and Public Health: The role of nature in improving the health of a population. Oxford: Oxford University Press; 2018 (https://oxfordmedicine.com/view/10.1093/med/9780198725916.001.0001/med-9780198725916-chapter-24, accessed 22 November 2021).

53. Strategisch-MER Verbeteren van de leefbaarheid voor de bewoners van de woonwijk Klein-Rusland (Zelzate) Ontwerptekst [Strategic EIA Improving the quality of life for the residents of the residential area Klein-Rusland (Zelzate) draft text]. Gent: Sweco Belgium; 2017 (in Flemish) (http://gentsekanaalzone.be/wp-content/uploads/2018/06/smerKR.pdf, accessed 22 November 2021).

54. Belgium: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/3bcb6b04-en, accessed 22 November 2021).

55. OÜ Adepte Ekspert. Põlva valla üldplaneeringu keskkonnamõju strateegiline hindamine [Strategic environmental assessment of Põlva municipality master plan]. Põlva: Põlva Parish Government; 2015 (in Estonian) (https://www.polva.ee/documents/17842760/19108887/P6lvaYP_LISA2_KSHA_20092017.pdf/1633df86-2835-47e1-bc5f-c6468208a24a, accessed 22 November 2021).

56. Estonia: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/0b94102e-en, accessed 22 November 2021).

57. Plan Régional de Prévention et Gestion des Déchets. Rapport environnemental [Regional Plan for the Prevention and Management of Waste. Environmental report]. l'Île-de-France: Institut d'Aménagement et d'Urbanisme de l'Île-de-France; 2018 (https://www.versaillesgrandparc.fr/fileadmin/user_upload/99_DE-D3210_DELIB_D20190412_ENVcridf_PRPGD_20190402ANX12.PDF, accessed 22 November 2021).

58. France: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/d74dbbda-en, accessed 22 November 2021).

59. Strategic Environmental Assessment (SEA). Assessment of the Proposed Amendments. Planning Scheme for the North Lotts & Grand Canal Dock Strategic Development Zone (SDZ). Screening Report. Dublin: Planning and Economic Development Department, Dublin City Council; 2013 (http://www.dublindocklands.ie/sites/default/files/Planning/Bridge%20Amendment/Strategic%20Environmental%20Assessment%20SDZ%202020.pdf, accessed 22 November 2021).

60. Ireland: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/2393fd0a-en, accessed 22 November 2021).

61. Miljökonsekvensbeskrivning av förslag till Nationell plan för transportsystemet 2018–2029 [Environmental impact statement of proposals for the National plan for the transport system 2018–2029]. Borlänge: Trafikverket; 2017 (in Swedish) (http://trafikverket.diva-portal.org/smash/record.jsf?pid=diva2%3A1363912&dswid=-9051, accessed 22 November 2021).

62. Sweden: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/2dcb7ca6-en, accessed 22 November 2021).

63. CH2M United Kingdom. Hull Local Plan. Publication Consultation Document. Sustainability Appraisal Report. Hull: Hull City Council; 2016 (https://www.hull.gov.uk/council-and-democracy/policies-and-plans/local-plan, accessed 22 November 2021).

64. European Union, European Atomic Energy Community, United Kingdom of Great Britain and Northern Ireland. Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community. Brussels: Official Journal of the European Union. 2019;CI384 (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580206007232&uri=CELEX%3A12019W/TXT%2802%29, accessed 22 November 2021).

65. United Kingdom: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/744df2e3-en, accessed 22 November 2021).

66. Puutionsaaren Tuulivoimapuiston Yleiskaava Ja Ympäristövaikutusten Arviointi [Puutionsaari Wind Farm Master Plan and Environmental Impact Assessment]. Haapaveden: FCG Suunnittelu ja tekniikka Oy; 2020 (in Finnish) (https://www.haapavesi.fi/sites/haapavesi.fi/files/liitetiedostot/Haapaveden%20Puutionsaaren_tuulipuiston_YK_YVA_SELOSTUS_EHDOTUSVAIHE_07122020.pdf, accessed 22 November 2021).

67. Finland: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/20656739-en, accessed 22 November 2021).

68. Environmental Impact Assessment of Section F4 of the Khevi-Ubisa-Shoropani-Argveta Road (E60 Highway) [Republic of Georgia]. Manila: Asian Development Bank; 2019 (https://www.georoad.ge/uploads/files/main.pdf, accessed 22 November 2021).

69. BMW közútigépjármű-gyártó üzem. Debrecen. Környezeti Hatástanulmány. Nyilvános Változat [BMW road vehicle manufacturing plant. Debrecen. Environmental Impact Assessment. Public version]. Budapest: Mott MacDonald; 2019 (in Hungarian) (https://www.kormanyhivatal.hu/download/7/b4/05000/BMW_kornyezeti_hatastanulmany.pdf, accessed 22 November 2021).

70. Hungary: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/4b7ba48c-en, accessed 22 November 2021).

71. Environmental Impact Assessment Report: Mixed Use Development – Opera Site, Limerick. Belfast: AECOM Limited; 2018 (https://www.limerick.ie/sites/default/files/media/documents/2019-03/Opera_Site_Environmental_Impact_Assessment_Report.pdf, accessed 22 November 2021).

72. Vėjo elektrinių parko Šilutės r. sav. Juknaičių sen., Domaičių k. įrengimo poveikio aplinkai vertinimo ataskaita [Wind farm in Silute d. sav. Juknaičiai sen, Domaičių village. Environmental impact assessment report for the installation]. Kaunas: UAB Infraplanas; 2014 (in Lithuanian) (https://infraplanas.lt/wp-content/uploads/2017/08/Silute_SV-projektai_PAV-Ataskaita-4.pdf, accessed 22 November 2021).

73. Lithuania: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/35913deb-en, accessed 22 November 2021).

74. Ligação do Interface Rodoferroviário/EN14 (Santana), incluindo nova ponte sobre o Rio Ave. Projecto Base. Estudo de Impacte Ambiental. Volume 1 – Relatório Síntese [Connection of the Road-Railway Interface/EN14 (Santana), including a new bridge over the River Ave. Project background. Environmental Impact Study. Volume 1 – Synthesis report]. Lisbon: Infrastructures de Portugal; 2018 (in Portuguese) (https://siaia.apambiente.pt/AIADOC/AIA3267/en14_pb_011_eia_rs_0201931916756.pdf, accessed 22 November 2021).

75. Portugal: Country Health Profile 2019. Paris and Brussels: Organisation for Economic Co-operation and Development, and European Observatory on Health Systems and Policies; 2019 (https://www.oecd-ilibrary.org/content/publication/85ed94fc-en, accessed 22 November 2021).

76. Cave B, Fothergill J, Pyper R, Gibson G. Health and environmental impact assessment: a briefing for public health teams in England. London: Public Health England; 2017 (https://www.gov.uk/government/publications/health-and-environmental-impact-assessment-guide-for-local-teams, accessed 22 November 2021).

77. Guidance notes: performance standards on environmental and social sustainability. Washington, DC: International Finance Corporation; 2012 (https://www.ifc.org/performancestandards, accessed 22 November 2021).

Annex 1. Finding SEA and EIA reports with coverage of human health

Table A1.1. SEA report search result summary by country and sector

	Energy	Industry	Urban/planning[a]	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
Albania					2							
Andorra												
Armenia					1							
Austria											1	2
Azerbaijan												
Belarus	2		3		1							
Belgium					1	1		1				
Bosnia and Herzegovina												1
Bulgaria				1								2
Croatia	1		2									3
Cyprus												1
Czechia			3									
Denmark	1			1	1					1		
Estonia	1		1	1				1	1			
Finland			1	1								1
France	3		1		1							1
Georgia			2		1							
Germany				1		1		1				
Greece			1			1				1		1
Hungary				1			1	1				1

Table A1.1. contd

	Energy	Industry	Urban/planning[a]	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
Iceland			1									
Ireland			3					2				1
Israel	1											
Italy	1		1	1				1				1
Kazakhstan												
Kyrgyzstan												
Latvia			3		1							
Lithuania			2	1								
Luxembourg												
Malta				1							1	
Monaco												
Montenegro			3									
Netherlands	1		1									1
North Macedonia			2	1								
Norway												
Poland	1		6									1
Portugal			2			1						
Republic of Moldova			1									
Romania					1			1			1	1
Russian Federation												
San Marino												
Serbia	1		2			1						
Slovakia					1			2				
Slovenia			2	1		1						1
Spain						1						
Sweden			1	1	1							1
Switzerland							1					

Table A1.1. contd

	Energy	Industry	Urban/planning[a]	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
Tajikistan												
Turkey												
Turkmenistan												
Ukraine	1		2									2
United Kingdom			1	1		2						1
Uzbekistan												
Sector totals	14	0	47	13	12	9	2	10	1	2	3	23

Note: Italics indicate countries where no results were identified.
[a] Urban/planning sector includes residential, commercial and mixed-use development, including projects and plan making for a wider area.

Table A1.2. EIA report search result summary by country and sector

	Energy	Industry	Urban/planning	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
Albania						1			1			
Andorra												
Armenia									2			
Austria	1			1								
Azerbaijan												
Belarus	1	3			3							
Belgium			1	1		1						
Bosnia and Herzegovina				1								
Bulgaria	1	3	2						1	1		1
Croatia				2		2						
Cyprus		1	2									
Czechia	1	1							1	1		
Denmark	1							3				

Table A1.2. contd

	Energy	Industry	Urban/planning	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
Estonia	2	1		2	1			1	1	2		
Finland	3			1	1			1				
France	11		4	3	1							
Georgia	1	1		1	1			3				
Germany	3	1				1		1				
Greece						1		1				
Hungary	1	2										
Iceland	2			1					1			
Ireland	1	1	3	2		2		1				
Israel				2				1				
Italy	1				1		1					
Kazakhstan		2		1				1				
Kyrgyzstan				1								
Latvia	1	1							2			
Lithuania	4					1						
Luxembourg												
Malta			1						1			
Monaco												
Montenegro				2	2							
Netherlands		1	1	1								
North Macedonia				2								
Norway								1				
Poland												
Portugal		1	1	1				1				
Republic of Moldova					1							
Romania	2	1		1				2				
Russian Federation		3			1			2	2			

Table A1.2. contd

	Energy	Industry	Urban/planning	Transport	Waste	Water	Tourism	Infrastructure	Extractive	Agriculture	Fisheries	Other
San Marino												
Serbia				1								
Slovakia	1							1				
Slovenia		1								1		1
Spain	2			1		1				1		
Sweden			2	1					1			
Switzerland			1	1								
Tajikistan				1								
Turkey	2							1				
Turkmenistan												
Ukraine	1		1		1			4	1			
United Kingdom	2							3	1			
Uzbekistan				1	2							
Sector totals	45	24	19	32	15	10	1	28	15	6	0	2

Note: Italics indicate countries where no results were identified.

Annex 2. Literature review of academic articles

A total of 93 papers were reviewed: 71 for health in SEA and 22 for health in EIA.

A preliminary analysis was conducted to remove duplicates, partial documents and off-topic papers, leaving 35 articles for review *(1–35)*. The articles were published between 2008 and 2020.

Case studies of human health in environmental assessment that are cited in academic articles

This annex lists case studies of health in environmental assessment that are cited in a total of 11 academic articles. These included:

- SEAs – plan/policy level, including transport movement strategies, regeneration plans, strategies for green spaces in urban areas and local development plans;
- EIAs – project level, including the mining industry, road and rail transport infrastructure, hydroelectric, dam construction and other major infrastructure projects.

The articles and the cases which are presented are set out in Table A2.1.

Table A2.1. Peer reviewed articles presenting case studies of HIA and health in SEA and EIA

Article	PPPP	Assessment type	City/state, country	Date
Diallo et al. 2017 *(8)*	Gare des Eaux-Vives Urbanization Project	HIA/EIA/SEA	Geneva, Switzerland	2015
	St-Gervais Sustainable Transportation Plan	HIA/SA	Geneva, Switzerland	2015
	Municipal Sustainable Commuting Strategy	HIA/SA	Geneva, Switzerland	2015
Fischer et al. 2018 *(15)*	Connswater Community Greenway (funding bid)	HIA	Belfast, United Kingdom	2007
	Kingswear Road, Torpoint Road & Haldon Close Development Area (masterplan)	HIA	Bristol, United Kingdom	2013
	West Rhyl Greenspace Project	HIA	Rhyl, United Kingdom	2014
	Stonehouse Gardens for People project	HIA	Plymouth, United Kingdom	2002
	East End Local Development Strategy	HIA	Glasgow, United Kingdom	2007
	Eastern Neighbourhoods Community HIA	HIA	San Francisco, USA	2007
	Atlanta Regional Plan 2040	HIA	Georgia, USA	2012
	Area Development Plan Brainport Park	EIA	Eindhoven, Netherlands	2015
	Urban development of Vienna Main Station	EIA	Vienna, Austria	2008
	Gottingen Landscape Plan and Land Use Plan	SEA	Gottingen, Germany	2015
	Plymouth Local Transport Plan	SEA	Plymouth, United Kingdom	2010
	Glasgow City Plan 2	SEA	Glasgow, United Kingdom	2009

Table A2.1. contd

Article	PPPP	Assessment type	City/state, country	Date
Fischer, Martuzzi & Nowacki 2010 *(16)*	Peterborough City Council Development Plan (scoping report and core strategy)	SA	Peterborough, United Kingdom	2006
		HIA		2008
	Peterborough Local Transport Plan	SEA/HIA	Peterborough, United Kingdom	2006
	Regional Plan of Western Saxony	SEA	Saxony, Germany	2008
	Leipzig Land Use Plan	SEA	Leipzig, Germany	2005
	Emmen Development Vision Statement (Structuurvisie)	SEA (plan EIA)	Emmen, Germany	2007
	Wrexham Local Development Plan (Scoping Report and Key Issues Report)	SA	Wrexham, United Kingdom	2006
		HIA		2008
	Vienna Waste Management Plan	SEA	Vienna, Austria	2001
	Czech Ministry of Industry and Trade, Operational Enterprise and Innovation Programme	SEA	Czechia	2006
Gwimbi, Lebese & Kanono 2020 *(18)*	Metolong Dam EIS (analysis of the consideration of health in 2008 EIS)	EIA	Lesotho	2019
Hackett, Liu & Noble 2018 *(19)*	210 (MW) Wuskwatim Generating Station (hydroelectric)	EIA	Manitoba, Canada	2003
	Bipole III Transmission Project (hydroelectric)	EIA	Manitoba, Canada	2011
	Keeyask Generating Station (hydroelectric)	EIA	Manitoba, Canada	2012
Harris et al. 2018 *(20)*	NorthConnex Tolled Motorway Tunnel	EIA	Sydney, Australia	2015
	Central Sydney Electric Light Rail Project	EIA	Sydney, Australia	2015
	WestConnex (M4 East) Road Motorway Programme	EIA	Sydney, Australia	2016

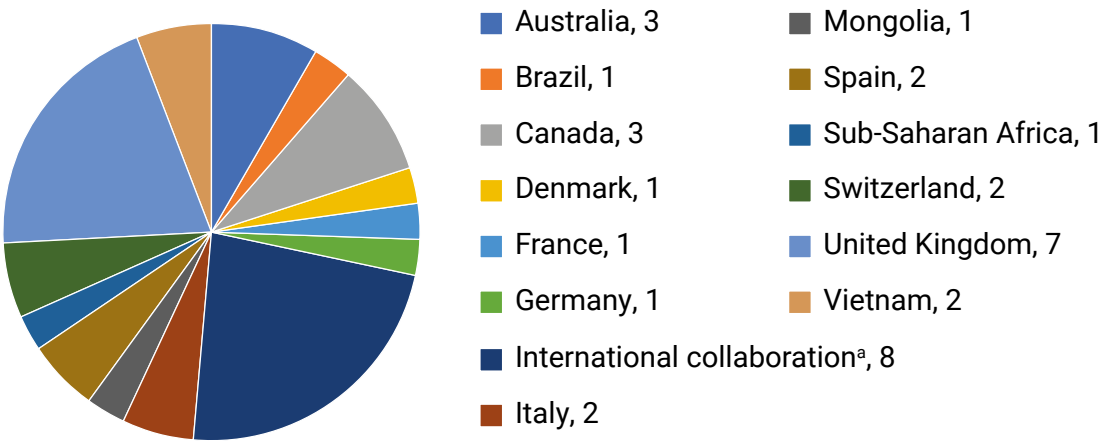
Table A2.1. contd

Article	PPPP	Assessment type	City/state, country	Date
Hresc, Riley & Harris 2018 *(22)*	Mandalong Underground Coal Mine Southern Extension Project, Lake Macquarie	EIA	NSW, Australia	2013
	Warkworth Continuation, Hunter Valley Region	EIA	NSW, Australia	2014
	Watermark Coal Project, Liverpool Plains	EIA	NSW, Australia	2013
Linzalone et al. 2014 *(25)*	Piedmont Region New High-Speed Railway	EIA	Turin, Italy to Lyon, France	2014
	Apulia Region ILVA Steel Plant (Gaps in Protection)	Valutazione del Danno Sanitario (VDS) [assessment of health damage]	Taranto, Italy	2014
Pfeiffer et al. 2017 *(29)*	Oyu Tolgoi (Turquoise Hill) Copper-Gold Mines	EIA/HIA	Southern Gobi Desert, Mongolia	2014/ 2015
	Ukhaa Khudag Coal Mine in Tavan Tolgoi (Five Hills) mining area	EIA/HIA	Southern Gobi Desert, Mongolia	2014/ 2016
Pham, Riley & Harris 2018 *(30)*	Hanoi Metro Rail and Underground (Line 3)	EIA	Hanoi, Vietnam	2010
	Ben Luc–Long Thanh Expressway	EIA	Ho Chi Minh City, Vietnam	2014
	Ho Chi Minh City Metro Rapid Transit Network (Line 2)	EIA	Ho Chi Minh City, Vietnam	2016
	Hanoi Lang Son Expressway	EIA	Hanoi, Vietnam	2016
Riley et al. 2020 *(31)*	Mandalong Underground Coal Mine Southern Extension Project, Lake Macquarie	EIA	NSW, Australia	2013
	Warkworth Continuation, Hunter Valley Region	EIA	NSW, Australia	2014
	Watermark Coal Project, Liverpool Plains	EIA	NSW, Australia	2013

NSW = New South Wales.

The geographic locations of the case studies that were identified through the literature review are shown in Fig. A2.1.

Fig. A2.1. Geographic location of case studies of health in EIA and SEA (n = 35)



[a] Cases from more than one country analysed within a single paper.

Tabulation of results from the literature review

The following tables A2.2–A2.10 summarize the results of the literature review.

Table A2.2. Articles *(1–4)*

Article	**Baumgart, Hartlik & Machtolf** (2018) *(1)*	**Bond, Cave & Ballantyne** (2013) *(2)*	**Brown et al.** (2020) *(3)*	**Burns & Bond** (2008) *(4)*
Authors' institutional setting				
Private/public/ university	University/public	University/private	University/public	University/public
Region/country	Germany	United Kingdom	Canada	United Kingdom
Type of article				
Theoretical/ conceptual discussion	Critical review of guidelines	NA	NA	NA
Empirical research	NA	Interviews with public health and planning practitioners	Review of practice	Survey/ interviews with planners
Research funder (list)	None declared	None declared	Social Sciences and Humanities Research Council of Canada	None declared
Focus: SEA, EIA or both	Both	SEA	EIA	SEA
If empirical research, then:				
What sectors/ areas does the article consider?	NA	Gaps between public health professionals and spatial planners; role of SEA/HIA	Federal legislation for major natural resource and large-scale infrastructure projects	Planning and public health
How many real-life cases are evaluated/ assessed/ described? (list)	NA	NA	NA	NA
Geographical and research focus				
Geographical focus	Germany	East of England and East Midlands, United Kingdom	Canada	East of England, United Kingdom

Table A2.2. contd

Article	**Baumgart, Hartlik & Machtolf** (2018) *(1)*	**Bond, Cave & Ballantyne** (2013) *(2)*	**Brown et al.** (2020) *(3)*	**Burns & Bond** (2008) *(4)*
Research underlying the publication	NA	Survey, focus groups	Literature review using RAMESES I publication standards. Knowledge synthesis to devise recommendations based on practice-based evidence	Literature review, analytical framework and self-completion questionnaire
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	SDoH
Research aim	To establish how SDoH is included in PPPPs	To investigate whether SEA is successful in integrating health into planning	To prioritize SDoH by finding leverage points in the federal system of IA, to prioritize health equity (especially of First Nations communities)	To understand how planners consider health when SEA is in place
Are connections made to HIA?	Both health in EIA and HIA (framework to support integration with SEA and EIA) are addressed	Extent of HIA application is established. South Cambridgeshire Council's supplementary planning guidance for HIA is introduced	HIA knowledge and needs scan with public health professionals is presented with the aim of increasing use of HIA/health in IA at regional level	Voluntary HIA conducted by public health professionals is discussed
Use of guidance documents and/or legislation	Introducing guidance on human health in EIA	Health in SEA; Kiev Protocol on SEA	Impact Assessment Act, 2019	EU SEA Directive

Table A2.2. contd

Article	**Baumgart, Hartlik & Machtolf** (2018) *(1)*	**Bond, Cave & Ballantyne** (2013) *(2)*	**Brown et al.** (2020) *(3)*	**Burns & Bond** (2008) *(4)*
Summary/ conclusions	Calls for integration of different impacts; HIA to support SEA and EIA guidelines in Peru	Argues for integration of planning and health. Health authorities to be statutory consultees. Health to be clearly identified as a planning issue	Offers 5 stages of planning and IA: 1. Planning 2. Impact statement 3. Impact assessment 4. Decision-making 5. Post decision continuous involvement of public health. Advocates for First Nations engagement funding	Integrating HIA into other assessments will lose SDoH understanding. Lack of monitoring will impede deeper understanding of health in SEA. Local planning systems lacking knowledge of HIA

IA = impact assessment; NA = not applicable; SDoH = Social Determinants of Health.

Table A2.3 Articles *(5–8)*

Article	**Carmichael et al.** (2012) *(5)*	**Cave et al.** (2017) *(6)*	**Cave et al.** (2021) *(7)*	**Diallo et al.** (2017) *(8)*
Authors' institutional setting				
Private/public/ university	University/private	Public	University/public/ private	University
Region/country	United Kingdom	United Kingdom	International	Switzerland
Type of article				
Theoretical/ conceptual discussion	NA	Briefing note for practitioners to consider health in EIA following new 2017 EU EIA Directive	NA	NA
Empirical research	Systematic literature review following NICE guidance on IA	NA	Literature review of policy analysis, IA and HIA. Consultation on drafting technical reference paper	IA for a Geneva urban district plan

Table A2.3. contd

Article	Carmichael et al. (2012) *(5)*	Cave et al. (2017) *(6)*	Cave et al. (2021) *(7)*	Diallo et al. (2017) *(8)*
Research funder (list)	None declared	None declared	Unfunded	Unfunded
Focus: SEA, EIA or both	Both	EIA	EIA	Both
If empirical research, then:				
What sectors/ areas does the article consider?	Impact assessment (HIA, SEA, EIA) in land use planning	NA	Sharing good practice – health in EIA for a health practitioner audience	Sustainable transport, urban planning and heating
How many real-life cases are evaluated/ assessed/ described? (list)	33 HIAs 8 EIAs 7 SEAs 7 SAs 1 integrated impact assessment 2 social impact assessments 1 equality impact assessment = 52 IAs in total	NA	NA	2 projects and 1 strategy: Urban neighbourhood project (Gare des Eaux-Vives project); Transportation plan for central district (Saint-Gervais project); Strategy for workers to use transport for local business travel
Geographical and research focus				
Geographical focus	International	England, United Kingdom	International	Canton of Geneva, Switzerland
Research underlying the publication	Literature review to establish facilitators and barriers to health integration in IA	NA	Thematic coding strategy to analyse comments from participants from: WHO, IAIA and EUPHA on draft technical guidance	Case studies; selection based on Geneva's climate change policy

Table A2.3. contd

Article	Carmichael et al. (2012) *(5)*	Cave et al. (2017) *(6)*	Cave et al. (2021) *(7)*	Diallo et al. (2017) *(8)*
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	In HIA
Research aim	To investigate the effectiveness of IA to consider health	To provide guidance to assist users when considering health in EIA	To offer lessons learned in drafting technical notes on health in EIA by expert group	To assess: a development project with SEA, HIA and EIA; a transportation plan with an SA and HIA; a strategy with an SA and HIA
Are connections made to HIA?	HIAs and other IAs are analysed	Relationship of EIA and HIA is discussed. HIA support units and networks are introduced	Relationship between EIA and HIA is discussed from a public health perspective	Reports on HIA application of PPPPs
Use of guidance documents and/or legislation	EU SEA Directive	EU SEA Directive; EU EIA Directive; SA	EU EIA Directive	EU SEA Directive; HIA within Health Act 2006; EIA in Switzerland since 1988
Summary/ conclusions	Lack of SEAs/ EIAs that consider health, hence focus on HIA; need to assess health outcomes; lack of interdisciplinary knowledge; need to mainstream IA	Defines relationship between EIA and HIA. Sets out 5 principles for consideration of health in EIA	Describes how to address health inequalities and health equity. Argues that public health should coordinate health input into IA. Identifies need to establish causal pathways and competencies for health in EIA	SEA and EIA use narrow meaning of health. Energy and transport choices made in the early stage of project development helped reduce negative effects of the project on air quality

EUPHA = European Public Health Association; IAIA = International Association for Impact Assessment.

Table A2.4 Articles *(9–12)*

Article	Diallo et al. (2018) *(9)*	Dietler et al. (2020) *(10)*	Domínguez-Ares, Martín-Olmedo & Iglesias-Merchan (2020) *(11)*	Douglas, Carver & Katikiredd (2011) *(12)*
Authors' institutional setting				
Private/public/ university	University	University/public	University/public	Public
Region/country	Switzerland	Switzerland	Spain	Scotland, United Kingdom
Type of article				
Theoretical/ conceptual discussion	NA	NA	NA	NA
Empirical research	Review of legal guidelines and texts underpinning SEA, EIA and SA	Consideration of health in IA in sub-Saharan Africa for natural resource extraction projects	Assessment of the perception of health by public health and environmental practitioners in HIA, using the concept of SDoH	Review of SEAs for their consideration of health
Research funder (list)	None declared	Joint funding by Swiss Agency for Development and Cooperation and the Swiss National Science Foundation	Unfunded	None declared
Focus: SEA, EIA or both	Both	EIA	EIA/HIA	SEA
If empirical research, then:				
What sectors/areas does the article consider?	Health in SEA, EIA and SA	IA in the mining sector; regulation of mining	Public health and environmental practitioners' involvement	The range of health issues considered in SEA in Scotland from a public health perspective
How many real-life cases are evaluated/ assessed/ described? (list)	37 case studies (11 SEAs, 20 EIAs and 6 SAs)	28 EIAs, 18 ESIAs, 6 HIAs, 8 SIAs, 2 ESHIAs	NA	62 SEAs categorized by sector

Table A2.4. contd

Article	Diallo et al. (2018) *(9)*	Dietler et al. (2020) *(10)*	Domínguez-Ares, Martín-Olmedo & Iglesias-Merchan (2020) *(11)*	Douglas, Carver & Katikiredd (2011) *(12)*
Geographical and research focus				
Geographical focus	Canton of Geneva, Switzerland	Sub-Saharan Africa	Spain	Scotland, United Kingdom
Research underlying the publication	Review of cases and semi-structured interviews with assessors	Search term "HIA for sustainable development" Sources: online Google search, ministries, mining companies – 44 returns and 18 reports	Expert survey; Kolmogorov-Smirnov test; Wilcoxon signed-rank test (non-parametric); Friedman test; Akaike information criterion; Kruskal-Wallis H test	Documentary review of 62 Scottish SEAs (2007–2008): 6 for transport plans, 15 for spatial plans, 22 for open spaces plans, 16 for environmental plans, 3 for other plans
Understanding of health as reflected in the article				
Social determinants addressed	In SA	Analysis of IAs (SDoH criteria)	SDoH in HIA/EIA	SDoH
Research aim	To examine the extent to which health is considered in EIA, SEA and SA in Canton of Geneva, Switzerland	To examine the extent to which health is considered in mining IA	To clarify how SDoH are considered in EIA/HIA	To analyse how health is considered in SEA for Scottish PPPP
Are connections made to HIA?	HIA at canton level may be included in SA in the future	Reviews HIA practitioners' opinions and legal frameworks to support HIA. Discusses role of SIA and health	Reviews how well HIA considers SDoH	Looks at SEA opportunities to reduce health inequalities and increase environmental justice

Table A2.4. contd

Article	Diallo et al. (2018) *(9)*	Dietler et al. (2020) *(10)*	Domínguez-Ares, Martín-Olmedo & Iglesias-Merchan (2020) *(11)*	Douglas, Carver & Katikiredd (2011) *(12)*
Use of guidance documents and/or legislation	Review of legal texts and guidelines for IAs used in Geneva	IFC performance standards require projects to publicly disclose information on project-related risks and impacts on affected communities	EU EIA Directive. HIA was incorporated in Spain's legal system in 2011 (Law 33/2011 on Public Health)	EU SEA Directive; Scottish guidance
Summary/ conclusions	Identifies inadequate coverage of health and narrow biophysical meaning. Stresses need for legislation and regulation. Calls for the integration of public health practitioners at all stages of IA	Identifies focus on environmental health determinants. Health outcomes limited to malaria, HIV or health and safety. Calls for legal support for standalone HIAs or rigorous integration of health into other IA	SDoH seen as most influential with regards to population health. Unfamiliarity of environmental specialists with the concept of SDoH	SEAs identified health issues, but inconsistent across the sample. Few identified differential impacts or mental health impacts. Mitigation focused on mitigating adverse impacts. Many SEAs adopt a wide perspective on health, but most fail to identify differential impacts

ESHIA = environmental, social and health impact assessment; ESIA = environmental and social impact assessment; IFC = International Finance Corporation; SIA = social impact assessment.

Table A2.5. Articles *(13–16)*

Article	Fischer (2014) *(13)*	Fischer & Cave (2018) *(14)*	Fischer et al. (2018) *(15)*	Fischer, Martuzzi & Nowacki (2010) *(16)*
Authors' institutional setting				
Private/public/ university	University/public	University/private	University/public	University/public
Region/country	United Kingdom	United Kingdom	United Kingdom	WHO European Region
Type of article				
Theoretical/ conceptual discussion	Chapter in book *Health in IA*; health in SEA	Introducing a journal special issue on health in IA	NA	NA
Empirical research	NA	NA	Reviews of EIAs, SEAs and HIAs; examines how health is considered in planning of urban green space	Evaluation of 8 SEAs from 6 European countries for consideration of health
Research funder (list)	WHO	None declared	None declared	3-year collaborative project between WHO and the Directorate-General for Health and Consumers of the European Commission
Focus: SEA, EIA or both	SEA	SEA and EIA	SEA and EIA	SEA
If empirical research, then:				
What sectors/areas does the article consider?	NA	NA	Urban green space and health	Spatial plans, transport, waste management and economic development
How many real-life cases are evaluated/ assessed/ described? (list)	NA	NA	13 cases analysed (7 HIAs, 5 EIA/ SEAs)	5 spatial plans, 1 SEA of transport plan, 1 waste management plan, 1 economic development plan

Table A2.5. contd

Article	Fischer (2014) *(13)*	Fischer & Cave (2018) *(14)*	Fischer et al. (2018) *(15)*	Fischer, Martuzzi & Nowacki (2010) *(16)*
Geographical and research focus				
Geographical focus	WHO European Region	NA	Austria, Germany, Netherlands, United Kingdom, USA	Austria; Czechia; England, United Kingdom; Germany; Netherlands; Wales, United Kingdom
Research underlying the publication	Literature review of existing empirical evidence	Journal special issue of articles from WHO publication *Health in Impact Assessment*	Google search with numerous keywords. HIA database, previously compiled by WHO Regional Office for Europe. Contacting HIA/ SEA/EIA and public health experts from 15 EU member states	500 emails to SEA list servers (e.g. IAIA); 10 responses. Google search with key words returning 3860 hits. Consideration of health in SEA
Understanding of health as reflected in the article				
Social determinants addressed	SDoH with model for SEA	SDoH	SDoH	SDoH
Research aim	To investigate evolution of SEA, integration issues, contextual issues for health in SEA, and facilitators and barriers	To reflect on the consideration of health in IA (in the editorial to a special journal issue)	To identify and evaluate HIAs, SEAs and EIAs with regard to considering green space and linkages with/impacts on human health	To review SEAs to establish to what extent they are considering health
Are connections made to HIA?	Discusses how literature describes relationship of HIA and SEA	Discusses HIA as part of the family of IA	Analyses 7 HIAs in terms of their consideration of green spaces for health	Asks question: "Is HIA mentioned or used?" 2 SEAs found to be integrated with HIA

Table A2.5. contd

Article	Fischer (2014) *(13)*	Fischer & Cave (2018) *(14)*	Fischer et al. (2018) *(15)*	Fischer, Martuzzi & Nowacki (2010) *(16)*
Use of guidance documents and/or legislation	EU SEA Directive; Danish guidelines on health in SEA; United Kingdom guidelines on health in SEA	EU SEA Directive; EU EIA Directive	United Nations Sustainable Development Goals; EU SEA Directive; EU EIA Directive	EU SEA Directive
Summary/ conclusions	Model created to assist in considering SDoH in SEA. Short-comings in considering health are depicted	Successful integration is linked to specific decision tiers. Decision-making power is unequally distributed. Successfully considering health is linked to specific administrative levels. Policy framework is needed. Institutional capacity to integrate health is needed	Only PPPPs that have green space development as the main starting point make an explicit connection with health. Most IAs played a minor role; EIAs had a moderate role in influencing projects. 2 approaches in IA: problem driven (positive outcomes) and impact driven (negative impacts)	4 SEAs covered social and behavioural aspects. Insufficient baseline evidence used. Ex-post use of HIA only. Recommends: involvement of health professionals, clearly defining significance, including behavioural aspects, integrative use of SEA, coordination with other IAs, proactive approach

Table A2.6. Articles *(17–20)*

Article	**Fischer & Muthoora** (2020) *(17)*	**Gwimbi, Lebese & Kanono** (2020) *(18)*	**Hacket, Liu & Noble** (2018) *(19)*	**Harris et al.** (2018) *(20)*
Authors' institutional setting				
Private/public/ university	University/public	University	University	University/public
Region/country	United Kingdom	South Africa	Canada	Australia
Type of article				
Theoretical/ conceptual discussion	NA	NA	NA	NA
Empirical research	Analysis of current use of HIA in town planning in England	Qualitative investigation into the mainstreaming of HIA into EIA in post dam construction	Analyses the extent to which health is considered in 3 hydroelectric power projects in the Nelson River watershed	Looks at how health impacts are assessed in transport projects: 2 road tunnels and 1 light railway
Research funder (list)	Public Health England; Ministry of Housing, Communities and Local Government	Unfunded	None declared	Henry Halloran Trust, University of Sydney; National Health and Medical Research Council
Focus: SEA, EIA or both	SEA and EIA/HIA	SEA and EIA/HIA	EIA	EIA
If empirical research, then:				
What sectors/ areas does the article consider?	Public health and planning in all sectors; all PPPPs except those that do not go through planning consent	Dam construction; planning obligations and monitoring of HIA	Hydroelectric	Mega billion-dollar transport projects (road tunnels and light rail)
How many real-life cases are evaluated/ assessed/ described? (list)	40 IAs (10 SEAs integrated with HIA; 10 standalone HIAs alongside local development plans; 10 HIAs with EIAs; 10 standalone HIAs for capital building projects)	Metolong Dam EIA in 2008 and its associated HIAs	EIAs of the 3 most recent hydro development projects in the Nelson River watershed – Wuskwatim, Bipole III and Keeyask	3: North Connex motorway tunnel; CSELR Light Rail; West Connex Motorway Tunnel (all Sydney)

Table A2.6. contd

Article	**Fischer & Muthoora** (2020) *(17)*	**Gwimbi, Lebese & Kanono** (2020) *(18)*	**Hacket, Liu & Noble** (2018) *(19)*	**Harris et al.** (2018) *(20)*
Geographical and research focus				
Geographical focus	England, United Kingdom	Metolong Dam host communities	Canada	Australia
Research underlying the publication	Quality reviews; expert discussion workshops; cooperative inquiry with practitioners, elected members, academics; guidelines for PHE on the application of HIA in town planning; 4 case studies of each type of HIA	Document analysis of EIA and associated HIA. Perception survey of communities: 100 households identified for open-ended questionnaire for the most senior member of the household	Document analysis/review of 3 EIAs that use Health Canada (2004) determinants framework for all health indicators. Examination of public hearing reports for each project to gauge impact on human health	Critical realist approach to the literature. 5 interviews with NSW government employees, project proponents, consultants and affected communities. Scopus database search for various terms. Of 181 titles and abstracts identified, 19 articles selected based on their focus on EIA (as opposed to SEA or HIA)
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	SDoH
Research aim	To establish extent to which HIAs are being used in planning in England; to share good practice and devise guidelines for health in planning	To provide evidence for the coverage of HIA in EIA post construction of Metolong Dam	To understand the cumulative health impacts of 3 hydroelectric power stations	To investigate how is health being assessed in major transport projects in Sydney; and why EIA prioritizes risk and not the SDoH

Table A2.6. contd

Article	**Fischer & Muthoora** (2020) *(17)*	**Gwimbi, Lebese & Kanono** (2020) *(18)*	**Hacket, Liu & Noble** (2018) *(19)*	**Harris et al.** (2018) *(20)*
Are connections made to HIA?	Looks at the extent to which SDoHs are considered in IAs	HIA used interchangeably with health impacts in EIA	Explores the role of HIA in considering cumulative impacts. Compares Canada's health determinants versus social determinants of indigenous health	There is a preference in Australia for environmental risk assessment over HIA. In NSW EIA does not include health
Use of guidance documents and/ or legislation	Wales HIA guidance; EU SEA Directive; EU EIA Directive. Aim is to create guidance for an English-speaking audience	WHO; multilateral development banks; Government of Lesotho	Health Canada's Determinants of Health	NSW EIA legislation
Summary/ conclusions	30% of local governments had HIA guidance. HIAs also undertaken when no guidance or commitment to HIA existed. Quality higher when in pilot HIAs. Local capacity and expertise is a key feature. Equal weight not given to social, economic and environmental impacts	Coverage of HIAs in EIS was confirmed. Local community think mainstreaming of HIA in EIA is low. Low number of community members benefiting from dam. Lack of monitoring information. Crucial to include participation from local community if health is to be considered	Failure to consider health impacts cumulatively in EIA. Health determinants are considered variably. Limited coordination and consistency. EIAs not capturing legacy impacts built up over time, specifically on First Nations communities. Error in baseline profiling	Actors in EIAs address goals that were predetermined by the system in which they worked or belonged. EIA undertaken as a compliance process late in the planning process. No options appraisals. Funders of EIA decided on scope. Health and transport links not addressed fully. Focus on specific health risks. Communities questioned EIA validity

PHE = Public Health England.

Table A2.7. Articles *(21–24)*

Article	**Harris & Haigh** (2015) *(21)*	**Hresc, Riley & Harris** (2018) *(22)*	**Humboldt-Dachroeden, Fischer-Bonde & Gulis** (2019) *(23)*	**Iglesias-Merchan & Domínguez-Ares** (2020) *(24)*
Authors' institutional setting				
Private/public/ university	University	University	Private/university	University
Region/country	Australia	Australia	Denmark	Spain
Type of article				
Theoretical/ conceptual discussion	NA	NA	NA	Discussion with practitioners on integration of HIA with SEA/EIA
Empirical research	Asks if an institutional approach to including health in EIA is useful for practice	Determines the extent to which economic impacts as a SDoH are considered in 3 mining EISs	Analyses health in EIA and SEA in Denmark	NA
Research funder (list)	None declared	Sydney Policy Lab, National Health and Medical Research Council	No funding	No funding
Focus: SEA, EIA or both	EIA	EIA	SEA and EIA	SEA and EIA/HIA
If empirical research, then:				
What sectors/ areas does the article consider?	Sharing global experiences with health in major project EIA, an expert group workshop with IAIA members	Open cut mines, electricity powerline extension	Mixture of PPPPs with SEAs and EIAs across Denmark	NA
How many real-life cases are evaluated/ assessed/ described? (list)	22 participants from Europe, North and Latin America and South-East Asia. Each identified as professionally involved in EIA or HIA	2 open cut mines – Liverpool Plains and Warkworth Continuation; Mandalong Southern Powerline Extension, Lake Macquarie	42 respondents (IA practitioners and researchers)	NA

Table A2.7. contd

Article	Harris & Haigh (2015) *(21)*	Hresc, Riley & Harris (2018) *(22)*	Humboldt-Dachroeden, Fischer-Bonde & Gulis (2019) *(23)*	Iglesias-Merchan & Domínguez-Ares (2020) *(24)*
Geographical and research focus				
Geographical focus	International	Australia	Denmark	Spain
Research underlying the publication	22 workshop participants; 9 follow-up responses. Results were analysed using "institutionalist" units of analysis (ideas, actors, organizations and institutions)	Case studies that identified concerns from local community which had sought legal advice about content of EIS. Adapted health-focused EIA coding framework used. Documentary analysis of selected EISs	Inclusion and exclusion criteria for literature research (2167 scientific articles of which, 21 case studies). Survey: 42 participants. Various search terms	NA
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	SDoH
Research aim	To investigate the range of influences and broader conditions involved in including health in EIA	To determine the extent to which economic impacts as a SDoH are considered in 3 EISs of mining projects	To address evidence gap for how health is considered in SEA and EIA	To promote the integration of HIA into SEA of PPPPs and EIA of projects
Are connections made to HIA?	HIA is considered underutilized	In Australia and NSW, HIA is not currently supported and a health risk assessment framework is preferred	HIA is used as an aid to SEA and EIA to consider health	Discussion on HIA integration into SEA/EIA in Andalusia

Table A2.7. contd

Article	Harris & Haigh (2015) *(21)*	Hresc, Riley & Harris (2018) *(22)*	Humboldt-Dachroeden, Fischer-Bonde & Gulis (2019) *(23)*	Iglesias-Merchan & Domínguez-Ares (2020) *(24)*
Use of guidance documents and/ or legislation	International Council on Mining and Minerals (2010); International Finance Corporation (2012); EU EIA Directive	"Addressing social, economic and environmental determinants of health and the health divide in the context of sustainable human development" (UNDP)	EU SEA Directive; EU EIA Directive; WHO HIA (1999)	Spanish Public Health Act (2011); Spanish Act on EA (2013); EU SEA Directive; EU EIA Directive; Andalusian HIA regulation
Summary/ conclusions	Health is least institutionalized dimension of IA. How health fits with rules, players and organizations is explained. How ideas which are inherent in EIA system can offer a conceptual platform is established	Economic indicators as SDoH rarely considered. Causal links of economic determinants and health outcomes insufficiently reported. Health data not used to inform assessments. Evidence base linking economic impacts of mines to health underdeveloped. EIA scoping should enable sufficient inclusion of broader health determinants using suitable methodology	Health considered in negative environmental factors and in terms of risk. Integration of health into SEA and EIA will be necessary. Need enhanced intersectoral cooperation of health and environmental sectors. Need specific guidance documents. Need stronger political support	HIA and SEA/ EIA require a minimum investment in resources to be effective and credible. HIA could contribute to achieve better practices (e.g. in terms of public participation in EIA procedures). Integration of HIA into SEA and EIA, or convergence of procedures, needs regulatory and organizational reform

EA = environmental assessment.

Table A2.8. Articles *(25–28)*

Article	**Linzalone et al.** (2014) *(25)*	**Linzalone et al.** (2019) *(26)*	**Mahboubi, Parkes & Chan** (2015) *(27)*	**McCallum, Ollson & Stefanovic** (2018) *(28)*
Authors' institutional setting				
Private/public/ university	University/public	University/public	University	University/private
Region/country	Italy	Italy	Canada	Canada
Type of article				
Theoretical/ conceptual discussion	NA	NA	NA	Creation of a framework to integrate HIA into EIA
Empirical research	Reviews HIAs/ EIAs/SEAs in Italy for consideration of health	Offers guidance for developers on how to integrate HIA into EIA	Scoping review of literature on integration of HIA into EA in Canada	NA
Research funder (list)	None declared	Italian Ministry of Health with the National Centre for Disease Prevention and Control	None declared	Natural Science and Engineering Research Council
Focus: SEA, EIA or both	SEA and EIA/HIA	EIA/HIA	EIA/HIA (EA)	EIA/HIA (EA)
If empirical research, then:				
What sectors/ areas does the article consider?	NA	Guidance for project developers	IA in Canada	HIA in EA in Canada
How many real-life cases are evaluated/ assessed/ described? (list)	Systematic review of all EIAs and SEAs for discussion of health/health chapters. Numbers not clear. 2 case studies	48 in international expert group	NA	NA

Table A2.8. contd

Article	**Linzalone et al.** (2014) *(25)*	**Linzalone et al.** (2019) *(26)*	**Mahboubi, Parkes & Chan** (2015) *(27)*	**McCallum, Ollson & Stefanovic** (2018) *(28)*
Geographical and research focus				
Geographical focus	Italy	Italy	Canada/ International	Canada
Research underlying the publication	131 EIAs, of which 91 mention health. 48 SEAs. Unclear how many HIAs reviewed. Selection of 2 case studies	Literature review; use of analytical framework; 48 stakeholders consulted (public and private sector) using participation techniques – Metaplan, World Cafè and Open Space Technology	Literature review	NA
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	SDoH
Research aim	To assess how health is considered in HIA, SEA and EIA in urban planning in Italy	To devise operational guidelines to support developers seeking planning consent; to investigate how to integrate HIA into EIA, including training sessions for users of guide	To review the literature to examine debate on integration of health into EA – due to rising community concern linked to poorly assessed social and health impacts	To develop an assessment framework that allows for HIA to be standalone and integrated into EA
Are connections made to HIA?	Review of number of HIAs – state of the art analytical framework of questions	How HIA is integrated into EIA is discussed	Discusses how to integrate HIA into EA	Presents framework to integrate HIA into EA
Use of guidance documents and/or legislation	EU SEA Directive; EU EIA Directive; methodological framework in Lombardy for integration of HIA and EIA	EU EIA Directive; Creation of new guidance for HIA in EIA	Canadian Environmental Assessment Act 2012	Development of HIA guidance

Table A2.8. contd

Article	**Linzalone et al.** (2014) *(25)*	**Linzalone et al.** (2019) *(26)*	**Mahboubi, Parkes & Chan** (2015) *(27)*	**McCallum, Ollson & Stefanovic** (2018) *(28)*
Summary/ conclusions	HIA has broadened meaning of health in Italy to include biophysical, SDoH and health equity. Involvement of practitioners should be increased at scoping stage. HIA poorly done when prospective. Increasing public participation and timing of consultation important	Recommendations: share skills and training on the relationship of health and the environment; promote harmonization of health prevention and environmental protection nationally; engage in better monitoring; ensure interdisciplinary working; include socioeconomic impacts in sustainable development	Narrow meaning of health in EA is not fit for purpose and needs to be widened. Need to: set standard approaches and methods to measure impacts; improve data integration; increase expertise; further examine cross discipline complexity; ensure efficiency and not duplication	Assessment framework tool facilitates cross discipline working, consistency of approach and promotes good practice in HIA. EIA is a key source of data for HIA if concurrent. EIA can draw on HIA for SDoH data. HIA recommendations gain legal validity if processed through EIA. Decision-making matrix to assist users in defining significance and uncertainty

Table A2.9. Articles *(29–32)*

Article	**Pfeiffer et al.** (2017) *(29)*	**Pham, Riley & Harris** (2018) *(30)*	**Riley et al.** (2020) *(31)*	**Roué Le Gall, Lemaire & Jabot** (2018) *(32)*
Authors' institutional setting				
Private/public/ university	University/public	University	University/public/ private	University
Region/country	Canada	Australia	Australia	France
Type of article				
Theoretical/ conceptual discussion	NA	NA	NA	Discussion of health challenges in EIA and urban planning; introduces planning guidelines

Table A2.9. contd

Article	**Pfeiffer et al.** (2017) *(29)*	**Pham, Riley & Harris** (2018) *(30)*	**Riley et al.** (2020) *(31)*	**Roué Le Gall, Lemaire & Jabot** (2018) *(32)*
Empirical research	Good governance of health impacts of mining projects in Mongolia	Investigating health inclusion in transport EIAs in Vietnam	Health in EIA for Australian coal mining projects	NA
Research funder (list)	Canadian Institutes of Health Research, Canadian International Development Agency, WHO	Australian National Health and Medical Research Council	Sydney Policy Lab, University of Sydney; Australian National Health and Medical Research Council; Canberra, Australian Capital Territory	Ministry of Health
Focus: SEA, EIA or both	EIA	EIA	EIA	EIA
If empirical research, then:				
What sectors/ areas does the article consider?	Mining sector in Mongolia	Transport – road and rail	Coal mining	NA
How many real-life cases are evaluated/ assessed/ described? (list)	HIA awareness raising with extractive industry stakeholders; 2 mining HIAs	Hanoi Metro Rail System Project – Line 3; Ben Luc–Long Thanh Expressway; HCMC Metro Rail System Project (Line 2); Ha Noi–Lang Son Expressway	Watermark Coal Project; Warkworth Continuation; Mandalong Southern Extension	NA
Geographical and research focus				
Geographical focus	Mongolia	Vietnam	Australia	France

Table A2.9. contd

Article	**Pfeiffer et al.** (2017) *(29)*	**Pham, Riley & Harris** (2018) *(30)*	**Riley et al.** (2020) *(31)*	**Roué Le Gall, Lemaire & Jabot** (2018) *(32)*
Research underlying the publication	HIA awareness-raising workshops to include health in EIA are described. Development and dissemination of a simplified equity-based HIA tool is attempted. Revision of environmental law is desired. Capacity-building programme is introduced	Analytical framework applied to 4 EIAs to show how health is considered in urban planning policy and practice. Documentary analysis. Comparison with the Australian system.	Documentary analysis of 3 EIAs and the extent to which they include a coverage of health. Adaption of a transport analytical coding framework for coal mining.	NA
Understanding of health as reflected in the article				
Social determinants addressed	SDoH	SDoH	SDoH	SDoH (HUP)
Research aim	To raise awareness of health in EIA for the extractive industry in Mongolia	To understand how health is considered in EIAs for transport infrastructure in Vietnam	To examine how and to what extent health, well-being and equity issues are considered in EIAs of major coal mining projects in NSW	To compile lessons learned from co-constructing a guide on healthy urban planning and on integrating health issues into EIA on French projects
Are connections made to HIA?	Discusses HIA as a lever to consider health in EIA	Specifically excluded from the search focus on health in EIA	None	None/indirectly via HUP

Table A2.9. contd

Article	**Pfeiffer et al.** (2017) *(29)*	**Pham, Riley & Harris** (2018) *(30)*	**Riley et al.** (2020) *(31)*	**Roué Le Gall, Lemaire & Jabot** (2018) *(32)*
Use of guidance documents and/or legislation	IFC performance standards; Mongolian Law on EIA (2012); Mongolian Law on Hygiene (2016)	2 sets of EIA prepared for each project: one to meet government requirements and the other to fulfil EIA requirements from financing agencies, such as ADB and World Bank	Australian EIA legislation	EU EIA Directive; EIA related Framework for Healthy Urban Planning for French regional health agencies (ARS)
Summary/ conclusions	Health in EIA seen to meet SDGs. Need to increase governance of health issues in mining. Need for intersectoral collaboration. Need for public–private partnerships, especially IFC funded, to use HIAs/consider health. Canadian/ Mongolian partnership for policy diffusion on health in EIA effecting change to policy. Need to stop silo working, maintain organizational memory, increase capacity. Need to develop framework for SDoH	Potential health risks identified but no health assessment. Social aspects not sufficiently considered. Community health baseline was not available except for information on health facilities. A lack of causal pathways requires changes to the environmental or social conditions and health outcomes. Health in EIA can deliver sustainability.	Impacts of each mine on health and well-being were narrowly and inadequately considered. Failure to assess possible impacts specific to the particular mine and the communities potentially affected. Cumulative impacts not assessed. Intragenerational and intergenerational equity not understood. Need to improve consistency and comprehension	EIA adopts narrow biophysical meaning; involvement of health professionals widens the meaning and HUP framework can facilitate this, but for this to work EIA must broaden understanding of health. ARS tool assists practitioners in widening health meaning. Lack of guidance for private sector, lack of public disclosure and access to EIAs

ARS = Agences Regionales de Santé [Regional Health Agencies]; HUP = healthy urban planning.

Table A2.10. Articles *(33–35)*

Article	**Scottish Environment Protection Agency** (2019) *(33)*	**de Souza Hacon et al.** (2018) *(34)*	**Vohra** (2018) *(35)*
Authors' institutional setting			
Private/public/ university	Public	University	University/private
Region/country	Scotland	Brazil and Switzerland	Australia, Canada, Denmark, United Kingdom
Type of article			
Theoretical/ conceptual discussion	Government guidance on considering health in SEA	Discussion on integrating health into EIA for large-scale projects	Discussion on environmental assessment and HIA
Empirical research	NA	NA	NA
Research funder (list)	Scottish government	Science without Borders (Ciências sem Fronteira) programme of the Brazilian government	None declared
Focus: SEA, EIA or both	SEA	EIA	SEA and EIA/HIA
If empirical research, then:			
What sectors/areas does the article consider?	NA	NA	NA
How many real-life cases are evaluated/ assessed/ described? (list)	NA	NA	Case examples in discussion: HIA of park, trail and green space planning in Greenville, South Carolina, USA; HIA of Garden City Project in Yala City, Thailand
Geographical and research focus			
Geographical focus	Scotland	Brazil	International
Research underlying the publication	Guidance on human health and SEA on those aspects which fall within Scotland's Environmental Protection Agency remit	Discussion of limitations of current EIA practice in Brazil with a focus on health considerations in IA	Book chapter, conceptual discussion

Table A2.10. contd

Article	**Scottish Environment Protection Agency** (2019) *(33)*	**de Souza Hacon et al.** (2018) *(34)*	**Vohra** (2018) *(35)*
Understanding of health as reflected in the article			
Social determinants addressed	Narrow biophysical only	SDoH	SDoH
Research aim	To produce guidance on biophysical human health issues in SEA in Scotland	To understand the limitations for EIA in considering health for large-scale projects in Brazil	To discuss the role of HIA in SEA and EIA in the context of the "precautionary principle". To discuss SDoH in HIA with the help of case study examples
Are connections made to HIA?	Baseline profiling; guidance offers sources of data that widen the meaning to well-being	Brazil is at early stage of capacity/awareness development	Discussion on HIA in SEA/EIA
Use of guidance documents and/or legislation	Guidance note to support EU SEA Directive in Scotland	Brazilian EIA legislation; technical document on HIA, describing approach and proposing the integration of health in the process of environmental licensing	EU SEA Directive; EU EIA Directive
Summary/ conclusions	Offers examples of: environmental problems and potential significant risks to health, baseline profiling sources, key strategies, mitigation and enhancement measures, indicators for monitoring, how to assess for cumulative impacts	What is needed includes: a definition and screening of capital projects; technical experts that are capable of conducting comprehensive HIA; adequate planning of large capital projects, including public participation; detailed studies on the health of population groups residing in affected areas; technical staff at the level of public regulatory agencies that have the skills and experience to review and evaluate HIAs and can carry out inspections in project areas	Quality HIAs/EIAs/SEAs when valued, support informed, transparent and democratic policy-making. Public health practitioners need to: increase knowledge and understanding of EA and HIA; improve links with EA and HIA experts; oversee and scrutinize scope of work for, and findings of, EAs and HIAs that are commissioned and undertaken by others

Annex 2 references

1. Baumgart S, Hartlik J, Machtolf M. Improving the consideration of human health in environmental planning and decision-making – perspectives from Germany. Impact Assess Proj Apprais. 2018;36:57–67. doi: 10.1080/14615517.2017.1364020.

2. Bond A, Cave B, Ballantyne R. Who plans for health improvement? SEA, HIA and the separation of spatial planning and health planning. Environ Impact Assess Rev. 2013;42:67–73. doi: 10.1016/j.eiar.2012.10.002.

3. Brown JA, Gorman M, Kim H, Schober K, Vipond J, Nykiforuk C. Scoping Population Health in Impact Assessment (ScopHIA) realist review: identifying best practices for equity in scoping of major natural resource and large-scale infrastructure projects. Edmunton: School of Public Health, University of Alberta; 2020 (https://era.library.ualberta.ca/items/3b517d35-4600-47b4-aeba-d9b541a3253a, accessed 17 November 2021).

4. Burns J, Bond A. The consideration of health in land use planning: barriers and opportunities. Environ Impact Assess Rev. 2008;28:184–97. doi: 10.1016/j.eiar.2007.06.001.

5. Carmichael L, Barton H, Gray S, Lease H, Pilkington P. Integration of health into urban spatial planning through impact assessment: identifying governance and policy barriers and facilitators. Environ Impact Assess Rev. 2012;32:187–94. doi: 10.1016/j.eiar.2011.08.003.

6. Cave B, Fothergill J, Pyper R, Gibson G, Saunders P. Health in environmental impact assessment: a primer for a proportionate approach. Lincoln: Ben Cave Associates Ltd, IEMA and the Faculty of Public Health; 2017 (https://www.bcainsight.com/resources, accessed 18 November 2021).

7. Cave B, Pyper R, Fischer-Bonde B, Humboldt-Dachroeden S, Martin-Olmedo P. Lessons from an international initiative to set and share good practice on human health in environmental impact assessment. Int J Environ Res. 2021;18. doi: 10.3390/ijerph18041392.

8. Diallo T, Cantoreggi N, Simos J, Christie DPTH. Is HIA the most effective tool to assess the impact on health of climate change mitigation policies at the local level? A case study in Geneva, Switzerland. Glob Health Promot. 2017;24:5–15. doi: 10.1177/1757975916686920.

9. Diallo T, Cantoreggi N, Simos J, Christie DPTH. The inclusion of health in impact assessments: a case study in Geneva, Switzerland. Impact Assess Proj Apprais. 2018;36:45–56. doi: 10.1080/14615517.2017.1364015.

10. Dietler D, Lewinski R, Azevedo S, Engebretsen R, Brugger F, Utzinger J et al. Inclusion of health in impact assessment: a review of current practice in sub-Saharan Africa. Int J Environ Res Public Health. 2020;17. doi: 10.3390/ijerph17114155.

11. Domínguez-Ares E, Martín-Olmedo P, Iglesias-Merchan C. Perception survey on the relevance of main categories of health determinants for conducting health impact assessment. Environ Impact Assess Rev. 2020;85:106445. doi: 10.1016/j.eiar.2020.106445.

12. Douglas MJ, Carver H, Katikireddi SV. How well do strategic environmental assessments in Scotland consider human health? Public Health. 2011;125:585–91. doi: 10.1016/j.puhe.2011.06.005.

13. Fischer T. Health in SEA. In: Fehr R, Viliani F, Nowacki J, Martuzzi M, editors. Health in impact assessments: opportunities not to be missed: Copenhagen: WHO Regional Office for Europe; 2014:23–46 (https://apps.who.int/iris/handle/10665/137369, accessed 18 November 2021).

14. Fischer TB, Cave B. Health in impact assessments – introduction to a special issue. Impact Assess Proj Apprais. 2018;36:1–4. doi: 10.1080/14615517.2017.1363976.

15. Fischer TB, Jha-Thakur U, Fawcett P, Clement S, Hayes S, Nowacki J. Consideration of urban green space in impact assessments for health. Impact Assess Proj Apprais. 2018;36:32–44. doi: 10.1080/14615517.2017.1364021.

16. Fischer TB, Martuzzi M, Nowacki J. The consideration of health in strategic environmental assessment (SEA). Environ Impact Assess Rev. 2010;30:200–10. doi: 10.1016/j.eiar.2009.10.005.

17. Fischer TB, Muthoora T. Research report on HIA practice in England. London: Public Health England; 2020.

18. Gwimbi P, Lebese P, Kanono K. Mainstreaming health impact assessments in environmental impact statements into planning obligations in post dam construction in Metolong, Lesotho: a qualitative investigation. Heliyon. 2020;6:e04362. doi: 10.1016/j.heliyon.2020.e04362.

19. Hackett P, Liu J, Noble B. Human health, development legacies, and cumulative effects: environmental assessments of hydroelectric projects in the Nelson River watershed, Canada. Impact Assess Proj Apprais. 2018;36:413–24. doi: 10.1080/14615517.2018.1487504.

20. Harris P, Riley E, Sainsbury P, Kent J, Baum F. Including health in environmental impact assessments of three mega transport projects in Sydney, Australia: a critical, institutional, analysis. Environ Impact Assess Rev. 2018;68:109–16. doi: 10.1016/j.eiar.2017.09.002.

21. Harris PJ, Haigh F. Including health in environmental impact assessments: is an institutional approach useful for practice? Impact Assess Proj Apprais. 2015;33:135–41. doi: 10.1080/14615517.2015.1006417.

22. Hresc J, Riley E, Harris P. Mining project's economic impact on local communities, as a social determinant of health: a documentary analysis of environmental impact statements. Environ Impact Assess Rev. 2018;72:64–70. doi: 10.1016/j.eiar.2018.05.009.

23. Humboldt-Dachroeden S, Fischer-Bonde B, Gulis G. Analysis of health in environmental assessments—a literature review and survey with a focus on Denmark. Int J Environ Res Public Health. 2019;16. doi: 10.3390/ijerph16224570.

24. Iglesias-Merchan C, Domínguez-Ares E. Challenges to integrate health impact assessment into environmental assessment procedures: the pending debate. Impact Assess Proj Apprais. 2020;38:299–307. doi: 10.1080/14615517.2020.1716161.

25. Linzalone N, Assennato G, Ballarini A, Cadum E, Cirillo M, Cori L et al. Health Impact Assessment practice and potential for integration within Environmental Impact and Strategic Environmental Assessments in Italy. Int J Environ Res Public Health. 2014;11:12683–99. doi: 10.3390/ijerph111212683.

26. Linzalone N, Bianchi F, Curzio O, Serasini L, Natali M. Theory and practice to integrating health in environmental assessment: synthesis of an experience with stakeholders to deliver a national HIA guideline. Environ Impact Assess Rev. 2019;77:49–59. doi: 10.1016/j.eiar.2019.03.004.

27. Mahboubi P, Parkes MW, Chan HM. Challenges and opportunities of integrating human health into the environmental assessment process: the Canadian experience contextualised to international efforts. J Environ Assess Policy Manag. 2015;17:1550034. doi: 10.1142/S1464333215500349.

28. McCallum LC, Ollson CA, Stefanovic IL. An adaptable Health Impact Assessment (HIA) framework for assessing health within Environmental Assessment (EA): Canadian context, international application. Impact Assess Proj Apprais. 2018;36:5–15. doi: 10.1080/14615517.2017.1364026.

29. Pfeiffer M, Vanya D, Davison C, Lkhagvasuren O, Johnston L, Janes CR. Harnessing opportunities for good governance of health impacts of mining projects in Mongolia: results of a global partnership. Glob Health. 2017;13:39. doi: 10.1186/s12992-017-0261-5.

30. Pham T, Riley E, Harris P. Inclusion of health in environmental impact assessment of major transport infrastructure projects in Vietnam. Int J Health Policy Manag. 2018;7:828–35. doi: 10.15171/ijhpm.2018.36.

31. Riley E, Sainsbury P, McManus P, Colagiuri R, Viliani F, Dawson A et al. Including health impacts in environmental impact assessments for three Australian coal-mining projects: a documentary analysis. Health Promot Int. 2020;35:449–57. doi: 10.1093/heapro/daz032.

32. Roué Le Gall A, Lemaire N, Jabot F. Lessons learned from co-constructing a guide on healthy urban planning and on integrating health issues into environmental impact assessments conducted on French urban development projects. Impact Assess Proj Apprais. 2018;36:68–80. doi: 10.1080/14615517.2017.1364018.

33. Guidance on consideration of human health in strategic environmental assessment. Stirling: Scottish Environment Protection Agency; 2019 (https://www.sepa.org.uk/media/219433/lups-sea-gu5-consideration-of-human-health-in-sea.pdf, accessed 22 November 2021).

34. de Souza Hacon S, Périssé ARS, Simos J, Cantoreggi NL, Winkler MS. Challenges and prospects for integrating the assessment of health impacts in the licensing process of large capital project in Brazil. Int J Health Policy Manag. 2018;7:885–8. doi: 10.15171/ijhpm.2018.58.

35. Vohra S, Orenstein M, Viliani F, Cave B, Harris-Roxas B, Silva F. Environmental assessment and health impact assessment. In: van den Bosch M, Bird W, editors. Oxford Textbook of Nature and Public Health: The role of nature in improving the health of a population. Oxford: Oxford University Press; 2018 (https://oxfordmedicine.com/view/10.1093/med/9780198725916.001.0001/med-9780198725916-chapter-24, accessed 22 November 2021).

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

Member States

Albania
Andorra
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands
North Macedonia
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
Turkey
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

WHO/EURO:2022-4889-44652-63378

WHO European Centre for Environment and Health
Platz der Vereinten Nationen 1
D-53113 Bonn
Germany

Tel.: +49 228 815 0400
Fax: +49 228 815 0440

Email: euroeceh@who.int
Website: www.euro.who.int