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Report: Investigation into the Assessment of Health Impacts within National Environmental Regulation Processes

Report commissioned by the Environmental Protection Agency

REPORT

The EPA Research Programme addresses the need for research in Ireland to inform policymakers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

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EXECUTIVE SUMMARY

In 2013, the EPA commissioned Golder Associates to undertake a study into how human health impacts are dealt with throughout the European Union (EU) by environmental regulators with an emphasis on the role of health impact assessment (HIA) at the planning / environment interface. The results of the study are to be used in conjunction with the conclusions presented within a 2010 Environment Research Centre report titled '*Understanding the links between the environment, human health and well-being*'.

What Does 'Health' Mean in Ireland

Healthy Ireland is a government framework for improved Health and Wellbeing in Ireland for 2013 to 2025. It defines health as 'potential to enjoy complete physical, mental and social wellbeing' and as such shifts focus on what can go wrong in a person's life to what can go right. The Healthy Ireland framework describes health in terms of Social determinants of health. These comprise those factors in society or living conditions that contribute to good or bad health. By contrast health within environmental legislation is often interpreted with a narrower lens, primarily discussed in terms of mitigation of potential negative impacts to physical health.

Health Assessment Methods

Consideration was given to a range of health assessment methods in Europe associated with environmental assessment. These included review of qualitative and quantitative methods to assess potential impact to health from pollution and health impact assessment methods.

Common objectives of HIAs conducted in Europe centre around supporting decision makers in tackling health inequalities, maximising health gains, minimising health losses and to help those affected by policies to participate in decision making processes.

The review identified a number of guidelines, methods and established sets of evidence based health indicators that are being widely used both nationally and internationally in the assessment of health at the environment-planning interface. Industry specific guidance for HIA is available via government departments (environment and health), environmental regulators, public health authorities and Industry groups in Europe and internationally.

International reviews of approaches within the EU

A number of Europe wide reports and books have been published that consider the efficacy of health impact assessment and integration of health into environmental assessments such as EIA and SEA, (IMP3, 2006, WHO 2013, WHO 2014). As such there are clear guidelines and frameworks available to assist in extending this aspect of EIA and SEA.

Stakeholder Feedback in Ireland

Stakeholders indicated different interpretations on the definition of health, typically based on their professional background. These varied from support for existing environmental limit values, through to a desire to see more robust quantitative risk assessment to addressing baseline community health and consideration of social determinants of health.

The primary concern expressed by respondents regarding the current approach is that assessing impacts in separate chapters in environmental assessments is disjointed and does not allow an overall picture of impacts to health of a proposed activity/development.

While international and national guidance is available, a significant concern to those stakeholders less familiar with HIA was the potential for the subject to be addressed using unsubstantiated evidence for a variable set of indicators of health.

There were mixed views on the necessity to legislate for HIA, some stakeholders felt that the requirement for HIA has already been legislated via existing environmental legislation.

Most frequently quoted barriers to addressing health included lack of sufficient clarity on what health means, lack of guidance or supporting legislation, timeframe to review, resources and lack of baseline data.

Opportunities identified by stakeholders included guidance, training, central unit for scoping / appraisal, tiered system to reduce administrative burden.

Health Impact Assessment at the planning –environment interface

Health at the environment-planning interface in Ireland has been considered in terms of the Healthy Ireland Framework and its inclusion of health within planning and environmental legislation (i.e. within SEA, EIA, environmental permitting requirements and via consideration of 'significant risk to public health' of plans and projects). Four case study countries were found to have legislation and / or regulations for health assessment namely Wales, Slovakia, Norway and the Netherlands. HIA was also found to have support in the UK (primarily in England and Wales) and Sweden either via planning tools or through public health obligations.

All countries assessed indicated the presence of a resource or support unit for HIA, which in some instances sits within the Department of Health or similar government health agency. The role of the unit varied between countries to comprise activities such as provision of a central information point, resourcing / support and compliance / quality monitoring.

Typically where HIA has been adopted as a standalone assessment tool, support for its use was found via planning-health requirements, with the primary stakeholders being health and planning authorities and the role of environmental regulators limited to consideration of exposure to pollutants. Standalone HIA was also observed in supplemental reports within Strategic Environmental Assessment and Environmental Impact Assessment. However, there is variation between countries and some environmental regulators indicated support for HIA e.g. guidance for particular industries.

Practitioners in the UK, Sweden and the Netherlands highlighted that the use of HIA is vulnerable to political will and changes to government have impacted on the frequency of use in the past.

Integration of Health into Strategic Environmental Assessment

Health in SEA in Ireland requires consideration of significant effects to population, human health and the interrelationship between environmental receptors (i.e. biodiversity, water, soil, air, landscape, cultural heritage, population, human health, climatic factors, material assets and other relevant receptors). Impacts are to be described in terms of direction (positive / negative), duration and timing, cumulative or synergistic effects, primary and secondary effects and the inter-relationship between environmental receptors. The interpretation of health in SEA in Ireland considers quality of life, however does not go into detail on appropriate methodologies.

The SEA process may be used as a mechanism to highlight and support consideration of human health aspects in subsequent project level assessments such as EIA or licence applications. As such, clarification regarding appropriate indicators for health in SEA could benefit related project level EIA. The competent authorities for SEA in Ireland do not include a health agency, however health is addressed through direct consultation between planning authorities and local representatives of the HSE during the development of plans.

There are a number of reports and guideline documents addressing the use of wider determinants of health and methodologies for the assessment of health in SEA at international level by the WHO and UNECE.

The most comprehensive guidance and training available at national level was observed within the UK. The HIA Gateway as part of Public Health England provides guidance, best practice documents, a library of published reports, journal articles and books in addition to comprehensive training tools on the integration of health in SEA. With the exception of Slovakia, none of the countries assessed indicated that health agencies were competent authorities for health assessment within the SEA process.

Integration of Health into Environmental impact assessment

Health within the EIA Directive was considered in terms of human beings. This has now been redefined as 'human health and populations' in the 2014 EIA Directive. The European Commission guidance on scoping document describes impacts to human beings in terms of physical (e.g. exposure to chemicals, noise,

radiation) and social health determinants (EC, 2001). However consideration of impacts to human beings has typically been reduced to physical health impacts in the majority of case study countries.

The EIA Directive is currently enacted through Irish Planning and Development Acts and Regulations. Irish guidelines for conducting EIA do include limited consideration of social and economic impacts. While the information required is identified, methodologies to undertake the assessment are not been presented. Guidance addressing health in EIA was observed in a number of case study countries, while generation of a single health chapter for significant projects is becoming more common in many countries studied.

Engagement with health agencies in Ireland occurs via the National Environment Health Office in the Health Service Executive. With the exception of Slovakia, engagement with health authorities tends to occur at local or municipal level. HIA has been used by health agencies in responding to submissions in the UK and Sweden. Slovakia was the only country to have established an accredited expert professional system.

The most significant upcoming changes in EU environmental legislation identified were the amendments to the EIA Directive which has redefined human beings as human health and populations. The new Directive will also require suitably accredited individuals to undertake environmental assessment. This may also drive a need to clarify the definition of health and procedures for assessing health such that suitable accredited professionals may be identified.

Health in Licensing and permitting

A review of sectoral directives that form the basis for environmental licencing in Europe indicated that the consideration of health is largely associated with managing exposure to pollution.

With regard to licensing and permitting, the vast majority of countries adopted an approach of BAT-ELV with risk based considerations included where required. Quantitative risk assessment methods were observed, typically in more significant permit applications where more than one chemical or exposure pathway may exist. Health based ELV or assessment of ELV with regards to their capacity to protect health was observed in some countries.

Health agencies were generally consulted as statutory consultees or by voluntary submissions during scoping/appraisal stage. Guidance is available for both those preparing and appraising health aspects of licence applications.

Consideration of existing community health status was generally undertaken by local public health officials during appraisal, though some applicants provide readily available information regarding baseline health status in local communities.

The use of risk based emissions limits was observed in a smaller number of cases. Approaches adopted in Europe included derivation of national risk based standards, project specific risk assessment of predicted emissions and review of legislated emissions standards using risk assessment methods.

Recommendations

The project undertook a broad overview of approaches to HIA and health in environmental regulation across the EU. The objective of the study was to inform the EPA regarding opportunities for greater use of HIA through existing and / or by effecting legislative change or guidance. The results of this study are to be used in conjunction with the conclusions presented within the Environmental Research Centre report.

It was found that roles, responsibilities and the structure of institutions within Member states varied from one country to the next. As such, certain aspects of health impact assessment, as interpreted within Europe, do not fall under the EPA's remit and it is appropriate to note that any approaches discussed here may be considered further by relevant stakeholders at their discretion.

It should also be recognised that no one country has adopted all measures observed during the study. In addition, across Europe there is widely recognised needs for further research to address specific issues identified during this project.

As such the recommendations presented below are intended as opportunities for further discussion by the relevant stakeholders. Consideration of these options should be done in a manner cognisant of proportionality and feasibility for each option being considered, following consideration by relevant stakeholders.

The review has identified that there are a number of opportunities for consideration in regards to health impact assessment, some of which may be suited to short, medium or long term objectives.

They are presented below (H01, H02, and H03) and priorities / timeframe attributed to individual components are summarised in Table 15. It is recognised that many of these options may take some time to address and a series of short term interim options have been presented in H04 to assist EPA in the short term.

H01: Working Group

H01a: Establishing a Working Group or Collaboration Equivalent

The area of health at the environment-planning interface is multifaceted, with numerous stakeholders involved in the assessment of health and decision making processes. During this project it was observed that the consideration of health varied depending on the professional background of a stakeholder. As such there is some uncertainty with regard to the definition of health in the context of the environmental assessment regulations and areas of overlap with other planning processes. In addition, roles and responsibilities of relevant stakeholders need further clarification.

As such, it would be beneficial to develop a working group of relevant individuals / organisations in order to address the recommendations outlined in this report. The relevant members of the working group may include members from the Department of Health, Department of Environment Communities and Local Government, EPA, the HSE (National Environmental Health Office, Public Health, Health Promotion and other Directorates where appropriate). Institute for Public Health, An Bord Pleanala and other academic / industry partners when appropriate.

It is noted that a working group has already been established to develop new guidelines for EIA and within this there are objectives in relation to addressing health and populations within EIA. As such it may be more efficient or appropriate to devise a series of collaborative efforts to assess those options provided within the recommendations.

H01b Define health and clarify roles and responsibilities

There is a need to provide a clarification with regard to the definition of health outlined within the Healthy Ireland framework and its interpretation within the context of environmental and planning legislation.

H01c Develop guidance on methodologies and appraisal criteria for health assessment

Currently guidance available on health assessment in Ireland is limited however there is significant resources in terms of international/EU and national guidance that maybe adapted or considered for the Irish context.

H01d Interrelationship and data gap analysis of health considerations between preparation of a development plan, SEA, EIA and licencing processes

There are a number of areas in which consideration of health within the planning system may overlap. It would be beneficial to consider these relationships in any future development of guidance / best practice for health in SEA, EIA and environmental licensing.

H01e Requirements for a single health chapter

A number of stakeholders noted that review or consideration of health impacts would be made much easier where data collated using current methods is presented in a single health focussed chapter in the EIS / SEA and Licence Application documents.

H01f Early engagement and scoping

Opportunities for early engagement have been observed in different formats in the EU. Opportunities to consider include early engagement and scoping opportunities for the public, development of scoping tools and advice from health agencies. Given that there are limitations regarding health assessment in Ireland, it may be appropriate to consider mandatory scoping for projects with significant potential for risks to human health.

H01g Proportionality

Concerns were raised that the quantity of EIA and licensing applications was given greater emphasis than the quality of such applications. Opportunities to provide a tiered system to EIA and licensing may be appropriate.

H01h Establishment of a central unit for environmental assessment with a health advisor

Some stakeholders held value in the approach within the Netherlands where a central unit provides scoping advice and appraises final reports and as such this option warrants further consideration.

H01i Baseline Population Health Data: sources, roles and responsibilities

The absence or limitations of baseline population health data was a significant concern for those stakeholders involved in appraisal of health assessments. A sub-group should be established to assess the adequacy of existing baseline health data resources.

H01j Process and timing

The objective of this study did not include assessment of the efficacy of current processes and as such a more targeted appraisal of current processes may be beneficial.

H02: Capacity building

Capacity building could be considered in a number of areas such as within environment and health agencies involved in review of applications, planning authorities and externally in consultancies preparing reports. It is also noted that the need for accredited professionals within the new EIA Directive will place pressure on the system if there is a shortage of appropriate individuals.

H02a Training in quantitative risk assessment methods.

H02b Targeted training in health impact assessment and social determinants of health.

H02c Development of guidance and knowledge banks.

H02d Engagement with third level education in undergraduate, postgraduate and continuing professional development areas.

H03: Recommendations for Legislation

Any consideration of legislation for HIA would require further research including:

- adequacy of the definition of health in current planning and environmental legislation to facilitate the objectives outlined in Healthy Ireland.
- consideration for developing tools to ensure stakeholders are aware of the scope of powers of such legislation when applied to planning and environmental decisions.
- If required, analysis to identify whether legislative changes are best catered for in Public Health legislation, Planning and Development / Environmental legislation or both.
- Any decision to legislate for HIA should be supported by an assessment of the adequacy and capacity of existing processes, requirements for establishment of additional resources and potential to bridge gaps between the existing and desired state for successful HIA implementation.

H04: Interim Recommendations

The following are a series of interim recommendations that may contribute to meeting the objectives outlined in H01 to H03 but that can be facilitated within a shorter time frame.

- There is already a strong body of work on environmental health supported by the EPA, this includes:
  - Existing information outlining how the environment impacts upon health (currently available via the EPA website);
  - A wide range of existing research publications relevant to health supported by the EPA;
  - Existing collaboration with the HSE and health research partners which has produced publications containing guidance on approaches to environmental health for specific topics (e.g. Air Quality Index for Health, HSE, 2011; Comparative health study, HSE 2008).

  It may be appropriate to look to identifying how these pieces of work may be highlighted as a resource for inclusion within environmental assessment processes.

- Guidance in relation to HIA is available in a number of countries, including Ireland (IPH, 2009), Australia (Department of Health, 2001); Canada (Health Canada, 1998), United States (US EPA, 2013), UK (Department of Health, 2010) amongst others as discussed within the report. A review of these guidelines, to assess which may best support consideration of health in EIA, would be beneficial to identify frameworks and methodologies. This may be an appropriate interim measure until such time as it is possible to develop national guidance.

- Given the need to consider quality of life within SEA, interim elaboration on application of existing guidance, such as that provided by the HIA Gateway, may be appropriate.

- As discussed in H01c above, there is a wide range of guidance available relating to quantitative health risk assessment. In Ireland, Most At Risk Individual (MARI) reports are already prepared for specific projects with potential risk of environmental exposure. Guidance on the specific information to be contained within these reports is necessary in order ensure consistency in approaches and to ensure minimum standards are met. In the short term, this may be achieved by preparation of interim position statements outlining appropriate frameworks/methodologies (e.g. approaches such as US EPA, Health Canada, Australian enHealth, UK Environment Agency, SNIFFER (Scotland and Northern Ireland), INERIS (France)) and minimum information required. A statement outlining what is considered to be ‘unacceptable risk’ in an Irish context would also be beneficial.

- Consideration may be given to the requirement to further emphasise screening of human health within existing licensing processes via a separate section to discuss environmental impacts to human health. This may have benefits in regards to simplifying review processes for statutory consultees and improved risk communication with the general public.

- In some jurisdictions a review of environmental standards has been undertaken to assess their protectiveness with regards to human health. This has been undertaken in Ireland in some areas e.g. the AQIH evidence base review by the HSE and the JAGDAG identification of hazardous substances for groundwater with the assistance of Public Health England. It may be beneficial to undertake a review the information already available to outline how standards applied are protective of human health.

Glossary

ABP	An Bord Pleanala
BAT	Best Available Techniques
CAFÉ	European Commissions Clean Air for Europe
COMEAP	Committee on the Medical Effects of Air Pollutants
DAFF	Department of Agriculture, Fisheries and Forestry
DALY	Disability-adjusted life year
DHSSPS	Department of Health, Social Services and Public Safety
DOH	Department of Health
EAP	European Action Programme
EC	European Commission
EDI	Estimated Daily Intake
EHO	Environmental Health Office
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ELCR	Excess Lifetime Cancer Risk
ELV	Environmental Limit Values
EPA	Environmental Protection Agency
ERC	Environmental Research Centre
EU	European Union
EUSES	European Union System for the Evaluation of Substances
FSA	Food Standards Authority
GIS	Geographical Information Systems
HA	Health Assessment
HHRA	Human Health Risk Assessment
HIA	Health Impact Assessment
HQ	Hazard Quotient
IED	Industrial Emissions Directive
INIsPHO	Ireland and Northern Irelands Population Health Observatory
IPC	Integrated Pollution Control
IPH	Institute for Public Health
LAP	Local Area Plans
MOU	Memorandum of Understanding
NHS	National Health Service
NIECE	Network for Ireland's Environmental Compliance and Enforcement
PHE	Public Health England
RCPI	Royal College of Physicians in Ireland
RIVM	National Institute for Public Health and the Environment
RPG	Regional Planning Guidelines
SEA	Strategic Environmental Assessment
SF	Slope Factor
SIA	Social Impact Assessment
SID	Strategic Infrastructure Developments
SNIPH	Swedish National Institute for Public Health
TDI	Tolerable Daily Intake
UNECE	United Nations Economic Commission for Europe
USEPA	United States Environment Protection
WFD	Water Framework Directive
WHIASU	Welsh Health Impact Assessment Support Unit
WHO	World Health Organisation
YLD	Years of life lived with disability

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Study Limitations

IMPORTANT: This section should be read before reliance is placed on any of the opinions advice, recommendations or conclusions herein set out.

a) This report has been prepared for and at the request of the Environment Protection Agency. ("the Client") for the purpose of undertaking a review of pursuant to its appointment of Golder Associates Ireland Limited (Golder) to act as Consultant;

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g) In the conclusions section of this report, Golder has set out its findings and provided a summary and overview of its advice, opinions and recommendations, However, other parts of this report will often indicate the limitations of the information obtained by Golder and therefore any advice, opinions or recommendations set out in the Conclusions section ought not to be relied upon until considered in the context of the whole report.

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1.0 INTRODUCTION

1.1 Background

In 2010, the results of an Environmental Protection Agency (EPA) commissioned investigation into understanding the links between the environment, human health and well-being, were published in an Environmental Research Centre report (ERC, 2010). This research suggested that significant work into improving the approach to considering health risks during licensing procedures is currently underway. In relation to Health Impact Assessment (HIA) a number of recommendations were made. These included:

- Prioritising consideration of health aspects in EIA and that the scope of health impacts considered are consistent with and takes account of currently accepted definitions of health and the known determinants of health;
- A need for EIA legislation to make explicit provisions to ensure adequate consideration of health issues;
- Consideration of resources such as a single unit to assess HIA, through the involvement of local health professionals; and
- The potential role of a framework for integrated environmental assessment and the need for greater guidance.

A review of the EPA undertaken in 2011 highlighted the potential impact on human health as the highest concern regarding environmental matters under the EPA's remit. The review board noted that the EPA uses a 'standards based' approach in the assessment of health impacts of proposed activities. They noted that a number of countries now utilise a risk-based approach which combines quantitative risk estimates and qualitative outcomes from community and stakeholder engagement. Regarding consideration of health in licensing, the review concluded there is a strong case for the EPA's licensing process to include formal requirements in relation to HIA and that the then proposed Health Advisory Committee should make appropriate recommendations in regards of how to address this issue.

In 2013, the EPA commissioned Golder Associates to undertake a study into how human health impacts are dealt with throughout the European Union (EU) by environmental regulators with an emphasis on the role of HIA at the planning / environment interface. The results of this study are to be used in conjunction with the conclusions presented within the ERC report, in order to provide recommendations to the EPA to facilitate greater use of HIA through existing and / or by effecting legislative change.

1.2 Objectives and Aim

The Aim of the review is to assess the role of Health Assessment at the Environment-Planning Interface. The key issues to be addressed include:

- Incorporation of human health issues into Irish and EU environmental legislation;
- Scope of typical health impact assessment (physical, mental, social), and the expertise required;
- Detailed examination of how human health issues are treated by environment regulatory agencies throughout the EU;
- Review of the treatment of human health issues at the interface of environmental regulation and planning approval processes in the EU;
- Potential impacts from future developments in related areas (*including the recast of the EIA Directive, the recent Directive on Industrial Emissions (IED), discussions on environment & health in the context of the forthcoming Seventh Environmental Action Plan, and ongoing commitments under the Water Framework Directive);*
- Background data issues including the use of monitoring data as a base for decisions, who collects / holds such data and availability to the regulator;

- Experiences from other jurisdictions on management of community engagement;
- Experiences from other jurisdictions on management of commercial data confidentiality; and
- Recommendations to the EPA and for legislative change to facilitate greater use of HIAs.

1.3 Proportionality and Reliability

This report considers a variety of approaches undertaken in Ireland and across the EU. Environmental health across the EU and in Ireland has improved considerably with the introduction of EU Directives on pollution control and national initiatives such as the ban on smoky coal. A number of health orientated research programmes have been supported by the EPA in the last ten years including the Environment Research Centre (ERC) study 'Understanding the Links between the environment, human health and wellbeing' (ERC, 2010). This report builds on these experiences and has been written in response to direct questions asked by the EPA within its tender.

As with any impact assessment, consideration of health may be a resource intense process depending on the level of assessment undertaken. Consideration of proportionality is important to ensure the level and quality of information obtained is reflective of the proposed development. The information in this report presents options for consideration. Not all options will be appropriate for every project or plan.

A large number of smaller projects or plans may be of such a scale that a comprehensive health assessment is inappropriate – rather a simple health screening tool may provide assurance that proposed changes are so minimal that impacts to health are negligible.

The use of Environmental Limit Values (ELV) for a particular project may be sufficiently adequate and quantitative risk assessment methods are not required. However the same plan or project may be such that social determinants are more likely to be affected and assessment of health via a Health Impact Assessment (HIA), or similar method is more appropriate. Similarly a plan or project may result in an increase of emissions of a chemical that is of particular concern for a community and a specific quantitative health assessment such as Human Health Risk Assessment (HHRA) is more appropriate to address their concerns.

Some projects may invoke so much public concern that a heavy investment in engagement and health assessment at the outset is the most beneficial route for all.

In this report it is important to keep two aspects in consideration throughout:

- Health assessment, like other forms of impact assessment, should be proportionate to the proposed project or plan; and
- All health assessment methods are subject to limitations, assumptions and uncertainty regardless of whether they are quantitative or qualitative. They serve as a supporting tool within the decision making process. They do not present a final decision; rather inform the decision making process.

2.0 PROJECT METHODOLOGY AND REPORT STRUCTURE

2.1 Project Methodology

The project comprised two streams run in parallel:

- Literature Review; and
- Stakeholder discussions.

The Literature Review comprised a review of the following information:

- Health assessment methods;

- Policy, legislation, regulation and national guidance on health in impact assessment in Ireland and the case study countries in the EU. The core countries considered were the UK (England, Scotland, Wales and Northern Ireland), Sweden and the Netherlands. It is noted that information for each area required was not readily available for each country, for example four countries in the EU have established a legislative/regulatory requirement for health assessment, namely Slovakia, Norway, the Netherlands and Wales. However the objectives of the legislation / regulation in each country are quite different. Similarly France was included for consideration with regard to their guidance on human health risk assessment in their licensing processes. As such these countries were retained for consideration although there is limited information on Norway at this stage; and
- Example EIA reports and licence applications.

A full bibliography is included at the rear of the report.

Informal stakeholder discussions were held with a number of individuals from government agencies, private consultancies, academia, local authorities and non-government organisations in Ireland and the case study countries assessed. The approach taken to these discussions was an informal information gathering on individual experiences working within the area of health and environment so as to understand processes, barriers and opportunities. These experiences are not representative of a corporate position, rather are an indication of experiences working within their area within their country.

In addition, a short survey was undertaken to further understand experiences regarding health assessment within Planning Authorities in Ireland. This was a deliberately simple process, the results of which are considered within the limitations of the survey.

It is important to note that this report provides options for further consideration. The information can only be utilised to devise a pathway forward in cognisance of the collaborative interagency requirements of health assessment, administrative processes, resources and opportunities in the current climate. With that in mind, recommendations have been provided, however they are not intended to be adopted without due consideration of feasibility.

2.2 Report Structure

The report has been divided up into the following areas:

- Definition of key terms (Section 3.0), including health, social determinants of health and health impact assessment;
- Short description of health assessment methods (Section 4.0), including qualitative risk assessment, screening against generic environmental criteria, quantitative risk assessment;
- Summary of how health is addressed in European policies, legislations and guidance (Section 5.0), including a discussion of upcoming changes in EU environmental regulations;
- Literature reviews on how health is incorporated in different assessment methods, namely Health Impact Assessment (HIA), Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) (Section 6.0);
- Health Assessment at the Planning-Environment interface in Ireland (Section 7.0);
- Health Assessment at the Planning-Environment interface in other EU countries, namely UK, The Netherlands, Norway, Sweden and Slovakia (Section 8.0);
- Summary of how Heath is incorporated in Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), Licensing and Permitting processes and post impact assessments in Ireland and in other EU countries (Section 9.0);
- Examples of how some EU countries manage commercial data confidentiality (Section 10.0);

- Examples of how community health concerns are raised during public consultations as part of HIA and SEA (Section 11.0);
- Key observations and opportunities for changes to the approach to Health in Environmental Assessment in Ireland; and
- List of references (Section 13.0).

3.0 DEFINITION OF KEY TERMS

3.1 Health

The World Health Organisation (WHO, 1948) defines health as:

> *'[…] a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'*

Healthy Ireland is a government framework for improved Health and Wellbeing in Ireland for 2013 to 2025 (DOH, 2013). Within Healthy Ireland health is defined as:

> '[…] everyone is achieving his or her potential to enjoy complete physical, mental and social wellbeing.
>
> Healthy people contribute to the health and equality of the society in which they live, work and play. Health is much more than an absence of disease or disability, and individual health and that of the country, affects the quality of everyone's lived experience. Health is an essential resource for everyday life, a public good and an asset for health and human development.
>
> Wellbeing is an integral part of this definition of health. It reflects the quality of life and the various factors which can influence it over the course of a person's life. Wellbeing also reflects the concept of positive mental health in which a person can realise his or her own abilities, cope with the normal stresses of life, work productively and fruitfully and be able to make a contribution to his or her community. *Consideration of health and wellbeing requires a shift in focus from what can go wrong in people's lives to focusing on what makes their lives go well.*'

Healthy Ireland has set out key actions relating to the environment and health within a number of themes, including:

Theme 1: Governance and Policy

- Establish formal multi-sectored committees to provide national, co-ordinated mechanisms to address and respond to issues that affect human, environmental and animal health, in line with EU council requirements.

Theme 2: Partnerships and cross-sectoral work

- Health and wellbeing impacts will be assessed locally and an integrated Social Impact Assessment approach at the local level will be mandated. Tools and supports for local authorities will be developed, to assist them in working across sectors at national and county level in undertaking health and wellbeing assessments. The Partners associated with this action were the Department of Social Protection, Department of Health, Department of Environment, Community and Local Government, Local authorities, HSE Directorates, County and City Managers Association; and
- Work with the EPA on its Health Advisory Committee to further integrate and improve consideration of human health and environmental protection activities across EPA functions and functions of related agencies and sectors. The partners identified here were the EPA the Department of Health, Department of Environment, Communities and Local Government, Health Service Executive Directorates, Health Research Board and others.

As such commitments have been made to development of health / social impact assessment tools that are to be used at a Local Authority level. In addition health is to be considered across EPA functions and those of related sectors. There will be number of areas of overlap, and if developed separately, potential for conflicting instruments or guidance.

3.2 Social Determinants of Health

The framework of Healthy Ireland is based on a Health in All Policies approach that considers the role of wider Government sectors, amongst others on broader social determinants of health. Figure 1 Presents Social Determinants of Health adapted from Dalghren and Whitehead (1991) and Grant and Barton (2006) as presented in Healthy Ireland.

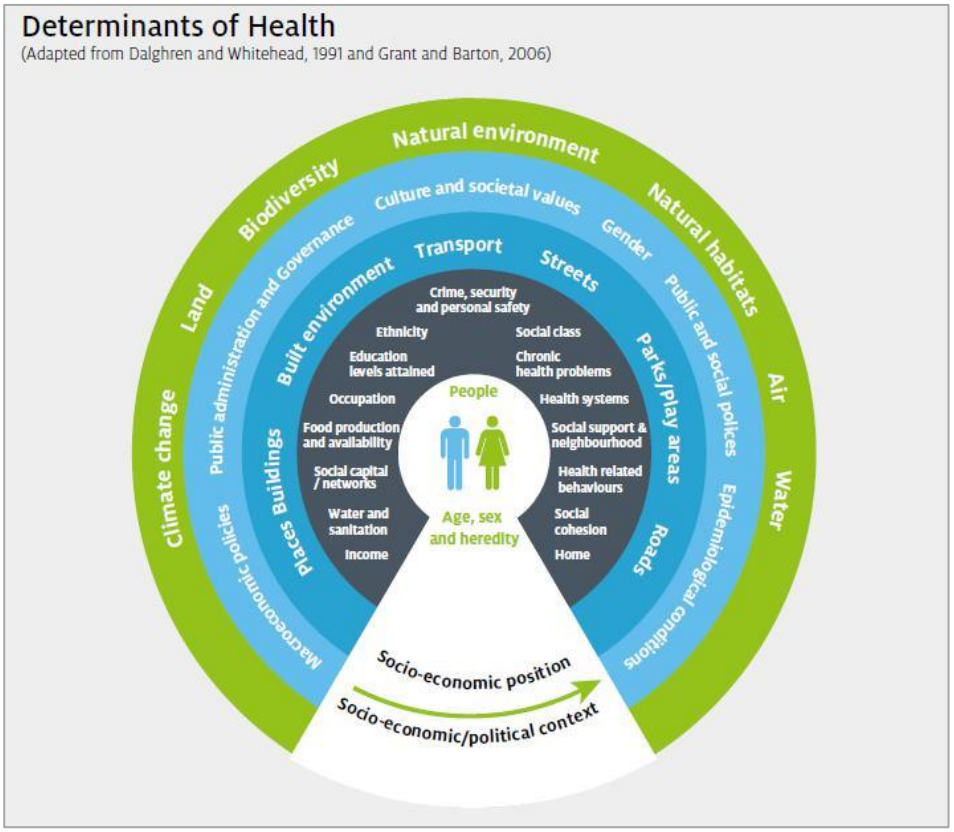

Figure 1: Social Determinants of Health (Healthy Ireland, DOH 2013)

Social determinants of health are those factors in society or living conditions that contribute to good or bad health. This approach requires a shift in focus from considering health end points such as specific diseases e.g. diabetes, respiratory illness to considering an inter-sectoral whole-system approach in addressing the conditions which may impact health outcomes. For example fuel poverty may lead to issues that impact on health in many ways including:

- Increased risk of winter mortality;
- Increased risk of accidents at home;
- Increased risk of respiratory illness;
- Social isolation;
- Increased blood pressure / cardiovascular events;
- Impaired mental health;

- Worsening arthritis; and
- Adverse effects on children's wellbeing.

Addressing the social determinant may capture a wider range of health effects and gives opportunity to take a preventative approach to managing health. This does not mean traditional means of addressing environmental health are not considered, rather they are included as part of a wider consideration of conditions that may impact upon health.

This approach is already used in Scotland through the Good Places Better Health framework (GPBH, 2008) and in Sweden within Public Health legislation. Consideration of this approach has also been undertaken in the UK between Town and Country Planners and local Health representatives (TCPA, 2012).

3.3 Health Impact Assessment

During this project there were four common interpretations by government and private industry stakeholders on what health should mean in terms of the environment-planning interface:

- Health is adequately assessed by the use of environmental limit values (ELV) which have been derived to be protective of physical health. If environmental emissions are below the ELV then the general population is protected. There is no role for consideration of wider health determinants in environmental assessment as these are qualitative health indicators and are too subjective to include within the decision making process;
- Health Impact Assessment (HIA) is a tool to assess the impact of projected physical health effects from exposure to chemicals against the existing health status and / or that of potentially susceptible / vulnerable members of the community. The role of HIA is to bring real community health information into comparison with projected effects from exposure to chemicals / radiation or physical agents (e.g. noise) for impact assessment. The current belief is that where ELV is used it is not in comparison with the local community health status and as such will not identify or protect any particularly vulnerable sub-sets of the population. In this case the term HIA was typically associated with assessment of physical health effects but in the context of the health status of the exposed community;
- HIA is a process of looking at social determinants of health as physical health is adequately covered by ELV and other aspects of environmental assessment. In particular there was concern that efforts to create healthy environments through programmes such as the World Health Organisation (WHO) Health Cities programme were often unsupported within the planning regime; and
- HIA is a tool to appraise both physical and social determinants of health, neither of which are addressed adequately by current methods in Ireland.

When asked what health may mean to a community – the answer is typically one of 'safety'. The term "*safe*" can be an emotive one, since it may mean different things to different people and in different circumstances. Stakeholder concerns regarding health and development may include questions regarding:

- Health and safety – am I safe in terms of crime rates, increased traffic etc;
- Physical health – am I safe if exposed to environmental pollution such as chemicals, noise or other nuisance that may result in chronic or acute health effects; and
- Wellbeing –Is my potential to achieve wellbeing and quality of life safe? Will the development provide for initiatives that support wellbeing or could it impact negatively on existing initiatives in place?

There are clear differences in the interpretation of health, potential assessment methods and where they should be used. This highlights that there is a need for clarification regarding our understanding of what health is in the context of environmental assessment in order to improve efficacy.

4.0 HEALTH ASSESSMENT METHODS

4.1 Qualitative Health Risk Assessment

Qualitative health risk assessment is used ubiquitously in environmental assessment. Methodologies generally comprise:

- Site setting / description of plan / project / programme;
- Hazard Identification / Impact Assessment;
- Receptor Identification / Community Profile;
- Risk Assessment (i.e. likelihood versus severity of impact) / prioritisation of impacts; and
- Risk Management options.

The approach can also be utilised to identify areas for further assessment such as the need for Human Health Risk Assessment (HHRA). The screening approach within HIA is an example of a qualitative assessment of whether further assessment of health is required.

Risk assessment is typically conducted in consideration of likelihood verses consequence and may include various descriptors for magnitude, direction, timescale of effect e.g. significant negative effect in the short term versus positive impact in the long term. It may identify particular vulnerable groups or significant concerns.

4.2 Screening Against Generic Environmental Quality Criteria

For community members who may be unintentionally exposed to environmental pollutants such as from emissions to air from an industrial facility, one of the most frequently asked questions is “is it safe?”, Safety does not necessarily mean the absence of risk, nor does risk mean the absence of safety.

The simplest approach to addressing safety associated with exposure to environmental pollution is the use of Environmental Limit Values (ELV). These are generic criteria derived as indicators of acceptable exposure to a particular chemical in a particular scenario. It is important to understand the derivation of these ELV in order consider whether they are appropriate for the proposed use. Each ELV may be derived based on assumptions such as:

- Most sensitive health effect based on toxicological profiles for the chemical;
- Non-health end points such as odour or aesthetics;
- A specific exposure frequency (e.g. 2 L drinking water per day);
- Overall lifetime exposure or a more sensitive exposure duration such as early childhood development stages;
- Body weight (e.g. 60 kg for an adult);
- Total environmental loading such as consideration of background contribution in the criteria derivation (this ranges depending on the substance and potential background sources which may or may not be relevant to the local exposure context); and
- Local / national policy.

4.3 Quantitative Health Risk Assessment Methods (Physical Effects)

In certain plans or projects there may be concern that the use of ELV may not provide sufficient protection for the health of the local population. This could be due to a number of reasons such as:

- There are no ELV for relevant environmental pollutants; and
- The only available ELV is derived based on non-health related effects e.g. odour / aesthetics or is based on policy that is not relevant to the jurisdiction;
- There is potential for cumulative impacts that may result in an increased risk to human health such as:
  - where there are a number of chemicals emitted at the facility that may result in the same health effect or there is potential for bioaccumulation;
  - high background concentrations (either due to natural conditions or additional industry presence);
  - receptors are exposed via a number of pathways, not just that considered within the ELV derivation; and
  - high incidence of a particular health effect in the local community.

Where a more detailed approach is warranted a Human Health Risk Assessment is a method often used to investigate possible effects of a substance via site specific exposure pathways.

There are a wide variety of models, tools and guidelines for undertaking quantitative health risk assessment. These include preliminary and detailed quantitative risk assessment methods, detailed guidance on exposure assessment methods and parameters, toxicology databases and guidance, methodologies for sensitive receptors, guidance on the use of uncertainty factors. Detailed guidance is available regarding the use of methods to calculate the burden of disease as discussed below. Industry specific guidance is also available such as for mining and metals. Chapter 13 presents links to some examples of available guidance and internationally recognised models. Methods and approaches to Human Health Risk Assessment and other quantitative risk assessment methods are discussed further below.

4.3.1 Human health risk assessment

Human Health Risk Assessment (HHRA) has a health protection focus and provides a systematic approach to characterising the nature and magnitude of the risks to human health associated with environmental hazards. It is often used in Environmental Impact Assessment (EIA) to characterise potential impacts associated with baseline environmental conditions and projected exposure due to the proposed development.

The risk assessment methodology can vary with national and international guidance however it generally comprises four to five components presented in Table 1

Table 1: Generic Steps Involved in Health Risk Assessments

Steps	Description
Problem Formulation	■ What is the development (description of the installation - its construction, operation and closure, chemical use, planned and fugitive emissions); ■ Who will be affected and when (receptors - age, gender, proximity, duration – daily activities, changes to community profile following development e.g. influx of construction workers); ■ What will affect receptors (chemicals of interest, odour); ■ How will they be affected (exposure pathways – how do receptors (current and future) use the land, water, air); and ■ What are the boundaries (spatial and temporal) of the assessment?
Toxicity Assessment	The major outcomes of the hazard assessment are an appreciation of the toxicology of the chemicals of concern and estimates of doses or exposure concentrations that can be used to estimate acceptable or tolerable intakes (toxicity reference values).
Exposure Assessment	This quantitative step estimates the absorbed dose of a chemical for a receptor. It depends on the concentration in various media (e.g., air, water, soil, food); the amount of time a receptor may be in contact with these media, and the physiological characteristics of the receptor (e.g., ingestion rates, inhalation rates, body weights, skin surface areas and dietary preferences).
Risk Characterisation	Risk characterisation combines the information from the exposure and hazard assessment steps to present a risk profile. ■ Who is at risk (e.g. child / adult / residential / occupational worker)? ■ What are the chemicals of concern and their potential health effects? ■ What exposure duration (acute / chronic)? ■ What exposure pathway (ingestion, inhalation, dermal contact with food, soils, air, water)? and ■ Can mitigation steps be utilised to reduce the risk?
Uncertainty Assessment	Identifies potential sources of uncertainty and qualitative discussion of the magnitude of uncertainty and expected effects on risk estimates.

The draft framework HHRA to inform decision making developed by the United States Environment Protection Agency (USEPA 2012) adds two further dimensions to the methodology above which are:

- Risk communication and community consultation are involved at all stages of this process where it is considered appropriate; and
- Scoping of the risk assessment that informs the analysis plan. As such the need for a HHRA informs the environmental data collection. This is an important step as it is often difficult to utilise environmental data that has been collected for a different objective (e.g. ecological impacts which may not be co-located with human receptors).

HHRA is often undertaken using a tiered approach with levels of complexity increasing proportionately to the project scale or risk to vulnerable receptors. The Environment Agency has developed a tiered risk assessment approach to contaminated land investigation (Environment Agency, 2004) while in Scotland and Northern Ireland a tiered approach to quantitative health risk assessment is also intended to support environmental permit processes (SNIFFER 2007). WHO (2010) presents a tiered framework for quantitative health risk assessment.

Assessment of risk

Some chemicals exhibit threshold toxicities such that below a certain dose adverse effects are not observed. The risks associated with exposure to such chemicals are often assessed via calculation of the Hazard Quotient (HQ).

The Hazard Quotient is the ratio of the exposure concentration to an acceptable concentration represented by a toxicity reference value (TRV). This is frequently achieved using an Estimated Daily Intake (EDI) and comparing against a Tolerable Daily Intake (TDI).

Hazard Quotient: $$HQ = \frac{EDI}{TDI} \quad (1)$$

Where the Hazard Quotient is less than or equal to one, the estimated daily intake is equal to the reference value, suggesting that the chemical may not cause adverse health effects. If the Hazard Quotient is greater than one, the EDI is greater than the reference value. This may be interpreted to present an "unacceptable risk".

For other chemicals, such as most carcinogens, it is not possible to identify a dose-response threshold and as such it is considered there is no dose that may be deemed 'safe'. These chemicals are called non-threshold chemicals and risks are assessed as potential for additional cancer cases resulting from a lifetime of exposure.

Excess Lifetime Cancer Risk: $$ELCR = EDI * SF \quad (2)$$

Instead of using a toxicity reference value such as a tolerable daily intake, cancer slope factors (SF) or unit risks (UR) are used to estimate the risk of cancer with the exposure to a carcinogenic substance. In the example above a slope factor is used, which is an upper bound, approximating a 95% confidence limit, on the increased cancer risk from a lifetime exposure to an agent by ingestion (excess lifetime cancer risk ELCR).

Guidance is available in a number of countries at national or provincial level on what is considered an acceptable risk level for carcinogenic contaminants. The US EPA considers this level to be 1 extra cancer case per 1 million people. The state of California has decided 1 X10-5 is an acceptable level. In Europe different countries also have different approaches, an acceptable level of 1 X 10-6 is considered appropriate in Italy. It is noted that the UK Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment advocate a different approach to dealing with non-threshold chemicals. They support non-quantitative extrapolation by identification of an appropriate dose without discernible carcinogenic effect, or the lowest dose tested if effects are apparent at all doses, and the use of expert judgement to derive a suitable margin. However where suitable human data is available, the UK Department of Environment, Food and Rural Affairs consider an ELCR of 1 X 10^{-5} to be appropriate.

However, a breach of HQ or ELCR does not necessarily mean that there is a high risk of adverse health effects or that they are imminent, rather it indicates further investigation is warranted. Examples of further investigation may include:

- Refinement of the exposure assessment;
- Consideration of the dose-response curve that informs the toxicity reference value or slope factor / unit risk (steep curve indicates low tolerance for increase in dose); and
- Mode of Action of toxicity.

The results of the human health risk assessment can inform you of the risk profile:

- Who is most at risk, from what and by which pathway;
- What risk mitigation measures may be most effective in breaking the pollutant linkage; and

- Inform development of risk based criteria to manage exposure.

An example of guidance for HHRA in EIA is available from the Government of Alberta in Canada (Government of Alberta, 2011). The guidance recommends assessment of multiple scenarios in order to support comparison of the potential project impacts against existing conditions and future plans. This includes risk assessment of four scenarios:

- Baseline environmental conditions (e.g. soil, air, water) (baseline case);
- Potential project impacts in addition to known baseline conditions (application case);
- Potential risks associated with the project in combination with other existing and approved projects and other reasonably foreseeable future activities in the region (planned development case); and
- Potential project impacts alone.

The results are then discussed in terms of relevance with regard to regulatory requirements (e.g. permitting) and development of project plans (e.g. risk mitigation).

It is important also to remember the role of the human health risk assessment as a communication tool. The results of the assessment inform decision making processes and the information contained within can be utilised to discuss those aspects considered to potentially impact on health as well as those perceived to impact on health. For example, where there may be general fears of cancer risks from exposure to certain pollutants that are not considered to be carcinogenic by the scientific community, risk assessment may be an opportunity to address those fears and support consideration of relevant health impacts).

Risk based environmental limits derivation

Approaches to developing risk based criteria for management of environmental emissions have been documented by a number of organisations and government bodies in Europe (e.g., EU, The Netherlands, and The UK). Examples of the use of risk based methods for environmental permitting are discussed in Section 9.3.

4.3.2 Burden of disease

Another approach to the quantification of health impacts is calculation of the burden of disease. As with human health risk assessment the quantification component of the assessment may be one portion of a wider health impact assessment addressing multiple impacts from a particular installation or plan. It is also noted that these methods have often been used to indicate negative impacts of an installation (Scott Wilson 2011, EPA, 2013) although predictive methods have also been used to assess the positive impacts of a policy or community gain action. For example Cordioli et al (2013) published preliminary results of work comparing predicted health impacts on a local community from emissions of a proposed incinerator, with those of the proposed incinerator with a district heating plan.

Health adjusted life year (Disability-adjusted life year / Quality adjusted life year)

Disability adjusted life year (DALYs) and quality adjusted life year (QALYs) express health in terms of life years and give a weight to years lived with a disease. The difference between a DALY and a QALY depends on whether the quality of life is expressed as a loss (DALY) or a gain (QALY). The DALY approach is discussed a little further below.

The disability-adjusted life year (DALY) is a summary measure of population health widely used in disease burden assessment studies and cost-utility analyses (Murray and Lopez, 1996; Lopez et al., 2006). It is a tool that can be used in HIA (e.g. Swedish Institute for Public Health) and has been used by the WHO to assess disease burden associated with environmental exposures and in the development of guidelines such as drinking water criteria for non-threshold agents (e.g. carcinogens, microbial exposure).

The basic principle of the DALY is to weigh each health effect for severity multiplied by the duration of the effect and number of people affected by the outcome. Disability weights have been assigned such as:

- Healthy person = 0.0;
- Death = 1.0;
- Disorder. Examples such as:
  - Quadriplegia = 0.90;
  - Major depressive disorder = 0.35; and
  - Deafness = 0.33.

The result is an estimate of the burden of disease attributable to a particular agent. DALYs represent the incident number of healthy life years lost due to disease or disability, and do so by incorporating non-fatal and fatal health outcomes, calculated as the years of life lived with disability (YLD) and the years of life lost due to premature death (YLL), respectively.

The advantages associated with the DALY / QALY approach is that it can aggregate health losses associated with various health indicators across levels of populations. It allows an understanding of the nature and magnitude of the adverse health effect and a comparison of impacts of health effects stemming from very different physiological processes. By comparison, most risk measures such as HHRA are based on probability of an adverse health effect due to exposure to a specific chemical / radiation and do not allow for comparison of impact of different health effects beyond those associated with a toxicological health effect.

However there are disadvantages associated with the DALY / QALY approach largely associated with availability of epidemiological data and availability of severity weights and durations.

CAFE and COMEAP methods

The burden of disease associated with air quality has been extensively studied by the European Commission's Clean Air for Europe (CAFE) Programme. The UK Department of Health Committee on the Medical Effects of Air Pollutants (COMEAP) has also reported methods of quantification of health effects from predicted pollutant concentrations.

The basic premise of quantification lies in exposure response functions which link health effects with a particular pollutant in air. For example COMEAP have derived an ERF for a 1 µg / m^3 rise in NO_2 concentration may increase the rate of health events (e.g. respiratory hospital admissions) by 0.038%.

This type of assessment has been used in EIA type environmental assessments to:

- Allow visual comparison of likely air quality impacts against potential increased health effects based on air modelling data and background health status (a similar approach used in the Netherlands with the DALYs approach); and
- Consideration of the lifecycle of a facility in terms of additional health cases e.g. number of years before one health incident is likely to occur versus number of cases over 30 years.

References to methods used include COMEAP (1998), COMEAP (2009), COMEAP (2010), and AEA Technology (2005).

4.3.3 Available National Guidance for Quantitative Risk Assessment Methods

The following is a brief summary of some of the examples of national and international level guidelines available in relation to environmental health risk assessment methods. Given the volume of guidelines and supporting documentation available, the information presented in Table 2 gives an indication of the types of information available, but does not constitute all guidelines available from an individual country.

In some countries there are multiple sources of guidelines relating to quantitative risk assessment, while in others a single guideline has been developed to support multiple objectives. In a number of countries guidance has evolved from initial programmes to support management of contaminated land sites and / or to

meet chemicals management regulations. The United States EPA is the highest single organisation contributor to national level guidelines, with a large number of documents made available to health risk assessment practitioners.

In addition to national or federal guidelines, a number of member states in the US, Canada and Australia have also developed guidelines specifically for their jurisdiction. An example of state guidelines for HHRA in EIA have been produced by the Government of Alberta in Canada (Government of Alberta, 2011). The guidance recommends assessment of multiple scenarios in order to support comparison of the potential project impacts against existing conditions and future plans. This includes risk assessment of four scenarios:

- Baseline environmental conditions (e.g. soil, air, water) (baseline case);
- Potential project impacts in addition to known baseline conditions (application case);
- Potential risks associated with the project in combination with other existing and approved projects and other reasonably foreseeable future activities in the region (planned development case); and
- Potential project impacts alone.

The results are then discussed in terms of relevance with regard to regulatory requirements (e.g. permitting) and development of project plans (e.g. risk mitigation).

Table 2: Summary of national guidelines available for Environmental Health Risk Assessment

Country	Author	Objectives	Year	Key concepts addressed
UK	Environment Agency	Contaminated Land	Multiple	Human health risk assessment of contaminants in soil; contaminants in soil – toxicological data and intake values for humans; various toxicological reports to support soil guideline values; various scientific reports to support exposure model development (e.g. vapour intrusion, building parameters, chemico-physical parameters of key chemicals)
	Public Health England (via Committee on Carcinogenicity, COMEAP etc)	Varied – carcinogenic risk assessment for chemicals, burden of disease approaches to air pollution	Multiple	Risk assessment of mixtures of chemical carcinogens, use of biomarkers in carcinogenic risk assessment, a strategy for chemical risk assessment of chemical carcinogens, assessment of specific chemicals, specific industries.
Scotland/Northern Ireland	SNIFFER	General guidance to support contaminated land, permitting and provide clarification on the origins of regulatory criteria protective of human health	2007	Approach to risk assessment, guidance for assessing risk including definition of legislative context, hazard identification, hazard assessment, risk estimation, risk management, generic and detailed quantitative risk assessment, uncertainty, cost-benefit, risk communication, wider regulatory requirements.
France	National Institute for Industrial Environment and Risks (INERIS) at request of the Ministry of Ecology, Sustainable Development and Energy.	Comprehensive guidance focusing on assessment of health risks from industrial chemical emissions	2013	Guidelines specifically to address risks to human health posed by industrial installations. Assessment of the installation – inventory and description of sources, quantitative review of flow, compliance audits, assessment of routes of exposure including local population and other health impact studies, selection of substances, conceptual model. Consideration of local environment, evaluation of degradation due to the installation and future emissions, new and existing installations, where the process should be pursued/stopped, prospective health risk evaluation methodology (e.g. HHRA), attributable risk and the local environment, requirements for authorisation, communication.
Canada	Health Canada	Contaminated Sites	2010, 2012	7 part guidelines including general human health risk assessment, toxicological reference values, peer review guidelines, spreadsheet tools, detailed quantitative risk

Country	Author	Objectives	Year	Key concepts addressed
				assessment for chemicals and radiation, guidance for soil vapour intrusion and supplemental guidelines on peer review, developing contract statement of work and risk assessment for country foods.
		EIA	2010	EIA guidelines address air quality, contamination of country foods, drinking and recreational water quality, radiological effects, EMF, noise, human health risk assessment and risk management, federal air, water and soil quality guidelines, toxicology, first nations and inuit health.
United States	Multiple national guidelines, significant contributor: US EPA	Multiple – originally developed as a result of contaminated land risk management but has since grown to include methodologies to support decisions on food, drinking water, industrial emissions and industrial chemicals.	Multiple	Multiple guidelines available which include (but are not limited to): Risk Assessment Guidelines (RAGS), carcinogen risk assessment, chemical mixtures, neurotoxicity, reproductive toxicity, exposure assessment, developmental toxicity, mutagenicity, cumulative risk, radiation, environmental exposures to children, bioavailability of metals in soils, biokinetic model for lead in children, dosimitery based cumulative risk assessment, relative potency factor approaches for polycyclic aromatic hydroarbons.
Australia	enHealth via Department of Health	Guidance to be applied for any environmental health risk assessment scenario (e.g. air quality, contaminated land, EIA, food).	2012	Problem formulation, Hazard identification, Dose response assessment, Exposure assessment, Risk characterisation Community engagement, Review of risk assessments, Data collection, Evaluation of toxicity data, Epidemiological data, Assessment of carcinogens, Multiple routes of exposure, Exposure modelling (deterministic and probabilistic), Biomonitoring, Microbiological, Route specific, Regulatory context. Also available are the Australian exposure factor guide, 2012 and route/scenario specific guidelines such as clandestine drug laboratories, air, water.

4.4 Health Impact Assessment Methods

A Human Health Risk Assessment is a narrow defined assessment of health effects resulting from chemical exposure. It cannot be used to address wider social determinants of health. These broader health issues can be considered in a separate Health Impact Assessment (HIA), Social Impact Assessment (SIA) or integrated into a health component of a Strategic Environmental Assessment (SEA) or Environmental Impact Assessment (EIA).

Common objectives of HIAs conducted in Europe (WHO, 2007) include:

- Maximise health gain or minimise health loss;
- Tackle health inequalities;
- Raise awareness among decision-makers of the relationship between health and the physical, social and economic environment;
- Help decision-makers identify and assess potential health consequences and optimise overall outcome of a decision; and
- Help those affected by policies to participate in policy formulation and contribute to decision making.

4.4.1 Health Impact Assessment Steps

HIA is defined within the Gothenburg Consensus (ECHP, 1999) as:

> *'A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population'*

Kemm (2013) states that HIA has two essential features:

- It seeks to predict the future consequences for health of possible decisions; and
- It seeks to inform decision making.

The HIA should describe impacts of a project or plan in terms of:

- The nature of the impacts (e.g. physical, social, mental – both positive and negative);
- The direction of the change (increased or decreased);
- The magnitude of change; and
- Distribution of impact (e.g. equality of distribution).

Similarly to HHRA, HIA may be undertaken in a tiered approach, depending on the level of detail required. The HIA process consists of a series of steps as outlined by the Institute for Public Health (IPH, 2009) and adapted in Figure 2. These have been summarised in Table 3.

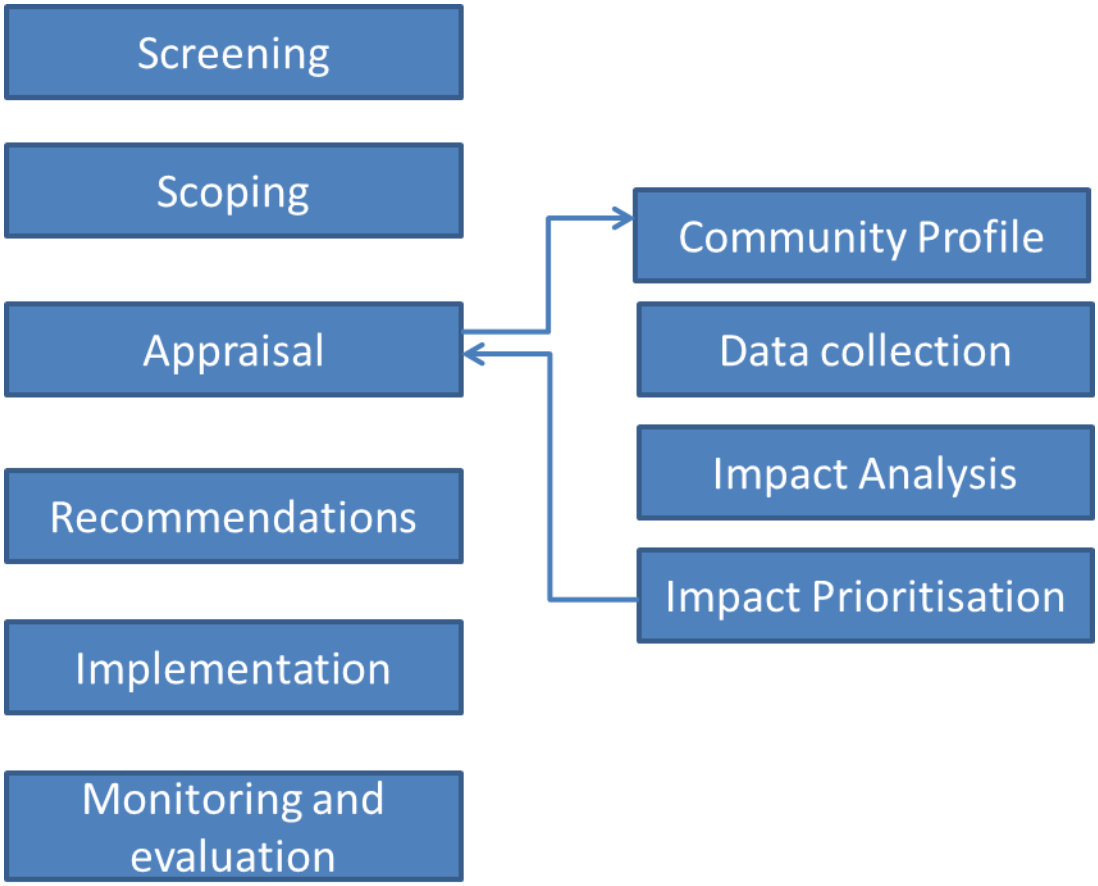

Figure 2: The HIA Process (adapted from IPH 2009)

Table 3: Summary of steps in HIA process

Step	Description	Methodology	Outcome
Screening	Assess project / plan for: ■ Impacts to health; and ■ Vulnerable members of population.	Use of a screening tool (e.g. IPH 2009)	Identify if HIA is required / appropriate
Scoping	Identifying following criteria: ■ Aims and objectives of HIA; ■ Boundaries / non-negotiable issues; ■ Resources and information sources; and ■ Health impacts and / or population group to be assessed based on screening outcome.	■ Establishment of steering group; and ■ Develop work plan based on criteria identified.	A clear and transparent framework for the proposed HIA
Appraisal	Data collection of: ■ Community profile; ■ Policy analysis; ■ Literature review for health impacts; and ■ Stakeholder information.	Use of tools such as: ■ Belfast Healthy Cities Community Profile Tools; and ■ Policy analysis tools (IPH 2009).	Causal map and / or robust problem formulation step identifying key impacts , receptors and assessment objectives (e.g. legislation / policy / imitative)
	Prioritising potential health impacts: ■ Likelihood (likely, possible, unlikely); ■ Scale (severe, moderate, minimal); ■ Number of people (many, few); ■ Timescale (short, medium, long term); ■ Distribution (equity); and ■ Specific stakeholder concern.	Evidence based assessment of impact (e.g. OECD 2013 'Guidelines on measuring subjective well-being').	Impact prioritisation
Recommendations	Develop recommendations to maximise health gain or minimise health loss	Consideration of : ■ Practicability; ■ Roles and responsibilities; ■ Timeframes; and ■ Cost efficacy.	HIA may be presented in a report at this stage. Relevant authorities are aware of health impacts and actions required to support / mitigate effect.
Monitoring and evaluation	Assess efficacy of the HIA	Assess how HIA was undertaken using established review methods (IPH 2009, Ben Cave, 2009).	Final HIA report prepared describing the process, findings and plan / project revision options for decision makers.

4.4.2 Identification of Health Indicators

While there are a large number of HIA that focus primarily on social determinants of health, both physical and non-physical health impacts may be addressed within a HIA. An area of concern amongst individuals who were less familiar with HIA techniques is centred on the role of social determinants of health (IMP3, 2006; WHO, 2007). In particular throughout this project stakeholders expressed concerns about:

- Identifying indicators for social determinants of health that are scientifically robust and may be utilised within a formal legislative forum such as EIA and / or licensing processes;
- How to apply such indicators – i.e. availability of verified quantitative methods or reliability of qualitative methods;
- Identifying boundaries relating to health for a specific project:
  - Creating equity in assessment methods from one project to another; and
  - Ensuring consideration of health is proportionate and reasonable reflection of the project or plans potential impact; and
- Identifying the assessment population.

The following section discusses opportunities to address these concerns by way of examining available guidance and resources. The core key questions asked within HIA include:

- What health indicators may be affected by a proposed project?
- How may we judge the magnitude, direction and distribution of the change?

A frequent concern appears to be that the use of social health determinants relies solely on subjective considerations of well-being. However this does not reflect that the majority of social health determinants are not subjective (e.g. links between fuel poverty and respiratory illness) and a large amount of evidence is available to support an assessment if an action is likely to cause impact. The concern is possibly associated with a perception that it is harder to quantify the impact on social health determinants than those of physical health effects.

It is important to note that methods of addressing subjective health matters are available. Recently, the OECD has published a guidance document on how to assess subjective well-being. It is intended to provide guidance on designing, collecting, publishing and interpreting measures of subjective well-being (OECD, 2013).

There are a wide range of international and national guidance and best practice documents on HIA that present examples of appropriate health determinants and how to assess potential impacts, with many listed in Section 13.0.

An example of a local resource available is the Belfast City Council (BCC) toolkit for health indicators developed as part of the WHO Healthy Cities programme (Ireson, 2011). The toolkit is intended for regeneration projects; however the health indicators are applicable in many development situations. There are four main domains in the indicator set comprising economic, social, environmental and access indicators.

In addition BCC developed a baseline set of indicators, which will indicate the health and socio-economic status of the community or population, and, when looked at together with indicators from the four main domains, will facilitate the impact assessment.

Another example of the use of social health determinants within a planning perspective is that of the Bristol Quality of Life survey. The survey is now in its thirteenth year and provides information to support the Local Authority and inform the public on issues on such as health and general well-being, sustainability, environment, leisure and culture, transport, education, employment, safety, health and social care. The

survey assists Bristol City Council identify where changes are occurring both positive and negative. A similar survey had been undertaken in Galway as part of the WHO Healthy Cities programme.

Often a causality map is used to demonstrate the range of impacts that may be associated with a proposed change. The map may not indicate the dimensions of the impact but assist in giving a whole view of where positive and negative impacts may occur within a project lifecycle.

The map in Figure 3 reproduced from the International Council for Mining and Minerals (ICMM, 2010) best practice guidance on HIA for the construction phase of a mine. The map does reflect issues that may not be likely to arise in an Irish setting (i.e. infectious diseases such as malaria) but many of the core issues are the same. For example, the construction phase of such a project will likely bring an increase in numbers of young males to the area. Many HIA completed for mines in Canada highlight this as having potential to result in increased alcohol and drug use in settlement areas. It also highlights those areas where pressures on amenities may occur. Promises of job opportunities may not come to fruition if the skills required are not matched by the local demographic and the associated health benefits may never be realised.

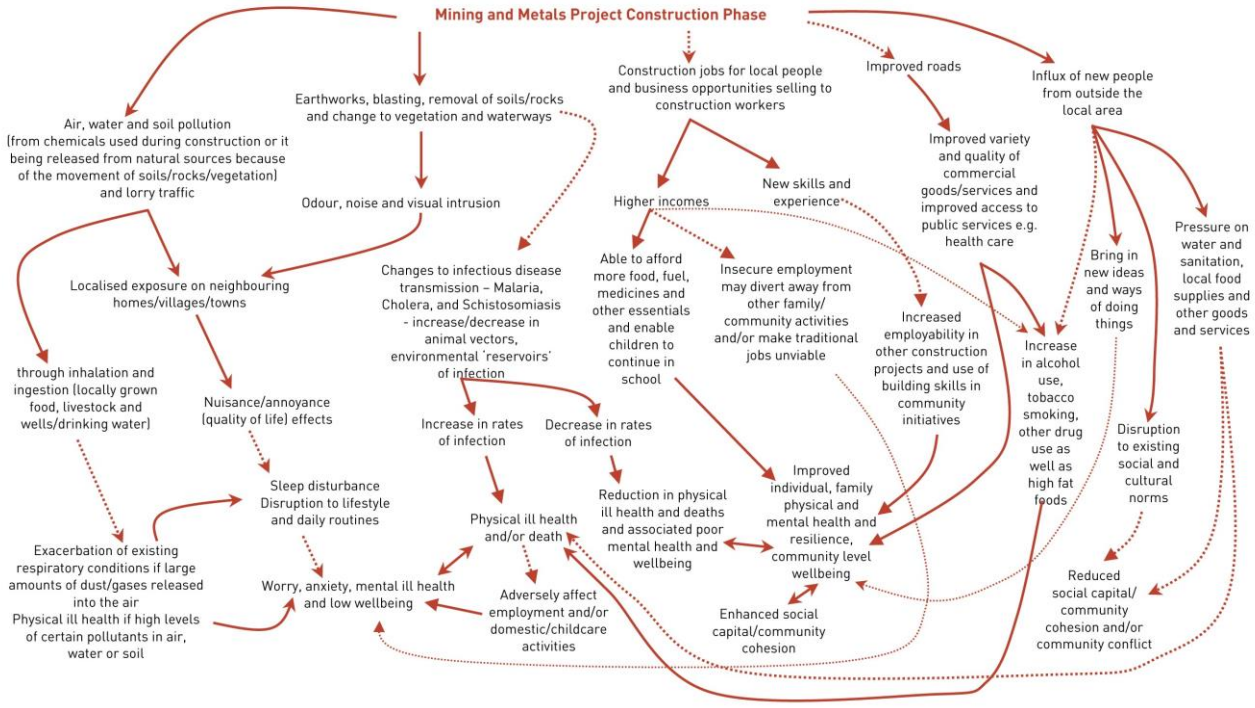

Figure 3: International Council on Mining and Minerals, Best Practice Guidance Health Impact Assessment (ICMM, 2010)

The causal map above makes note of potential exposure pathways which may not be included in generic environmental limit values.

To consider the whole life-cycle of the mine would also require considering effects during operations and following mine-closure when new sets of issues may arise – in the latter these may be associated with loss of employment and associated impacts on local businesses, geochemical changes in rebounding groundwater, potential adverse conditions associated with long term waste management facilities and ensuring any surface contamination issues are closed out appropriately.

4.4.3 Approaches to Assessing Health Impacts

In order to assess how an indicator of health is likely to be affected by a proposed plan or programme there is a need to identify an objective and / or target for the effect. In all cases this should be supported by scientific evidence.

Typical sources for identifying health objectives include:

- National and Regional environment and health policies, legislation and regulations (e.g. Healthy Ireland, Environmental Quality Standards);
- Local Area environment and health objectives (e.g. obesity / mental health / respiratory disease prevalence, air, surface water quality); and
- Significant issues within the community profile identifying key health indicators (positive and negative).

Both quantitative and qualitative approaches to assessing impacts to health are available however qualitative approaches are more common. There are a number of quantitative methods available in relation to HIA including burden of disease approaches discussed earlier, models for assessing effects of lifestyle changes e.g. PREVENT / Simsmoke and assessment of impacts of environmental changes e.g. ARMAD.

However there are implications for using models in HIA. In particular, the use of a model constrains the data set that may be used. Care should be used when employing models as the limitations and assumption may bias an answer such that the outcome is less robust than if a simple qualitative mechanism had been employed. This is particularly a concern where a limited dataset is available. Any quantitative result should be brought into context by the HIA such that its impact on the population is discussed. Often it is good practice to do both quantitative and qualitative assessment in order to reality check. The use of models is also only appropriate where it is matched by the objective of the HIA, relying solely on modelling methods will reduce the human aspect of HIA where the process is used as an opportunity to embrace stakeholder engagement.

HIA is most frequently assessed using qualitative methods comparing significance against likelihood to prioritise potential impacts. Impacts can be described in terms of magnitude (major, minor, negligible / positive, no effect, negative / ++ 0 --), timing (short, medium, long term). This qualitative description is not unlike similar methods used within existing approaches such the guidance for Environmental Liability Risk Assessments (EPA, 2006).

Winkler et al (Winkler, 2010) present a two-step qualitative methodology for assessing health impacts in environmental assessment, as summarised in Table 4 and Table 5 below.

Table 4: Step 1: Rate consequence for extent, intensity, duration and effect

	Consequence			
	A. Extent	**B. Intensity**	**C. Duration**	**D. Effect**
Low (0)	Rare	Barely noticed	<1 month	Not perceptible
Medium (1)	Local, small, limited, small number of households	Impacted will be able to adapt and maintain pre-impact health levels	1 to 12 months	Annoyance, minor injuries or illness that do not require hospitalisations
High (2)	Project area beyond neighbourhood	Will be able to adapt but will need support to maintain pre-impact levels	1 to 4 years	Moderate injury or illness that may require hospitalization
Very High (3)	Extends beyond project area	Will not adapt	>4 years	Loss of life, sever injuries, chronic illness that may require hospitalisation

Table 5: Step 2: Prioritise Impacts

Impact Severity A+B+C+D	Likelihood			
	Improbable (<40%)	Possible (40-70%)	Probable (70-90%)	Definite (90-100%)
Low (0-3)	Low	Low	Low	Medium
Medium (4-6)	Low	Medium	Medium	High
High (7-9)	Medium	High	High	Very High
Very High (10-12)	Medium	Very High	Very High	Very High

As such where a health impact affects a project area (A=2) but is something that will be adaptable to (B=1) is of short duration (C = 0) and results in annoyance only (D=1) the impact severity is 4. If the likelihood of this occurring is definite then it ranks High whereas if it is improbably the impact ranks Low.

4.4.4 HIA Guidelines

As HIA is a broad ranging topic, there are a wide variety of examples of guidance. In particular it is noted that there is a greater amount of industry specific guidance available on conducting HIA than for Human Health Risk Assessment e.g. waste management, mining, oil and gas.

Guidance is also available for specific stages of the HIA process such as screening and scoping stages, policy analysis and identification of health determinants. Notably guidance is also available for an Irish context (IPH, 2009). The Institute for Public Health have also provided training to a number of stakeholders who may be involved in environmental assessments and licensing, however a number of participants noted that while they found it informative it was often difficult to relate how it may be used within their particular area. There may be value in tailoring training for regulatory staff within the context of specific job roles.

Table 6 below provides of examples of national level guidelines available in relation to Health Impact Assessment methods. Given the large quantity of guidelines available, the information included below are examples of types of guidelines available that have varying objectives such as:

- General guidelines at national or state level;
- Support for EIA and industry specific projects;
- Guidelines to address health inequities; and
- Support for policy development.

In addition to national or federal level guidelines there is a substantial amount of guidance available at state/local authority levels or by interested academic or non-government organisations. This is particularly observed within the UK, Australia, Canada and the United States. These guidelines often address specific local aspects or are intended to provide clarification on expectations from decision makers within the local/state context.

It should be noted that, whilst not summarised here, there is also a wide variety of guidelines available that have been developed at international standard (e.g. WHO, IFC), by industry (ICMM) and by non-government organisations.

Table 6: Summary of national guidelines available for Health Impact Assessment and health integrated into Environmental Assessment

Country	Author	Objectives	Year	Key concepts addressed
Ireland	Institute for Public Health	Practical guideline explaining HIA and the stages involved in conducting an assessment.	2009	Definition of health, basis, aims and values of HIA, integrated assessment, issues to consider such as support, understanding of health, timing, proportionality, HIA process including screening, scoping and policy tools. IPH provide additional documentation, policy context and evidence based data via the HealthWell portal.
UK	Department of Health	Policy	2010	Cross government approach, what is HIA and roles, process to undertaking a HIA. Evidence bases for HIA including statistics and epidemiological data, published reports, research studies and grey literature, qualitative information, matrix of available evidence.
		Multiple project and policy guidelines at local, national and international level via the HIA Gateway, notably draft document relating to Health in SEA	2007	Draft document for consultation, outlining principals of SEA, consideration of the populations health in SEA (direct and indirect effects, health topics and evidence, organisations to contribute to health in SEA). Stages of the SEA process. The HIA Gateway also runs a short course on health in SEA.
Wales	Welsh Health Impact Assessment Support Unit (Welsh Assembly Government)	General guidance for improving health and reducing inequalities.	2004	Practical guide that outlines five stages of HIA screening, scoping, assessment, reporting and monitoring. Includes checklists for relevant health and well-being determinants and vulnerable population groups. HIA screening and appraisal tools and further resources are also included.
		Industry specific guidance also available for open cast mining (2011), housing and health evidence (2014)	Multiple	Outlines the process including screening, scoping, establishing a steering group, public participation, assessment and evidence bases particular to the industry. These include physical environmental impacts, amenity, severance and social capital, mental health and wellbeing amongst others.
Sweden	Swedish national institute for public health (now part of the Public Health Agency	Multiple guidelines addressing different areas relevant to HIA.	Multiple	Focussing on Health – the health matrix (undated); General guidelines 'The five steps' undated. Checklist for HIA (undated). Quantitative methods in HIA using the QALY/DALY approach (2014); HIA guidelines for physical planning case study (2008). Consideration of health aspects in EIA for roads (2001). A guide to HIA focusing on social and environmental sustainability (2005).

Country	Author	Objectives	Year	Key concepts addressed
Canada	Health Canada	A four volume handbook presenting requirements to incorporate the assessment of health into environmental assessment, now archived.	2004	Volume 1: definition of health, stages in environmental assessment, health indicators, environmental assessment in Canada, Aboriginal health, international environmental assessment, forging ahead Volume 2: Approaches and decision making: sustainable development and health, analysing health risk data, risk management tools, public health notices and interventions, communication and credibility Volume 3: Multidisciplinary team: social impact assessment, economic appraisal, environmental epidemiology and HIA, worker health, food issues in EIA, Volume 4: Health impacts by sector – energy, transportation and communication, forestry, mining, agriculture, waste management, wastewater and sludge management, manufacturing industries.
United States	US EPA	A review of HIA practices in the US focussing on four sectors that the US EPA have identified as target areas for empowering communities to move toward more sustainable states.	2013	Review of HIA for transportation, housing/building/structures, land use and waste management/site revitalisation. Organisations involved, funding sources, types of community level decisions, data, tools and models, methods of stakeholder engagement, pathways and endpoints, characterisation of impacts, defensibility and effectiveness, minimum elements , areas for improvement and best practices. The review identified areas that may benefit from enhanced guidance. Additional case studies where the EPA have been involved are also presented on the US EPA website.
	Centre for Disease Control and National Research Council	Multiple guidelines as part of the Healthy Places programme. Some guidance referenced has been prepared by other government and/or non-government organisations	Multiple	Guidelines for methodology including: tracing data for HIA, parks and trails HIA toolkits, transportation HIA toolkits, minimum standards for HIA (PEW charitable trust). Links to HIA free online training run by the American Planning Association. NRC has published a guideline on the role of HIA in improving health in the US (Policy orientated).

Country	Author	Objectives	Year	Key concepts addressed
Australia	Federal, Department of Health	Guidelines that aim to promote and enhance the incorporation of HIA into environmental and planning impact assessment.	2001	Principles of HIA, Process including community consultation, project description, screening, scoping, profiling, identification of relevant health determinants and vulnerable members of the population, assessment of health impacts (quantitative and qualitative methods), management of health impacts, decision making. Roles and responsibilities. Preparation of health impact statements including details of the proponent, development, affected communities, environmental health data, social impacts, economic impacts and overall assessment of health impact.
New Zealand	Ministry of Health	Multiple guidelines and case studies. 2005 guidelines aimed at both policy and projects.	Variable	2005 guidelines outlining who and when HIA should be undertaken, definition of health (Te Whare Tapa Wha model), identification of health determinants and outcomes, health inequalities, process of undertaking HIA – screening, scoping, methods for appraisal Case studies for HIA used in urban planning, water enhancement schemes,
Thailand	Department of Health, Ministry of Public Health	Multiple guidelines – project EHIA, industry specific HIA	Multiple	EHIA guidelines for projects, HIA guidelines for water resource development, mining, Mekong river projects, energy, climate change adaptation. The 2012 EIA guidelines identify human use values (drinking/domestic water, transport, electricity, energy, flood control/drainage, industry, mining, recreation, landuse) and quality of life (socio-economic, health including sickness rate, infectious disease, occupational health, historical sites, recreational value). Industry specific HIA guidelines outline frameworks for HIA that include identification of specific health determinants relating to environment, social and public services.

4.5 Strengths and Weaknesses of Health Assessment Methods

As discussed earlier, taking an environmental limit value approach to managing environmental emissions is likely appropriate in a large number of facilities. However there are those where the application of such limits may narrow the viewpoint of health such that particular elements go unassessed.

As with all assessments Human Health Risk Assessment and other quantitative risk assessment methods (QRA) are subject to limitations, assumptions and uncertainty. It is important that this is discussed in full such that those relying on the information can understand the boundaries of the assessment.

Uncertainty is ubiquitous throughout the risk assessment process, examples include:

- Obtaining representative environmental media sampling methods;
- Deviation in laboratory analysis;
- Assumptions and limitations of fate and transport modelling;
- Uncertainty factors within toxicity reference value generation; and
- Assumptions within exposure assessment.

The strength of a quantitative risk assessment, such as Human Health Risk Assessment, is in its ability to inform. It can provide a systematic approach to prioritising potential hazards associated with a facility. It is an internationally recognised approach to addressing human health risks and as such may give confidence to the local community that their physical health concerns are being addressed.

Where quantitative risk assessment is undertaken the assumptions, limitations and uncertainties should be discussed in full so as to ensure relevant stakeholders are supplied with sufficient information to understand the context of the report. It is also important to have a clear understanding of the objectives that frame the assessment. Often the purpose is to provide information on the potential for a change to the health status of a community resulting from the development of a project / plan, and in some cases the objective of the assessment may be to address a very specific component of an environmental impact. In this scenario QRA are not generally developed such that they identify vulnerable members of the population or address existing inequalities in health in a community, rather it discusses health from the perspective of the likelihood of additional burden. Information provided will primarily indicate who will be affected, by what chemical / radiation, in which pathway and to what degree of magnitude. However guidance from some countries/states include consideration of vulnerable sub-populations within a QRA (Government of Alberta, 2011).

It is for this reason it is important to ensure that the objectives, limitations and assumptions of the QRA are fully understood and that while QRA gives a quantitative approach to considering risks to health, it informs rather than provides the final decision.

There are limitations to the effectiveness of some quantitative risk assessment. Often an individual preparing a Human Health Risk Assessment report will have a different skill set to others who may be engaged to prepare a summary of background health and social conditions of a community, if such information is being included within an overall EIA. As such chapters of EIAs have been prepared that present findings of a HHRA for pollutants discussing entirely different health end points to the baseline health status reported for the local community. The results are not often discussed with relevance to each other; rather if a risk is identified then some mitigation measure is discussed. A reliance on engineering to prevent a health effect may not always provide comfort to the general public if the discussion on health is not clear.

In some countries regulations require that it is not the role of a health assessment in EIA to address existing health inequalities in the community. Rather, the assessment is to inform a health authority of the likely source, pathway and receptor of potential environmental impacts in order to inform their professional assessment of impacts from the proposed facility on the local community.

Some of the key strengths of a Health Impact Assessment are those that directly meet the weaknesses of a Human Health Risk Assessment. Greater consideration is given to understanding the existing community profile and health status. In addition public engagement is typically encouraged and facilitated from the start of the process. A Health Impact Assessment can provide a more comprehensive causal map of potential health impacts both positive and negative, where elsewhere a quantitative risk assessment may only focus on negative physical impacts. However it is noted that some quantitative risk methods can be utilised to identify health benefits (Cordioli, 2012).

A HIA will only be as strong as the boundaries and scope set from the outset. If the HIA is not scoped appropriately or there are unreasonable expectations on what it can achieve then it may not be as effective as intended.

4.6 Skillsets Needed for Health Assessments

The definition and therefore skillset for assessment of health in an environmental context is very broad. It is a multi-disciplinary approach that requires input from a wide range of disciplines. Areas requiring a minimum level of understanding may include (but are not limited to):

- Sampling, analysis, fate and transport of chemicals within the environment;
- Quantitative exposure assessment methods;
- Epidemiology;
- Toxicology;
- Public Health;
- Impact Assessment Techniques;
- Community relations and stakeholder engagement; and
- Regulatory and policy analysis.

Depending on the scope, objectives and aims a health assessment may require some or all of these skills. John Kemm (WHO 2007) notes that the key requirements are ‘robust common sense, an ability to pull together disparate elements to form a big picture and a capacity to persuade different people to work in cooperation’.

This is an important aspect of health assessment in general – due to the separate nature of the skillsets involved in environmental assessment it is often seen that single chapters on a particular environmental aspect are conducted independently (e.g. air, groundwater, surface water, community engagement). This can result in adequate description of particular issues independently however the cumulative assessment of impacts is not undertaken in a holistic manner. The creation of chapters by different authors can result in a report where the outcome of assessments is not discussed in terms of overall impacts to existing community health.

It is also important to identify the roles and responsibilities of those involved in the preparation and appraisal of health assessments. Some stakeholders have raised concerns that that the existing health status of a community is not considered sufficiently by current EIA methods. However interpretation of existing health status of local communities by developers is also likely to pose questions regarding capacity to maintain confidential health data and impartiality. To that end some countries have decided that consideration of baseline health status of a community is to be considered by health professionals within local authorities/health authorities rather than the developer.

5.0 HEALTH IN EUROPEAN POLICY, LEGISLATION AND GUIDANCE AND BEYOND

5.1 Global Initiatives and Commitments

5.1.1 Rio political declaration on social determinants of health

The Rio Political Declaration on Social Determinants of Health was adopted during the World Conference on Social Determinants of Health on 21 October 2011, to which Ireland is a signatory. The declaration expresses global political commitment for the implementation of an approach to social determinants of health to reduce health inequities and to achieve other global priorities. It is intended to help build momentum within countries for the development of dedicated national action plans and strategies.

5.1.2 WHO Parma declaration on environment and health

The Parma Declaration on Environment and Health was endorsed by 53 Member States attending the Fifth Ministerial Conference in Parma, Italy in March 2010. The conference was organized by the WHO Regional Office for Europe. Through the Declaration and Commitment to Act, participating governments agreed to implement national programmes regarding key environment and health challenges such as:

- Health and environmental impacts of climate change;
- Health risks to children and other vulnerable groups posed by poor environmental, working and living conditions (especially the lack of water and sanitation);
- Socioeconomic and gender inequalities in the human environment and health, amplified by the financial crises;
- The burden of non-communicable disease in particular to the extent that it can be reduced through adequate policies in areas such as urban development, transport, food safety and nutrition, and living and working environments; and
- Concerns raised by persistent, endocrine-disrupting and bio-accumulating harmful chemicals and nano particles and by novel and emerging issues.

5.1.3 WHO Healthy Cities Programme

The primary goal of the WHO Healthy Cities Network is to put health high on the social, economic and political agenda of city governments. It is therefore targeted at local government level. The current theme, Phase V, includes consideration of healthy urban environment and design:

> *"A healthy city offers a physical and built environment that supports health, recreation and well-being, safety, social interaction, easy mobility, a sense of pride and cultural identity and that is accessible to the needs of all its citizens."*

In Ireland there are three WHO recognised Healthy Cities: Cork, Galway and Waterford. It is also noted that a number of other cities work to promote a healthy cities agenda such as Limerick and Dublin.

The Healthy Cities programme has already led to the use of health assessment tools such as HIA and the consideration of social determinants of health at local authority level in Ireland (e.g. Good for Regeneration, Good for Health, Good for Belfast, Belfast City Council et al, 2011), .

5.1.4 United Nations Economic Commission for Europe - ESPOO convention (EIA) and SEA protocol

The Espoo (Environmental Impact Assessment) Convention sets out obligations of signatories to assess the environmental impact of certain activities at an early stage of planning. It also lays down the general obligation of States regarding potentially significant adverse environmental impact across boundaries. The Convention was adopted in 1991 and entered into force on 10 September 1997.

The Kyiv (Strategic Environmental Assessment) Protocol requires signatories to evaluate the environmental consequences of their official draft plans and programmes. The Protocol was adopted by an extraordinary meeting of the Parties to the Espoo Convention, held on 21 May 2003 during the Ministerial 'Environment for Europe' Conference (Kyiv). The United Nations Economic Commission for Europe (UNECE) note that project EIAs do not typically adequately address potential impacts to health. The SEA Protocol attempts to redress this imbalance by placing a special emphasis on human health, in addition to considering typical environmental and physical effects. The scope and consideration of health assessment outlined in the protocol goes beyond existing EU legislation.

The protocol addresses the tendency for health assessment to focus on negative effects from physical environmental media, broadening it to consider both environmental and socio-economic determinants. The completion of health components of EIA or SEA by environmental or social scientists is noted as a limiting factor in addressing issues regarding health.

A resource manual published by the UNECE in December 2011 outlines methods and approaches to implementing the SEA Protocol. Guidance regarding the assessment of impacts on health is presented in Annex 1 and includes information on diseases and risks associated with the physical environment.

5.2 European Policy, Legislation and Guidelines

5.2.1 6 and proposed 7 EU environment action programme

The European Commission prepared a Final Assessment on the effectiveness of the 6th European Action Programme (Ecologic Institute, 2011). Overall it was considered that the 2004-2010 Environment and Health Action Plan helped to increase awareness and information on the linkages between environment and health. Comprehensive legislation was adopted in the areas of chemicals, pesticides and water and levels of SOx, NOx and lead in air have declined over the last nine years.

In regards to challenges, the 6th EAP found that issues surrounding chemical production and use, data on effects of chemical mixtures and particulate matter in urban areas continue to be causes for concern for human health. There are also a number of gaps in legislation such as in relation to indoor air and on emissions from domestic and commercial appliances.

The 6th EAP expired in July 2012 and following on from this the Commission has proposed a successor Programme. The 7th EU Environment Action Programme 'Living Well within the Limits of Our Planet' has set out a proposal for the Commissions vision for where it wants the EU to be by 2050.

> *'In 2050, we live well, within the planets ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed in ways that enhance our society's resilience. Our low carbon growth has long been decoupled from resource use, setting the pace for a global sustainable economy.'*

In order to achieve this, the Commission has proposed nine priority objectives. Health forms one of three thematic priority objectives, with the intention to '*safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing*'. The Programme is intended to ensure that by 2020:

- Air quality in the EU has significantly improved;
- Noise pollution in the EU has significantly decreased;
- Citizens throughout the EU benefit from high standards for safe drinking and bathing water, with a specific consideration of small water providers;
- The combination effects of chemicals and safety concerns related to endocrine disruptors are effectively addressed, and risks for the environment and health associated with the use of hazardous substances including chemicals in products is assessed and minimised;
- Safety concerns relating to nanomaterial's are effectively addressed as part of a coherent approach across different legislation; and

- Decisive progress is made in adapting to climate change impacts.

In addition monitoring measures are proposed to be developed in coordination with stakeholders to assess the contribution of resource efficiency measures to prosperity and well-being.

5.2.2 EU Strategic Environmental Assessment Directive

The Strategic Environmental Assessment (SEA) Directive applies to a wide range of public plans and programmes (e.g. on land use, transport, energy, waste, agriculture). SEA is mandatory for plans / programmes which:

- are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste / water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive. or
- have been determined to require an assessment under the Habitats Directive.

Figure 4 outlines the hierarchy between SEA and EIA as adapted from the UK Environment Agency. While noted that it is a simplified approach to a more complex process, a key observation is that SEA may be utilised as a mechanism to highlight those environmental health aspects required at project specific level and as such inform the EIA process.

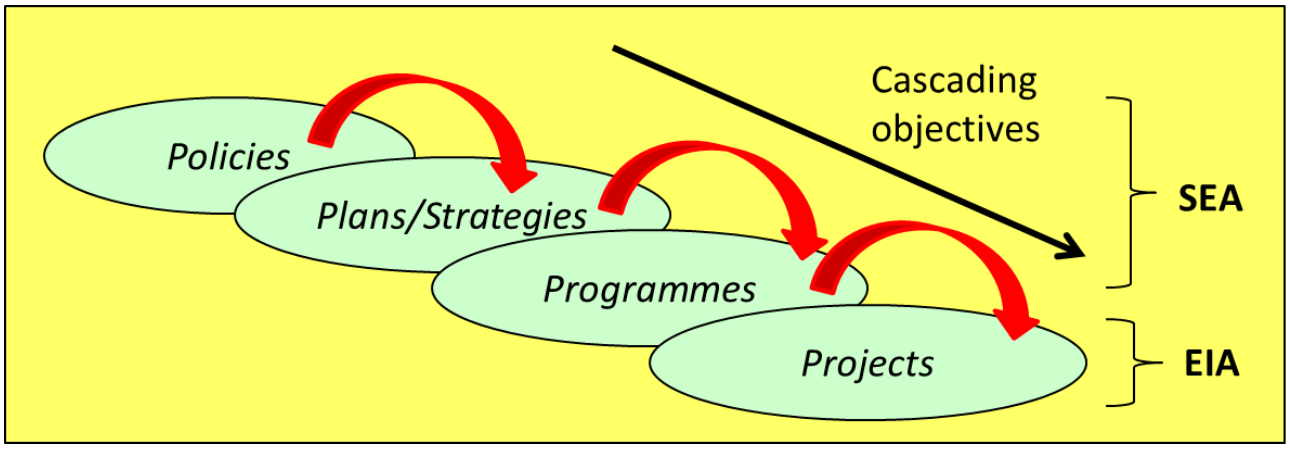

Figure 4: Hierarchy between SEA and EIA, adapted from UK Environment Agency

Regarding health within SEA, the Directive preamble outlines how Article 174 of the Treaty provides that Community policy on the environment is to contribute to, *inter alia*, the preservation, protection and improvement of the quality of the environment, the protection of *human health* and the prudent and rational utilisation of natural resources and that it is to be based on the precautionary principle.

Article 3 identifies plans and programmes where an environmental assessment should be carried out. The article requires that Member States shall take into account the criteria set out in Annex II which include:

- The characteristics of the plan or programme (e.g. degree of influence of the plan or programme or environmental problems relevant to the plan or programme, amongst others); and
- Characteristics of the effects and area likely to be affected (in particular risks to human health or the environment e.g. due to accidents, cumulative effects and trans-boundary effects)

Article 5 sets out the requirements associated with the environmental report. The information to be given for this purpose is referred to in Annex I and includes:

(e) The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;

(f) the likely significant effects on the environment, including on issues such as biodiversity, **population, human health,** fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the **interrelationship between the above factors**;

Article 6 of the Directive requires that both environmental authorities and the public must be given an "*early and effective"* opportunity to make submissions on the draft plan or programme and the accompanying Environmental Report before any final decision is made on the adoption of the plan or programme or its submission to the legislative procedure ("The public" includes organisations and individuals).

EU guidance on SEA

EU guidance on the implementation of the SEA Directive is presented in 'Implementation of Directive 2001 / 42 on the assessment of the effects of certain plans and programmes on the environment' (DG Environment, 2001). The definition of health is not explicitly described, nor is a list of potential health determinants described in as much detail as in EU guidance for EIA.

The guidance states that:

- The list of issues in (f) is not exhaustive and that other issues may be relevant;
- Compared with the EIA Directive, human health, biodiversity and cultural heritage are mentioned explicitly; and
- The notion of human health is to be considered in context of the other issues mentioned in paragraph (f) and as such environmentally related health issues such as exposure to traffic noise or air pollution are obvious aspects to study.

The guidance goes on to emphasise the need for broad and comprehensive information on the factors and their interrelationship. A description of positive effects is essential in order to show the contribution of the plan and programme to environmental protection and sustainable development.

While guidance on health at EU level is not very prescriptive, many national health documents have given a more in depth interpretation of the meaning of health in SEA as will be discussed in Section 6.2.

5.2.3 EU Environmental Impact Assessment Directive

The EIA Directive (85 / 337 / EEC) is in force since 1985. It was codified by 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 (13 December 2011). It applies to a wide range of public and private projects, which are defined in Annexes I and II:

- **Mandatory EIA**: all projects listed in Annex I are considered as having significant effects on the environment and require an EIA; and
- **Discretion of Member States (screening)**: for projects listed in Annex II, the national authorities have to decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds / criteria or a case by case examination. However, the national authorities must take into account the criteria laid down in Annex III.

Health is described in greater detail in the EIA Directive preamble than in the SEA Directive and refers to both personal health and well-being and contribution of the environment to quality of life.

Article 3 requires that an EIA shall identify, describe and assess the *'effects of a project on human beings and interaction between human beings and other factors described therein'*.

Article 4 outlines the requirement to assess a project against the selection criteria in Annex III. This includes direct reference to the absorption capacity of natural environment including areas in which EQS have already been exceeded and densely populated areas.

Article 5 requires a developer to supply information specified in Annex IV which includes a description on aspects, including, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.

EU guidance on EIA

There is guidance on health in EIA which aims to address what is considered by some (IMP3, 2006) as ambiguity on the definition and scope of health.

The European Commission 'Guidance on EIA Scoping' document (June 2001) outlines health by posing the question 'is the project likely to affect human or community health and welfare?' The topics considered relevant include:

- The quality or toxicity of air, water, foodstuffs and other products consumed by humans;
- Morbidity or mortality of individuals, communities or populations by exposure to pollution;
- Occurrence or distribution of disease vectors including insects;
- Vulnerability of individuals, communities or populations to disease;
- Individuals sense of personal security;
- Community cohesion and identity;
- Cultural identity and associations;
- Minority rights;
- Housing conditions;
- Employment and quality of employment; and
- Social institutions.

The determinants of health outlined above are not solely based on physical effects and do include consideration of social determinants of health. In addition assessment of vulnerable members of the population is also considered appropriate. However the EU Guidance is not mandatory and interpretation of health in EIA varies significantly across the EU.

5.2.4 EC health impact assessment guidelines

Health Impact Assessment in terms of plans or projects has not been legislated at EU level. However, most Commission initiatives must assess impacts of a policy to health. Health is incorporated in the Commission's impact assessment guidelines (EPHC, 2009), backed up by methodologies for health impact assessment (HIA) developed through the public health programme. This has three pillars – health is particularly mentioned under the social and environmental pillar.

5.2.5 Sectoral Environmental Directives

Figure 5 summarises current sectoral EU Environmental Directives and the implications for the assessment of health. Given the focus on licensing and permits, the Industrial Emissions Directive (IED) and the Framework Directive on Waste are discussed here in more detail.

The IED is a recast of 7 existing pieces of legislation and its aim is to reduce harmful industrial emissions across the EU. The IED entered into force on 6 January 2011 and must be transposed into national legislation by Member States by 7 January 2013. It replaces the following Directive definitively:

- With effect from 7 January 2014: Directive 78 / 176 / EEC on titanium dioxide industrial waste, Directive 82 / 883 / EEC on the surveillance and monitoring of titanium dioxide waste, Directive 92 / 112 / EEC on the reduction of titanium dioxide industrial waste, Directive 1999 / 13 / EC on reducing emissions of

volatile organic compounds (VOCs), Directive 2000 / 76 / EC on waste incineration, Directive 2008 / 1 / EC concerning integrated pollution prevention and control; and

- With effect from 1 January 2016: Directive 2001 / 80 / EC on the limitation of emissions of certain pollutants from large combustion plants.

The legislation was revised in order to simplify and clarify existing provisions and to build on communications of thematic strategies which set objectives to protect human health and the environment that would not be met without further reductions in emissions from industrial activities (Preamble 4).

The Directive considers human health within the definition of pollution and hazardous substances (Article 3):

(2) 'pollution means the direct or indirect introduction and as a result of human activity, of substances, vibrations, heat or noise into air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property or impair or interfere with amenities and other legitimate uses of the environment' (Article 3).

(18) Hazardous substances means substances or mixtures as defined in Article 3 of Regulation (EC)No1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.

Article 3 of Regulation (EC)No1272/2008 defines Hazardous substances as a substance which fulfills the criteria relating to physical hazards, health hazards or environmental hazards laid down in Parts 2 to 5 of Annex I of the Classification Labelling and Packaging regulations and classified in relation to their respective hazard classes provided for in that Annex. Guidance in relation to identifying and addressing hazardous substances is discussed further below.

(38) 'hazardous waste' means hazardous waste as defined in point 2 of Article 3 of Directive 2008/98/EC;

Article 3 of Directive 2008/98/EC states 'hazardous waste' means waste which displays one or more of the hazardous properties listed in Annex III; Those properties include acute risks to health such as (but not limited to) whether the waste is explosive, irritant, harmful and also potential for waste to be carcinogenic, mutagenic or reproductive toxicants.

As such the IED regulations are intended to consider the potential for health impacts associated with emissions from industrial facilities covered by these regulations.

The IED is based on the following principles:

- The integrated approach means that the permits must take into account the environmental performance of the plant including the generation or waste, use of materials, emissions to environmental media, energy efficiency, noise and prevention of accidents and restoration on closure.

  If the activity involves the use, production or release of hazardous substances that may impact on soil or groundwater, a baseline report must be prepared prior to operations. On closure, a site assessment is required to ensure there are no residual risks to human health or the environment. This may result in an increase in quantitative health risk assessments in the coming years;

- The permit conditions including emission limit values must be based on the Best Available Techniques (BAT). BAT conclusions shall be the reference for setting permit conditions;

- The IED contains certain elements of flexibility by allowing the licensing authorities to set less strict emission limit values in specific cases;

- The IED contains mandatory requirements on environmental inspections every 1 to 3 years, using risk based approach to the assessment of risk to health and the environment; and

- The Directive ensures that the public has a right to participate in the decision-making process, and to be informed of its consequences.

The Framework Directive on Waste 2008 / 98 / EC sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down waste management principles relating to health in Article 13. It requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.

With respect to waste permits, Member States shall require any establishment or undertaking intending to carry out waste treatment to obtain a permit from the competent authority. Such permits shall specify at least the following:

- The types and quantities of waste that may be treated;
- For each type of operation permitted, the technical and any other requirements relevant to the site concerned;
- The safety and precautionary measures to be taken;
- The method to be used for each type of operation;
- Such monitoring and control operations as may be necessary; and
- Such closure and after-care provisions as may be necessary.

The Waste Framework Directive requires that where relevant Member States shall lay down specific conditions for exemptions relating to hazardous waste, including types of activity, as well as any other necessary requirement for carrying out different forms of recovery and, where relevant, the limit values for the content of hazardous substances in the waste as well as the emission limit values.

As noted above, Article 3 of 2008 / 98 / EC defines hazardous waste as waste that displays one or more of the properties set out in Annex III. These include properties associated with health impacts that range from those that may pose health and safety risks such as explosive or flammable properties to those that may pose acute or chronic health risks such as irritants, sensitization, carcinogenic or mutagenic toxicants. As such consideration of potential health impacts is a requirement of the Directive.

EU Sectoral Guidance and Literature Pertaining to Health

There is a large amount of guidance and supporting documentation for the assessment of health impacts associated with Sectoral Directives intended to manage chemical exposure and/or exposure to pollution in the EU. As such, only a few of the more pertinent documents are discussed briefly below. It is noted that guidelines in relation to health aspects of Sectoral Directives are not always addressed in a standalone publication and may be addressed within or as part of a series of guideline documents or they may reference other international organisations documents e.g. WHO air quality guidelines.

The main document outlined here relates to the identification of ‘hazardous substances’ as per IED Regulations. The European Chemicals Agency (ECHA) provides services to ensure the consistent implementation of Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Classification, Labelling and Packaging of hazardous chemicals (CLP), Biocidal Products Regulations (BPR) and Prior Informed Consent (PIC) Regulations. Amongst other services it provides guidance on general and technical aspects in the implementation of these regulations. ECHA have prepared a document ‘Guidance on the application of CLP Criteria’ most recently revised in November 2013. The document provides comprehensive technical guidance on the application of CLP regulations. This includes detailed guidance on the CLP criteria for physical, health and environmental hazards associated with a chemical. It is also considered to be appropriate guidance for Competent Authorities in the Member States.

General aspects relating to human health in the Water Framework Directive are addressed in a number of guidance documents such as 'Groundwater in Drinking Water Protected Areas, No. 16' and 'Technical Report No. 4 Groundwater Risk Assessment'. It is often the case that toxicological or epidemiological assessment methods relating to the specific exposure pathway (e.g. air, groundwater) are not discussed in great detail. Specific guidance on setting Environmental Quality Standards is set out in Guidance document No. 27. This document includes exposure scenarios such as drinking water, consumption of fisheries products and provides information on the use of non-testing approaches. In regards to the potential for exposure to a carcinogenic chemical, the document identifies a human toxicological standard that is equal to an additional risk of cancer of 1×10^{-6} (for 70 years exposure). It notes that there is no guidance available on how to estimate a concentration that corresponds to an excess cancer lifetime risk of 10^{-6} and as such a human toxicologist should be consulted.

The Environmental Quality Standards set out for the priority substances identified within the Water Framework Directive were derived as per the guidelines in document no. 27. The supporting information was subsequently reviewed by the Scientific Committee for Health and Environmental Risks. The supporting information documents on priority substances are available on the CIRCABC website.

Drinking water standards are based on World Health Organisation guidance and the opinion of the Commissions scientific advisory committee SCHER.

Guidance in relation to the Air Quality Framework Directive focusses largely on addressing queries in relation to zoning, monitoring and assessment against pre-determined environmental quality standards. The minimum assessment requirements are linked to specific concentration thresholds as well as the population within each air quality zone. The guidance document on Assessment under EU Air Quality Directives sets out guidelines that include numerous considerations regarding consideration of health and population exposure to air pollution. These include aspects such as spatial resolution of health based limit values,

A series of position papers outline the basis and methodologies adopted in the determination of air quality standards. These typically include a review of existing publically available information from sources such as the US EPA, the Agency for Toxic Substances and Disease Registry and the World Health Organisation.

Air Quality Framework Directive	•Air Quality Framework Directive (2008 / 50 / EC): This directive establishes targets for improving human health and environmental quality up to 2020. The Framework Directive merged existing legislation with the exception of the fourth daughter directive. Targets have been set for Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter, lead, carbon monoxide, benzene and Ozone. The 4th Daughter Directive lay down limits for specific pollutants : Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air.
Large Combustion Plants Directive	•The LCP Directive contains provisions for compliance emission limit values for SO2, NOx and dust, overall emissions reductions targets and requirements for stack heights based on protection of human health and the environment. In addition the Commission was required to submit a report to the European Parliament to address human health and environmental objective issues including heavy metal emissions. The LCP will be repealed into the IED from January 2016.
Water Framework Directive	•Directive establishing a framework for Community action in the field of water policy (Water Framework Directive (WFD)) (2000 / 60 / EC). The WFD aims to improve and prevent the deterioration of all waters (groundwater, rivers, lakes, transitional waters (estuaries), coastal waters and wetlands). The WFD is complemented by additional legislation including the Groundwater Directive (GWD) (2006); the Environmental Quality Standards Directive (EQSD) (2008), the Urban Wastewater Directive (UWWD) (1991); the Nitrates Directive (1991); the Bathing Water Directive (BWD) (2006) and the Drinking Water Directive (DWD) (1998). Upcoming changes in the DWD and the GWD are discussed in Section 5.7.
REACH Directive / Biocidal Products Regulations	•Regulation on the registration, evaluation and authorisation of chemicals (REACH) (1907 / 2006 / EC). The regulations deal with the Registration, Evaluation, Authorisation ad Restriction of Chemical substances. The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances, frequently via a Chemical Safety Assessment. The Biocidal Products Regulations concerns placing on the market and use of biocidal products (EU 528 / 2012). It is applicable from 1 September 2013. Both the REACH and Biocidal Products regulations have resulted in guidance from EU and other recognised organisations (e.g. WHO) on the derivation of risk based criteria for human exposure scenarios.
SEVESO II / COMAH	•The Control of Major Accidents and Hazards Regulations (1999) were prepared to implement the Seveso II Directive. The aim of the regulations is to prevent any accidents involving dangerous substances such as chlorine, liquid petroleum gas, explosives, arsenic pentoxide. The regulations were amended in 2005.

Figure 5: Additional Sectoral Directives

5.3 Upcoming changes within EU environmental legislation

5.3.1 Environmental impact assessment directive

On 26 October 2012 the Commission adopted a proposal for a new Directive that would amend the current Environmental Impact Assessment (EIA) Directive. This proposal has since been reviewed amended and adopted in full by European Parliament.

There are a number of changes to the EIA Directive, those that may impact on the assessment of health include:

- Article 2.3 – regarding establishment of a joint procedure where simultaneous obligations arise from EU legislation (e.g. IED) to conduct environmental assessment.
- Article 3 – requires the environmental impact assessment shall identify, describe and asses:
  - Amongst others: population, human health. The existing EIA Directive refers only to impacts on human beings and does not specifically call out human health.
  - (e) Exposure vulnerability and resilience of the factors (a), [(b), and (c)] to likely natural and man-made disaster risks; and
- Article 5.3 sets out a requirement for accredited and technically competent experts.

With regard to a joint procedure the Commission is required to provide necessary assistance in order to define and implement the coordinated or joint procedure.

There has been considerable concern regarding the proposed new Directive from various Member States who have consider it will increase administrative burden and extend the scope of EIA. Concerns raised include:

- Practicality of a 'joint procedure' that may require production of documentation during the development consent stage of projects;
- Overlap between Control of Major Accident Hazards regulation and the broader qualitative risk assessment required for natural and man-made disaster risks; and
- Requirements for accreditation on the assessment of health which may be difficult where the definition of health is unclear.

As a minimum, it is likely that calling out human health and populations will result in health being addressed in a single specific chapter. This may be a welcome addition for those involved in the appraisal process however it may require development of more robust guidelines in regards to the integration of health considerations in EIA.

5.3.2 Groundwater Directive

Annexes I and II of the Groundwater Directive (GWD) contain:

- Europe wide environmental quality standards for pollutants;
- A minimum list of pollutants and indicators for which Member States should consider establishing threshold values;
- Guidelines for the establishment of threshold values; and
- Information to be provided by Member States on those pollutants and indicators.

Article 10 of the GWD requires a review of Annex I and II every six years. The Commission undertook the first review of those Annexes in 2013.

A background paper to the Public Consultation stage of the review (Umweltbundesamt-AT, Arcadis undated) identified key problems to be addressed and possible policy options for consideration. The key issues identified were focussed on new scientific information, transparency and comparability of threshold values across the EU. The policy options identified included:

- Upgrading naturally occurring and / or synthetic pollutants (e.g. trichloroethene) from Annex II Part B to Annex I;
- Approaches to procedures for determination of natural background levels;
- Provisions to make threshold value determination and monitoring mandatory; and
- Voluntary or compulsory monitoring of pollutants of concern including emerging contaminants.

A proposal for a commission Directive amending Annex II of the GWD was put forward in February 2014.

The new Directive proposes:

- There is insufficient information available to set new groundwater quality standards in Annex I but technical adaptations in accordance with Article 8 of the Directive are necessary in Annex II.
- Common principles for the determination of background levels are required to improve comparability of threshold values;
- Nitrites and total phosphorus (or phosphates) should also be considered by Member States when establishing threshold values;
- A watch list for pollutants of groundwater should be established under the Common Implementation Strategy for Directive 200/60/EC in order to increase availability of monitoring data on substances posing a risk or potential risk to bodies of groundwater; and
- Additional reporting requirements to improve the capacity to enable greater understanding and comparison of results across river basin management plans. The information provided will increase transparency of assessments and facilitate comparison of chemical status assessment results across the Member States and contribute to future harmonisation of methodologies for establishing groundwater threshold values.

5.3.3 Drinking Water Directive

In 2007–2008 a broad consultation on the review of the Directive was undertaken with Member States, stakeholders and NGOs, as well as the scientific community including the WHO. The Commission decided that revision of the Directive was not required however revision of the technical Annex II (Monitoring) and Annex III (specifications for analysis of parameters) is appropriate.

In addition the adoption of Council Directive 2013/51/EURATOM has resulted in specific legislation on radioactive substances in drinking water. This brings drinking water legislation in line with the European Atomic Energy Community Treaty.

The Commission has also focused on risk assessment for small water supplies in the published report “Towards a guidance document for the Implementation of a Risk Assessment for small water supplies in the European Union” (KWR, November 2011). A subsequent framework for action is being developed with Member States.

On 23 June 2014 the Commission launched a public consultation on the quality of drinking water in the EU in order to assess the need for improvements on EU drinking water legislation. This consultation phase may lead to revision of the Drinking Water Directive in the future.

5.3.4 Air quality

In December 2013, the European Commission published an air quality package, which includes the following draft legislation:

- Draft Directive to reduce national emissions, amending the National Emissions Ceilings Directive 2001 (Directive 2001 / 81 / EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants);
- Draft Directive to reduce air emissions from medium-sized combustion plants; and
- Draft Decision to implement a May 2012 amendment to the Gothenburg Protocol on long-range transboundary pollution.

The draft legislation will be considered by the European Parliament and Council in 2014.

5.4 Summary of how health is addressed in EU Environmental Legislation

The notion of human health is addressed in a number of EU Environmental Legislative instruments. The approach to health varied depending on the purpose of the legislation. Broader interpretations of health were observed within the SEA and EIA Directives. Consideration of health within sectoral Directives was typically narrower e.g. impacts associated with hazardous substances. However it is also noted that the definition of pollution could broaden to include consideration of impacts to 'amenities' and 'other legitimate uses of the environment'.

The approach to the assessment of risk to human health is multi-faceted with consideration of:

- Separation distances e.g. stack heights, septic tanks;
- Consideration of diffuse sources of contamination e.g. agricultural use of fertilizers;
- Qualitative risk assessment and mitigation methods e.g. risk of accidents, sensitive receptors;
- Identification of hazardous substances or hazardous wastes;
- Environmental limit values and Best Available Techniques;
- Quantitative Risk Assessment; and
- Health Impact Assessment / Social Determinants of health.

European Commission guidance for SEA is not very prescriptive with respect to addressing human health and populations. Guidance relating to health in EIA is more descriptive (EC, 2001). With regard to sectoral Directives there is a large amount of guidance and supporting documentation for the assessment of health impacts. These documents are primarily intended to manage chemical exposure and/or exposure to pollution in the EU.

The most significant of upcoming changes in relation to health assessment will be the revised EIA Directive with requirements for accredited professionals, joint procedures and additional considerations to vulnerability / resilience to disaster risks.

It is also noted that the new IED requirement for baseline reports and subsequent site closure reports may increase the number of HHRA completed in line with contaminated land regimes in other countries. If adopted, the clean air programme will aim to make significant reductions in air pollution.

6.0 INTERNATIONAL REVIEWS ON HEALTH AS PART OF DIFFERENT ASSESSMENT METHODS

A number of reviews have been completed at international and EU level regarding health and environmental assessment. As such these reports have been reviewed to provide a wider understanding of the opportunities and challenges identified by these studies. The reports reviewed included:

- Effectiveness of Health Impact Assessment, (WHO 2007);
- Health and Strategic Environmental Assessment (WHO, 2009); and
- Health Aspects in EIA: Improving the Implementation of Health in Environmental Impact Assessment, (IMP3, 2006).

6.1 Health Impact Assessment

In 2007 the World Health Organisation (WHO) undertook an assessment of the effectiveness of HIA on behalf of the European Observatory on Health Systems for Policies (WHO, 2007).

In assessing effectiveness the study considered four types of effectiveness (direct, general, opportunistic, no effect) all of which were observed within the case studies assessed. The authors considered that the fact that none of the HIAs studied resulted in withdrawal of the proposed plan indicates that HIA is not intended to be a mechanism to hinder planning, rather one to show implications of decisions so appropriate decisions can be made with regard to health. However, there is no indication of whether this is due to an absence in evaluation methodologies, or criteria for HIA to enable a legally justifiable decision to be made to refuse development.

A European map of HIA use was considered and addressed key questions regarding how HIA was defined, who was conducting them, how often and for what industries amongst others. Table 7 provides a summary of the use of HIA studied in the assessment.

Table 7: Summary of HIA setting, WHO 2007

Item	Observation
Levels	Predominantly undertaken at regional and local level. National level less so.
Sectors	Varied based on level however transport, urban planning and environment most frequent.
Timing	Predominantly prospective, though some examples of retrospective
Stages	Scoping, appraisal and reporting most frequently used, screening and evaluation less frequent
Types	Standard / intermediate HIA most common at national and local level. At regional level the rapid or mini HIA was more common. The comprehensive HIA was used less frequently but observed to be more common in England, Italy and Spain.

Other aspects addressed included an assessment of policy, regulation and other means of endorsement to provide a framework for HIA. This aspect of the report has changed since the time of publication so comparison of stewardship approaches across the EU is undertaken in Section 8.0.

The review noted the following factors were important in contributing to the effectiveness of HIA:

- Using specific challenges to implement and test HIA;
- Political leadership;
- Public support;
- Early consideration of health;
- Providing legal backup for the use of health determinants;

- Integrating HIA into health systems; and
- Clarifying who bears the cost of HIA.

6.2 Strategic Environmental Assessment

In 2009, the WHO Regional Office for Europe published a background report on Health and Strategic Environmental Assessment (WHO, 2009). The report was to support a consultation meeting seeking further advice from SEA and health experts.

Examples of barriers and inadequacies to the assessment of health in SEA identified in the WHO report included:

- Describing socio-economic or behavioural aspects but not including these in final assessment; and
- Lack of consideration of distributional aspects such as health inequalities or cumulative aspects.

They identified a number of facilitating factors for effective health inclusion in SEA which briefly comprised:

- Institutional factors (e.g. institutional links between proponents and health authorities);
- Methodological factors (e.g. clear distinction of what is significant for health, sector specific health aspect); and
- Procedural factors (e.g. coordination with other assessment tools, use as an instrument for integration).

Key recommendations were made to enhance inclusion of health in SEA, in particular it was noted that the health sector should be made more systematically aware of the value that SEA can provide for health protection and health promotion.

They note that guidance is already available via the United Nations Economic Commission for Europe Manual, UK Department of Health and the WHO Healthy Cities Network. Further guidance would need to be demand driven and responding to what is needed within health and other sectors. The WHO Regional Office for Europe committed to producing such further guidance as outlined in the report.

6.3 Environmental Impact Assessment

In 2006, the project (IMP) 3 was carried out within the 6th framework programme investigating the application of environmental impact assessment in Europe. The project focussed primarily on the consideration of human health, risk assessment and project types subject to EIA. The work focussed on human health was reported in 'Health Aspects in EIA: Improving the Implementation of Health in Environmental Impact Assessment (IMP3)', and is discussed briefly here. The project team comprised members of Environment and Planning Agencies and Academic centres from Austria, United Kingdom, Sweden, Portugal and Slovakia.

The report concluded that there continued to be a lack of adequate methods, baseline data, institutional capacity and partnership or explicit statements on the importance of health within EIA legislation across the countries assessed. However they noted that there are signs of a shift within most Member States towards assessing health within EIA and considering the use of wider health determinants.

They observed that where health is considered it is either associated with a Human Health Risk Assessment or a separate Health Impact Assessment completed after the EIA. They noted that there is some momentum towards institutionalising health assessment and queried if it was enough to rely on this alone. A number of barriers to addressing health were identified which have been summarised in Table 8

Table 8: Summary of Barriers to Health in Environmental Assessment

Theme	Issue
Procedural	Lack of legislation Cost / duration Lack of scoping Lack of involvement of ministry of health / health professionals or engagement between environment and health Client consultant relationship
Methodology	Definition of health too narrow / misleading Absence of practical indicators Inadequate prediction of health impacts Insufficient knowledge of health / health determinants Insufficient guidance
Public	General public may become over-concerned Health complicates public consultation

Regarding the integration of health in EIA, as opposed to the use of a separate HIA, the majority of stakeholders considered health should be integrated within EIA but there was diverging opinions on what determinants of health should be assessed. Feedback from Member States included:

- Small but significant number of stakeholders felt a separate HIA would be more appropriate;
- EIA is an appropriate platform in which to consider health however there are risks of overburdening it by the inclusion of health;
- If health is to be narrowed in EIA then an alternative mechanism for assessing health should be considered (e.g. HIA); and
- Member States considered physical health impacts were well covered but mental, social and well-being impacts are not well covered.

When discussing which proposed methods should be used for integrating health into EIA the study recognised that there is no easy answer to this question. They report that any approach should be:

- Both quantitative and qualitative to be considered scientifically robust;
- In a form as legally robust as EIA in the planning system within which it is being undertaken; and
- Consensually agreed upon by both health and environmental professionals and institutions both within Member States and across the EU.

With regard to public engagement, the authors report that the EIA Directive and HIA methodologies require community engagement. They argue that community concerns are not likely to be allayed if the perceived health impacts as understood by the community are not dealt with and as such any methodology should deal with perceived health impacts. They note that there is already guidance within HIA literature to address this.

The report outlined potential best practice scenarios for EU, National and project level exposure to health in EIA. These included but were not limited to:

- A clear definition of health at EU and national level legislation and guidance;
- Inclusion of health experts and health training at planning level and in project teams;
- Consideration of health at screening and scoping stage; and

- Community engagement.

They included statements such as 'health impacts are considered equal to other types of impacts within an EIA'. The report put forward five policy options for consideration which are presented here:

- Preparation of a new guidance package on incorporating health into EIA;
- Supporting measures such as establishment of a central environmental assessment unit, a systemic widespread and long term awareness programme for environmental and health professionals, coordination of small area health datasets amongst other approaches, plus the preparation of a new guidance package;
- Minor amendments to the EIA Directive such that there is an explicit reference to the need to assess positive and negative impacts to health, reference to the wider determinants of health in the descriptive part of the Directive, development of a programme monitoring implementation of amendments to the Directive, plus supporting measures plus the preparation of a new guidance package;
- Major amendments to the EIA Directive such as those above and explicit reference in the Directive on the need to assess social, health and environmental equity and inequalities, explicit reference to the reporting requirements for health impacts within environmental statements, plus supporting measures plus the preparation of a new guidance package; and
- A new HIA Directive.

6.4 Capacity Building in Environment and Health, WHO Project

The European Centre for Environment and Health of the WHO Regional Office for Europe has been running a project entitled 'capacity building in environment and health (CBEH)' The objective of the project was to strengthen in-country capacity to deal with environment and health issues. The project was co-funded by the European Commission and addressed 8 countries from central and eastern Europe. These included the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

An international capacity building workshop was held in Latvia in March 2012 which was followed by national training workshops in Estonia and Slovenia in June 2012. The national training workshops were aimed at assisting countries in further developing resources, tools and applying methodologies to consider health in plans, programmes or policies in assessments such as HIA, EIA and SEA. While the purpose of the workshops was to support the target eight countries the material developed is intended to support countries throughout wider Europe. The training packages and frameworks have been developed by leading experts in the area of health, HIA and health in environmental assessment from the UK, the Netherlands, Italy and beyond.

A series of reports into the outcome of the project are presented on the WHO website:

- Strengthening health in environmental assessments in Slovenia. Gap analysis and way forward, WHO/Europe 2013a;
- Strengthening health in environmental assessments in Estonia. Gap analysis and way forward, WHO/Europe 2013b;
- Report of the international training workshop on CBEH. 19–23 March 2012 Riga, Latvia, WHO 2013;
- Strengthening the implementation of health impact assessment in Latvia, WHO 2012;
- Using impact assessment in environment and health: a framework, WHO 2013;
- Continuous training in environment and health, WHO 2013; and
- An intersectoral training package for environment and health experts, WHO 2013

Each of the report packages contains information that would be relevant to a more detailed review of the approach in Ireland. Briefly discussed below is the outcome of the framework for impact assessment (WHO, 2013a) and the intersectoral training package for environment and health experts (WHO, 2013b)

The report discussing a potential framework for the use of impact assessment in environment and health presents a brief discussion on the definition of health, its consideration in HIA and environmental assessment. It goes on to discuss common gaps that may need to be addressed for a better consideration of health in impact assessment. These include legal requirements, communication, guidance and training.

The framework proposed is outlined in 7 points, which has been represented here in Figure 6. A more expanded version is presented within the report. The report describes these steps as a move towards 'effective and sustainable use of impact assessment in environmental health'. It is noted that this report may be considered to fulfil certain aspects of the early steps in the overall framework.

A report outlining an intersectoral training package was also developed (WHO, 2013). This package contains information to support countries in the development of continuous professional development courses in the area of health and environmental assessment/HIA. The package aims to provide trainers examples on how training could be structured and how specific topics could be addressed. It also presents examples of how joint training can improve understanding between sectors and enhance intersectoral work.

The target audience includes personnel from government agencies, research institutes in health, environment and other sectors related to environment and health such as energy, transport and education.

The topics are covered in modules which address health within EIA (module A), SEA (module B), risk assessment for contaminated sites (module C1), quantitative risk assessment (module C2) and environmental burden of disease (module C3). Module D addresses the delivery of training and looks to assist those delivering the course in effective learning aspects.

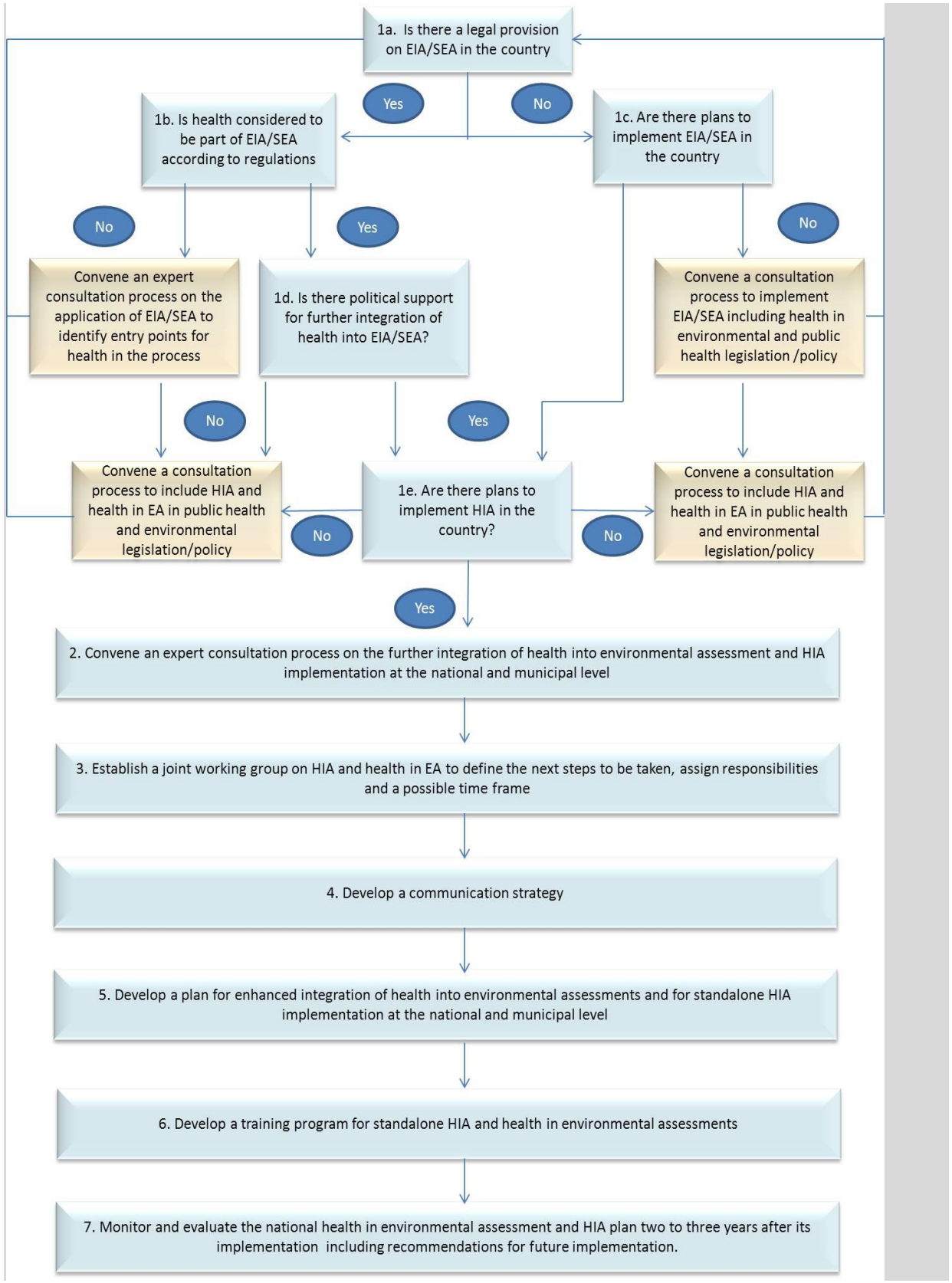

Figure 6: WHO 2013, Framework for Health in Impact Assessment

6.5 Health in Impact Assessments, WHO 2014

In 2014, the WHO Regional Office for Europe, the International Association for Impact Assessment (IAIA), and the European Public Health Association (EUPHA) published a report presenting the findings of a review into the principles and practice of health in impact assessments to address the following questions:

- How can the various assessments contribute to promoting and protecting human health?
- How can further integration of health support other forms of impact assessments?
- What experiences can be shared across the various impact assessment types?
- What forms and levels of integration seem advisable? and
- What should be seen as priorities for further development?

The document addresses topics such as health in EIA, SEA, social impact assessment, sustainability assessments and health impact assessment as a standalone tool. They observe that all forms of impact assessment seem to be evolving in a direction that includes a more comprehensive consideration of human health.

The key requirements to facilitate inclusion of health in impact assessment were summarised as including:

- Consistent use of a clear conceptualisation of health, including the physical, mental and social dimension;
- Access to reliable health data and information including on proximate as well as distant health determinants;
- Involvement of health experts from early stages, contributing substantive as well as methodological knowledge and experience; and
- Awareness by all impact assessors as well as decision makers on the interconnections of policies and projects with health

They raise a concern regarding impact assessment fatigue and support integration of health into existing impact assessments where possible. They summarise by stating '*there is a need to ensure health consequences of proposed actions are predicted and understood in a reliable, transparent way, based on the available evidence.*' They identify the health sector, planning arena and impact assessment institutions as joint stakeholders with a role in the development of frameworks and guidance.

6.6 Summary of key observations in international review/activities on Health as part of Assessment methods

While the international reviews were addressing different environmental assessment methods, some key messages were common to all three studies. The most common facilitating factors to assessing health were quoted as:

- Early and effective engagement with health authorities;
- Clear objectives and methodologies for assessing health; and
- Legislative support for the use of health determinants.

Common inadequacies observed were most clearly discussed in the WHO SEA report. In particular they described the scenario where an environmental report discusses background socio-economic or behavioural aspects but does not go on to consider these within the impact assessment. This is something that has been described as a deficiency raised by a number of stakeholders contacted within this project for all

elements of health assessment (i.e. in HIA, SEA and EIA). It was also noted that the barriers quoted within the EIA study were very much echoed by Irish stakeholders consulted during this project.

The CBEH project provides valuable information regarding possible approaches to increasing capacity in the area of health and environmental assessment. The framework for increasing consideration of health in impact assessment provides a possible road map for consideration. It is noted that while the project focussed on development of health in environmental assessment in eight eastern and central European countries, the project programme and training was developed by a wider European group of experts. It would be possible to consider the applicability of the framework within an Irish context with a more detailed review and gap analysis of the current approach in Ireland.

7.0 HEALTH ASSESSMENT AT THE PLANNING-ENVIRONMENT INTERFACE IN IRELAND

7.1 Current Approach in Ireland

7.1.1 EPA perspective

Currently assessments undertaken by EPA as part of its formal regulatory activities on project / development proposals (whether under the EIA, Planning & Development, Waste or EPA Act legislation) include the consideration of potential impacts on the health of a local human population.

The EPA uses a standards based approach in assessing the potential health impacts of proposed activities, in its monitoring of industrial licensee's performance, waste disposal and water quality. This approach to health protection as part of the IPPC and Waste Licensing process is similar to that of the Environment Agency, UK, whose position statement on Environment & Health states that they seek *advice and help from health professionals whenever needed.* As statutory consultees to the EPA, the Health Authorities can bring forward information or concerns regarding a project that might influence the EPA in relation to the acceptance of a proposal for an area or the setting of ELVs.

7.1.2 Planning perspective

Health is addressed in a number of areas within planning legislation in Ireland. In the first instance the majority of plans and developments require consultation with the HSE where there may be a 'significant risk to public health'.

Health is additionally considered within Strategic Environmental Assessment, Environmental Impact Assessment and licensing legislation. The interpretation of health in legislation is discussed further in Section 9.0.

7.1.2.1 Forward planning

County development plans

The primary instrument for regulation and control of development in Ireland is the County Development Plan, prepared by each Local Authority every six years. In general, the Plan shows the authority's objectives for the sole or primary use of particular areas (e.g. residential, commercial, industrial, agricultural), for road improvements, for development and renewal of obsolete areas, and for preserving, improving and extending amenities. Public participation, including statutory consultees such as the HSE in making the Plan is important. The HSE can become involved in the making of the development plan, at the initial stage, when the planning authority publishes its intention to review the plan, at the draft plan stage and if applicable, at the amended draft plan stage.

Local area plans

In addition to county development plans, other 'forward planning' tools employed by the planning authorities include the preparation of local area plans (planning control for towns and villages). Again the HSE may

provide input into these plans, as these Statutory Local Area Plans provide for proper consultation with the public and statutory Consultees, in accordance with the Planning and Development Regulations.

Regional planning guidelines

To support the implementation of the National Spatial Strategy (NSS) as a "big picture" framework for achieving the Government's objective of more balanced regional development, effective planning strategies are needed at regional level to provide the link between the national and local planning frameworks. Implementing the NSS requires that Regional Planning Guidelines be put in place across the country. This means that regional authorities are obliged to take account of the NSS when making regional planning guidelines for their areas, and in the preparation of these Guidelines, prescribed bodies such as the HSE are may provide input into these documents.

7.1.2.2 Development management

All decisions to grant or to refuse planning permission are made in the first instance by the relevant planning authority and by An Bord Pleanála (the Planning Appeals Board) in an appeal. The Local Government Acts and Regulations 2000 to 2013 provide the framework for granting or refusing planning permissions. In certain instances, An Bord Pleanala directly adjudicates on development that is considered strategic to the State, under specific legislation (Strategic Infrastructure Development Acts and associated Regulations). Part 8 applications made by the planning authorities under the Planning and Development Regulations 2001 to 2013 are also considered by An Board Pleanala, who acts as the competent authority for these types of public infrastructure development activities.

Where the development is significant and requires the preparation of an EIS, there is a consultation process, during which prescribed bodies / statutory consultees such as the HSE are requested to make submissions to the Planning Authority and the Board on the content of the EIS. This provides the opportunity to make submissions on any health related impacts of the proposed development, either to the Planning Authority or the Board on appeal / SID / Part 8

In accordance with the Planning and Development Acts and Regulations, when the planning authority or An Bord Pleanala is making its decision on a development proposal, it is required to consider the proper planning and sustainable development of the area, having regard to the provisions of county development plans, RPGs, LAPs and the NSS. As the HSE is given the opportunity to provide input to these plans and guidance documents, health is also considered indirectly for all planning decisions.

7.1.3 Role of health as advisor

The HSE may comment on health issues, which includes consideration of environmental health aspects, during planning and licencing processes including:

- Via direct consultation during development of draft plans and programmes, as indicated above (e.g. LAP, RPG);
- During SEA consultation phases;
- During appraisal of EIA; and
- In relation to licenced facilities e.g. during review of applications.

The HSE are required to be notified where there may be ‘significant risk to public health’. The HSE are not a competent authority in relation to SEA, EIA or licencing however they must be consulted for EIA and IPPC (IED) licensing applications. There is no legal obligation to provide an observation. The HSE are not a statutory consultee in relation to SEA and as such consultation predominantly occurs at local level in the development of a draft plan rather than during the SEA. However, SEA should also address both physical and quality of life health impacts (discussed further in Section 9.1). As such there is overlap and potential for conflicting statements where health is addressed within SEA and separately within the development plan itself. In addition, with Healthy Ireland mandating the use of Social Impact Assessment at local authority

level, this may lead to a number of impact assessments occurring simultaneously during the development of Plans and Guidelines and consideration of streamlining this process may be beneficial.

HSE corporate responses to requests regarding EIA or license applications are submitted via the National Environmental Health Office (NEHO) within the HSE. The NEHO collates a corporate response to consultation requests that incorporates responses from HSE Directorates including Public Health, Emergency Planning, Estates and Health Promotion. The protocol for response was established in 2011 with subsequent training within the Environmental Health Service to enable input into the corporate response to consultation requests to the HSE. There are approximately 60 employees within the EHS that have received such training who are situated across the country, with generally two employees located in each county. Some of the NEHO capabilities include:

- Local presence and understanding of local issues in the vicinity of the proposed project;
- Coordinated central response for planning queries relating to health for EIA and licensing applications;
- Health screening tools to facilitate EHO in the scoping and / or review of EIS and license applications;
- Training programmes for staff in relation to health aspects in EIA, licensing, contaminated land etc; and
- Database that has been established to share regulatory and other updates, project experience and examples. The NEHO respond to queries within the planning timeframe however this is not always the case for Public Health or other stakeholders who respond as resources allow.

With regards to health aspects of EIA and licensing applications, the NEHO will respond in terms of compliance with ELV in a context of knowledge of local issues and total environmental loading of pollutants and sensitive receptors.

7.1.4 Stakeholder Concerns

While the following information may give some indication to strengths and weaknesses in the current approach as experienced by stakeholders, it should be noted that the objective of this study was not to assess efficacy of current assessment processes.

Discussions were held with a number of individuals and groups from academia, the HSE, EPA, Planning Authorities, Local Authorities and non-government organisations. Opinions varied considerably depending on an individual's professional background, particularly with regard to whether they were involved in aspects relating to an area plan versus a specific project / installation. Consideration of social determinants of health was more likely to be considered appropriate in consideration of an area plan rather than licensing a specific installation. The following discussion summarises feedback obtained. It is noted that the opinions offered were those of an individual's own experience in an area and do not represent that of an agency or other organisation.

Adequacy

- General opinion that the treatment of health in SEA and EIA could be improved and reasonable opportunities exist to address the gap; and
- Particularly strong opinion from a number of stakeholders that the human beings section of EIA is often very weak with a number of reports giving a general description of the community but no impact assessment is undertaken; and
- Mixed opinions on the treatment of health within the licensing regime.

Treatment of health

This is the issue of highest level of diverging opinions. Key issues include:

- Conflicting understanding of what HIA entails;

- Concern that there is a lack of clarity regarding the definition of health under their remit;
- Concern this investigation would result in an inappropriate inclusion of additional health determinants in their area;
- Concern the study would result in disproportionate consideration of health in environmental assessment;
- Conflicting opinions regarding the adequacy of ELV to protect the population or whether vulnerable members of the population should be considered;
- Stakeholders open to social determinants tended to be at SEA level over EIA with least support for their use in licensing. This was reflected in all areas and not in one particular agency, with a general opinion that licensing should focus on environmental emissions and other social determinants of health may be addressed within planning (which may include an EIA);
- Disparity in treatment of health via a dual consent process which may be more adequately dealt with in one consent process;
- A general opinion that development of guidance on methodologies and evaluation criteria would be appropriate;
- Concern that there are no validated models for HIA and as such it may not be adopted in a manner that may be used in a planning framework;
- Consideration that the approach towards health in SEA, EIA and licensing should be clear and create a level playing field such that expectations are managed for all stakeholders including but not limited to Planning Authorities, Developers, EPA, HSE and the wider public;
- Very high concern that small area baseline health data is not available and as such it is not possible to properly address public complaints for a facility;
- Concern that if an issue arises at a facility, capacity to respond in a meaningful way is not always possible due to a lack of baseline data and / or unclear consideration of health objectives in initial impact assessments;
- Some concern that the basis for considering health in planning legislation is focused solely on health protection. These stakeholders felt that the current planning regime does not provide a legal basis for supporting health promotion initiatives by way of objections to certain developments.
- Concern that the lack of baseline data may result in the wrong health indicators being assessed; and
- Lack of subsequent monitoring.

Engagement with health

- General consideration that greater engagement with health early at scoping stage would improve matters but the implications for the planning timeframe were potentially too onerous; and
- Concern that current methods of separately reporting impacts in air, water etc is leading to uninformative disjointed submissions which makes providing responses difficult. Proposals for a single health chapter in EIA or license applications are considered a definite improvement. This health focussed chapter was reiterated by a number of stakeholders from different backgrounds.

Training

- Concern that there are insufficient individuals appropriately qualified in Ireland to adequately assess risk to human health;

- Lack of training in risk assessment methods even though a number of HHRAs are accompanied by EIA and licenses. It is noted that HHRA may also be accompanied by baseline and IED closure sites and as such it would be beneficial to develop review skills in this area at a minimum; and
- Training in HIA methods has not been targeted specifically at relevant areas for the participants e.g. SEA, EIA or licensing or for specific industry scenarios e.g. waste, mining, oil and gas. Individuals reported that while they felt the training was valuable they could not see how they may apply it in their day to day job.

Process, timing and resources

- Opinion that there is currently quantity over quality – a number of stakeholders voiced a desire for a tiered system and / or a central unit such as the Dutch approach where there is potential for independent scoping and appraisal;
- Inadequate resources and skills base to cover all health aspects in any one department;
- Planning timeframe is too tight to provide a real response; and
- Conflicting agendas across departments as each have different remits to prioritise submission responses.

Public consultation

- Concern that public fears are not being heard at the outset of a planning or licensing; and
- Concern that a process such as HIA would lead to greater public confusion or escalate concerns.

7.2 Survey of Planning Authorities in Ireland

An anonymous survey was sent out to Planning Authorities in Ireland. The purpose of the survey was to identify general trends in how health is treated within the Irish planning process and what barriers and opportunities were most relevant to their experience. It should be noted that the survey was deliberately limited and only intended to provide general feedback on experiences of health aspects within planning process. In addition as the survey was anonymous details of respondents position or location were not requested, both of which may considerably affect the level of experience from which the response is made. Of the 33 contacted a total of 13 responded. As such it may be beneficial to undertake additional surveys to expand upon and / or validate the results. Survey results and a copy of the questionnaire are included in Appendix A; some comments have been slightly altered to maintain anonymity.

Six (6 no.) respondents indicated that they were aware that Healthy Ireland has mandated the use of Social Impact Assessment at local authority level.

Approximately 88% (7 no.) of projects / plans were assessed in-house, with one respondent indicating they consult a health advisor such as the HSE for all plans / projects. Five (5 no.) participants responded that they had received training on health in environmental assessment while eight indicated they had not.

When asked who is most likely to request that a HIA is undertaken, the most frequent response was that of a prescribed body or competent authority (9 no.). This was followed in almost equal numbers local community representative (individuals and / or organisations) or via internal request. Three (3 no.) indicated that industry may request a HIA.

The survey asked the participants to indicate which of seven options were associated with health. All respondents considered exposure to chemicals or noise / nuisance relevant. Eleven (11 no.) participants also considered access to cultural, heritage or green space related to health. Changes to population and accommodation were reported by seven (7 no.) respondents. Education / training / employment and safety / perception of safety were reported as relevant to public health by eight (8 no.) and nine (9 no.) participants respectively. However while only seven (7 no.) responded for some of the social health determinants

individuals also included comments on additional aspects such as transport or more general observations that many indirect impacts could occur.

When asked who they contact with respect to health the most frequent response was the National Environmental Health Office within the HSE (11 no.) followed by the EPA and / or internal resources (10 no. each) indicating that a number of stakeholders are consulted. Four participants indicated they contact local public health officers. None of the respondents indicated that they contact local health promotion representatives. Four (4 no.) respondents indicated additional contacts which included local WHO Healthy Cities Forums (which may include Health Promotion representatives), local environmental health officers, the Health and Safety Authority, the Garda, National Roads Authority, building control, childcare committee, water safety development officer and Chief Medical Officer.

Overall, more participants indicated helpful experiences with health assessment with 90% (9 no.) reporting it assisted in minimising health risks. The nearest benefit after this was capacity to maximise of health benefits (8 no.) followed by capacity to inform management measures (7 no) and opportunities to emphasise health policy and local initiatives (7 no.). Greater public engagement and potential to map health effects were seen as helpful by only five (5 no.) and three (3 no.) participants respectively. Two (2 no.) respondents indicated that aspects of health assessment could be unhelpful both of whom also considered that there should be no change to current practices on health in planning.

One of the two respondents that indicated negative experiences with health assessment also reported they had an understanding of social health determinants, received training and have access to internal support with respect to health. The respondent went on to emphasise that public health and safety is already a primary concern for planning authorities and is embedded in the planning and development management system. They did however note that further clarity with respect to assessment and quantification of impact of health in the SEA / EIA process would be helpful.

The barriers to assessing health that responders identified with most frequently included:

- Lack of guidance on how to assess health effects (11 no.);
- Lack of legislative support (8 no.);
- Lack of scoping at the outset of EIA / SEA (7 no.);
- Lack of definition and absence of health policy in local or county plan (6 no. each);
- Potential to cause unnecessary public concern and access to suitably qualified persons (4 no. each); and
- Fear of a long drawn out process (3 no.).

Not all those who considered lack of legislative support to be a barrier went on to identify legislating HIA as a preferred method of improving health assessment. Time, cost, experience, limited role of prescribed bodies as commentators were generally not considered significant barriers by responders, despite these barriers often being quoted in literature as significant (IMP3, 2006).

A number of possible approaches to assist the use of health assessment at the planning interface were put to the participants. These approaches were based on reported approaches in literature, practices in other countries or comments made by other interviewees / academic experts. Table 9 ranks the responses of participants from most favoured to least favoured.

Table 9: Summary of opinions on potential actions to address health in environmental assessment

Approach	Responses out of 13
Development of national guidance or direction to international guidance on health in EIA and SEA	9
Development of a health screening tool aimed at the needs of Planning Authorities	7
Establishment of a central unit to act as a resource for scoping and appraisal of EIA and SEA	5
Development of proportionate approach to EIA and SEA in relation to health	5
Introduction of a tiered system for EIA to focus on large projects and reduce information required on small projects	5
Legislate for health assessment	5
No change the current approach is adequate	3
Mandatory scoping for plans / projects indicating health impacts	4
Establishment of a central unit to reduce client-consultant bias by way of independent tender process	2
Introduction of a third party review system to reduce work load	0

By far the most supported approach related to the need for guidance on health in EIA and SEA. Three respondents indicated that current practices are more than adequate and no changes are necessary while conversely four responded that legislating for HIA would be more appropriate. There was a general pattern that those who indicated current practices were adequate had training and access to in-house support while those who indicated legislating for HIA were less likely to have had training and / or in-house support.

The survey, while a simplified process, gives an indication of some of the experiences of planners within the Planning Authorities. There is potentially some inconsistency between Planning Authorities in terms of support (e.g. training, access to health professionals) depending on the location, size or level of industrial activity in a particular area. While not asked, it is quite possible that those who indicated most support are associated with large county or city local authorities and may have experience with a larger number of EIA or SEA than others.

A number of participants provided additional comments to ensure that due consideration is given to the fact that there are already a number of assessments undertaken and addition of another would be rather onerous. Others wished to acknowledge that public health is at the forefront of all planning decisions and that in relation to social health determinants a range of stakeholders are consulted as part of the development plan process.

7.3 Health Impact Assessment in Ireland

The Institute for Public Health (IPH) is governed by a management Board consisting of representatives for Northern Ireland and the Republic of Ireland. These are the Department of Health (DOH) in Ireland and the Department of Health, Social Services and Public Safety (DHSSPS) in Northern Ireland and a representative from the Royal College of Physicians in Ireland (RCPI). The IPH work in partnership with a range of health organisations including the HSE, in particular those involved in the Healthy Cities programme in Health Promotion.

The IPH has developed a number of tools and guidelines to assist the use of HIA in Ireland. In addition they have developed the HealthWell which is an interactive health dataset to allow consideration of baseline health determinants. The data is available to electoral division level in some instances however there are tools that may allow extrapolation of data to small areas. Health Intelligence Ireland builds on the framework of Health Atlas and has expanded rapidly in the breadth and complexity of the analytic facilities delivered and the numbers of end-user groups gaining direct value.

The availability of data at small area level in Ireland is a concern to a number of stakeholders. There is potential for a greater level of local area health data in the coming years. The introduction of a geocoding system by An Post may be utilised to provide assistance to a number of health systems including those involved in the surveillance and monitoring of small area health.

Table 10 summarises some examples of HIA conducted in Ireland in recent years. It indicates that there is precedence in Ireland for considering social determinants of health within the context of decision making. It also indicates precedence for government organisations utilising HIA.

Table 10: Example HIA conducted in Republic of Ireland

Year	Agency	HIA
2013	EPA	Indoor Air Pollution and Health (Quantitative)
2011	HSE	Active travel route for Kells
2009	Galway Traveller Movement / Combat Poverty Ireland	Travellers Health Matters (including consideration of planning site infrastructure, accommodation, access etc.)
2008	HSE	HIA of the regeneration of Limerick City
2007	Department of Environment and Local Government	National Homelessness Strategy

The majority of HIA's in Ireland are conducted at local level. In 2011 O'Mullane et al discussed the role of Local Government and HIA in Ireland. The paper discussed a number of HIA that had been undertaken between 2006 and 2008. The findings indicated that engagement with public authorities assists in implementation of findings. Lack of uniformity in policy at local and central government hindered the use of HIA. The role of Local Government was that of enabler, barrier or indifferent player which may have been influenced by level of ownership in the HIA process.

IPH (Kemm 2013) has reported that there are challenges in putting HIA in practice in Ireland. They state that any legislative basis for HIA would need discussion in order to devise appropriate legislation, however they go on to note that legislation alone may not result in practice of HIA.

The IPH goes on to call out the need for Health Agencies to become health advocates to ensure interagency collaboration. The lack of understanding across government agencies of health determinants requires specific training. They close with a statement that without support HIA will remain adhoc rather than a systematic support mechanism.

7.4 Summary of Assessment of Health in Environment and Planning in Ireland

The review of health in planning and development in Ireland provided an insight to some of the current practices, pressures and opportunities for the future.

Plans and guidelines

The HSE are to be consulted in relation to the development of Plans and Guidelines where there may be a significant risk to public health. Local HSE representatives are consulted more frequently in the preparation of a draft plan rather than within the associated SEA. However the SEA should address both physical health and quality of life impacts as will be discussed in Section 9.1. As such there is overlap and potential for conflicting statements where health is addressed within SEA and separately within the development Plan itself. With Healthy Ireland mandating the use of Social Impact Assessment at local authority level, this may lead to a number of impact assessments occurring simultaneously during the development of Plans and Guidelines. A streamlining of this process may be beneficial.

Planning and licensing

The current process is that requests for observations on health in EIS and license applications come through the National Environmental Health Office (NEHO). This unit collates information obtained from other HSE

Directorates and submits a HSE corporate response to the requesting body. There are clear benefits to the system which has staff located within the community who can also avail of a centralised and defined approach to responding to requests. The staff can also avail of training and knowledge sharing. Pressures exist where other HSE Directorates such as Health Promotion and Public Health do not have the same resources to respond to enquiries within the planning timeframe. The current layout of reports with health impacts addressed in separate chapters was noted as unhelpful in responding adequately within an appropriate timeframe.

Stakeholder Feedback

A number of stakeholders indicated concern regarding the inclusion of social health determinants and were reticent to include HIA as a practice in a planning framework. Conversely there were many who felt very strongly that health promotion efforts were not being supported due to a lack of consideration of social health determinants at a planning level.

Overall the general opinion was that regardless of health determinants to be considered there is a need for:

- Clarification of what health means and roles and responsibilities for its assessment;
- Guidance on how to assess health in a manner that is clear for all stakeholders;
- Greater involvement of health professionals in scoping for health and / or development of guidance on health assessment. This was reiterated for both medical health and social health determinant scenarios;
- Greater inclusion of planning and local authorities in development of processes for considering health going forward;
- Consideration of tiered or proportionate assessment to maximise quality over quantity in the approach to health assessment;
- Appropriate training in both quantitative risk assessment methods and social health determinant methods to improve capacity for informed review.
- Mixed opinions on whether legislation is the most appropriate way forward;
- Some interest both within Planning Authorities and elsewhere in the Dutch approach of a central environmental assessment unit that may be utilised for scoping and appraisal of EIA and SEA; and
- Some concern that the basis for considering health in planning legislation is focused solely on health protection. These stakeholders felt that the current planning regime does not provide a legal basis for supporting health promotion initiatives by way of objections to certain developments.

Concern regarding the HIA process was typically observed in those who were more frequently involved in the assessment of physical health (i.e. medical health). Within this group there was mixed opinion on the adequacy of current approaches – some considered the ELV approach more than adequate, while other considered medical health is very poorly addressed.

Regardless of concern, there is evidence that HIA methods, that utilise social determinants of health, are currently being considered by a number of agencies in Ireland. These have largely been associated with local area plans, regeneration or community initiatives. However, these determinants of health considered in these documents may well be appropriate in other projects or developments. There are a number of international and recognised documents on the use of HIA and social determinants for particular industrial development projects such as oil and gas, mining and transportation. As such the concern voiced by many is that the current practice in Ireland is not based on strong guidance to assist the planning / licensing process for projects and developments. Any guidance on the assessment of social determinants of health will need to be consistent with other mandates (e.g. SIA in local authorities) and create a clear level playing field for all stakeholders involved.

8.0 THE ASSESSMENT OF HEALTH AT THE PLANNING-ENVIRONMENT INTERFACE IN OTHER EU COUNTRIES

The following sections discuss where health in the context of environmental impacts is addressed in legislation within the United Kingdom, the Netherlands, Norway, Sweden, and Slovakia.

8.1 United Kingdom

There is no legislative requirement for HIA in the UK. However, HIA is supported by a number of government organisations similar to the IPH, including HIA Gateway (as part of Public Health England), the Welsh Health Impact Assessment Support Unit (WHIASU) and Scottish Health Impact Assessment Network (Scotland).

England

The 2012 Town and Country (Local Planning) Regulations make no reference to health in terms of planning other than the provision of health services. The Town and Country Planning EIA Regulations (Environmental Impact Assessment) regulations, 2011 do not specify human health, rather refer to impacts on populations.

The National Planning Policy Framework (NPPF), published in March 2012, is the overarching guidance for local authority planners in making plans and assessing development proposals. It requires planners to promote healthy communities, use evidence to assess health and wellbeing needs, and work with public health leads and organisations. The Health and Social Care Act 2012 transfers the responsibility for public health to upper-tier local authorities from April 2013. It also requires the creation of health and wellbeing boards to bring together key commissioners from the local NHS and local government to strategically plan local health and social care services. The Act outlines local authorities as responsible for providing assistance to help individuals to minimise any risk to health from accommodation or environments. The health and wellbeing boards became fully operational on 1 April 2013. The boards comprise representatives from the National Health Service, public health, local government and community organisations. A 2014 report on the performance of the boards after one year indicated that nearly all the boards had produced a joint strategic needs assessment and joint health and wellbeing strategy.

In response to the NPPF and the Health and Social Care Act, the Town and Country Planning Association have looked to encourage consideration of health aspects in planning. They published a report 'Reuniting Health with Planning, Healthier Homes, Healthier Communities' in June 2012 (TCPA, 2012). The report is aimed at planning officials and public health specialists and offers case studies of towns where public health and planning have established a framework for ensuring health is considered in local area planning. It also presents a series of questions for planners to consider when assessing health aspects of a proposed plan and a discussion on the use of HIA.

In 2014 the Department for Communities and Local Government launched a planning practice guidance web-based resource. This planning portal includes guidance relating to the role of health and wellbeing in planning. It outlines the requirement that local authorities ensure health, wellbeing and health infrastructure are considered in the development of local area plans and in planning decisions. The guidance goes on to discuss the links between health and planning, identifies key relevant aspects relating to health in the NPPF and discusses the main health organisations local authorities should contact. The Health and Wellbeing Boards are outlined as a key resource that will outline strategic needs local authorities need to consider in order to support health and wellbeing.

The guidance notes that local authority planners should consider consulting the Director of Public Health on any planning applications (including at the pre-application stage) that may have a significant impact on health and wellbeing of the local population or particular groups within it. It also states a health impact assessment may be a useful tool where there expected to be significant impacts.

Public Health England (PHE) is an executive agency of the Department of Health, England. The HIA Gateway has become part of Public Health England and is a central source of resources and information on HIA.

The website includes a substantial number of resources which are available to all. These include:

- Industry specific literature (e.g. bibliographies for hydraulic fracturing, mining);
- Methodology resources including training, literature, guidelines;
- Networking opportunities e.g. discussion groups such as health in planning, conferences; and
- Example projects.

The gateway is located with the Network of Public Health Observatories on the PHE website allowing easy access to health information.

HIA in the UK is not legislated; however it has garnered support in particular within the planning context often occurring jointly by a health authority and local authority (e.g. TCPA guidelines). Discussion with staff of the HIA Gateway indicated however that support for HIA is vulnerable to political will and a change in local government had seen a reduction in the number of HIAs being completed in London in recent years.

Wales

In Wales, health impact assessment is supported in a number of planning areas including applications for new roads, open cast mines and waste facilities. In 2012 the Welsh Government presented a Green Paper for consultation on whether a Public Health Bill is required in Wales. One aspect for consideration was the legislation of HIA however this was removed and consideration of national health and well-being objectives is under consideration within the Future Generations Bill.

On 7 July 2014 the Well-being of Future Generations Bill was introduced and is currently being considered by the National Assembly. The Bill establishes a framework for sustainable development by establishing a set of long-term goals which relate to the social, economic and environmental well-being of Wales. The bill will require Welsh Ministers to establish national indicators to measure progress towards the achievement of well-being goals. Public authorities will be required to set out objectives in order to maximise on attaining these well-being goals. It is intended that the Bill will reform integrated community planning in Wales and will result in the establishment of Public Services Boards to assess economic, social and environmental well-being in their jurisdiction. The Stage 1 Committee Report was published in November 2014 and identified a need for further clarification on the definition of well-being and its intended application (at national or local/sub-population level).

The WHIASU was established in response to a commitment to long term strategy for health improvement and addressing health inequalities in ‘Better Health, Better Wales’. It grew from an observed trend in ill-health and social disadvantage following the decline of traditional industries and place importance on addressing wider social determinants of health (Kemm, 2013).

Welsh government has continued to support the use of HIA both at a number of levels including 2010: Our Healthy Future which promotes the use of HIA in planning and with communities, the 2011 National Spatial Improvement Programme for the rail network and the 2011 Wales Waste Sector Action Plans. While it is not a statutory requirement, it is increasingly considered best practice in regards of addressing health and wellbeing beyond the health care sector. HIA is referred to in a number of Welsh Government Guidance documents including:

- Technical Advice Note (TAN) 21 for waste advises that HIAs be conducted for the Wales Waste Strategy and its associated Plans; The Wales Waste Strategy Sector Plan ‘Construction, Infrastructure and Markets’ advocates for HIAs to be conducted as best practice at a local level in the siting of waste management facilities;
- Draft Ministerial Interim Planning Policy Statement (DMIPPS) 02 / 06 supports a consideration of health and wellbeing at a local level and is supplementary guidance to Planning Policy Wales for large planning applications and Local Development Plans (LDPs);

- Welsh Transport Appraisal Guidance (WelTAG) for transport requires a HIA to be undertaken for certain types of transport proposals;
- 'One Wales' document of the Labour / Plaid Cymru Coalition government (2007) committed the Welsh Government to the use of HIA in relation to open cast mine applications. This was reinforced by MTAN2 and will be made statutory as part of planning legislation in the next Welsh Parliament; and
- Minerals Technical Advice Note (MTAN) 2 for minerals and opencast mining developments requires a HIA with community participation to be conducted.

As a result practical guidance on industry specific topics such as mining and minerals has been developed to support such projects.

WHIASU provides support to local planning authorities who include advice, guidance and training for specific needs. Their website also includes example reports associated with various development plans and projects such as transport, minerals, waste and local area plans.

WHIASU noted that in early days the focus was primarily on the development of capacity of sectors to incorporate health into decision making processes however as the use of HIA has increased, particularly in the commercial arena, their role has moved towards a quality watchdog. In particular it was noted that HIA was being conducted by some consultants with little or no experience of health or HIA (Kemm, 2013).

Scotland

Health has a narrow definition in planning legislation in Scotland, focussing on physical health determinants. However, in 2008 Scotland launched 'Good Places, Better Health' (GPBH) as the Scottish Governments strategy on health and the environment. The purpose of this was to move the focus of environmental health from toxic, infectious or other physical threats to include wider health issues relating the health, wellbeing and resilience.

GPBH recognised the role of health boards, local authorities, community planning partnerships and communities themselves amongst a few. Single Outcome Agreements were forged between Scottish Government and each local authority for 2008 / 2009 in order to maximise on implementation of the policy.

The GPBH strategy in Scotland has also contributed specifically to the consideration of health determinants in planning and policy. Between 2008 and 2011 GPBH tested the approach to environment and health in the context of early years. The key health challenges assessed were associated with obesity, asthma, unintentional injury and mental health and wellbeing. Evidence based assessment of these health determinants is available on the GPBH website.

The Scottish Health Impact Assessment Network (SHIAN) was set up in 2001 and is now hosted by NHS Health Scotland. The authors in Kemm 2013 state that SHIAN is a relatively loose support network and is not a dedicated resource. It is open to anyone with an interest in HIA. They noted HIA has developed in an organic way through individuals adopting the use of HIA rather than by government policy. Difficulties associated with this included issues around consistency however this manner of application has allowed stakeholders to modify their approach to fit their needs.

In Kemm 2013, authors write about challenges facing HIA within the planning system. In 2008 The Chief Planner wrote to all heads of planning highlighting concerns that HIA could add to the challenge of implementing the planning system and stating that Scottish Government had no intention of placing HIA on a statutory footing. The interpretation of health in SEA and EIA in Scotland is relatively narrow by comparison to their English and Welsh counterparts.

SHIAN has prepared guidance on a number of topic specific issues such as transport, housing etc. It promotes a tiered approach to HIA which comprises a tier 1 Rapid HIA which utilises screening / scoping exercises. This is a checklist approach that can be quick and cost-effective.

The tier two HIA is a more detailed approach that is reserved for projects with potential for significant health effects.

Another network resource that is hosted by the NHS Scotland is the Healthy Environment Network. This was established as a forum for individuals, professionals and decision makers with an interest in the interface between health and the environment. The steering group meets every two months and the network develops matters of interest, position papers and consultation responses on a variety of subjects associated with environment, place and health.

8.2 The Netherlands

Legal frameworks that may consider health in a planning context in the Netherlands include:

- The Public Health Act which requires municipalities examine the health consequence of local policies but gives no guidance on how this should be achieved. However in a number of documents (e.g. WHO, 2013) it is considered that this Act legislates for HIA in the Netherlands, while others (Kemm, 2013) consider HIA is not legislated in the Netherlands;
- The interim City and Environment Act regulates infrastructural planning in environmental vulnerable sites and requires an assessment of impacts on population health. From this Act the 'HIA for City and Environment' tool has been developed. The Act was intended as temporary legislation to support the derogation from environmental laws where clear benefits to other issues (such as public health) were associated with the project. The Act was due to cease in 2014 but has since been extended; and
- The Environment Management Act primarily addresses risks to physical health from environmental issues. The Environment Assessment Modernisation Bill 1 July 2010 and 1 April 2011 has revised the EIA process to allow for a tiered process for simple versus complex projects. The consideration of health in such projects will vary based on the potential impacts.

Len den Broeder and Brigit Staatsen contributed to discussion of HIA in the Netherlands within Kemm 2013. They observed that HIA developed along two different lines – public health approach and environmental field approach. HIA undertaken within the public health paradigm were typically of health policy such as tobacco, housing and other infrastructure. HIA in the environmental field emerged out of EIA. The limitations of ELV as a policy rather than health based criteria and the focus of EIA on negative impacts only were a driver to expand health aspects. In recent years the authors note that the two streams of HIA have started to merge – that is that environmental HIA has expanded to include other aspects such as lifestyle, social cohesion and access to facilities. In addition public health authorities have become more involved in spatial planning.

In 2009 the Commission of EIA experts recommended that health assessment should be undertaken for large infrastructural industrial projects and airports near residential areas. The Netherlands Commission for Environmental Assessment (NCEA) prepared a factsheet to address health aspects in EIA. The guidance recommends tools such as spatial representation of health impacts (i.e. to identify separation zones) and quantification of health impacts via a DALY approach.

In particular the spatial-planning approach to the impact of emission limit values is used to assess impacts on local populations. The approach presents visualised contour maps which indicate exposure categories and impacts e.g. good / bad. Broeder et al noted that a 2010 survey indicated this tool has been quite helpful in decision making.

A number of other tools for HIA are available in the Netherlands. The Health Council are independent advisors to the government and have developed guidance on the assessment of social determinants of health (Health Council of the Netherlands, 2012). RIVM have also published a guidance document for HIA, HIA database and an online health in spatial planning checklist. While useful, Broeder et al note that the checklist is not used often and needed to be expanded with information and recommendations on HIA and health determinants. It is also noted that RIVM have a strong legacy of scientific research on environmental exposure and quantified risk assessment methods.

8.3 Norway

In Norway, regulations on health assessment are rooted in:

- Instructions for Official Studies and Reports (which states health as one of the impact assessment topics, Norwegian Government 2005;
- Norwegian Public Health Act of 2012 through the Ministry of Health and Care Services; and
- Planning and Building Act (2009) and in the regulations on impact assessment under the Planning and Building Act by Ministry of Environment.

The purpose of the Norwegian Public Health Act is to contribute to societal development that promotes public health and reduces social inequalities in health. Public health work shall promote the population's health, well-being and good social and environmental conditions, and contribute to the prevention of mental and somatic illnesses, disorders or injuries.

In the Norwegian Public Health Act, under Chapter 3 «Environmental health» § 11 Health impact assessments, the following are stated:

'The purpose of this provision is to assess the potential health impacts of a planned or existing project or business. However, the municipality may order whoever is planning or engaging in activities, or whoever is responsible for the situation at a property, to assess the possible health impact of the measure or situation at their own expense. Such an assessment may only be demanded if the inconvenience caused by the assessment is in a reasonable proportion to the possible health impact indicating that the situation should be studied. The appellate authority has a corresponding right to demand a health impact assessment when hearing appeals.'

Discussions with the Norwegian Directorate for Health indicate that that medical expertise and assessments will be required to be involved when determining the requirements for impact assessments and the assessments of these. The provision of the Public Health Law will primarily apply to cases where the impact assessment provisions of the Planning and Building Act does not apply.

Norwegian impact assessment regulations represent the transposition of the European SEA and EIA Directives. Within the regulations criteria for consideration of health include projects or plans that may have significant consequences for the population's access to outdoor areas, buildings and services, may have consequences for public health due to significant changes in the composition of the population, the housing market, housing needs or the need for services.

The Directorate for Health website outlines the legislative requirements for public health to be addressed via the Public Health Act and the Planning and Building Act. The link between public health and municipal planning is called out along with the roles and responsibilities of local and regional authorities. A checklist for public health within the municipal planning system has been developed and the latest review published in 2012.

The WHO 2014 study considered how health is integrated in EIA in Norway. They note that efforts to reach an agreement between the Ministry for the Environment and the Directorate for Health on workable criteria have been ongoing for a number of years without success.

A series of papers were discussed which looked at how health is being assessed in impact assessment and within municipal planning in general. One paper considered there was little interaction between planners and public health coordinators. A 2005 study indicated that the treatment of health in seven impact assessments was relatively successful due to health stakeholders active involvement in the process. They note that health has to be clearly defined to be handled adequately. Showing good will or applying too general an approach does not produce sufficient results in terms of good enough quality (Hofstad, 2011).

Difficulties observed in addressing health in land-use planning were observed – it was considered difficult to demarcate, define and frame and has no one simple commonly accepted agreed solution (Hofstad, 2011).

They note that political will from authorities will be needed and even increased for there to be continued success in this area.

A number of guidance documents for inclusion of health within planning and development decisions have been developed and include consideration of social determinants of health (Sosial-og helsedirektoratet, 2006, Helsedirektoratet, 2011). The guidance documents address the social determinants of health model. Discussions with the Norwegian Directorate for Health indicated that guidance for HIA is currently being developed and that the Directorate will be adapted to support and offer advice on how and when to conduct HIA.

The Norwegian Institute for Public Health has considerable research capabilities relating to environmental health which are undertaken within the Department for Environmental Medicine. Exposure and risk assessment methods are therefore well developed.

8.4 Sweden

The Environmental Code and the Planning and Building Act form the legal basis of physical planning in Sweden. The Environmental Code constitutes an 'umbrella' for the Planning and Building Act as well as other special laws that have an impact on the physical environment. The aim of the Environmental Code is to promote sustainable development. It is to be applied so that human health and the environment are protected. The term health in the Environment Code is not defined in terms of physical and / or social health determinants.

The role of HIA in Sweden is largely based in public health policy. In 2003 the Swedish Riksdag adopted a government Bill Public Health Objectives (2002 / 03:35). The Bill brought a paradigm shift in public health policy from one that had previously been based on disease or health problems to one that was based on health determinants.

Public authorities at all levels should be guided by 11 public health objective domains which cover the most important determinants of Swedish public health. The 11 objectives focus on life conditions, environments, products and lifestyles.

1) Participation and influence in society;
2) Economic and social prerequisites;
3) Conditions during childhood and adolescence;
4) Health in working life;
5) Environments and products;
6) Health-promoting health services;
7) Protection against communicable diseases;
8) Sexuality and reproductive health;
9) Physical activity;
10) Eating habits and food; and
11) Tobacco, alcohol, illicit drugs, doping and gambling.

This approach has resulted in support for research on and use of HIA in planning. The Swedish National Institute of Public Health (SNIPH) has the role equal to Swedish Environmental Protection Agency when it comes to government of the public health objectives, but they are not stated in environmental legislation in a manner similar to the environmental objectives.

The SNIPH has had a role in the promotion and development of HIA. In 2004 it developed 70 indicators for health determinants relating to the public health objectives, at the request of the government. The indicators

were established in cooperation with national agencies. The SNIPH has also developed a significant number of guidelines associated with planning and public infrastructure. A Guide to Health Impact Assessment: Focusing on Social and Environmental Sustainability (SNIPH, 2005) is a general guide to HIA and presents the five different stages that should be included in an HIA. The aim of the guide has been for the health impact assessment to reflect both social and environmental sustainability, and to act as a complement to environmental impact assessments (EIA) and assessments of the effects of certain plans and programmes on the environment (i.e. SEA).

Knutsson et al have reported on progress of HIA in Sweden (Knutsson, 2010). They considered various factors that have facilitated uptake in HIA in Sweden. In their conclusions they indicate that the Public Health Bill had a significant effect as a framework for HIA in Sweden. HIA became a cornerstone for addressing evidence based determinants for health and population groups requiring priority attention. They consider that the framework is probably unique by international comparison.

Other particular aspects they note are:

- Government strategy to implement HIA through assignments. One such example was a requirement that County Administrative Boards (CAB) reviewed health in EIA with the use of HIA. This increased understanding and use of health both at CAB and municipality levels; and
- Consistency in the framework despite government change has allowed implementation to continue to grow. This is a factor that may have challenged HIA progress in other jurisdictions such as the Netherlands and the UK (at city level).

8.5 Slovakia

The approach in Slovakia was to address health in Public Health legislation. It was included in the Protection, Support and Development of Public Health Act (355 / 2007) of the Slovak Republic in 2007. Under Article 1 (9) it requires:

'*The assessment of environmental health risks or the assessment of impacts on public health if….proves that the proposed activity may have a significant impact on public health and if the respective body of public health requires its presentation.*'

The Slovak National Public Health Authority (NPHA) based in the Bratislava region, plus the 36 Regional Public Health Authorities, are responsible for approving and assessing HIAs (37 Authorities in total). Between the 2007 Act and HIA's enforcement since January 2011, the NPHA was responsible for training public health officials in HIA. HIA is coordinated within the Environmental Health departments of the NPHA.

O'Mullane et al, (in press 2013) undertook a survey exploring perspectives on the upcoming enforcement of HIA in Slovakia in 2010. The survey included 37 heads of Environmental Health Departments, of which 14 responded. The questions were focussed on understanding if the timing of HIA was appropriate and if the respondents felt there was adequate training or resource support to implement enforcement of HIA.

The key outcome of the research was an overall impression that the by legislating they had put the 'cart before the horse'. The legislation had been put in place before the infrastructure to implement it had been appropriately developed. Amongst others, some of the issues identified included:

- Fear of commercial implications – e.g. effect on timing of projects, costs, objectivity, capacity to support a decision (and commonly the misunderstanding that it would be used to make the decision).
- Lack of clear communication to heads of Environmental Health Departments in how to enforce HIA legislation;
- Lack of preparedness within infrastructure to undertake HIA; and
- A dearth of leadership and guidance from senior positions in Public Health on the legal framework for HIA.

The paper concluded with recommendations for further training and education, national HIA resource centres and cross-country support to improve integration of HIA in the public health system.

8.6 Summary Health in Planning across the EU

Table 11 provides a summary of how and where environmental health is referenced in other countries in legislation. In some instances it is not referred to other than within EIA or SEA regulations. In other cases there is a direct reference to health or health assessment within Planning and Development or Public Health Legislation.

Table 11: Summary of Treatment of Environmental Health in Planning, across EU

Topic	Ireland	UK	Norway	Sweden	Slovakia	The Netherlands
Health relating to planning / projects defined in legislation	Requirement to notify HSE where there may be significant risk to Public Health in Planning and Development regulations	Via guidance based on the national planning framework and Health and Social Care Act, EIA and SEA	direct reference to health assessment via Public Health Act	Via requirement for health protection within Environment Code	Via requirement for health assessment for environmental projects within Public Health Act	Via Environment Management Act
Role of Health Agency	Comment	Comment	Comment	Comment	Enforcement	Comment
Central Unit - Environmental Assessment	Partial for EIA consultation requests, assessment is undertaken locally for central collation. Referrals under 'significant risk to public health' are local and response is local.	No, health assessed at local Primary Care Trust	No	No	Yes, National Public Health Authority	Yes for Environmental Assessment
Tiered system to manage EIS or licensing	No	Yes	No	Yes	No	Yes

- Some of the approaches that were noted included: A number of countries have formally addressed the link between public health planning and development through a variety of mechanisms such as national planning frameworks, public health strategies and legislation;
- Legislation for HIA was observed within Public Health Acts or were incorporated in Planning and Development Acts with corresponding requirements in Public Health Acts;
- Public Health policies based on social determinants of health were common;
- Some countries indicated strong support for HIA and HIA units with significant training resources;

- Mandatory HIA for certain projects of significance;
- Mandatory scoping included requirements regarding health aspects;
- Tiered or proportionate approach to assessments were observed;
- Strong national research groups in certain aspects of health e.g. quantitative risk assessment methods and exposure assessment; and
- Available small area data in some countries.

The consideration of health at the planning-environment varies considerably from one country to the next. Ireland has a strong reference to health (e.g. significant risk to public health) in planning regulations compared with planning regulations in the UK. However, the UK national framework for planning in combination with the Health and Social Care Act prompted the TCPA to develop guidance for evidence based consideration of health in planning in 2012. The Department for Communities and Local Government launched a planning practice guidance web-based resource in 2014. This planning portal includes guidance relating to the role of health and wellbeing in planning.

The role of Health in planning and in particular HIA as a method of assessment, is seen under the jurisdiction of the Ministry of Health a number of countries – often legislated through Public Health Acts. This may be due to the broad intersectoral approach to assess how and where health may be impacted by a plan or project, beyond those of emissions management. In this respect it can be seen that while Norway and Slovakia are the only countries to have legislated HIA. The UK, Sweden and the Netherlands have adopted certain aspects where they have been considered beneficial. Where health is regulated solely through Ministries for the Environment it appears to more frequently comprise a narrower definition of health to support management of licensed facilities and environmental emissions. It is noted that while Norway has legislated for HIA within the Planning and Building Act there is corresponding legislation within the Public Health Act for those policies, projects or plans that would not be captured through planning and development.

It is noted that the definition of health in environmental projects and plans appears to be expanding and clarification of roles and responsibilities relating to environment and wider health determinants become more prevalent in a number of countries. Another observation notes that the new Healthy Ireland definition for health may be more comprehensive than the interpretation of health within Irish planning legislation. The consideration of health in planning is based on ‘significant risk to public health’. It is not clear if this definition in planning restricts the capacity of planning authorities to support those health initiatives that are rooted in the concept of health promotion as a result. Some health promotion practitioners in Ireland raised concerns that their capacity to object to certain developments was impeded by a lack of legislative basis for protecting health promotion initiatives. If this is the case it may be appropriate to consider the current interpretation of health within the Planning Act is aligned with future objectives to protect and promote health and wellbeing.

9.0 HEALTH IN ENVIRONMENTAL ASSESSMENT AND PERMITTING IN EU

9.1 Strategic Environmental Assessment

9.1.1 SEA in Ireland

The SEA Directive was transposed into Irish planning law by the following Regulations:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004); and
- Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. 436 of 2004).

Two amending SEA Regulations were signed into Irish law on 3 May 2011, amending the original SEA Regulations.

S.I. 436 sets out the procedural requirements for the preparation and consideration for the Environmental Report prepared in the course of an SEA, including scoping and public consultation and the integration of the requirements with existing plan preparation and review processes. The Environmental Authorities to be consulted at various stages of the SEA process are:

- The Environmental Protection Agency (EPA) for all applications;
- The Minister for the Environment, Heritage and Local Government, where the planning authority considers that a plan might have significant effects in relation to the architectural or archaeological heritage or to nature conservation; and
- The Minister for Communications, Marine and Natural Resources, where the planning authority considers that a plan might have significant effects on fisheries or the marine environment.

9.1.1.1 Irish guidance on health in SEA

A number of guidelines on how to undertake SEA have been published and specific references to health are presented in Figure 7. SEA not only requires consideration of human health and populations as described below but also consideration of the inter-relationship of all environmental receptors (i.e. biodiversity, water, soil, air, landscape, cultural heritage, population, human health, climatic factors, material assets and other relevant receptors).

Department of Environment Community and Local Government, 2004	• Indicative list of environmental protection objectives relevant to human health:
	  • Population – improve peoples **quality of life** based on high-quality residential, working and recreational environments and on sustainable travel patterns.
	  • Minimise noise, vibration and emissions from traffic, industrial processes and extractive industry.
	• Other environmental protection objectives associated with human health e.g. sustainable water use, brownfields regeneration, air plans, floods etc.
	• Health checklist :*'Are primary and secondary effects on human health and welfare described and, where appropriate, quantified? (e.g. health effects caused by release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups)'*
	• sources for statistics associated with population and human health.

SEA Process Checklist, 2013	• provision of adequate and appropriate infrastructure and to serve both the existing community and likely future predicted increases in population within the Plan area.
	  • exploring current practice and opportunities with respect to promoting the protection and, as appropriate, improvement of "Quality of Life". Where relevant, the application of existing "Quality of Life Indices" would be considered in consultation with relevant statutory and non-statutory bodies / organisations.
	  • relevant aspects associated with physical health in terms of water, biodiversity, air, energy as discussed below.

Figure 7: Summary of health in Irish guidance for SEA

The SEA Process checklist goes on to provide guidance regarding establishing environmental objectives, targets and indicators. Impacts are to be described in terms of direction (positive / negative), duration and timing, cumulative or synergistic effects, primary and secondary effects and the inter-relationship between environmental receptors. The SEA process may be used as a mechanism to highlight and integrate Human Health aspects in subsequent project level assessments such as EIA or licence applications.

The National SEA (Environmental Authority) Technical Forum was established as part of the SEA Efficacy Review in 2012 (EPA, 2012). Through the Forum the five SEA statutory environmental authorities in Ireland jointly developed an SEA Action Plan to implement recommendations of the review. This forum, in collaboration with relevant health stakeholders such as the HSE and / or the Institute for Public Health, may be an effective space in which to identify and address additional needs in regards to addressing health in SEA.

It is noted that the inclusion of wider determinants of health and the concept of 'quality of life' would indicate that the existing definition of health in SEA is generally aligned with the objectives of Healthy Ireland.

9.1.1.2 Public participation in SEA

The Planning and Development (Strategic Environmental Assessment) Regulations 2004 give effect to Article 6 of the Directive on public consultation requirements by providing that:

- The Environmental Report must be put on public display along with the draft plan;
- In addition to the draft plan, the Environmental Report must be sent to the prescribed authorities and the environmental authorities; and
- Written submissions are invited on the Environmental Report as well as the draft plan.

Regional and planning authorities can take a pro-active approach to engaging the public in the SEA process; the guidelines quote an example where a portion of the authorities' website may be dedicated to SEA information.

9.1.1.3 Scoping

The SEA Directive provides for considerable flexibility concerning the scope and the level of detail to be included in the environmental report. As part of the SEA scoping process, EPA suggests convening of a Scoping Meeting / Workshop with key staff within the LA (planning, roads, environment, heritage etc.). They also support consultation with personnel from National Parks and Wildlife Service (NPWS), Department of Communications, Energy and National Resources (DCENR), and Environmental Protection Agency, as appropriate.

9.1.1.4 IPH review of SEA reports

The Institute for Public Health undertook a review of 36 SEA carried out in Ireland and Northern Ireland to assess how health has been addressed (IPH, 2011). The review comprised a desktop review of SEA reports and as such did not include engagement with the EPA or authors of the SEA reports. The following key areas were addressed:

- Understanding of health;
- Health expertise;
- Health data; and
- Monitoring of health.

Overall the IPH noted the findings reflected other studies. They provided the following recommendations for improvements in the consideration of health in SEA:

- Broadening the definition of health used in SEA to include social and economic determinants of health;
- Development of clear consideration of what aspects of health are appropriate to cover within SEA;
- Adoption of the Department of Health, England guidance document to provide clearer guidance on how to assess health effects;
- Involvement of health professionals at the outset of undertaking an SEA to support scoping, data gathering and ensuring monitoring reflects consideration of health;
- Development of a clear framework for engagement from the health sector;
- Increase dialogue with health professionals to ascertain what health information is required in order to facilitate increasing assessment of health; and
- Increasing both the level of baseline data and broadening the understanding of health to ensure health impacts are closely monitored into the future.

They conclude that guidance on necessary health information and sources is required to support practitioners. They also note strengthening the consideration of health in SEA over the introduction of HIA in addition to SEA would likely be a more cost effective option. It would also streamline assessments

producing one set of recommendations for policy makers. These opportunities may be addressed through the National SEA Technical Forum in collaboration with relevant health stakeholders.

9.1.2 Health in SEA in case study countries

The following section summarises how health and related aspects are approached in SEA in the EU countries assessed. Within Sweden, Norway and The Netherlands the SEA Directive has been implemented in wider domestic environmental assessment legislation.

Table 12 presents a summary of the key information observed between Ireland and the other EU countries assessed. The main topics considered include:

- Is a health agency included as a competent authority?
- Is a health agency included as an advisor?
- How has health been interpreted in guidance (e.g. physical and / or social health determinants identified as environmental objectives?)
- Level of guidance available on how to approach health in SEA (none, minor, comprehensive); and
- Is scoping mandatory? Inclusion of health aspects may increase where scoping is mandatory.

Table 12: Summary of information relating to SEA

Item	Ireland	UK	Sweden	Norway	Netherlands	Slovakia
Reference to Health in Domestic Legislation	Population Human health	Population, human health	Human health	Human health	Human health	Health
Health as an authority	No	No	No	No	No	In part
Health authority as an adviser	Voluntary	Voluntary	Voluntary	Voluntary	Via public consultation at Municipal level	Preparation/ review by accredited individuals, assessment of expert standpoint by public health authority.
Description of health in guidance	Physical and social	Physical and Social	Physical (though social considerations addressed by SNIPH)	Physical and Social	Physical and Social	Physical and Social
Depth of guidance on approach to health in SEA	Moderate	Comprehensive	None on health in SEA, other guidance available by SNIPH	Guidance on impact assessments, health aspects include physical, social and	Short guidance – factsheet.	Guidance on health obtained via the CBEH project

Item	Ireland	UK	Sweden	Norway	Netherlands	Slovakia
			(SNIPH 2005).	economic.		
Scoping requirement	Voluntary with competent authority	Voluntary with consulting authority	Mandatory for large projects	Mandatory	Mandatory public notification of project	Voluntary however sections are prepared by professionally accredited persons
Review of final by competent authority	Planning authority or An Bord Pleanala	Planning Authority	Municipality / CAB / Environmental Court (depending on size of plans / programmes)	Planning Authority	NCEA	Planning authority
Public participation	At draft report	Varies between countries	At scoping	At scoping	At notification of proposed plan – opportunity to contribute to scoping.	At notice of intent

9.1.2.1 Health agencies as competent authorities or advisors in SEA

None of the case study countries identified health agencies as competent authorities or prescribed bodies for SEA. This is not to say that health agencies are not consulted at any stage during an SEA, rather it is not a mandatory requirement or health may be considered via another mechanism such as HIA. It is also noted that in each country and similarly to the Irish situation, health agencies are engaged as part of a consultative process during the development of a plan.

The Public Health Authority of the Slovak Republic may assess or elaborate upon expert standpoints within the preparation of Environmental Assessments.

In the UK the competent authorities (consultancy bodies / authorities) do not include a health agency however the UK Practical Guidance on SEA indicates likely appropriate bodies such as Primary Care Trusts who may be consulted where human health is concerned.

In the Netherlands consultation with health authorities is not considered at national levels however at municipal level local health agencies may give advice regarding the content of SEA during public consultation phase (personal communication with NCEA).

9.1.2.2 Guidance on approach to health

By far the most comprehensive guidance regarding health and SEA was found in the UK although there was some variation between Scotland, Northern Ireland, England and Wales individually.

Key sources for guidance on health included:

- UK Office of the Deputy Prime Minister (2005) which includes direct reference to HIA, methods and sources of baseline information;
- The Environment Agency (UK) has indicated the use of Quality of Life indicators;

- The HIA Gateway has become part of Public Health England and has provided a number of resources for health in SEA on its website. These include:
  - Courses including an e-learning course on health in SEA;
  - Examples of reports on SEA some with HIA, some with health content;
  - Guidelines and evidence sources;
  - Tools such as screening tools, checklists, causal diagrams for health determinants and predicted health outcomes;
  - Policy Documents;
  - Evidence reviews;
  - Bibliography for published journals on SEA and health in SEA; and
  - Networks and events.
- Natural Scotland published a SEA Toolkit in 2006 that included a chapter on the assessment of impacts to human health. The guidance recognised that the majority of stakeholders do not currently have significant experience in this area and that guidance would be updated as skills became more established. While HIA was noted as not required there were a number of references to where the methods and processes in SEA and HIA overlap and direction to further guidance including screening criteria. This guidance was updated in August 2013 and the reference to health was reduced to focus on physical effects such as pollution, noise, vibration. The 2013 guidance notes that social impacts such as crime are less directly covered by the 2005 Act and practitioners may wish to explore wider health implications through a voluntary HIA;
- The Netherlands has issued a fact sheet on consideration of health in EIA and SEA. The fact sheet indicates the type of development that may require consideration of health and health assessment methods that are appropriate. These include consideration of separation zones, GBD DALY approach and the Dutch Gezondheids effect screening guidelines which are short guidelines primarily focussed on physical impacts e.g. air quality, noise, although they do also mention other aspects such as access to green space. The guidance does recommend consulting a health professional when assessing health aspects. In addition to the NCEA guidance, there are a number of other tools prepared by RIVM such as guidance on HIA and other tools such as the HIA for City and Environment method. The Health Council in the Netherlands has also published a report on the consideration of social determinants of health including information on methods used to integrate social and environmental aspects of health (Health Council, 2012);
- National guidance on SEA methodology or health in SEA was not found for Slovakia. However Slovakia participated (along with 7 other eastern European countries) in a WHO project looking to support building capacity of health within environmental assessment (as discussed in Section 6.0). The project outcome was a number of key documents and a framework to support countries looking to improve approaches to health and the environment. It discusses health determinants in addition to administrative and training aspects, much of which may also bear relevance to the Irish context of SEA. It is also noted that SEA/EIA legislation in Slovakia requires technically competent persons who are certified by a national body to undertake specific aspects of SEA and EIA. The assessing body must include a member of the Ministry for Health;
- In Norway a guidance document on environmental health has been developed by the Norwegian Directorate for Health (Sosial- og helsedirektoratet, 2006). It is based on the social determinants of health model and includes biological, chemical, physical and social issues that may affect health; and

- In Sweden 'Practical guidelines on Strategic Environmental Assessment of plans and programmes' did not include detailed references to health. The SNIPH have published guidance on HIA with an objective of complimenting EIA and SEA (SNPIH, 2005).

9.1.2.3 Scoping and consultation

Scoping is a voluntary step for SEA in Ireland, the UK and the Netherlands and mandatory in Sweden and Norway. In each country there were different levels of public consultation at this step ranging from none at all to active engagement.

For example after a recent review on the effectiveness of SEA, the Scottish Government decided to expand their guidelines on what 'early and effective engagement' entails to include consideration of consultation at scoping and methods of communication such as email alerts. In Norway, Sweden and the Netherlands there is also public participation early at notification or scoping stage.

In the UK the environmental authorities must be consulted at various stages of the process however they are not required to respond. In the Netherlands the NCEA are involved in the review of the overall plan and are available to assist in scoping. The public are generally notified early in the project process. In Sweden, depending on the size of a project / plan the adjudication of the environmental assessment may be done at municipality, county administration board or Environmental Court level.

9.2 Environmental Impact Assessment

9.2.1 EIA in Ireland

The EIA Directive Council Directive 85 / 337 / EEC as amended by Directive 97 / 11 / EC, Directive 2003 / 35 / EC and Directive 2009 / 31 / EC and codified by 2011 / 92 / EU on the assessment of the effects of certain public and private projects on the environment) has been implemented in Ireland. The EIA Directive is currently enacted through our Planning and Development Acts 2000 to 2013 specifically part X of the Acts and Part X and Schedules 5, 6 and 7 of the Planning and Development Regulations 2001 to 2013. The local planning authority or An Bord Pleanala are the competent authorities for EIA in Ireland.

9.2.1.1 Health in EIA guidance in Ireland

Advice regarding the practice of EIA in Ireland has been published in:

- Guidelines on the information to be contained in EIS (EPA, 2002);
- Advice Notes on Current Practice in the preparation of EIS (EPA, 2003);
- Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub Threshold Development (Department of Environment, Heritage and Local Government, 2003); and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, 2011)

The 2002 and 2003 guidelines consider human beings to comprise 'the existence, activities and wellbeing of people within the context of populations. It is intended that the EIS concentrates on those topics manifested in the environment e.g. land use, buildings, and greater emissions. The guidance notes issues such as employment, commercial competition, zoning and other social and economic issues are dealt with by more specific instruments (such as the Planning Acts).

However economic and social consideration are still considered in the context of the development. The guidance asks a range of questions that are associated with human health such as:

- Will it stimulate additional development – if so where?
- Will it change activities and land use or result in loss of rights of way or amenities?
- Will there be risks of death, disease or nuisance?

- Who are the most sensitive or vulnerable receptors and what are the main fears associated with the development?

While the information required includes consideration of some social determinants of health however it does not provide guidance on suitable indicators or methodologies for impact assessment.

While some broader indicators for health are considered in the current EIA guidance it is noted that the focus is primarily on prevention of negative impacts to health. In this regard there are some differences when compared with the definition of health in Healthy Ireland which seeks to prevent ill health and maximise health benefits. This inclusion of positive health impacts may not be addressed adequately by the current definition of health within planning and EIA legislation.

9.2.1.2 Public participation

Current guidance regarding public participation in EIA indicates two paths for consultation:

- Making observations or submissions: in response to any preliminary invitations to participate e.g. scoping, evaluation of alternatives or document review. Consultation may occur through public notifications, via public representatives or at community meetings facilitated by the applicant. Early engagement is noted as being more beneficial; and

- Direct participation: aims to develop accurate and focused communications between applicants and members of the public. This may occur via local community groups.

In practice public consultation occurs largely after publication of the EIS, prior to the decision. It does not frequently occur at the scoping stage, although an increase in scoping consultations has been observed in recent years. However it is also noted that EIA is an iterative process in Ireland and opportunities for stakeholders to provide comment can be used to identify key concerns of the local population and may result in requests for further information. Recent developments at EU level (e.g. Aarhus Convention) may impact these processes.

9.2.1.3 Scoping

Scoping is not mandatory in Ireland; however it may be undertaken by the competent authority if requested in scenarios such as:

- For licensed facilities the EPA is a competent authority and will assess an EIS submitted as part of an application for an environmental permit. EPA can provide scoping advice for these EIS on request. In turn EPA can request HSE to assist in scoping for health aspects; and

- The EPA is also a consultee to An Bord Pleanala (ABP). EPA will make observations relating to EIS for Local Authority Developments and Strategic Infrastructure Developments (SID) that include a licensable activity. If requested by the Planning Authority or ABP, the EPA can provide scoping advice for information to be contained within an EIS.

9.2.1.4 Stakeholder considerations of EIA in Ireland

A number of concerns have been raised by stakeholders on the quality of health aspects of EIA prepared in Ireland. It is important to note the concerns are not necessarily indicative that health is inadequate in all projects. The overall consensus was a desire to see a more cohesive approach to addressing health in EIA. The concerns most frequently raised included:

- A generally weak human beings section such that the community profile may be loosely described but potential impacts are not addressed;

- Lack of public consultation during development of the EIA report – often consultation occurs after a report is written;

- Lack of scoping for health and consideration of health only in terms of individual media such that potential exposure pathways are not identified and discussed in a holistic approach – i.e. consideration of cumulative impacts is not appropriately addressed;
- Minimalistic approach to most at risk individual (MARI) reports which lack transparency in the reporting of calculations, results and limitation or assumptions; and
- Lack of comparison between predicted emissions versus impact on existing baseline health status of the population.
- Lack of availability of small area health data to support undertaking assessment of existing health status of populations and a lack of clarity on how to define boundaries of such a population.

Golder reviewed a limited number of EIA which indicated elements of the above concerns. It was noted that a considerable degree of information was collated for some reports but a cohesive approach may have been lost where individual sections on health were addressed by different consultants resulting in an unclear picture regarding the whole of health aspect. This is by no means an indictment of every EIA produced rather a general observation from a limited review and does not constitute a thorough quality review.

9.2.2 EIA in Ireland compared to other EU countries

The following section summarises how health and related aspects are approached in EIA in the EU countries assessed. Table 13 presents a summary of the key information observed between Ireland and the other EU countries assessed. The main topics considered include:

- Is health referenced in the domestic implementation of the EIA Directive?
- Is a health agency included as a competent authority?
- Is a health agency included as an advisor?
- How has health been interpreted in guidance (e.g. physical and / or social health determinants identified as environmental objectives?);
- Level of guidance available on how to approach health in EIA (none, minor, comprehensive); and
- Is scoping mandatory? Inclusion of health aspects may increase where scoping is mandatory.

Table 13: Summary of information relating to EIA

Item	Ireland	UK	Sweden	Norway	Netherlands	Slovakia
Reference to health in Domestic legislation	Human beings / populations	Varies, population in Scotland, health in England	Human health	Human health	Human health	Human health, however more comprehensive health assessment required as part of planning legislation
Health Agency as an authority	No	No	No	No	No	Yes in health assessment, No in EIA/SEA
Health as an adviser	Voluntary	Voluntary	Voluntary	Voluntary in EIA	Voluntary	Voluntary although accredited health professionals

						involved within development of EIA
Interpretation of health in national guidance	Physical and Social	Physical and Social	Physical	Physical and social	Predominantly physical, though light social reference.	Health in EIA addressed via CBEH project and considers physical and social
Depth of guidance on approach to health	Information described, methodology not	Scoping guidance for health including physical and social impacts, references available	Specific guidance for health in EIA and SEA from Swedish National Institute for Public Health (SNIPH)	Specific guidance for health in environmental assessment by Directorate of Health	Short guidance – information and methodology briefly described with references.	Guidance via CBEH comprehensive, unclear how this has been disseminated.
Scoping requirement	Voluntary	Voluntary	Mandatory	Mandatory	Voluntary	Voluntary
Public participation	Generally in advance of submission of application of planning application / licence however not always the case.	At draft report	At scoping	At scoping	At notification of proposed plan – opportunity to contribute to scoping.	At notice of intent
Tiered assessment	No	No	Yes	No	Yes	No

9.2.2.1 Health agencies as competent authorities or advisors in EIA

Consultation with health authorities appears to occur via voluntary submissions in a number of countries such as the Netherlands and Sweden. In the UK EIA and licence applications may be sent to local Primary Care Trusts for consideration, the HPA have developed guidelines to support the PCTs in their review. In some instances a stand-alone HIA has been conducted by a health authority to supplement an EIA. For example, the Plymouth teaching Primary Care Trust undertook a 'Rapid prospective desk-top health impact assessment' for the Energy from Waste Plant in Devonport, Plymouth (Public Health Plymouth, 2011). The rationale for conducting a HIA in this instance was to further inform the Public Health response to the planning application and to assist the Developers with regard to promoting health benefits and mitigating adverse health impacts.

The issue of health impacts is often considered at scoping level in Norway, Sweden and the Netherlands.

9.2.2.2 Guidance and approach to health

By far the most comprehensive guidance regarding health and EIA was found in the UK although there was some variation between Scotland, Northern Ireland, England and Wales individually. Key sources for guidance on health included:

- The Environment Agency (UK) Handbook for scoping projects, 2002. Includes guidance on physical and social determinants of health and consideration of sources of information;
- The Environment Agency – multiple guidelines on scoping specific developments e.g. oil and gas where health impacts (including perceived impacts) for the particular industry are discussed further;
- Specific guidance on quantitative health risk assessment is not discussed in the context of EIA in the UK however a number of reports have utilised methods such as US EPA (1989); COMEAP (2009), HIA and burden of disease approaches;
- In Slovakia the US EPA methodology for HHRA is recommended as appropriate. In the Czech Republic, all EIA with emissions must use US EPA methodology. In addition Slovakia were part of a WHO project on improving consideration of health in EIA and SEA through the CBEH project, this includes both physical and social determinants of health (Section 6.0);
- As noted previously, the Netherlands have issued a fact sheet on consideration of health in EIA and SEA which includes both quantitative health risk assessment methods and consideration of some social health determinants;
- In Sweden comprehensive guidance is not available however recommendations are made regarding appropriate models and methods; and
- In Norway the guidance document on environmental health developed by the Norwegian Directorate for Health relates to both SEA and EIA and includes consideration of social determinants of health.

Two impact assessments for Energy from Waste facilities in the UK included relatively comprehensive health assessments, though neither fully address all aspects of concern highlighted by stakeholders in this project. The Devonport Energy from Waste impact assessment was conducted to support the environmental permit application and included:

- Visual methods of indicating air quality impacts similar to those recommended within Dutch guidance;
- Burden of disease assessments for PM2.5, PM10, NOx and SOx, based on zones identified using visual mapping of predicted air quality impacts;
- A health and wellbeing report which collated health aspects of previous chapters (e.g. air, water, transport). The causal pathway which framed the health and wellbeing assessment is presented in Figure 8; and
- HHRA for exposure to metals and organic compounds (benzo(a)pyrene, dioxins and furans, in general accordance with US EPA 1989 methodology.

It is noted that the NHS undertook an additional HIA to assist in their review of health issues in the EIS and to highlight additional management options to the Developer.

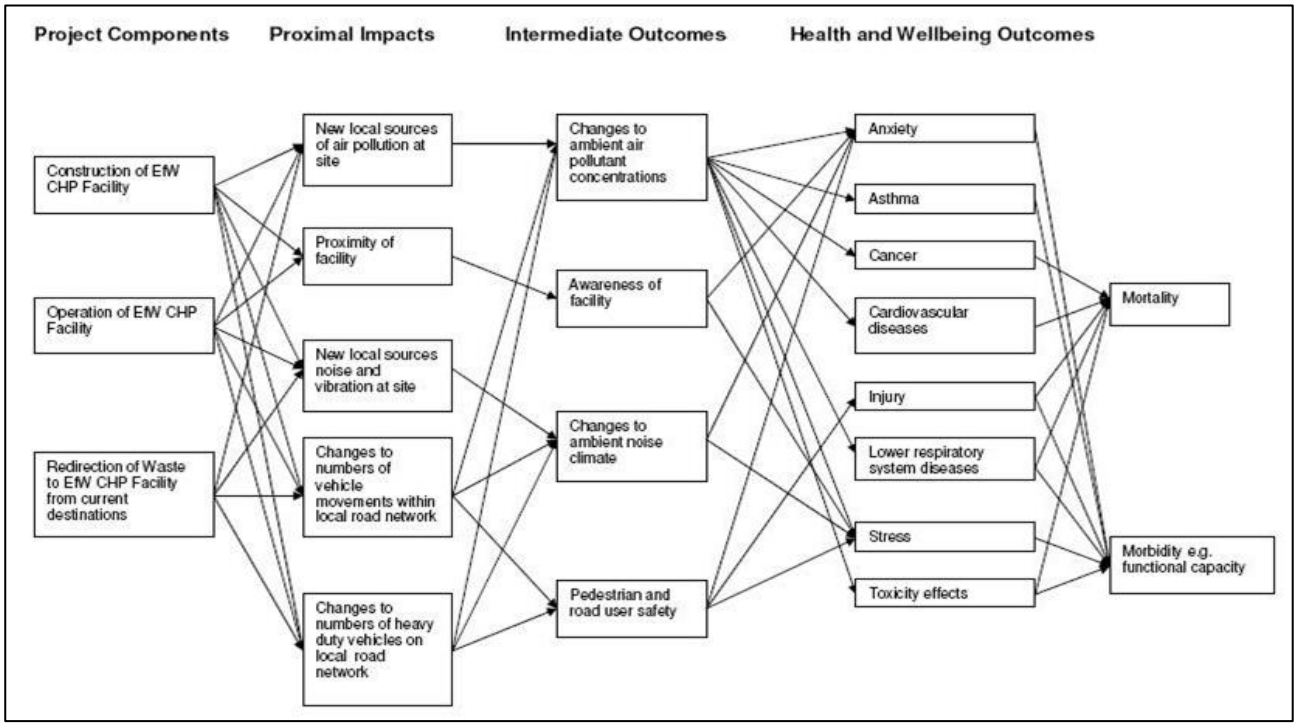

Figure 8: Framework for Health and Wellbeing assessment, Devonport Energy from Waste, 2011

The Rose Energy report comprised a combined HHRA and HIA. The methodology used for the HHRA was also generally based on US EPA methods and included consideration of risks associated with metals and dioxins. Other emissions were dealt with separately within the EIA. The HIA considered impacts during construction, operations, decommissioning phases on issues such as injury, mental health and wellbeing, transport and connectivity, housing and accommodation, lifestyle and daily routine.

Several Swedish examples of EIA were briefly reviewed. The treatment of health was largely undertaken in the context of physical health and comparison against legislated ELV. Borealis facilities in Stenungsund include a cracker and polythene plant and an EIA was prepared as part of a renewal of an existing environmental permit. The main environmental impacts described are emissions to air (VOC, NOx, SO_2, CO_2, and dust), odour, emissions to water and noise. No quantitative risk assessment concerning human health was undertaken but references were made to studies that have been carried out in the area e. g. a study carried out by Gothenburg University concerning the occurrence of cancer in the region. Emissions to air considered likely impacts, preventative measure, potential recipients (air quality in the area, emissions from other industries and from traffic and air pollutions from long distance transportation by air). The final assessment considered consequences from air emissions referring to municipal air quality and environmental quality standards. Additional studies from other industrial activities in the area are also accounted for. With regard to emissions from water the assessment very briefly considers bio-accumulation of substances from process water into potential food sources based on the physic-chemico properties of the chemicals of concern rather than quantification of exposure.

An EIA for a mine in Norway was reviewed. Elements associated with health were addressed in separate chapters. A number of social impacts were addressed however the reviewer noted they largely focussed on positive impacts relating to economic improvements. Minority groups were considered as were impacts to different groups in society e.g. kindergartens, schools, elderly. A quantitative risk assessment was not clearly provided however the report referenced data for human exposure to metals within the food chain (namely fish).

9.2.2.3 Scoping and consultation with environmental authorities

Scoping requirements varied between countries. In Ireland and the UK, scoping is not mandatory for all projects. In the UK the environmental authorities must be notified at various stages of the process however

they are not required to respond. It is noted that for certain projects where public concern is likely to be high, scoping is undertaken and an increase in public participation during scoping stages have been observed (IMPEL, 2012). For example a scoping document was prepared outlining the proposed approach to a combined HHRA / HIA for the Rose Energy development.

In Sweden and Norway scoping is mandatory and public consultation occurs at this point, in the case of Sweden this is particularly for large projects under the jurisdiction of the Environmental Court. In the Netherlands the NCEA can provide scoping advice and appraises final reports.

9.3 Licensing and Permitting

9.3.1 Licensing and permitting in Ireland

The EPA is the consent authority for a number of licencing / permitting objectives in Ireland including:

- Industrial Emissions (and previously the IPC);
- Waste licences;
- Waste water discharge licences;
- Dumping at Sea permits; and
- Volatile organic compound permits.

The licencing procedures considered in this report primarily focussed on industrial emissions and waste licensing procedures. Both processes follow a similar approach which comprises the following stages:

- Pre-application enquiry;
- Submission of application to EPA;
- EPA publish proposed determination;
- Submission of objections;
- Opportunity for Oral Hearing; and
- Final Determination.

9.3.1.1 Role of health in licensing and permitting

There is no specific guidance on health in licence applications, though it is noted that application forms require the applicant to identify the regional HSE representative in the relevant area. The applicant must also state if the facility falls under the Seveso / Major Accident Directive. Guidance relating to IPC applications presents the definition of environmental pollution as per the EPA Act and outlines obligations to consider risks to public health associated with air impacts.

The information required within a licence application varies depending on the nature of the facility. Installations that fall under the EIA Directive should include a copy of the EIS with the licence application or provide confirmation from the planning authority that it is exempt. In this regard, further information on impacts to health and / or human beings is supplied within applications of larger facilities.

The HSE is a statutory consultee to the EPA on licence applications and reviews applications with respect to potential impacts to public health.

9.3.1.2 Emission limit values

The EPA uses a standards based approach in assessing the potential health impacts of proposed activities. Pollution control is undertaken utilising Best Available Techniques (BAT) and published ELV to decide

appropriate emission limit values for a specific facility. The final decision is based upon a number of factors including:

- Technical characteristics of the installation / facility;
- Geographical location;
- Local environmental considerations; and
- Economic and technical viability of upgrading existing installations.

The EPA website notes that this will often involve making a judgment between different types of environmental impact which may be influenced by local considerations and long-distance or transboundary impacts.

In regards to local health impacts, the HSE may provide comment to EPA regarding the appropriateness of a licence application and any associated emission limit values for the local population who may be affected. As noted, in Section 7.1, a corporate response is prepared by the HSE via the National Environmental Health Office.

With respect to the Water Framework and the Groundwater Daughter Directives, the EPA are members of the Joint Agencies Groundwater Directive Advisory Group (JAGDAG). This group reviews assessments made by agencies with regard to whether a potential pollutant is determined to be a hazardous substance. JAGDAG comprises the Environment Agency (EA), the Scottish Environment Protection Agency (SEPA), the Northern Ireland Environment Agency (NIEA), the Environmental Protection Agency Ireland (EPA), Health Protection Agency (HPA), Department of Environment, Food and Rural Affairs (Defra), Welsh Assembly Government (WAG) and industry representatives. Assessments are then subject to public consultation, and may be subject to further review by the respective governments, before a final determination is made.

9.3.1.3 Public participation

Public notification occurs at pre-application stage when an applicant must notify the general public of intention to apply for a licence via:

- Site notice; and
- Notification in a newspaper circulating in the area.

Access to the application documentation is available on the EPA website for information obtained post 2004. Information prior to this date is available in hardcopy. Members of the public may make written submissions or objections to the EPA about waste licence applications for up to 28 days after the proposed determination has been published. Submissions are available for public inspection on the Agency's website and are considered by the EPA in deciding on the application. The licensing process allows for written submissions and objections by anyone, as well as the provision of an oral hearing of objections. Subsequently, anyone may make an objection, accompanied by the appropriate fee, to a proposed decision by the EPA on an application, within 28 days of notification of the proposed decision.

9.3.2 Licensing and permitting procedure in Ireland compared to other EU countries

The consideration of health in permitting and licensing procedures in Ireland, the UK, Sweden, Norway, France and the Netherlands were reviewed. Consideration was given to whether:

- Health was focussed on physical health or physical and social health determinants;
- Emission limits were based on standards or risk based criteria; and
- Community health status was considered in the overall permit process.

Table 14: Summary of information relating to licensing and permitting

Item	Ireland	UK	Sweden	Norway	Netherlands
Health as an authority	No	No	No	No	No
Health authorities as an adviser	Statutory consultee to EPA	Memorandums of Understanding between the Environment Agency and Food Standards Authority and Public Health England (formerly Health Protection Agency)	At request of competent authority	Applicants obliged to contact County Administrative Board or local Environmental and Public Health Committee (EPHC)	Via public consultation at Municipal level
Interpretation of health permitting regulations	Physical	Physical	Physical	Physical	Physical
Source of permit limits – Risk based or Standard	Standard	Risk Based and Standard	Standard	Standard	Risk Based and Standard
Consideration of existing health conditions in the community	By health authorities as statutory consultees	By health authorities as consultees	By health authorities in submission	By health authorities in submission	By health authorities in submission
Public participation	Notification at pre-application, public consultation at draft determination	Varies between countries, and project.	At scoping	At scoping	At notification of proposed plan – opportunity to contribute to scoping.

In regards to licensing and permitting in all countries the determinants of health assessed were associated with physical health effects. It appears that social determinants of health are largely addressed in EIA to inform planning permission. It is noted that waste licensing procedures do require consideration of cultural / green space aspects and consideration of the role of social determinants in relation to these environments may be appropriate within the licensing process.

In the Netherlands, Sweden and Norway all licence applications must include an EIA. Consideration of local health is most commonly undertaken by local health authorities appraising applicant documentation. In Sweden applicants are obliged to contact their CAB or local Environment and Public Health Committee which may facilitate easier engagement during scoping at an early stage.

However it is noted that a number of those voicing an interest in the role of HIA in terms of licensing did not necessarily require consideration of social determinants where they are considered elsewhere in the planning process (i.e. within the EIA). Rather they were keen to see a more robust health assessment process that takes into consideration existing health status of the community and presents a more transparent and systematic approach (source-pathway-receptor) to identifying potential impacts to health.

Where risk assessment is observed across the EU it was generally within the EIA stage with the report referenced within the licensing application. The availability of guidance on how to conduct risk assessment is discussed further below.

9.3.2.1 Health agencies as competent authorities or advisors in licensing and permitting

Health Protection Agency (now part of Public Health England (PHE)) is consultees to the Environment Agency on licence applications as per their Working Together Agreement. The agreement indicates the Environment Agency will supply PHE with a list of all applications received and consult in particular where specific criteria apply (e.g. applications with human health risk assessment or health impact assessments). PHE (as the former Health Protection Agency) generated guidance for Primary Care Trusts and Local Health Boards such that they will be equipped to respond to licence applications (HPA, 2004a and 2004b);

- The guidance also notes that the reviewer should expect that operators use the basic source-pathway-receptor framework and to have considered human health within the application. The guidance expects a full inventory of chemicals used regardless of whether emissions are intended; and
- The generation of local health data is not expected to be provided within the report, rather the Primary Care Trust (PCT) are to assess the application against their knowledge of local conditions. This is may be easier in some jurisdictions in the UK where access to small area data is more readily available than in Ireland. However it is noted within the guidance that not all data will be available and that the PCT may focus on potential health effects of exposure based on toxicological end points rather than conducting site specific research on health status in the locality.

In addition to the PHE, the EA have signed a memorandum of understanding with the Food Standards Authority (FSA) such that the FSA would be consulted on certain permits to develop risk based criteria for permitting purposes. This is discussed further below.

In Norway the role of health agencies is voluntary and based at local level; this may change with new guidelines associated with health assessment however the information is not currently available. The Norwegian Environment Agency consults the Norwegian Institute for Public Health where human health risk assessment is required. In the Netherlands, health authorities are engaged at municipality level. Further information on methods associated with this engagement was not available. At national level the Health Council advises the government on matters associated with environmental impacts to public health.

The Public Health Authority of the Slovak Republic carries out activities relating to environmental health which includes providing guidance on legislative obligations and appropriate methodologies for addressing environmental impacts on human health and proposing health based environmental limits for individual pollutants in various environmental media.

9.3.2.2 Guidance and approach to licensing

Tiered Approaches to licensing

The Environmental Permitting (England and Wales) Regulations came into force in April 2008 and provided a mechanism to reduce the administrative burden via the use of a more risk-based approach to pollution control. A qualitative approach to licensing has resulted in a standard and bespoke licensing system based on significance of potential impacts to the environment. Standard licenses have been developed for activities that pose a lower risk to the environment. These licenses include conditions that were developed as a result of a generic risk assessment. The risk assessments associated with standard licenses were sent out for consultation prior to being adopted for the relevant activity. The consultation process allowed the opportunity for feedback from health authorities (now Public Health England). Bespoke licensing is required for more complex activities and is undertaken using site specific risk assessments. These risk assessments address key aspects such as odour, noise and vibration, accidents, fugitive emissions, controlled releases to air and water. Individual guidance is available for each risk assessment.

In the Netherlands the there are two types of permits an all-in-one permit for physical aspects (omgevingsvergunning) (APPA) and a water permit. The all-in-one permit for physical aspects (omgevingsvergunning) (APPA) covers a range of 25 former environmental permits, and regulates air, land waste and energy efficiency with the exception of water. Whether a full APPA or simple notification is required depends on the environmental activities of the company concerned. It is noted however that all IED facilities likely fall under the one licence type (APPA C).

In Sweden a tiered system is based on the type of industry with certain projects being addressed at municipal, County Administrative Board (Class B Permits) or for significant developments by the Environmental Court (Class A Permits). Approximately 6900 facilities require a permit in Sweden and out of these about 400 facilities is classified as A-activities and consequently 6500 as B-activities.

HHRA and risk based limit values

The development of site specific risk based limit values was not widely identified in licensing across the study countries. The most frequent approach to licensing and permitting centred on the use of BAT and ELV. Risk assessment methods were more frequently observed in the management of contaminated land. However, risk assessment methods and / or development of risk based limit values were observed in specific scenarios such as more significant projects or in the development of national standards.

There were two methods typically observed where risk assessment was used to inform environmental permitting.

- HHRA undertaken for potential impacts from a facility and results used to inform risk management; and / or
- Derivation of risk based criteria.

All countries used the former option where appropriate. Guidance for HHRA methods was available in the Netherlands (as per EIA and SEA), Sweden (primarily associated with post-impact scenarios), France and Norway. In the UK there was no specific guidance however US EPA methodology was frequently reported as were clean Air for Europe (CAFE) / Committee on the Medical Effect of Air Pollutants (COMEAP) methods within supporting EIA documentation.

In Norway both health based criteria (e.g. environmental quality standards for air and water quality) are used in combination with BAT-ELV. Where no BAT-ELVs are developed, ELVs may be set based on toxicological data (e.g. emissions of amines from carbon capture and storage facilities). As noted earlier, where human health risk assessment is warranted, the Norwegian Environment Agency contacts the Norwegian Institute for Public Health.

France has specific detailed guidance for risk assessment as part of licensing procedure (INERIS 2013) which presents clear guidance on methods for assessing existing site conditions and potential health impacts associated with predicted emissions from a facility. The guidance also provides clear guidance regarding the objective of the impact assessment with regard to local exposure conditions and the role of the competent authority in the interpretation of the data. Such impact assessment is required for creation and extension of installations classified for the protection of the environment subject to permit. After inspections, an updating of an impact assessment can also be required following (1) a re-examination of authorization conditions imposed by the Industrial Emissions Directive (IED), (2) a failure to comply with the requirements of permitting, a recognized impact on the environment or a justified concerned by the population; or (3) changes in the legislation, in the installation or in the environment. The risk assessment is limited to effects on human health linked to the toxicity of chemical substances emitted during the normal operation of the installation (i.e. non accidental). It should concern all human receptors potentially exposed to chemical substances emitted by the site, with exception of on-site workers as they are already covered by labour law.

Scotland and Northern Ireland (SNIFFER 2007) also present detailed guidance on the consideration of human health in environmental legislation (including permitting applications). The guidance follows a similar tiered approach as those presented in WHO 2010 and includes detailed guidance on methodologies for the quantitative assessment of risks to human health. The SNIFFER report discusses existing regulatory

standards for the protection of human health from a legislative context i.e. IPPC/COMAH, radioactive substances, contaminated land, waste management and water environment. It goes on to elaborate generic versus detailed risk assessment approaches for each legislative context. The UK and the Netherlands also use risk based methods to assess the appropriateness of ELV and / or effects of predicted impacts for a given facility under certain circumstances. Approaches used for the derivation of risk based criteria were generally in accordance with published methods such as:

- WHO risk assessment of chemicals in food (WHO 2009);and
- Health based limit values in the Netherlands and Slovakia.

Within the bespoke licencing system in the UK, Horizontal guidance manuals address potential impacts to human health via different environmental media focussing on identification of receptors, hazardous substances and appropriate limit values where relevant. As an example, guidance regarding air emissions presents approaches to addressing human health including:

- Identification of sensitive receptors
- Consideration of appropriate environmental standards for the receptor (ecological or human health)
- Guidance for comparing predicted emissions with available human health air quality standards.
- Presentation of environmental assessment levels for the protection of human health and discussion regarding their derivation and application.

Guidance for groundwater references the work of the Joint Agencies Groundwater Directive Advisory Group (JAGDAG) on hazardous substances which includes the Health Protection Agency (now Public Health England) as a member.

In 2013 the Environment Agency and the Food Standards Agency (FSA) in the UK signed a memorandum of understanding such that the FSA would be consulted on certain permits to develop risk based criteria for permitting purposes. The installations include all energy from waste, cement and lime, steel works, plants with emissions of dioxins, cadmium, lead or mercury. Consultation is also need for hazardous landfills, coal or waste derived combustion plants and other waste operations such as combustion, anaerobic digestion, and mechanical biological treatment. Discussions with the FSA indicated that the methods used to derive criteria were based on WHO 2009 report on risk assessment of chemicals in food. The FSA stated that they relied upon fate and transport modelling from the EA to ascertain the concentrations that may reach the food chain and undertook risk assessment from this point.

In the Netherlands, permits for certain air emissions are based on mass flow limits of the Best Available Techniques (BAT). RIVM conducted a study on the safety of these limits from a toxicological view. Substances of very high concern were compared with worst case air concentrations based on current mass flow limits (RIVM 2013).

The National Institute for Public Health and the Environment (RIVM) in The Netherlands has also developed guidance for derivation of environmental risk limits (RIVM, 2007) for three levels of protection for humans (negligible concentration, maximum permissible concentration, serious risk concentration). The guidelines present information on:

- Appropriate use of toxicological data, and
- Derivation methods for media compartment specific human risk limits for soil, groundwater, air and subsequent consumption of impacted leaf crops, root crops, milk crops and meat crops.

The approaches used were based on established methods established within the Water Framework Directive (WFD), European Chemicals Bureaus (ECB) Technical Guidance for the risk assessment of new and existing substances and biocides (ECB 2003) and models such as European Union System for the Evaluation of Substances (EUSES).

The Health Council has also developed certain national standards based on the RIVM environmental limit report. Environmental limits in the Netherlands may be derived where EU legislation does not override Dutch jurisdiction. Other approaches to risk assessment in relation to licensing in the Netherlands have considered third party risks from site operations which are often calculated using risk based derivations and converted into safety distances. All Seveso II site operations in the Netherlands must submit a quantitative risk assessment for chronic and acute risks.

9.4 Post Impact Assessments

A number of stakeholders made comments on how the issue of contamination is addressed in Ireland. Ireland does not have a contaminated land regulatory regime such as in the UK or other case study countries in this assessment. However cases where significant concerns, such as those identified at Silvermines have been addressed by a collaborative approach between the EPA and the HSE. A protocol was established for dealing with issues such as human and animal health and the environment (Protocol for the Investigative Approach to Serious Animal / Human Health Problems, EPA and Department of Agriculture, Forestry and Fisheries, 1997). In addition HSE have undertaken a number of investigations to support the assessment of human health issues at licensed facilities. Concern was noted by some stakeholders that health issues have occurred in the past at licensed facilities and in particular the lack of jurisdiction for health to respond. It was reported that cases have arisen where health concerns (noise) were reported for a length of time before a licence could be reviewed. Other issues noted related to the lack of baseline human health data which made it difficult to assess if a facility has had made an impact once it became operational.

In December 2012 EPA published guidance for the assessment of contaminated land at licensed facilities. The guidance is well laid out and will likely reflect well against the requirements of a baseline report as part of Industrial Emissions Directive. There is limited guidance on appropriate methodologies to undertake HHRA, with the reader directed to UK CLEA models. It is noted that within case study countries assessed (UK, Sweden, Norway, the Netherlands, Slovakia, France) all had a contaminated land framework with either detailed guidance or reference to appropriate methods for assessing risks to human health from exposure to contamination.

Nevertheless, concerns raised stakeholders were frequently associated with approaches to contaminant releases at smaller or non-licensed facilities that also may lead to a significant impact if not dealt with appropriately. In particular local authorities noted situations have occurred where:

- A health response lacked understanding of the fate and transport of contamination, where health monitoring did not always reflect that the presence of contamination is typically an uncontrolled exposure;
- Environmental responses often considered an engineering solution equivalent to ‘turn off the tap’ but resulting actions did not go on to require that the impact is delineated or that potential exposure of sensitive receptors is assessed; and
- There are increasing numbers of groundwater wells in urban areas for use in community gardens to water food products. There may be a need to ensure users are aware of the potential for groundwater contamination and to ensure adequate testing is undertaken, particularly in situations where community gardens have been established close to current / historical industrial sites.

Consideration could be made for a contaminated land regime however it is beyond the scope of this project. Previous work undertaken by EPA has indicated that Ireland has comparatively few potentially contaminated land sites compared with other EU countries such as the UK. There is currently no legal remit for EPA or any other government body to set national contaminated soil standards. A short term approach may be one of awareness building through the Network for Ireland's Environmental Compliance and Enforcement (NIECE) network to build greater understanding of potential exposure pathways and resulting acute and / or chronic health effects that need to be considered in responding to contamination incidents.

10.0 BASELINE DATA AND COMMERCIAL DATA MANAGEMENT

10.1 Baseline Health Data

Ireland

Concern was raised by a number of stakeholders that access to baseline health data is cumbersome in Ireland. There are no centralised systems that may facilitate accessing small area data relating to health issues, particularly reported to General Practitioners. There is access to health data at local authority, electoral ward, regional and national levels. Some health databases (e.g. the cancer registry) that do contain information to small area level and access may be granted under strict confidentiality conditions. However the overall experience of obtaining data relevant to a small area such as at licensing level is considered to be opaque.

As discussed briefly in Section 7.3 Ireland and Northern Irelands Population Health Observatory (INIsPHO) manage The HealthWell website on behalf of the Institute for Public Health. The HealthWell provides information to support evidence based decision making in relation to health issues. The website includes a number of resources such as relevant health interventions, policies, statistical data and evidence (e.g. peer reviewed journal articles, national and other relevant guidance). The focus is currently on fuel poverty, chronic conditions and nutrition. Statistical Data is available from a number of sources and it is possible to build community profiles down to electoral ward level with some opportunities to extrapolate to smaller areas.

Health intelligence has developed out of the Health Atlas and integrates health datasets (e.g. census, Hospital Inpatient Information, mortality etc.) with geographical information systems (GIS). Access to information is role based such that distribution of potentially confidential information is limited.

Health intelligence have on occasion assisted in collating information when addressing retrospective analysis of health conditions following impacts associated with a licenced facility. It may be possible to discuss opportunities to develop health summaries for HSE staff reviewing licence applications. It is also noted that An Post are introducing a geocoding scheme such that every house in Ireland will have a unique identifier. This information may also be used to support other services such as emergency response functions. It may be possible to develop a more robust health surveillance system on the back of this scheme.

United Kingdom

There are a wide number of health data sources in the UK examples of which include Public Health England community profiles and local health programmes.

Community profiles have been designed to help local government and health services make decisions regarding key issues in their areas. They provide a snapshot of the overall health of the local population, and highlight potential problems through comparison with other areas and with the national average.

Local Health is a programme that gives access to interactive maps and reports at Ward, local authority and Middle Super Output Area (small "neighbourhood" size areas). It includes many of the indicators presented in Health Profiles and more. However some of the data in Local Health are for different time periods than those in Health Profiles. Also different methods of standardisation are used. While the term neighbourhood size area may imply small area data, in reality the population in a number of these areas is in the tens to hundreds of thousands.

The National Health Service (NHS) compendium of population health indicators has been developed to collate data relating to over 1000 health indicators at a national, regional and local level. It is possible to retrieve data for very small areas however this is undertaken with strict patient confidentiality controls in place and is not generally available to the wider public, as such detailed information more easily accessed by those reviewing licence applications than those preparing the application. Regardless, there is a large amount of data available that may assist in framing a discussion of health trends in the wider area of a licence application. The data can be obtained via spreadsheet or by viewing digital maps. Information on both medical and social health determinants is available.

The NHS Wales has a number of health statistics that can be accessed via their website including health mapping. Information is available to local authority level and includes statistics relating to medical health and wider determinants of health.

Norway

The Norwegian Institute for Public Health (NIPH) is responsible for ten mandatory health registers which include cause of death, prescription database, immunisation, cardiovascular disease, cancer, food allergy, medical birth, termination and communicable disease registers. Data is available to regional and town / city level however confidentiality must be maintained and in some cases small area data may not be released. The health registries are currently being modernised to allow for greater connectivity between systems.

Information relating to various regional studies is also available, though the studies were sometimes targeted at specific age groups and may not provide entire community profiles.

The Department of Environmental Medicine in the NIPH conducts research in key areas of environmental medicine including exposure and risk assessment, air pollution and noise, food water and cosmetics and chemicals and radiation. The purpose of the unit is to undertake research to support provision of advice.

Sweden

The Swedish National Institute for Public Health provides data relating to disease statistics, public health data relating to the 11 public health objectives and additional information from national surveys.

Public Health Data containing statistics on health determinants and health outcomes, and organized by public health policies eleven target areas. Statistics in Public Health Data presented at several regional levels and as far as possible at the municipal level. Statistics are broken down by factors such as gender, age and socio-economics.

Fact sheets have also been prepared for each municipality and at district level in major cities. The factsheets contain charts and graphs presenting information on the eleven public health objectives. A national public health atlas has also been developed to provide a visual presentation of selected public health data at municipal level.

Summary

Of all countries assessed, the UK indicated the highest level of data readily available; in particular there is greater ease of access for health professionals wishing to interrogate small area data. The issue regarding availability of this type of data has been highlighted in other studies (e.g. IMP3). While this level of data is not readily available in Ireland there may be opportunities to further develop databases or information for health professionals reviewing applications.

10.2 Commercial Confidentiality

UK

Commercial confidentiality regarding environmental information is regulated by the Environmental Information Regulations 2004. The regulations give rights of public access to information held by public authorities. To refuse environmental information under the exception in regulation 12(5) (e), public authorities need to establish that:

- The information is not on emissions;
- The information is commercial or industrial in nature;
- It is confidential under either the common law of confidence, contract, or a statutory bar;
- The confidentiality is protecting a legitimate economic interest;
- The confidentiality will be adversely affected by disclosure; and

- The public interest in maintaining the exception outweighs the public interest in disclosing the information.

In Scotland regulations allow commercially confidential information to be withheld from public registers. If information is accepted as confidential, the Scottish ministers may still require it to be registered for public interest. There is an appeal mechanism should information be judged non-confidential.

- Under the regulations, information is commercially confidential if placing it on the public register would prejudice (to an unreasonable degree) the commercial interest of any person. Operators claiming confidentiality must clearly explain how such prejudice would arise;
- Confidentiality claims may be granted for up to four years, although a shorter period may be specified. A person may re-apply for continued protection before the period ends. Where commercially confidential information is protected, the regulations require a statement to this effect to be put on the register. If monitoring data is withheld, the regulations also require a statement in the register indicating whether or not the permit conditions have been complied with; and
- Regulations require that both commercially confidential and nationally secure information must be given to statutory consultees such as the health boards, local authorities and the Food Standards Agency.

Sweden

In Sweden, access to environmental information (and as such confidentiality aspects) are regulated through the Public Access to Information and Secrecy Act, (2009).

Operators submit environmental data to the Swedish Portal for Environmental Reporting (SMP). The supervisory authority can classify environmental data as confidential if it concerns business or operating conditions, inventions or research results. This applies only if it can be assumed that individuals will suffer injury if the information is communicated.

If the operator considers that there is information in the environmental report is confidential the information should be presented in SMP separated from other text (i.e. in attachments for each installation specifying what information is considered confidential and the nature of potential harm they may suffer if the data was disclosed. Only the supervisory authority has access to this information. This is managed by:

- Encrypted communication between the operator and SMP;
- Storing all environmental reports in SMP;
- Working versions of the environmental reports are only available to a registered user of the operator;
- Submitted versions are available to view for registered users of the operator;
- The Swedish EPA, SMP administration, country administrative boards and municipalities can view all environmental reports in SMP, except attachments indicated as confidential;
- Confidential data is only available via a log in system;
- The information in the emission declaration is automatically transferred from SMP to MiljöReda; and
- Any revisions of the basic part of the environmental report shall be sent by a separate mail to the supervisory authority for control and possible updating of the MiljöReda

Norway

Confidentiality regarding environmental data is legislated via the 2003 ‘Right to Environmental Information and Public Participation in Decision-Making Processes Relating to the Environment’ Act. Citizens have the right to request information on production processes, content of products including imports.

The Act allows public authorities to request that an operator or vested person declares where environmental information may be confidential for commercial reasons. The operator must provide reasons to support the claim. Should the public authority subsequently decide to disclose the information the operator has an opportunity to appeal the decision? The appeal has a suspensive effect.

Confidentiality is also addressed in other legislation such as via The Petroleum Act, 2006. In this instance, environmental data can be submitted to the National Petroleum Directive. Confidentiality issues are managed through a single data management system.

11.0 PUBLIC CONSULTATION

11.1 Health Impact Assessment

Two examples of HIA have been considered here:

- Review of a HIA for reconstruction of route 73 in Sweden; and
- HIA of the proposed extension to Margam Opencast Mine, Wales

In Sweden the Regional Road Administration of Stockholm initiated a construction project on Route 73. The road was of national and regional importance and comprised 25km of a dangerous stretch of road that had high traffic loads. The proposed new road ran close to a protected natural area.

The Regional Road Administration undertook an EIA that included partial health elements such as exposure to emissions and noise. The EIA was sent to a range of stakeholders affected by the project in line with the Environmental Code. The stakeholders involved included central and regional agencies, municipalities, organizations with interest in the issue and private stakeholders. Consultation was undertaken by way of hearings and exhibitions during the EIA process and also by sending review copies of the EIA to stakeholders.

The Swedish EPA had concerns that the proposed project conflicted with national environmental quality objectives. The final decision maker for road traffic is the County Administration Board however as the SEPA objection was based on objectives set by the Riksdag the decision now sat with the Swedish Government.

Following postponement of a decision several times, it was recommended that a HIA may assist the process. A HIA was prepared in accordance with Public Health Policy and addressed social and environmental health determinants, equity and gender perspective. It focussed on a comparison between alternative E versus no change. The complementary HIA identified priority groups of children, adults, older people, people with disabilities chronically ill persons and horse riders, hunters and the population as a whole. The health determinants identified included: air quality, noise, vibrations, accessibility, encroachment on cultural green areas, recreation, injuries in traffic, transportation of hazardous goods, worry / insecurity about risk of accident and support for physical activity.

A steering group was established that comprised representatives from SNIPH, the RRA and the municipality of Nynashamn. They met on six occasions and led the HIA process, conducted analysis and wrote the report. Comments were submitted from a wider group of stakeholders including central agencies, councils, municipalities, research organisations, local businesses, residents, road-users (including pedestrians), and commuters. Two particular groups of opposing opinion were the local Green Party who wished to redirect funding to improving public transport and a local interest group Route 73 Now who were concerned in particular with aspects such as worry and insecurity about the risk of accidents. The complementary HIA

Subsequent analysis of the effectiveness of the HIA was undertaken. A number of stakeholders were interviewed who considered that the HIA was decision effective as it helped to identify the best alternative and gave a thorough assessment of solutions. Regarding community effectiveness interviewees had mixed opinions on how effective the HIA had been. There had been at least two public hearings and a few exhibitions as part of the original EIA which gave the community opportunity to learn about the

consequences of alternatives. However two interviewees considered that the HIA had a direct positive effect on community engagement as alternative solutions had been modified due to dialogue with the community within the HIA.

In 2004 the Government made the decision to permit the construction of Route 73 according to alternative E. The results of the complementary HIA were found to have strengthened the decision even though the final report was not ready until 2005. The interviewees stated that had the final report been ready earlier it would have made it easier to reach a decision.

In Wales, the Welsh Health Impact Assessment Support Unit and National Public Health Service for Wales undertook a HIA for Margam Open Cast Mine was undertaken in 2005. The HIA was requested by the local community members who felt the extension would have a negative impact on their health. The mine had applied for planning permission to extend the mine to allow a further ten years extraction to occur at the mine. The scope of the HIA was to provide a responsive process for the community. The community felt they had been misled and misinformed as they had previously been told that there would be no extension and subsequently were told it would be a deep mine. They also felt pressured that if the extension was not permitted the current site would not be appropriately remediated due to lack of funds.

Methods of communication explored by two local authorities involved in the planning decision included press notices, information posted on poles and gate posts of laneways, two public meetings in which the mining company representatives did not attend. A Mine Liaison Committee was formed which comprised members of the local authorities, community council members, residents and the mine officials. Meetings are held every three months to discuss site progress, environmental reports and planning application progress. The residents were not satisfied that concerns were adequately being addressed by the public meetings or the committee and wished to explore a HIA.

The HIA involved initial meetings with local residents followed by establishment of a steering group. The group comprised members of

A Focus group was established for six interest groups – residents living near the present mine site, older people, those involved in outdoor pursuits, local business representatives, and younger parents. The HIA noted the focus groups are of particular importance where there's a power differential between participants and decision makers.

HIA explored impacts including dust, particulates, plant movement and fuels, stress, anxiety, depression, physical activity, social capital, severance, local economy, noise, vibration, waterways, safety issues, light pollution, visual impact, effect on property and character of the neighbourhood, heritage and human rights. It also looked to health impacts identified by residents which primarily focussed on respiratory, cardiovascular and stress related illness. There were also claims of higher incidences of diabetes, brain tumours, skin and eye disease and congenital abnormalities. Residents also carried out studies of asthma prevalence near the site.

The HIA concluded in clear terms that the negative impacts on health and wellbeing from the extension of the mine would far outweigh the positive impacts. Following the HIA outcome, planning permission was refused and the Welsh Government went on to include a requirement for HIA in all minerals and opencast mine planning applications.

11.2 Strategic Environmental Assessment

A comparison of two projects subject to SEA in the Netherlands was undertaken by van Buuren et al in 2012. The authors write that despite the Dutch planning culture being consensus orientated it can be litigious with threatened groups open to addressing concerns within a legal framework. As such they noted that the planning process becomes unpredictable and time consuming.

The two case studies considered were that of the Southern Sea Line, (a high-speed rail connection) and river flow management near the City of Kampen. Significant preparatory work was done by the Ministry for Transport however a Parliamentary Enquiry Committee raised concerns about the need for the railway. The Committee demanded a reassessment of the project. The result was a zoning plan that included a formal

SEA, spatial analysis and societal cost-benefit analysis. The second case concerned the redevelopment of an area near the river Ijssel. Two spatial investments were proposed to enhance the rivers retention capacity. A SEA was commissioned because adjustments were needed for the regional and local planning documents.

The strengths observed in the SEA process for the high speed railway line were largely associated with early and effective engagement. The SEA was considered at the very start of the planning and design processes and the inclusion of these stakeholders increased expectations of what the SEA could deliver.

The NCEA scoped the SEA and a subsequent starting document was prepared to inform the general public of the scope and their comments were invited. Meetings were held with the public, politicians, officials and other stakeholders and several alternatives discussed. A draft SEA and vision were circulated within one year and public feedback sought again. The Cabinet ultimately decided to go with another option however this was due to issues that were highlighted as a result of the SEA process. As such the overall public response was that the SEA was money well invested. The authors felt early elicitation of views from affected residents long before a planning decision contributed to positive public engagement experiences.

The second case study was undertaken with a different approach. A small intergovernmental team was charged with developing two scenarios for managing high river discharges in the Ijssel River near the city of Kampen. There was pressure to ensure the study was completed by the end of 2005 which resulted in a decision to limit engagement with the public in the early stages. A voluntary environmental assessment that was not a full SEA was undertaken. Five scenarios were presented to the public which were met with objections. The Deputy of the province requested the public develop an alternative which was adopted as a Masterplan. The SEA was conducted on this Masterplan to fine-tune details however additional issues were raised. These were addressed where possible however there was general ill feeling towards the process. The Authors considered that the timing of the SEA did not allow for meaningful engagement and it was not an inclusive or collaborative process. The approach also focussed on managing negative impacts rather than considering added value.

Greater public engagement beyond that of the standard planning requirements was observed through the use of HIA in Sweden and Wales. In Sweden, Norway and the Netherlands public consultation begins early in the process when project notification occurs and there is an opportunity to give input to the scoping of an environmental assessment.

In Sweden the practical process of HIA was found to assist in speeding up the decision process for a road development. The public engagement was generally high with a number of exhibitions and public meetings as part of the EIA. The HIA brought additional public engagement with a wider network of stakeholders and it was found that the consideration of wider health determinants was beneficial to the decision making process.

The HIA in Wales was undertaken specifically to give a greater platform to public concerns. As such the methods employed were more involved and included focus groups that were intended to solely address public concern. The standard mode of public engagement while compliant with planning requirements was seen as dismissive and no different to the approach undertaken if ‘a neighbour wanted to extend a garage’. This standard approach was upsetting to the public who felt that no greater care was given to them in the face of a development that may have significant effects on their health. The final outcome of the HIA meant that the planning permission was refused, however this outcome was supported by the Welsh Government who responded by including a requirement for HIA in any future planning applications for minerals and opencast mining.

In the Netherlands a comparative study of two SEA was consulted and shows the variation of public engagement that occurs within a single country. The project that provided greater public engagement throughout the process was found to be more effective. In particular it was the early engagement that assisted in the decision process.

Overall, early and effective engagement appears to be a key message in each case. In particular inclusion of opportunities to be involved in project scoping at the outset may be a beneficial approach to future projects. This may or may not include mandatory scoping, most of the study countries simply relied on public

notification on the intention of a project to proceed for voluntary scoping observations based on background information prepared by the developer. The Netherlands NCEA unit are available for scoping guidance.

12.0 CONCLUSIONS AND RECOMMENDATIONS

The EPA commissioned Golder Associates to undertake a study into how human health impacts are dealt with throughout the EU by environmental regulators, with an emphasis on the role of Health Impact Assessment at the planning / environment interface. The results of this study are to be used in consideration of the conclusions presented within the Environmental Research Centre report, to inform the EPA in their decisions regarding greater use of HIA through existing and / or by effecting legislative change or guidance.

Following review of approaches to health at the environment-planning interface in Ireland and in the case study countries reviewed, the following observations were made:

Health at the environment-planning interface in Ireland

- The Healthy Ireland Framework defines health as 'potential to enjoy complete physical, mental and social wellbeing' and as such looks includes a shift in focus on what can go wrong in a person's life to what can go right.
- By contrast health within environmental legislation is often narrower and discussed in terms of mitigation of potential negative impacts to physical health.
- Health is considered across the planning process within development of plans of programmes, SEA, EIA and as part of the licensing and permitting process.
- In Ireland stakeholders held varying interpretations of what health means in an environmental context.

Health Impact Assessment

- Across the EU, HIA was used as a tool to support health consideration within EIA or SEA, or as a standalone tool used separately within planning processes;
- Four case study countries were found to have legislation/regulations for health assessment;
- Support for the use of HIA was primarily observed via planning-health arrangements such as in the UK;
- HIA and health risk assessments were observed in support of environmental permits of significant activities;
- HIA was reported to be vulnerable to political will if not legislated.

Health within EU Environmental Legislation

- Health in Strategic Environmental Assessment requires consideration of human health and populations. It also requires impacts to be described in terms of direction (positive/negative), duration and timing, cumulative or synergistic effects, primary and secondary effects and the inter-relationship between environmental receptors.
- Health in Environmental Impact Assessment was addressed under the theme 'human beings' but this has recently been changed to 'human health and populations' in the new EIA Directive. European Commission guidance on health within EIA describes health in terms of physical (chemicals, noise, radiation) and social determinants of health.
- Sectoral Directives have clear requirements regarding the consideration of health. These tend to be focussed on the management of exposure to physical agents such as chemicals, noise or radiation. Guidance on appropriate methodologies for the identification, assessment and mitigation of impacts from hazardous substances is well developed.

- There are additional drivers to refine the consideration of health within EIA through the new EIA Directive. This includes consideration of 'human health and populations', 'vulnerability to accidents' and the requirements for monitoring and competent technical persons in the preparation and appraisal of reports.
- The integration of health into environmental assessments such as EIA and SEA has been reviewed extensively in the EU (IMP3, 2006, WHO 2013) and there are clear guidelines available to assist in extending this aspect of EIA and SEA should it be considered appropriate.

Health integrated into SEA and EIA at national level

- Consideration of health within environmental legislation varied from one country to the next, with some including consideration of broader determinants of health, others focussing solely on exposure to pollutants.
- In Ireland, in addition to direct health impacts resulting from exposure to environmental media, health in SEA includes quality of life and health in EIA includes a limited consideration of social and economic impacts.
- Comprehensive guidance for integrating health into SEA has been prepared by the UK and WHO.
- Guidance regarding health in EIA is less well developed, however a framework and training modules have been developed by the WHO.
- HIA and health risk assessments have frequently been observed as part of EIA or environmental permits for more complex industrial facilities.

Licensing and Permitting

- The vast majority of countries adopted an approach of BAT-ELV with risk based considerations included where required. Quantitative risk assessment methods were observed, typically in more significant permit applications where more than one chemical or exposure pathway may exist. The use of health based ELV or assessment of ELV with regards to their capacity to protect health was observed in some countries.
- Guidance regarding appropriate methods to approach health risk assessment was observed in a number of countries.
- Consideration of existing community health status was generally undertaken by local public health officials during appraisal, though some applicants provide readily available information regarding baseline health status in local communities.
- The level of transparency associated within health assessment within environmental assessment and permitting varied between countries.

12.1 Recommendations

The project undertook a broad overview of approaches to HIA and health in environmental regulation across the EU. The objective of the study was to inform the EPA regarding opportunities for greater use of HIA through existing and / or by effecting legislative change or guidance. The results of this study are to be used in conjunction with the conclusions presented within the Environmental Research Centre report.

It was found that roles, responsibilities and the structure of institutions within Member states varied from one country to the next. As such, certain aspects of health impact assessment, as interpreted within Europe, do not fall under the EPA's remit and it is appropriate to note that any approaches discussed here may be considered further by relevant stakeholders at their discretion.

It should also be recognised that no one country has adopted all measures observed during the study. In addition, across Europe there is widely recognised needs for further research to address specific issues identified during this project.

As such the recommendations presented below are to be interpreted as opportunities for further discussion by the relevant stakeholders. Consideration of these options should be done in a manner cognisant of proportionality and feasibility for each option being considered, following consideration by relevant stakeholders.

The review has identified that there are a number of opportunities for consideration in regards to health impact assessment, some of which may be suited to short, medium or long term objectives.

They are presented below (H01, H02, and H03) and priorities / timeframe attributed to individual components are summarised in Table 15. It is recognised that many of these options may take some time to address and a series of short term interim options have been presented in H04 to assist EPA in the short term.

H01: Working Group

H01a: Establishing a Working Group or Collaboration Equivalent

The area of health at the environment-planning interface is multifaceted, with numerous stakeholders involved in the assessment of health and decision making processes. During this project it was observed that the consideration of health varied depending on the professional background of a stakeholder. As such there is some uncertainty with regard to the definition of health in the context of the environmental assessment regulations and areas of overlap with other planning processes. In addition roles and responsibilities of relevant stakeholders need further clarification.

As such, it would be beneficial to develop a working group in order to develop an appropriate definition of health in the context of environmental regulation and develop / endorse assessment methods and other supporting tools or frameworks necessary for implementation.

The relevant members of a working group may include members from the Department of Health, Department of Environment Communities and Local Government, EPA, the HSE NEHO, HSE Public Health, IPH, An Bord Pleanala and other academic / industry partners when appropriate. It is noted that a working group has already been established to develop new guidelines for EIA and within this there are objectives in relation to addressing health and populations within EIA. As such it may be more efficient or appropriate to devise a series of collaborative efforts to assess those options provided within the recommendations.

In addition to any other areas identified by the working group, the areas described below should be considered:

H01b Define health and clarify roles and responsibilities

There is a need to provide a clarification with regard to the definition health outlined within the Healthy Ireland framework and its interpretation within the context of environmental and planning legislation.

There are a number of reasons why a clear definition of health would be beneficial to all:

- To ensure a clear, coordinated and defined path for those in planning, industry, regulatory roles and the general public;
- Greater capacity to manage expectations and identify potential for gaps that may be addressed through other mechanisms; and
- Greater capacity to create a life-cycle approach to health in planning and development by defining health objectives at plan level, project level and licence level such that the relationship between each may be better understood.

H01c Develop guidance on methodologies and appraisal criteria for health assessment

Currently guidance available on health assessment in Ireland is limited however consideration could be given to providing further information on health assessment to:

- Provide greater consistency between projects and across planning authorities; and
- Provide clear benchmarks for those preparing and reviewing health aspects in SEA, EIA and licence applications.

There is a large volume of international and national guidelines and tools on aspects of health assessment, both for quantitative methods for exposure to chemical and / or radiological agents and for the assessment of impacts to social determinants of health. Consideration may be given to identifying appropriate methods to endorse, preparation of position statements with regard to specific items or to develop national guidelines for use in Ireland, this approach is discussed further in H04. Regardless of the approach taken it would be beneficial to ensure that the path forward is clear to all stakeholders.

H01d Interrelationship and data gap analysis of health considerations between preparation of a development plan, SEA, EIA and licencing processes

There are a number of areas in which consideration of health within the planning system may overlap. For example, in relation to SEA, there is some overlap or interaction between consideration of health in SEA processes, existing consultation processes with health authorities during preparation of a draft development plan and future Social Impact Assessment requirements in local authorities. It would be beneficial to consider these relationships in any future development of guidance / best practice for health in SEA. It is also considered appropriate to assess how SEA as a mechanism may be better used to highlight and integrate health aspects at subsequent project level assessments such as EIA.

The new EIA Directive provides additional requirements for monitoring and as such it is appropriate to consider what indicators for health could be included in the context of EIA. It is also appropriate to undertake a data gap analysis of the licensing process to provide clarity on where health considerations are included within existing processes and identify requirements for additional measures (if any).

H01e Requirements for a single health chapter

A number of stakeholders noted that review or consideration of health impacts would be made much easier where data collated using current methods is presented in a single health focussed chapter in the EIS / SEA and Licence Application documents. Preparation of a single health chapter could be developed such that it is proportionate to the risks associated with the application while making a difference to those involved in the review of these reports. Increasing the capacity of health professionals to respond to submissions may also provide greater confidence within the wider community. As such, it is recommended the working group considers development of succinct interim guidance for health focussed chapters within SEA, EIA and licence applications, this is discussed further in H04.

H01f Early engagement and scoping

Opportunities for early engagement have been observed in different formats in the EU. Opportunities to consider include:

- Notification of a project with opportunity for public input to the project scoping;
- Development of scoping tools for health assessments; and
- Scoping advice from health partners or via a central unit with a health advisor.

Given that there are limitations regarding health assessment in Ireland, it may be appropriate to consider mandatory scoping for projects with significant potential for risks to human health.

H01g Proportionality

Concerns were raised that the quantity of EIA and licensing applications was given greater emphasis than the quality of such applications. Other options that were observed and may be considered include but are not limited to:

- Tiered approaches to licensing requirements e.g. UK and the Netherlands; and
- Tiered approaches to competent authorities for review of EIA / permits e.g. Sweden

As with all impacts, the consideration of health should be proportionate to the risk due to potential impacts associated with an installation, and the sensitivity / vulnerability of the community.

H01h Establishment of a central unit for environmental assessment with a health advisor

Some stakeholders held value in the approach within the Netherlands where a central unit provides scoping advice and appraises final reports. This option would require significant resourcing requirements and as such should be discussed in the context of feasibility.

A central unit for environmental assessment may also provide advice and generate guidance to facilitate capacity building in health assessment from an environmental context in Ireland. However the need for such a unit would need to be considered against the limitations it may place on the breadth and depth of health assessment as a whole.

H01i Baseline Population Health Data: sources, roles and responsibilities

The absence or limitations of baseline population health data was a significant concern for those stakeholders involved in appraisal of health assessments. A sub-group should be established to assess the adequacy of existing baseline health data resources, and opportunities to expand in light of the upcoming Eircode scheme, in particular in relation to small area data. Roles and responsibilities in relation to the use of this data should also be clarified (i.e. should local health be considered by the health agency during review or by the applicant within their report), particularly in light of the confidential nature of health data. Determining roles and responsibilities in regards to the assessment of population health will also bring clarity to the objectives of health assessment conducted as part of SEA, EIA or licence applications (e.g. assessment of existing baseline health inequalities versus assessment of potential changes to overall health status of a community).

H01j Process and timing

The objective of this study did not include assessment of the efficacy of current processes and as such a more targeted appraisal of current processes may be beneficial. There are reports of some inconsistencies in regards to resources and support available across planning authorities and wider HSE staff involved in the assessment of health in EIA and licensing. Some areas reported a high level of access to support and resources while other areas reported some difficulties. In addition some stakeholders reported a lack of clarity with regard to their obligations, if any, with respect to EIA and licensing. In these instances, addressing health aspects in EIA / licensing was found to be in addition to numerous other duties of higher or competing priority. Clarification and prioritisation of roles and responsibilities may assist in addressing pressure points within the system to support identification of alternative approaches.

H02: Capacity building

Capacity building could be considered in a number of areas such as within environment and health agencies involved in review of applications, planning authorities and externally in consultancies preparing reports. It is also noted that the need for accredited professionals within the new EIA Directive will place pressure on the system if there is a shortage of appropriate individuals.

H02a Training in quantitative risk assessment methods.

Consideration should be given to development of training in a variety of quantitative risk assessment methods that may be employed in the assessment of impacts to health. Methods such as human health risk

assessment and burden of disease approaches are already used in the preparation of certain aspects of health assessment in EIA and in connection with contaminated land issues. The WHO CBEH programme also provides an outline of appropriate training modules to guide stakeholders looking to increase capacity in this area.

Staff involved in the review of such reports should be supported with training to assess these reports for adequacy and quality. While likely adequate, a number of reports viewed did not include one or all of the following: a systematic development of a conceptual site model, toxicity assessment, discussion of limitations and assumptions, exposure parameter choice, model assumptions, model inputs and outputs. The results may be reliable however confidence in the process is weakened where the risk assessment approach is not presented in a clear and documented manner.

H02b Targeted Training in health impact assessment and social determinants of health.

This has already been undertaken in a number of areas however feedback indicated that while the training was rewarding it was difficult to assess where HIA processes may be used in everyday roles. It may be appropriate to develop a more targeted training approach whereby HIA methods are addressed in site specific scenarios e.g. waste management, oil and gas developments, mining and minerals, land use planning. It may also be useful to develop training on the role of HIA or aspects of HIA at different environmental assessment levels e.g. SEA versus EIA or licensing.

H02c Development of Guidance and knowledge banks.

The need to develop or identify best practice guidance has been indicated above and will contribute to capacity building for staff who do not feel there is sufficient support to undertake health assessment. It may also be useful to develop a databank of HIA, HHRA, Burden of disease and health approaches to SEA and EIA that are considered best practice examples for a range of industries and plans.;

H02d Engagement with third level education in undergraduate, postgraduate and continuing professional development areas.

There may be merit in working with third level education providers such that a greater understanding of interrelationships between health, planning and environmental regulation are built into the next generation of graduates. Opportunities for consideration may include embedding health assessment skills within undergraduate courses, development of targeted postgraduate and CPD courses for current SEA and EIA practitioners, symposia, research funding etc.

H03: Recommendations for Legislation

Any consideration of legislation for HIA would require further research including:

- Assessment of the adequacy of the definition of health in current legislation to facilitate the objectives outlined in Healthy Ireland, in particular the impact of the new definition of health on planning and environmental legislation.
- If legislation is found to be adequate, consideration for developing tools to ensure stakeholders are aware of the scope of powers of such legislation when applied to planning and environmental decisions.
- If legislation is found to be inadequate detailed analysis should be undertaken to identify whether health in this context is best catered for in Public Health legislation, Planning and Development / Environmental legislation or both.
- Any decision to legislate for HIA should be supported by an assessment of the adequacy and capacity of existing processes, requirements for establishment of additional resources and potential to bridge gaps between the existing and desired state for successful HIA implementation.

A summary of these recommendations and indication of prioritisation/timeframes are presented below in Table 13.

Table 15: Summary of Recommendations and Prioritisation

Recommendation	Task	Timeframe
H01 Working Group	a) Establish Working Group	Short Term
	a) Define health and clarify roles and responsibilities	Short Term
	b) Develop guidance on methodologies and appraisal criteria for health assessment	Short to Medium Term
	d) Interrelationship and data gap analysis of health consideration between preparation of development plan, SEA, EIA and licensing processes	Short to Medium Term
	e) Requirements for a single health chapter	Short to Medium Term
	f) Early engagement and scoping	Medium Term
	g) Proportionality	Medium Term
	h) Establishment of a central unit for environmental assessment with a health advisor	Long Term
	i) Baseline Population Health Data	Medium to Long Term
	j) Process and Timing	Short to Medium Term
H02 Capacity Building	a) Targeted QRA methods training	Short to Medium Term
	b) Targeted HIA training	Short to Medium Term
	c) Development of Guidance and Knowledge Banks	Short Term
	d) Engagement with third level education	Ongoing
H03 Recommendations for Legislation	Feasibility Study for legislation	Longer Term

H04: Interim Recommendations

The following are a series of interim recommendations that may contribute to meeting the objectives outlined in H01 to H03 but that can be facilitated within a shorter time frame.

- There is already a strong body of work on environmental health supported by the EPA, this includes:
  - Existing information outlining how the environment impacts upon health (currently available via the EPA website);
  - A wide range of existing research publications relevant to health supported by the EPA;
  - Existing collaboration with the HSE and health research partners which has produced publications containing guidance on approaches to environmental health for specific topics (e.g. Air Quality Index for Health, HSE, 2011; Comparative health study, HSE 2008).

  It may be appropriate to look to identifying how these pieces of work may be highlighted as a resource for inclusion within environmental assessment processes.

- Guidance in relation to HIA is available in a number of countries, including Ireland (IPH, 2009), Australia (Department of Health, 2001); Canada (Health Canada, 1998), United States (US EPA, 2013), UK (Department of Health, 2010) amongst others as discussed within the report. A review of these guidelines, to assess which may best support consideration of health in EIA, would be beneficial to

identify frameworks and methodologies. This may be an appropriate interim measure until such time as it is possible to develop national guidance.

- Given the need to consider quality of life within SEA, interim elaboration on application of existing guidance, such as that provided by the HIA Gateway, may be appropriate.
- As discussed in H01c above, there is a wide range of guidance available relating to quantitative health risk assessment. In Ireland, Most At Risk Individual (MARI) reports are already prepared for specific projects with potential risk of environmental exposure. Guidance on the specific information to be contained within these reports is necessary in order ensure consistency in approaches and to ensure minimum standards are met. In the short term, this may be achieved by preparation of interim position statements outlining appropriate frameworks/methodologies (e.g. approaches such as US EPA, Health Canada, Australian enHealth, UK Environment Agency, SNIFFER (Scotland and Northern Ireland), INERIS (France)) and minimum information required. A statement outlining what is considered to be 'unacceptable risk' in an Irish context would also be beneficial.
- Consideration may be given to the requirement to further emphasise screening of human health within existing licensing processes via a separate section to discuss environmental impacts to human health. This may have benefits in regards to simplifying review processes for statutory consultees and improved risk communication with the general public.
- In some jurisdictions a review of environmental standards has been undertaken to assess their protectiveness with regards to human health. This has been undertaken in Ireland in some areas e.g. the AQIH evidence base review by the HSE and the JAGDAG identification of hazardous substances for groundwater with the assistance of Public Health England. It may be beneficial to undertake a review the information already available to outline how standards applied are protective of human health.

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APPENDIX A

Survey Documents

Q1. Healthy Ireland has indicated that Social Impact Assessment will be		
Answer	**Response**	**Number of respondents**
Yes	50%	6
No	50%	6
Comments		
As part of the development plan process. social matters i.e. school places, childcare, services, public amenities etc. are addressed through		
no formal impact assessment done, issues addressed though preparation of plan/project and associated environmental reports		
Health Impact Assessments have been undertaken as part of Feasibility Study for a walking / cycling greenway project. Capacity in education is a fundamental consideration for larger residential developments.		
never heard of 'social impact assessment' in planning context		
Social Infrastructure Assessment required in County Development Plan for larger housing developments but not enforced		

public health?		
Answer	**Response**	**Number of respondents**
Health screening tool	0%	0
All projects or plans are sent to a health advisor regardless of size or likelihood of impact	13%	1
Informal in-house consideration	88%	7
Comments		
Targeted consultation with internal and external consultees based on specifics of proposal		
None of the above. Consultation (both in-house and external) is carried out in line with development plan requirements		
Not all projects or plans, referrals to internal Environment Section and HSE if required.		
assess applications taking into consideration development plan/ reports from prescribed bodies / guidelines/ legislation. identify likely effects of		
In 'Forward Planning' required to carry out SEA which deals with impacts on human beings/ human health		
where potential risks are identified then the HSE is notified. e.g. all applications where customer toilets are proposed		

of a plan or project are relevant to public health		
Answer	**Response**	**Number of respondents**
exposure to chemicals or emissions from a facility	100%	13
exposure to noise, nuisance	100%	13
changes in population	54%	7
accommodation	54%	7
education, training, employment opportunities	62%	8
safety/perception of safety	69%	9
cultural and leisure facilities/green spaces	92%	12
other		
Comments		
All are relevant depending on the nature of the plan/project proposed		
see planning acts		
Many of issues listed could be an indirect impact		
Water / air pollution		
transportation infrastructure and SMARTER travel		

Q4. When issues surrounding public health and a proposed plan/project need further consideration who do you contact for further advice		
Answer	**Response**	**Number of respondents**
Internal resources	77%	10
EPA	77%	10
National Environmental Health Office, HSE	85%	11
Local public health representative	31%	4
Local health promotion representative	0%	0
Other (please specify)	31%	4
Comments		
Health and Safety Authority		
Garda, NRA,buildign control office, childcare committee, water safety development officer, Chief medical officer		
WHO Healthy Cities Forum contacts		
Local EHO		

Q5. Have you had training regarding Health Impact Assessment, health in EIA, SEA or any planning issues relating to the environment?		
Answer	**Response**	**Number of respondents**
Yes	38%	5
No	62%	8
Comment		
EIA and SEA		

Q6. Which of the following stakeholders are most likely to indicate to the planning authority that a Health Impact Assessment for a plan or		
Answer	**Response**	**Number of respondents**
Internal request	38%	5
Local community - individual	31%	4
Local community - organisation	38%	5
Industry	23%	3
Prescribed body/competent authority	69%	9

Q7. Which of the following barriers to assessing health do you find are most relevant?		
Answer	**Response**	**Number of respondents**
Lack of definition on what 'health' means	46%	6
Lack of guidance on how health should be assessed	85%	11
Lack of legislation to support addressing social determinants of health from a planning perspective	62%	8
Restrictive role of prescribed bodies as commentator rather than objector	8%	1
Need for a multidisciplinary approach to health - access to suitably qualified persons	31%	4
Lack of scoping for health at outset of EIA/SEA	54%	7
Fear that health will result in a long drawn out process that is unfocussed and unbounded	23%	3
Lack of engagement with health professionals	15%	2
Cost	8%	1
Time required to engage with public	8%	1
Potential for unnecessary public concern by separately addressing health	31%	4
Inexperience	15%	2
Absence of health policy in Local or County Area Plan	46%	6
Comment		
Public health and safety is already addressed in existing legislation and guidelines i.e. road traffic safety, air emissions, water quality. there is		
health issues are taken outside the remit of the Local Authority: e.g.: Telecom mast Guidelines issued by DoEC&LG and Discharges licensable by		

HIA please rank the aspects you found most helpful to least helpful			
Option	**helpful**	**neither helpful or unhelpful**	**unhelpful**
Minimise health risks	90%	10%	0%
	9 (no.)	1 (no.)	0 (no.)
Maximise health benefits	80%	20%	0%
	8 (no.)	2 (no.)	0 (no.)
Inform management measures or alternatives	70%	30%	0%
	7 (no.)	3 (no.)	0 (no.)
Emphasise relevant health policies and initiatives to the area	70%	30%	0%
	7 (no.)	3 (no.)	0 (no.)
General supporting information in decision making process	60%	30%	10%
	6 (no.)	3 (no.)	1 (no.)
Greater public engagement	45.45%	45.45%	9.09%
	5 (no.)	5 (no.)	1 (no.)
Map health and wellbeing effects	30%	60%	10%
	3 (no.)	6 (no.)	1 (no.)

do you think would be beneficial in assisting Planning Authorities		
Answer	**Response**	**Number of respondents**
Development of national guidance or direction to international guidance on health in EIA and SEA	69%	9
Development of a health screening tool aimed at needs of Planning Authorities	54%	7
Development of proportionate approach to EIA and SEA in relation to potential for impact to health	38%	5
Establishment of a central unit e.g. Environment Assessment Unit or Health Impact Assessment Unit to act as a resource for scoping and appraisal of EIA and SEA	38%	5
Introduction of a tiered system for EIA to reduce level of information required on small projects and focus on quality of information on large	38%	5
Legislate for Health Impact Assessment	38%	5
Mandatory scoping for plans/projects indicating health impacts	31%	4
No change - the current approach is adequate	23%	3
Establishment of a central unit to reduce client-consultant bias by way of an independent tender process for conducting EIA and SEA	15%	2
Introduction of third party review system of environmental assessment reports to reduce work-load and increase response timeframes	0%	0

Q10. Any other comment or information
Public health and safety is already a primary concern of planning authorities and is embedded in the existing planning and development management system. Some further clarity with respect the SEA/EIA process would be helpful with respect assessment and quantification of impact on health.
lot of indirect / unknown impacts related to health. WHO Healthy Cities good at promoting health / healthy urban planning initiatives
I have not made any response to parts of query 8 as the issues highlighted have no meaning for me. I have seldom seen health assessment as a separate heading in either and EIA or SEA.
The number of stand alone 'assessments' now required for plans / projects is getting out of control. It is the job of a planner to balance competing economic, social and environmental concerns - that is what we are trained to do and do it every day. To have to carry out a stand alone assessment for every single aspect of a proposal will only add a new burden to those that have no expertise in the area and no funding. It would also potentially lead to risk of challenges due to perceived 'inadequacies' of assessments when they are done 'in a rush' (to comply with statutory deadlines) by professionals with no expertise in the area.
Most EIS would be referred to HSE locally community care. Also where potential health impacts are identified an application would also be referred to HSE.
I have ticked 'No change' in Q 9 solely on the basis that Planners are not trained health professionals. There is sufficient national guidance on the health benefits of activity, environment etc. etc. Resources should be concentrated on encouraging people to become more active and eat healthier - if planning as a discipline can help then this should be a primary focus through land use planning, creation of parks, developing cycle routes, regional parks etc. A quality built environment with key services is also critical to the overall populations health.

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