


REVIEW OF ENVIRONMENT AND HEALTH NEEDS

HSE PUBLIC HEALTH: HEALTH PROTECTION

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Contents

Abbreviations

COPD	Chronic Obstructive Pulmonary Disease
CPD	Continuing Professional Development
CPHM	Consultant in Public Health Medicine
EHP	Environment and Health Programme
E&H SIG	Environment and Health Special Interest Group
EU	European Union
GHG	Greenhouse Gas
HPSC	Health Protection Surveillance Centre
HSE	Health Service Executive
IHR	International Health Regulations
MDT	Multi-Disciplinary Team
MOH	Medical Officer of Health
NEHS	National Environmental Health Service
NHPO	National Health Protection Office
OCIMS	Outbreak Case and Incident Management System
SpR	Specialist Registrar
WTE	Whole Time Equivalent

Foreword

Implementation of an all-hazards national health protection service is a key component of **HSE's National Health Protection Strategy**. The Environment and Health Programme (EHP) within the National Health Protection Office (NHPO) is a key enabler for delivering our vision, and a support to the development programme we need to realise this, at national and regional level. This work is by its very nature collaborative and needs partnership work within HSE, as well as with a broad range of stakeholders and partners, nationally and internationally.

Among the range of challenges we need to address in relation to environmental hazards, is mitigating the impact of climate change. According to the WHO, climate change presents a fundamental threat to human health. These effects are complex and act as 'multipliers' of health threats. They include:

- **Extreme Weather Events**: Increased frequency and intensity of heatwaves, storms, floods, and wildfires lead to injuries, deaths, and mental health issues.
- **Air Quality**: Higher temperatures and changing weather patterns can worsen air quality, leading to respiratory and cardiovascular diseases.
- **Infectious Diseases**: Climate change alters the distribution of vector-borne diseases like malaria and dengue and increases the prevalence of food- and water-borne illnesses.
- **Food and Water Security**: Disruptions in food systems and water supply can lead to malnutrition and dehydration, particularly affecting vulnerable populations.
- **Mental Health**: The stress and anxiety caused by extreme weather events, displacement, and loss of livelihoods can lead to mental health issues.
- **Health Infrastructure**: Climate change can strain health systems, reducing their capacity to provide care during emergencies.

Addressing climate change through mitigation and adaptation strategies can significantly reduce these health risks and improve overall public health. In the NHPO, we continue to integrate environmental health considerations into our health protection efforts, in surveillance, in research activities, and in our capabilities in responding to environmental health threats, collaboratively with key partners, like the HSE National Environmental Health Service (NEHS), and stakeholders external to HSE.

The work presented in this document has been led by our National Lead for Environment and Health, Dr Ina Kelly. It provides an overview of the key needs in relation to environmental health hazards facing the Irish population and the work

required to address them. It is a frank appraisal of the level of the challenge facing us and the journey ahead to build capability and capacity to meet those challenges. But as the longest journey starts with the first step, so too does our work on the road to improving our capabilities in addressing environmental health hazards move forward, informed by this report to guide the way.

I am deeply grateful to all our colleagues who contributed to this report.

Dr Éamonn O'Moore,
An Dr. Éamonn Ó Mórdha
Director of National Health Protection, HSE
Stiúrthóir um Chosaint Sláinte Náisiúnta, FSS

1. Introduction

Public Health in Ireland has been undergoing a transformation process since the latter stages of the Covid-19 pandemic through the Public Health Reform Programme. As part of this, the **National Health Protection Strategy 2022-2027** was published to highlight the ten key priority areas for health protection and health security for Ireland. The Strategy specifically describes the importance of the **Environment and Health Programme (EHP)** within the **National Health Protection Office (NHPO)** in delivering our ambition to have an all-hazards national health protection service. Specifically, **objective 3** of the Strategy states we will "*Further develop public health risk assessment of, advice on, and advocacy on non-infectious disease hazards related to the environment*". In addition, the NHPO has an international obligation under **International Health Regulations (IHR) 2005** and **EU regulation 2022/2371 (Serious Cross-Border Threats to Health)** to actively contribute to international alert and preparedness mechanisms, and benefit reciprocally from international contributions that enhance Ireland's own health security in relation to environmental hazards.

An environmental hazard is a potential threat to human health caused by harmful substances or events. In the source-pathway-receptor model of risk management, the **source** is the originating point of the hazard (e.g. burning fossil fuels), the **pathway** is the route the hazard travels (e.g. air pollution), and the **receptor** is the population affected by the hazard (e.g. humans residing in the area of pollution). Effective public health risk management aims to break or control this chain by addressing one or more links in the model.

To progress the development of an all-hazards health protection service, a comprehensive review of the Environment and Health Needs in the Republic of Ireland was required. This document presents the findings of that review, commissioned from the EHP by the Director of National Health Protection.

2. Overview of Environment and Health Function

The EHP, part of the Health Security Programme, within the NHPO, collaborates with Regional Health Areas, **National Environmental Health Service** (NEHS), other teams within HSE, and wider partners beyond HSE, to:

- Investigate and control environmental sources of notifiable infectious diseases;
- Collaborate with partners and stakeholders on environmental threats prevention, preparedness, response and recovery;
- Conduct post-incident debriefing to improve the quality of future health protection responses;
- Develop operational guidance related to environmental hazards;
- Perform public health risk assessment for all-hazards to protect health and prevent harm;

- Provide public health advice to professionals and the public regarding environmental hazards;
- Provide prevention advice and advocacy with a wide range of stakeholders who influence environmental determinants of health;
- Advocate for benefits of a healthy environment in collaboration with HSE Public Health: Health Improvement;
- Train staff, including higher specialist training and continuing professional development (CPD)

3. Methodology

The aim of this Environment and Health Needs Review was to identify priority needs for the EHP and develop a programme for delivery. Key priorities were identified by documentary analysis, literature review and consultation with regional Consultants in Public Health Medicine (CPHM) and the Environment and Health Special Interest Group[1] (E&H SIG).

Priorities were considered based on:

- International review of environmental hazards and pathways
- Magnitude and severity of environmental health impacts
- Availability of effective and acceptable interventions and actions
- Statutory responsibilities and legislative power and capacity to achieve them

[1] Special Interest Groups (SIG) provide expertise and leadership of a designated health threat to inform a standardised approach to its surveillance, risk assessment and risk management within HSE Public Health: Health Protection.

Findings:

4.1 Population of Interest

The environment and health needs of all residents in the Republic of Ireland are considered. In addition, there is recognition that certain sub-populations are at increased risk of exposure from, and more vulnerable to, environmental hazards.

Vulnerable groups include:

- Extremes of age
- Underlying co-morbidities (asthma, chronic obstructive pulmonary disease (COPD), cardiovascular disease)
- People with mobility problems
- People in environmentally vulnerable (e.g. flooding risk) and degraded (e.g. polluted) areas
- People residing in poor quality accommodation (e.g. inadequate ventilation or insulation)

4.2 Key Stakeholders

Environment and Health is a cross-cutting issue that involves numerous stakeholders across multiple domains. **Figure 1** provides a non-exhaustive overview of the most relevant stakeholders identified during this review.

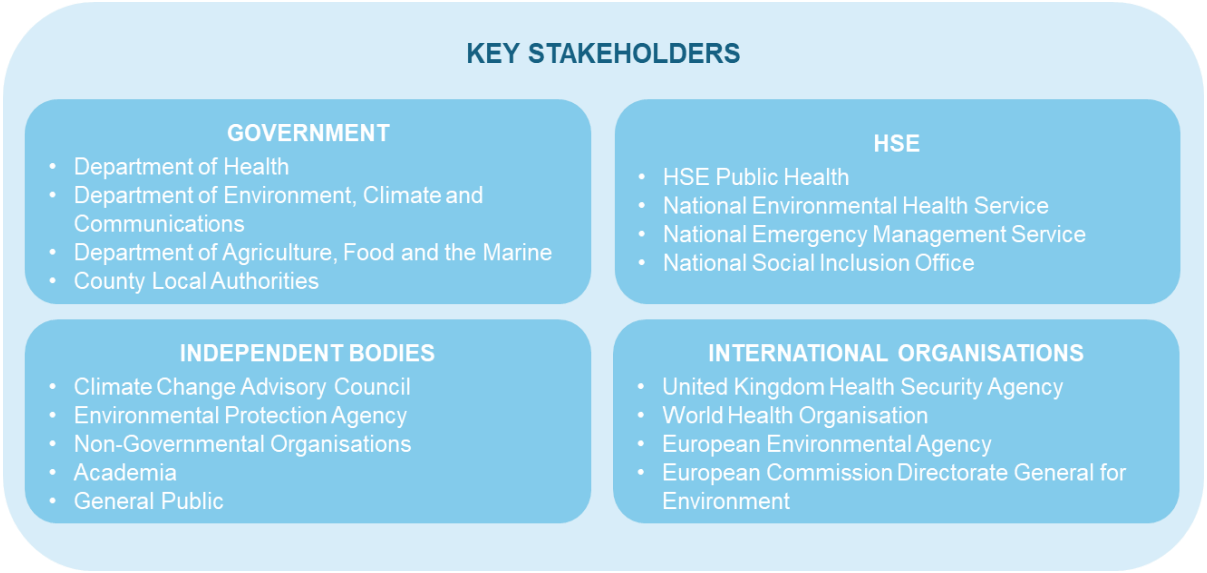

Figure 1: Key Stakeholders Involved in Environment and Health Function

4.3 Resources

4.3.1 Human Resources Capacity

A workshop consultation across the national and regional members of the E&H SIG in June 2024 identified the need for further training, development and expansion of the multidisciplinary team (MDT), as most of the Environment and Health capacity is currently provided by CPHMs, and specialist registrars (SpRs) in training. It was agreed that ensuring adequate training, continuing professional development (CPD) and expertise amongst members of the MDT, including CPHMs, would address some of the capacity concerns raised.

Attendees noted that increasing capacity would enable them to engage in longer term planning and operational delivery (including prevention) on Environment and Health issues, such as National Groups (e.g. National Drinking Water Group, E&H SIG), Environment and Health training and development, inter-departmental collaboration, and local and national authority planning consultations.

4.3.2 Environment and Health Guidance

Environment and Health Guidance for CPHMs and other public health practitioners was developed by the former Public Health Medicine Environment and Health Group and is currently accessible through the Health Protection Surveillance Centre (HPSC) website. However, while most of the pertinent topics are covered, workshop attendees did note the absence of detailed Irish guidance for certain workstreams, and environment and health overall. Furthermore, many of the guides have not been reviewed for update since 2019 due to the impact of the COVID-19 pandemic, which displaced other work from 2020 until recently.

4.4 Health Priorities

The following health priorities relevant to Ireland were identified:

4.4.1 Air pollution

Air pollution is a significant risk factor for noncommunicable cardiovascular and respiratory diseases and is estimated to cause at least 1,700 premature deaths per year in the Republic of Ireland (McVicar *et al*, 2023). Pollutants may cause problems in the immediate vicinity (e.g. residential fire), or across long distances (e.g. wildfires)

Air Pollutants Monitored in Ireland

- **Nitrogen dioxide**: A byproduct of fuel combustion
- **Ozone**: Occurs from a reaction between pollutants and the sun
- **Carbon monoxide**: A toxic gas produced by incomplete combustion
- **Sulphur dioxide**: The result of burning fossil fuels
- **Particulate matter**: Consisting of sulphates, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water

where it tends to affect more people and places. Poor quality accommodation can aggravate exposure risk through inadequate ventilation and insulation (e.g. carbon monoxide poisoning, mould formation) and substandard construction (e.g. radon gas buildup).

4.4.2 Noise

Environmental noise is the second biggest environmental cause of health problems after air pollution, leading to (EEA, 2020):

- cardiovascular diseases
- reduced cognitive performance in children
- severe annoyance (a form of stress)
- sleep disturbance
- tinnitus

Environmental noise also carries a cost burden in the form of less productive working days, over-burdened health systems, and reduced property values (European Commission, n.d.)

4.4.3 Radiation

Radon[2] is the main source of radiation for people in Ireland and contributes to approximately 350 lung cancer cases per year (EPA, 2024a). There is no safe level of radon radiation exposure. Some of the highest recorded international measurements of radon in homes and offices have been in Ireland (Organo and Murphy, 2007). The current annual average indoor radon exposure in Ireland is 98 Bq/m3 (EPA, 2024b), versus a worldwide average of 50 Bq/m3 (ICRP, 2018). For each increase of 100 Bq/m3, a person's risk of lung cancer from radon increases by 16% (WHO, 2009).

4.4.4 Water

Drinking water is a significant pathway for waterborne diseases. There are over 180,000 water supply sources in Ireland (The Water Forum, 2023). Over the past 10 years, there has been an average of 14 outbreaks related to waterborne sources

Factors Influencing Drinking Water Quality, Ireland

- **Raw water quality**: vulnerable to contamination
- **Governance:** piecemeal approach with multiple stakeholders
- **Groundwater vulnerability**: nature of Irish geography increases risk of groundwater contamination
- **Treatment**: no treatment in some unregulated well-water sources
- **Climate change**: increases risk of contaminated water
- **Chemical contaminants:** such as lead (Pb) and trihalomethanes

[2] Radon is an odourless, colourless gas that is naturally released from rocks and soil. It can get trapped inside closed buildings, where it can lead to a buildup in the air. Long-term exposure to radon can cause lung cancer.

reported every year in Ireland. Most sources in these outbreaks (84.4%) are private household domestic wells, which are currently exempt from any drinking water regulations.

Bathing water. Wild swimming is a popular physical activity that promotes good health, if the water is clean. There are currently 148 monitored sites in Ireland, the majority of which were of excellent quality in 2023 (77%). There was, however, an increase in pollution incidents in 2023; heavy rainfall leading to wastewater overflow is one of the main reasons and is likely to increase with increased precipitation due to climate change (EPA, 2024c).

4.4.5 Climate Change Adaptation and Resilience

Climate change is already impacting populations, and the challenges will increase during the remainder of the 21st century. Reducing greenhouse gas (GHG) emissions is required to achieve net-zero carbon emissions and limit the impacts of climate change. However, even once achieved, the inertia in the climate system will continue to result in warming of the planet, requiring health sector and population adaptation and resilience through early warning systems, prevention, preparedness, response and recovery. As contributors to GHGs, the health sector has a role in reducing emissions; the HSE has committed to achieving net-zero carbon emissions by 2050 as per the **HSE Climate Action Strategy 2023-2050**. Climate change exposes underlying vulnerabilities to health across sectors; health protection action can offer opportunities to tackle wider public health issues.

4.4.6 Chemicals

WHO has identified 10 chemicals of major public health concern (WHO, 2020), several of these important for Ireland.

Important Chemical Exposures, Ireland include:

- **Air pollution** – see section 4.4.1
- **Asbestos** – increased risk of lung disease and lung cancer
- **Benzene** – increased risk of cancer, notably blood cancers
- **Inadequate fluoride** – increased risk of poor dental health
- **Lead (Pb)** – negatively impacts brain development, particularly in children
- **Hazardous pesticides** – increased risk of chronic diseases

There are currently over 100 Seveso sites[3] in Ireland (HSA, 2023), all storing a variety of dangerous chemicals at sufficient quantities to require regulatory oversight to protect the health of the public. The HSE is one of three Local Competent Authorities

[3] Seveso sites are industrial sites that present a high risk of major incidents endangering the health of the local population and environment due to the nature and quantity of chemicals contained on site. These sites are regulated under the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015).

responsible for developing and reviewing External Emergency Plans (EEPs) for these sites.

4.5 Service Priorities

In addition to the health priorities identified above, the following priorities related to workflow processes and infrastructure were identified:

4.5.1 Surveillance

There is currently no centralised Environment and Health Surveillance system in Ireland, limiting the ability of Public Health to identify and monitor emerging or ongoing environmental hazards. The lack of reliable, valid and ongoing data collection pertaining to environmental hazards also limits the ability for evidence informed public health research to inform policy development and evaluation.

4.5.2 Environment and Health Research

A robust Environment and Health action research programme is needed to provide the necessary evidence to inform Ireland specific guidance (Section 4.3.2). There is currently limited Irish Public Health Environment and Health input to research and research strategy, likely driven by the lack of dedicated resources, data sources and surveillance.

4.5.3 Public Health and Environmental Legislation

Public Health Environment and Health has very little history to date of exploration of the legal basis for processing special category data under Medical Officer of Health (MOH) legislation. There is a need to understand challenges that may arise in interpretation and application of legislation as it applies to Environment and Health. Similarly, some of the legislation pertinent to Environment and Health is developed in other sectors (e.g. drinking water and air pollution) and consideration as to its effectiveness in protecting the health of the public is needed.

5. Priorities for Action

Table 1 below presents the priorities identified during this review, and the proposed actions required to address them.

Table 1: Priorities for Action

PRIORITIES	ACTIONS	TIMELINE FOR DELIVERY
An Environment and Health Programme implementation strategy aligned to the Health Protection Strategy 2022-2027, taking into account the changing HSE structures and governance	Develop evidence-informed workstreams for each health priority issue, addressing all phases of risk management (prevention, preparedness, response, recovery)	2025 In Progress
Integrate quality improvement and performance measurement throughout implementation plan	Formalise and implement a monitoring and evaluation framework aligned to agreed performance measures	2025
Increase Environment and Health capacity by expanding MDT membership	Develop appropriate MDT guidance, training and resource repositories to enhance MDT capacity, capability and engagement	2026 In Progress
A comprehensive Environment and Health Surveillance system to improve clinical management and provide evidence to support Health in All Policies	Develop best-practice Environment and Health Surveillance in anticipation of a central OCIMS	2027 In Progress
An Environment and Health research strategy that leverages research in action to improve population outcomes while informing research funding priorities	Develop research strategy that addresses most urgent Environment and Health information gaps, aligned with health priorities identified, and utilising internal and external stakeholder resources	2027
Investigate the use of Public Health Legislation as it relates to Environment and Health, and conversely, environmental legislation as it relates to Public Health	Conduct a review of the use of Public Health and relevant environmental legislation as it relates to Environment and Health	2026

6. Conclusion and Next Steps

The Environment and Health service within Health Protection has moved from a regionally provided service (for regional and national issues) to an integrated service embedded in the all-hazards National Health Protection Office, which has oversight of national and regional operational prevention, preparedness and response. This change in structure necessitated a review and restructuring of clinical and governance pathways, at national and regional level. The priorities identified in this Environment and Health Needs review take this restructuring into consideration, and propose key actions aligned with the Health Protection Strategy 2022-2027. One of the key actions already commenced is a **3-year implementation plan**, which includes appropriate monitoring and evaluation, to be delivered during the lifetime of the Health Protection Strategy 2022-2027. The delivery of this plan will ensure that the residents of the Republic of Ireland are protected from environmental hazards, now and into the future.

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