

Health Impact Assessment (HIA) as a tool to mobilise 'Health in All Policies'

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Health Impact Assessment (HIA) as a tool to mobilise 'Health in All Policies'



Liz Green

Health Impact Assessment (HIA) as a tool to mobilise 'Health in All Policies'

Dissertation

to obtain the degree of Doctor at the Maastricht University,

on the authority of the Rector Magnificus

Prof.dr. Pamela Habibović

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Chapter 1: Introduction

Sections of this introductory chapter are taken from Chapter 4 'Health in All Policies' and Chapter 6 'Health in other impact assessments' authored by Liz Green in Chang, M., Green, L., & Petrokofsky, C. (2022), 'Public Health Spatial Planning in Practice: Improving Health and Well-being' published by Bristol: Policy Press. It is available online at: [Policy Press | Public Health Spatial Planning in Practice - Improving Health and Well-being](https://bristoluniversitypress.co.uk/PolicyPress/PublicHealthSpatialPlanninginPractice-ImprovingHealthandWell-being). By Michael Chang, Liz Green and Carl Petrokofsky (bristoluniversitypress.co.uk)

Background

Health and well-being are significantly affected by factors outside of health systems such as spatial planning, the economy and governmental policies and their decisions (Marmot, 2008). These factors are routinely referred to as the 'social determinants of health' and have been articulated in frameworks such as that depicted by Dahlgren and Whitehead (Dahlgren and Whitehead, 2021). The impact of these determinants can create or exacerbate existing inequalities in social and health outcomes for a wide range of population groups (Marmot, 2010). More recently there have been developments and more detailed frameworks and discussions around the determinants of health for example, the commercial determinants, which focus on issues such as trade and mass producers of unhealthy commodities (UHCs), for example, soft drinks; and the political determinants of health (Kickbusch et al., 2016; Lawson, 2020; World Health Organization, 2021).

One key concept to consider the health implications of policy decisions in a synergistic way in a range of settings, sectors and systems in order to avoid harmful health impacts, promote health and improve health outcomes – is 'Health in All Policies' (HiAP) (Leppo et al., 2013; World Health Organization, 2013). The concept of health commonly referred to within HiAP is that of the World Health Organization (World Health Organization, 1948) – a holistic in nature and includes physical, mental and social well-being.

As part of this approach to protect and improve health and reducing inequalities in a participatory and integrated way, Health Impact Assessment (HIA) is a tool through which we can drive the concept of HiAP (Collins and Koplan, 2009; Rogerson et al., 2020; World Health Organization, 2015a), and is a decision-informing tool, which promotes cross-sector collaboration (Green et al., 2021b). The benefits of HIA and how it can be used in informing decision-making is described in detail in Chapter 2.

Internationally, HiAP has had variable success depending on the political, economic and social context (Rogerson et al., 2020). The 1978 Declaration of Alma Ata (World Health Organization, 1978) promoted the need to focus on the wider determinants of health, engage wider sectors and promote intersectoral action in order to achieve better health and improve equity. This was followed by the Ottawa Charter in 1986 which identified creating Healthy Public Policy as something which public health officers should focus on and that *'puts health on the agenda of policy makers in all sectors and at all levels, directing them to be aware of the health consequences of their decisions and to accept their responsibilities for health'* (World Health Organization, 1986). In these, the foundations of HiAP were built and the concept emerged in 2006 when it was identified by the Finnish EU Presidency (Ståhl, 2018) and the following year it was adopted by South Australia (Delany et al., 2016). At a European regional level, WHO Europe embraced Health in All Policies as a driver for good health in its 2013 Policy Framework for the 21st century 'Health 2020' and its 'Draft Framework for country action' (World Health Organization, 2013, 2015a). HiAP is at the core of its ambitions and recognises that much health inequity is created outside of specific health systems and that it is a whole of government responsibility and needs a whole of society approach. The European Commission and NGOs also advocate for HiAP (European Centre for Health Policy, 1999).

The implementation of HiAP has been approached in a variety of ways across the world. In Europe, Finland embraced it explicitly based on the work that it had carried out to promote cross sector working for better health and the systems in place to do this (Hagen et al., 2015) and many other European nations have promoted HiAP at the strategic level for example, Sweden, England and Scotland (Douglas, 2019; Pinto et al., 2015; Public Health England, 2016) but in practice it is implemented and most effective at a local level.

South Australia, California and Wales have all promoted and enabled HiAP to take place on a formal basis at a national or state level and required local agencies and departments to work together (Delany et al., 2016; Huang et al., 2018; Welsh Government, 2021, 2015). The South Australian government also set up a specific unit for HiAP through which to undertake Health Lens Analyses of specific policy areas and support the

promotion of HiAP and provide expert advice (Delany et al., 2016). The WHO have also re-emphasised the need for HiAP action and developed a manual for nations to use to enable the concept in practice (World Health Organization, 2015b). Other organisations for example, in the US or the UK have developed similar tools (Association of State and Territorial Health Officials, 2014; Department of Health, 2015; Scottish Health and Inequality Impact Assessment Network (SHIAN), 2019; Society of Practitioners of Health Impact Assessment, 2017).

More recently, there has been a focus on HiAP due to the COVID-19 pandemic and the need for sectors to work with each other as the pandemic has shown how central health is to a well-functioning, economically active society (Green et al., 2021b) and a shift to well-being economies which place health and well-being and working together at their heart (EuroHealthNet, 2022; World Health Organization, 2023a) and a move to 'Health for all Policies' (Greer et al., 2022).

In the UK, and in particularly the devolved nations of Scotland and Wales, there is a strong emphasis on sustainable development and equity (Committee of the Faculty of Public Health Scotland Advocacy Subgroup, 2018; Welsh Government, 2021). The Well-being of the Future Generations (Wales) Act 2015 (WFGA) (Welsh Government, 2015) provides a legal duty for public bodies in the country for example, Welsh Government, Local Health Boards and Local Authorities and organisations with a national remit such as its national public health institute, Public Health Wales (PHW) and environmental agency Natural Resources Wales to strive to maximise its contribution to seven Well-being Goals. These goals include a focus on society, economy, the environment, health, equity and being globally responsible. As such they reflect the determinants of health and well-being and implicitly drive a HiAP approach. The WFGA is Wales's response to the UN SDGs (United Nations, 2020) and is the first Act globally to enshrine the SDGs in legislation. Furthermore, this allows the practical tool of HIA to be utilised support the Act and healthy public policy making in practice (Kemm, 2001; Metcalfe and Higgins, 2009).

HIA uses the framework of the wider determinants of health, is participatory in nature and engages with other stakeholders who are developing plans or policies - thus connecting sectors and exploring synergies in policies. See chapter 2 for the process and stakeholder roles. It also aims to mitigate for negative health and equity impacts and maximise positive ones - the definition of HiAP (Douglas, 2019; Green et al., 2021b; Society of Practitioners of Health Impact Assessment, 2017).

Welsh Government introduced a Public Health (Wales) Act in 2017 (Welsh Government, 2017) which makes HIA statutory. This provides a legal basis to promote and drive HiAP further by providing a practical step which public bodies must carry out to consider health and well-being and inequalities as part of planning and policy development (Green et al., 2021b; Welsh Government, 2017). Wales has a dedicated HIA support unit (Wales Health Impact Assessment Support Unit, WHIASU) that is established within Public Health Wales. Together these levers aim to promote and protect health and wider social, economic and environmental well-being and reduce inequalities which exist across Wales (Public Health Wales, 2022).

What is Health in All Policies (HiAP)?

HiAP has been developed by the WHO, and since the late 1970's has been supported by governments across the world such as Finland, Wales, and South Australia (Delany et al., 2016; Leppo et al., 2013; Welsh Government, 2015; World Health Organization, 2023a). It was solidified at an international conference in 2010 and again in 2013, where the focus was on the concept and presented how it could be utilised and implemented in practice (World Health Organization, 2013, 2010).

HiAP is a concept that seeks to improve population health and health equity by looking at public policies across all sectors. It does this by taking account of the health implications of decisions, seeking synergies and

avoiding harmful health impacts and inequalities. In effect, it entails working collaboratively across sectors to inform and influence evidence-based decisions, so that any negative impacts on health and well-being are reduced, avoided or mitigated. It is preventative in nature and aims to address any social and health equity issues by focussing on the particular populations who will be affected by those decisions (Cave et al., 2021).

To communicate, implement and enable the concept of HiAP, engagement with colleagues in partner and other relevant organisations who are developing plans or strategies that are likely to affect health and well-being is essential. This involves working together to ensure plans and strategies are shaped to improve health and well-being and reduce inequalities. It can include participating in partnership groups, collating and using health intelligence data and evidence, and leading or contributing to health impact assessment or similar processes. For this to occur, sectors and systems need to speak to each other, and create and develop solid and trustful long-term working relationships so that they can understand each other's terminology and perspectives. This can take time to evolve both at a national and local level (World Health Organization, 2018) and many organisations and individuals carry it out subconsciously via consultation and informal partnership working.

HiAP can be achieved through working in partnership across sectors to deliver shared goals and have shared outcomes. Both systems are evidence based and close collaboration can add to and support shared evidence bases. Partnership working and collaboration, involving and consulting with the public are core aspects of both planning and public health functions. This can foster better relationships, access to data and evidence, support regulatory and compulsory consultation processes and, importantly, lead to strengthening of sectors, policies, plans and projects and to the implementation of healthy and strong policies, services and facilities, employment and housing opportunities appropriate for the local community's needs (Michael Chang, 2022).

It must be noted that there are some essential requirements to the successful implementation of HiAP in practice and some challenges. Evaluations of HiAP implementation identified several important areas to be fulfilled for it to be successful. These include needing time as HiAP is built over the long term as relationships develop, political buy in and commitment (Baum et al., 2019; Ståhl, 2018), resources (including money, data and intelligence and public health professionals with the knowledge and skills to understand other sectors and settings) and/or dedicated Units such as that in South Australia (Delany et al., 2016). High level leadership, high levels of trust and strong working relationships, specific strategies which cross refer and include a reference to the concept of HiAP and joint working and structures to support this in reality have been deemed essential in a review of the implementation of HiAP at a local level (Delany et al., 2016; Ståhl, 2018, 2018; Welsh Government, 2019; World Health Organization, 2018). With all this then any recommended actions or changes can be implemented, and public health will be able to influence policy makers decisions (Douglas et al., 2020; Haigh et al., 2015).

In terms of challenges then there can be barriers to its implementation from both a public health and stakeholder perspective (Molnar et al., 2016). The main challenge is the political nature of HiAP and the short-term policy cycles which politicians and decision makers work within. Whilst there are times when co-benefits or 'win:wins' can be achieved there is often a conflict between health and other sectors and outcomes for example, the economy. This was clearly seen during the COVID-19 pandemic (Green et al., 2021a; Kokkinen et al., 2019; Mahoney et al., 2004). Additionally, political priorities, policy setters and governments can, and do, frequently change and this can result in it being hard to maintain HiAP and cross sectoral work or focus on health equity and preventative health (de Leeuw and Clavier, 2011; Holt et al., 2017). In relation to supporting HiAP with infrastructure or governance systems only South Australia have this, along with a dedicated HiAP Unit. In reality, most HiAP activities take place on an ad hoc basis or because there is a window of opportunity (Baum et al., 2019; Green et al., 2021b).

In terms of being able to demonstrate the impact of HiAP is challenging. This is due in part to lack of monitoring of health impacts and outcomes of policies and the challenge of evaluating the impact of HiAP on decisions (Marmot, 2018; Public Health England, 2017) or robustly demonstrating or attributing any changes in health, well-being and equity attribute to any one policy or intervention over the long term (Government of South Australia and Global Network for Health in All Policies, 2019; Mahoney et al., 2004).

Some evaluation has happened with regard to HiAP effectiveness and its influence on population health and inequalities (Baum et al., 2019; van Eyk et al., 2017; World Health Organization, 2018) but more are required in order to gain a better understanding of where and how HiAP is beneficial and influential and what is needed to mobilise it in practice (Green et al., 2020).

However, there are opportunities for the HiAP approach to contribute to both national and international goals including the Sustainable Development Goals, or the Well-being Goals being developed by nations such as Wales (Fonseca, 2016; Storm et al., 2011; Welsh Government, 2015) in a holistic way. The COVID-19 pandemic has highlighted how intertwined policy areas and sectors are (Green et al., 2021a; Greer et al., 2022) and how a range of determinants of health and population health inequalities have been affected (Douglas et al., 2020; Green et al., 2022; United Nations, 2020; World Health Organization, 2023a). Goals such as the SDGs provide a platform for governments to prioritise action on determinants in an integrated way. There may still be scope for discord between policy makers on which is a more important area but tools such as HIA and HLA can help to unpick how to mitigate for the unintended negative impacts on health and inequalities (Baum et al., 2019; Bielecki et al., 2021; Green et al., 2021a; White and Razgour, 2020; World Health Organization, 2010).

What is Health Impact Assessment (HIA)

Since the late 1990's Health Impact Assessment has been highlighted as a tool to mobilise Healthy Public Policy (Collins and Koplan, 2009; Kemm, 2001; Metcalfe and Higgins, 2009).

HIA is defined as *'a combination of procedures, methods and tools by which a policy, intervention or service may be judged as to its potential effects on the health of a population, and the distribution of those effects within a population'* (World Health Organization, 2023b). It is an evidence based practical, systematic yet flexible tool through which policy makers can establish if and how their work could have an impact on the population and if so, how will these affect them (i.e. positive or negative or unintended negative impact) (Green et al., 2021a). It does this through the lens of the social determinants of health for example, social, community, environmental or economic impacts and identifies which particular groups will be affected for example, older people, those on low incomes. HIAs can be carried out prospectively or 'ex-ante' (before a policy, project or proposal have been developed), concurrently (as part of the development of a policy or proposal or at a consultation stage) or retrospectively (after the policy or project has been confirmed or implemented) (Green et al., 2020; Winkler et al., 2021). It can be carried out comprehensively or rapidly with a small amount of resource.

HIA is also a valuable tool in that it provides practical and realistic evidence-based recommendations for action to maximise any positive impact or opportunities and mitigate for any negative or unintended negative impacts. HIA also has a monitoring stage that can seamlessly be included in annual monitoring plans. A longer introduction to HIA and the process is described in more detail in Chapter 2.

Health in impact assessments

"Health is an increasingly important component in many ex-ante decision-making support impact assessment (IA) instruments...This continues to be a developing agenda which brings new actors and new

perspectives into established IA systems” (Fischer and Cave, 2018). Fischer and Cave made a valid point about the increasing inclusion of health in strategic and operational decision making. This is particularly true for spatial planning policy and project development and Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA).

Health and its meaning

‘Health’ can be described and interpreted in different ways and mean different things to different individuals, communities and practitioners dependent on their local contexts, knowledge, practice and beliefs (Larson, 1999; Tamm, 1993). This is particularly true dependent on national or local or regional guidance and context. SEA nor EIA nor many HIA directives and guides define what they mean by the terms health, human health or population health and how these will be interpreted. ‘Health’ as a term can be categorised via several models (see Table 1).

Table 1: Models of Health

A medical model - Focuses on the physical body itself and disease, illness and death. The body is something to be healed and measured in a negative way (Stokes et al., 1982). Population Health would be viewed through statistics for example, levels of disease or life expectancy rates.
A holistic model - Focuses on both physical and mental health and well-being (World Health Organization, 1948). It views health as something that can be measured both positively and negatively. However, the concept of well-being can be difficult to capture compared to rates of disease that are more readily available. Population health would be measured through statistics and data for example, levels of disease and life expectancy rates and well-being through proxy indicators such as levels of physical activity, dietary indicators such as amount of fresh fruit or vegetables eaten per day.
A wellness model - The WHO definition was further expanded in the 1986 Ottawa Charter for Health Promotion which focused on the extent to which an individual or group is able to attain their aspirations and needs and adapt or be resilient in the context of their environment. It states that ‘Health is a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources, as well as physical capacities’ (World Health Organization, 1948). It views health as something which can be measured both positively and negatively. However, the concept of well-being can be difficult to capture compared to rates of disease which are more readily available (World Health Organization, 2023b). Population health would be measured through statistics and data for example, levels of disease and life expectancy rates. Well-being would be measured through proxy indicators such as levels of physical activity, dietary indicators such as amount of fresh fruit or vegetables eaten per day or how happy someone is or not.
An environmental model - Focuses on physical health risk and negative effects which results from the interaction with a person or population’s environment. The World Health Organization (WHO) defines environment, as it relates to health, as “all the physical, chemical, and biological factors external to a person, and all the related (Cave et al., 2021; Winkler et al., 2021) behaviours.’ (World Health Organization, 2006). Environmental health consists of preventing or controlling disease, injury, and disability related to the interactions between people and their environment. Population health can be measured through statistics about levels of air pollution and emissions, noise, toxic substances and waste against pre-defined safety thresholds.

Why is the definition of health important in impact assessment?

Definitions and models of health are important when considering and understanding health and well-being how to integrate it into HIA and other impact assessments that are relevant to policy and plan making and project development for example, Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA). Integrating health into impact assessment as a plan, policy or proposal level can be complicated in nature and defined not only by an individual's view of health, but that of society, key stakeholders, legislators, policy makers, developers and those commissioned to carry out an impact assessment which has health as an element (Cave et al., 2021; Winkler et al., 2021). It is important that there is clarity about the process and what it entails along with explicit regulator, professional body or legislator guidance around how these are carried out, the elements which must be considered within it and which health model is to be used as a lens.

There are several forms of impact assessment which consider health impact at a population level, and which are statutory for policies, plans and projects particularly with regards to environmental and spatial planning and the definition of health used within these can have both challenges and opportunities attached to them. The definition of health embraced in the Welsh HIAs discussed in this thesis (see Chapters 4, 5, 6, 7 and 8) is that of the wellness and holistic models where Wales has a strong emphasis on well-being and reducing inequalities as mentioned previously (Welsh Government, 2021, 2015).

Gaps in knowledge and relevance

This PhD proposes to contribute to the evidence base by exploring perspectives of, and practical support for, HIA as a method to advance HiAP in Europe and globally and share how HIA has evolved and been implemented in Wales to drive and apply HiAP in practice. It will also look at HIA use, practice and promotion in (national) public health institutes (PHI) internationally at the present time.

There are gaps in the peer reviewed and grey literature which this thesis aims to fill. There is little in the peer reviewed literature in respect to evidence derived from HIA case studies (for example, reflections and learning from them), especially published by the actual practitioners who have carried them out (Harris-Roxas and Harris, 2007) There have been no case studies examples beyond the papers in this thesis that provide insight into the practice of HIA in PHIs. There are also no HIA specific examples of the complex mapping of cumulative health and equity impacts of policies and plans; or which measure the accuracy of HIA prediction and is needed to provide confidence in the process (Rogerson et al., 2020). The thesis can be used as a platform by national/regional PHIs or other Impact Assessment (IA) and health and environmental practitioners, researchers, politicians and policy makers internationally to help fulfil the need to inform cross sector policy and decision making, advocacy for, and allocation of, resources for HIA and promote further research or HIA activity (Cave et al., 2021; Rogerson et al., 2020; Winkler et al., 2020).

Aim and Objectives

The main objective of thesis is to explore and identify how Health Impact Assessment (HIA) can be or is used as a tool to mobilise 'Health in All Policies'.

This PhD contributes to the evidence base by exploring Health Impact Assessment (HIA)

- as a method to advance the concept of 'Health in All Policies' (HiAP),
- capture national public health institutes perspectives of, and practical support for this approach, and
- assesses how HIA has evolved and been implemented in Wales to drive and apply HiAP in practice.

It will also examine if and how HIA has been used to promote cross sector and multi-disciplinary working to inform and better understand decision making, and to reflect on and detail to what extent and how NPHI's can mobilize 'Health in All Policies' approaches to enable cross disciplinary and cross sector working to protect, promote and integrate health and well-being and a consideration of inequalities.

The thesis focusses across four areas of interest. It

- maps the **current status** of HIA internationally and across PHIs
- maps the **health impacts in specific policies** for example, Brexit, responses to the COVID-19 pandemic and the SDGs via an infrastructure project
- maps the **health impacts in multiple and broader policies** jointly for example, Brexit, responses to the COVID-19 pandemic and climate change
- **an evaluation of HIAs predictive accuracy.**

The papers and research carried out use a variety of methods. The areas of focus, papers and methods are summarised in Table 2.

Table 2: Areas of focus and papers published

Areas of focus in Thesis	Current status of HIA		Mapping the health and inequality impacts in specific policies and projects – evidence from Wales			Mapping the health impact of multiple broader policies	Evaluation of HIA predictive accuracy
Chapter	2	3	4	5	6	7	8
Aim and objectives	To better understand the concept, its methods and current status. It considers the benefits and challenges of utilising HIA in practice.	To map the current status of HIA in Public Health Institutes globally. It captures the enablers or barriers to implementation and what needs to be done to make it more effective as a tool within these organisations.	How can HIA be used to consider health, well-being, and inequalities at a local, regional, national or international level? What can be learnt from the carrying out of HIAs in Wales and how can this support	How can HIA be used to inform and understand the implications for health and well-being of policy decisions? What can be learnt from the carrying out of HIAs in Wales and how can this support	How can HIA be used to inform and understand the implications for health and well-being of policy decisions? What can be learnt from the carrying out of HIAs in Wales and how can this support	How can HIA be used to inform and understand the implications for health and well-being of policy decisions? What can be learnt from the carrying out of HIAs in Wales and how can this support	To map the accuracy of predictive HIAs and provide confidence

			future practice?	future practice?	future practice?	future practice?	
Methods & data sources	Scoping Review	Mixed methods Scoping review - Online digital qualitative and quantitative survey; key informant interviews.	Case study. Investigation of primary and secondary sources	Case study. Investigation of primary and secondary sources	Case study. Investigation of primary and secondary sources	Case study. Investigation of primary and secondary sources	Evaluation. Baseline statistics and other evidence was compared to the published data of the same identified impacts 18 months later

Methodological approach

At its core, this thesis examines how Health Impact Assessment (HIA) can be used to mobilise HIAP in practice and is centred around the hypothesis:

‘The practice of Health Impact Assessment (HIA) in Wales has positively demonstrated that it can be used to support the concept of ‘Health in All policies’ in practice and offers transferable learning for nation states and public health institutes and agencies internationally’.

The methodological approach is focused on the 4 areas of research around HIA as outlined above. It explores and investigates these areas using mixed methods and collecting, and analysing, both primary and secondary data and evidence. It does this via the use of critical appraisal, content analysis, statistical packages such as online questionnaires and Excel packages and scoping reviews. This approach means that both quantitative and qualitative evidence can be combined to provide a better understanding of the use of HIA globally, and specifically in Wales, and how it has, or is, or can be, used for HIAP.

The methods involved include a variety of data collection methods including qualitative real life HIA case study examples using primary sources of evidence and practitioner knowledge and experience; a digital scoping questionnaire using open and closed questions; qualitative interviews with HIA key informants; and an evaluation of predicted impacts against published statistics and other robust intelligence. This provides a breadth of evidence and data to form a picture of HIA practice and perspectives. It aims to answer several research questions. It includes peer-reviewed papers and grey literature as the grey literature is very important in HIA as most HIAs are published as reports.

The research questions include:

- How can HIA be used to consider health, well-being, and inequalities at a local, regional, national or international level? (current status of HIA, chapter 2)
- What steps can PHIs take to advocate for, and support, cross sector working to enable health and well-being integration? (current status of HIA, chapter 3)

- How can HIA be used to inform and understand the implications for health and well-being of specific policy decisions? What can be learnt from the carrying out of HIAs in Wales? (Mapping impacts in specific policies, chapters 4-6)
- What can be learnt from the carrying out of broader HIAs in Wales and how can this support future practice? (Mapping health impacts in multiple broader policies, chapter 7)
- How can HIAs provide confidence in their predictions to decision and policy makers? (Evaluation of HIAs predictive accuracy, chapter 8)

The analysis to this PhD thesis is articulated in 7 chapters supported by an introduction and discussion chapter.

Current status of HIA

Chapter 2: This chapter focuses on the concept of Health Impact Assessment (HIA), the methodology and evidence used in the process and the benefits and challenges associated with it. It is a review of current literature and practice and includes both peer reviewed and grey published literature. Grey literature is very important to the practice of HIA as most published work is in this form.

Chapter 3: An international digital scoping survey and expert interviews to assesses the current use of HIA to enable HIA and HIAP in global public health institutes (PHIs). It describes the facilitators to the use of HIA as a method both in its own right but also as a way to mobilise HIAP. It also discusses the barriers and gathers a range of views and statistics from key stakeholders to better understand how HIA is both being used and could be used as part of PHI activities. The paper also suggests some ways forward which could support the future use of HIA in PHIs. In the qualitative interviews PHIs representatives focussed on the main themes which emerged from the survey including what are the main enablers or barriers to implementation and what do PHIs need to make it more effective as a tool.

Mapping the health and inequality impacts in specific policies and projects – evidence from Wales

Chapters 4, 5 and 6: These chapters comprise case studies examples and focus on a three specific HIAs at national policy and local project levels which were carried out in Wales and reflect on current HIA Welsh practice and learning and how HIA can be used as a method to advance the concept of HIAP. These include innovative approaches to implementing policies and strategies for example, 'Staying at Home and Social Distancing' ('lockdown') and associated policies in response to the COVID-19 pandemic, Brexit and the Sustainable Development Goals (SDGs).

These case studies and the learning from them are captured and the methods and process which were carried out, the findings and the impact of the work to date are detailed. They help to support the work of PHIs and provide the real-life successful case study examples asked for by participants in Chapter 3. These were selected for their impact and influence, originality, transferability and the learning and reflections captured whilst carrying them out. They utilised the primary knowledge of those who carried out the HIAs and primary evidence sources completed as part of the process.

Mapping the health impact of multiple broader policies

Chapter 7: This research takes the case studies in chapters 4, 5 and 6 one step further and evaluates the novel use of HIA to map the cumulative health impacts of broader policies together and assesses the integrations needed to bring HIAP to life. This research involved the complex mapping of three HIAs carried out in Wales at a national policy level and captures the synergies in positive and negative health, well-being

and equity impact. The policies are 'lockdown' restrictions in response to the COVID-19 pandemic, Brexit and Climate change in Wales. They utilise the learning from the research team and primary sources, present the results and denote the reflection and learning including the positive impact to date of the work and benefits for PHIs but also the limitations of the approach.

Evaluation of HIA predictive accuracy

Chapter 8: This paper evaluates the impacts anticipated in the COVID-19 health impact assessments against actual observed trends. The paper addresses a clear need as policy and decision makers need to be confident in the predictive findings of a HIA. The paper compares and analyses two national level HIAs carried out on similar policies ('lockdown' in Wales and Scotland). The processes undertaken were compared and predicted impacts were tabulated. Routine robust published data and peer reviewed and grey literature evidence were collated to compare predicted and observed impacts. The paper describes the HIA processes followed, the mapping of the impacts to compare the prediction against the observed impacts and explores the differences between the HIAs and why this may be. It shares learning and makes the case for HIA as a robust predictive policy tool to support HIAP in the post pandemic recovery.

Chapter 9: Discussion and conclusions. This provides a synthesis of the main findings from this research and a discussion of them. It includes some suggestions to address the findings, future research questions, limitations and conclusions.

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Chapter 2: Health Impact Assessment: Concept, process, practice, roles, benefits and impact

This chapter is taken from Chapter 5 'Health Impact Assessment in Planning' by Liz Green in 'Public Health Spatial Planning in Practice Improving Health and Well-being' published in: Chang, Green, Petrokofsky. September 2022 Policy Press. It is available online at: [Policy Press | Public Health Spatial Planning in Practice - Improving Health and Well-being, By Michael Chang, Liz Green and Carl Petrokofsky \(bristoluniversitypress.co.uk\)](https://www.bristoluniversitypress.co.uk/public-health-spatial-planning-in-practice-improving-health-and-well-being/)

Health Impact Assessment (HIA): Concept, process, practice, roles, benefits and impact

This chapter outlines the process of Health Impact Assessment (HIA), the roles carried out in HIA, how it can be used as a beneficial and proportional process to support effective public health planning and decision-making and its integration in practice. The current status of HIA has also been included and outlined within this chapter.

What is Health Impact Assessment?

A HIA is a flexible and systematic tool that can be applied to effectively implement 'Health in all policies' approaches at local, national and regional levels. It considers in an explicit and effective way populations impacted by policy and plans and can address and help to discuss and mitigate any issues before they arise. HIA is defined as 'a combination of procedures, methods and tools by which a policy, intervention or service may be judged as to its potential effects on the health of a population, and the distribution of those effects within a population' (European Centre for Health Policy, 1999). Underpinned by the World Health Organisation (WHO) holistic definition of health and well-being, it uses the social determinants of health as a lens through which to identify health impacts (World Health Organization, 1948). It is a tool which can be used to implement 'Health in All Policies' in practice (Collins and Koplan, 2009; Douglas, 2019; Green et al., 2022b; Metcalfe and Higgins, 2009; World Health Organization, 2013).

Current practice

Emerging in the late 1990's out of Environmental Impact Assessment (EIA), the first HIAs were published in the early 2000's and since then the field of HIA has evolved and advanced (Birley, 2011; Rogerson et al., 2020; Winkler et al., 2020).

There have been recent reviews and scoping studies of HIA practice internationally and regionally which have been conducted and published (Cave et al., 2021; Green et al., 2022b; Winkler et al., 2020). These depict a picture of advancement in some geographic or regional areas but none in others. They also highlight that at this point in time HIA is at risk of splintering into several distinct perspectives and fields of practice and research (Cave et al., 2021; Green et al., 2022b; Kim and Haigh, 2021; Winkler et al., 2020).

In practice, this includes the carrying out of HIAs which are standalone with a primary focus on health and equity (Green et al., 2022b; Haigh et al., 2015; Harris-Roxas and Harris, 2007), those which assess only health risk and / or the environmental determinants of health and those in which health is integrated into other impact assessments such as Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) (Cave et al., 2021; Fischer, 2008). This is highly dependent on context, legislative background and policy drivers (Cave et al., 2021; Green et al., 2022b; Rogerson et al., 2020). In academia, there are several clusters of academics and practitioners who specialise and publish in specific aspects of HIA, for example the evaluation and effectiveness of the HIA process, quantitative model driven HIA, transport and active travel HIAs and health integration in EIA and SEA (Kim and Haigh, 2021).

There were two recent Health Impact Assessment research activities which captured the current status of HIA practice globally across all sectors and settings (Cave et al., 2021; Winkler et al., 2020). There have also been individual regional scoping exercises which focussed on the implementation of HIA in South America (Pereira et al., 2017). In addition, Chapter 3 in this PhD scopes the current status and use of HIA as a tool to mobilise HIAP in public health institutes (PHIs) across the world. This is the first time this has taken place and it provides a baseline of activity from which to measure future activity. These studies all demonstrated the variability in success across the world in the practice and promotion of HIA and some of the challenges linked to its implementation (Cave et al., 2021; Rogerson et al., 2020; Winkler et al., 2020). Europe is the focus of most HIA activity and here it has evolved so that HIAs are carried out across a wide range of policies,

plans and developments (Cave et al., 2021; Green et al., 2022b; Haigh et al., 2015; Winkler et al., 2020). Oceania (Australia and New Zealand) and the United States follow (Winkler et al., 2020).

There is variability in the implementation of HIA practice internationally. As previously stated, this often depends on the political and social context and the legislative frameworks in which HIA must operate within and the perspectives of health embraced. For example, some nations such as Wales have an enabling political environment (devolution, a progressive government which a social and health focus) which have legislated for HIA in decision and policy making as a driver of HIAP and a vehicle to enable integrated policy and plan making and to reduce inequalities (Welsh Government, 2017). Others such as Thailand have mandated for HIA as part of community engagement or environmental legislation (Chandanachulaka, 2012) whilst others such as Quebec and Canada use it as a response to HIAP agendas and to enhance decision making (Boldo et al., 2011; Government of Canada, 2012). At an organisational level, some for example, the Asian Development Bank require HIAs as part of funding requirements for development projects (Asian Development Bank, 2018, 1992).

Environmental Impact Assessment (EIA) is also a clear driver for HIA (WHO, 2014, Cave et al., 2021; Green et al., 2022b; Winkler et al., 2020). However, the focus of this is on the integration of health into the EIA and this can lead to an explicit focus on environmental determinants of health rather than a wider holistic assessment that looks at the social determinants of health and inequalities (Michael Chang, 2022). Legislation to protect and consider the environment as part of planning processes is a core element of many governmental and regional frameworks for example the EU Directive on EIA or the Impact Assessment Act in Canada (Cave et al., 2021) and provides an opportunity for health to be considered and built into spatial planning and environmental decision making. Strategic Environmental Assessment (SEA) can also be used to consider health and HIA. (Fischer and Cave, 2019) There is no 'one-size' fits all to the development and evolution of HIA practice internationally.

More recently, the COVID-19 pandemic has highlighted the importance of health and well-being and the wide health inequalities faced not just by, and between, nations but also between communities (Marmot, 2021). HIA has been used in some nations as a way of supporting policy making and informing decisions around the pandemic response measures (Douglas et al., 2020; Green et al., 2021a, 2022a). It has been utilised in a range of settings and sectors and can be used to mobilise HIAP and promote cross sector working as much as inform and improve plans, policies and projects (Chang et al., 2021; Public Health England, 2020; Rogerson et al., 2020).

In terms of effectiveness of HIA as a process, there have been several studies to date (Haigh et al., 2015; Wismar et al., 2007). These highlight the clear parameters needed for HIA to be successful and acceptable as a process and a tool in which policy and decision makers can have confidence (Green et al., 2022a; Haigh et al., 2015; Rogerson et al., 2020).

In terms of capturing reflections on carrying out a HIA, detailing the process followed to inform decisions and have impact and measuring the effectiveness and accuracy of prediction in HIA there is very little (Green et al., 2022b). Chapters 4, 5, 6, 7 and 8 of this thesis aim to address this and start to add to the literature and evidence and fill some of these gaps.

The HIA process

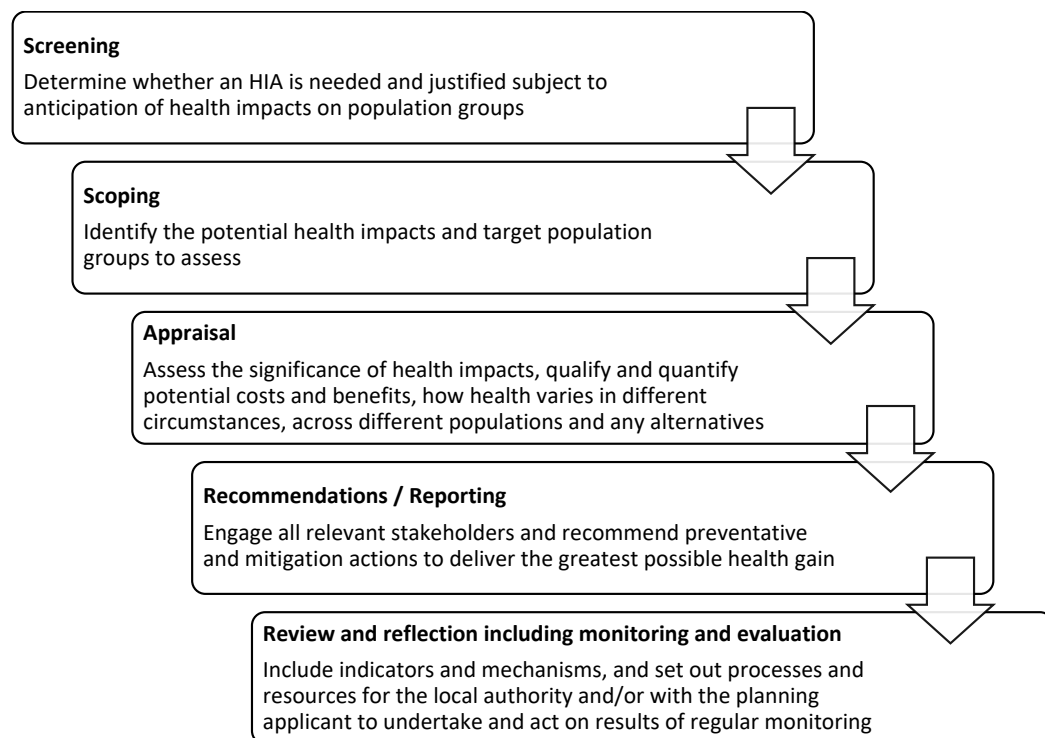
As a process, HIA is a systematic and scalable which allows health and well-being to be considered in all policy sectors in a proportionate way. The process explicitly raises awareness of well-being and inequalities amongst policy and decision makers and officers (Parry and Scully, 2003; Winkler et al., 2021; World Health Organization, 2021a) and is recommended by the WHO as an important method with which to drive and apply HIAP to support healthy public policymaking (World Health Organization, 2014). HIA is explicitly tied to

HiAP as it can enable collaboration across sectors to influence and inform decision-making processes, identifies positive and negative impacts on the population and makes recommendations to mitigate and avoid them (Winkler et al., 2013). However, previous evidence acknowledges there can be both benefits and challenges attached to the use of HIA dependent on context (Huang, 2012; Tamburrini et al., 2011; Winkler et al., 2021).

The process uses the determinants of health as a lens through which to assess the impact of policies, plans or projects. It follows a broad mixed methods approach to HIA, considers the potential positive and the negative (and unintended negative) impacts across the breadth of determinants, and focuses on the impact on health equity and vulnerable populations, for example, women, children and young people, or older people. It can do this via checklists that focus on population groups and the wider determinants of health and well-being, for example those used in Wales (Wales Health Impact Assessment Support Unit, 2020). The HIA process also directly involves organisations and institutions, public bodies and communities (and their representatives) who could, or will be, affected by the policy or plan under assessment or have an interest in it (Winkler et al., 2021).

HIA is a 5 step standard process which consists of the stages of: screening; scoping; appraisal of the evidence; recommendations and reporting; review and reflection (including monitoring and evaluation (Green et al., 2020b)). Figure 1 depicts the process to be followed. Whilst some may regard it as a linear process, HIAs are most useful and effective when the process is iterative and can be adapted to particular timescales and circumstances. The process is not detailed in this chapter but is explained more comprehensively in many of the HIA guides available across the world (Scottish Health and Inequality Impact Assessment Network (SHIIAN), 2019; Society of Practitioners of Health Impact Assessment, 2017; Wales Health Impact Assessment Support Unit, 2012).

Figure 1. The health impact assessment process



Perspectives on HIA

Within HIA, there are two primary perspectives that can be used to inform the practice of HIA (Kemmer, 2003). Firstly, there is 'tight' HIA, which tends to be epidemiologically focussed - mainly on quantifiable and physical health impacts such as air quality, emissions, noise levels and visual impacts. This perspective was developed out of Environmental Impact Assessment (Birley et al., 1998; Cave et al., 2021; Wismar et al., 2007).

Secondly, there is 'broad' HIA, which is more sociological in nature, uses a social and holistic definition of health, acknowledges that there are different theories of change and health impact, addresses the complex nature of the contexts to which proposals refer, has a broader understanding of what constitutes knowledge and evidence and may include the accounts and perspectives of lay communities (Green et al., 2019, 2020b; Tamburrini et al., 2011; World Health Organization, 2021b). A consideration of health inequalities and equity should be an integral component of any HIA (Green et al., 2021a; Kemmer et al., 2004; Winkler et al., 2021). In nation states which have a legislative requirement for HIA and a focus on equity, such as Wales, all HIAs must systematically consider inequalities and the impacts on a range of population groups and assess the extent and distribution of these impacts (Wales Health Impact Assessment Support Unit, 2020). These groups can, for example, include older people, children and young people, those who suffer from chronic conditions or are geographically isolated. HIA is also based on a number of key principles and values – these include equity, robustness, and openness, and transparency, ethical use of evidence, participation, sustainability and democracy.

There is no 'right' or 'wrong' way to carry out a HIA, but the approach taken needs to be carefully scoped and clearly articulated as to why a specific approach was taken. A robust, useful and holistic HIA will use mixed qualitative and quantitative methods using the theories, concepts and methods of sociology, epidemiology and other disciplines as necessary, with an equal importance attached to democracy and scientific credibility.

Typologies of HIA

There are three main types of HIA, and they can embrace differing perspectives and policy levels. HIA can be prospective, concurrent or retrospective (Figure 2).

Figure 2. Types of health impact assessment

1. **Prospective HIA** – at the start of the development of a project, proposal or plan. Anticipates impact.
2. **Concurrent HIA** – runs alongside the implementation of the project (or policy). Captures evidence as it emerges and can inform and influence changes to plans or policies as they are implemented and reviewed at nominated times.
3. **Retrospective HIA** - assesses the effect of an existing project or policy and can be used as an evaluation and review tool. Retrospective assessments can be carried out on unexpected or unanticipated plans and unique events such as Brexit. Captures existing published evidence and can discuss the effect of implementation with key stakeholders as way of learning lessons and informing any future similar events.

HIA is routinely promoted as providing most value when utilised prospectively during the development of a proposal (Parry and Stevens, 2001) and the process should be activated late enough in a proposal's development to be clear about its nature and purpose but early enough to be able to influence its design and/or implementation. However, there are some clear examples of HIAs carried out in real-time as a policy or plan is being implemented which have provided evidence and information for policy and decision makers and planners (Green et al., 2020a) and these have highlighted the benefits of these approaches – particularly in emergency situations or unique events where decisions have been taken at speed.

Within any of the above types, an HIA can also take several different forms depending on the focus and the time and resources available - Desktop, Rapid (including a participatory workshop) or Comprehensive (Birley, 2011) (Figure 3). In practice, the most commonly used is a 'Rapid' HIA (Chilaka, 2010). Often any particular HIA may fit in between two of these forms as the approach taken will be determined by the nature of the proposal, the timescales involved and the human, organizational and financial resources available to undertake the process. However, there has been a move away from these labels by some practitioners (Winkler et al., 2021).

Figure 3: Forms of Health Impact Assessments

1. A Desktop HIA exercise can take hours or a day and can encompass a small number of stakeholders to utilise existing knowledge and evidence to assess a proposal, policy or plan.
2. A Rapid Participatory HIA can take days or weeks and usually includes the establishment of a small Steering Group and a participatory workshop - in which there is a brief investigation of the health impacts on the local population and includes gathering knowledge and further evidence from a number of key stakeholders. This type of HIA also includes a short literature review of quantitative and qualitative evidence, health intelligence and other demographic data to form a better understanding of the impacts.
3. A Comprehensive HIA are more in-depth and can take several weeks or months to complete. Comprehensive HIAs are not completed as frequently as Desktop or Rapid HIAs and this can be attributed to the fact that they can be time and resource intensive; require the policy context and more wide-ranging evidence obtained via literature searches, the collection of primary quantitative or qualitative data such as interviews or workshops and more focussed health intelligence and demographic statistics.

Characterisation of impact

There are ways in which the potential impacts may be described (Table 1). Where possible, the following impacts should be assessed:

- Nature of the impact - how will the proposal affect health, and will the impact be positive or negative? Will it be direct or indirect i.e. via a direct pathway or as an associated impact?
- Likelihood of the impact - is the likelihood of the impact of the proposal confirmed, probable or possible?
- Scale and significance of the impact - what proportion of the population is likely to be affected? How significant, moderate or minimal will the impact be (i.e. will it cause mild ill health or improve well-being or lead to deaths)?
- Timing of the impact - will the impact be in the short, medium or long term? In some instances, the short-term risks to health may be worth the long-term benefits.
- Distribution of the effects - will the proposal affect different groups of people in different ways? A proposal that is likely to benefit one section of the population for example, older people, may not benefit others for example, children and young people. The assessment will identify ways in which members of the least healthy or most vulnerable populations could be helped. This can be an important contribution to reducing the health inequalities that exist in some communities.

Table 1. Terminology: Characterisation of impact

Positive - impacts that improve or maintain health status
Negative - impacts that diminish health status
Confirmed - actual direct evidence in existence
Probable - more likely to happen than not, direct evidence but from limited sources

Possible - may or may not happen
Significant - sufficiently great or important to be worthy of attention, noteworthy
Moderate - average in intensity quality or degree
Minimal - of a minimum amount, quantity or degree, negligible
S = Short term - less than 1 year*
SM = Short to medium term – 1 to 3 years*
ML = Medium to long term - 3 to 5 or 10 years*
L = 10+ years*

*These timeframes can be shortened or lengthened according to the policy, project or plan being assessed.

What evidence is acceptable?

HIA utilises both qualitative and quantitative types of evidence (Birley, 2011; Green et al., 2021a; World Health Organization, 2021b). Where an estimation of the size of an impact can be measured then quantitative methods may be most appropriate or modelling techniques can be used to project and anticipate impact. For instance, when estimating the increase of air borne particulates due to changes in traffic variations and the resultant impact on the health and well-being of nearby communities.

However, some potential health impacts are not easily to measure, but may be equally or more important in terms of their impact on population health. Shutting a community facility such as a library, for example, can have a range of impacts. These impacts can manifest themselves in a myriad of ways which can only be accessed through more qualitative methods that explore people's feelings, experiences or perspectives. 'A Guide to Reviewing Published Evidence for use in Health Impact Assessment' (Mindell et al., 2010) provides useful information to support HIA practitioners when assessing the quality and type of evidence included in HIAs. The Wales HIA Support Unit and Ben Cave Associates have also published critical review quality assurance review frameworks for HIA which focusses on the process, the evidence used, the participation and contributions and the report itself (Green et al., 2019).

Roles in HIA

There are several different roles which are in play when a HIA is commissioned, carried out and reviewed. HIAs can be carried out by anyone who can follow the process as outlined in a recognised guide or review one (Scottish Health and Inequality Impact Assessment Network (SHIAN), 2019; Wales Health Impact Assessment Support Unit, 2012). This includes individuals, private and public organisations including local government or health agencies, developers, or communities (Winkler et al., 2021). There is a

misapprehension within some organisations that a HIA will be carried out by an individual. However, this is not good practice. In reality, HIA should be a collective and multidisciplinary process with a nominated lead and a variety of contributors – ranging from a lead who understands the process and can use the tools available, to health intelligence and data leads who can provide evidence to administrators who can support the process in practice and set up meetings etc through to reviewers who can quality assure the report. This approach is similar to multi-disciplinary teams who carry out Strategic Environmental Assessment and Environmental Impact Assessments. WHIASU published a HIA Training and Capacity Building Framework in 2019 which outlined the roles and their component parts (Edmonds et al., 2019), and summarised in Table 2.

Table 2. Different roles of professionals in the HIA process

Role	Definition
Advocate / System leader	Advocates for 'Health in all Policies', champions the use of HIA, provides leadership and identifies opportunities to use HIA
Authoriser	Commissions and/or allocates resources to HIA and integrates HiAP into organisational structures and work plans. Holds overall ownership and accountability for HIAs that they authorise or commission
Stakeholder	Participates in a HIA as a key stakeholder, community member, lay representative etc.
Contributor	Contributes to a HIA with a particular skill set or knowledge
Reviewer	Carries out quality assurance reviews, monitoring and evaluation of HIAs. Provides clear feedback to commissioners and decision makers
Lead HIA Practitioner (Intermediate) - Screening and Desktop HIAs	Leads the planning, design, delivery, and evaluation of Desktop HIAs or HIA Screenings focused on a discrete project, policy or service area. Ensures that the HIA process follows guidance and benchmarks for high quality HIA
Lead HIA Practitioner (Advanced) - Comprehensive, complex and participatory HIAs	This role leads the planning, design, delivery and evaluation of participatory, complex, contentious and/or large scale comprehensive HIAs. Ensures that the HIA process follows guidance and benchmarks for high quality HIAs

Whilst Table 2 makes it explicit which role can be carried out as part of a HIA, it discusses the individual's contribution but what about the specific sectors team, department or organisation and their roles? Table 3 depicts the roles that the key stakeholders have in commissioning, carrying out and reviewing HIAs.

Table 3. Stakeholder roles in HIA

Benefit	Spatial planners	Public health officers	Communities and society	Developers of the policy or project	Commissioned consultants
Advocate	√	√	√	√	√
Authoriser / commissioner	√	√		√	
Lead HIA Practitioner (Intermediate)	√	√			√
Lead HIA Practitioner (Advanced)	√	√			√
Stakeholder	√	√	√	√	
Contributor	√	√	√	√	
Reviewer – quality assurance	√	√	√	√	√

Table 3 demonstrates that there are a wide range of possible leads, contributors, and reviewers within HIA practice. But it is not essential that within any one particular HIA, an organisation or team will have every role to carry out and these may be interchangeable based on the scope, scale, nature and significance of each HIA carried out.

For example, in the example of spatial planners, they may commission a HIA, contribute to it as a stakeholder or sit on a Steering Group and contribute to setting the scope and then review it or ask local public health officers to do so. A project developer for example, a housing developer or energy plant developer, may commission a HIA but then let those commissioned to carry out the work do it and only review it or interrogate it at the end of the process.

It must be stressed that carrying out a fit for purpose, quality HIA is not, and should not be a one-person task. HIAs need to be proportionate and manageable within the resources that are available but that should not limit wider contribution or interaction with key stakeholders. A participatory interactive workshop

(either virtual or in person) can be a time efficient and resource effective method of engaging with stakeholders and collecting evidence (Green et al., 2020a, 2021a).

Using HIAs to inform decision and policy making processes

Conducting an HIA within traditionally described 'non-health' sectors such as planning, regeneration and housing sectors can confer considerable benefits and contribute to healthy public policy and urban and rural planning (Public Health England, 2020). Not only will HIA assess the potential positive and negative impacts but also it will highlight any potential improvements that could be made to maximize health and well-being and identify and mitigate for any detrimental impacts or unintended consequences. HIA can make more explicit the links between for example, land use and associated planning decisions, the way that we live and the key health and well-being issues today – including obesity, lack of physical activity and the associated risk factors and illnesses. There are a range of roles which can be carried out in HIA, and these can be assigned to a wide range of contributors and stakeholders. Carrying out a HIA is not, nor should be a one-person task (Douglas, 2019; Green et al., 2017).

It directly involves the local key organizational and community stakeholders and those who have local knowledge and understanding of how the project, plan or proposal will have a direct and indirect impact on local populations (Haigh et al., 2015; Winkler et al., 2021). A HIA can give context to a decision or plan. This includes how a community interacts with its physical and built environment and can facilitate physical health promotion and health improvement by encouraging cycle paths, pedestrian friendly towns, more active travel, open and green space allocation for recreation and sport in local plans and housing developments and access to the growth and purchase of fresh and affordable food.

Carrying out HIAs has benefits, not only for the policy and plan makers but also the developers, public health, the environment and most importantly the communities which are affected by these. Despite this and until recently, not all local authorities have reflected the importance of health in planning decisions such as in relation to green spaces, recreational areas or person-centred built environments. This is now changing as obesity and associated ill health increases, awareness of the implications of spatial planning in relation to emergencies such as COVID-19 also increases, and supportive resources and reviews are published (Green et al., 2021b; Public Health England, 2020).

Benefits and challenges to the use of HIA

There are many benefits to requiring and carrying out an HIA to assess the impacts of policies, plans and development projects (Cave et al., 2020; Tamburrini et al., 2011; Winkler et al., 2021). These include:

- increasing awareness across sectors of their impact on health and well-being and inequalities,
- involving the key stakeholders who may be affected by, or have an interest in, a plan and the process can bring them together as part of workshops or focus groups in an open way to discuss issues of concern,
- coordinating action between sectors to protect health and societal well-being,
- promoting evidence-based planning and decision-making, and
- giving a clearer view of how what is being planned and what impact there might be on the community in the short, medium and long term.

HIAs should be an integral component in assessing the benefits and harms of any policies or plans or projects. Ideally, they should be conducted prior to any proposals are formulated, integrated throughout the development of a plan or development or at specific consultation junctures for example in the UK as part of the preferred strategy stage of Local Development Plans. The evidence-based findings and recommendations should be used within the planning and / or development process in order to address and mitigate any potential negative impacts or unintended negative impacts but also be used as a platform to maximise any positive impacts or opportunities. Table 4 summarises the benefits to particular groups using the example of the spatial planning sector.

Table 4. Benefits of HIA

Benefit	Spatial planners	Public health officers	Communities and society	Developers of the policy or project
Strengthen and improve policies, plans and developments by mitigating for negative and unintended negative impacts. Maximise positive impacts and opportunities.	√	√	√	√
Development of health, well-being and equity focused plans and development which are desirable, viable and fit for local purposes.	√	√	√	√
Engages with key stakeholders in a systematic and focused method	√	√	√	√
Identification of key local knowledge and evidence	√	√	√	√
Informs decisions including midterm reviews which provide opportunities to change plans and policies based on emerging evidence and learn from the implementation of these to date.	√	√		√
Can identify opportunities for further integration and collaboration between sectors and connect key stakeholders to each other	√	√		√

Standalone HIAs can add value to other impact assessment processes that are being or have been carried out.	✓	✓	✓	✓
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Involving the community is an integral aspect of an HIA process (Chadderton et al., 2013; Mahoney et al., 2007; Winkler et al., 2021) and can be used to complement and inform robust research and other evidence and data. This is when the triangulation and appraisal of evidence is very beneficial in HIA as it provides a holistic and evidence-based understanding of how any plans or policies may play out. The development of shared evidence bases and shared knowledge between public health and local or national planners is particularly helpful to strengthen both plans and population health and can lead to shared outcomes (Johnson and Green, 2021; Town and Country Planning Association, 2016). HIA can also be used as a platform on which to build other impact assessment processes such as Equality Impact Assessment or Social Return on Investment (Ashton et al., 2020) and the data, evidence and intelligence can be utilised to be integrated into these and other processes such as EIA or to capture equity issues or social value of projects and interventions (Ashton et al., 2020; WHO, 2014, Cave et al., 2021).

However, there can be several challenges to the implementation of HIA. While the definition of HIA is generally agreed upon, complicating matters is the fact that countries have different legislative/regulatory frameworks and Public Health and other systems for example, spatial planning can have differing foci and priorities. As such, HIAs must be designed within these contexts and their constraints and be proportionate yet robust. As previously referred to, there are many guides to carrying out HIAs in a robust manner (Douglas, 2019; Green et al., 2019; Wales Health Impact Assessment Support Unit, 2012) and two focused critical appraisal tools which can ensure that the process is of sufficient quality (Green et al., 2017).

In terms of carrying out HIAs on policies or plans, there may be no or little capacity to carry out a HIA in an organisation / authority. Several studies and reports highlight the need for training or additional capacity and support for HIA (Cave et al., 2021; Green et al., 2022c; Walpita and Green, 2022; Winkler et al., 2020). The lack of this can lead to the use of screening tools as a mechanism to consider health and inequalities as part of organisational processes in a proportional way but at the same time can lead to health (or other determinants) being considered insufficiently and becoming a 'tick-box' exercise (Audit Wales, 2022, Green et al, 2022c). However, there is guidance which describes how HIAs can be carried out 'in house' in a proportionate and time effective and efficient way (Cave et al., 2021; Johnson and Green, 2021; Public Health England, 2020). This lack of capacity and capability to undertake HIAs in local teams (which could also be reflected in any local or national public health teams who could assist them), has led to an increased growth in international HIA consultants and health focussed leads at environmental consultancies. In the main, the latter tend to have a primary focus on environmental health determinants only due to the consultancies they sit in rather than have a wider determinant of health and health inequalities focus.

Issues around the financing, building capacity for, and resourcing of HIAs to be carried out can create situations in which those with particular interests (for example, private housing developers and extraction industries) can, and do, fund HIAs or elements of a HIA. This is more routinely as part of a statutory obligation to conduct an Environmental Impact Assessment (Cave et al., 2020; Walpita and Green, 2022). Therefore, if a HIA is commissioned, then the likelihood is that the private developer will pay for it and any HIA will be undertaken alongside their statutory obligation to conduct an EIA. Clearly this situation could be construed as a conflict of interest by key stakeholders such as local communities and compromise the study.

This can lead to a distrust of any findings or recommendations by public health practitioners and citizens, particularly regarding planning or contentious decisions, and can be challenging to surmount.

Additionally, an obstacle to overcome can be how to manage a community's expectations of what a HIA can and cannot achieve and minimise 'jargon' as part of the process. HIA is a balanced process that assesses both positive and negative impacts and the evidence for both must be transparently published. Therefore, the aims and objectives of any HIA must be established and communicated from the outset and require the involvement or consultation with stakeholders such as local public health teams at the start of a planning or policy process and give them a voice. The HIA should be used as a transparent vehicle to gather data and evidence of all types to use in and to support planning decision and policymaking processes whilst strengthening their outcomes. Table 5 provides an example of how HIA can be maximised in processes – in this example, spatial planning.

Table 5. Strategic considerations in maximising the application of HIAs in Wales planning policy development

HIAs and Planning Policy	Key Points	
	Why undertake a HIA?	<ul style="list-style-type: none"> ✓ Ensure robust evidence base for health and well-being ✓ Identify local health needs/issues directly from relevant stakeholders in a participatory manner ✓ Ensure policies reflect appropriate local community needs ✓ Local Development Plan supports healthy and sustainable communities
	Who should undertake a HIA?	<p>Local Planning Authority</p> <ul style="list-style-type: none"> ✓ In-house (consider local organisational involvement) ✓ External consultants
	When should HIA be undertaken?	<p>At an Early Stage</p> <ul style="list-style-type: none"> ✓ Evidence gathering ✓ Issues and Options ✓ Preferred Strategy (as part of consultation to maximise benefits) ✓ Deposit Stage
	What type of HIA should be undertaken?	<p>Local Development Plan (New and Review) or Supplementary Planning Document</p> <ul style="list-style-type: none"> ✓ Rapid Participatory HIA

	How should HIA be undertaken?	<p>There are two ways of undertaking HIA</p> <ul style="list-style-type: none"> ✓ Standalone assessment ✓ Integration within the wider processes such as SEA
	What is the benefit of a HIA?	<ul style="list-style-type: none"> ✓ Additional qualitative and quantitative evidence provided to add to existing base ✓ Fits into all consultation stages as a participatory process ✓ Improved links to policy areas and sectors such as public health and well-being agendas ✓ Increased mutual understanding amongst public health practitioners and planning professionals ✓ Demonstrable understanding, accountability and consideration of the impact of planning on health and well-being of the local population/community

Source: Green et al, 2021a

Conclusion

A HIA is flexible, systematic and scalable tool. It can be applied to a variety of plans, policies and development projects. It can provide a balanced, wide ranging, evidence-based overview of the positive impacts and good practice derived from these plans and projects whilst also identifying negative or unintended negative impacts for communities and particular population groups. This allows for constructive conversations to enhance opportunities or mitigate for negative impacts within of those plans or policies a proportionate and practical way.

HIA has had variable success across the world depending on context, legislative frameworks and policy drivers in which it operates, and which can or cannot enable it to be carried out. It is more advanced in some regions of the world such as Europe and Oceania whilst still in nascent stages within others (Winkler et al., 2020).

One thing is certain, since the late 1990's and its inception, HIA has gained momentum and gained acceptability as a tool to help support policy and project development and inform decision makers. Whilst this chapter has focussed on HIA in more general terms, it must be noted that HIA has been used for a wide range of policies, plans and development initiatives in a wide range of specific sectors and settings. These include the EU Withdrawal (Brexit), climate change, COVID-19 responses, housing, commercial and retail, place making and the natural environment including creating green and blue space, regeneration, transport (Cave et al., 2020; Douglas et al., 2020; Rogerson et al., 2020). It is at an important juncture in its evolution with recent studies showing that it is splintering into a range of practices and research topics (Cave et al., 2021; Kim and Haigh, 2021).

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Chapter 3: Facilitators, Barriers and Views on the Role of Public Health Institutes in Promoting and Using Health Impact Assessment—An International Virtual Scoping Survey and Expert Interviews

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Abstract

Public health institutes have an important role in promoting and protecting the health and well-being of populations. A key focus of such institutes are the wider determinants of health, embracing the need to advocate for 'Health in All Policies' (HiAP). A valuable tool to support this is the health impact assessment. This study aims to support public health institutes to advocate more successfully for the use of health impact assessments and HiAP in order to promote and protect health, well-being and equity. During July 2021, a quantitative online survey was undertaken across international networks with 17 valid responses received. Semi-structured interviews were also administered with nine expert representatives and analysed thematically. In total, 64.7% (n = 11) of survey respondents were aware of health impact assessments and 47.1% (n = 8) currently conducted health impact assessments. It was noted that there are differing approaches to HIAs, with a need for a clear set of standards. Barriers to use included lack of knowledge, training and resources. Overall, 64.7% (n = 11) of survey respondents would like to do more to develop knowledge and capacity around health impact assessments. The results from this study can serve as a platform to help build knowledge, networks and expertise, to help support a 'Health in All Policies' approach and address inequalities which exist in all societies.

Keywords: health impact assessment; public health institutes; health in all policies

Introduction

Public health institutes (PHIs) have an important role to promote and protect the health and well-being of populations at a national (or sometimes regional) level (Koplan et al, 2007). They have a remit to monitor health, establish and gather evidence, provide advice and protect the population from communicable and non-communicable diseases (Pascal et al, 2022). They also have a role in providing guidance on health improvement and promotion such as smoking cessation or workplace and school health-based programmes and have workforces with essential skills from a range of health disciplines which can assist in setting national policy direction (Koplan et al, 2007). PHIs can be defined as ‘an organizational unit of a national government health ministry (not of a state or province), which serves the whole country as a source of technical public health expertise and would be the unit called upon to respond to public health threats’ (Koplan et al, 2005), whilst the International Association of National Public Health Institutes (IANPHI) defines a PHI as ‘a government agency, or closely networked group of agencies, that provides science-based leadership, expertise, and coordination for a country’s public health activities’ (International Association of National Public Health Institutes, 2022). Advantages of a PHI include the assembly of a stable mass of expertise, continuity of experience, and the scientific knowledge and appropriate human, technical and financial resources to tackle public health challenges; it is an independent scientific organization without political affinity; increasingly, PHIs have a role to work on behalf of their country on public health issues that cross national boundaries (Koplan et al, 2005).

During the 20th century, PHIs were established to support and address critical public and environmental health-related issues, such as infectious disease outbreaks and sanitation conditions which could affect health (Koplan et al, 2005, Friedhan and Koplan, 2010). The majority of PHIs’ work remains focused on communicable disease control and environmental health protection, and this was reinforced during the COVID-19 pandemic. The recent pandemic has also highlighted the critical importance of PHIs and the key expertise and skill sets held within them to address important health threats (Pascal et al, 2022). However, presently, the range of public health activities within a PHI can vary and include a focus on advocating for health and well-being at a national level, reducing health inequalities, tackling non-communicable diseases such as obesity, and policy work (Pascal et al, 2022, Myhre et al, 2021). They also include the same historical focus on health protection and communicable diseases (including immunizations, epidemiology and infectious diseases), environmental health and safety, and health services research (Koplan et al, 2005). Some PHIs have broadened their work approaches to include the wider determinants of health and how these will affect population health and inequalities (Pascal et al, 2022, Sharma et al, 2022). In doing so, they have embraced the need to advocate for a consideration of ‘Health in All Policies’ (HiAP) (Leppo et al, 2013, Public Health Wales, 2022, Centres for Disease Control and Prevention, 2016) in order to address the causes of poor health—traditionally described as the ‘causes of the causes’ (Braveman and Gottlieb, 2014, Marmot, 2010). They have taken specific perspectives on how to tackle these—by engaging with decision makers, providing evidence and health intelligence data and also through the use of specific tools to help assist policy and decision makers to better understand the implications of their decisions (Wales Health Impact Assessment Support Unit, 2012, Public Health Wales, 2022).

A key tool and vehicle to support, drive and implement HiAP is the health impact assessment (HIA) (Green et al, 2021). HIAs are a widely used methodology, commonly defined as ‘a combination of procedures, methods, and tools by which a policy, intervention or service may be judged as to its potential effects on the health of a population, and the distribution of those effects within a population’ (European Centre for Health Policy, 1999). As a flexible tool which can be applied proportionally in practice, an HIA allows health and well-being to be considered in all policy areas such as planning or housing as a method of implementing a ‘Health in All Policies’ approach and has the power to influence the decision-making process by promoting cross-sector collaboration (World Health Organization, 2014).

There is little peer-reviewed published academic research which illustrates the use, impact and co-benefits of HIAs which can be reaped by PHIs promoting and using HIAs beyond a few recent case studies (Andrew et al, 2022, Green et al, 2021, Green et al, 2020). There have been recent examples of surveys which provide a snapshot of global HIA practice, but they did not specifically focus on how the methodology can be promoted or used by PHIs (Harris et al, 2013, Winkler et al, 2020). Whilst some PHIs promote the use of HIAs as a way to identify the wider health, wellbeing and equity impact of policies, plans and projects on the population (Gruber et al, 2017, Wales Health Impact Assessment Support Unit, 2022, World Health Organisation, 2019), there is a need to further explore and understand how PHIs globally are currently using and promoting HIAs, if at all, what the barriers and enablers are, and what can be done to promote and use HIAs more in the future. The COVID-19 pandemic has also presented an opportunity to review work streams within PHIs as they, and society, advance into the pandemic recovery stage (Pascal et al, 2022, International Association of National Public Health Institutes, 2022).

This study aims to support PHIs in their capacity and capability and strengthen their ability to advocate more successfully for the use of HIAs and HiAP in order to promote and protect health, well-being and equity. This paper outlines the results from an online survey and interviews undertaken with representatives from PHIs to inform future practice in HIAs for PHIs, and to share learning from each other. It develops a base for a shared understanding, paints an international picture of HIA practice, and can lead to future work at a global and national level.

Materials and Methods

A digital international survey and interviews were carried out to scope and capture global HIA practices in PHIs, how they are being implemented (if at all), and any challenges, enablers and opportunities. The interviews provided an opportunity to explore in more depth issues raised in the survey and understand the nuances of practice and the different positions and priorities for PHIs in respect to HIAs. The survey was targeted towards, and disseminated to, national and regional PHIs. When defining the sampling frame, the following definition of PHIs was utilized:

‘A Public Health Institute (PHI) is a government agency, or closely networked group of agencies, that provides science-based leadership, expertise, and coordination for a country’s or region’s public health activities’ (Koplan et al, 2005, International Association of National Public Health Institutes, 2022).

Third sector bodies, and other organisations with a public health focus were deemed to be outside of the scope of this research. In addition, this study was part of a wider joint project which aimed to scope understanding and use of social value methods within PHIs. Results from that study have been published elsewhere (Ashton et al, 2022).

Survey Design and Dissemination

A self-administered quantitative virtual survey was disseminated using Survey Mon- key during July 2021. The questionnaire asked about background details for the respondent’s PHI, their HIA awareness and experience in their PHI, and any barriers and facilitators to using the process. Of the total maximum of 45 questions included in the survey (some were only asked if respondent answered yes), 10 questions were open-ended, and 35 were of a closed format (see Supplementary Material S1 for the questionnaire). Due to resource limitations, the survey was only made available in English. The survey was internally tested within a PHI and also externally with IANPHI. Feedback was considered and incorporated into the final survey.

For the dissemination of the survey, two non-probability sampling methods, namely purposive and convenience sampling, were used (Tongco, 2007). Responses were only included if the respondent was an official from a PHI with a national or regional portfolio. An invitation and a participant information sheet were circulated by email via a range of networks. These included IANPHI, World Health Organization (WHO) networks including the Regions for Health Network and EuroHealthNet. The questionnaire was also directly circulated to previously identified representatives from PHIs (convenience sampling). At the midpoint of the data collection period, reminders to gather more responses were sent.

As indicated in the NHS Health Research Association ethics decision tool (National Health Research Authority, n.d.), approval from an NHS Ethics Committee was not needed for this study to be undertaken. It posed little potential harm to those taking part, and all the data which was collected and analysed was anonymised and safely secured digitally to protect personal data and privacy.

Semi-Structured Interviews

At the end of survey completion, all respondents were asked whether they would want to take part in a semi-structured interview to further the conversation. Questions in the interview guide were steered by the survey results and aimed to allow for triangulation of results. The semi-structured approach allowed participants to demonstrate their views and experience, but also helped gently guide specific areas of interest for the researcher. Individuals who agreed to participate were invited to participate via email, and informed consent was obtained prior to interviewing. Interviews were conducted via virtual video calls. The interviews were recorded digitally, and a professional transcription company transcribed and anonymized them. For the survey closed question responses, analysis was carried out using Microsoft Excel. The responses from the open-ended questions in the survey and data from the interviews were analysed thematically by two researchers.

Results

Study Participants

The survey was live from 7–19 July 2021 and gathered 37 responses. Unfortunately, 12 (29.7%) needed to be excluded from analysis due to either being incomplete responses or because the organization they were representing did not fit the inclusion criteria. Within the remaining 25 responses that were eligible to be included, 17 countries were represented. In a few cases, countries or regions had more than one response. To minimize the introduction of country bias, responses from the same country were amalgamated. In total, 76.5% (n = 13) of respondents were based in PHIs in Europe (Norway, the Netherlands, Portugal, Ireland, Italy, Scotland, Spain, Belgium, Republic of Moldova, Finland, Iceland, Wales and Sweden), 11.8% (n = 2) were based in Asia (South Korea and Israel) and 11.8% (n = 2) were based in Oceania institutes (New Zealand and Australia). There was an absence of responses from North America, the Middle East and Africa despite attempts to make contact via email.

There are 110 NPHIs registered as members of IANPHI. The 17 country responses to this scoping survey provided a 15.4% response rate of all members of IANPHI. Given the exploratory, first-step nature of this research, this is a reasonable response rate. Of the survey respondents, 11 stated within the survey that they would like to take part in an interview. After further communication, during September and October 2021, a total of nine interviews were carried out. This was deemed to be a satisfactory number of interviews due to the scoping and exploratory nature of this work, and saturation point was reached with no new information being provided due to the specificity of the topic. The interviewees represented nations such as Australia,

Portugal, Iceland and the UK and Ireland including devolved nations such as Wales and Scotland. The roles of those interviewed included chief executive, public health specialist, programme manager, environmental health specialist and HIA specialist.

Raising Awareness and Promoting an Understanding of the Key Concepts of HIAs

Amongst survey respondents, the level of awareness of HIA methodology prior to being asked to complete the survey was 64.7% (n = 11). A total of four interviewees stated that there was a high awareness of HIAs within their organisations. Interviewees indicated that they promote HIAs (when they can) in a range of ways, for example, using existing evidence resources and public health indicators to promote the importance of HIAs and aligning work with the Sustainable Development Goals and other key policies. Several participants highlighted the work they are doing in this arena, which includes trying to develop more guidance and tools and use existing case studies (even if they are derived from other nations) to promote HIAs and their benefits.

Why Are PHIs Important in the Use and Promotion of HIAs?

Five of the nine interviewees believed that PHIs are important in the use and promotion of HIAs because their PHI has an environmental determinant and health protection focus and an ability to statutorily respond to environmental impact assessments (EIAs). In addition, four interviewees stated that PHIs were important due to the fact that they have a clear remit for wider public health, prevention and HiAP approaches and inequalities. This gave them legitimacy and credibility when promoting HIAs as a tool to inform decisions in advance of making decisions.

I think because they're normally government led, they have a bit of, they have the, again, it's that credibility and the endorsement and the recognition amongst other government agencies. (Interviewee I)

Two interview respondents stated that the latter then enabled them to start conversations around health and another two that PHIs hold the competence, core knowledge and skill sets and evidence to support the use and promotion of HIAs. Interestingly, only two stated that their PHI could lead in their context by setting out clear direction about HIAs and advocating a consistent approach and methodology.

Otherwise, it's just another metric that, you know, lots of consultancies and people, you know, have vary, variations that you could describe as HIA, or different frameworks that just, you know, decision making frameworks that they've made up, you know, they've kind of developed themselves. There's nothing wrong with that, but we want everybody to be doing the same thing. (Interviewee I)

Current Use of HIAs in National and Regional PHIs

With regards to the use of HIAs as a method of assessing the impact on health, interviewees from four countries indicated in the survey that HIAs are mandatory in the environment field of application, for example, environmental impact assessment or strategic environmental assessment. This was at both a national and regional level in three of the countries, with one reporting it was mandatory at a national level. In addition, just under half (41.2%) of the institutes who responded to the survey reported having a lead for 'Health in All Policies'. In total, 35.3% (n = 6) had a dedicated in-house lead/resource for HIAs. Of those, four (23.5%) had an HIA toolkit or guide, three (17.6%) stated their HIAs had a quality assurance process, and nine

(52.9%) currently advocated for HIAs. In total, 47.1% (n = 8) stated in the survey that their institutions currently undertook

HIAs, but the subject matter and level differed. This ranged from air quality, transport, housing and spatial planning through to health service interventions and mental well-being initiatives and national policies such as climate change and COVID-19 pandemic measures. Eight survey respondents (47.1%) stated that HIAs were primarily used to support EIAs or concentrated on environmental health determinants for example, air quality, whilst only four (23.5%) specified that they focused on wider determinants of health and mental wellbeing and wider policies and services, for example, the impact of 'lockdown' on the population. These data were reinforced in the interviews. Seven interviewees stated that when HIAs were carried out, they were very ad hoc, across differing teams, or EIA-focused. Only one PHI reported having a dedicated HIA team and director for HIAs.

This differs across the organization.....We are more likely to undertake Health Inequalities Impact Assessments on our own programmes of work, and to support HIAs undertaken by others. Buthas done a range of HIAs on things like housing and planning. Our environmental health team have done them on air quality and I think maybe alternative heat sources. (Interviewee C)

Perceived Barriers to the Use and Promotion of HIAs

In the survey, reported barriers to the use of HIAs or their promotion included that they are not an area of prioritisation at present (n = 7, 41.1%), lack of knowledge (n = 4, 5.88%), lack of training (n = 6, 35.2%), and lack of ability to advocate for them (n = 2, 11.7%). By far the most cited reason (70.5%) was a lack of resources (n = 12), which was reiterated by the interviewees. The need for more HIA training was emphasised by six of the nine interviewees:

You know, a lot of, additional learning through conferences, seminars, e-learning, the different kind of routes that people have for the existing workforce, and then I suppose for the workforce coming through, it's about embedding that more strongly into Public Health Training and things like Masters in Public Health and epidemiology. (Interviewee C)

There is great interest in this work, we have strong group, but it would help to have further training and more time available to do the work. Other tasks are not going away. (Interviewee D)

Three interviewees also highlighted the lack of, and need for, political leadership or stewardship in this space and how it could make a huge difference in terms of enabling and creating a positive environment for HIAs or hindering their implementation. Two-thirds of interviewees cited financial resources as a barrier to building capacity to advocate for and develop HIAs.

Despite theoretical institutional interest on HIA, the lack of resources, leadership and clear political support are just some of the very difficult barriers lived by organizations to undertake a real institutionalization of HIA. (Interviewee E)

It shouldn't be the most important. But at the end of the day, it's it is important, isn't it, but where, where is the money coming from? (Interviewee G)

Finally, it was highlighted by two interviewees that it is perceived as 'another process to do' and, therefore, not be meaningful by becoming a 'tick box exercise'.

. . . there is always the problem, I suppose not a problem, well I don't see it as a problem, but what some people would see is HIA, the only pushback we've ever received on it is the fact that, oh my . . . , it's just another process and thing to do. (Interviewee I)

Legislation could support progress around this, but the type of legislation and nature of it was also cited by three interviewees as a barrier. Lack of legislation led to HIAs not being carried out routinely across the PHI but also the locality.

Then we don't have legal support, a legal-law, a law that says that you need to do this. But I think in sometimes it's not only the law, it's the perception of it, because we have this EU directive, which say that we need-there's a, a description of health in the, in the impact-health impact-not health-environment impact assessment. (Interviewee E)

Perceived Benefits to PHIs

Interviewees expanded on the benefits of HIAs as a follow on from questions about the barriers. Six interviewees of the nine stated that HIAs are beneficial to PHIs because they focus on prevention as an 'ex-ante' tool.

HIA is seen very much as it's become more popular as pre, you know, as it's supposed to do, pre-empting problems that come down the line, and I think there's an attempt to have a more holistic approach to dealing with health inequalities, in particular. (Interviewee I)

Five of the interviewees highlighted that HIAs could facilitate HiAP by considering health in other/traditionally described 'non-health sectors' such as spatial planning or housing, and four noted that HIAs can have a clear focus on wider determinants of health.

. . . HIAs . . . are very useful into bringing, so again, whether we call it health in all policies . . . or a cross sector sort of engagement is where of course, we try to influence the wider determinants of health, it is a very helpful because on one hand, they show the different sectors, what is their impact on health, but also they show with the, with the social value as to why, what is what Public Health is doing, which can actually has a value to their own areas of responsibility. (Interviewee G)

Five interviewees also identified that HIAs can improve plans, strategies and projects to make them healthier and two stated that they do this by building health into decision making.

Also, the thing about using, you know, like, if you use HIA as a tool to look at, like a built environment intervention or something like that, then, yeah, it provides a way for the Institutes to get that into part of the decision-making process, and, yeah, I think that's probably one of the key aspects of it. (Interviewee A)

Five interviewees noted that HIAs address equity and inequalities by considering population groups as part of the process. Other reasons provided included that HIAs can be a useful involvement tool through which to engage with a variety of stakeholders and start conversations about health and inequalities. The identified barriers and benefits of HIAs from the survey are demonstrated in Table [1](#).

Table 1. Survey responses—barriers and benefits of HIAs.

Perceived Barriers	Perceived Benefits
<ul style="list-style-type: none">• Lack of resources (<i>n</i> = 12)• Lack of capacity (<i>n</i> = 10)• Not a priority at present for the institute or government (<i>n</i> = 7)• Lack of training (<i>n</i> = 6)• Lack of knowledge (<i>n</i> = 4)• Lack of ability to advocate for HIAs (<i>n</i> = 2)	<ul style="list-style-type: none">• Focuses on prevention as an ‘ex-ante’ tool (<i>n</i> = 6)• Can facilitate HiAP by considering health in other sectors (<i>n</i> = 5)• Addresses equity/inequalities by considering population groups (<i>n</i> = 5)• HIAs can improve plans, strategies and projects to make them healthier (<i>n</i> = 5)• HIAs can have a focus on wider determinants of health (<i>n</i> = 4)• Builds health into decision making (<i>n</i> = 2)• HIAs can be a useful involvement tool through which to involve stakeholders (<i>n</i> = 2)

What Could Be Done to Improve the Situation and the Awareness and Enable the Use of HIAs in NPHIs?

In total, 64.7% (*n* = 11) of survey respondents would like to do more to develop knowledge and capacity around HIAs in their institutes. The survey responses provided insight into how PHIs could improve awareness of HIAs, their effectiveness and their outputs and benefits.

Improving Awareness of HIAs as a Methodology

Open-ended survey responses included five respondents (29.4%) citing the need to embed HIAs in public health training and education; four (23.5%) citing awareness-raising including case studies and conferences which showcase the role of HIAs in policy development; two (11.7%) stating government support, two (11.7%) stating having identified centres of excellence and one (5.9%) citing having dialogue with commissioners.

The participants in the nine interviews supported all of these and articulated them further.

And if you’ve got someone good from public health, who knows how to communicate the benefits to people, you can actually have really good conversations that help people in other sectors to understand why they have a role to play in health improvement and why they . . . What they can do, I suppose, so, you know, people don’t generally, don’t generally want to harm health. (Interviewee C)

So they, they always look for, kind of lots of evidence to deliver something, case studies. But the, the major thing I’ve always found is that if it’s something that’s been transferred from a similar jurisdiction and it has worked well there, that, that really gives them a lot of confidence in, in pursuing it. (Interviewee I)

I think the Welsh example of having legislative mandate and also a lead agency is an excellent example of how to strengthen HIA across all the dimensions. (Interviewee A)

Improving Awareness of HIA Outputs

In terms of awareness-raising of HIA outputs, the open-ended survey responses revealed several themes. These included the belief that embedding HIAs in core business would lead to more officers being familiar with HIAs and their outputs, cited by four respondents (23.5%); the need for stronger regulation, cited by three respondents (17.6%); two (11.7%) stated the need for more high-quality evidence to support HIAs, two respondents (11.7%) believed in increasing the awareness of the role of NPHIs in HIAs and decision making, and successful case study examples were also cited by two (11.7%) as a method of improving HIAs and their outputs.

What Support Would Public Health Officers in PHIs Need in Practice to Promote and Use HIAs?

The interviews reinforced the survey results described above with four interviewees stating that having buy-in from key stakeholders and politicians was important, including legislation for HIAs.

And at the top, yes, we've got buy-in, I would say, and this period (COVID-19) has really cemented that buy-in in terms to the concept because of the work that's gone on and they've seen the value in it

(Interviewee B)

Four interviewees identified learning from, and highlighting, the work in Wales and Public Health Wales's Wales HIA Support Unit and noted that following a similar model would help them.

It's been very helpful the work that Wales has done on everything. We really- we know we have a place to look for . . . But we- And with this COVID-19, we have really been looking into the work . . . done for that and are . . . adapting, you know, to (inaudible-0:27:18.3) following the steps . . . (Interviewee D)

Case studies, always invaluable. I mean, you know, what we've learned from x's work in Wales has been really, really helpful to us, you know, and that really is what you need. You know, you need somebody who's gone down the path before you. We're modelling completely on what Wales' team has done. (Interviewee I)

Three interviewees stated that more resources would help along with three who believed that increasing capacity and allowing the time to learn or apply their skills to HIAs would increase their confidence in promoting and using the process. Other reasons included embedding HIAs in core business of the institute and highlighting the environmental, economic and social value that a process such as the HIA can support.

But . . . I don't think we have to make the case anymoreWhat we have to do is really, truly embed it into people's practice. (Interviewee C)

COVID-19 Pandemic

Finally, the survey asked if there were any further comments, and this revealed some reflections derived from the COVID-19 pandemic. Both within the survey open-ended questions and the interviews, six survey participants identified how HIAs had captured the wider impact of the pandemic and that their way of capturing the health impacts was beneficial to broaden the conversation around health and equity, and three referred to this in the interviews.

'it was difficult for it (HIA) to get traction. I think it's beginning, I think the time is right now for it to get traction because people are beginning, post-pandemic, particularly to understand more about social determinants of health, about how, you know, personal responsibility is not the only issue'. (Interviewee I)

Discussion

This study captured some of the barriers and enablers for HIAs in PHIs and highlighted how HIAs are being promoted or used currently (or not) by them across the world. It highlighted how PHIs could further advance the work they do to increase an awareness of HIAs, promote better understanding of the tool and its use at a regional or national level and better understand the barriers which they may currently face and opportunities which can be utilized, for example, any requirements for a consideration of health in other assessments such as EIAs which may be legally required. Both the survey and interview respondents recognised HIAs as an important tool to drive HiAP approaches to improve health and reduce inequalities (Leppo et al, 2013, Green et al, 2021, World Health Organisation, 2018). HIAs were also recognised as a prevention tool which identifies and anticipates any negative impacts which can be mitigated as part of the journey of policy or project development.

This scoping study highlighted how HIAs have been utilised in responding countries. This is consistent with previous surveys which have looked at international HIA practice (World Health Organisation, 2018, Cave et al, 2021). The lack of engagement from PHIs outside of Europe, for example, North America and Africa, indicates this, although some work has been carried out in these geographical regions (Rogerson et al, 2020). Although the work is exploratory and the numbers are small, what is new is the insight provided into how institutions such as PHIs view HIAs, the perspectives and approaches they do or do not take, and how they look for clear examples of successful practice to assist them. It can provide a direction of travel for future work with both PHIs and the wider HIA community.

A good overall awareness of the concept of the HIA was reported in the research, including how the approach and methods could be utilised in practice. However, it is important to note the differing approaches to HIAs described by PHIs who engaged in the survey and interviews, with some very focused on environmental determinants of health and health protection risk such as transport or air quality and using EIAs as a vehicle to address and mitigate health risk. This is compared to some other PHIs who emphasise a social determinant of health and equity approach to HIAs and health maximisation. Although this distinction in practice has been described previously (World Health Organisation, 2018, Cave et al, 2021, Rogerson et al, 2020, Linzalone et al, 2018), it did not focus on PHIs specifically and included practice from a range of public and private organisations such as private environmental and health consultancies. This is an important distinction to draw in the practice of HIAs, as many in the survey referred to the focus on environmental determinants of health and responding to EIAs. This could highlight a potential key issue, where many PHIs may think of HIAs as synonymous with EIAs. This could, therefore, be limiting where and how PHIs deploy the HIA process particularly in nations where EIAs are already established in legislation. It could also highlight the issue of methods of collecting evidence, confidence in them and the acceptability and accuracy of the evidence and data. For some PHIs responding to or supporting consultations and decision-making processes, EIAs and other IAs may be viewed as being more robust, valid and acceptable by containing more technical health data and epidemiological evidence, compared to more qualitative or mixed-method HIA processes (Veerman et al, 2005, Cortes-Ramirez et al, 2019, Harris-Roxas et al, 2014). Therefore, the perspective, context and remit of the PHI are very important to HIA practice and setting strategic direction for the process.

Barriers to current use of HIAs reported in this research included the lack of understanding of how HIAs can benefit a wide range of sectors' work by improving plans or policies, and a lack of understanding in institutes about the benefits of the process which will assist them to carry out and advocate for HIAs (33). This scoping study also reinforces the fact that lack of knowledge, training and resources constrains the use and promotion of HIAs in many PHIs even if they have received training, as they still lack confidence. This could

be due to HIAs only being one part of their job role and being seen as ‘something else to do’ which risks becoming a ‘tick box exercise’. Many of the survey respondents and those interviewed referred to the need for additional training and capacity in order to carry out or promote HIAs; this has been previously cited as a barrier to the implementation and effectiveness of HIAs (World Health Organisation, 2018, Haigh et al, 2013, World Health Organisation, 2010). A previous study carried out specifically for public health officers and spatial planning identified that ‘training provision for Public Health Practitioners in reviewing spatial planning HIAs was found to be very limited, with 65% reporting that they had received no formal HIA training’ (Sharma et al, 2022). Therefore, despite the advancement and evolution of HIAs and tools, practitioners still identify the need for more training and resources. Institutional support and resources would be welcomed by PHIs, including support from organisations such as the World Health Organization in advocating for HIAs and learning from expert PHI teams such as that in Wales (Wales Health Impact Assessment Support Unit, 2022.).

However, some of these barriers could be overcome with increased promotion inside and outside the PHI, as well as joined up working with likeminded practitioners and officers based in PHIs to carry out small-scale HIAs, which are not time or resource intensive. This would enable them to familiarize themselves with the process in practice, ‘learn by doing’ and gain confidence to carry out an HIA and importantly advocate for it as a process. This has been recognized as an important first step (Green et al, 2021, Harris et al, 2013). It would form a rich learning experience and provide a case study example to ‘sell’ to the organization (and politicians who can make it a legal process) and explain any benefits gained from it. This has been the experience in Wales (Green, 2017). At the same time, strategic advocates for HIAs need to be created within an organisation, and engaging with senior leaders and demonstrating the value of standalone HIAs as part of prevention strategies and HiAP approaches to them is hugely important. This is because they have the power to commission and allocate resources for HIAs. A ‘bottom up’/‘top-down’ approach is necessary, as is utilizing all facilitators and enablers which officers may have already, for example, the inclusion or strengthening of a consideration of health in EIAs. In addition, collaboration and learning between, and from, PHIs and the sharing of virtual training sessions and resources which would be time effective and resource efficient is a way forward. HIAs as an impact assessment can also learn from the evolution and development of other impact assessment processes (Morgan, 2011). Practitioners can also learn from different perspectives that decision makers and legal processes apply about evidence in IAs, for example in EIAs, which include more health quantification data and epidemiological exposure and estimate studies which can increase the validity of the findings and provide more confidence in them (Veerman et al, 2005, Cortes-Ramirez et al, 2019).

Whilst several barriers were highlighted, many participating institutes felt positive about the use, and advocacy of, HIAs and the benefits they can bring, with several interviewees citing the distinct example of PHIs such as Public Health Wales’s work and the Wales HIA Support Unit, as a centre of practice to replicate. There was a consensus that carrying out HIAs can improve planning, policy delivery and design by prospectively anticipating issues and addressing them in an evidence-based way. It can promote a consideration of health and well-being in decision making. It was also noted that they involve wider sector stakeholders, for example, spatial planners to facilitate conversations about health inequalities and enhance engagement. It is a clear driver of the concept of HiAP in doing this—by seeking synergies with others and anticipating impact in order to reduce negative impacts and inequalities—and can reap benefits by making others understand their impact on health and equity status (World Health Organisation, 2018, Rogerson et al, 2020).

Legislation was clearly cited in the interviews as being an enabler—if in existence—but an inhibitor if not. EIA directives, Public and Environmental Health and other IA legislation have provided opportunities (World Health Organisation, 2018, Cave et al, 2021) for health inclusion and PHI input. Sharma et al. (Sharma et al,

2022) reinforced the need for statutory levers, but without confidence to engage or lack of knowledge and resources, PHIs are hampered. In the Welsh context, legislation specifically making broad HIAs a statutory requirement for public bodies (Welsh Government, 2017, Welsh Government, 2015) and the Wales Health Impact Assessment Support Unit (WHIASU) and its model of being situated within a PHI (Public Health Wales) were cited several times in interviews as an example to be aspired to and a resource to be drawn on by other PHIs when advice or real-life examples of how to carry out HIAs in practice are needed (Green et al, 2021, Green et al, 2020, Wales Health Impact Assessment Support Unit, n.d., Green et al, 2019). WHIASU is currently globally unique in that it is the only dedicated HIA support unit based in a PHI in the world. It also highlights the need for a sustained, consistent approach to HIA methods and tools which Wales promotes at all levels of government and public health.

The findings reinforce that national and regional PHIs have a key role to play in both promoting and facilitating the use of HIAs within their contexts, either through setting a direction of travel by providing HIA guidance and tools or providing actual practical advice, guidance and some support, such as the model in Wales. In Wales, the HIA unit supports practitioners by mentoring and ‘learning by doing’ in partnership with public bodies and third-sector organisations and providing guidance, training and tools (Wales Health Impact Assessment Support Unit, 2022). The Welsh model also promotes the idea that HIAs are not a ‘hard to do’ technical process in which one person must carry out all aspects of the HIA, but rather promotes the creation of multi- skilled, multidisciplinary teams to carry them out within an agency or organisation (Edmonds et al, 2019). This approach demolishes the misconception that one person should conduct an HIA and promotes a time- and resource-effective and efficient HIA model of working—not dissimilar to how environmental assessment teams are constructed. This division also adds to the process, encourages a diverse range of perspectives and can lead to stronger working relationships. It can also support, through a division of labour approach, those who want to promote HIAs or review or carry out assessments but do not feel they have the confidence, time or financial resources.

HIAs of COVID-19 related response measures, for example, lockdowns (Green et al, 2021, Anthony et al, 2021), were also cited by several respondents and interviewees, and they believed these demonstrated the value of HIAs as a tool to be utilised by PHIs to capture the wider health impacts of plans and policies on equity in an evidence-based way. The increased awareness of the HIA as a process to better understand the wider health and equity impacts clearly derived from these COVID-19 HIAs, for example, economic or social impacts, and also highlighted how policy decisions can directly impact population health (Green et al, 2021), providing a platform on which to build and continue to promote and demonstrate the usefulness of HIAs and HiAP approaches to policy and decision makers when seeking evidence to inform actions including mitigating negative impacts and maximizing positive ones. The role of NPHIs in leading these as a mandated lead for public health is also viewed as important, as is their role in building capacity (Green et al, 2021). The HiAP approach of engaging with other sectors and stakeholders, avoiding harm to health (both directly and indirectly) and reducing inequalities during the pandemic recovery is more important than ever (Greer et al, 2022) and provides a window of opportunity for HIAs.

The results from this study identify the need for further work in this arena to improve the practical application of HIAs and methods in PHIs. It could include the development of bespoke HIA awareness-raising, training, case study examples and targeted briefing papers for PHIs. This links to the ability to communicate about HIAs or ‘sell’ them to key stakeholders and politicians to ensure a better understanding of both the process and its benefits. Key themes identified were the development of dedicated support units or officers, case studies, training, templates and tools to help support institutes. Benefits of networks such as IANPHI (International Association of National Public Health Institutes, 2022) and the World Health Organization’s Regions for Health Network were not mentioned specifically but could also be explored, as they could be excellent vehicles for PHIs to improve their practice or knowledge, along with models such as the Welsh HIA

Network of Practice (Wales Health Impact Assessment Support Unit, 2022), which could be replicated by other PHIs at a national or regional level.

There are limitations to this scoping research. The questionnaire was only disseminated in English and, therefore, limited the number of PHIs who participated and the geographical areas from which they came. This would, therefore, be reflected in the response rate. The sample for the survey were not representative of all international PHIs, and the majority of the survey responses were from the European region. However, a number of responses were submitted by participants from other regions, for example, Oceania. The response rate was 15.4% from 110 PHIs. Considering that the questionnaire was disseminated during the global COVID-19 pandemic and PHIs were, and still are in many cases, leading and focusing on the response to it, this is a respectable response rate. It must be noted that the researchers could not perform a cross-continent comparison due to the small sample size or carry out a comparison of country results. The analytical synthesis of the expert interview and survey results did, however, assist in confirming and boosting the findings and providing extra insight. The team were unable to outline the demographics of the interviewees, for example, age, due to the small sample size and potentially disclosing personal identifiable data on the participants.

Further research could support this study. It could include engaging with additional PHIs to boost the findings, uncover more insights, enable regional analysis and identify any differences or commonalities. Whilst Europe was strongly represented in the scoping survey respondents, the lack of responses from others such as North America and Africa could be explored to unpick this further. This could be due to regulatory context (World Health Organisation, 2018, Cave et al, 2021, Rogerson et al, 2020) or a focus on other public health challenges such as communicable diseases (International Association of National Public Health Institutes, 2022). This exploratory work could also be used as a platform to better understand how public health institutes can utilize the support of different actors and agencies to raise awareness of, or enable the use of, HIAs. This could include carrying out additional scoping reviews with, for example, schools of public health in academic institutions or the WHO. It could also deepen investigations into the practice and use of HIAs in PHIs within their own contexts or regions.

There is a need for PHIs and HIA practitioners to support each other and share experiences, and HIAs could be a vehicle to facilitate this along with health protection expertise and health intelligence. Two impacts of this work to date have been better networking, including workshops at international conferences (European Public Health Association, 2022), and the replication of the survey, which has been translated and adapted at a local level in Portugal by the Portuguese Public Health Institute (Servico Nacional De Saude, 2022) to better understand and inform practice there.

Conclusions

This paper outlines the results from an online survey and interviews undertaken with representatives from PHIs to inform future practice in HIAs for PHIs and to share learning from each other. It develops a base for a shared understanding, paints an international picture of HIA practice, and can lead to future work at a global and national level. It adds to the evidence base around the practice and understanding of HIAs as a concept to mobilise HiAP. Additionally, it adds value by directly engaging with international PHIs— something not explored until now. PHIs have an important role in addressing the needs of their stakeholders, including public bodies such as local government and public health departments, by providing strategic direction for HIAs along with national governmental departments such as those in the health and environment fields. They can also provide HIA tools and resources such as those produced by Wales, Ireland and Scotland. The results from this study can also serve as a platform to help build knowledge, networks and expertise to

promote capturing the co-benefits of investing in HIAs. This has the potential to encourage decision- and policy-makers to see health and well-being not as a cost, but as an investment that is the foundation of productive, resilient and stable economies, linking in with the HiAP approach and supporting them to address inequalities and 'wicked issues' which exist in all societies (Marmot, 2010, Marmot et al, 2020).

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Supplementary Material

Capturing the Social Value and Health Impact of Public Health Institutes Survey

Thank you for taking the time to complete this survey. It will take around 20 minutes to complete and all answers will be stored at a secure place, anonymised and only shared with the concerned research team.

Your participation is entirely voluntary, you do not have to answer every question and you are free to withdraw at any time. The first three sections of the survey focus on economic evaluation methodologies and social value. The final section of the survey focuses on Health Impact Assessment. Please answer all sections relevant to your role and expertise

Q1. In what country is your Institute based?

Q2. Please state the name of your Institute (optional)

Q3. What focus does your Institute have?

(please select one answer option)

National / Regional/ Other (please specify)

Q4. In what year was your Institute established

Q5. Are the services or programmes provided or commissioned by your Institute, informed by any economic evaluation? (For example, cost-effectiveness or cost-benefit analysis (CEA/CBA), return on investment (ROI), etc.) (please select one answer option)

All of them / Some of them / None / Don't know

If your institute use economic evaluation to inform their services or programmes:

a) Does this economic evaluation consider the physical/mental health impacts? (please select one answer option)

Yes, both / Yes, only the physical health impacts / Yes, only the mental health impacts / None / Don't know

b) Does this economic evaluation consider the social or community impacts? *(please select one answer option)*

Yes / No / Don't know

c) Does this economic evaluation consider the Environmental impacts? *(please select one answer option)*

Yes / No / Don't know

d) Does this economic evaluation consider the Economic impacts? *(please select one answer option)*

Yes / No / Don't know

Please provide more detail

Social Value

Social value is defined as the quantification of the relative importance that people place on the changes they experience in their lives accounting for the broader human and societal factors that result from an intervention or action. By asking individuals what has changed in their lives, it is possible to understand the wider results of our actions, not only on physical health, but also on social, economic and environmental factors.

Q6. Before being asked to complete this survey:

a) Had you heard about 'Social Value'? *(please select one answer option)*

Yes / No

b) Do you know what it means?

Yes / No

Q7. What do you think would be the benefits of capturing the Social Value of a Public Health programme?
(Please select all that apply)

- Greater stakeholder engagement
- Capturing the social outcomes and impacts
- Capturing the environmental outcomes and impacts
- Quantifying and monetizing outcomes (showing their financial value)

- Being accountable to stakeholders
- Being accountable to funders
- Improved service design and delivery
- Enable organisations to act on the social determinants of health
- Make the case for investing in public health, based on evidence
- None
- Other (please specify)

Q8. What barriers do you think prevent Public Health Institutes from capturing their Social Value?

(Please select all that apply)

- Not a priority at present (for the Institute or Government)
- Lack of awareness
- Lack of training
- Lack of resources
- Capacity
- None
- Other (please specify)

Q9. Does your Institute currently capture or measure the Social Value of the public health programmes provided/commissioned? *(please select one answer option)*

Yes / No / Don't know

Q9a). If Q9 = yes, was this work done in house or commissioned externally? *(please select one answer option)*

In house / Commissioned externally

Q9b). If Q9 = yes, do you know what methods are used to capture this? *(Please select all that apply)*

- Social Cost Benefit Analysis
- Social Return on Investment
- Other (please specify)

Q9c). If Q9 = yes, what impact do you think this has had?

Q10. Would your Institute like to do more to understand and measure the wider outcomes and impacts that public health programmes have? *(please select one answer option)*

Yes / No / Don't know

Q11. What do you think would help your Institute to capture (and measure) Social Value? *(Please select all that apply)*

- Specialist training
- Targeted resources to help increase awareness
- Targeted resources to help increase knowledge and skills (create capacity)
- Change in culture
- Examples of good practice
- Other (please specify)
-

Q12. Do you think capturing the Social Value of your Institute could contribute to a sustainable recovery from COVID-19 pandemic? *(please select one answer option)*

Yes, it should be a priority / Yes, but there are other priorities / No / Don't know

Please explain your answer

Economic Evaluation and Social Return on Investment (SROI)

Q13. Are you aware of your Institute using health economics methods to measure (Social) Value and impact, for example cost-benefit analysis? *(please select one answer option)*

Yes / No / Don't know

Q14. Before completing this survey, were you aware of the 'Social Return on Investment (SROI)' method? *(please select one answer option)*

Yes / No

Q15. Are you aware of your Institute ever having used Social Return on Investment to capture and measure social value? *(please select one answer option)*

Yes, in the past but not anymore / Yes, occasionally when resources allow / Yes, frequently / No / Don't know

If yes, please describe:

Q16. Does your Institute currently advocate for more investment (resources) for public health or prevention? *(please select one answer option)*

Yes / No / Don't know

Q16a). If Q16 = yes, do you know what arguments/evidence is used to make the case for investment in public health/prevention? *(please select one answer option)*

Yes / No

If yes, please describe:

Q17. Does your Institute currently have a dedicated team/lead for using economic evaluation of public health programmes? *(please select one answer option)*

Yes / No / Don't know

Q18. What (if any) are the barriers to the use of economic evaluation, including measuring Social Value, in your Institute? *(Please select all that apply)*

- Not an area of prioritisation at present
- Lack of knowledge
- Lack of training
- Lack of ability to advocate for it
- Lack of resources
- None
- Other (please specify)

Q19. How do you think awareness of the Social Value concept and the Social Return on Investment method could be improved?

Health Impact Assessments (HIA)

HIA is commonly defined 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 a population'. The participatory nature of a HIA incorporates high levels of stakeholder engagement throughout the process, to account for the health, economic, social and environmental impacts of a policy, programme, service or project on health, well-being and population inequalities.

Q20. Before completing this survey, were you aware of the Health Impact Assessment method? *(please select one answer option)*

Yes / No

Q21. Does your Institute currently undertake Health Impact Assessments? *(please select one answer option)*

Yes / No / Don't know

Q21a). If Q21 = yes, please specify in which areas they are undertaken e.g. air quality, housing

Q21b). If Q21 = yes, does your Institute have a dedicated resource/team/lead for Health Impact Assessments? *(please select one answer option)*

Yes / No / Don't know

Q21c). If Q21 = yes, has your Institute developed a Health Impact Assessment guide or toolkit? *(please select one answer option)*

Yes / No / Don't know

Q21d). If Q21 = yes, are the Health Impact Assessments quality assured? *(please select one answer option)*

Yes / No / Don't know

Q22. Does your Institute currently advocate for using Health Impact Assessments in policy/decision-making? *(please select one answer option)*

Yes / No / Don't know

Q23. In your region or country, are you aware of any legislation/regulation which makes Health Impact Assessment mandatory? ? *(please select one answer option)*

Yes / No

Q23a). If Q23 = yes, for which fields of application? *(Please select all that apply)*

- Health policy
- Environment
- Others (please specify)

Q23b). If Q23 = yes, at which level? *(please select one answer option)*

National / Regional / Both

Q24. Does your Institute currently have a lead for Health in All Policies? *(please select one answer option)*

Health in All Policies is an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity.

Yes / No / Don't know

Q25. What (if any) are the barriers to the use of Health Impact Assessment in your Institute? *(Please select all that apply)*

- Not an area of prioritisation at present
- Lack of knowledge
- Lack of training
- Lack of ability to advocate for it
- Lack of resources
- None
- Other (please specify)

Q26. Would your Institute like to develop your knowledge and capacity around Health Impact Assessments? *(please select one answer option)*

Yes / No / Don't know

Q27. How do you think the effectiveness of Health Impact Assessments could be improved?

Q28. How do you think awareness of Health Impact Assessment methodology could be improved?

Q29. How do you think awareness of Health Impact Assessment outputs could be improved?

Q30. Please share any other comments and reflections.

Thank you for taking the time to participate in this survey.

Would you be interested in participating in a semi-structured interview with us to provide further in-depth information to progress our work?

Yes / No

If yes, please can you provide your email address for us to contact you on:

When this work has been completed, we will be running a webinar to disseminate and share the results. If you are interested in attending please can you provide your email address:

Chapter 4: Utilising Health Impact Assessment as a method to implement the Sustainable Development Goals: a case study from Wales

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Abstract

Welsh Government's (WG) Well-being of Future Generations (Wales) Act 2015 (Welsh Government 2015) is a unique legislation which demonstrates its commitment to sustainable development. It is the only global legislation that enshrines the UNs Sustainable Development Goals (SDGs) within it. It emphasises WGs commitment to a 'Health in All Policies' approach to policymaking by emphasising the sustainable development principle is integrated to address seven Well-being Goals. Two of these goals are focussed on health and (in)equality which ties them distinctly to the practice of Health Impact Assessment (HIA). The World Health Organisation recommends the use of HIA to achieve the SDGs but not how to practically do this. This paper describes a HIA undertaken on a proposed major electricity cable connection development in Wales. It discusses how this HIA was the catalyst for considered thinking about the HIA process and how it can be used to consider and implement the Well-being Goals in practice and initiates further thinking about how this can be extended to implement and address the SDGs at a local, regional and national level.

Introduction

Launched in January 2016, the 17 Sustainable Development Goals (SDGs) were introduced as part of the 2030 Agenda for Sustainable Development (United Nations [2015](#)). These goals are an urgent call to global action to improve health and educational outcomes, reduce inequality, and spur economic growth in partnership with ending poverty and deprivation. These strategies must consider at the same time environmental impacts such as climate change and preserving forest and marine ecosystems (United Nations [2015](#)). One suggested a method to help inform and achieve the SDGs is through policy coherence and legislation (Ruckert et al. [2017](#)).

To coincide with the launch of the SDGs, Welsh Government introduced a ground-breaking and unique piece of legislation, the Well-being of Future Generations (Wales) Act 2015 (WFGA) (Welsh Government [2015](#)). This places a statutory duty on a number of specified public bodies and public service boards to ensure that sustainable well-being becomes a core focus for all. At present, it is the only legislation in the world that enshrines the SDGs within it. The WFGA emphasises the sustainable development principle of the five ways of working (integration, collaboration; prevention; long-term thinking and involvement) to address seven Well-being Goals (A healthier Wales; A more equal Wales; A Wales of cohesive communities; A resilient Wales; A prosperous Wales; A globally responsible Wales; A Wales of vibrant culture and thriving Welsh Language) – all of which can be linked to the SDGs and which embody the wider determinants of health and well-being. In including ‘A healthier Wales’ and ‘A more equal Wales’ it also emphasises a governmental commitment to integrating a ‘Health in All Policies’ (HiAP) approach to policy-making by ensuring that public bodies strive to maximise their contribution to achieving them.

Two of the Well-being Goals (A healthier Wales; A more equal Wales) are directly focussed on health and (in)equality and several of the SDGs incorporate the wider determinants of health and this ties them distinctly to the practice of Health Impact Assessment (HIA). Defined as a process to support organisations to assess the potential consequences of their decisions on people’s health and well-being, HIA is a key vehicle with which to drive and implement HiAP and explicitly raise awareness of well-being/inequalities. Global practice examples from Switzerland, Australia and Quebec have attempted to use HIA and HiAP processes together (Delany et al. 2014; Pinto et al. 2015; Mattig et al. 2017). Furthermore, the HIA process in Wales uses the lens of the social determinants of health as a framework with which to assess the impact of policies, plans or projects, including two specific checklists to consider the potential positive and the negative (and unintended negative) impacts across populations and the determinants of health and well-being (WHIASU 2012). Participatory in nature, the HIA process delivers maximum potential when multi, cross-disciplinary and lay stakeholders are involved to contribute relevant evidence, knowledge and insight. The World Health Organization (WHO [2018](#)) recommends the use of HIA to achieve the SDGs, however, does not contain any practical guidance how to do this.

Within this paper, we describe a HIA undertaken on a proposed major electricity cable connection development in Wales. To our knowledge, no comparable broad approach assessment has been undertaken on this type of development. In addition, this paper discusses how this HIA was the catalyst for considered thinking about the HIA process and how it can be used to consider and implement the Well-being Goals in practice, and initiates further thinking about how this can be extended to implement and address the SDGs at a local, regional and national level.

Methodology

Context and background evidence

Within a local authority in Wales, a proposal for a power station was subject to a consideration of environmental health risk as part of an Environmental Impact Assessment (EIA). The EIA amassed a wide range of quantitative technical and qualitative data that focussed primarily on environmental health determinants such as air quality, noise and vibration, visual amenity, and took some consideration of socio-economic determinants such as economic development and income. It was highlighted that the proposed power cable connection between the area which sites the proposed power station to transport energy had potentially significant implications for the well-being of the local population and the surrounding environs. This included a potential impact on health, inequalities, economic, Welsh language and cultural impacts.

The local authority in question has a strong history of routinely carrying out HIAs on a wide range of projects, plans and policies. As a designated public body required to comply with the WFGA, the local authority directed a more comprehensive approach to consider the wider well-being, health and sustainability implications of the proposal. A comprehensive and discreet HIA had previously been carried out as part of the process for applying for a Development Consent Order (DCO) earlier in the development process for the power station. This was a separate HIA for a separate component in the same development, therefore the processes for planning permission were separate and the power station HIA was commissioned by a separate company responsible for that part of the development. It was believed by the local authority that a similar exercise should be undertaken to support decisions in respect of the proposed power cable connection between the power station site and the mainland. The details of the proposed power cable connection are documented in [Box 1](#).

Box 1. Details of the HIA case study.

Overview of the proposed Connection Route

The proposal aimed to develop a new 400 Kilovolt (kV) connection between the existing 400 kV substation at the top end of the island and the existing high voltage electricity transmission network on the mainland in north Wales. This would facilitate the export of power from the proposed new Power Station.

At that stage, the proposals (which remained subject to further development and consultation) involved a combination of overhead line and underground cables for the connection. Cable sealing end compounds would be required at the boundary points between the overhead and underground sections of the connection. The proposals included: substation upgrade works at the power station; approximately 30 kilometres of new overhead line between the power station and the bottom side of the island and a Strait and then the across the Strait to the existing substation; an underground section across the Strait; two new cable sealing end compounds and tunnel head houses either side of the Strait; and an extension to the substation.

The connection was split into sections (A-F) which were variable in their nature – ranging from constructing new single route overhead connection lines to duplicate lines and a section which would consist of cabling being routed under water to connect two regional areas.

In most instances, it was proposed to keep the existing and new pylons broadly in pairs as it is considered that this will keep views more open between pylons and this meant that the wires will run in the same line, which helps to reduce effects.

HIA approach and consideration of SDGs

As part of discussions about the connection project between the local authority and the energy company, it was recognised and agreed that a health (and well-being) impact assessment would be a beneficial way of discussing the proposed project and understanding local concerns about the potential effects it may have on the local population and area. HIA, as practiced in Wales, considers not just the biophysical and environmental health impacts which can be derived from planning proposals but assesses the wider determinants of health in a systematic yet flexible way (WHIASU 2012). These determinants such as social interaction, environment, transport, housing, access to services and employment can all interact to a greater or lesser extent with the lifestyle choices that we make and genetic makeup to influence our health and well-being. In addition, HIA is evidence-based. This evidence includes quantitative, statistical data, health intelligence and qualitative knowledge that embraces organisational, community and lay knowledge. The Deputy Chief Executive of the originating local authority, with agreement from the energy company, approached the Wales Health Impact Assessment Support Unit (WHIASU) to independently facilitate the HIA so that any health and well-being impacts, inequality impacts, positive or unintended consequences could be identified. This was to ensure that the HIA and workshop was carried out independently for what was recognised as a sensitive significant development in the community setting.

These aforementioned determinants in combination with an appreciation of long-term thinking are key components in the WFGA and thus, have an implication for the SDGs. The approach for this HIA was adapted from published practical guidance (WHIASU [2012](#)) and routinely used checklists (Supplementary Tables 1 and 2). The relationship of the checklist components against the seven Well-being Goals and the SDGs is shown in Table 1–3. This process successfully mapped all of the 17 SDGs against at least one of the Well-being Goals and therefore the determinants of health used in HIA and demonstrates the explicit linkages to HIA practice. It should be acknowledged that this mapping is not exhaustive, and the determinants can be mapped to one or more SDGs Sections and SDGs to one or more determinants.

HIA process and participatory workshop (Appraisal)

The HIA considered the wider impacts on those key stakeholders who could be affected by the preferred route, including a nearby local authority which was another administrative area that the proposed route would also be located within. The HIA was conducted to ascertain the potential impacts both short and long term and that this would ensure that any decisions made would minimise or prevent any detrimental impact and maximise any potential positive impacts or opportunities. In respect of inequalities, the HIA included a consideration of any vulnerable groups who could be particularly affected in the population, as well as the general population as a whole. Although not bound by legislation, the power company voluntarily agreed to proceed and be involved in the work. Full details of the HIA process are documented in [Box 2](#).

Box 2. Details of the power cable connection HIA process.

- Screening – a short session with local authority officers identified the potential impacts and groups affected. This highlighted the need for a broad focussed HIA.
- Scoping – The scope, resources and type of HIA were defined. Steering Group (SG) established.
- Evidence gathered – Literature review, health intelligence (demographic and health profile) and quantitative information including that from other EIA topic areas i.e. noise assessment and social impact assessment was gathered.
- Steering Group held and stakeholders identified to be invited to the workshop.
- Participatory workshop held – All notes were transcribed, translated into Welsh and circulated post workshop by attendees and agreed. Workshop evaluation carried out.
- Analysis and triangulation of evidence.
- Steering Group held to discuss findings and amend (if necessary).
- Report drafted and circulated to Steering Group
- Steering Group held to discuss the report and amend if necessary. Transcripts/notes referred back to. Final draft reviewed by Senior Managers in PHW and local authority and power company. Changes noted or actioned.
- Final versions (Welsh and English) prepared. These were used to support the final DCO application and inform the wider stakeholders. These flag up potential opportunities and unintended consequences, and those groups affected in the local population.
- Report amended agreed, circulated, and added to the Environmental Statement as an appendix.

Once it was identified that there was a need for a HIA to be carried out on the development, a small multidisciplinary Steering Group was established to provide advice and governance. This group included stakeholders from the local public health team, local authority environmental health, inequalities and well-being officers; the WHIASU leads; consultants who were appointed by the power company in the fields of health, environmental and social impact and the Project Manager and Director. This HIA was informed by local health intelligence, community statistics and other quantitative baseline information (such as traffic information, noise or vibration and air quality statistics).

This was also complemented by a qualitative assessment of the proposed project and provided supplementary community evidence to complement the quantitative data already collected to inform the DCO. A participatory workshop was undertaken with a broad range of local stakeholders as participants (i.e. power company, local authority officers (well-being; environmental health; transport and planning) public health and health services officers, third sector representatives, local residents). In total, 60 individuals were invited to attend the workshop, with 39 people agreeing to participate. Of these, 90% originated from, worked and lived in the local authority area. The individuals selected for the workshop were identified by the HIA Steering Group at the Screening and Scoping stage of the HIA, based on baseline and community data of the affected area and local knowledge. This built on much of the data already collected from the EIA and DCO work, avoided duplication of resources and provided a forum for stakeholder involvement and discussions following a recognised and systematic process (WHIASU [2012](#)).

The aim of the workshop was primarily to gather professional and community stakeholder knowledge and evidence about the potential impacts of the proposed route. It assessed the proposed project based on the attendees' understanding of the national policy context; the local circumstances; and the wealth of experience gained from working and living in the area and their experience of these types of development. Ahead of the workshop, all attendees were sent background information on the proposal and preliminary evidence from the quantitative data previously collated. The workshop was undertaken bilingually in Welsh

and English. The WHIASU Population Groups checklist [Supplementary Table 2] were utilised and systematically worked through with independent facilitators and scribes from WHIASU and the local Public Health Team of the Health Board. In addition, representatives from the Power Company attended as an observer to be on hand for any questions. The majority of attendees were familiar with the proposals being discussed as this was a significant local development with much information distributed as part of the process up until that point. Furthermore, an introductory presentation was given at the start of the workshop to ensure every participant had an understanding of the development consultation proposals, the HIA process, the WFGA/SDGs and the wider determinants of health. The meeting was hand scribed and all participant notes were recorded and securely stored electronically. The notes were translated into Welsh and these were distributed to the participants alongside the English language version for comment, clarification and agreement. A thematic analysis of the participants comments from the workshop was undertaken by the WHIASU lead which identified several key population groups as being potentially affected throughout the construction and operation phases. Similarly, there were several major themes and potential impacts identified by the participants from these phases. The findings of the analysis were triangulated with the scientific quantitative evidence previously collected and cross-checked for validity by the other facilitators from the workshop, and any discrepancies in opinion were discussed at a subsequent review meeting and addressed within the final HIA report.

Results

The thematic analysis from this case study identified a wide range of impacts that relate to the SDGs, i.e. environmental impacts; mental well-being; social capital; economic uplift for communities/specific groups; energy security. This results section is structured to reflect the well-being goals from Wales, the determinants identified, and the relevant SDGs that these findings link to (Tables 1–3).

A healthier Wales

The major health concern with regards to the proposal that arose from discussions in the workshop was the issue around electromagnetic fields (EMF). The main focus of these concerns were on the potential psychological impacts, leading to the decision that there would be a standalone EMF report to set out clearly how the power company complied with the guidance on EMF (SDG 3).

The impact on psychological well-being was also considered during the construction phase with regards to the increased concentrated levels of traffic and where these may occur. These were highlighted as likely to be where there are higher levels of residents (i.e. around the tunnel construction site) and the additional noise and air pollution could lead to an increase in stress and anxiety. An increase in light pollution in rural areas was also raised especially if the construction work took place overnight. The noise from overhead power lines was also a potential concern in respect of detriment to health and well-being. The potential avoidance of pathways and land within close proximity to the pylons both during and after construction would also have a potential negative impact on physical activity levels in the area (SDG 3).

Positively, stakeholders emphasised the need to promote alternative services such as leisure centres which can promote and maintain healthy behaviour ensuring that these services remain available to all including the workforce and be sustainable for the future. However, the demographic of the workforce are likely to be younger, and therefore attracted not only to leisure centres, but also socialising at local pubs and licensed premises. This could unfortunately lead to potential issues with regards to an increased use of alcohol and other risk-taking behaviours (SDG 3).

A more equal Wales

It was acknowledged by stakeholders and participants that the proposed project was applicable to a wide range of communities, groups and individuals in the general population. However, it was identified by the participants that there were a number of vulnerable groups who could be specifically affected by the development locally; specifically older individuals and the younger demographic. The area has a significant older population, some of whom may be living alone in small, rural isolated villages or hamlets (which can be related to social isolation). Therefore, there was the potential for a disproportionate impact on the older population, caused by the uncertainty of any disruption associated with the construction phase. Traffic disruption such as road closures may impact upon the routines (shopping, socialising) of the older population and consequently result in greater isolation. Isolation could be further increased by difficulties in access by family members or carers to visit these older individuals. One unintended consequence could be that individuals currently employed as carers for these older individuals could be drawn to higher-paid work with the developers of the project, which would again lead to gaps in service provision and isolation (SDG 3, SDG 9, SDG 10).

The potential unintended negative impact on younger people is related to a possible lack of affordable accommodation in the area, as it is likely that any capacity would be utilised to house construction workers for the project. Young people may, therefore, choose to move away from the area which could cause challenges to current family and close support networks. Although advocates and representatives of young people were invited to attend the workshop and two did participate, it was noted that young people themselves were absent from the participatory workshop. Therefore, any future developments would require further consultation with this demographic. The impact of the project on children was also considered. The length of the construction period was estimated to be 3 years, which is a long time relative to the lifespan of a child, and is especially significant for the development phase. The predicted rise in road traffic during construction would also increase the risk of children experiencing a traffic-related incident (SDG 3). The potential detrimental impact on the Welsh language (the area is majority first language Welsh speaking) was raised and this was both in the context of young people migrating from the area due to lack of affordable housing and opportunities but also through an influx on non-Welsh speakers. (SDG 11, SDG 4; *A Wales of vibrant culture and thriving Welsh language*).

Participants also highlighted the importance of citizen power and influence with regards to any future developments and stressed that open communication and transparency are key to overcoming any future conflicts. In particular, the potential conflicts were related to the confusion regarding EMFs (SDG 3; *A healthier Wales*) and the preference for an under-ground/sea option for the cable connection (SDG 7, SDG 14, SDG 15; *A globally responsible Wales*).

A Wales of cohesive communities

The major impact of the project on the local communities would be the addition of the workforce to the area. At the peak of the construction phase (the overlap of the cabling connection and the power station construction), it was estimated that there would be over 9,000 workers and contractors who would be working (and living) in the area. This had the potential to completely transform the demographic of the area from an older population to one which would contain a significant proportion of young men (SDG 11) and an influx of non-Welsh speakers could potentially dilute the use of the Welsh language (SDG 11; *A Wales of vibrant culture and thriving Welsh language*).

The potential negative impact identified was the potential conflicts between ‘locals’ and the workers, and even between the workers themselves. The demographic of young men in the workforce are likely to socialise (and consume alcohol) in the local area which would increase the likelihood of physical and verbal confrontations. Participants also suggested that an increase in non-local and migrant workers of other nationalities could give rise to the potential for increased incidence of hate crime (SDG 10, SDG 11). Again, the consequences of travel disruption during the construction phase and the potential negative implications for some isolated/older populations who may currently have a weekly plan for accessing shops and services have relevance to this well-being goal (SDG 9, SDG 10).

One possible solution proposed was the provision of a community fund for those communities who may be disproportionately impacted. The need for additional investment was also suggested, especially in relation to housing, health and well-being services and tourism to make the community more cohesive and resilient (SDG 9, SDG 10, SDG 11; *A resilient Wales; A prosperous Wales*). Although, the development did not include the building of new roads, there was the potential to upgrade the existing road network and infrastructure (SDG 9, SDG 11).

A globally responsible Wales

There were a limited number of potential impacts identified during the process in relation to this Goal. However, both positive and negative consequences were identified. Participants broadly accepted that the development would contribute to the energy security (low carbon delivery) of Wales and the wider UK without any detrimental impacts to the environment as identified through the EIA (SDG 7, SDG 13).

There were concerns raised with regards to the arrangements for the removal of waste/spoil from the exploration and construction of the tunnel and these impacts on the local ecosystems. The power company stated that there was a need to understand the full geology of the tunnel as this varied across the length of the route (SDG 7). The local residents also expressed a preference for the connections to be underground/sea rather than the overhead connections which had been proposed by the power company and consulted on. The overhead connections have implications for the landscape and local wildlife, whereas underground/sea connections would also have separate but significant environmental impacts (SDG 14, SDG 15).

A resilient Wales

The impact of the estimated workforce (over 9,000 individuals) would effectively increase the population of the area by 15-20% which would place a huge demand on the health (and other public) services in the area. Certain health services were already under pressure and this extra stress could have had a major impact on the delivery of these services which would have had a detrimental impact to the health and well-being of the local population (SDG 3, SDG 10, SDG 11). The infrastructure of the area would also be tested by these significant numbers of people especially with regards to transport connections and also housing. There was potential for some housing located in close proximity to the proposed connections to remain unoccupied for extended periods of time due to the concerns of EMF emissions, noise pollution on health and well-being and the aesthetic implications of the pylons (SDG 3, SDG 11).

The workshop participants noted that there was currently little or no evidence on the long-term impacts for the landscape, services or even the future demographic profile of the area. However, addressing or providing evidence on these long-term concerns would have provided some reassurance that the detrimental short-term challenges were outweighed by the long-term benefits (SDG 10, SDG 11, SDG 15).

A prosperous Wales

The influx of the potential workforce into the area should result in short-term investment in the local economy and facilities. There could be opportunities for increased turnover for local businesses, more revenue for landlords and economic opportunities to be leveraged from having so many additional customers and service users to provide for. More specifically, it was felt that the tourism industry and associated leisure services would reap financial benefits in the short-term (SDG 8).

However, there were strong concerns that these short-term benefits would not outweigh the potential detrimental long-term impacts on the tourism industry. Tourist activity in the area is the major contributor to the local economy and many of the local jobs are reliant on this industry. There was a significant risk that the development and the visual amenity aspects would result in a reduction of visitors to the area which is deemed as an area of natural beauty. Furthermore, during the construction phase, frequent tourists may seek alternative areas to visit which they prefer, again leading to a potential reduction in visitor numbers and a decrease in revenues. It was proposed in the workshop that the area was 'losing heritage in order to subsidise electricity'. The most pessimistic forecasts suggested that investment in the local area could take up to 60 years to fully recover (SDG 8).

The development would bring new jobs to the area, although the opportunities for local residents would likely be limited due to the highly skilled requirements of the work and the time constraints of the construction phase (relative short space of time for completion). Although, the developers did suggest there could be some possible job creation for the local residents in aspects of maintenance work such as ground working and fencing (SDG 8, SDG 9).

There were concerns about the unintended consequences of reduced property valuation and the difficulty of selling property in the future. The participants also believed that there would be a disproportionate impact on landowners and farmers in the area and whilst some financial compensation would be awarded, there were further questions if these financial payments would offset the longer-term negative implications (SDG 8, SDG 11).

A Wales of vibrant culture and thriving Welsh language

There were several potential positive impacts highlighted along with a number of detrimental and unintended consequences. On a positive note, participants highlighted that the development could provide an opportunity to improve access to, and the interpretation of, ancient sites on Anglesey. It could foster an increased understanding and appreciation of them and increase educational opportunities and benefits from learning across all educational establishments (primary, secondary and tertiary). It could be linked to aspirations relating to future jobs and professions. By opening up access to the sites, there could be a unique opportunity to increase the understanding and involvement of the local community with their archaeological

heritage and facilitate potential tourist opportunities (SDG 4, SDG 8, SDG 11; *A more equal Wales; A prosperous Wales*).

In respect of any detrimental impacts, the impact for Welsh language and culture was again raised (SDG 4, 11; *A more equal Wales*). A large influx of non-Welsh speakers could also have a major impact on the Welsh language and community cohesion as cited previously.

Table 1. Mapping of health and inequality across SDGs and within HIA checklist.

Future Generations (Wales) Well-being Goal	Sustainable Development Goal and Description	Health Impact Assessment checklist determinant
<p>A healthier Wales – physical and mental well-being is maximised</p>	<ul style="list-style-type: none"> • Goal 2 (Zero Hunger): End hunger, achieve food security and improved nutrition and promote sustainable agriculture. • Goal 3 (Good Health and Well-being): Ensure healthy lives and promote well-being for all at all ages. 	<p>Physical:</p> <ul style="list-style-type: none"> • Diet • Physical activity • Use of alcohol, cigarettes, non-prescribed drugs • Sexual activity • Other risk-taking activity <p>Emotional:</p> <ul style="list-style-type: none"> • Mental well-being - consider: • supporting sense of control • enabling participation in community and economic life • impacting on emotional well-being and resilience
<p>A more equal Wales – fulfil potential no matter background or circumstances</p>	<ul style="list-style-type: none"> • Goal 1 (No Poverty): End poverty in all its forms everywhere. • Goal 4 (Quality Education): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. • Goal 5 (Gender Equality): Achieve gender equality and empower all women and girls. 	<ul style="list-style-type: none"> • Family organisation and roles. • Citizen power and influence. • Social support and social networks. • Divisions in community.

	<ul style="list-style-type: none"> • Goal 10 (Reduced Inequalities): Reduce inequality within and among countries. • Goal 16 (Peace, Justice and Strong Institutions): Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. 	<ul style="list-style-type: none"> • Social isolation. • Peer pressure. • Racism. <p>Includes Population groups i.e. sex/gender/age/ethnicity</p>
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Table 2. Mapping of integration and environmental considerations across SDGs and within HIA checklist.

Future Generations (Wales) Well-being Goal	Sustainable Development Goal and Description	Health Impact Assessment checklist determinant
<p>A Wales of cohesive communities – attractive, viable, safe and well-connected</p>	<ul style="list-style-type: none"> • Goal 4 (Quality Education): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. • Goal 7 (Affordable and Clean Energy): Ensure access to affordable, reliable, sustainable and modern energy for all. • Goal 11 (Sustainable Cities and Communities): Make cities and human settlements inclusive, safe, resilient and sustainable. • Goal 16 (Peace, Justice and Strong Institutions): Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. 	<ul style="list-style-type: none"> • Community identity • Neighbourliness • Sense of belonging • Local pride • Racism • Community safety • Other social exclusion • Safety of area e.g. road hazards • Transport/connectivity (including parking) • Waste disposal • Noise • Air and water quality • Attractiveness of area • Green space • Smell/odour

<p>A globally responsible Wales – contribution to Global well-being</p>	<ul style="list-style-type: none"> ● Goal 6 (Clean Water and Sanitation): Ensure availability and sustainable management of water and sanitation for all. ● Goal 7 (Affordable and Clean Energy): Ensure access to affordable, reliable, sustainable and modern energy for all. ● Goal 10 (Reduced Inequalities): Reduce inequality within and among countries. ● Goal 12 (Responsible Consumption and Production) Ensure sustainable consumption and production patterns. ● Goal 13 (Climate Action): Take urgent action to combat climate change and its impacts. ● Goal 14 (Life below Water): Conserve and sustainably use the oceans, seas and marine resources for sustainable development. ● Goal 15 (Life on Land): Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss ● Goal 17 (Partnerships to achieve the goal): Strengthen the means of implementation and revitalize the global partnership for sustainable development 	<ul style="list-style-type: none"> ● Government policies ● International policies ● Gross Domestic Product ● Economic development ● Biological diversity ● Climate change ● Sustainable Development
<p>A Wales of vibrant culture and thriving Welsh language – promotes and protects culture, heritage, language and encourages participation</p>	<ul style="list-style-type: none"> ● Goal 4 (Quality Education): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. ● Goal 9 (Industry, Innovation and Infrastructure) Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. 	<ul style="list-style-type: none"> ● Welsh language ● Public amenities ● Information technology ● Cultural and spiritual ethos

Table 3. Mapping of resilience and prosperity across SDGs and within HIA checklist.

Future Generations (Wales) Well-being Goal	Sustainable Development Goal and Description	Health Impact Assessment checklist determinant
A resilient Wales – an innovative, productive and low carbon society which develops a skilled and well-educated population in an economy which generates	<ul style="list-style-type: none"> • Goal 3 (Good Health and Well-being): Ensure healthy lives and promote well-being for all at all ages. • Goal 9 (Industry, Innovation and Infrastructure) Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. • Goal 11 (Sustainable Cities and Communities): Make cities and human settlements inclusive, safe, resilient and sustainable 	Quality, sustainability and access to the built/natural environment, infrastructure and services <ul style="list-style-type: none"> • Neighbourhood design • Housing • Medical services • Other caring services • Road hazards • Injury hazards • Quality and safety of play areas • Shops and commercial services • Open/green space
A prosperous Wales – an innovative, productive and low carbon society which develops a skilled and well-educated population in an economy which generates	<ul style="list-style-type: none"> • Goal 1 (No Poverty): End poverty in all its forms everywhere. • Goal 4 (Quality Education): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. • Goal 8 (Decent Work and Economic Growth) Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. 	Employment <ul style="list-style-type: none"> • Education, training, skills and employability • Literacy (including health) • Maximising income • Economic inactivity

wealth and provides employment	<ul style="list-style-type: none"> • Goal 9 (Industry, Innovation and Infrastructure) Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. 	<ul style="list-style-type: none"> • Workplace conditions • Careers advice • Volunteering • Social enterprise
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Summary of main findings

Overall, the participants involved were able to identify a greater number of negative impacts or unintended detrimental consequences compared to the positive opportunities that would arise from the development. The main findings and recommendations are summarised and mapped across SDGs and Well-being goals and presented in Table 4.

The opportunities that were identified were mainly in relation to the short-term economic investment opportunities that the new workforce would present. Another positive opportunity that was welcomed was the dialogue with developers and the proviso that any future dialogue would have a greater element of transparency and involve representation from all and especially young individuals who would form the future generations in the area. There is a genuine concern that the impacts of the proposal would have disproportionate, equality impacts for older generations and the younger individuals of the area through travel disruption and future employment opportunities. Tourism is a key element for economic growth in the area, and the long-term implications of this development may have long-lasting consequences for the industry.

The new workforce would undoubtedly, without mitigation, add extra pressure to health services which are already stretched and the fear over the potential health implications of the EMF emissions would also impact on service delivery. There is also the environmental impacts of the construction to consider with regards to noise, air and light pollution, and also the concerns around the 'clean' removal of waste products. Furthermore, the cumulative impacts during the construction phase of both the connection (discussed here) and the power station development itself would have major negative implications for the area (including Welsh language, mental well-being and those derived from the typology of the workforce) and these would need to be considered and planned for in tandem.

Table 4. Main outcomes from the workshop and alignment to SDGs and well-being goals

Workshop Recommendation/Outcomes	Sustainable Development Goal	Future Generations (Wales) Well-being Goal
<p>1. The construction and infrastructure of the connection development.</p> <p>The impact of the construction and operation of the connection development itself would be significantly smaller than the proposed Power Station development but when considered together it would have a huge cumulative impact.</p> <p>It is important to consider the power station when discussing the power cable development and the participants called for closer working and co-ordination with the development company for the power station to ensure that impacts were minimised – particularly during the construction phases.</p> <p>The impact of the connection and the implications for the landscape (and green space) of the local area and communities both in the short term and the long-term future would be significant (noise, light, air pollution).</p> <p>Several participants wished to explicitly state in the key messages that undersea or underground routing was their preferred option. This was preferred to the over ground connection that was consulted upon.</p>	<ul style="list-style-type: none"> • Goal 3 (Good Health and Well-being). • Goal 7 (Affordable and Clean Energy). • Goal 9 (Industry, Innovation and Infrastructure). • Goal 11 (Sustainable Cities and Communities). • Goal 15 (Life on Land). 	<ul style="list-style-type: none"> • A resilient Wales • A Wales of cohesive communities • A globally responsible Wales
<p>2. Increased demand on services, infrastructure and facilities by potential workforce and wider families.</p> <p>The power company were asked to collate evidence in respect of its likely workforce profile. This could provide some insight into the potential demographics and behaviour in respect of going home (or not) at weekends of subcontractors and would be based on previous similar developments. There is the potential for an increased pressure on the provision of services, infrastructure and facilities on the island. Participants stated that the potential impacts were likely to potentially fall mainly on health care and social services (a healthier Wales), housing (a resilient Wales) and impact on local</p>	<ul style="list-style-type: none"> • Goal 3 (Good Health and Well-being) • Goal 8 (Decent Work and Economic Growth) • Goal 9 (Industry, Innovation and Infrastructure) • Goal 11 (Sustainable Cities and Communities) 	<ul style="list-style-type: none"> • A healthier Wales • A resilient Wales • A prosperous Wales

transport routes and regional connections across Wales. However, the potential workforce might provide a short-term economic boost to the local tourism industry.			
<p>3. Better and Continued Involvement with local residents</p> <p>There was a need for transparency throughout the decision-making process and the implementation process. There should be advance warnings on specific actions such as construction work with clear and timely information. There needs to be ongoing community focused discussions once construction starts within individual settlements using local community venues to have conversations about when and what actions will occur, how and where.</p> <p>It was noted by some of the participants that the information available was not detailed enough. This was raised in respect of the workforce profile and the need for additional planning for the impacts on housing, transport, the Welsh language and health services - particularly when considered cumulatively with power station construction.</p> <p>There was a need to engage with young people on the island and gain their perspectives – as this could affect them both in the short and the longer term. (a more equal Wales)</p>	<ul style="list-style-type: none">• Goal 3 (Good Health and Well-being)• Goal 9 (Industry, Innovation and Infrastructure)• Goal 10 (Reduced Inequalities)• Goal 11 (Sustainable Cities and Communities)	<ul style="list-style-type: none">• A more equal Wales• A prosperous Wales• A resilient Wales• A healthier Wales• A Wales of vibrant culture and thriving Welsh language	
<p>4. Specific Health Implications</p> <p>Potential negative impacts or unintended detrimental consequences of the proposed project were highlighted to be any psychological and mental well-being impact which would arise from perceptions of risk from residing near the receptors. More specifically, the issue of electromagnetic fields (EMF) was raised, and these well-being impacts need to be addressed as a priority.</p>	<ul style="list-style-type: none">• Goal 3 (Good Health and Well-being)	<ul style="list-style-type: none">• A healthier Wales	

Discussion

The HIA presented in this article is important for a couple of reasons. Firstly, the article provides an overview of the relationship and overlap between HIA and SDGs and an example of how the HIA process can be undertaken to consider the SDGs in practice. Secondly, to our knowledge, a broad, wider determinant perspective or community HIA have not been undertaken on a power connection development of this type before. Therefore, the findings from the HIA themselves are new learning that can be applied to any similar future developments, both nationally and internationally.

The main focus of this discussion is the role of HIA in supporting meeting the SDGs. The case study and the use of HIA to assess the impact on the health and well-being of the population from the proposed power line development via the Welsh Well-being Goals instigated further thinking. Not only about how HIA can be used as a practical process to address and implement not only the WFGA, the Well-being Goals, the aims of 'health in all' policies and sustainable development approaches but also how it could evolve and be used as a platform to address and implement the SDGs in reality. The focus on sustainable development, well-being, climate change and the wider issues covered by the SDGs are those being concentrated on by a large number of nation-states. Even though regulatory and legal contexts may differ, many nations have signed up to the SDGs and committed to applying and delivering them in practice by 2030. HIA is a practical method to do this. Even though the WFGA has provided an enabling environment in Wales for this case study to take place and promoted the thinking about the application of HIA to the Act and Well-being Goals, it also provided a clear lens to extend the authors thinking. If the Well-being Goals are removed from the tables, it is still possible for states to map the SDGs to the wider determinants of health and inequalities to enable them to consider the range of these in some form. In addition, states with a well-being focus such as New Zealand with its Local Government (Community Well-being) Amendment Act 2019 (Parliamentary Counsel Office. New Zealand Legislation 2019) could utilise this thinking and translate or adapt it into practice. It is acknowledged that these can be translated in a different number of ways dependent on perspective, but this paper highlights that the HIA approach can be utilised to implement the SDGs and can be tailored to the local context and population. The HIA approach can also be used on similar planning proposals and developments, for example, power plans, plants or connections and would be highly appropriate for such developments in low to middle-income countries with an SDG focus who are expanding or going through a period of economic development. This approach considers not just the SDGs but also health and well-being, risks and opportunities and population effects and inequalities.

There was a clear thread through from the Well-being Goals to the SDGs. The World Health Organization toolkit on achieving the SDGs makes reference to HIA (WHO 2018) but contains no explicit guidance as to how this would work in practice. Through the methodology and results outlined in this article, in particular how HIA can support translation of the SDGs and their aims, this should help to address this lack of practical guidance. The checklists used as part of Welsh HIA practice enabled the process to be applied to mapping the Well-being Goals and thus it was sensible to suggest that the same approach could evolve and be used to map the social determinants and population groups to the SDGs. By considering the determinants and population via the checklists, the SDGs can be incorporated and included as part of evidence-based health impact assessment decision-making processes and be applied across a wide range of nation-states and municipalities in order to inform and enhance current and future plans, projects and strategies in relation to them.

We acknowledge in Wales that we are aided by unique legislation, but there is still significant global relevance to this approach. It can be explicitly demonstrated that the use of HIA can capture all the social determinants and SDGs in some form, however not all social determinants or SDGs will be applicable to every development assessed. This approach can provide a much broader perspective with which to try and maximise society, the environment and health gain and health equity for all when informing and influencing

decision-making processes and policymaking. HIA can also be utilised as a practical instrument to support economic development and drivers (such as natural resources extraction or regional development growth) in developing low to middle income and high-income countries, whilst at the same time ensuring and considering the potential detrimental impacts to other SDGs aims are not realised. This can be done by providing mitigation for any potential negative impacts and maximising any positive impacts or opportunities for sustainable development, equity and health gain. The mapping of SDGs through HIA could also further enable those nations and regions who currently align (or are considering aligning) their HIA delivery with a HiAP approach (Delany et al. 2014; Pinto et al. 2015; Mattig et al. 2017).

The considered proposal for this HIA was politically sensitive and contentious, and in order to deliver renewable energy nationally there would be a substantial impact on the picturesque landscape and associated tourism in the locality. Tourism in rural communities has been suggested as an approach for sustainable development (Petrović et al., 2018), with some of the important factors driving this including the friendliness of locals and the quality of infrastructure in the area (Petrović et al. 2018), both of which would be tested by this proposal. The local residents have also requested more transparent and detailed information with regards to future decision-making and the importance of involving young people in these discussions was also raised. Community engagement and involvement in decision-making creates a more democratic approach (Chadderton et al. 2013) and could build a sense of control, strengthening communities and also reducing inequalities (O'Mara-Eyes et al. 2013), all of which would negate some of the adverse consequences of the proposal. The influx of a younger workforce who would socialise at licensed premises and consume alcohol may also have a negative community impact. Research demonstrates that regular consumption and a younger demographic are both contributing factors that increase the likelihood of physical confrontation (Schnitzer et al. 2010).

In addition to these wider community impacts there were also some specific health and well-being implications that were identified. Some of these concerns are applicable to any similar global development, and all have an extensive evidence base behind them. The perceptions of risks from electromagnetic fields is a long-standing public health concern (MacGregor et al. 1994; Kheifets et al. 2006) and there was a clear concern remaining which may lead to heightened anxiety and stress in residents. The reduction and inaccessibility of green space may also have an adverse impact on mental well-being (Mitchell et al. 2015), and could also have negative implications on physical activity levels (Toftager et al. 2011). The increases in traffic during the construction phase would also have a detrimental impact on the air quality of the green spaces and hamper some of the associated benefits with this environment (Vienneau et al. 2017). The increased traffic would also increase noise pollution, and a previous HIA conducted in Europe concluded that traffic noise alone can contribute to cardiovascular and respiratory conditions in the older population (Tobías et al. 2015).

To conclude, the SDGs were launched in 2016 but they are looking to make a positive impact by 2030. This paper outlines how carrying out a HIA can help to reflect on, implement and achieve the SDGs in practice by providing evidence-based maximisation and mitigation opportunities for any identified potential impacts and/or any negative unintended consequences. Although, this case study is from Wales, the same HIA approach can be applied globally to inform and influence any evidence decision-making processes and will ensure that the aims of the SDGs are considered throughout.

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Supplementary Table 1. Health and Well-being Determinants Checklist

1. Lifestyles	<ul style="list-style-type: none">• Diet / Nutrition / Breastfeeding• Physical activity• Risk-taking activity i.e. addictive behaviour, gambling• Sexual activity• Social media use	<ul style="list-style-type: none">• Use of alcohol, cigarettes, Electronic Nicotine Delivery Systems (i.e. e-cigarettes),• Use of substances, non-prescribed medication, and abuse of prescription medication
2. Social and community influences on health	<ul style="list-style-type: none">• Adverse childhood experiences i.e. physical, emotional or sexual abuse.• Citizen power and influence• Community cohesion, identity, local pride• Community resilience• Divisions in community• Domestic violence• Family relationships, organisation and roles• Language• Cultural and spiritual ethos	<ul style="list-style-type: none">• Neighbourliness• Other social exclusion i.e. homelessness, incarceration• Parenting and infant attachment (strong early bond between infant and primary caregiver)• Peer pressure• Racism• Sense of belonging• Social isolation/loneliness• Social capital, support and social networks• Third Sector and Volunteering
3. Mental Health & Well-being	<p>Consider:</p> <ul style="list-style-type: none">• Does this proposal support sense of control?• Does it enable participation in community and economic life?• Does it impact on emotional well-being and resilience?	
4. Living & environmental conditions affecting health	<ul style="list-style-type: none">• Air Quality• Attractiveness of area• Community safety• Access, availability and quality of green and blue space, natural space• Housing quality and tenure	<ul style="list-style-type: none">• Noise• Quality and safety of play areas (formal and informal)• Road safety• Odours• Urban/Rural built and natural environment & neighbourhood design

Physical, mental, social, environmental health & well-being

	<ul style="list-style-type: none"> • Indoor environment • Health and safety i.e. falls, home safety, safety of public places • Light pollution 	<ul style="list-style-type: none"> • Waste disposal, recycling • Water quality i.e. sea water 	
5. Economic conditions affecting health	<ul style="list-style-type: none"> • Unemployment • Poverty including food and fuel poverty • Income • Personal and household debt 	<ul style="list-style-type: none"> • Economic inactivity • Type of employment i.e. permanent/temporary, full /part time • Working conditions i.e. work environment, bullying, health and safety 	
6. Access and quality of services	<ul style="list-style-type: none"> • Careers advice • Education and training • Information technology, internet access, digital services • Leisure services • Medical and health services 	<ul style="list-style-type: none"> • Other caring services i.e. social care; Third Sector, youth services, child care • Public amenities i.e. village halls, libraries, community hub • Shops and commercial services • Transport including parking, public transport, active travel 	
7. Macro-economic, environmental and sustainability factors	<ul style="list-style-type: none"> • Biodiversity • Climate change i.e. flooding, heatwave • Cost of living i.e. food, rent, transport and house prices • Economic development including trade 	<ul style="list-style-type: none"> • Government policies i.e. Sustainable Development principle (integration; collaboration; involvement; long term thinking; and prevention) • Gross Domestic Product • Regeneration 	

Supplementary Table 2. Population Groups Checklist

This checklist is for use during a HIA Screening and Appraisal in order to identify the population groups who could be more impacted than others by a policy/project/proposal. This list is not exhaustive and other groups may be highlighted as part of the process.

Sex/Gender related groups

- Female
- Male
- Transgender
- Other (*please specify*)

Age related groups (*Could specify age range for special consideration*)

- Children and young people
- Early years (including pregnancy and first year of life)
- General adult population
- Older people

Income related groups

- Economically inactive
- People on low income
- People who are unable to work due to ill health
- Unemployed/workless

Groups at higher risk of discrimination or other social disadvantage

- Black and minority ethnic groups (*please specify*)
- Carers
- Ex-offenders
- Gypsies and Travellers
- Homeless
- Language/culture (*please specify*)
- Lesbian, gay and bisexual people
- Looked after children
- People seeking asylum
- People with long term health conditions
- People with mental health conditions
- People with physical, sensory or learning disabilities/difficulties
- Refugee groups
- Religious groups (*please specify*)
- Lone parent families
- Veterans

Geographical groups and/or settings

- People in key settings: workplaces/schools/hospitals/care homes/ prisons
- People living in areas which exhibit poor economic and/or health indicators

- People living in isolated or over-populated areas
- People unable to access services and facilities

Chapter 5: Process, Practice and Progress: A Case Study of the Health Impact Assessment (HIA) of Brexit in Wales

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Abstract

Health impact assessment (HIA) is a systematic and flexible tool, which is advocated by the World Health Organisation as a method through which to consider the impact of policies on the health and well-being of a population, and the inequalities that may arise because of it. In 2018, the HIA support unit in Wales carried out a comprehensive and unique HIA on the impact of Brexit in Wales. The aims were to understand the differential impacts that Brexit would have on the health and well-being of the population and to provide evidence to inform decision makers across a range of public bodies. It followed a five-step process for HIA and utilised a wide range of evidence sources and health intelligence including both quantitative and qualitative evidence. This paper reflects on the process of carrying out the HIA and the methods used. It discusses the stages of the HIA, and shares the findings and reflections of implementation which will be beneficial to other HIA practitioners and policy makers. It does not concentrate on the findings of the HIA in detail, but focusses on what worked and any challenges encountered. It has been used to progress the practice of HIA in Wales and demonstrates the value of HIA as a method to inform and influence complex decisions.

Keywords: health impact assessment; Brexit; health and well-being

Introduction

Health and well-being is majorly influenced by factors outside of health systems, such as spatial planning, the economy and governmental policies and their decisions, plans and policies (Commission on the Social Determinants of Health, 2010). These factors are routinely referred to as the “social determinants of health” and have been articulated in frameworks such as that depicted by Dahlgren and Whitehead (Dahlgren and Whitehead, 1991). The social determinants are multifaceted and need to be addressed in order to tackle the “causes of the causes” of ill health (Frieden, 2010; Islam, 2019) which are often policy driven, as the impact of them can create or exacerbate existing inequalities in social and health outcomes for a wide range of population groups (Marmot, 2010). One of the key concepts advocated to address this is to consider the health implications of policies in a range of settings, sectors and systems in order to protect and promote health and improve health outcomes. This is known as health in all policies (HiAP) (Dean et al., 2013; Kokkinen et al., 2017; World Health Organization, 2013). HiAP entails working synergistically across sectors to take account of the health implications of decisions, aims to avoid health harm and rebalance social and health equity (World Health Organization, 2013). As part of this approach to protecting health and reducing inequalities, health impact assessment (HIA) is a tool commonly advocated to do this (Collins and Koplan, 2009; Kemm, 2001).

HIA is defined as “a combination of procedures, methods and tools by which a policy, plan or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within a population” (Birley, 2011; National Research Council (US) Committee on Health Impact Assessment, 2011). Underpinned by the World Health Organisation (WHO) holistic definition of health and well-being, it uses the social determinants of health as a lens through which to identify health impacts (World Health Organization, 1948). As a process, HIA is a systematic and scalable which allows health and well-being to be considered in all policy sectors in a flexible way. The process explicitly raises awareness of well-being and inequalities (Birley, 2011) and is recommended by the WHO as an important method with which to drive and apply HiAP to support healthy public policy-making (World Health Organization, 2013). HIA is explicitly tied to HiAP as it can enable collaboration across sectors to influence and inform decision-making processes, identifies positive and negative impacts on the population and makes recommendations to mitigate and avoid them (National Research Council (US) Committee on Health Impact Assessment, 2011). However, previous evidence acknowledges there can be both benefits and challenges attached to the use of HIA dependent on context (Elliott and Francis, 2005; Parry and Stevens, 2001).

In 2018, the United Kingdom withdrew from the European Union (EU), routinely referred to as “Brexit” (UK Government, 2019; Wincott et al., 2017). This was an unprecedented event in UK history, and as such the impact was not yet known for a wide range of policy areas, including the impact on the health system but also the economic and social impact. These impacts may not be distributed evenly across the population and therefore increase inequalities. To date, little has been published in the peer-reviewed literature to capture the knowledge and learning from carrying out an HIA on an event such as Brexit (Harris-Roxas and Harris, 2007). This paper aims to explore the use of HIA to examine the impact of Brexit in Wales on health, well-being and inequalities. Wales is a devolved nation, with its own government and Parliament, and as such has the ability to legislate in specific areas including for health, planning and the environment. It has an underpinning tenet of sustainable development, which is built on the platform of the Well-being of the Future Generations (Wales) Act 2015 (WFGA) (Welsh Government, 2015). This Act has a clear focus on addressing health, social and economic inequalities and provides an enabling environment to promote an HiAP approach to policy-making. The Act consists of seven core well-being goals including resilient communities, economy and culture, which Welsh public bodies must strive to maximise. In including goals for “A more equal Wales” and “A healthier Wales”, the Act enshrines a strategic commitment to considering and integrating health and well-being into policies across sectors and addressing inequalities. The Act also

specifies that this must be carried out using five ways of working, which are prevention, involvement, long-term thinking, integration and collaboration.

This paper outlines the case study of a complex, comprehensive HIA carried out in Wales, describes the process followed, the impact of the report and discusses and reflects on the knowledge obtained from undertaking the process by demonstrating the implementation of HiAP via HIA in our context. As such, the results of the HIA will not be detailed in any depth. This paper examines the benefits and issues that can arise from carrying out an HIA on a novel subject such as Brexit and what can be learnt in order to evolve practice and mobilise HiAP at a regional level in a nation like Wales. This paper is relevant to policy makers and practitioners who may be required to carry out HIAs on significant policies, major challenging and unique events and it aims to share the transferable learning. It can also demonstrate the “added value” of carrying out a process such as HIA on policies and exceptional events such as Brexit.

Materials and Methods

HIA in Wales is based on the WHO definition of health and is carried out as a flexible and systematic evidence-based process (Birley, 2011; Wales Health Impact Assessment Support Unit, 2012a). Supported by the Wales Health Impact Assessment Support Unit (WHIASU) and Public Health Wales (PHW), the process uses the determinants of health as a lens through which to assess the impact of policies, plans or projects. It follows a broad mixed methods approach to HIA, considers the potential positive and the negative (and unintended negative) impacts across the breadth of determinants, and focuses on the impact on health equity and vulnerable populations. It does this via two checklists that focus on population groups and the wider determinants of health and well-being (Wales Health Impact Assessment Support Unit, 2012a). The HIA process also directly involves organisations, public bodies and communities (and their representatives) who could, or will be, affected by the policy or plan under assessment or have an interest in it.

The Brexit HIA was undertaken over a six-month period in 2018. It captured the impacts of Brexit at that moment in time for Wales and was set against an evolving political situation predating the date of withdrawal. Evidence in relation to Brexit and its differential scenarios was limited as the HIA was carried out, but modelling scenarios and other impact assessments have since been published into 2019 and early 2020 (Confederation of British Industry, 2019; HM Government, 2020; Parker and Hughes, 2019). Based on the context at the time, the HIA did not appraise specific Brexit scenarios (for example, a withdrawal with major alignment with many EU regulations and trading positions versus a “no-deal” agreement) because of the short timeframe and complicated nature of Brexit. It therefore explicitly focussed on the impacts that could potentially occur in Wales and those groups that could be affected by the UK exiting from the current EU framework.

The HIA followed the Welsh HIA guidance (Wales Health Impact Assessment Support Unit, 2012a), which is based on standard international practice with a five-stage process and was comprehensive, participatory and prospective in its nature.

Screening and Scoping

A core group and a working group were established to carry out the HIA. A strategic advisory group (SAG) was formed to provide governance to the HIA. The SAG was cross-sector and disciplinary in nature and consisted of highly relevant internal and external stakeholders, for example from PHW, Welsh Government (WG), academia and from a range of backgrounds (environmental public health; health policy, Brexit

planning). In addition to providing oversight of the process, the SAG also provided guidance and advice, agreed on the findings and reviewed and made suggestions for the developing HIA report.

A screening paper was developed by the working group that highlighted the potential determinants of health that could be affected, the vulnerable groups and policy areas that could be affected by Brexit, which covered the whole population. In addition, a scoping paper was drafted. It defined the scope of the HIA based on the information from the screening paper and included the timescales, the types of evidence needed and the parameters of the process in order to ensure that the HIA was robust and high quality. This was carried out in tandem with screening to expedite the process, articulate those to be involved and the resources needed.

A prioritization process of the impacts was carried out due to the huge range, sensitivity, complexity, depth and breadth of potential impact of Brexit across all the determinants and populations in Wales, and its effect with respect to inequalities and the need to act quickly. A list of prioritization criteria was developed and included any evidence relevant to Wales of direct impact on health and well-being, and the strength of the potential impact. The SAG prioritised determinants such as healthcare, research and development, and health protection and food—safety, supply, access, and mental well-being. Populations such as young people, adults of working age and non-UK EU nationals were also prioritised due to the potential negative impact of Brexit on them. An example of the completed list of prioritised determinants is contained in Table 1.

Evidence

A literature review was undertaken using high quality databases (ProQuest, MEDLINE and Embase) to review the potential impact of Brexit on health and the economy. It focussed on peer-reviewed evidence alongside a review of grey literature, which focussed on impacts such as the healthcare, EU funding and the environment. Only studies included were those that focussed on the impact of Brexit across the population of Wales and the UK, published in the English language since January 2017, and had health determinant, well-being and equity outcomes. All results were screened and reviewed by two independent reviewers.

Quantitative health intelligence data were gathered and a community health profile was constructed based on the findings of the screening and scoping stages. It contained robust technical and quantitative data from 2017 and 2018 in relation to the demographics of Wales, health intelligence statistics in relation to the prevalence of health conditions in Wales (Welsh Health Survey (Stats Wales, 2020a) and levels of deprivation (Welsh Index of Multiple Deprivation) (Stats Wales, 2020b).

Semi structured qualitative interviews (n = 17) were completed involving 25 representatives from 12 organisations. Some organisations had more than one individual contribute to the interviews dependent on their field of expertise. Interviewees were selected via purposeful sampling and in total 20 organisations were approached. Interview respondents included representatives from a wide range of identified affected sectors, including the Welsh NHS Confederation, Nursing and General Practice, WG, Food Standards Agency Wales and the Local Government. The interviews aimed to identify organisations' preparedness for the UK's exit from the EU and identify which particular vulnerable groups they believed would potentially be affected alongside which social determinants could be impacted. Post an initial rapid literature review, a set of open-ended interview questions were developed to facilitate the discussion. They did not include obtaining the political views of the organisations or representatives about Brexit. The interviews were carried out in person with the exception of one, which was carried out via telephone.

In addition to the interviews, a cross-sector, multidisciplinary participatory stakeholder workshop was held on the 3 October 2018. A wide range of stakeholders were invited (n = 35) to contribute and in total 14 people attended. The purpose of the workshop was to capture any qualitative evidence and contextual knowledge from the organisations, sectors and community representatives about how Brexit could affect them. This included individuals from a range of disciplines and agencies including environmental and public health, sustainable development, healthcare services and the housing sectors. It was independently facilitated by the WHIASU leads and carried out in an interactive and transparent manner. Participants agreed to the findings being reported. A transcribed record of the workshop was completed and sent to the participants for agreement and consent. The workshop participants completed a feedback and evaluation form. No ethics approval was required for this work. The transcripts from the interviews and the workshop were integrated into the overall collated evidence to provide a rich, wide-ranging overview of the potential impact of Brexit for Wales in the near and long term.

Appraisal

During four half-day sessions, all evidence was collated, synthesised and analysed by individuals who led the HIA, gathered the health intelligence and carried out the interviews and literature review. As in usual HIA practice (Wales Health Impact Assessment Support Unit, 2012a), a robust discussion took place to make sense of all the evidence gathered. Two matrices were created as part of the key papers at the start of the process and it was these that were completed as discussions took place and gave the analysis structure. The impact considered was for the identified population groups and the prioritised determinants of health. Evidence was identified and discussed to support the characterisation of the impact, for example, duration of impact. The matrix also listed the policy pathways through which the impact would manifest itself. These were drawn up after discussions about how Brexit would impact on the population and constructed on advice of a SAG member. The team realised that it was not actually Brexit that would have the impact but that any impact would occur thorough policy pathways; for example, the curtailment of the free movement of people from the EU could have major implications for staffing in health and social care services because high levels of non-UK nationals work in these sectors. The full characterisation was summarised as described in Table 1.

Table 1. Terminology: Characterisation of impact.

Positive—impacts that improve or maintain health status
Negative—impacts that diminish health status
Confirmed—actual direct evidence in existence
Probable—more likely to happen than not, direct evidence but from limited sources
Possible—may or may not happen
Major—sufficiently great or important to be worthy of attention, noteworthy
Moderate—average in intensity quality or degree
Minimal—of a minimum amount, quantity or degree, negligible
S = Short term—less than 1 year
SM = Short to medium term—1–3 years
ML = Medium to long term—3–5 or 10 years
L = 10+ years

Reporting

The evidence, analysis and findings were written up with the SAG given opportunities to review and comment on the draft and final reports. Internally in PHW, it was reviewed by the Board and subject to quality assurance process using the WHIASU Quality Assurance review framework (Green et al., 2019b).

Monitoring and Evaluation including Review and Reflection

Monitoring and evaluation indicators were established and included, for example, tracking and collating newly published evidence in the short term and the impact on key determinants such as mental well-being in the long-term. This monitoring is still ongoing and updated approximately every six months. A review and reflection meeting was held post publication to capture any learning. It consisted of the working group and the findings have informed some of this paper.

Results

Findings of the HIA

The purpose of this paper is not to report the findings of the HIA itself, but to focus on the actual methods and process of the HIA in order to share learning and inform policy and decision makers and practitioners. To aid understanding, however, the main findings of the HIA are summarised.

The HIA identified major, direct potential impacts across the social determinants of health and well-being including for health and social care, and environmental regulations such as food safety and supply. Many of these are potentially probable, major and negative in their character. Uncertainty, the changing nature of the UK's relationship with the EU, economic downturn and changes in regulatory alignment were identified as key pathways for health impacts. Wider socioeconomic impacts included the impact on working conditions and the loss of access to EU economic and social investment funding on deprived communities. Community impacts included the potential for divisions in communities from the "remain/leave" vote and the potential for increased hate crime against non-UK EU nationals. A major indirect determinant affected by Brexit was identified as mental well-being with outcomes being potentially both positive and negative. Some opportunities were identified based on devolution and the ability for Wales to develop sustainable policies, for example, land management, environment and health policy through the WFGA.

The HIA also highlighted inequalities and impacts across vulnerable population groups, such as Welsh geographical areas receiving EU funding: farmers and farming communities, young people, older people, working age population in areas that rely on one employer and whom may be affected by an economic downturn or trade tariffs leading to mass unemployment events (Davies et al., 2019).

Future free trade agreements and trade arrangements were noted as key determinants of health and well-being. This was because future trade agreements can have a major effect on the economy, can provide favourable or non-favourable conditions for major employers in Wales, such as Airbus UK, which are also major local employers.

The assessment also identified gaps in the evidence base and recommended further research in those areas; this included the impact of Brexit on mental well-being (particularly in relation to some population groups such as young people or farmers and farming communities). A set of recommendations proposed for action were completed and included, for example, the need to utilise the HIA as a joint organisational framework to coordinate, develop and track actions, monitoring the identified impacts and that actions and policies should

be prioritized so that the impacts on population groups are addressed in order to mitigate for potential increased inequalities.

Reporting, Review and Reflection (Including Monitoring and Evaluation)

The HIA was published in Welsh and English, and consisted of an Executive Summary providing an overview of the HIA and key findings, a Main Report providing an appraisal and analysis of the evidence, recommendations and future actions that could be implemented, and a Technical Report in two parts that provided a comprehensive overview of the HIA methodology, all the evidence, the tools and checklists used in the HIA and the matrices detailing the evidence of impact across the population groups and the determinants of health and well-being (Green et al., 2019a). All the evidence was openly published and supports principles of HIA such as the ethical use of evidence and transparency (Quigley et al., 2006).

A “review and reflection” meeting was held by the working group in March 2019 to discuss key questions such as how the HIA influenced decision makers and how its recommendations were actioned. The overall review, reflection and monitoring of the Brexit HIA will be a multistage process over time, taking into account short- to long-term impacts and any outcomes. To date, the HIA has had an impact in Wales with research funding coming onstream for PHW to carry out research on the impact of Brexit on farmers and young people (Davies et al., 2019), and to organize a symposium on “trade and health and well-being” that was held in November 2019 (Wales Health Impact Assessment Support Unit, 2019). Many of the recommendations have been actioned in the 18 months post publication; for example, a high level cross-organisational strategic workshop was held by PHW and WG in August 2019 to discuss the immediate actions needed to influence future policies, strategies and plans to maximise the long-term positive opportunities for Wales that will emerge from Brexit. Many stakeholders took away actions to implement and conversations to be followed up by using the Brexit HIA as a lens. It has been very positively received politically. In the Senedd (Welsh Parliament) debate on Brexit in January 2019, Vaughan Gethin, the Welsh Health Minister, praised the HIA and its usefulness to WG (Welsh Government, 2017). This was due to the distinct lens it applies and because it provides robust evidence for national and local decision makers and planners to plan for and respond to Brexit at a time when little robust evidence-based information was available.

Discussion

The HIA outlined in this paper examined the potential impact of Brexit on the population of Wales and future health and well-being outcomes across key determinants. It identified the potential positive or negative impacts of Brexit in relation to these and highlighted the potential inequalities that could arise from Brexit across the population in Wales. It appraised a wide range of evidence and provided information and recommendations to support policy decisions and future actions to address the impact made by PHW and key strategic partners such as the WG. In addition, it demonstrated the implementation of HiAP in practice by considering harms to health, informing decisions and working collaboratively with key stakeholders and sectors.

The Brexit HIA has helped to clarify and progress both HIA and HiAP in Wales. The WG strongly supports HiAP using HIA as a method by which to improve health and health outcomes and address inequalities. In 2017, the WG passed a public health act (Frankish et al., 2001) that legislates for HIA to be carried out by public bodies in specific circumstances. This HIA reinforced the importance of the HIA process to WG and has demonstrated the value and benefits of HIA to a wide range of senior leaders and planners in a broad range

of public bodies in Wales, and has been informative at a time when there was little robust information forthcoming about the impact of Brexit in relation to wider public health and healthcare services.

The evidence produced by this HIA changed many people's perspectives on HiAP and HIA and created more advocates for the process from one of theory to actual practice through its analysis of evidence and usefulness to them. The creation of strategic advocates or "champions" is stressed as an important and essential driver for health and equity (Green, 2017; Haigh et al., 2015; Petchey et al., 2019). It has promoted the continued support of HIA at a senior strategic level through advocacy and support for HIAs to seeing the actual benefits of the method in reality. This is clearly demonstrated in PHW with the commissioning of an HIA on climate change in Wales (forthcoming 2023) but also a series of HIAs in response to the COVID-19 response policies such as "lockdown" and any changes that may arise from it (Green et al., 2020). The concept of HIA as an important tool to inform and support decisions, guide the development of organisational planning for complex strategic priorities and to act on the information and recommendations; i.e., the HIA highlighted areas for future action, strengthening opportunities to be explored or research that has subsequently been carried out (Davies et al., 2019). Its importance and value to decision makers has led to follow-up work, including the publication of a short rapid review and update report at the six-month point (Petchey et al., 2019).

It has also promoted practice-based professional learning, which is essential to develop skills and knowledge, and is required as part of membership in professional bodies (Chartered Institute of Environmental Health, n.d.; Faculty of Public Health, n.d.). Key findings from the reflection meeting were that the experience of the leads (HIA experts) and team (policy researcher and public health practitioners) was invaluable. The team all knew their roles and communication was very good between them. For team members new to HIA, it provided them with a better understanding the method, its component parts, evidence and data needed, and how it can be helpful for organisations, for example, by including recommendations for mitigation to address the identified negative impacts. It also demonstrates how HIA can be utilised to implement HiAP in practice as it achieved its aim of identifying the potential impact of Brexit in Wales over the short to long term on key determinants and the populations affected, thereby informing integrated action through collaboration with stakeholders and mitigation for any negative impacts.

This HIA of Brexit in Wales was unique in approach, differing from standard HIA practice that tends to focus on one single policy area or proposal. HIA is frequently described as an iterative process (Parry and Stevens, 2001; Wales Health Impact Assessment Support Unit, 2012a) but is often depicted in figures and guidance with a clearly linear process flowchart to describe the order and steps to take (Centers for Disease Control and Prevention, n.d.; Kemm, 2012; Pew Trust, n.d.). However, by its very nature Brexit encompasses many policy areas, complex international relations and uncertainty. As a result, the Brexit HIA was scoped alongside screening due to the need to reflect on and guide discussions about the resources needed, and to ensure the report would provide timely information for decision makers. It was also used as a method to quickly identify and inform the leads about the stakeholders to involve in the process. The scope of this HIA was tight in approach due to factors such as the deadline for withdrawal and the potential breadth of the types of Brexit that could occur (for example, "soft" Brexit). This HIA tested the HIA methods and proven the flexible and adaptable nature of the process. The multidisciplinary, cross-sector SAG and working group were both valuable within the scoping stage of the HIA due to their expertise, their ability to prioritise impact and their input into the construction of policy pathways.

In HIAs, the last stage is commonly listed as monitoring and evaluation. However, in practice, it is rarely carried out (Kemm, 2012; Linzalone et al., 2018; Mindell et al., 2003) or if it is, it is contained within the health components of many Environmental Impact Assessments (EIA) and their health management and monitoring plans (Linzalone et al., 2018), which tend to monitor indicators for biophysical health or health services. In Wales, many participatory HIAs are routinely process evaluated (Wales Health Impact

Assessment Support Unit, 2016, 2014, 2012b), but this Brexit HIA gave the leads the opportunity to ensure that a strong review, including monitoring and evaluation indicators, of both the process and its impact could take place. The Brexit HIA identified a number of indicators to monitor, i.e., mental well-being and questions in the Welsh Health Survey (Stats Wales, 2020a) such as "how positive do you feel about the future?" in relation to supporting the monitoring of the HIA.

The terminology used to describe the final stage of an HIA, previously referred to in Wales as "monitoring and evaluation" (Wales Health Impact Assessment Support Unit, 2012a), has evolved over recent years in Wales to become "review and reflection" (which includes monitoring and evaluation) as this, in our experience, is perceived by stakeholders to be a more achievable action and less complicated than amassing and extracting indicators and future data, which can be time consuming or may be unavailable. By changing the terminology of stage 5 of the process, it may make it seem less onerous and challenging and an easy step to add at the end of the HIA when closing it, particularly when a resource-light, rapid and smaller HIA has taken place.

Challenges/Limitations of the Work

The HIA focussed on the major direct and indirect impacts only due to the scale and complicated nature of Brexit. It must be acknowledged however, that other impacts may not have been identified due to the lack of robust evidence available at that time. Indeed, new impacts came forth in the follow-up rapid review and update HIA report, such as NHS governance and waste management (Petchey et al., 2019).

The HIA faced time constraints, as there was an agreed withdrawal date and deadline that needed information to inform planning, which was well before it happened and against a dynamic political landscape. This was exacerbated by the fact that the UK withdrawal from the EU was an unprecedented situation and the UK government's negotiating position continued to remain uncertain. Thus, there was, and remains, little evidence on the exact implications of any scenario in relation to withdrawal. The withdrawal date also meant that the team had to carry out a comprehensive and robust assessment of a contentious and time-sensitive policy in a very short time; along with capacity and resourcing, timing and time constraints which are noted as potential key challenges in carrying out HIAs (Dannenberg, 2016; Elliott and Francis, 2005). The complexity of an HIA such as this highlighted the number of "hidden" additional hours involved in this dynamic HIA.

In addition, there was also no actual evidence of impact of Brexit because the UK had not yet withdrawn from the EU, and there was no previous work with respect to the public health implications, apart from a health technology assessment and health systems impact analysis (Fahy et al., 2017). Brexit had no comparable previous examples and there were no robust systematic reviews or experiences to draw upon to help inform decision-making and policy makers. Published evidence such as grey literature and opinion pieces are all highly contested and this was a challenge. As a result, editorials by single authors were excluded from the literature review. The evidence was weighted with peer-reviewed journals identified as part of the literature review given most strength. This was used as a platform on which to build the HIA appraisal, together with other identified strong evidence. Welsh population data and health statistics stood alongside this and were used to articulate whether a potential impact is relevant for Wales, and the likelihood of the size and susceptibility of the population in the absence of hard empirical evidence. For example, there are a number of major ports in Wales, making implications for that infrastructure from Brexit extremely likely. However, they could be of lower relevance and significance to other areas of the UK. Stakeholder evidence from interviews and the HIA workshop provided contextual knowledge only unless there was strong evidence derived from the literature to support it. For example, mental well-being was

highlighted as a key determinant of health by the participants at the workshop and in interviews. There is evidence to support the mental well-being implications of pathways such as economic downturns (Allen et al., 2014), but the HIA did not actually identify any published qualitative research or health intelligence data analysis in relation to population mental health and well-being and Brexit.

Finally, constant political changes and shifts meant that the team had to react rapidly to these as they happened in real time and review the details to ascertain if the contents or context could change the contents of the HIA and the analysis constructed around the evidence. For example, Prime Minister Theresa May announced an agreement for withdrawal from the EU in early December 2018 (Institute for Government, 2019); the team had to review all the impact analyses to clarify if this may have changed any classification of impact or not.

Conclusions

This HIA demonstrates continued leadership by Wales in the field of impact assessment and “health in all policies” and has demonstrated how HiAP can be practically implemented in our context. The work has been positively received. It created and solidified many high-level strategic advocates for HIA and HiAP across a wide range of national and local stakeholders. Forthcoming are HIAs responding to the COVID-19 pandemic and another on climate change in Wales.

It has transferable learnings and knowledge obtained from practice, which can be used by many nation states and devolved regions. Health policy leads, grappling with complex novel policies and needing a lens to think these through. It has demonstrated the “added value” of HIA to inform action in assessing policies, plans and projects at all levels, but particularly those in relation to dynamic and unknown significant events.

Finally, the Brexit HIA achieved its aim of identifying the potential positive and negative impact of the UK withdrawal and for whom, and provided a set of realistic, strategic and practical recommendations and actions (such as future research) that could be followed by decision makers and planners in an ever-changing political climate. Others could replicate this approach in a tangible way to do the same.

Appendix

Table 1: Example of summary screening paper—list of prioritised determinants of health to be investigated further.

Priority Determinants of Health	Potential Impact on Health	Potential Impact of Brexit	Comments/Rationale
Health and Social Care			
Medicines and medical devices—regulation and licensing	Yes	Negative	Medicines and Healthcare Regulatory Agency (MHRA) currently works with the European Medicines Agency (which is moving to Amsterdam)—post-Brexit position still unclear.
Medical and professional qualifications	Yes	Negative	United Kingdom Government (UKG) proposing to continue with existing arrangements but subject to agreement by European Union (EU).
Staffing and recruitment	Yes	Negative	British Medical Association (BMA) survey has shown that 45% of EU doctors considering leaving UK. Royal College of Nursing (RCN) and others have expressed concern about recruitment of nurses.
Research and development	Yes	Negative	UKG plans to discuss temporary mobility of scientists and researchers subject to agreement by EU. Access to EU networks may be reduced.
Working hours and conditions	Yes	Negative	UKG assurances on long-term continuation of existing workers' rights under EU law questioned by RCN and others.
Reciprocal healthcare	Yes	Negative	UKG proposals for continuation of reciprocal healthcare for United Kingdom pensioners, the European Health Insurance Card (EHIC) scheme and cooperation on planned medical treatment subject to agreement by EU. Position on other types of reciprocal healthcare unclear.
Fitness to practise	Yes	Negative	UKG position on continuation of participation in EU Internal Market Information (IMI) alert system that records cases of professionals unfit to practise unclear.

Health protection and security	Yes	Negative	UKG proposals for ongoing work with key EU agencies on health security to enable information sharing and access to key datasets subject to agreement with EU.
Rare diseases	Yes	Negative	As above.
Patient care and services	Yes	Negative	Subject to staffing and recruitment and other issues.
Pandemics and infectious diseases	Yes	Negative	See Health protection and security.
Clinical trials	Yes	Negative	UKG proposals for continued participation in EU wide clinical trials subject to agreement with EU.
Life sciences	Yes	Negative	UKG proposals for continuation of existing or similar arrangements subject to agreement with EU.
Medical students	Yes	Negative and Positive	Potential vacancies created by fall in EU students may lead to increased opportunities for UK students.
Health promotion	Yes	Negative	UKG position unclear but Welsh National Health Service (NHS) Confederation calling for highest possible level of coordination on health promotion.
Behaviours affecting health			
Food and diet	Yes	Negative	UKG proposing common framework with EU but subject to agreement with EU. Implications of Trade Agreements, i.e., regulations and labelling.
Alcohol, cigarettes, nonprescribed drugs	Yes	Negative	Continuation of EU cross-border approach to antismoking measures through the Tobacco Products Directive (TPD) unclear. Implications of Trade Agreements, i.e., regulations and labelling.
Mental well-being including: sense of control, resilience and participation	Yes	Negative and Positive	Likely to dependent on population profile and attitudes/belief. Indirect impact of potential economic downturns post exit.

Social and community influences			
Family organisations and roles	Yes	Negative and Positive	Likely to depend on population profile and attitudes/belief. Impact of changes to immigration rules—impact on non-UK EU nationals who live and work in Wales.
Citizen power and influence/social isolation/community networks/racism/hate crime	Yes	Negative and Positive	Likely to depend on population profile and attitudes/belief.
Living and Environmental factors			
Built environment	Yes	Negative	A significant portion (>90%) of environmental legislation currently derives from EU law, giving rise to uncertainty in the short term.
Housing	Yes	Negative and Positive	Stock may increase if EU and other non-UK nationals leave but house prices may fall subject to market conditions.
Noise/air quality/waste/community safety	Yes	Negative and Positive	A significant portion of environmental legislation currently derives from EU law, giving rise to uncertainty in the short term, although the majority of environmental legislation is devolved.
Economic Factors			
Workplace and working conditions	Yes	Negative	The majority of health and safety legislation derives from EU law, giving rise to uncertainty.
Economic inactivity/income/employment	Yes	Uncertain	Dependent on market conditions/future trade agreements.
Skills	Yes	Negative and Positive	Expected short-term shortages may lead to increased opportunities for UK nationals to gain skills in longer term.
EU Funding	Yes	Negative	UKG has guaranteed funding for EU projects agreed before Brexit, but it is likely the majority of EU funding will disappear.

Access and quality of services			
Careers advice	Yes	Unclear	Will likely depend on economic conditions.
Other caring services	Yes	Negative and Positive	Short-term shortages may mean increased opportunities for employment for UK nationals in the longer term.
Shops and commercial services	Yes	Negative and Positive	Potential price rises and reduction in choice may led to closures, but opportunities may arise to create new businesses.
Public amenities/services	Yes	Negative	Will likely depend on economic conditions.
Education and training	Yes	Negative and Positive	Reduction in EU students may lead to increased opportunities for UK students.
Information Technology	Yes	Negative	UK proposals on a data protection agreement subject to agreement by the EU.
Macro-economic, sustainability and governmental factors			
Gross Domestic Product	Yes	Uncertain	May increase or decrease, depending on market conditions.
Government policies	Yes	Negative and Positive	Following transition from EU to UK law, policy impacts may be mixed.
Economic Development	Yes	Uncertain	May increase or decrease, depending on market conditions.

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Chapter 6: Using Health Impact Assessment (HIA) to understand the wider health and well-being implications of policy decisions: The COVID-19 'Staying at Home and Social Distancing Policy' in Wales.

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Abstract

Background: Health Impact Assessment (HIA) is promoted as a decision-informing tool by public health and governmental agencies. HIA is beneficial when carried out as part of policy development but is also valuable as a methodology when a policy is being implemented to identify and understand the wider health and well-being impacts of policy decisions, particularly when a decision needs to be taken rapidly to protect the population. This paper focusses on a HIA of the 'Staying at Home and Social Distancing Policy' or 'lockdown' in response to the COVID-19 pandemic in Wales conducted by the Welsh national public health institute. It describes the process and findings, captures the learning and discusses how the process has been used to better understand the wider health and well-being impacts of policy decisions beyond direct health harm. It also examines the role of public health institutes in promoting and using HIA.

Methods: A HIA was conducted following a standard HIA five step process. A literature review was undertaken alongside 15 qualitative semi-structured interviews with key stakeholders, and relevant health and demographic data were collated. The results were triangulated and analysed to form a holistic assessment of the policy decision and its impacts.

Results: A wide range of major health and well-being impacts of the lockdown in Wales were identified across the determinants of health, which included positive and negative social, economic, environmental and mental well-being impacts beyond the impact on direct health. Populations affected included children and young people, those on low incomes and women as well as those whose health has been directly impacted by COVID-19 such as older people. The work highlighted the benefit that HIA can bring in emphasizing impacts which can inform policy and shared learning with others.

Conclusion: HIA is a largely underused tool to understand the impact of policy and political decisions, particularly when a decision has been taken at speed. This case study highlights how HIA provide evidence and information for advocacy and further work by public health institutes, health agencies and policy makers.

Keywords: Health impact assessment, COVID-19, Lockdown, Wales, Health and well-being, Public health

Background

Policy decisions made internally or externally to the health sector can have a significant impact on individual and population health and well-being (Bekker et al., 2004; The Sycamore Institute, 2017; World Health Organization, 2013). These impacts can occur directly or indirectly via the pathways of the social determinants of health (SDOH) (Dahlgren and Whitehead, 2007) which relate to wider social, economic and environmental factors that have an impact outside of the health system (Centers for Disease Control and Prevention, 2010; Marmot, 2010; Marmot et al., 2020). This includes for example, transport policies that can enable or inhibit active travel and physical activity, but can also have an impact on air quality and respiratory conditions (Dora, 1999; Galea et al., 2011; Woodcock et al., 2013). Globally, national policy makers and politicians have a responsibility to protect the health and well-being of populations (Legis Quebec, 2020; Welsh Government, 2017, 2020a). However, the potential wider health and well-being impacts are not specifically and routinely taken into consideration when making policy decisions (Davenport et al., 2006; Harris-Roxas et al., 2012; O'Mullane, 2013; Winkler et al., 2013), except for a few examples in which health and well-being is required in legislation to be considered as part of wider policy making (Phoolcharoen et al., 2003; Welsh Government, 2017, 2015).

Health Impact Assessment (HIA) is promoted as a decision-informing tool (Birley, 2011; Kemm, 2012; World Health Organization, 2021) which can support the development and implementation of policy decisions by identifying a broad and holistic health impact across the determinants of physical, social, environmental and mental health and well-being (Davenport et al., 2006; World Health Organization, 2021). HIA is a method which can be applied to systematically and flexibly to appraise a policy, plan or project or intervention (European Centre for Health Policy, 1999; Wales Health Impact Assessment Support Unit, 2012), acknowledged as a cornerstone of Healthy Public Policy-making (Department of Health, 2015) and includes the concept of 'Health in All Policies' (HiAP) (World Health Organization, 2013). This is an approach that seeks synergies between sectors, avoids harms to health and promotes equity (Birley, 2011; World Health Organization, 2013). It is not the only form of impact assessment (IA) which can be carried out on policies, for example Social Impact Assessment (Vanclay, 2003), Mental Well-being Impact Assessment (National Mental Health Development Unit, 2010; Public Health Network Cymru, 2021) and Strategic Environmental Assessment (United Nations Economic Commission for Europe, 2015) can all be utilised either legally or voluntarily. These all allow input from a wide range of stakeholders including the health sector, but the primary focus is on a particular area for example, mental health and well-being (National Mental Health Development Unit, 2010) or a or specific group with protected characteristics such as sex or religion. Health can also be included and considered to varying degrees within these and it has been noted that IAs can learn from each other to better integrate health and other considerations (Cave et al., 2021b; Morgan, 2011). HIA, however, provides a specific vehicle for the explicit consideration of health and wider well-being in a cross sectoral, participative and systematic way (Green et al., 2020; Winkler et al., 2021, 2020).

HIAs can be carried out prospectively (before a decision has been taken), concurrently (as one is being implemented) or retrospectively (after it has been implemented and concluded) (Birley, 2011; World Health Organization, 2013). It is advocated as a tool which is utilised most effectively prospectively in order to inform decision makers about the potential future anticipated positive or negative impacts that a policy decision can have, and identifies who may be affected by that decision (Dannenberg, 2016; European Observatory on Health Systems and Policies, 2007; Haigh et al., 2015). The prospective approach is widely supported in the literature (Fleeman and Scott-Samuel, 2000; Gaber and Overacker, 2012; Joffe and Mindell, 2005; Kögel et al., 2020; National Research Council (US) Committee on Health Impact Assessment, 2011; World Health Organization, 2010) with little being published about concurrent or retrospective HIAs which are less frequently carried out (Kemm, 2008). However, a recently published best practice principles suggest that these descriptions along with terminology such as rapid, intermediate and comprehensive should be

dispensed with as they can cause confusion and be misleading amongst decision makers (Winkler et al., 2021).

Whilst some papers discuss the effect of HIA in general on policy decision-making processes (Dannenberg, 2016; Haigh et al., 2015), there is sparse literature internationally which discusses how HIAs can be utilised or practically applied to better understand the wide-ranging consequences of a policy decision once it has been agreed and is being, or has been, implemented (Kemmm, 2008). This is an interesting missing component of HIA practice particularly where examples of unique or emergency events such as the COVID-19 pandemic would benefit from a HIA being carried out as it unfolds (or after the event has occurred) in order to learn from, and inform, future decision-making processes. Some authors discuss the effectiveness of HIA in different sectors or have evaluated HIA effectiveness which are based on case studies (Dannenberg, 2016; Haigh et al., 2015) and these detail the enablers such as the flexible process, stakeholder engagement and the learning which can be captured when carrying out a HIA whilst time and resources could be a challenge.

It has also been noted in other IA literature for example, in relation to disaster management planning that there is little research on this topic and that using IA in order to prepare for, and recover from, disaster or emergency events would be advantageous (Tajima et al., 2014). Furthermore, others have highlighted that the failure of some cities across the world to prepare for an unexpected event such as COVID-19 through an equity lens resulted in negative health impacts for many population groups (Cave et al., 2021a). Therefore carrying out an health and equity focused impact assessment such as HIA can be beneficial as it can ensure that evidence can be gathered, synthesized and published to systematically support future policy and decision-making, raise awareness of potential health and well-being implications (particularly when outside of the health care sector) and ensure mitigation is in place to address inequalities that may arise (Cole and Fielding, 2007; Winkler et al., 2013). Health agencies such as national and regional Public Health Institutes (PHIs), have a critical role in supporting this activity. For the purpose of this paper, a PHI is defined as ‘a government agency, or closely networked group of agencies, that provides science-based leadership, expertise, and coordination for a country’s or region’s public health activities.’ (International Association of National Public Health Institutes, 2009). These agencies deliver essential public health functions including gathering health intelligence, support health protection and promote health and well-being (Bloland et al., 2012; The International Association of National Public Health Institutes, 2020; Verrecchia et al., 2019). These elements are also key components of HIA practice which identifies positive impacts for health promotion, and negative impacts which need to be mitigated for to protect health (Joffe and Mindell, 2005; Mindell et al., 2004; Wales Health Impact Assessment Support Unit, 2012). As such PHIs can be an important advocate and natural host for HIA activity with a focus on evidence based health equity (Green et al., 2020). To date, little has been researched and published to illustrate the role of PHIs in using HIA to promote and enable a preventive, Health in All Policies approach to inform decision-making, beyond their role in capacity building or advocacy for HIA (European Observatory on Health Systems and Policies, 2007; Verrecchia et al., 2019).

Wales is one of four United Kingdom nations and Welsh Government is devolved and therefore can make its own laws across a breadth of areas for example, health and social care and spatial planning (UK Government, 2013). Wales provides an unusual context for HIA with a dedicated Health Impact Assessment Support Unit (WHIASU) based in the World Health Organization (WHO) Collaborating Centre on Investment for Health and Well-being Directorate at Public Health Wales, the national public health institute, legislation to maximise well-being (Welsh Government, 2015) and a public health law which requires HIAs to be carried out by public bodies such as Welsh Government, Public Health Wales, local Health Boards and local authorities in specific circumstances. This includes a consideration of major policies or plans such as planning policies (Welsh Government, 2017). WHIASU provides HIA advice, guidance and training and occasionally carries out HIAs which identify any health impact of important policies or events and shares learning with

others. This has been highlighted as a positive factor in HIA capacity building (Harris-Roxas and Harris, 2007; Rogerson et al., 2020).

In April 2020, Public Health Wales carried out a HIA of the 'The Health Protection (Coronavirus) (Wales) Regulations 2020' (UK Government, 2020) - commonly referred to as the 'Staying at Home and Social Distancing' policy (SAH Policy) in Wales due to the associated published guidance for the Welsh restrictions (Welsh Government, 2020a). HIA methodology was chosen by the PHI for several reasons. HIA has a specific evidence-based focus on identifying the cross sectoral health and well-being impacts and population groups who would be affected by the novel national policy, which had been drafted and implemented as speed. At that time, there was little or no evidence of how a worldwide modern pandemic would impact wider health and well-being and it has been highlighted that whilst there is now a wide range of evidence of the health and wider effects in Wales and across the world (Aughterson et al., 2021; Economics Observatory, 2021; Groarke et al., 2020; Jacob et al., 2021). It would provide statistical and qualitative evidence to inform future action and this would be enhanced by internal and external engagement with key stakeholders such as the Welsh Local Government Association, the Children's Commissioner for Wales, Healthy Working Wales teams. Other factors included the expertise of WHIASU (Rogerson et al., 2020) and the positive experience and influence of carrying out a previous HIA on the United Kingdom withdrawal from the European Union ('Brexit') (Green et al., 2020). Additionally, it would demonstrate leadership for HIA and HiAP by voluntarily carrying out HIA in advance of the enactment of Welsh Government legislation for HIA (Welsh Government, 2017). The work complemented and supported the organisational acute health protection response to control the transmission of the virus (Public Health Wales, 2020a; Welsh Government, 2020a) and existing work with government and local health boards. Furthermore, it enabled PHW, Welsh Government and other key stakeholders to ensure that any harms caused by 'lockdown' could be mitigated for, or considered along with positive impacts and opportunities, in future decisions during and post the pandemic. The HIA provided Wales with specific evidence to support targeted policy making and interventions during the pandemic recovery and renewal phases. The majority of the authors are employed by, or work with the national public health institute and carried out the HIA discussed in this paper.

The purpose of this paper is to add to the evidence base which policy and decision-makers and the HIA community can draw upon and utilise in the future to inform, promote or carry out similar HIAs. It aims to demonstrate how HIA can be implemented in practice to examine and better understand the impact of a rapid policy decision on health and well-being once it has been taken and has been, or is being, implemented. Using the example of 'the 'Staying at Home and Social Distancing' policy (SAH Policy) in Wales which were implemented in response to the COVID-19 pandemic, this paper highlights how HIA has enabled health sector bodies for example, health boards and wider 'non-health' sector stakeholders, for example, local government with wide ranging responsibilities including spatial planning, economic development, transport and environment to understand the wider impact of the pandemic. It articulates how the policy has impacted the social determinants of health, well-being and inequalities in Wales and captures transferable learning from it to inform and support public health practitioners, decision and policy-makers nationally and globally. In addition, it raises awareness about the role of PHIs with respect to HIA and how they can use the HIA process to understand and explicitly communicate the wider societal harms and benefits, both inside and outside of the health care sector, to advocate for healthier populations and fairer societies.

Methods

In 2020, Public Health Wales, undertook a HIA of the SAH Policy in Wales in response to the COVID-19 pandemic otherwise referred to as 'lockdown'. It was carried out in real time whilst lockdown measures were in place. To date it is the only HIA of such a COVID-19 related measure with only one other screening example (Douglas et al., 2020). The lockdown measures implemented in Wales on the 24th March 2020 included a

requirement to stay at home at all times except for a few exceptions, to work from home if you can and to ensure that social distancing from people not in your household was at least two metres at all times (Table 1) (UK Government, 2020).

Table 1: An overview of The Health Protection (Coronavirus) (Wales) Regulations 2020' implemented in Wales on 24th March 2020 (UK Government, 2020)

The regulations:
<ul style="list-style-type: none"> provided Welsh Ministers, registered public health officials and police constables the right to detain people contaminated or infected with coronavirus. required some business premises to close (those classed as non-essential such as leisure and hospitality) and required those allowed to remain open (those classed as essential, such as food retailers and supermarkets), to put specific measures in place to ensure adequate social distancing. restricted individuals movements so that they were prohibited to leave the place they were living without a 'reasonable excuse'. The regulations included examples of a 'reasonable excuse' for example, shopping for food, taking physical exercise once a day, obtaining medical assistance and travelling to a place of work where it was 'not reasonable and practicable to work from home'. closed places of worship, apart from in limited circumstances such as in relation to funerals. required Natural Resources Wales (the environment agency for Wales), local authorities, National Park Authorities and the National Trust to close public footpaths and access land, where the use of a path or land posed a high risk of spreading coronavirus. changed elements of planning restrictions. The UK Government also made regulations and changes in non-devolved areas, for example, for statutory sick pay, Universal Credit and other welfare benefit claims. Welsh Parliament also approved other health related legislation including some changes for example, to the regulations for Mental Health Tribunals, amended rules for social care standards. Although there was coordination in health policy across the UK in respect to addressing the pandemic (and the Chief Medical Officers worked closely to develop a shared evidence base for the four national governments), Welsh policy diverged in places from that of England. Welsh Government policy included secondary legislation, for example, closing all caravan parks in Wales to reduce people travelling to these in order to isolate or 'lockdown'.

The HIA assessed the impact of this policy across a wide range of determinants of health and identified those population groups who may have been disproportionately affected by lockdown in Wales. It did not assess the direct physical health impact of COVID-19 in relation to transmission rates, morbidity and mortality, but viewed the pandemic through a broader social determinants and inequalities lens (Dahlgren and Whitehead, 1991). It aimed to capture the wider potential or actual harms or benefits and unintended consequences which such lockdowns can have.

This HIA followed a standard five-step evidence based process (Birley, 2011; Wales Health Impact Assessment Support Unit, 2012), which is depicted in Table 2. An additional supplementary table show this in more detail (see Additional Table 1).

Table 2: The HIA Process

HIA Step	Actions	
Screening	The wide ranging populations and determinants affected were identified and a Steering Group was established.	
Scoping	The scope of the HIA was defined with a clear focus on Wales. Methods decided upon were a literature review, collation of health intelligence data and interviews with key stakeholders.	
3a. Appraisal – Evidence Gathering	Literature Review	Carry out literature review and synthesise into summary to identify relevant qualitative and quantitative evidence and statistics
	Collate Community Health Profile	Use the scoping and screening checklists as a guide to gather data to identify relevant health intelligence and demographic, economic, environmental and social data / statistics. This includes gathering data in relation to population groups affected and determinants of health identified to be synthesised into a summary for the final report.
	Stakeholder evidence	15 stakeholders identified as part of the Scoping Process were interviewed to identify key information, knowledge and evidence.
3b. Appraisal of Evidence	The evidence was assessed and characterised to identify the positive and negative impacts and form a picture of the scale, scope and duration of these. This informed recommendations and conclusion.	
4. Reporting and Recommendations	The final HIA report was drafted and finalised by Steering Group and published.	
5. Review, reflection and Monitoring	A review and evaluation of the process of carrying out the HIA is currently being undertaken.	

Screening and scoping

A Working Group was formed the first week of the lock- down in Wales, with the aim of identifying the potential impacts of the SAH policy. It did this via the social determinants framework (Dahlgren and Whitehead, 1991) and assessed the effect it would have across vulnerable groups in Wales for example older people, children and young people, those who have caring responsibilities and lone parents. A three-hour virtual interactive session was held utilising two validated screening checklists promoted as part of standard procedure in the Welsh HIA guidance (Wales Health Impact Assessment Support Unit, 2012). One checklist was for population groups, for example, older people, sex / gender groups, those who have long term health conditions; and one for the determinants of health, for example, behavioural (diet/nutrition, levels of physical activity), air quality, noise, access to health care services and public transportation, food and fuel poverty (Wales Health Impact Assessment Support Unit, 2012). Links to these are contained in Additional Table 1. The discussion was transcribed and provided direction for a literature review and the health intelligence to be collected and explored for example, population demographics for older people, statistics around numbers of key workers in Wales, and the key stakeholder groups who needed to be

interviewed such as the Older People's Commissioner and the Children's Commissioner in Wales (Older People's Commissioner for Wales, 2020).

A scoping checklist (link in Additional Table [1](#)) was constructed at the same time for the HIA to define the type of HIA to be undertaken (for example the use of mixed method evidence collection) and stakeholder engagement measures. The timeframes for the HIA were extremely narrow as although the HIA would identify the impacts of the policy decision, it could also provide useful evidence and information to inform policy responses to anticipated future pandemic waves.

Appraisal

A wide range of evidence was gathered. A community health and demographic profile was constructed using data from sources such as the Wales Health Survey (Stats Wales, 2020a) and the Welsh Index of Multiple Deprivation (Stats Wales, 2020b). This included demographic statistics such as levels of community deprivation, numbers of older people, those with caring responsibilities, children and young people and related social, physical and mental well-being levels in Wales. It also captured health intelligence around levels of mortality and morbidity for conditions such as obesity and respiratory illnesses (which are risk factors for COVID-19) and data around digital use in Wales and intersected these with the population groups. This was captured via health intelligence and other databases in Wales for example, the Welsh Index of Multiple Deprivation (links and examples are contained in Additional Table [1](#)).

A literature review of both academic and grey literature was carried out using the search terms; social and physical distancing; quarantine, social or wider determinants of health, inequalities, outbreaks and pandemics and Wales. Academic databases searched included HMIC, Medline and PsycInfo. Criteria for the review included papers that had been published in the last 15 years in the English language. In total, 49 papers were included in the review. Most of the papers identified focussed on previous outbreaks such as Severe Acute Respiratory Syndrome (SARS) or Middle East Respiratory Syndrome (MERS), on the impact of quarantine and isolation in response to an outbreak and psychosocial impact.

In total, 15 key stakeholder representatives were approached to participate in semi-structured interviews. Nine stakeholders were interviewed, four provided written responses and two declined with no reason being provided. Stakeholders were drawn from a range of sectors, disciplines and population groups including from environmental and public health, housing, criminal justice, third sector organisations, employer and employee groups and older and young people representatives. Semi-structured interview schedules included questions on whether organisations had a programme of work in relation to COVID-19 and the SAH policy; what were the key issues their organisation and their service users were facing; had any positives been noted; and which population groups and health outcomes were impacted. Interviewees were also asked to provide any relevant published evidence and data which could inform the HIA. The responses were transcribed, assigned a number and returned to the interviewee to be validated and / or amended. The responses were then locked in a PDF and stored on a password protected drive. Further detail on questions included can be found in the published HIA report (Green et al, 2020).

The quantitative and qualitative data and evidence was triangulated and synthesised. Peer reviewed academic publications and health intelligence were weighted with more significance, followed by grey literature and stakeholder feedback obtained via the interviews. The evidence was then analysed and viewed through the lens of the two standard validated checklists used for the Screening session (Wales Health Impact Assessment Support Unit, 2012) and characterised for impact. The impacts were classified as follows – major, moderate, minimal; short, medium and long term; positive or negative; and confirmed, probable and possible. The definitions of these are provided in Table [3](#).

Table 3: Characterisation of Impact – Staying at Home and Social Distancing HIA

Impact type:	
Positive	Impacts that are considered to improve health status or provide an opportunity to do so.
Negative	Impacts that are considered to diminish health status.
Significance/intensity:	
Minimal	Of a minimum amount, quantity or degree, negligible.
Moderate	Average in intensity, quality or degree.
Major	Significant in intensity, quality or extent. Significant or important enough to be worthy of attention, noteworthy.
Duration/timeframe	
Short term	Impact seen in 0 – 1 year.
Medium term	Impact seen in 1 – 5 years.
Long term	Impact seen in over 5 years.
Likelihood:	
Possible	May or may not happen. Plausible, but with limited evidence to support.
Probable	More likely to happen than not. Direct evidence but from limited sources.
Confirmed	Strong direct evidence e.g. from a wide range of sources that an impact has already happened or will happen.

A thematic analysis was completed by the HIA lead which was discussed with, validated and agreed by the Working Group. The appraisal identified the key determinants of health that the policy would impact and the populations who would be susceptible to the impact of the SAH policy. Once completed, the HIA draft report was quality assured through several rounds of external and internal feedback from multidisciplinary public health specialists and those who were interviewed. Amendments were made to the report based on the comments received.

Reporting

The HIA findings were presented through a report that contained the findings, recommendations, methodology, evidence, data and checklists used as part of the assessment (Green et al, 2020). The impacts were collated into report sections which mirrored key Welsh Government policy areas so that the impacts could be viewed at speed by the relevant decision and policy makers in a variety of sectors. The policy areas included: health and social care; business, the economy and innovation; education, children and young people and equality and justice. The report was designed interactively with clickable links throughout the document so that all sections of the report could be accessed and read quickly and easily by policy and decision makers from all sectors. It was published on the Public Health Wales and WHIASU websites and disseminated widely via a number of relevant networks. Links to this are contained in Additional Table [1](#).

Review, reflection and monitoring

A 'Review and Reflection' meeting was held 8 weeks post publication to allow for the team to reflect on their experiences and for any immediate impact of the report and HIA to become apparent. The key questions discussed were: what worked, what could have been improved, what had the impact been to date and what could the team do differently next time. Monitoring of the impacts of the HIA report started (short to long term) in terms of influencing cross sector policy and planning, whether the recommendations were implemented, whether learning from the HIA was used to inform further HIA work and whether evidence continued to emerge to support or contradict the findings of the HIA. For example, there was evidence published at the start of the lockdown which indicated that levels of domestic abuse were increasing under the SAH policy and this was subsequently borne out by domestic abuse organisations and police forces in Wales and the UK who reported increased calls to them (Office for National Statistics, 2020).

Results

The aim of this paper is to outline how HIA has been used to better understand the implications of a policy decision, rather than to comprehensively describe the results of the HIA. To do this, it is necessary to outline the main impacts identified and the groups who were affected by the SAH policy.

The HIA identified a breadth and depth of impacts of the policy across the plethora of determinants of health and population groups – some of which had previously been unknown or hidden. A key positive impact identified included the compliance with the legislation to reduce transmission and to prevent the NHS in Wales from exceeding capacity. Other major positive impacts included a rise in the numbers of volunteers with 27% of the Welsh population stating that they were actively volunteering during lockdown (Public Health Wales, 2020b). In addition, evidence indicated an increase in social mobilisation and cohesion (Public Health Wales, 2020b) and a positive effect on the environment as air quality improved in some areas of Wales (Public Health Wales, 2020c; Ricardo, 2020; Welsh Government, 2020b). Home working was identified as a major enabler for those who could work from home to continue to do so. In addition, it ensured that services continued to be provided to a wide range of sectors including health and social care sector and other public services. A survey carried out at the time highlighted that 44% of the Welsh working population were working from home (Public Health Wales, 2020b).

The HIA also highlighted major negative unintended impacts of the policy on the lives and livelihoods of all members of society. These included the detrimental effect on the Welsh economy due to the closure of some sectors, for example, non-essential retail, leisure and hospitality and those employed in these sectors (Welsh Government, 2020c, 2020d, 2020e). The education of children and young people was also disrupted as they were required to stay at home and be home schooled. There was a major negative impact identified for individual and societal mental health and well-being for example, individuals who worked in public and patient services and experienced fear of infection and increased pressure, stress or anxiety (Public Health Wales, 2020b); those who lived and worked on their own and who had their face-to-face connectedness to family, communities and social networks reduced (Mental Health Foundation, 2020). The uncertainty during the pandemic also affected people with many reporting increasing anxiety, loneliness and social isolation (Public Health Wales, 2020b).

Furthermore, the HIA identified a range of opportunities that could be maximised and built on in the future. The movement towards working at home was noted as opening up future opportunities for sections of the workforce to continue to work from home and this could enable them to have a better work / life balance and manage caring responsibilities (Davies et al., 2017). It provided an opportunity for employers

and employees to utilise new ways of working, increase productivity and reduce commuting time which could be better for the environment.

HIA also provides evidence about the impact of a policy decision on inequalities across the population, with some groups being disproportionately negatively affected by the policy and some benefitting. In this HIA, major negative impacts were identified for older people, babies, children and young people (0–25 years age range), key workers such as health and social care workers, those on low incomes and those with caring responsibilities including childcare. Older people and women were affected in a multi-faceted way. In total, 47% of employed women in Wales work in education, childcare, health, social care and retail sectors (Institute for Fiscal Studies, 2020). Many women particularly those with children also work in low paid, part time employment within the sectors closed down and largely provided caring responsibilities including home schooling.

The HIA explicitly demonstrated the difference between those who were at increased risk of contracting and dying from COVID-19 and the rest of the population who were, and could be, substantially affected via the wider determinants of health and increasing the inequality gap. For example, babies, children and young people are acknowledged to not be at major risk of mortality and morbidity but the HIA identified them as being severely affected by the SAH policy as education, social interaction and sources of employment for those working in shut down sectors was disrupted (Institute for Fiscal Studies, 2020; National Society for the Prevention of Cruelty to Children, 2020). A comparison is depicted in Table 4.

Table 4. Population Groups most affected by COVID-19 and those most affected by the lockdown and SAH Policy

Population Groups	Those at risk of direct harm of mortality and morbidity from COVID-19	Most at risk from the SAH policy to address the COVID-19 pandemic and reduce transmission
The whole population		✓
Older people	✓	✓
Men	✓	✓
Black and Minority Ethnic groups (including some Refugee and Asylum Seeker groups)	✓	✓
Those who live in areas of deprivation	✓	✓
Those who live in care homes	✓	✓
Key workers	✓ (Health care workers)	✓
Women		✓
Babies, children and young people		✓
Those who have existing mental health conditions		✓

Carers and those with caring responsibilities		✓
Those with physical and learning disabilities	✓ (Learning disabilities)	✓
Refugees and Asylum Seekers		✓

Discussion

Summary of results

The SAH HIA is to date the only HIA carried out on a national COVID-19 related measure such as lockdown. There are transferrable learnings for international, national, regional and local authorities and PHIs who are considering using or promoting HiAP through HIA as a process to understand the wider impact, and harms and benefits of policy decisions (O'Mullane and Cave, 2021). This paper helps to enable learning, mitigation of harm and development of interventions to aid societal recovery and increasing equity from an event such as the COVID-19 pandemic (Douglas et al., 2020). It aims to contribute to closing the knowledge gap in relation to the role of PHIs in advocating or using HIA as a tool and platform for providing evidence to inform policy and decision makers. This is little addressed in the peer reviewed literature beyond their role in capacity building (Harris-Roxas and Harris, 2007) where the focus on the remit of PHIs is in respect to health information, data and evidence gathering and dissemination, infection and outbreak control, laboratory management and health promotion and improvement programmes such as smoking cessation and obesity interventions (Glasgow et al., 2012).

The use of HIA in the decision-making process

HIA is not the only process which can be utilised to appraise the impact of policies and include health input or determinants to some extent (Cave et al., 2021b; Public Health Network Cymru, 2021; United Nations Economic Commission for Europe, 2015) nor is it unusual in analysing the effect of a policy. However, it is the only IA which is explicit in its focus on health and well-being carried out via a systematic, participatory process which characterises the scale and scope of any identified impact. Being able to assess, understand and communicate the wider population impacts, beyond the direct physical health harms, of policies is important as it enables a wide range of organisations and decision makers to better understand the differential effect of policies on societal groups and communities. This is relevant to both health and non-health stakeholders due to the acknowledged importance that wider sectors and social determinants have on population health and equity (Marmot, 2010; Marmot et al., 2020). For example, children and young people have had their education disrupted which could affect their future economic life choices and chances and social development. In addition, their mental well-being may be affected by being isolated or disconnected from their face-to-face social networks (Fore, 2020; World Health Organization, 2020). Evidence presented by this HIA could enable policy and decision makers target action in order to address or mitigate for these. For example during the second short 'Firebreak' lock-down in Wales in October 2020, schools and colleges remained opened and two households were allowed to join to form an extended household to help to reduce social isolation for vulnerable people (Welsh Government, 2020f). The findings can also be used to address any inequalities created or exacerbated in the short to long term (Winkler et al., 2013).

The HIA allowed cross-sector and cross-determinant impact to be harnessed and collated in one report to enable a better understanding of the wide-ranging implications. It identified future actions, for example, monitoring the impact of the policy on excess morbidity and mortality, and ongoing mental health and well-

being support for the population that could be implemented to protect and mitigate harm to health and well-being which are important for future health outcomes (Harris-Roxas and Harris, 2007). The HIA also highlighted the multifaceted, complex nature of the impact for inequalities on groups such as older people or BAME groups (Public Health England, 2020b). The HIA has been utilised to inform actions, research and plans in Wales for example, Public Health Wales is undertaking a Mental Well-being Impact Assessment (MWIA) specifically appraising the impact of the COVID-19 pandemic on children and young people in Wales (forthcoming); Public Health Wales' Operational plan 2021–22 (Public Health Wales, 2020d); Welsh Government's Remote Working programme; and a paper in relation to the lockdown, pandemic and the food environment in the United Kingdom (Chang et al., 2020). The HIA was presented to Welsh Government ministers and heads of NHS Health Boards in Wales and shared with other national and international ministries of health, PHIs and agencies and acknowledged to be of value (Chief Medical Office for Wales, 2021). The HIA has also been submitted to calls for evidence in the UK about the effect of the pandemic (The Health Foundation, 2020; UK Parliament, 2020; Welsh Parliament, 2020) and as a platform for other nations to build on.

The role of HIA by public health institutes

Whilst PHIs have a key role in protecting, improving and promoting health, there is little consideration and evidence about their role in HIA beyond advocacy and capacity building for example, carrying out HIAs (Chairs: Piedad Martin-Olmedo and Organised by: EUPHA (HIA) (PHPP), 2017; European Observatory on Health Systems and Policies, 2007; Green et al., 2020a; Wales Health Impact Assessment Support Unit, 2012a). In the case of the SAH policy, it demonstrated that HIA could be used and adapted as part of emergency planning and supporting measures as a way of establishing the health, inequality and well-being impacts and/or anticipating the impact of future identical or similar situations along with other IA processes as noted by Tajima et al. (Tajima et al., 2014). PHIs also hold health intelligence required for such a HIA, for example the Public Health Observatory at Public Health Wales. In addition, PHIs can facilitate dedicated resources such as WHIASU in order to carry out or advocate for HIAs as part of a HiAP approach. This is seen as a key element of capacity building and raising awareness and 'buy in' for HIAP and HIA in public health and wider systems (Rogerson et al., 2020). The implementation of the HIA was supported by the enabling legislation of Welsh Government but also by the proactive leadership of WHIASU which is part of Public Health Wales and can be a key enabler of HIAP (Rogerson et al., 2020). Considering the impact of COVID-19 and pandemic measures across the whole of society is a key focus and third pillar of Welsh Government's recovery framework (Welsh Government, 2020g) as well as Public Health Wales' Operational Plan and associated campaigns (Public Health Wales, 2020e). Learning by doing is acknowledged as an important aspect of HIA capacity building (The Institute of Public Health in Ireland, 2019). This HIA provided an opportunity for capacity building and enabled public health officers to be part of a collaborative HIA of a rare event in modern times and build capacity, skills and knowledge in a safe space (Green et al., 2020a; Harris-Roxas and Harris, 2007).

HIA is already acknowledged in the literature as a useful tool to apply in order to anticipate impacts in a prospective and balanced way which it does by identifying both positive and negative impact (World Health Organization, 2021b). This HIA demonstrated that there is also value in carrying out HIAs to explicitly articulate impacts as they occur. The HIA was carried out alongside the health protection response and collected evidence in 'real time' as it emerged and has added value to future policy decisions by raising awareness explicitly of the health and population impacts of those decisions as they occur which has been noted by others (Cole and Fielding, 2007; Davenport et al., 2006; Winkler et al., 2013). HIA can be utilised in times of un-precedented situations such as health (or other kinds of) emergencies. It can also be used when decisions need to be made at speed to protect the public and their health or safety for example, a lockdown

and / or where there are no previous examples or when there is little evidence to assist the decision-making process for example, policy and political decisions such as Brexit in the UK (Green et al., 2020a).

Constraints and limitations

The SAH HIA did face some constraints and limitations. It was carried out in 'real time' against a dynamic and evolving situation which meant that the impacts and findings needed to be reviewed and amended if required until the publication date. The team aimed to produce a high-quality report in a timely manner in order to provide information and evidence for decision makers. With unique events such as Brexit or unprecedented responses to events such as the COVID-19 pandemic, there may be evidence in existence or available but not for all determinants or groups. There is now a raft of evidence in relation to the health and wider impacts of the COVID-19 pandemic in Wales (Aughterson et al., 2021; Economics Observatory, 2021; Groarke et al., 2020; Jacob et al., 2021) which researchers and impact assessment practitioners and policy makers can draw on. The lack of evidence of previous extensive and comprehensive measures across the population highlighted some areas which needed to be monitored and explored further, for example the impact on refugees and asylum seekers in Wales. This had been identified as part of the stakeholder interviews and deemed important. A specific review and reflection session enabled the team to capture learning in order to support the evolution of HIA practice in Wales. This paper shares some of this learning but it is also useful for HIA and IA practitioners and processes to learn from each other around how they include health and well-being (Cave et al., 2021b; Morgan, 2011).

Future research

Finally, the HIA flagged up gaps in the evidence base that require further exploration of both the short and longer-term impact of the lockdown policy implemented in response to the pandemic. These include the multifaceted impact on particular population groups such as children and young people, and women; the need for more research on the impact of such a situation on health behaviours including diet and physical activity, violence against women, domestic abuse and sexual violence (VAWDASV) and the mental health and well-being impact across a number of population groups. This has led to the commissioning of several work streams on some of these topics in Public Health Wales including a systematic literature review and the MWIA. These were both recommendations in the HIA report. The HIA also highlighted the need to carry out further HIA work to explore particular aspects and interventions that were component parts of the Coronavirus legislation such as the accelerated move to more employees' home working and to explore further how it has been utilised by policy makers to understand and react to the impacts and inequalities identified.

Conclusions

HIA has a key role in policymaking and can support PHIs, regional and national governments in their roles to promote and protect health and well-being and reduce the inequality gap. HIA can do this by enabling both health and 'non-health' stakeholders to better understand the wider health impact of a policy which has been implemented at speed. It can explicitly identify a wide range of positive intended and negative unintended health implications for populations as well as societal, economic and environmental well-being.

The SAH HIA demonstrates how the process is a beneficial tool to inform and understand a policy decision and the unknown short and long-term challenges which emergency and unpredicted major events such as the COVID-19 pandemic present. These can be captured using a 'real time' HIA approach that identifies the impacts as they emerge so that future policies and plans can be adjusted to mitigate for negative health impacts and maximise positive impacts. The impacts identified can add to the evidence base in relation to the wider impact of COVID-19 and the HIA can be utilised by policy and decision-makers and the HIA community in the future to inform, promote or carry out similar HIAs.

The HIA involves key cross sectoral and multi- disciplinary stakeholders and evidence and can enable an evidence based HIAP approach. The HIA of the SAH policy in Wales has transferrable learnings in relation to the use of HIA in promoting a better understanding of the immediate and the long-term ramifications of policy decisions but also raises awareness of how PHIs can use HIA to communicate any harm to, and opportunities for, population health and well-being in order to advocate for healthier and fairer societies.

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Additional Table 1: The Methodological Process for the SAH HIA

HIA Step	Actions	How Step was undertaken in the SAH HIA	Useful links for further information
Screening	Identify the preliminary health and well-being impact and those affected in the population.	A Working Group was established internal to Public Health Wales. Wide ranging populations and determinants affected were identified. 2 checklists were used as a guide.	https://whiasu.publichealthnetwork.cymru/files/6415/9430/8755/HIA - Rapid Review of SAH Policy Supporting Info.pdf See Section 5, page 52 WHIASU Population Groups Checklists.pdf (publichealthnetwork.cymru)
Scoping	Use a Scoping checklist to identify the: geographical boundaries of the HIA, methods of evidence collection key stakeholders to be involved and resources required timeframes / deadlines characterise and define the impact terminology for example, major, long term, positive	Wales is the boundary Literature review of journal papers and grey literature to be carried out Health intelligence and other statistics and data to be collated Interviews with key stakeholders to be carried out HIA Team is the resource Timeframe was as soon as possible to inform policy and decision makers	Internal use only. Checklist template example available at: https://whiasu.publichealthnetwork.cymru/files/6414/9993/9603/Scoping_Info.pdf
3a. Appraisal – Evidence Gathering	Literature Review Carry out literature review and synthesise into summary to identify relevant	Search terms used included: social and physical distancing; quarantine, social or wider determinants of health, inequalities, outbreaks and pandemics and Wales. Criteria for the review included papers that had been published in the last 15 years in the English language. Most of the papers identified focussed on previous outbreaks such as Severe Acute Respiratory Syndrome (SARS) or Middle East Respiratory Syndrome (MERS), on the impact of quarantine and isolation in response to an outbreak and psychosocial impact.	https://whiasu.publichealthnetwork.cymru/files/6415/9430/8755/HIA - Rapid Review of SAH Policy Supporting Info.pdf See Section 3, page 55

		qualitative and quantitative evidence and statistics		
	Collate Community Health Profile	Use the scoping and screening checklists as a guide to gather data to identify relevant health intelligence and demographic, economic, environmental and social data / statistics. This includes gathering data in relation to population groups affected and determinants	<p>Examples of websites accessed:</p> <p>Welsh Government</p> <p>Welsh Health Survey</p> <p>Welsh Health Observatory</p> <p>Welsh Index of Multiple Deprivation</p> <p>Office of National Statistics</p> <p>Statistics Wales</p> <p>All data collected was compiled into a Community Health Profile which fed into the final HIA report.</p>	<p>https://whiasu.publichealthnetwork.cymru/files/6415/9430/8755/HIA_-_Rapid_Review_of_SAH_Policy_Supporting_Info.pdf</p> <p>See Section 2, page 8</p>

	ts of health identified to be synthesised into a summary for the final report.		
Stakeholder evidence	Identify key information, knowledge and evidence of external stakeholder s identified as part of the Scoping Process by: Inviting identified stakeholder s to be interviewed Developing topic guide and participant information Undertaking interviews and	13 stakeholder interviews were undertaken, which included for example: Natural Resources Wales Public Health Wales Healthy Working Wales Team Trade Union Congress Wales Public Health Wales Healthy Schools Programme Lead Public Health Wales Environmental Health Protection Consultant Children's Commissioner for Wales Office of the Future Generations of Wales Commissioner Welsh Local Government Association Welsh Government	https://whiasu.publichealthnetwork.cymru/files/6415/9430/8755/HIA - _Rapid_Review_of_SAH_Policy_Supporting_Info.pdf See Section 4, page 49 and the acknowledgements

	transcribing for analysis Developing a summary of results to input into the final report.		
3b. Appraisal of Evidence	Assess and characterise the positive and negative impacts and form a picture of the scale, scope and duration of these. Form recommendations and conclusion	Impact on determinants of health identified included, for example: Volunteering and social mobilisation https://phw.nhs.wales/topics/latest-information-on-novel-coronavirus-covid-19/how-are-you-doing/how-are-we-doing-in-wales-reports/week-25-report-how-are-we-doing-in-wales/ Domestic violence https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/domesticabuseduringthecoronaviruscovid19pandemicenglandandwales/november2020 Home working https://www.mentalhealth.org.uk/our-work/research/coronavirus-mental-health-pandemic Mental well-being https://www.mentalhealth.org.uk/our-work/research/coronavirus-mental-health-pandemic Environment https://airquality.gov.wales/sites/default/files/documents/2020-08/Analysis_of_Welsh_Air_Quality_Data_Impacts_of_Covid-19_Final_Issue2.pdf . Economy https://seneddresearch.blog/2020/10/13/coronavirus-youth-unemployment/ Population Groups identified as being affected included for example: Children and young people https://www.nspcc.org.uk/about-us/news-opinion/2020/childline-lifeline-coronavirus/ . Those on low incomes https://www.ifs.org.uk/publications/14791	https://whiasu.publichealthnetwork.cymru/files/6415/9430/8755/HIA_-_Rapid_Review_of_SAH_Policy_Supporting_Info.pdf See Section 3, page 10 and also: https://whiasu.publichealthnetwork.cymru/files/3915/9280/5148/HIA_-_Rapid_Review_of_SAH_Policy_Executive_Summary.pdf See Table 1, page 11

		<p>Black, Asian and Minority Groups https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/908434/Disparities in the risk and outcomes of COVID August 2020 update.pdf Those with mental health conditions https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/mental-health-and-psychological-resilience-during-the-covid-19-pandemic</p> <p>Characterisation of Impact table drafted.</p>	
4. Reporting and Recommendations	<p>Compile report and recommendations. Carry out quality assurance with key stakeholders Review and Sign off in NPHI Publication of HIA</p>	<p>Report published Press release published Dissemination via networks and stakeholders involved</p>	<p>https://whiasu.publichealthnetwork.cymru/files/3915/9280/5148/HIA - Rapid Review of SAH Policy Exec Summary.pdf https://whiasu.publichealthnetwork.cymru/files/4515/9618/5918/HIA - Rapid Review of SAH Policy Main Report.pdf</p> <p>Future actions – See Section 5, page 84</p>
5. Review, reflection and Monitoring	<p>Review and evaluate the process of carrying out the HIA Develop monitoring indicators / steps</p>	<p>Compile review and reflection paper. Ongoing.</p>	<p>Internal use only</p>

Chapter 7: Brexit, COVID-19 and climate change: Mapping the impact of the 'Triple Challenge' on health and well-being in Wales

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Introduction

The United Kingdom's (UK) withdrawal from the European Union (EU) ('Brexit'), the COVID-19 pandemic and climate change all pose major contemporary challenges of either national or international importance for population health, well-being, and health inequalities (Chiesa et al. 2021; Douglas et al. 2020; Fahy et al. 2017; Green et al. 2021, 2020, 2020a; IPCC 2022; Romanello et al. 2021). The wider determinants of health such as the economy, the environment and community have an impact on physical and mental health and well-being (Acheson 1998; Marmot 2010). All three challenges impact across the wider determinants of health in a myriad of ways – some of which are the same and some of which are different (Figure 1; Box 1). Little literature to date has referred to or looked to systematically combine and objectively examine the policy impacts of these challenges on public health (Burns 2020; Woods 2020; Farming Life 2021; Hasa 2021; One World 2021; Rivington et al. 2021). The National Public Health Institute for Wales, Public Health Wales, carried out three Health Impact Assessments (HIA) in relation to the separate challenges to capture the impact on population health and well-being in Wales between 2018 and 2021 (Green et al. [2019](#), [2020b](#); Public Health Wales [2021b](#)).

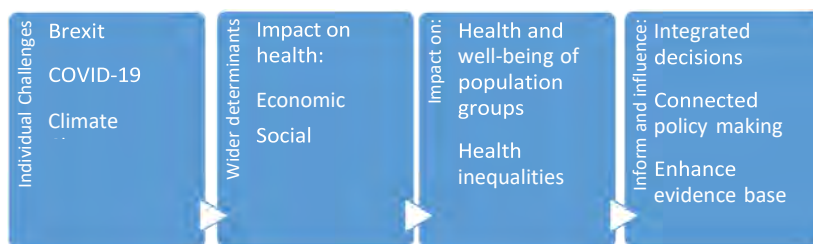


Figure 1. Conceptual relationship between the three challenges and the wider determinants of health and policy making.

Wales has at its core a focus on sustainable development and has a unique act, the Well-being of the Future Generations (Wales) Act 2015 which focusses on driving sustainable development for the future and promoting well-being across society, the environment, and the economy (Welsh Government [2015](#)).

HIA provides a useful methodology through which to explicitly articulate the impacts of unexpected and unique policies, plans, or projects. The benefits, challenges, and effectiveness of HIA have been long debated (Parry and Stevens 2001; Ahmad et al. 2008; Dannenberg 2016; Nour et al. 2016), concluding the approach to be successful and impactful in many circumstances (Harris-Roxas et al. 2014; Haigh et al. 2015; Green et al. 2020, 2021). It is a decision and policy informing process which is acknowledged as a tool to drive 'Health in all Policies' approaches in practice (Leppo, 2013; WHO, 2018). In addition, HIAs have been proven to have a key role in health improvement, protection, and prevention (Winkler et al. 2020; Cave et al. 2021) and have been used in Wales as a vehicle through which to drive health in all policies and sustainable development (Green et al. 2020; Green and Edmonds 2021). Like many other impact assessments, HIA tends to look at a single project, policy, and plan in isolation. There are examples of peer-reviewed papers that examine or discuss cumulative health impact as part of environmental assessments (Morello-Frosch et al. 2011; Morgan 2012; Blakley and Franks 2021) such as Strategic Environmental Assessment (SEA) and Environmental Impact Assessment and SEA, for example, considers cumulative health impacts in environmental planning and to inform strategic decision-making (Fischer 2006; Fischer, 2014; UNECE 2020). However, there is no literature on how a standalone HIA can be utilized to view the cumulative impact of multiple plans or policies together in relation to wider determinants of health, well-being, and inequalities.

This paper presents a strategic overview of the impact, and interconnectedness of the challenges of Brexit, the COVID-19 pandemic and climate change, termed by Public Health Wales as the 'Triple Challenge', in a specific region of the United Kingdom. This research provides an opportunity to take the learning from Wales into the international arena to understand how the challenges have impacted on public health. Based on the evidence from the three individual HIAs carried out within Public Health Wales, it articulates the synergies in impact and the population groups affected across the 'Triple Challenge' and provides a better understanding of how any potential positive or negative impacts will manifest themselves. It focuses on how using the systematic process of HIA as a platform and multichallenger lens can paint a picture of dynamic and cumulative impact and provides some specific examples demonstrating transferable learning for practitioners and policy makers both in the UK and internationally.

Box 1. Examples of the individual health and equity impacts of the individual three challenges.

Coronavirus SARS-CoV-2 (COVID-19) pandemic

The global pandemic has revealed the complex, interwoven relationships between health, well-being, equity, the economy, the environment, and society as a whole. In doing so, it has created new inequalities, but also exacerbated existing social and health inequalities and inequities (Dyakova et al. [2021](#); Marmot et al. [2020](#)). High levels of morbidity and mortality have been witnessed across the world as a result of the pandemic, with the UK being particularly affected – both in terms of the impact on a range of specific vulnerable populations for example, older people and health and care workforces, but also in terms of the policies implemented to contain the virus (Institute for Fiscal Studies [2020](#); Public Health England [2020](#); United Nations [2021](#); Woodfine et al. [2021](#)). This has resulted in major impacts for health determinants such as economic inactivity, education and mental well-being and for some populations for example older people and those from ethnic minority groups (Dyakova et al. [2021](#); Institute for Fiscal Studies [2020a](#), Public Health England [2020](#)).

Climate Change

Climate change can affect positively or negatively health and well-being directly or indirectly through, for example, facilitating the amount of physical activity someone takes, their employment, health care services provision and infrastructure and the local environment (Watts et al. [2021](#)). It can impact whole communities and residents in their entirety and dispersed populations, depending on the nature of extreme weather events such as flooding (Netherwood [2021](#)). Children and young people may be affected, as well as those on low incomes and those in specific settings or employment, for example, farmers and agriculture workers (IPCC [2022](#); Netherwood [2021](#)).

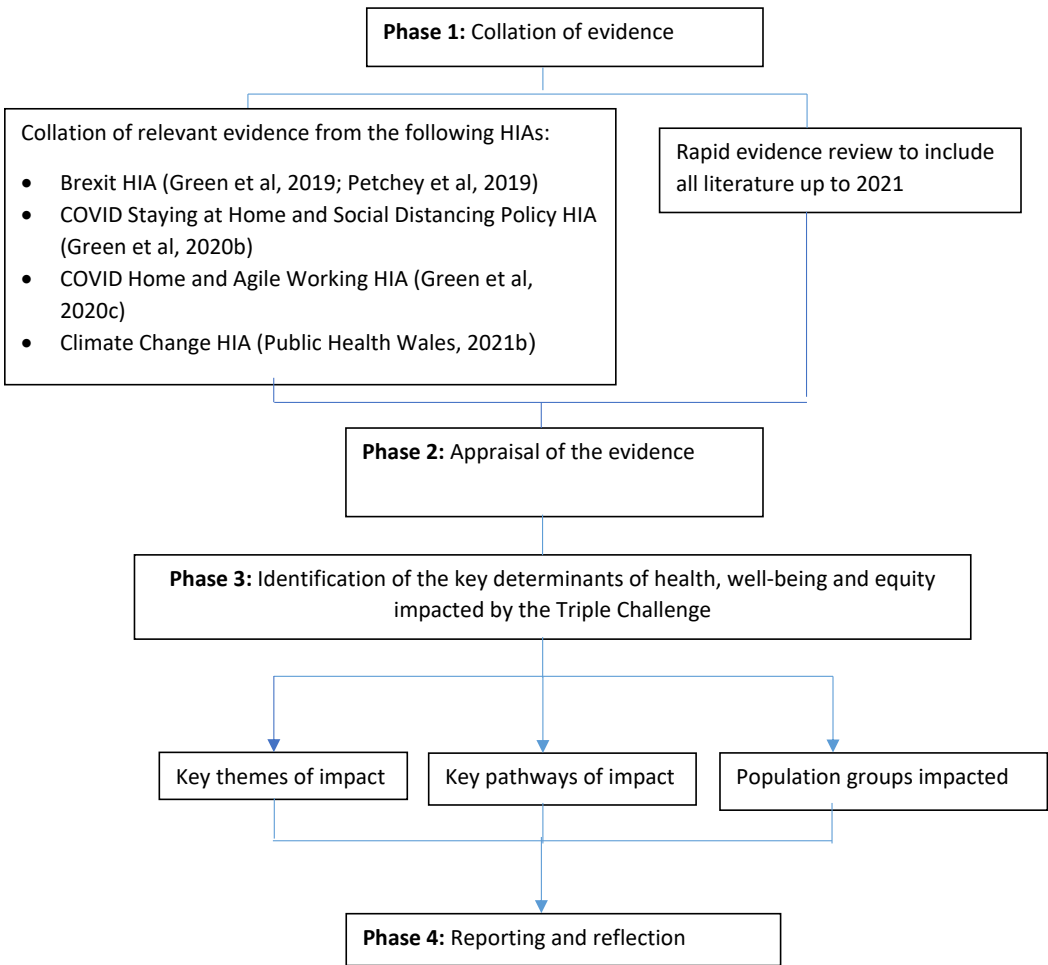
Brexit

Brexit affects not only the 66 million people who live and work in the UK and its devolved nations of Northern Ireland, Scotland and Wales, but also affects those who visit each year and who trade with the UK. Brexit can affect health and social care services and their workforces, the economy and lead to loss of access to funding to improve social and environmental infrastructure in communities (Fahy et al. [2017](#); UK Parliament, n.d.). It affects a wide range of population groups including non-UK EU residents, older people, those who work in industries highly exposed to trade and tariff barriers and men (Green et al. [2019](#)).

Materials and methods

A small team consisting of two researchers, two policy officers and two impact assessors carried out the Phases of the research outlined in [Figure 2](#). The researchers were responsible for leading the literature review and engaging with stakeholders, the policy officers gathered the grey literature and the impact assessors provided insight and tools from the HIAs.

Figure 2: The Methodological Process



Phase 1: collation of evidence

Existing evidence was collated by firstly undertaking a mapping process of the three individual HIAs that had been carried out in Wales on the wider impact of the events of Brexit, COVID-19 and climate change in Wales from 2018 to 2021 (Green et al. [2019](#), [2020c](#); Petchey et al. [2019](#); Public Health Wales [2021b](#)). HIA is a five step process that assesses the impact of policies, plans, and projects on the health and well-being of the population (EHP, [1999](#); WHO, n.d; Winkler et al. [2021](#); [Box 2](#)).

Box 2: The five steps of the HIA process

Step 1: Screening – does the policy or plan have an impact on health and well-being? If so, who does it affect and how?

Step 2: Scoping – what are the parameters of the HIA? How long will it take, what resources should it require, what are any deadlines, and what evidence should be gathered and appraised?

Step 3: Appraisal – assessing the evidence gathered by synthesising it and analysing it to form a picture of impact. This evidence can include peer reviewed and grey literature, stakeholder evidence and routinely gathered statistics and data for example, government statistics and reporting.

Step 4: Recommendations and reporting – construction of a report which includes the findings and any recommended actions that should be taken to maximise the positive impact and mitigate any negative impact

Step 5: Review and reflection including monitoring and evaluation – this involves highlighting milestones to measure any changes in impact or if the predicted impacts were observed, reviewing the process and any impact which it may have had on decisions and future policies.

HIA can explicitly capture evidence-based health impacts, highlight synergies between policy sectors and lead to actions to reduce any negative impacts that may emerge from these and any population inequity. It considers the wider determinants of health and well-being and any uneven distribution of impacts across population groups for example, older people, children, and young people or those with long-standing illnesses or conditions (WHIASU, [2012](#); Pyper et al. [2021](#); Winkler et al. [2021](#)). All of the three HIAs had research protocols, clear search terms, and stakeholder participation. For example, interviews (n = 13 for Covid HIA; n = 17 for Brexit HIA and n = 18 for climate change HIA) and inter- active workshops (n = 1 for Brexit HIA; n = 2 for climate change HIA) (Green et al. [2019](#), [2020](#), [2021](#); Martin-Olmedo and Green [2020](#); Green and Edmonds [2021](#); PHW, [2021](#)).

Building on evidence and findings from the previous HIAs, rapid evidence searches were undertaken to identify the literature which focused on the Triple Challenge as a whole and its impacts. The search terms used were 'Brexit' OR 'EU withdrawal' AND 'climate change' AND 'COVID-19' OR 'coronavirus' and 'health' OR 'well-being' OR 'wider determinants' OR 'inequalities'. These search terms were used to search on title or abstract within peer reviewed databases (PubMed and ProQuest). The grey literature was explored using the same search terms as the academic search on Google scholar and organizational websites such as the World Health Organization. Manual snowball and forward citation searches were also conducted on the academic and grey literature identified for inclusion. One researcher independently conducted the search in January 2021. An additional researcher also screened the evidence, and any conflicts in opinion were discussed by the two researchers and a consensus agreed upon. Evidence was deemed eligible if they were published in

the English language and focused on identifying possible health and well-being implications of all of the three challenges.

Phase 2: appraisal of the evidence

Using the data and evidence and processes from the previous HIAs, crossovers of impact between the three challenges were identified and mapped by the team members. The exercise captured both the positive and negative impacts and any opportunities or unintended negative impacts. An example of this is depicted in [Supplementary Table 1](#).

The determinants of health and groups were then explored further in a screening session with the team members. This was based on the evidence gathered in the previous HIAs. It also included papers and research published since the publication of the HIAs which had been identified as part of the rapid literature review and as part of conversations and engagement with key stakeholders for example, Welsh Government representatives from departments such as EU Exit, agriculture, food policy, poverty, and health inequalities.

Phase 3: identification of the key impacts on health and well-being

The main determinants and population groups were then analysed to further pull out the significant impacts across all the challenges only. Definitions which had been previously debated and validated by the individual HIAs external Strategic Advisory Groups were utilised. These included four directions (positive/negative/opportunities/unintended negative impacts); intensity (major/moderate/minimal), and duration (short/medium/long term) which included representatives from national government, environmental public health, Public Health Wales policy, health services specialists, and academia. These have been previously published elsewhere (Green et al. [2019](#), [2020b](#)).

Screening criteria for inclusion in the work include the following: Are there major impacts across all three challenges either positive and negative or both?; Is the evidence to support this robust and credible?; Is there significant evidence to support the inclusion of the determinant or group or does it add to another determinant or group?; Is it a major evidence gap and an area for further research?

Phase 4: reporting and reflection

As part of the process, a quality assured summary paper was produced in both Welsh and English which summarised the findings, those affected and some suggested actions for policymakers. Multidisciplinary internal and external stakeholders were given the opportunity to provide feedback on the report, and a reflection meeting was held post publication to evaluate the process, impact to date, and learn from it.

Results

The three challenges that this work considers (Brexit, Climate Change, and COVID-19) have a broad range of commonalities in impact across many determinants of health and population groups. Results captured the synergies in both positive and negative impact across those determinants, which were deemed majorly affected and for which there was sufficient evidence available ([Figure 3](#)).

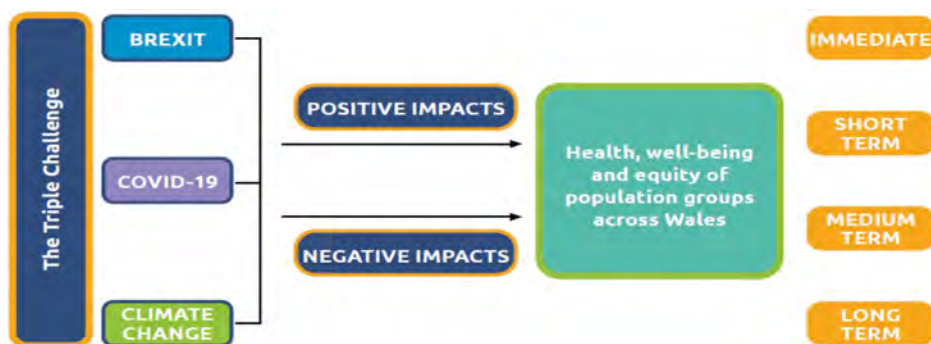


Figure 3. The triple challenge.

The rapid evidence searches identified two eligible studies from the academic literature and four studies from the grey literature that had previously considered the multiple impacts of the Triple Challenge on health and well-being. These plus evidence identified in the individual Brexit, COVID-19 and climate change HIAs have highlighted that the population of Wales have been majorly impacted by the Triple Challenge. These are summarised with some specific examples below and in [Box 3](#) and [Supplementary Table 2](#).

Box 3. Determinants of health and well-being and the population groups impacted by Brexit, COVID-19 and Climate Change.

Determinant:

- Healthcare service delivery
- Health Protection including intelligence, evidence, research and development
- Diet, alcohol, tobacco
- Types of employment
- Working conditions including health and safety and workers' rights and equality
- Skills and employment
- Poverty – food, fuel, employment status
- Community, economic, and infrastructure investment for addressing inequalities
- Community infrastructure and resilience
- Divisions in communities
- Intergenerational relationships
- Environmental regulations
- Sustainable food supply, security, production
- Food security, cost, access, supply, and safety
- Transport and movement of people
- Mental well-being
- Access to services
- Communication and digital media
- Health and Social Care workforce including recruitment, retention
- New models of working

Population Groups:

- Those on low incomes
- Those at risk of unemployment/who are unemployed
- Children and young people/young adults
- Older People
- Black and Minority Ethnic Groups
- Those with existing health conditions including mental health and those in need of health and social care
- Those who need care in a community or acute setting
- Geographical groups – urban/rural settings
- Key occupations and critical workers including construction, outdoors workers such as farmers and health and social care services
- Coastal towns
- Immigrants, Refugees, and Asylum Seekers.

A clear result is in respect to the pathways and factors, which lead to impact. It is not the actual challenges that directly affects health and well-being per se but the pathways of impact for example, policies around lock-downs or immigration, legislation, and trade and Free Trade Agreements. These were also mapped and used as some of the causal pathways on the determinants and population groups (Supplementary Table 2).

Alongside the results of this study which demonstrate the potential impacts of the Triple Challenge on health and well-being, reflections were observed around the complexities of the work undertaken. The work assessed three challenges which are highly complex in themselves. However, policy making itself is complex as is cross system and sector working (Cairney et al. [2019](#); Love and Stockdale-Otarola, [2017](#)) and so to unpick some of the health impacts was and still is, complex too. The team used the logical stepped process to drive the work and map the specific health and equity impacts across the three challenges and met regularly to share perspectives in an open and honest collaborative way. The timeline and main objectives of the work had to be adapted as it progressed due to the complexity of the proposal, and it was necessary for the work to evolve due to the dynamic situation of the Triple Challenge. Limitations around the availability of particular areas of evidence, the breadth of the policy context, and changes in Brexit regulations, policies, and COVID-19 measures whilst undertaking the work created some challenges. These challenges were overcome by remaining flexible and reactive throughout the process, which the HIA assessment process allows for. The benefit of setting clear roles at the start of the project was seen as a positive of the work and resulted in a clear and comprehensive output.

The main impacts and their connectedness are summarised below and further condensed in **Supplementary Table 1**.

Health and social care

Common positive impacts were identified across all three challenges in relation to developing new models of working (including remote and teleworking) and providing future employment opportunities. Common negative impacts evidenced were issues around workforce recruitment and retention that are largely linked to the changes in immigration policy as part of Brexit with large numbers of non-UK health and social care staff working in Wales including from the EU (Department of Health [2017](#); Fahy, [2017](#)).

Health protection

Common negative impacts highlighted were around loss of access to data intelligence, evidence, and research and development networks in a post Brexit world for example, changes due to Brexit meant that the UK could no longer access some important intelligence or be part of networks such as the European Medicines Agency (EMA). However, the research also highlighted positive impacts for networks for example, the pandemic had brought a renewed appetite for international data sharing and co-working to address the pandemic and the transmission of the SAR-COV-02 virus (Welsh Government [2020](#)).

Health behaviours

Diet, nutrition, tobacco, and physical activity could be positively or negatively affected from all the challenges (Heaney et al. [2019](#); World Health Organization [2020](#); Chang et al. [2021](#); Public Health England [2021](#); Public Health Wales [2021](#)). For example, they are highly dependent on the provisions contained in trade agreements (McNamara and Labonté [2016](#); McNamara [2017](#); Labonté et al. [2020](#)).

Intergenerational impacts

Brexit voting patterns demonstrated that younger voters were more likely to vote to remain in the EU whilst older voters wanted to leave (Moore [2016](#)). COVID-19 is a disease, which primarily affects older people's mortality and morbidity levels (Mueller et al. [2020](#)). Response measures also affected children and young people as educational settings were closed and sectors in which they mainly worked, for example, hospitality and non-essential retail closed down (Joyce and Xu [2020](#)). Therefore, older and younger generations are cumulatively impacted by the three challenges.

Mental well-being

Negative impacts on mental well-being impact were noted mainly with respect to stress and anxiety relating to uncertainty about the future (Public Health Wales [2021](#), [2021a](#)). Negatively, for Brexit, this is related to immigration changes and settled status and the impact on non-UK EU citizens and their families who work and reside in Wales whilst for COVID-19 this again is related to stress and uncertainty about employment status, loss of social freedoms, and the length of time of response measures such as 'lockdowns'. Further compounding the impact is climate change, where there is evidence of stress and fear about future extreme weather events that will affect homes and businesses for example, those of farmers and the subsequent negative economic impacts that these may bring (Castells-Quintana et al. [2015](#); Bonafede et al. [2016](#); Flouris et al. [2018](#); Levi et al. [2018](#); Binazzi et al. [2019](#); Davies et al. [2019](#); Cianconi et al. [2020](#)).

Environmental policies and regulations ([Figure 4](#))

For Brexit, the impacts are driven by potential divergence in standards away from those of the EU and it could have an impact on the carrying out of environmental assessments in the UK which still refer to the EU Directives (Fischer et al. [2018](#)). Whilst current standards will remain aligned with the EU, in the future they could diverge and be diminished (or enhanced) by government reviews and changes after these (UK Government [2022](#)) or through the conclusion of Free Trade Agreements with other trading nations or blocs. These trade agreements could also lead to challenges from investors about public health laws and policies for example, minimum unit pricing or alcohol or tobacco labelling (Hirono et al. [2016](#)). The pandemic has placed an emphasis positively on environmental regulations including lockdowns to control and reduce the transmission of COVID-19. The focus on climate change alongside the COVID-19 pandemic provides an opportunity to enhance environmental regulations that contribute to global warming, for example Wales's Clean Air Bill and the NHS Decarbonisation Plans (NHS Wales Shared Service Partnership [2021](#); Welsh Government [2021a](#)) or develop new sustainable models of working, but extreme weather events could majorly affect the provision of healthcare services and disrupt infrastructure and workforces and single use Personal Protection Equipment (PPE) and healthcare waste has implications for the environment and the climate (Rume and Islam [2020](#); WHO, [2022](#)).

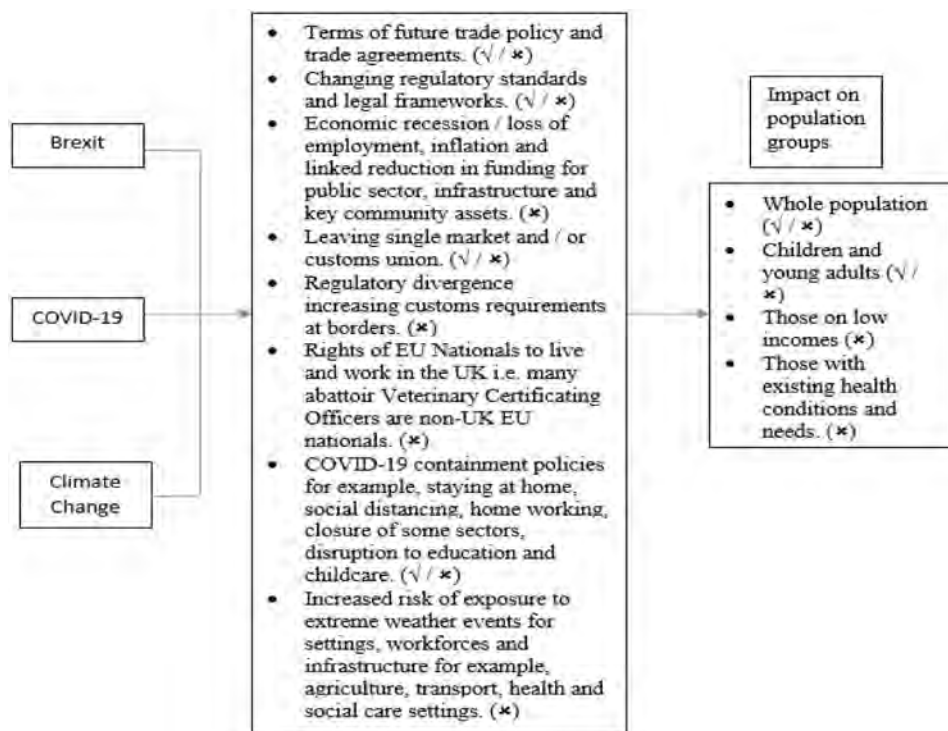


Figure 4. An example of the factors and impact of the triple challenge on environmental policy and regulations determinants of health and population groups.

Workforce

Regarding Brexit, EU withdrawal has led to changes in the UK's immigration policy that has had an impact not only on the recruitment of the health and social care workforce in Wales but also its retention as large numbers in the workforce come from the EU (NHS Confederation, [2021](#); Welsh Government [2022](#)). COVID-19 has positively raised the profile and respect of health and social care workforces, but the workload and intense and stressful working conditions and high levels of mortality and morbidity have placed the workforce under immense stress, which can (or has) led to anxiety and burnout. The workforce has also been split into those who can work from home, and those who cannot, as the former work directly with patients and service users. However, the pandemic and responses such as working from home has provided an opportunity to think through new models of working and ways of delivering services and who may particularly benefit (or not) from such models. Climate change will also provide similar opportunities to develop new and more sustainable service delivery and workforce resilience as increasingly frequent extreme weather events disrupt services and infrastructure and decarbonisation leads to changes in practice for example, changes in anaesthetics (Van Hove and Leng [2019](#)).

Transport

The determinants of transport and travel also have many commonalities in impact (either positive or negative). For example, climate change was positively impacted at the start of the COVID-19 pandemic by 'lockdowns' which led to a reduction in transport movements when people in Wales were encouraged to use active travel and take more physical activity as a means to access work and services if they could. Reduced

car movements during the early part of 2020 led to reduced emissions (Usman et al. [2021](#)). Transport movements release high levels of GHG emissions each year, which contributes to global warming and climate change. However, in Wales by mid-2021 levels were back to those pre-pandemic, driven by a reluctance to use public transport for fearing of being infected with the virus, an increase in online delivery transport vehicles, and many people feeling safer in one's own car (Neill [2021](#)).

Free Trade Agreements (FTAs)

Finally, FTAs are an important driver for the three challenges and their impact on health both now and in the future. For some determinants, for example, environmental regulation and standards or the economy, this is more evident than for others (Hirono et al. [2016](#); Labonté et al. [2020](#); Johnson et al. [2021](#); Van Schalkwyk et al. [2021](#)) and is most often referred to in relation to Brexit and the need for the UK to have an independent trade policy for the first time in 40 years. However, trade is also important for COVID-19, for example, with the supply of vaccines and accessing data and intelligence networks and in respect to climate change as FTAs can limit the ability to tackle climate change and local policies and targets. A more holistic and integrated way of policymaking is required for trade with leadership needed to bring all those affected together to consider the health impact of these and who is affected (Faculty of Public Health [2019](#); Petchey and Cresswell [2022](#)).

Discussion

The Triple Challenge collectively is having significant impacts on the key determinants of health ([Box 3](#); Supplementary Table 2). This study also highlights the factors that affect the determinants, and a wide range of population groups who are vulnerable to Brexit, COVID-19 and climate change. The need to address the impacts which in turn are having a major impact on inequalities underpins the Triple Challenge work as a key crosscutting theme. These findings reinforce those efforts to address the three challenges must connect and include a public health perspective in order to protect and advocate for, the most vulnerable in society.

As little literature had been published to date that looked at the three challenges collectively, the previous individual HIAs were invaluable as they provided a wide range of peer reviewed and stakeholder evidence. This is therefore a gap and warrants further research, exploration, or discussion between and by academics, researchers, and policymakers. By undertaking this process, it has highlighted the need for further research on specific determinants of health. For example, only a few studies have been published to date on the topic of alcohol and consumption in relation to the pandemic, Brexit and climate change as individual challenges (Cusack et al. [2011](#); Ventura-Cots et al. [2018](#)).

The pandemic has also raised the profile of public health and its importance to individuals, communities, and society as a whole (Dyakova et al. [2021](#)). It highlights the role of National Public Health Institutes to mobilize action and provide evidence and information to promote discussion about the unseen health and well-being impacts of major challenges. This study also identified recommendations that identified an opportunity to strengthen public health messaging around health behaviours with the increased profile of public health and environmental issues related to Brexit, COVID-19 and climate change for example, alcohol, tobacco and nutritional labelling, food insecurity, and waste. Policy and decision makers require information and evidence to strengthen future long-term planning and decisions so that negative impacts of the Triple Challenge can be mitigated for, positive impacts or opportunities be maximised and inequalities, which emerge can be addressed in a sustainable and integrated manner.

This work also highlights that HIA can be used creatively as a process by using it singularly, but also a model to capture multiple impacts. This can be done by mapping the single HIAs in order to form a matrix to provide information from which to gather research evidence in order to form a coherent assessment of how policy areas interact (Supplementary Table 1). Using HIA in a combined way as a process can paint a picture

of multifaceted, cumulative impact and taking this approach can enable a wide range of organisations and strategic stakeholders to critically view the challenges not just as single issues but as a holistic whole in order to mobilise action. The combined HIA lens could also be useful in relation to other multiple challenges for example, syndemics which are defined as a set of linked health problems involving two or more afflictions, interacting synergistically, and contributing to the excess burden of disease in a population (Horton [2020](#)). Additionally, other challenges for example, ‘black swan’ or unexpected occurrences, which require policy responses, such as the Ukrainian war or the cost-of-living crisis in the UK, could be added into the mix as a fourth challenge or replace one of the others as they may recede or dissipate. These additional challenges have already been noted as having an impact on population and determinants of health (Jones [2022](#); UK Parliament, n.d.; Welsh Government [2022](#)).

As part of the recovery process from the pandemic, there is a ‘window of opportunity’ for policy change that will have co-benefits for the wider determinants, based on evidence within the HIAs and the Triple Challenge reports. Some of the policy areas affected, such as environment, are devolved to Wales and some of these areas are non-devolved and therefore nations will need to work together to maximise any positive impacts and mitigate any negative ones. This includes through events such as the COP 26 and also the proposed Agriculture (Wales) and Food (Wales) Bills in passage (Welsh Government [2020a](#); Parliament [2021](#)). In addition, the Well-being of the Future Generations (Wales) Act 2015 with its implicit focus on ‘Health in All Policies’ and facilitating cross-sectoral working can provide an enabling environment for Wales to utilise the application of a Triple Challenge lens to policies and strategies (Welsh Government [2015](#)). This can be transferable to other similarly devolved nations across the UK and Europe. It can also be highlighted that whilst policymakers and politicians are often more sensitive to the interconnected nature of the policy areas they work in, the challenges collectively and singularly (in the case of the pandemic) also highlight the vulnerability of wider systems if public health and well-being is not robust (OECD [2017](#)). Being able to explicitly demonstrate this in an evidence-based way provides an opening for policy to be steered towards beneficial opportunities in the future as much as avoiding unintended negative impacts.

As part of the review and reflection session it was noted that, to date, the work has been positively received and has been utilised by Public Health Wales to guide planning (Public Health Wales [2022](#)) and for Welsh Government work and Parliamentary Committees (Welsh Parliament [2022](#)). The reflection session also noted that it was beneficial as it clearly mapped the specific health impacts to others and carrying it out helped to breakdown silos between colleagues and stakeholders and start conversations about health with them. The Triple Challenge work has been used to also develop further work for example, identifying the compounding impacts on specific topics, for example, food security and rural populations in order to further assist Welsh policymakers and organisations (Green et al. [2021](#), [2022](#)).

Finally, it must be noted that there are some limitations to this work. The review and reflection session highlighted that it was hugely complex and time intensive. However, as noted previously, policy making and the synergies between it are similarly hugely complex and time intensive (Love and Stockdale-Otárola [2017](#); Cairney et al. [2019](#)). Wales had the benefit of extensive previous HIA experience and is advanced in using this methodology to inform policymaking and practice to specifically identify health and equity impact

Whilst the review and reflection session evaluated the process and the immediate impact in the same way as the singular HIAs did (Green et al. [2020](#), [2021](#), [2022](#)) capturing the longer term impact of the triple challenges on health and well-being outcomes faces the difficulties of confounding and attribution – for example, is it Brexit, climate change, or COVID-19 which will lead to the health outcome or another intervention or policy? The collective team learning also identified that the team collaboration was key, clear leadership and direction for the work from the outset and regular short meetings helped everyone to clarify any points or discuss any issues or findings with the team in an open and timely way. The team recognised

that they needed to be flexible and adapt throughout the process and to be realistic about timeframes and what could be achieved in that time.

HIAs and the multi-challenge HIA approach as used in this study can also be utilized as a platform to complement other research. For example, using DESTEP analysis that implicitly explores the impact on wider determinants of health such as political (or policy), economic, technological, and social factors but through a different lens and context (Frue [2017](#)). This would provide a more comprehensive view of the wider landscape. Additionally, the approach could be enhanced and provide more evidence by including more statistical modelling and predictive techniques such as Foresight technologies, which anticipate trends and provide information around current and future challenges (Verschuuren et al. [2020](#)).

However, this paper shares learning which could make the work replicable at a smaller scale in other nations with some capacity building or with a focus on alternative challenges, which may be context specific. It could provide a blueprint for others to carry out similar work and make connections to major multiple challenges or policies and start conversations with other sectors and external partners and nations, for example, the NPHIs of England, Scotland, Ireland, and Wales in the UK and could be replicated by others at an international level also.

Conclusion

COVID-19, Brexit, and climate change represent the biggest combined challenge to health and well-being that the UK has faced in recent times. However, they also provide an opportunity for it to set a new direction and leverage policies and plans using health and well-being, equity and sustainability as a lens through which to view this. In the example of Wales, the Well-being of Future Generations (Wales) Act 2015 provides a key driver to do this.

HIA provides a flexible evidence-based and systematic process through which to identify health and well-being impacts across the population. It is routinely used to assess the impact on one policy, plan, or project, but until now has not been used to assess the cumulative and compounding impact of several developments or policies when viewed together and not only in isolation as singular challenges with multiple policy responses at a national, local, or regional level. The innovative Triple Challenge impact assessment has used a multi-challenge lens which can support discussions around future policies and plans for example, new models of working for future health service delivery and new economic models, for example an eco-environmental one that considers environmental and health protection and promotes renewable energy and sustainable transport systems but also highlighted negative impacts which can be mitigated for and a balanced way forward. There is also the opportunity for HIA to work more in alignment with other impact assessment processes which include cumulation such as SEA and EIA in order to assess these impacts.

This approach can be replicated by other nation states, regions, or public health institutes to enable a wide range of organisations and strategic stakeholders to critically view challenges such as Brexit and COVID-19 not just as single issues but as a holistic whole. This can support action and 'Health in all policies' approaches which can promote intersectoral action and the need to consider common areas which may affect health and well-being across policy areas.

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Supplementary Table 1:

Determinants of health and well-being affected by the policy areas of Brexit, COVID-19 and Climate Change: Examples of Employment and health behaviour

Determinant of health and well-being	COVID-19		Brexit		Climate Change	
	Positive ✓	Negative ✗	Positive ✓	Negative ✗	Positive ✓	Negative ✗
Employment	Growth of online retailers and employment protection schemes such as 'Furlough'. Rise in 'staycations'	Impact on sectors closed down to contain the transmission of the virus including hospitality, leisure and non-essential retail	Increase in job opportunities for young and older people due to immigration regulation changes	Loss of access to economic structural funds. Impact on economy in relation to immigration changes and content of Free Trade Agreements. Loss of critical workers in key sectors such as hospitality, agriculture and HGV drivers	Investment in 'green economy' and decarbonisation Focus on the development of Local Foundational Economies and a switch to digital methods and home and agile working thus reducing need to commute Investment in zero carbon measure e.g. electric vehicles	Investment in 'green economy' and decarbonisation. - Could lead to unemployment in some industries Disruption from extreme weather with essential Infrastructure vulnerable. Vulnerable areas and employment sectors; Coastal / fishing, agriculture/transport

			leading to shortages.	Industry and key areas of government decarbonise	
Health Behaviours including diet, alcohol, smoking and physical activity	<p>More opportunities for physical activity near the home</p> <p>Increase in home-cooked meals in place of restaurant/take-out meals</p> <p>More people are aware of the importance of a healthy lifestyle due to the risks of Covid-19.</p>	<p>Increased home working could lead to a reduction in physical activity levels and more sedentary behaviour.</p> <p>Reduced physical activity owing to closure of leisure facilities/recreational sporting facilities</p> <p>Possible increase in home consumption of alcohol</p> <p>Increased snacking and impact on diet and nutrition</p>	<p>Potential for strengthening public health messages for tobacco, alcohol and food labelling – highly dependent on content of Free Trade Agreements</p> <p>Possible opportunities for growing local produce due to gaps in the market</p>	<p>Risk of tobacco, food and alcohol regulations and labelling diminishing and being amended once outside of EU law</p> <p>Risk of lower alcohol prices (dependent on trade deals)</p> <p>Risk of higher food prices, especially for healthy food, possibly leading to poor diets.</p>	<p>Promotion of green environment may increase participation in physical activity (walking, cycling)</p> <p>Warmer climate may enable more outdoor activity</p> <p>Investment in green infrastructure may increase physical activity (cycling, walking routes)</p> <p>Covid-19 risks could potentially encourage people to lead healthier lifestyles,</p>
					<p>Climate may become too warm for sustained physical activity in summer months – risk of extreme weather events</p> <p>Flooding may affect active travel infrastructure</p> <p>Winter extreme weather events may prevent physical activity outdoors</p> <p>Heat events and hot weather can lead to an increase in alcohol intake and resultant increase in accidents and Violence Against Women, Domestic Abuse and</p>

						Sexual Violence (VAWDASV) incidents
					Better work life balance due to agile working providing more opportunity for physical activity.	A shift to more sustainable plant based diet may not necessarily be a healthier diet.
					Improved air quality from reduction in transport emissions (due to Covid-19 restrictions) could encourage more people to engage in outdoor physical activity and active travel	Increased stress or outdoor lifestyle may increase alcohol use.
					Health benefits in a shift to more sustainable plant based and locally sourced diet	

Supplementary Table 2: Determinants of health and well-being affected by Brexit, COVID-19 and Climate Change
Summary results for the determinants of health and well-being

Determinant of health and well-being affected by Brexit, COVID, 19 and Climate Change	Magnitude	Positive health impact and opportunities (✓) / Negative health impact (✗)	Population Groups	Magnitude	Positive health impact and opportunities (✓) / Negative health impact (✗)	Brief summary of rationale
Health care service delivery and workforce	Major	✓ / ✗	<ul style="list-style-type: none"> Whole population Those on low incomes Critical workers Older people Geographical areas Those who have existing conditions or have additional care needs Older people Critical workers Geographical groups 	Major	✓ / ✗	<p>Negative impact: Increased waiting times; impacts on delivery of services including social care from extreme weather and workforce disruptions and recruitment and retention pressures exacerbated from Brexit migration changes and COVID-19</p> <p>Positives/Opportunities: Development of new models of working which are energy efficient and maximise positives which were developed during COVID-19 and account for changes in workforce from Brexit.</p>
Health Protection – intelligence,	✓	✓ / ✗		✓	✓ / ✗	Negative impacts: Research and collaboration implications for EU collaboration in academia and industry

evidence, research and development						<p>due to Brexit changes across many fields including for COVID-19 in respect to vaccine development and clinical trials and in relation to climate change and environmental sustainability and zoonotic diseases.</p> <p>Cannot bid for funding opportunities</p> <p>Positive impacts: COVID-19 has highlighted the importance of health intelligence; Demonstrated the importance of, and increased profile of, environmental health protection post Brexit in relation to Free Trade Agreements (FTAs) and Brexit i.e. the US example of chlorinated chicken and ability to affect current standards and rules</p>
Health Behaviours including diet, alcohol, smoking and physical activity	✓	✓ / ✗	Those on low incomes <ul style="list-style-type: none"> • Whole population • Those who are less affluent • Those who have chronic conditions 	✓	✓ / ✗	<p>Negative impact: Post Brexit FTAs could impact on tobacco labelling etc. FTAs could lead to challenges by manufacturers in respect to public health laws for labelling and pricing i.e. Minimum Unit Pricing</p> <p>Noted an increased reporting of increased alcohol consumption throughout lockdown.</p>

			<ul style="list-style-type: none"> • Farmers and fishers • Those with existing conditions 			<p>extreme weather damaging community infrastructure.</p> <p>Positive impacts:</p> <p>Increased social mobilisation during COVID-19 and increased incidence of reported neighbourliness and volunteering. Political participation due to Brexit has increased in the young.</p> <p>Communities mobilised to support each other during extreme weather events in Wales in 2020 and 2021.</p> <p>Opportunities to provide improved sustainable infrastructure and promote community resilience in the future</p>
Intergenerational relationships / Divisions in communities	✓	✓ / ✗	<ul style="list-style-type: none"> • Young people and young adults • Older people • Whole population 	✓	✓ / ✗	<p>Negative impact: Divisions during the pandemic for example, the young were primarily unaffected by direct mortality but were affected through educational disruption and loss of social contact whilst older people were more affected by morbidity and mortality. Some evidence frames this as division across the generations – perceived as the younger sacrificing freedom for older people being protected from the virus.</p>

Mental well-being	✓		✓ / ✕	<ul style="list-style-type: none"> • Whole population • Those with existing conditions • Children and young people • Older people • Critical workers • Unemployed 	✓	✓ / ✕	<p>Brexit - older voters primarily voted leave and the younger demographic to remain which divides the generations.</p> <p>Climate change has led to many divergent views between young and old and there is increasing interest in CC i.e. numbers of vegans in young adults increasing</p> <p>Positives/Opportunities: evidence that communities and generations have pulled together through the three challenges – for example, during the lockdowns helping neighbours and volunteering and enhanced family connections via digital methods. Younger generation have had different experiences compared to previous generations which provides them with different drivers and perspectives to build on.</p> <p>Negative impact: Direct and indirect impact across all challenges in relation to anxiety, uncertainty and stress about the future, or income or family.</p> <p>Home working and pandemic led to isolation, burnout and stress for many.</p> <p>Positives/Opportunities Increased participation in society and increased</p>
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			<ul style="list-style-type: none"> Those on low incomes Migrants and their families 			<p>engagement and political participation for all three challenges. Increased volunteering etc for COVID-19 which enhanced mental well-being. More visible activism re CC and Brexit and the engagement and involvement of young people.</p> <p>Increased opportunity for improved mental well-being through home working.</p>
Environmental regulations and policy	✓	✓ / ✗	<ul style="list-style-type: none"> Whole population Those with existing conditions 	✓	✓ / ✗	<p>Negative impacts:</p> <p>Brexit trade policies and changes to regulations can be strengthened or diminished as a result of future policy and through FTAs.</p> <p>FTAs could limit ability to hit targets or policy or make policies around carbon limits and standards in UK</p> <p>Trade rules could impact on sustainable procurement policies. Divergence between nations – create ‘pollution havens’.</p> <p>Environmental health protection policy regulations which were enforced during pandemic i.e. lockdowns, had positive and negative impacts which protected population health but had some negative impacts such as social isolation.</p>

						<p>Enhanced focus on environmental health protection hygiene measures and standards which were increased in response to COVID-19 but there were delays in inspections for example for food establishments.</p> <p>Impact could be variable in relation to the alignment of environmental / climate standards across the world.</p> <p>Air quality improved with lockdowns but back to pre-pandemic levels by end 2021.</p> <p>Positive impact/Opportunities:</p> <p>Brexit trade policies and changes to regulations can be strengthened or diminished as a result of future policy and through FTAs.</p> <p>CC presents an opportunity to enhance environmental health protection regulations and limits and targets in relation to air quality standards and decarbonisation.</p> <p>Environmental health protection policy regulations which were enforced during pandemic i.e. lockdowns, had positive and negative impacts which protected</p>
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						<p>population health but had some negative impacts such as social isolation.</p> <p>Enhanced focus on environmental health protection hygiene measures and standards which were increased in response to COVID-19</p>
Food security, cost, access, supply, safety and production	✓	✓	<ul style="list-style-type: none"> • Whole population • Those on low incomes • Farmers and fishers 	✓	✗	<p>Negative impact:</p> <p>Food security, supply, cost, production and standards all affected by Brexit, increased migration of workers away from UK and reduced supply chains from pandemic restrictions.</p> <p>For farmers and CAP the Brexit led to reduced funding on which Wales has a reliance</p> <p>Reduced access to food online and in person supplies running low with panic buying</p> <p>Extreme weather events affected food production and infrastructure.</p>
Movement of people / Migration	✓	✓ / ✗	<ul style="list-style-type: none"> • Whole population • Migrants and their families 	✓	✓ / ✗	<p>Negative impact:</p> <p>Brexit immigration changes led to large numbers of non-UK EU nationals moving away from UK including health and social care staff.</p>

			<ul style="list-style-type: none"> Those with existing health conditions Those on low incomes Young people Older people Minority ethnic groups 			<p>COVID-19 lockdowns majorly restricted the movement of people to prevent disease transmission in Wales and led to the closure of many non-essential sectors i.e. retail</p> <p>Climate change can increase the numbers of displaced persons both in the UK and globally as a result of increased incidence of extreme weather events i.e. drought, flooding and lead to increasing migration around, to and from Wales and the UK.</p> <p>Positive impact/opportunities:</p> <p>The three challenges and changes in FTAs and restrictions which affect movement of people / migration can provide different and new workforces and skills to Wales, training opportunities for young people and lead to new ways of working for example, use of more digital and telehealth methods.</p>
Access to services and models of working	v	v / ✕	<ul style="list-style-type: none"> Whole population Older people Critical workers Those with chronic conditions / in need of care 	v	v / ✕	<p>Negative impacts: Increased waiting times in call centres and in person during the pandemic; Low digital literacy levels and access for some populations exposed in pandemic.</p> <p>Impacts on delivery of services from extreme weather and workforce disruptions including and recruitment and</p>

			<ul style="list-style-type: none"> Those on low incomes Geographical groups 			<p>retention pressures exacerbated from Brexit migration changes and COVID-19.</p> <p>Positives/Opportunities: Development of new models of working which are energy efficient and more climate friendly and maximise positives which were developed during COVID-19, in response to Brexit and shortage of staff, and account for changes due to increased home working, digitalisation and movement of people.</p>
Trade and Free Trade Agreements (FTAs)	✓	✓ / ✗	<ul style="list-style-type: none"> Whole population Key workers Older people Those with existing conditions Those on low incomes Farmers and fishers 	✓	✓ / ✗	<p>Negative impact:</p> <p>Brexit has provided the ability to make new trade agreements autonomously. Can enhance or diminish economic growth and employment and environmental and health standards, safety and policy.</p> <p>COVID-19 had a negative impact on imports / exports and need for strong FTAs which will support recovery from pandemic and economic growth for the future.</p> <p>Implications for obtaining essential goods and medicines from the EU from Brexit import checks and export paperwork.</p>

						<p>Climate Change – trade is a major driver of air freight, lorry and naval journeys from across the world to deliver goods and products - increases carbon footprint and emissions.</p> <p>Positive impacts/opportunities:</p> <p>Brexit has provided the UK with the ability to make new trade agreements autonomously. Can enhance or diminish economic growth and employment and environmental and health standards, safety and policy.</p> <p>COVID-19 led to the formation of new trading partnerships and purchasing relationships.</p> <p>Climate change awareness can lead to the development of more sustainable methods of agricultural production and farming. The triple challenge can provide more opportunities to develop future sustainable land management methods.</p>
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Chapter 8: Predicted and observed impacts of COVID-19 lockdowns: two Health Impact Assessments in Scotland and Wales

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Introduction

Health Impact Assessment (HIA) is a key approach to promote ‘Health in all policies’ by assessing determinants of health and health equity likely to be affected by proposed policies, plans and proposals in all sectors. This should enable governments to ensure their policies promote health and health equity (Rogerson et al, 2020). HIA aims to identify potential impacts - positive or negative, intended and unintended - their scale and nature, and affected populations. It uses evidence and follows the five steps (Green et al, 2020; WHO, 2022) depicted in Box 1. HIA can support collaboration with stakeholders who provide insights and ensure ownership of action. (Green et al, 2021; Leppo et al, 2013; Rogerson et al, 2020; WHO, 2014).

Box 1: The HIA process

Step 1: Screening to determine whether to complete an HIA. This includes consideration of whether there are likely to be effects on health and whether there is scope for changes to improve these impacts.

Step 2: Scoping the boundaries of the assessment, including timeframes, resources, key stakeholders to engage with, evidence collection methods and key determinants and populations of focus.

Step 3: Appraisal of evidence, which is triangulated and analysed. This evidence can include peer reviewed and grey literature, stakeholder evidence and routinely gathered statistics and data for example, government statistics and reporting.

Step 4: Recommendations and reporting to inform decision makers, including the construction of a report which includes the findings and any recommended actions that should be taken to maximise the positive impact and mitigate any negative impact.

Step 5: Review and reflection including monitoring and evaluation. This involves highlighting milestones to measure any changes in impact or if the predicted impacts were observed, reviewing the process and any impact which it may have had on decisions and future policies.

HIAs and other impact assessments are best used to inform policies before decisions are taken and involve anticipating or predicting their potential impacts (Haigh et al, 2013). Whilst prospective assessment is needed to inform decision-making (Davenport et al, 2006), the lack of direct evidence can lead some to question the validity of findings (Parry and Stevens, 2001). Retrospective validation of prediction in impact assessment is little addressed in the literature and discussion has focused on the use of predictive tools (George, 2000; Gontier et al, 2006; Hecky et al, 1984; Moelfe, 2017) or the challenges of evaluating and predicting impacts (Ali et al, 2009). For prediction in HIA specifically, the literature is even sparser (Petticrew et al, 2007; Veerman et al, 2007).

Evaluations of HIA can consider: their accuracy in predicting the health and well-being impacts; how well stakeholders were engaged; or their effectiveness in informing decisions (Parry and Kemm, 2005). Several studies have evaluated the effectiveness of HIAs in influencing decisions (Bias and Abildso, 2017; Buregeya et al, 2020; Dannenberg et al, 2008; Haigh et al, 2013; Nour et al, 2016; Wismar et al 2007). Some studies have evaluated the HIA process including the evidence used (Tyler et al, 2019), consideration of equity (Buregeya et al, 2019; Povall et al, 2014) or level of participation (Thondoo et al, 2019). But we found none that assessed the accuracy of prediction by comparing the impacts predicted in an HIA with those observed after a policy or plan has been implemented.

The COVID-19 pandemic and the measures taken to control transmission, including requirements to stay at home, work from home, and socially distance, have had far reaching effects on populations and society since March 2020 (Chiesa et al, 2021; Gautam and Hens, 2020; Public Health England, 2020; United Nations, 2021; WHO, 2020; World Economic Forum, 2020). These have affected health and inequalities beyond the direct morbidity and mortality caused by illness from the virus (Dyakova et al., 2021). They have affected wider determinants of health, including the economy, the environment, social interaction, mental well-being and access to services such as education and health (Dahlgren and Whitehead, 2021). They have also had differential effects on population groups including older people, children, young people, women and those on low incomes (UK Government, 2020; United Nations, 2020).

In 2020, during the first wave of COVID-19 in the United Kingdom, both the Scottish Health and Inequalities Impact Assessment Network (SHIAN) and the Wales Health Impact Assessment Support Unit (WHIASU) carried out HIAs to identify the potential impacts of ‘stay at home’ and physical distancing measures (‘lockdown’) that were then being implemented (Douglas et al, 2020; Green et al, 2021a). Table 1 presents the policy measures that were assessed.

Table 1: Lockdown policy measures in Wales and Scotland during the first wave of COVID in 2020

Wales	Scotland
<p>The Welsh HIA was completed rapidly from April 1st until May 11th 2020, as the regulations were coming into force. These included the following:</p> <ul style="list-style-type: none"> • Welsh Ministers, registered public health officials and police constables had the right to detain people infected or contaminated with coronavirus • required some business premises to close, and required those that were allowed to stay open, such as supermarkets, to put specific measures in place to ensure adequate social distancing • restricted the movements of individuals so that they were not allowed to leave the place they were living without a ‘reasonable excuse’. The regulations included examples of these such as shopping for food, exercising once a day, getting medical help and travelling to work where it was not reasonable and practicable to work from home • closed places of worship, apart from in limited circumstances such as in relation to funerals • required Natural Resources Wales, local authorities, National Park Authorities and the National Trust to close public footpaths and access land, where the use of a path or 	<p>The Scottish HIA was completed rapidly between 13th and 20th March 2020, before restrictions were approved or implemented. The authors assumed that measures to contain the virus would include all of some of the following:</p> <ul style="list-style-type: none"> • Advising the whole population to self-isolate at home if they or their family are symptomatic • Bans on social gatherings • Stopping flights and public transport • Closure of ‘non-essential’ workplaces (i.e. beyond the health and social care sector, utilities and the food chain) with continued working from home for those that can • Closure of schools, colleges and universities • Prohibition of all ‘non-essential’ population movement • Limiting contact for special populations (i.e. care homes, prisons)

land posed a high risk of spreading coronavirus.	
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Both HIAs considered potential impacts on population health, well-being and health inequalities and made recommendations to mitigate negative impacts and enhance positive impacts. This paper aims to compare the predicted impacts identified in the two HIAs, with observed trends in both countries over the 18-month period after the start of the pandemic, between March 2020 and December 2021. The paper briefly compares the two HIAs, reports on a comparison of predicted and observed impacts, their accuracy, discusses reasons for any differences, and suggests implications for policy and practice.

Methods

The methods and findings of both the Welsh and the Scottish HIAs have been reported previously (Douglas et al, 2020; Douglas et al, 2020a; Green et al, 2020a, Green et al, 2021a). Both assessed the ‘stay at home’ and physical or social distancing policies of the Welsh and Scottish Governments, implemented in response to the COVID-19 pandemic in order to control the transmission of the virus. They followed the standard HIA process (Bhatia et al, 2014; Douglas, 2011; WHO, 2022; Winkler et al, 2020;) and were undertaken in the first wave of the pandemic (March - May 2020).

Overview of the Scottish and Welsh HIAs

Table 2 summarises the processes followed in the two HIAs. The Scottish HIA was completed in one week between 13th and 20th March 2020, before lockdown measures were initiated on 26th March. The HIA used a health impact checklist (Douglas, 2019) to identify potential mechanisms through which positive and negative impacts might arise. The five authors then collated routine data, systematic reviews, and other peer reviewed and grey literature. They estimated for each impact an approximate number of people likely to be affected, a qualitative description of severity and direction of the impacts (positive or negative). There was no stakeholder engagement. The report presented main areas of impact and recommended mitigation measures (Douglas et al, 2020a) and included a more detailed impacts table. The HIA was used as an initial framework and subsequently developed further as part of the Public Health Scotland COVID-19 Response.

The Welsh HIA was completed in two months between April and 11th May 2020, from the start of lockdown and during the first few weeks of the first wave. The HIA used health and well-being and population group checklists (WHIASU, 2020) to identify mechanisms through which impacts might arise. The six authors collated routine data, systematic reviews, peer reviewed and grey literature. Stakeholder engagement involved interviews with 15 key stakeholders from Wales. The HIA team estimated for each impact the direction (positive/negative), likelihood, intensity/severity and duration using previously validated definitions (Green et al, 2020). Reporting included: an Executive Summary; Main Report with analysis of main areas of impact, recommended mitigation measures, and detailed impacts table; and Supporting Information technical report (Green et al, 2020a). The HIA was used as an initial framework with an indication of the scale of some impacts, and subsequently developed further as part of the Public Health Wales and Welsh Government’s COVID-19 Response. This paper uses the areas of impact highlighted in the original HIA report.

Table 2: The Welsh and Scottish HIA processes

	Scottish HIA	Welsh HIA
Stages of the HIA	<ol style="list-style-type: none"> 1. Screening 2. Scoping 3. Appraisal of evidence 4. Recommendations 5. Reporting 	<ol style="list-style-type: none"> 1. Screening 2. Scoping 3. Appraisal of evidence 4. Recommendations 5. Reporting 6. Process review and reflection
Timing of the HIA	Immediately prior to the introduction of COVID-19 regulations	As regulations were introduced
Checklists used	<ul style="list-style-type: none"> • Population groups • Wider determinants of health 	<ul style="list-style-type: none"> • Health and Well-Being Determinants • Population Groups
Characterisation of each impact	<ul style="list-style-type: none"> • Affected populations • Estimated number affected • Severity 	<ul style="list-style-type: none"> • Positive / negative • Severity/duration/likelihood
Evidence used to inform the HIA	<ul style="list-style-type: none"> • Routine data • Public health knowledge • Background information • Literature review – mainly systematic reviews 	<ul style="list-style-type: none"> • Health intelligence and data • Public health knowledge • Grey literature and background information • Literature review - systematic reviews and other peer reviewed articles • Stakeholder involvement
Stakeholder evidence	None	15 interviews were undertaken with key stakeholders

Overall, the two HIAs followed similar processes and assessed broadly similar policies. However, the Welsh HIA gathered evidence from stakeholders and included a more comprehensive literature review and evidence gathering process. The Scottish HIA was carried out immediately before the lockdown, whilst the Welsh HIA was conducted during the first eight weeks. It also included a review and reflection on the process and recommended monitoring of future impacts.

Comparing HIA predictions with observed impacts

Firstly, the affected populations and main determinants or areas of impact identified in the two HIA reports were tabulated, to compare the impacts identified between each HIA. Robust routine monitoring and survey data on relevant trends were then collated for each identified area of impact. This included Scottish and Welsh Government data, data from StatsWales, the Office for National Statistics, Public Health Wales reports and surveys such as the PHW Public Engagement Survey on Coronavirus Measures (Public Health Wales, 2022), Public Health Scotland reports and surveys. The authors also drew on other surveys in Wales, Scotland and UK wide. These sources were used to compare the direction of change for each determinant with the direction (positive or negative) predicted in the HIAs. We did not attempt to assess whether the judgements of severity were accurate as these were mostly qualitative descriptors. We graded the strength of evidence available for each impact as High (rated as 1) for government or public health institute data and for peer reviewed papers and Low for other sources (rated as 2).

Results

Comparison of predicted and observed impacts

Tables 3 and 4 present a summary of the predicted impacts and whether they were observed and accurate, indicating the strength of supporting evidence. Supplementary Tables S1 and S2 provide further detail. For most of the impacts, High grade evidence was available from government or public health institute sources supporting the prediction. For both HIAs, most predicted impacts were observed in the expected direction (positive or negative). As predicted, there were negative impacts on income, particularly for people already on low incomes, which were only partially mitigated by the Coronavirus Job Retention scheme and other measures (ONS, 2021; Widnall et al, 2020). Social isolation led to high levels of loneliness (Groarke et al, 2020; Public Health Wales, 2020; Scottish Government, 2022; WCPP, 2021) and there is evidence of increased child abuse and domestic abuse (Davenport et al, 2020; House of Commons Library, 2021; ONS, 2020), as predicted in both HIAs. The HIAs predicted that disruption and unwillingness to attend health settings would affect care of non-COVID-19 conditions, and this has occurred (Scottish Government, 2020; Welsh Parliament, 2021a). Similarly, the HIAs predicted disruption to education would increase educational inequalities and there is evidence that this has happened (Public Health Wales, 2021; Scottish Government, 2021). The predicted short-term fall in car and other journeys occurred, resulting in improved air quality and other environmental impacts (Transport Scotland, 2021; Welsh Parliament, 2021b). But, as also predicted, reluctance to use public transportation has led to higher car travel and this now accounts for a higher proportion of journeys. Both HIAs predicted negative effects on mental well-being through high levels of anxiety (Mind Cymru, 2021; Public Health Wales, 2020; Scottish Government, 2020). They also predicted positive effects on community cohesion through collective individual and neighbourhood responses and there is evidence of high levels of community support during the pandemic (Edinburgh Community Health Forum, 2020; Public Health Wales, 2020). The HIAs predicted potential negative impacts on ethnic minority populations and there has been an observed increase in hate crime and reports of harassment affecting people of Asian ancestry and disabled people (BBC, 2021; UK Government, 2021). The Welsh HIA predicted exacerbation of these impacts by crowded living conditions, and there is evidence of an increase in household disputes (Woodfine et al, 2021). The Scottish HIA identified the negative impact of restricted access to greenspace, and surveys found that use of greenspace reduced during the 2020 lockdown period although respondents reported it benefited their mental health (Public Health Scotland, 2021a).

The Scottish HIA identified the potential for unrest, whereas the Welsh HIA predicted reduction in overall crime and increased trust in the police. The Welsh HIA was more correct, as most forms of crime reduced and there has been no significant unrest in either nation, although there were increases in some types of crime such as domestic abuse, as noted above, and virtual fraud (Public Health Wales, 2020; Scottish Government, 2021a). The HIAs also differed in their assessment of likely impacts on health-related behaviour, and the observed impacts have also been mixed (Public Health Scotland, 2021; Public Health Wales, 2020). Both HIAs identified the potential for increases in health harming behaviours, for example snacking and alcohol use. The Scottish HIA predicted a reduction in physical activity whereas the Welsh HIA predicted that increased appreciation of physical activity may lead some to increase physical activity. The available data suggest that some people adopted healthier behaviours, but a higher proportion adopted less healthy behaviours, including physical activity for which larger declines were seen in younger, ethnic minority and unemployed populations (Obesity Action Scotland, 2020; Public Health Wales, 2020). The Welsh HIA also identified a reduction in street sleeping (Woodfine et al, 2021) and increased digital connectivity (Public Health Wales, 2020), both of which occurred, partly due to mitigation measures implemented early in the pandemic.

Both HIAs identified population groups that would be particularly vulnerable to negative impacts. Most of these populations have been disproportionately affected by the anticipated impacts. The only exception is that both HIAs predicted that older people would bear a higher impact on mental health than other groups.

Despite bearing a disproportionately much higher burden of direct morbidity and mortality from COVID-19, older people have reported lower levels of anxiety, loneliness and hopelessness than younger age groups (Office for Health Improvement and Disparities, 2021).

Table 3: Predicted and observed health impacts of the COVID-19 lockdowns on population groups

Population Group	Predicted health impacts identified in Scottish HIA	Predicted health impacts identified in Welsh HIA	Prediction confirmed as observed? (Strength of evidence*)	
			Scotland	Wales
Older people	Negative impact – high-risk of infection and social isolation	Negative impact – social isolation	✓ (1)	✓ (1)
Children and young people	Negative impact - disrupted education	Negative impact – disrupted education, adverse childhood experiences, reduced socialisations, loss of employment for young people due to shutdown sectors	✓ (1)	✓ (1)
Women	Negative impact - more likely to be carers, income loss if need to provide childcare during school closures, potential for increase in family violence	Negative impact – more likely to be carers, potential for increase in family violence, stress from patient and public facing roles, loss of employment from shutdown sectors	✓ (1)	✓ (1)
Minority ethnic groups	Negative impact – increased discrimination and harassment	Negative impact – worse health outcomes from infection, increased discrimination and harassment	✓ (2)	✓ (1)
People with existing mental health issues	Negative impact – social isolation, risk of relapse/withdrawal in substance misusers	Negative impact – worsening mental well-being	✓ (1)	✓ (1)
Those with disabilities including learning challenges	Negative impact – disrupted support services	Negative impact – disrupted support services. Positive impact – more opportunities to join the workforce	✓ (1)	✓ (1)
Homeless people	Negative impact – disrupted support service, unable to self-isolate	Positive impact – providing shelters to prevent transmission could end street sleeping	✓ (1)	✓ (1)
People in criminal justice system	Negative impact - difficulty of isolation in prison setting, loss of contact with family	No predicted impacts identified	✓ (1)	-
Undocumented migrants	Negative impact - may have no access or be reluctant to engage with health services	No predicted impacts identified	No data available	-

Workers	Negative impact - workers on precarious contracts or self-employed may be at significant risk of adverse impacts from loss of work and no income	Negative impact - those who work in sectors which have closed due to restrictions, resulting in people losing jobs or experiencing reduced income, increased mental health impacts on key workers	✓ (1)	✓ (1)
People with low income	Negative impact - already more likely to have poor health	Negative impact – financial insecurity, although mitigated by the furlough scheme	✓ (1)	✓ (1)
People in institutions	Negative impact - care homes, special needs facilities, prisons, migrant detention centres, cruise liners – these institutions may act as amplifiers	Negative impact - care homes may act as amplifiers	✓ (1)	✓ (1)

*Strength of evidence:

1 = High - Evidence of trends from national statistics, government or public health institute reports or peer reviewed papers

2 = Low - No national statistics or peer reviewed papers but evidence available from other surveys, grey literature reports or other sources

Table 4: Predicted and observed health impacts of the COVID-19 lockdowns on the wider determinants of health

Determinant of health and well-being / Pathway of impact	Predicted health impacts in Scottish HIA	Predicted health impacts in Welsh HIA	Prediction confirmed as observed? (Strength of evidence*)	
			Scotland	Wales
Economic impacts	Negative impact – loss of income, increased unemployment and recession	Negative impact - loss of income and spending, increased unemployment, and closure of small businesses Positive impact – home working has provided greater flexibility	✓ (1)	✓ (1)
Social isolation	Negative impact – individuals who live alone and have lower access to digital connectivity	Negative impact – all populations groups affected Positive impact – digital technology lead to increased connectivity	✓ (1)	✓ (1)
Food security	Negative impact - difficulty accessing food and other supplies	Positive impact – protection of the vulnerable for example through free school meals	✓ (1)	✓ (1)
Family relationships	Negative impact - home confinement may increase family violence and abuse	Negative impact – potential for domestic abuse	✓ (1)	✓ (1)
Health-related behaviours	Negative impact – substance misuse, gambling, unintended pregnancies, reduced physical activity	Negative impact – substance misuse, snacking Positive impact – increased appreciation of the importance of physical activity	✓ (1)	✓ (1) ✗ (1)
Disruption to essential services	Negative impact – health and social care demand, unwillingness to attend healthcare setting, loss of workforce	Negative impact – reduced access to services	✓ (1)	✓ (1)
Disruption to education	Negative impact - loss of education and skills, reliance on home schooling	Negative impact – loss of education and skills	✓ (1)	✓ (1)

Traffic, transport and green and blue infrastructure	Positive impact - reduced traffic and air pollution in short term Negative impact – restricted public transport, reduced use of public transport, restricted access to green space	Positive impact – reduced traffic and air pollution in short term Negative impact – reduced use of public transport	✓ (1)	✓ (1)
Social disorder	Negative impact - potential for unrest	Positive impact - reduction in crime rates, increased trust in police	✗ (1)	✓ (1)
	Negative impact - harassment of people believed to be at risk of transmitting the virus		✓ (1)	
Psychosocial impacts	Negative impact - public fear and anxiety	Negative impact – public fear and anxiety	✓ (1)	✓ (1)
	Positive impact - community cohesion	Positive impact – mobilisation of society	✓ (1)	✓ (1)
Living conditions		Negative impact - Crowded or poor housing quality exacerbating existing health conditions Positive impact -There has been rapid action to place those who are homeless in accommodation.	-	✓ (1)

* Strength of evidence:

1 = High - Evidence of trends from national statistics, government or public health institute reports or peer reviewed papers

2 = Low - No national statistics or peer reviewed papers but evidence available from other surveys, grey literature reports or other sources

Discussion

This paper has shown that most of the health impacts anticipated in the Scottish and Welsh HIAs have occurred in the predicted direction, using monitoring data up to December 2021. As predicted, there have been significant adverse impacts through multiple pathways including loss of income and employment; mental health and well-being impacts of social isolation, stress and anxiety; family stress and increased violence against women and domestic abuse; disruption to health and other services; educational disruption; and a reluctance to use public transport. These have disproportionately affected population groups who were already disadvantaged, for example women, older people, those on low incomes, children and young people. The impacts on health-related behaviours have been more mixed, for example some people increased physical activity or alcohol intake, and some reduced it. The main positive impact identified in the Scottish HIA was the potential for increased sense of community, which has been demonstrated. The Welsh HIA identified further positive impacts reflecting mitigation measures early in the pandemic, such as provision of accommodation for homeless people and the increased use of digital technology.

We are not aware of any other evaluations of HIAs that assessed whether the anticipated impacts proved to be correct after the proposed policy was implemented. Assessing the predictive accuracy of an HIA is difficult, as the impacts that occur after implementation may be altered by responses taken after the HIA has been completed (Parry and Stevens, 2001; Petticrew et al, 2007). This includes measures taken to implement the HIA recommendations, so ironically if an HIA is effective in influencing policy this makes it more difficult to evaluate the accuracy of its predictions. In this case, several interventions were implemented to help mitigate wider impacts, although not directly as a result of these HIAs. These include the Coronavirus Job Retention Scheme ('furlough') providing economic support to employers and employees (House of Commons Library, 2021), a temporary increase in universal credit (Department for Work and Pensions, 2021) and providing free laptops to some children and young people to support online learning (Department for Education, 2020). These measures will have mitigated some of the anticipated negative impacts, but significant residual impacts still clearly occurred, for example those on low incomes bore strongly negative impacts despite employment support (Mental Health Foundation, 2020).

Both HIAs followed the standard HIA process but differed in timing and depth. The earlier timing of the Scottish HIA potentially gave more opportunity to inform early mitigation measures, whereas the later Welsh HIA allowed early evidence of emerging impacts to suggest changes to mitigate or maximise these. The Scottish HIA was completed very rapidly in one week and included relevant data and literature evidence but no stakeholder involvement. The more comprehensive Welsh HIA allowed a fuller characterisation of the likelihood, significance and duration of each impact, using criteria validated in previous HIAs (Green et al, 2020).

Finally, the HIAs identified very similar impacts with some differences (Table 3 and Table 4; Supplementary Tables S1 and S2). The Welsh HIA identified more opportunities for positive health and well-being. This included the potential for home working to promote better work/life balance and flexible working; increased family connectivity; and the potential to develop a more sustainable economic model prioritising health and well-being. The main area in which they reached opposing conclusions was the impact on crime. The Welsh HIA predicted a reduction in crime, based on police reports during the early part of the pandemic. Conversely, the Scottish HIA predicted a potential increase in crime and social disorder due to discontent about the pandemic response and reduced policing capacity. In practice, there was little significant disorder in the UK (although events elsewhere show the potential for this to arise). Crime overall fell during restrictions, especially violent crimes associated with the night-time economy, but some crimes such as domestic abuse, child abuse and virtual fraud increased (Office for National Statistics, 2022; Scottish Government, 2020). A more detailed HIA in Scotland may have predicted these nuances. Both HIAs identified the potential for an increase in health harming behaviours, but they diverged in their prediction of impacts

on physical activity. Whereas the Scottish HIA identified the potential for reduced physical activity because of closed sports facilities and less utilitarian active travel, the Welsh HIA identified increased appreciation of the importance of physical activity as population movements outside of the home were restricted (PHW, 2020). In both countries and across the UK, the impacts on health-related behaviours have been mixed, with polarisation between populations and a likely increase in inequalities (Convention of Scottish Local Authorities and Scottish Government, 2020; Public Health England, 2020a). Some negative consequences were not foreseen by either HIA i.e. the Welsh HIA identified positive opportunities for local tourism but not the accompanying negative impacts of increased tourist traffic, increased accommodation prices and environmental damage (Christian, 2021; Department for Transport, 2021; Schofields Insurance, 2020).

The strengths of this evaluation are that it is original in evaluating the accuracy of predictions in the HIAs, and the broad range of data sources used to assess whether anticipated impacts emerged in the direction expected. There are limitations to the available data for some impacts, particularly health related behaviours and differences between population groups. Also, some impacts may emerge later – for example longer term impacts on unemployment, predicted by both HIAs, are not yet clear. The HIAs presented a high-level characterisation of different types of impacts and the evaluation has not sought to determine whether judgements about scale or severity of impact were correct. The authors were involved in the HIAs, which might bias our conclusions. However, the two HIAs were completed independently and this evaluation, involving authors of both HIAs, encouraged cross-scrutiny and appraisal and used robust sources where available. As noted above, anticipated impacts will have been affected by mitigation measures and further work is needed to explore the extent to which the HIAs were able to influence policy responses.

Implications for HIA practice

This evaluation demonstrates that even a very rapid HIA can correctly predict many relevant impacts on health and equity before a policy is implemented. The breadth of the impacts and their differential effects reinforce the need for a holistic approach, enabling HIAs to identify potential impacts affecting different populations through multiple pathways. Comparison between the HIAs demonstrates the benefit of stakeholder involvement and a more detailed review of supporting evidence. These are routinely advocated to enable robust analysis (Mindell et al, 2014; Negev et al, 2013; Tamburrini et al, 2012; Mindell et al, 2010; Mindell et al, 2004). Evidence from stakeholders, who were being affected by impacts that had not yet been captured in literature or statistics, provided more certainty and depth. In every HIA, there is a need to balance the available resources and capacity, the level of detail needed to provide robust conclusions and the need for timeliness of recommendations to influence decision making and inform actions.

Both HIAs were used as a framework for initial mitigation and were then developed further. This allowed the initial findings to be used while emerging impacts were explored. This shows that HIAs can support an ongoing, collaborative 'Health in All Policies' approach working across sectors rather than being just a one-off assessment (Green et al, 2021; Rogerson et al, 2020).

This evaluation shows the potential to monitor observed impacts following an HIA, using routine data. Although most HIA guidance suggests that HIA should include monitoring and evaluation (Pyper et al, 2021; National Research Council (US) Committee on Health Impact Assessment, 2011; Dannenberg et al, 2008; Harris et al, 2007; Quigley and Taylor, 2004), in practice this is often not done. Undoubtedly, many of the impacts anticipated in these HIAs were partially mitigated by other measures implemented alongside social distancing restrictions. However, this paper shows that it is still possible to assess whether the HIA predictions were broadly correct. Further similar evaluations could help demonstrate whether, and when, HIAs are effective in predicting future impacts and improve future practice. This paper assessed national level HIAs for which national data were readily available, but relevant data are also often disaggregated to

more local levels thus making this approach replicable locally. HIAs should highlight the priority indicators to monitor, so they can be collated following proposal implementation.

The close match between predicted and observed negative impacts raises the question of whether the HIAs were effective in informing action to mitigate these. Were the HIAs ignored, or did they inform actions that in practice only partially reduced the impacts? The legal context is important as the ability to more fully mitigate some impacts may have been beyond the powers of the devolved Welsh and Scottish governments. A consideration for future HIAs is to prioritise the impacts that are most amenable to action, and specify the authorities with power to implement these. Further research could explore how HIAs are used by policymakers to enhance their effectiveness in influencing action.

In both HIAs, some or all authors worked in the national public health organisation. This enabled access to relevant evidence, for example health observatory data and statistics, but also more importantly allowed the findings to be used in the relevant organisations' responses to the wider impacts of the pandemic. Both HIAs and findings were also published in academic journals, reaching a wider audience (Douglas et al, 2020; Green et al, 2021a).

Implications for policy

HIAs are themselves an intervention that aim to influence the outcome of the policies assessed (Mindell et al, 2014). The finding that even very rapid HIAs, such as the Scottish example, can effectively predict a wide range of impacts on health also supports more widespread use of HIA in policymaking. Routine use of HIA could identify unanticipated potential health impacts before, or as, policies are implemented, offering the opportunity to mitigate adverse and enhance positive impacts in 'real time' (Green et al, 2021a). Evaluations showing evidence of validated prediction should increase commissioners' confidence to use HIA.

The data also highlight the range of negative impacts of the pandemic and their differential effects. There is a clear need for continuing action to address these residual health impacts in the post pandemic period. Processes such as HIA can help to ensure actions are well designed to enhance their positive effects, avoid unanticipated harms and are targeted to the populations most affected.

Conclusion

This paper evaluated the impacts identified in two HIAs that assessed the impact of 'lockdown' in Scotland and Wales in 2020. It demonstrates the value of prediction in health impact assessment and fills a gap in the literature by comparing predicted with observed impacts. The rapid Scottish and more comprehensive Welsh approaches both have value, with the stakeholder involvement and more comprehensive evidence review allowing more detailed characterisation of the impacts to inform decisions and action.

The pandemic has raised the profile of public health more widely. The use of processes such as HIA can build on this and inform decisions based on evidence and predictive analysis. Evaluations like this could increase confidence in prospective HIA. Post COVID-19 recovery and renewal should allow health and well-being should be centred within future policies and decisions. Processes such as HIA can support this and form a key part of a 'health in all policies' approach (Wismar, Kemm and Fehr, 2013).

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Chapter 9: Discussion

Parts of this chapter are based on Chapter 5 'Health Impact Assessment in Planning' and Chapter 6 'Health in Impact Assessment' by Liz Green in 'Public Health Spatial Planning in Practice Improving Health and Well-being' published in: Chang, Green, Petrokofsky. September 2022 Policy Press. It is available online at: Policy Press | Public Health Spatial Planning in Practice - Improving Health and Well-being, By Michael Chang, Liz Green and Carl Petrokofsky (bristoluniversitypress.co.uk)

Discussion

Introduction

This section discusses the main findings of the research, examines what this means in practice and for academia and discusses the strengths, weaknesses, limitations, impact and influence to date. It explores potential future ways forward on from the work for the development and institutionalisation of Health Impact Assessment (HIA) as a field and as a process for ‘Health in All Policies’ (HiAP).

The aim of this work is to identify how HIA can be used as a tool to mobilise HiAP. This is viewed using Wales as a best practice example/ early adopter, and it uses a mixed methodological approach of case studies, scoping reviews and open and closed question digital surveys and expert interviews. The research investigates the contribution of HIA to advance HiAP in reality, both in Wales and globally, in Public Health Institutes (PHIs). It shares learning from HIA practice in Wales to better understand how HIA has been, and can be, used to inform policies, projects and decisions and the thesis concludes by assessing the accuracy of prediction in HIA. It suggests some tangible ways forward for the field and next steps.

The thesis is broken down into several peer reviewed published chapters and papers. These reflect four areas of focus for the research:

- Mapping the current status of health impact assessment in Chapters 2 and 3
- Mapping health impacts in specific broader policies in Chapters 4, 5 and 6
- Mapping health impacts in multiple broader policies and innovative methods in HIA in Chapter 7
- Evaluating predictive accuracy in HIA in Chapter 8.

Main findings of the chapters

The main findings of the chapters are summarised below and reflect the four areas of interest investigated.

Current Status of HIA

Chapter 2 - Health impact assessment

The findings from the literature review highlight that HIA is widely respected as a public health tool and is used to support the practical implementation of HIAP. HIA can be used to identify both positive and negative impacts on health, well-being and inequalities and inform decision making and policies, plans and projects to mitigate for these. It can be practiced as a standalone process or integrated into other assessments. The practice of HIA is more advanced in some regions and nations than others for example, Europe and Australia; Wales, Scotland, Andalusia and New South Wales. There are opportunities and challenges around the implementation of HIA and how it is used to promote and enable HIAP. Challenges include lack of capacity, time, resources and the need for training whilst opportunities can be provided be through legislation and integration into other legally required impact assessments such as Environmental Impact Assessment (EIA) or Strategic Environmental Assessment (SEA). The post pandemic recovery and the increased profile of public health, the wider determinants and inequalities can also be used as a platform on which to advance HIA and HIAP.

Chapter 3 – Facilitators, Barriers and Views on the Role of Public Health Institutes in Promoting and Using Health Impact Assessment—An International Virtual Scoping Survey and Expert Interviews

This study highlighted how HIAs are being promoted or used currently (or not) by PHIs across the world. It captured some of the barriers and enablers for HIAs in PHIs. For example, lack of knowledge, capacity and resources; legislation and integration of health into assessments such as EIAs which may be legally required. Both the survey and interview respondents recognised HIAs as an important tool to drive HiAP approaches to improve health and reduce inequalities and inform policy and decision making. HIAs are recognised as a prevention tool and the practice of HIA in Wales was identified as an example to follow. The post pandemic landscape presents a 'window of opportunity' for PHIs to utilise and advocate for HIAs to be carried out. The results from this study can serve as baseline for future work and a platform to help build knowledge, networks, and expertise to promote capturing the co-benefits of investing in HIAs.

Mapping the health and inequality impacts in specific policies and projects – evidence from Wales:

Chapter 4 - Using health impact assessments to implement the Sustainable Development Goals (SDGs) in practice: a case study in Wales

This research outlines how carrying out a HIA can help to reflect on, implement and achieve the SDGs in practice by providing evidence-based maximisation and mitigation opportunities for any identified impacts. The World Health Organization toolkit on achieving the SDGs refers to HIA as a method to implement them but gives no direction how (WHO, 2016) and this is the first example of how it could be done. It maps the relationship and overlap between HIA and SDGs and is the first case study example of a social determinant, community participative HIA of a power cable development. The wider determinants of health and population groups were mapped across to the Well-being Goals in Wales (which enshrine the SDGs) and then mapped across to the corresponding SDGs. This approach enabled the HIA to demonstrate how the process and the two checklists used in HIA can be explicitly tied to the SDGs. It highlighted the community contributions to the HIA and associated EIA and the issues which were important to them. For example, Electro Magnetic Fields and how they were included and considered. The HIA was used to inform the decision-making process and refine further consultation with the community. Although the Welsh context is different to many nations, the mapping of SDGs through HIA could be carried out by these to tie their HIA delivery with a HiAP and SDG approach.

Chapter 5 - Process, Practice and Progress: A Case Study of the Health Impact Assessment (HIA) of Brexit in Wales

This paper articulates the process of carrying out a complex policy (Brexit) HIA in Wales. It captures the 'learning from doing' the HIA (positives and negatives) and the workforce implications. It has had a clear impact on decision making and actions by public bodies including national government. 'Learning by doing' is a very good method of carrying out HIAs and should be promoted. The HIA demonstrates continued leadership by Wales in the field of HIA and HiAP and has demonstrated how HiAP can be practically implemented in this context. The work created and solidified many high-level strategic advocates for HIA across a wide range of national and local stakeholders including in national government and PHIs. It has transferable learnings obtained from practice, which can be used by many nations and devolved regions. HIA can provide health policy leads, grappling with complex novel policies with a lens to think these through. It has demonstrated the "added value" of HIA to inform action in assessing policies, plans and projects at all levels, but particularly those in relation to dynamic policies and unknown significant events.

Chapter 6 - Using health impact assessment (HIA) to understand the wider health and well-being implications of policy decisions: the COVID-19 'staying at home and social distancing policy' in Wales

This HIA demonstrates how the process has been a beneficial tool to inform and understand a policy decision and the unknown challenges which emergency and unpredicted major events such as the COVID-19 pandemic present. Using a 'real time' approach the concurrent HIA identified the health and equity impacts as they emerged and allowed for future policies and plans to be adjusted to mitigate for negative health impacts and maximise positive impacts on the population and any inequalities. It involved key cross-sectoral and multi-disciplinary stakeholders and evidence in synergy and enabled an evidence based HiAP approach. The impacts identified have added to the evidence base in relation to the wider determinants impact of the COVID-19 pandemic. HIA can be utilised by policy and decision-makers and the HIA community in the future to inform, promote or carry out similar HIAs. The HIA has transferrable learnings in relation to the use of HIA in promoting a better understanding of the immediate and the long-term ramifications of policy decisions. It also raises awareness of how PHIs can use HIA to communicate any harm to, and opportunities for, wider population health and well-being in order to advocate for healthier and fairer societies.

Mapping the health impact in multiple and broader policy contexts

Chapter 7 - Brexit, COVID-19 and climate change: Mapping the impact of the 'Triple Challenge' on health and wellbeing in Wales

This research provides an overview of the mapping of multiple (three), comprehensive HIAs of complex policies in Wales. This is the first such piece of research which does this with HIA. It provides a synopsis of the results, details the methods and discusses the learning from carrying out the mapping process and work itself. Results indicate the three components of the Triple Challenge must not be viewed as separate silos as they have cumulative multi-faceted impacts such as the impact on mental well-being or the environment. Some population groups are more negatively affected than others for example, rural populations. The HIA approach can enable a range of stakeholders to critically view similar challenges not just as single issues but as a holistic whole to mobilise action and inform policy and decision making based on evidence from a range of sources. It was a highly challenging piece of work but has transferrable learning for other practitioners and policy makers in how it was carried out. It could be replicated in other contexts but with caveats around resources and the knowledge and experience needed to do so. It can be replicated in a more proportionate way for example, at a screening level.

Evaluation of HIA predictive accuracy

Chapter 8 - Comparing predicted and observed impacts of the COVID-19 pandemic response in two Health Impact Assessments in Scotland and Wales

This study evaluated the impacts identified in two HIAs that assessed the impact of 'lockdown' in Scotland and Wales in 2020. It provides an overview of the results and how the evidence was mapped and graded in comparing the predicted impacts against the observed ones. It demonstrates the value of prediction in HIA and fills a gap in the literature. The Scottish rapid HIA and more comprehensive Welsh approaches both have value, with the stakeholder involvement and more comprehensive evidence review allowing for more detailed characterisation of the impacts to inform decisions and action. The results from this paper can provide some confidence and assurance to decision and policy makers in the predictive nature and accuracy of prospective HIA as a tool to enable healthy public policy and decision making and its effectiveness.

Conceptual, practice and diffusion considerations

This research has led to several conclusions and overall findings in relation to HIA and its use in implementing HiAP. These are discussed in the following pages and some suggested practical ways forward are proposed. It is centred around three themes. These are: conceptual considerations; practical implementation issues; and policy learning and diffusion.

1. Conceptual considerations:

HIA as a tool to implement ‘Health in All Policies’ in practice

At its core, this thesis examines how HIA can be used to mobilise HiAP in practice and is centred around the hypothesis:

‘The practice of Health Impact Assessment (HIA) in Wales has positively demonstrated that it can be used to support the concept of ‘HiAP’ in practice and offers transferable learning for nation states and public health institutes and agencies internationally’.

The research confirms that HIA as a process supports a consideration and the implementation of HiAP in practice using the example of Wales (albeit with its own particular political strategic policy levers and drivers) and the HIAs articulated and discussed.

Several case study examples of HIAs from Wales which have been successfully carried out across traditionally described ‘non-health sectors’ and health systems and for policies, projects, events and decisions are presented. These describe the impact that they have had in informing decisions and policies and projects and capturing the wider health impacts across sectors in doing so, and the synergies in policy interests at points in time to enable them to be completed. Through the HIA process, these case studies have engaged with different sectors and settings to identify synergies, potential positive impacts and harms to health on the determinants of health and well-being, and provided some realistic recommendations and suggested actions to reduce inequalities and improve equity – as provided by the WHO definition of HiAP in chapter 1 (page 2). They have demonstrated where HIA has been used as part of an integrated approach (with EIA or multiple policies) or as a standalone process, and shows the usefulness and effectiveness for policy and decision makers when the process is led by a respected organisation with respected leads. This confidence and acceptability should be built on and Chapter 8 evaluates the accuracy in prediction and anticipated impacts, and this can also provide further confidence to both health, and traditionally described ‘non-health sectors’ policy and decision makers and show its value to them as a public health tool.

A practice at a juncture

As a field of practice HIA appears to be at a juncture in its development and evolution which the pandemic recovery could support. This work captures new learning and evidence around how HIA can be mobilised including within national and regional public health institutes (PHIs), across the world, and the enablers and barriers for this. Peer reviewed HIA literature reinforces the idea that HIAs can be standalone or integrated, focused on social determinants and equity or environmental determinants and risk and be qualitative or quantitative in nature (Cave et al., 2021b; Kim and Haigh, 2021; Winkler et al., 2021).

Whilst this affords flexibility to practitioners, it can lead to a fractionalisation across the field with different perspectives and practice being presented as ‘HIA’. This could unintentionally lead to HIA becoming synonymous with EIA and environmental determinants in many PHIs and organisations to the detriment of wider health determinants and equity issues. Many PHIs automatically refer to environmental risks and harms rather than equity and the wider determinants depending on their remit and so the two processes are already inextricably linked for them. The mandated EIA process also requires a consideration of ‘population

and human health’ and by focussing on one impact assessment process it becomes the default position and easier to demonstrate where health involvement or input has been provided. However, there are also examples of other PHIs who take a distinct equity and social determinant focus (Frieden and Koplan, 2010; International Association of National Public Health Institutes, 2023; Koplan et al., 2005; Myhre et al., 2022; Pascal et al., 2022).

In the academic field, a recent bibliographic analysis (Kim and Haigh, 2021) also depicts a picture of distinct differences and perspectives around HIA in the peer reviewed literature – with distinct areas of focus highlighted for social determinant and equity driven HIAs and those who advocate for health integration into EIA or SEA and environmentally determinant aligned policies and plans. Currently, the latter are more prevalent than the former. Whilst HIA is a well-respected and recognised public health tool (World Health Organization, 2023b) which has grown in practice and evolved over the last 25 years, it is still not fully trusted by some policy and decision makers. This could be due to being perceived as ‘speculative’ if there is little evidence to establish causal paths or ‘anecdotal’ when qualitative evidence and community engagement is part of the process (Haigh et al., 2020; Lock, 2000; Mahoney et al., 2004; Tamburrini et al., 2011).

This lack of confidence and acceptability by some leads to health impacts which can be measured and quantified as taking precedence when identifying health impacts. This has led to a field which routinely looks at environmental health determinants which can be measured such as air quality levels, emissions and noise levels. The research presented can bolster the academic evidence for wider determinant and equity driven HIAs and demonstrates that health can be integrated into developments and national policies and projects, whilst still maintaining a social determinant and equity lens to enable HiAP and meet its definition of synergies with other sectors and systems, mitigation for negative impacts and addressing inequalities.

The COVID-19 pandemic has demonstrated the importance of public health (World Health Organization, 2023b) and its role in environmental and health policy and protecting health and health care services. But it has also heightened the obvious wider health impacts and the inequalities caused by policies such as ‘lockdown’ as described in Chapters 6, 7 and 8 (Green et al., 2021a; Marmot et al., 2020; The World Bank, 2021). This should be viewed as a ‘window of opportunity’ to use the process to reap co-benefits to health and wider society, and the post pandemic recovery presents an avenue for HIAP and HIA to be utilised more to incorporate a consideration of wider determinants focused public health and equity into policies and plans (Green et al., 2021c; Greer et al., 2022).

This is also a reason as to why HIA is at a juncture in its evolution. The HIAs which have been carried out in respect to COVID-19 responses have invoked interest and made policy and decision makers aware of the process. The fact that it provides robust evidence on which to make decisions has led to more confidence and acceptability in the process and therefore increase impact and effectiveness – particularly in Wales and also in the Scottish example. This must be built on and shared more widely by researchers and practitioners.

Perspectives on health, wellbeing and equity

Many impact assessments for example, EIA, SEA and Mental Well-being Impact Assessment, or frameworks such as Social Return on Investment (SROI) which capture social value, have scope for a consideration of health, well-being and vulnerable population groups to a greater or lesser extent (K Ashton et al., 2020; Cave et al., 2021b; Cooke and Stansfield, 2009; Fischer, 2013). This is highly dependent on not only the model of health that they utilise but also the perspectives of health they take as described previously. The models of health and how they relate to impact assessment is depicted in Table 1 below.

Table 1. Models of health and relating impact assessments and frameworks

Model	Impact Assessment typology				
	HIA	SEA	EIA	MWIA	SROI
Medical	√			√	√
Holistic	√ (dependent on Tender Brief, scope and context)	√ (dependent on Tender Brief, scope and context)	√ (dependent on Tender Brief, scope and context)	√	√
Wellness	√			√	√
Environmental	√	√	√	√	√

However, there are opportunities to shape the perspective taken during the impact assessment process itself (whichever sector or setting a person comes from) through discussions about scoping and any inclusion or exclusion criteria as part of the process. There is a requirement for a Scoping stage to be completed for all of these (and other assessments). For example, the SROI framework has a similar process flow as HIA which includes a scoping stage (K Ashton et al., 2020) and in the amended EU EIA Directive Population Health is included as part of the formal scoping process (European Commission, 2010). HIA and health can be integrated into this stage, and a distinct HIA scoping exercise can be carried out to inform the Scoping Statement or Opinion and it provides an important opportunity to identify and include key public health and health services stakeholders other than the statutory consultees. Frameworks such as Social Value and Social Return on Investment (Ashton et al., 2022; K Ashton et al., 2020) and the United Nations Sustainable Development Goals (UN SDGs) could also provide a way of driving a wider consideration of wider health impact within a range of sectors or organisations such as PHIs, as the SDGs include health, environment, equity and economy (Buse et al., 2019; Rogerson et al., 2020; United Nations, 2020).

A better understanding of wider determinant focussed HIA is essential and the differences in definitions of health used in HIA can, and do, make a major difference. However, there is a challenge in defining health in some sectors for example, spatial planning. Health is routinely considered as part of environmental or spatial planning related impact assessments across the world and there is legislation in place to ensure this (Branch, 2019; European Commission, 2010; Government of Japan, 2005). However, it tends to be more environmental health determinant focused. In the context of public health focussed spatial planning, there needs to be a move away from the environmental model of health which is routinely utilised to those of holistic or wellness models and equity highlighted above.

This poses several challenges including the terminology used, interpretation of evidence and terminology, legislation, practical guidance, knowledge, understanding and skills, rigour and defensibility and economics. However, it can be achieved and be integrated in this way as demonstrated by several Integrated Sustainability Appraisals, EIAs and SEAs which have been carried out internationally (Tajima and Fischer, 2013; Welsh Government, 2021b; Winkler et al., 2021, 2020) and the use of standalone HIAs such as that articulated in Chapter 4 and others (Rogerson et al., 2020)(Cave et al, 2020). To ensure that wider determinants and equity are considered it is essential that legislators and regulations define what they mean in terms of health at the outset i.e. bio-physical, environmental or holistic equity focussed WHO definition and what they need to be included to meet that definition. This research provides clear examples of the holistic model of health and wellbeing being used for determinants equity focused HIAs across policies and projects.

Different nation states are also at different points in the evolution and integration of health, well-being and equity into sectors such as spatial planning and development implementation (Rogerson et al., 2020). In

some nations in the world for example, UK, Canada, Thailand, parts of Europe and other economically developed and sustainable development aware countries, public health and planning practitioners are pushing for a shift in the way health is considered and this is gaining traction. However, there are many nations across the world who are pushing for basic environmental and biophysical health risks to be considered as part of policies, plans and projects or the enforcement of them. This means that for public health and environmental protection officers in these countries the inclusion of health per se is important rather than the definition and model – and the wellness model of promoting health and well-being is an ambition rather than a reality. Therefore, it is even more important that context and the regulatory, policy and practice landscape needs to be considered when integrating health into policies, plans and development proposals.

2. Practical implementation issues:

Role of legislation and an enabling environment

The importance of legislation is critical to providing strategic levers and direction for HIAs to be carried out in national, regional or local contexts (Cave et al., 2021b; Rogerson et al., 2020; Walpita and Green, 2022; Winkler et al., 2021). HIAs are still carried out voluntarily (as they still are in Wales and currently in many jurisdictions) (Cave et al., 2021b; Green, 2022a; Rogerson et al., 2020; Winkler et al., 2021) so that they are valuable and not just become a ‘tick box exercise’ like in some other legislative or mandatory impact assessment examples (Audit Wales, n.d.). Legislation or mandating is clearly cited as being important and that for many, without it, it makes making the case for HIA or to carry out a HIA challenging. Legislation or mandating, for example, using Environmental Impact Assessment or Public Health Acts can be an enabler (Linzone et al., 2018) - if in existence - however, it can also be an inhibitor if not. Legislation, therefore, can bring both opportunities and challenges (Winkler et al., 2021, 2013). This includes using other legislated for (or voluntary) types of assessments and processes such as EIA, SEA or SROI as a lever for health. Challenges include the following:

- the definition of health followed, and the understanding of this by a wide range of actors including assessors, commissioners, competent authorities or regulators and developers
- economic development and economic growth which may take precedence over health
- legal obligations
- the extent and timing to which health and public health stakeholders are involved
- the lack of public health capacity or knowledge to input into the assessment process or review it (Cave et al., 2021b; Winkler et al., 2021).

Opportunities include a better consideration, and integration of, health and well-being and inequalities into policies, plans and projects and legislation can enable the integration of health and a broad consideration of all health determinants into other impact assessments and processes. EIA and SEA Directives, public and environmental health and other IA legislation have provided opportunities for health inclusion and health agency input (Boldo et al., 2011; Branch, 2019; European Parliament, 2014; Government of Japan, 2005; UNECE, 2019; Welsh Government, 2017). Wider health impacts and public health perspectives and equity should be clearly referenced as to what constitutes health and HIA - as implemented in Welsh Legislation (Welsh Government, 2017).

Public Health is an ‘art and a science’ (Calman, 1998) and encompasses health promotion, protection and health services, and so this needs to be critically unpicked and agreed. Any specific guidance needs to not only be consulted on with regulators, legislators and key stakeholders such as spatial planners,

environmental and national public health institutes but actively engage with them from the start of the process. The examples from Wales demonstrate clearly that legislation specifically for HIA is not essential – but that an enabling environment, which provides strategic and local policy levers such as the Well-being of the Future Generations (Wales) Act 2015 (Welsh Government, 2015), and having supportive structures such as a dedicated HIA Unit, guidance which describes the definition of health to be considered or having a knowledge and skills base in place are hugely helpful and impactful.

Organisational aspects and workforce at Public Health Institutes

This research highlights examples of the conduct of HIAs which have been carried out in one PHI. For the PHI in question the organisational aspects and workforce supportive environment was incredibly helpful. It is very clear that workforce development, training, capacity and confidence building are essential for the promotion, implementation, evolution and institutionalisation of HIA in organisational settings. However, a number of barriers can exist. Barriers to capacity building activity and HIA implementation are frequently reported (Rogerson et al., 2020; Winkler et al., 2021, 2020; World Health Organization, 2010b) and include the need for better knowledge and skills for HIA, more resources for example, money or lack of capacity and more dedicated time to carry out HIAs in PHIs (Sharma et al., 2022).

For most PHIs this is an issue, as they often do not have the sufficient knowledge, skills (or feel they don't and if they do, then don't have the confidence to carry them out) nor training support to build capacity for HIA internally or externally. Wales is unusual in this respect and over almost 20 years the Wales Health Impact Assessment Support Unit (WHIASU) has evolved within the national PHI and the Welsh public health system. HIAs need to be proportionate and manageable within the resources that are available but that should not limit wider contribution or interaction with key stakeholders. For example, a participatory interactive workshop (either virtual or in person as described in the research) can be a time efficient and resource effective method of engaging with stakeholders and collecting evidence.

Critical to this is the need for organisational leads to understand that for the workforce to carry out a HIA does not mean that one person, one team or indeed one organisation carries them out by themselves. It needs to be understood within organisations such as PHIs that in fact it is a multisectoral, multi-skilled and multidisciplinary process which can be led by one person or one agency or several agencies with contributions from a range of officers and/or agencies with a wide range of necessary skills and knowledge. For example, a researcher would carry out the literature review, or an administrative officer would coordinate meetings and workshops. Seven different roles including lead practitioner, advocate, contributor and reviewer are articulated in the Wales HIA Training and Skills Knowledge Framework (Edmonds et al., 2019). This approach demolishes the misconception that one person should do a HIA and promotes a time and resource effective and efficient HIA model of working – not dissimilar to how Environmental Assessments are constructed. This division also adds to the process, encourages a range of diverse perspectives, plays to specialist's strengths and can lead to stronger working relationships.

Similarly, dispelling the myth that HIA is a hard and technical process to carry out is necessary. This thesis presents HIAs which are complex but driven by following a standard process which includes the collation of existing evidence, alongside undertaking primary data collection. PHIs and organisations and officers can, and should, start at a smaller level initially, for example on a small project or plan or proposal and learn from carrying these out. Practice can evolve eventually into more complex examples or with the help and advice of a Unit such as WHIASU.

The successful integration of HIA/P into PHIs can also be enabled by some small steps. This includes overcoming misconceptions from all sides of the system by providing training and capacity building, understanding roles, other perspectives and terminology, knowing the actual detail of the policy and

regulatory assessment landscape. They need to articulate what the PHI and stakeholders are trying to achieve, outlining clearly what is being sought, and recognising that the underlying aim of HIA or other IAs which may be being used as a lever for health is the same i.e. to inform and refine a policy, plan or proposal and assist, improve and influence planning and policy and decision making. Ultimately HIA and HIAP approaches need to be embedded in a PHI or other organisations who wish to take this approach.

3. Centres of excellence, learning and diffusion:

For those who wish to drive HIA, as mentioned above, units such as WHIASU in Wales, agencies such as WHO and their collaborating centres or academic units such as the Centre for Health Equity Training, Research and Evaluation (CHETRE) at the University of New South Wales can have a key role to play in diffusing the practice of HIA regionally and globally ("Centre for Health Equity Training, Research and Evaluation (CHETRE)," 2022). Other PHIs can learn from these and the knowledge and experience gained by them and use them to make their case for investment in HIA/P, or to increase capacity and knowledge. Additionally, other institutional support and resources would be welcomed by PHIs, including support from organisations such as the WHO in advocating for HIAs and learning from expert units such as that in Wales.

Such Centres of Excellence promote a sustained consistent approach to HIA methods and tools across a locality at all levels of government and public health and this can be adopted so that there is clear direction and also reduced risk of fractionalisation. There is an explicit ask, and identified need, for more case study examples in peer reviewed literature of when successful HIAs have been carried out. Grey literature and training aids, which are important in HIA, have tended to be the main vehicles for these to date if published anywhere (Pyper et al., 2021; Wales Health Impact Assessment Support Unit, 2012a). It was highlighted that case studies need to include and look at the synergies across traditionally described 'non-health' sectors, for example, spatial planning or policies such as 'lockdown' to make connections, reduce negative health and well-being impacts and highlight any equity issues. This thesis contains clear examples of how to do this.

In terms of learning and policy diffusion, Centres of Excellence such as WHIASU can influence both practice and policy levels and can be 'touchstones' for others to aspire to, learn from or go to when seeking advice, reassurance or replicable methods and resources. They can do this by simply existing and successfully operating in this policy space, by providing models of practice for others to replicate for example the establishment of a similar unit, by sharing 'learning from doing' including workforce approaches to carrying out HIAs within a PHI or organisation and the reflection obtained from these. Similarly, they can diffuse policy learning transfer across the nation(s) and regions they are based in on how to implement or advocate for HIA and HIAP in their particular political and social contexts. Some of this is contained in grey literature or conference papers (Costa, 2022a; Green, 2022a; Haigh et al., 2020; Hirono, 2014) and so another key role for these centres is to publish research and peer reviewed papers, if they have the capacity, similar to those contained in this research. This can lead to external and international influence by supporting other PHIs and governments to have a better understanding of how to increase and implement the use of HIA, any statutory levers which have been used and what works or does not work. They can be signposted to and utilised to advocate for HIA/P at a global, national governmental and legislative level as much as promoting and enabling them to be being carried out at a local level within or without adaptation to their specific regulatory contexts.

Centres of Excellence are also key to providing support, resources, guides and training. This research also demonstrates how practitioners can be supported through mentoring and 'learning by doing' in partnership with public bodies and third sector organisations. Wales has built a time effective and resource efficient model which can be replicated with political will, strategic advocates, and stakeholder support. PHIs such as

Public Health Wales, or the Institute of Public Health in Ireland also publish guides and host training events on health integration or HIA as a standalone process, as do public health associations for example the European Public Health Association. Practitioner bodies such as the International Association of Impact Assessment (IAIA), the Institute of Environmental Management (IEMA) in the UK and the US based Society of Practitioners of Health Impact Assessment (SOPHIA) also provide guidance, training and resources. Similarly, organisations such as WHO regional offices and Collaborating Centres such as for Environmental Health Impact Assessment, Health in Impact Assessment and on Investment for Health and Well-being, and academic institutions such as the Centre for Health Equity Training Research and Evaluation (CHETRE) in Australia do so (Haigh et al., 2015; Harris et al., 2007; Hirono, 2014). Health practitioners and assessors can learn from the knowledge and practice of other impact assessments too (Cave et al., 2021b; Morgan, 2011).

Strengths and limitations

There are some limitations to this body of work both in its methods and content. However, it also has a number of strengths.

In terms of strengths, a mixed methodological approach to data and evidence gathering and analysis was used. The analysis was based on both primary and secondary data and evidence sources. These include a combination of quantitative and qualitative methods to establish a baseline and inform future working around HIA in PHIs. A virtual questionnaire survey and informant interviews with both open and closed questions was undertaken. It contains several case studies, uses thematic analysis and a comparison technique mapping predicted impacts versus capturing the same impacts 18 months later to identify any which had been observed. This data was then graded for robustness using predefined criteria. The research has also been carried out by a HIA practitioner and researcher allowing for an interplay between insight from, and into, the field and academic discovery and learning. Limitations include that there is no systematic literature review or meta-analysis which would provide a clear, up to date and comprehensive overview of the field globally and the issues, challenges and actors face. However, a global scoping review and literature review was carried out only a couple of years ago (Winkler et al., 2020). Chapter 3's survey data, planned as a global survey included no responses from Africa and limited ones from Asia. There is no purely quantitative statistical paper or modelling included in the thesis. There are a number of papers published which do this based on DYNAMO HIA and other methods (Kim and Haigh, 2021; Lhachimi et al., 2012) which do this. Chapter 7, on the 'Triple Challenge', was particularly complex to develop, carry out and to write and articulate as the work, and the individual challenges were so complex themselves. This could make the work hard to follow. However, it shows how HIA can be utilised in a flexible way and subsequent issues were similarly explored through the same lens (Green et al., 2022a). This complex mapping of cumulative health impacts across multiple broader policy areas requires further testing and refinement. Similarly, the predictive effectiveness and accuracy of HIA is captured for the first time with two HIA examples but this again needs further validation and testing.

The research is based around several case studies from Wales which has a specific political and social context and legislative frameworks. Wales also carry out HIAs in a particular holistic way which could be a limitation as there may not be directly transferable for other nations or organisations to carry out similarly holistic HIAs. Therefore, whilst it has transferrable learning and replicable methods these examples certainly need adaptation in other contexts rather than pure adoption. However, they can be used as guiding examples which can be adapted to their local contexts.

Contribution to the field and suggested next steps

The thesis contributes to expanding and enhancing the evidence base for HIA and fills gaps in the peer reviewed literature with HIA case studies of high-level policies, including a cumulative and complex HIA of multiple policies, reflects on the learning from carrying these out and the impact they have had to date. The virtual scoping survey and expert interviews captures and examines the issues and opportunities for HIA and HIAP within public health institutes globally for the first time. Other PHIs have been able to replicate HIAs and research carried out as part of this work (Antony et al., 2021; Costa, 2022b). Chapter 4 articulates how HIA can be used to implement the SDGs in practice - it had been advocated as a process to do so (World Health Organization, 2018) but not practically demonstrated. Finally, it includes an evaluation of the effectiveness and accuracy of prediction in HIA which can be utilised to support arguments around the benefits of HIA.

It can be used as a platform for future work, actions around policy, research and practice and foster discussions. Some of the follow up activities based on this thesis have started with a cross-national collaboration. It focuses on a discussion and survey distributed internationally to ask HIA proponents, academics and practitioners what their key areas of research are for the next 10 years (Haigh et al, forthcoming). There will also be continued collaboration with other PHIs, for example, Portugal as referenced in Chapter 3, to work jointly to maximise resources, reach and impact, and with Scotland as demonstrated in Chapter 8. Furthermore, more HIA case studies are planned – one on the climate change HIA as described in Chapter 7 and a second prediction paper is in traction which is a comparison of the predictive impacts versus observed impacts of the Brexit HIA discussed in Chapter 5.

Research

Further research in the field would be beneficial to a wide range of stakeholders. Whilst this research provides case studies and examples of ‘learning by doing’ more are needed – particularly those carried out in other nations and regions with different contexts. Researchers should also further explore and test the accuracy and effectiveness in HIA and there is more work required to test how a multiple policy HIA works at a more streamlined level as Chapter 7 was the first example. A similar scoping survey and expert interviews can be carried out in the future with PHIs to see if anything has changed, or one could be undertaken with other agencies for example, schools of public health.

There are many other HIA issues and areas which need to be investigated and researched. These include taking for example, spatial planning and health as a focus building on the recent work in Chang, Green and Petrokofsky (Chang and Green, n.d.) or increasing the breadth and updating the literature on evaluation for which there is little published peer reviewed literature (Dannenberg, 2016; Haigh et al., 2015; Nour et al., 2016). A review of how HIA may have been utilised to implement the SDGs could also be helpful to policy makers and practitioners - especially when considering such high-level levers for nations to improve health and equity across the globe and any further iterations of the Goals.

A systematic literature review on the institutionalisation of HIA in organisations such as government or PHIs or research on mapping the legislative requirements globally or regionally would be helpful to better understand the challenges or opportunities for HIA and HIAP, as would an exploration of systems thinking in HIA. There has been no research on these topics to date.

Policy

The pandemic has highlighted the importance of public health and recognised public health tools such as HIA to policy makers. The post pandemic recovery presents an opportunity for PHIs, public and environmental health specialists and academics to build on this with a wide range of policy makers whilst public health still

has a relatively high profile. It is important to build more strategic advocates for a process such as HIA and for the benefits to them. Public health leads must also promote to policy makers and legislators the different perspectives on health in order to ensure that wider determinants and equity are considered within processes such as EIA or other IAs. Any regulations need to define what they mean in terms of health i.e., bio-physical, environmental or the holistic equity focussed WHO definition and what they need to be included to meet criteria and definition. Public health agencies such as WHO, its collaborating centres can also promote further the use of HIA at a local or regional level and how it is a very useful tool to promote or be integrated into policy and planning cycles and processes. Other organisations such as IANPHI could also establish policy discussions around the use of HIA and engage with PHIs who are interested in the process and how it can be carried out.

Practice

PHIs and organisations with ambitions for HIA and HIAP can develop a proposed plan and phased approach for the development of HIA/P. They can learn from the experiences of WHIASU (Green, 2017) or other PHIs, centres and practitioners in the field, for example Austria (Gruber, 2017). To support HIA practice the development of an implementation and capacity building plan, or an advocacy map is considered. This can help to start conversations about the role of PHIs in facilitating and enabling HIA and HIAP to be carried out in practice and enable a greater understanding of the process, what it entails (or not) and how it can be used effectively to mobilise health integration and address equity issues.

HIA practice will benefit from a formalised Network of Practice. An informal Network of Practice exists with collaborations between academics and practitioners from Wales and Scotland working closely together and established collaborations between Wales and Portugal (Costa, 2022b, 2022b) and Australia respectively. A regional Network of Practice in Europe or other geographical scope would help those who require assistance and guidance particularly in PHIs. Wales can explore and take a lead on this if necessary and work with agencies such as IANPHI, the WHO and EUPHA.

More routine monitoring and evaluation of HIAs and their impact on decision making and predictive accuracy need to occur to further build up the evidence to increase confidence and acceptability across sectors and settings – particularly spatial planning sectors which focus on environmental determinants as part of EIA.

Conclusion

Wales is a leader in the field of HIA supported by an enabling environment. For HIA and HIAP to be of benefit more broadly across different contexts, it must have practical support – political, human or financial resources – to create or use supportive systems and resources such as those highlighted in the examples from Wales.

HiAP is a concept that many public health, health care and traditionally described ‘non-health’ sectors officers can implement when they work in collaboration or consult with each other. HIA as a process as articulated in this thesis in a practical way to do so.

This research provides evidence for HIA as a method to mobilise HIAP – meeting the definition of HIAP in identifying synergies between sectors policies, addressing inequalities and mitigating for health harms. The findings contribute confidence to policy and decision makers and can promote acceptability of the process as a useful and impactful tool. Ideas and ways forward are suggested and the ‘real life’ case study examples and the learning captured from doing them support practitioners to advocate for HIAs, to carry them out as part of their work and to academics who are interested in the field of HIA and health in other assessments.

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Impact

The aim of this work is to identify how HIA can be used as a tool to mobilise HiAP and also to fill some of the gaps in the HIA peer reviewed and grey literature. This is all viewed using Wales as a best practice example/early adopter, and it uses a mixed methodological approach. It has a number of innovative papers and has demonstrated originality in the field. The research contained in this thesis is aimed at a wide range of sectors practitioners and policy makers and can be used as a platform by researchers, PHIs or other IA and health and environmental organisations, practitioners, politicians and policy makers internationally. It can be used to advocate for the effective use of HIA, its benefits and help to make a case for investment in HIA and/or the allocation of resources for it.

Policy

The research has influenced policy and decision making within Wales and raised the profile of HIA as a practical and beneficial process through which to make explicit the health and equity impacts of proposed policies and plans (Welsh Government, 2021c, 2021b). It has explicitly supported the implicit HiAP aim of the Wellbeing of the Future Generations legislation in Wales by supporting policy making and cross sector thinking across the related SDG based Wellbeing Goals. It led to a number of requests to discuss the work at a national policy level and the climate change HIA included in Chapter 7 has led to action with a number of other sectors to consider health and identify co-benefits for example, waste (Andrew et al., 2022).

It also highlights how the HIAs carried out in Chapters 4, 5, 6 and 7 had an impact and influence on cross sector policy and decision making and can be used to leverage the benefits of HiAP through HIA and supported the implementation of the Public Health (Wales) Act 2017 which is to be implemented in 2023. Welsh Government used the findings of the research in Chapters 5, 6 and 7 to make changes to policy responses in respect to Brexit and COVID-19 (Sennedd Home, 2019; Welsh Government, 2021c) and PHW have used the process to inform its internal planning policies and direction (Public Health Wales, 2022b). It has also been submitted to many governmental and other calls for evidence (The Health Foundation, 2019; UK Parliament, 2020; Welsh Parliament, 2020). Chapter 8 can also provide more confidence and assurance to policy and decision makers in the nature of predictive accuracy for prospective and concurrent HIAs and support efforts to advocate or legislate for the process.

Scientific impacts

The research consists of several unique papers which are examples of innovative HIAs and tests some theories which can contribute to the methodological evolution of HIA. The examples of methodological advancement for HIA are featured across the Chapters. Chapter 7 demonstrates for the first time how to map multiple complex interventions and policies such as Brexit, COVID-19 and climate change together (the Triple Challenge) and identify the synergies in health, wellbeing and equity impacts. Chapter 8 advances the field by researching for the first time the accuracy of prediction in prospective HIA – rather than retrospective when impacts have been observed and captured as part of evaluation processes. Chapters 4, 5 and 6 provide case study examples of HIAs and captures the process of carrying them out and the learning from them – something which was asked for by the stakeholders in Chapter 3.

The published papers have also been cited by other academics in English and other language publications – particularly since the pandemic has highlighted the importance of public health to society as a whole across a huge range of sectors including climate change and sustainable development, public health, spatial planning. It highlights HiAP and HIA as a way forward to recover and plan for renewal. (Diallo, 2022; Green et al., 2021c; Kalel et al., 2023; Urtaran-Laresgoiti et al., 2022). This research has been supported by a number of published commentaries (Chang et al., 2021; Green et al., 2021b).

It has also led to a collaboration of a number of international academics and practitioners with an interest in HIA establishing a research agenda for the field for the next 10 years (HIANet., 2022). Furthermore, a platform is provided for further research or areas of HIA activity for practitioners, researchers and academics to explore, for example prediction in, and effectiveness of, HIA and a further exploration of how other actors in the public health system such as Schools of Public Health view or promote HIA.

A recently published bibliographic analysis (Kim and Haigh, 2021) named this author as the lead of one of 5 clusters identified of co-authors and their academic interests (the 'Green et al' cluster). This cluster focuses on publishing work on HIA in relation to the process, its evaluation, effectiveness and provides case study examples. This thesis aims to continue to build on this work but also make connections to authors who work in other named clusters. This includes working on health equity, climate change (Haigh et al., forthcoming) and publishing a journal paper on Health in All Policies in a special edition edited by one of the other cluster leads (Green et al., 2021c).

Practice

The research presented in this thesis involved collaboration with a range of stakeholders including both practitioners and academics across several nations and is influencing work currently taking place or which has taken place globally, for example work in Portugal to scope the landscape around HIA the carrying out and analysis of a similar digital survey (Costa, 2022b). The research has also provided clear practice examples of when, and how, HIAs have been successfully carried out to support HIAP approaches including the challenges and opportunities and gaining knowledge, confidence and proxy experience from others who have walked the path before them. They can then be replicated in local or national contexts for example the carrying out of COVID-19 lockdown HIAs in Icelandic and Austrian (Antony et al., 2021) PHIs and other HIAs in the UK and Wales (Edmonds et al., 2022). In terms of practice and HIAP, the Brexit HIA featured in Chapter 5 is a clear example of mobilising cross sector stakeholders and disciplines to come together to discuss and consider the health, wellbeing and equity implications of subjects such as trade and bring a health lens to their work in practice (Petchey and Cresswell, 2021).

Diffusion

The goals for the dissemination of this research include advocacy for HIAP and HIA as a vehicle to drive it and improve health, wellbeing and equity outcomes, resources for the process and encourage capacity building and workforce enhancement. It is aimed at a number of cross sector and multidisciplinary audiences including academics, policy and decision makers across all sectors and public health agencies.

Many of the topics related to this thesis have been disseminated in a variety of channels. It has been presented at international and national research conferences, practice and policy webinars and events (Costa, 2022a; Green, 2022a, 2022b; WHO European Observatory on Health Systems and Policies, 2021).

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Summary

The main objective of the thesis was to explore and identify how Health Impact Assessment (HIA) can be or is used as a tool to mobilise 'Health in All Policies'. It is centred around the hypothesis:

'The practice of Health Impact Assessment (HIA) in Wales has positively demonstrated that it can be used to support the concept of 'Health in All policies' in practice and offers transferable learning for nation states and public health institutes and agencies internationally'.

The research is viewed using Wales as a best practice example/early adopter, and it uses a mixed methodological approach of case studies, scoping reviews and open and closed question digital surveys and expert interviews. The research investigates the contribution of HIA to advance HiAP in reality, both in Wales and globally, in Public Health Institutes (PHIs). It shares learning from HIA practice in Wales to better understand how HIA has been, and can be, used to inform policies, projects and decisions and the thesis concludes by assessing the accuracy of prediction in HIA. It suggests some tangible ways forward for the field and next steps. The thesis is broken down into several peer reviewed published chapters and papers. These reflect four areas of focus for the research:

- Mapping the current status of health impact assessment in Chapters 2 and 3
- Mapping health impacts in specific broader policies in Chapters 4, 5 and 6
- Mapping health impacts in multiple broader policies and innovative methods in HIA in Chapter 7
- Evaluating predictive accuracy in HIA in Chapter 8.

Main findings of the chapters

Current Status of HIA

The findings from this literature review in Chapter 2 highlight that HIA is widely respected as a public health tool and is used to support the practical implementation of HIAP. HIA can be used to identify both positive and negative impacts on health, wellbeing and inequalities and inform decision making and policies, plans and projects to mitigate for these. It can be practiced as a standalone process or integrated into other assessments. The practice of HIA is more advanced in some regions and nations than others. There are opportunities and challenges around the implementation of HIA and how it is used to promote and enable HIAP. Challenges include lack of capacity, time, resources and the need for training whilst opportunities can be provided be through legislation and integration into other legally required impact assessments such as Environmental Impact Assessment (EIA) or Strategic Environmental Assessment (SEA). The post pandemic recovery and the increased profile of public health, the wider determinants and inequalities can also be used as a platform on which to advance HIA and HIAP.

Chapter 3 highlighted how HIAs are being promoted or used currently (or not) by PHIs across the world. It captured some of the barriers and enablers for HIAs in PHIs. Respondents recognised HIAs as an important tool to drive HiAP approaches to improve health and reduce inequalities and inform policy and decision making. HIAs are recognised as a prevention tool and the practice of HIA in Wales was identified as an example to follow. The post pandemic landscape presents a 'window of opportunity' for PHIs to utilise and advocate for HIAs to be carried out. The results from this study can serve as baseline for future work and a platform to help build knowledge, networks and expertise to promote capturing the co-benefits of investing in HIAs.

Mapping the health and inequality impacts in specific policies and projects – evidence from Wales

Chapter 4 maps the relationship and overlap between HIA and SDGs and is the first case study example of a social determinant, community participative HIA of a power cable development. The wider determinants of health and population groups were mapped across to the Wellbeing Goals in Wales (which enshrine the SDGs) and then mapped across to the corresponding SDGs. This approach enabled the HIA to demonstrate how the process can be explicitly tied to the SDGs and community contributions to the HIA and the issues which were important to them. The HIA was used to inform the decision-making process and refine further consultation with the community. Although the Welsh context is different to many nations, the mapping of SDGs through HIA could be carried out by these to tie their HIA delivery with a HiAP and SDG approach.

Chapter 5 articulates the process of carrying out a complex policy (Brexit) HIA in Wales. It captures the 'learning from doing' the HIA (positives and negatives) and the workforce implications. The HIA demonstrates continued leadership by Wales in the field of HIA and HiAP and has demonstrated how HiAP can be practically implemented in this context. It has transferable learnings obtained from practice, which can be used by many nations and devolved regions. HIA can provide health policy leads, grappling with complex novel policies with a lens to think these through.

Chapter 6 demonstrates how the HIA process has been a beneficial tool to inform and understand a policy decision and the unknown challenges which emergency and unpredicted major events such as the COVID-19 pandemic present. Using a 'real time' approach the HIA identified the health and equity impacts as they emerged and allowed for future policies and plans to be adjusted to mitigate for negative health impacts and maximise positive impacts on the population and any inequalities. It involved key cross-sectoral stakeholders and enabled an evidence based HiAP approach. The impacts identified have added to the evidence base. HIA can be utilised by policy and decision-makers and the HIA community in the future to inform, promote or carry out similar HIAs. The HIA has transferrable learnings in relation to the use of HIA in promoting a better understanding of the immediate and the long-term ramifications of policy decisions. It also raises awareness of how PHIs can use HIA.

Mapping the health impact in multiple and broader policy contexts

Chapter 7 provides an overview of the novel mapping of multiple (three), comprehensive HIAs of complex policies in Wales. It provides a synopsis of the results, details the methods and discusses the learning from carrying out the mapping process and work itself. Results indicate the three components of the Triple Challenge must not be viewed as separate silos as they have cumulative multi-faceted impacts such as the impact on mental wellbeing or the environment. Some population groups are more negatively affected than others for example, rural populations. The HIA approach can enable a range of stakeholders to critically view similar challenges not just as single issues but as a holistic whole to mobilise action and inform policy and decision making based on evidence from a range of sources.

Evaluation of HIA predictive accuracy

Chapter 8 evaluated the impacts identified in two HIAs that assessed the impact of 'lockdown' in Scotland and Wales in 2020. It provides an overview of the results and how the evidence was mapped and graded in comparing the predicted impacts against the observed ones. It demonstrates the value of prediction in HIA and fills a gap in the literature. The results from this paper can provide some confidence and assurance to decision and policy makers in the predictive nature and accuracy of prospective HIA as a tool to enable healthy public policy and decision making and its effectiveness.

Main results

1. Conceptual considerations

HIA as a tool to implement 'Health in All Policies' in practice

The research confirms that HIA as a process supports a consideration and the implementation of HiAP in practice using the example of Wales (albeit with its own particular political strategic policy levers and drivers) and the HIAs articulated and discussed. Several case study examples of HIAs from Wales which have been successfully carried out across traditionally described 'non-health sectors' and health systems and for policies, projects, events and decisions are presented.

A practice at a juncture

HIAs can be standalone or integrated, focused on social determinants and equity or environmental determinants and risk and be qualitative or quantitative in nature. Whilst this affords flexibility to practitioners, it can lead to a fractionalisation across the field with different perspectives and practice being presented as 'HIA'. This could unintentionally lead to HIA becoming synonymous with EIA and environmental determinants in many PHIs and organisations to the detriment of wider health determinants and equity issues. Academia shows similar patterns in research in the field with most focussing the environmental aspects of practice and integration. The enhanced awareness of the impact of health on a wide range of sectors during the pandemic means that the recovery space presents a 'window of opportunity' and an avenue for HIAP and HIA to be utilised more to incorporate a consideration of wider determinants focused public health and equity into policies and plans.

Perspectives on health, wellbeing and equity

Many impact assessments for example, EIA, SEA and Mental Wellbeing Impact Assessment, or frameworks such as Social Return on Investment (SROI) which captures social value, have scope for a consideration of health, wellbeing and vulnerable population groups to a greater or lesser extent (Cooke et al, 2011, Fischer, 2013, Ashton et al, 2020; Cave et al, 2021; Edmonds et al, 2022). This is highly dependent on not only the model of health that they utilise but also the perspectives of health they take i.e. social or environmental determinant. A better understanding of wider determinant focussed HIA is essential and the differences in definitions of health used in HIA can, and do, make a major difference. However, there is a challenge in defining health in some sectors for example, spatial planning.

2. Practical implementation issues

Role of legislation and an enabling environment

The importance of legislation is viewed as critical to providing strategic levers and direction for HIAs to be carried out in national, regional or local contexts. However, it can be an enabler or inhibitor for example, mandating is clearly cited as being important and that for many, without it, it makes making the case for HIA or to carry out a HIA challenging but it could risk becoming a 'tick box exercise' like in some other legislative or mandatory impact assessment examples. HIAs are and should be carried out voluntarily (as they still are in Wales and currently in many jurisdictions) so that they are valuable. The examples from Wales demonstrate clearly that legislation specifically for HIA is not essential but that an enabling policy context and implementation infrastructure are.

Organisational aspects and workforce at Public Health Institutes

For HIA and HIAP to be of benefit more broadly across different contexts, it must have practical policy and organisational support. This research highlights examples of the conduct of HIAs which have been carried

out in one PHI. For the PHI in question the organisational aspects and workforce supportive environment was incredibly helpful. It is very clear that workforce development, training, capacity and confidence building are essential for the promotion, implementation, evolution and institutionalisation of HIA in organisational settings. However, a number of barriers can exist. Barriers to capacity building activity and HIA implementation are frequently reported. Wales is a leader in the field of HIA supported by an enabling environment and is supported by a dedicated HIA Unit with clear strategies and plans. Critical to this is the need for organisational leads to understand that for the workforce to carry out a HIA does not mean that one person, one team or indeed one organisation carries them out by themselves. The successful integration of HIA/P into PHIs can also be enabled by some small steps. Ultimately HIA and HIAP approaches need to be embedded in a PHI or other organisations who wish to take this approach.

3. Centres of excellence, learning and diffusion

For those who wish to drive HIA, as mentioned above, units such as WHIASU in Wales, agencies such as WHO and their collaborating centres or academic units such as the Centre for Health Equity Training, Research and Evaluation (CHETRE) at the University of New South Wales can have a key role to play in diffusing the practice of HIA regionally and globally. Other PHIs and organisations can learn from these and the knowledge and experience gained by them and use them to make their case for investment in HIA/P, or to increase capacity and knowledge. Additionally, other institutional support and resources would be welcomed by PHIs, including support from organisations such as the WHO in advocating for HIAs and learning from expert units such as that in Wales.

Main conclusion and reflections

The thesis contributes to expanding and enhancing the evidence base for HIA and fills gaps in the peer reviewed literature with HIA case studies of high-level policies, including a cumulative and complex HIA of multiple policies, reflects on the learning from carrying these out and the impact they have had to date. This research provides evidence to support the hypothesis of HIA as a method to mobilise HIAP using the example of Wales and by meeting the definition of HIAP in identifying synergies between sectors policies, addressing inequalities and mitigating for health harms. The findings contribute confidence to policy and decision makers and can promote acceptability of the process as a useful and impactful tool. Ideas and ways forward are suggested, and the 'real life' case study examples and the learning captured from doing them support practitioners to advocate for HIAs, to carry them out as part of their work and to academics who are interested in the field of HIA and health in other assessments. It can be used as a platform for future work, actions around policy, research and practice and foster discussions. Some of the follow up activities based on this thesis have started with a cross-national collaboration.

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Curriculum Vitae

Education

2020-present	School of Care and Primary Research Health Institute, University of Maastricht, The Netherlands – PhD
2010	School of Health Sciences, Swansea University - Masters Module in Health Protection
2005-2009	Department of Medicine, University of Manchester - Masters in Public Health (MPH)
1989-1992	Department of History, University of Leicester - BA (Hons) in History and Politics – Degree Class 2:1; Subsidiary subjects – French and Italian.

Professional affiliations

- UK Public Health Register (UKPHR) – Registered Public Health Specialist since 2014; revalidated 2019
- Fellow of the Faculty of Public Health (FFPH)
- Accredited Member of the Chartered Institute of Environmental Health (ACIEH)
- Visiting Professor - WHO Collaborating Centre (WHO CC) for 'Healthy Urban Environments', University of West of England, United Kingdom

Experience

Present Consultant in Public Health – Policy and International Health / Programme Director for Health Impact Assessment (HIA), Public Health Wales.

As Programme Director for HIA at PHW and Consultant in Public Health for Policy and International Health, I provide strategic leadership and direction for HIA and HiAP both internationally and in Wales. This includes having a vision for HIA/P and creating long-term sustained relationships, methods, tools and resources to implement priorities such as the Welsh Government (WG) Public Health (Wales) Act 2017 (PHA) successfully. The PHA includes a statutory requirement for HIAs to be carried out by public bodies in Wales.

I direct the Wales Health Impact Assessment Support Unit (WHIASU) which aims to develop, guide, advise on and facilitate HIA/P and support healthy policymaking and sustainable development. It also carries out complex, politically sensitive and deadline focussed HIAs for PHW such as the Brexit HIA. Currently, I am directing and leading work on a HIA of Climate Change in Wales and also the Comprehensive and Progressive TransPacific (CPTPP) free trade agreement which are both taking population and equity led approaches.

As part of a 'Health in All Policies' approach to policy making, much of the work I lead on takes place in traditionally described 'non-health' sectors such as spatial planning or more recently trade, economy and trade agreements. I have extensive expert knowledge, understanding and practical application of HIA, HiAP and health integration into non-health systems, settings and sectors (particularly spatial planning) which includes how to foster health and well-being, address health equity / inequalities and sustainable development within them. I direct and lead the HIA Activity work stream for the PHW WHO Collaborating Centre on 'Investment for Health and Wellbeing', the International Health Co-ordinating Centre within Public Health Wales and am working on how to mobilise social value and health impact through the use of Social Return on Investment (SROI).

I provide extensive expert technical advice, training, guidance, and support for HIA/P and other IA processes to public bodies in Wales. This includes advising Welsh Government on the drafting of the HIA statutory regulations for the PH Act and the new spatial plan for Wales, the 'Future Wales'. I have provided steer to WG on how and in which circumstances HIA can be applied in a successful and meaningful way. I also provide guidance and governance for nationally significant and community sensitive HIAs such as the new Wylfa Nuclear Power Station and similar schemes. I am regularly invited to speak at national and international conferences and events, and I presented at the United Nations Economic Commission in Europe (UNECE) workshop on 'Health in Strategic Environmental Assessment' in 2019. I regularly support the work of the WHO European Regional Offices in Bonn and Venice and provide input at meetings and events and feedback on reports and documents.

At present, I am finalising a number of guides and resources for PHW that will enable the integration of health into non health settings and processes. My work includes responsibility for commissioning, writing and producing new research and resources (such as a freely available HIA E-learning course delivered in partnership with Cardiff Metropolitan University), writing business cases for investment bids, allocating resources, managing the budget, writing a range of reports and advocating for, and quality assuring HIAs. I also publish journal papers as part of my ongoing PhD with Maastricht University.

During the COVID-19 pandemic, I contributed to the PHW acute response and the recovery and renewal plans for Wales this includes leading on, and critically thinking through, work to address the Triple Challenge of COVID-19, Brexit and Climate Change.

I co-authored a book entitled 'Public Health Spatial Planning in Practice' (September 2022) and was named as one of the Royal Town Planning Institute's 'Women of Influence' and won Best Research Paper at the Healthy Cities Design conference in 2022.

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This thesis explores how Health Impact Assessment (HIA) can be used as a tool to mobilise 'Health in All Policies' (HIAP). The research is viewed using Wales as a best practice example/ early adopter, and it uses a mixed methodological approach of case studies, scoping reviews, surveys and interviews and evaluative techniques. The research also investigates for the first time the contribution of HIA to advance HIAP in reality, both in Wales and globally, in Public Health Institutes (PHIs).

It shares learning from HIA practice in Wales to better understand how HIA has been, and can be, used to inform policies, projects and decisions and the thesis concludes by assessing the accuracy of prediction in HIA. It suggests some tangible ways forward for the field and next steps for research, policy and practice.

Health Impact Assessment (HIA) as a tool to mobilise 'Health in All Policies'.
Liz Green

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