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Circular Economies and Sustainable Health and Well-being

The public health impact of public bodies refocusing on waste reduction and reuse in Wales

Summary Report



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(Alphabetical order).

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This report consists of:

- **Executive Summary**
- **Summary Report (This report)**
- **Supporting Information Report**

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- Bridgend County Borough Council
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Contents

1.0 Introduction	6
2.0 Methods	10
3.0 Analysis	12
3.1 Key Findings	12
3.2 Population Groups	14
3.2.1 Whole Population	14
3.2.2 People in Low and Mid-Level Occupations	17
3.2.3 People living in areas which exhibit poor economic indicators/ disadvantaged areas	18
3.2.4 Employees of Public Bodies	19
3.2.5 COVID-19 impact for population groups	20
3.3 Determinants of Health and Well-being	21
3.3.1 Mental Health and Well-being	21
3.3.2 Living and environmental conditions affecting health	22
3.3.3 Economic conditions affecting health	23
3.3.4 Macro-economic, environmental and sustainability factors: including circular economy and organisational policies	25
3.3.5 COVID-19 impact for determinants of health	27
4.0 Opportunities and Potential	28
4.1 Opportunities	28
4.2 Evidence Gaps	28
4.3 Future Actions	28
5.0 Conclusion	32
Appendix	33
Bibliography	35

The public health impact of public bodies refocusing on waste reduction and reuse in Wales

“By 2050, Wales will be a country which instinctively thinks and plans to **use as few resources as possible**, **keeps those resources in use for as long as possible** and then **finds new uses for these resources** at the end of their first useful life.”¹



What is a Circular Economy?

The cycling of all resources, both biological (biodegradable) and technical (not biodegradable). Gives tools to tackle climate change and biodiversity loss, while addressing social needs. Gives us the power to grow prosperity, jobs, and resilience while cutting greenhouse gas emissions, waste, and pollution².

What is waste?

“any substance or object which the holder discards or intends or is required to discard...”³

Who is most impacted by Circular Economy waste strategies?



Managing Waste in Wales

The total amount of local authority municipal waste generated in Wales **decreased by 2.5%** from 1,590 thousand tonnes to 1,550 thousand tonnes between 2016/17 and 2017/18⁴.

Which determinants of health & well-being are most affected by Circular Economy waste strategies?



The total amount of municipal waste (kilogram per capita) created in Wales is higher than in England and Scotland⁵

Key
 ✓ Positive impact
 ✗ Negative impact
 ✕ Mixed positive & negative impact

How can we benefit from using Reduce, Reuse, Recycle/Circular Economy approach



Wales is a global leader in recycling rates of municipal waste (64%), second only to Germany (66%)⁵.

¹(Welsh Government, 2021a: p.11) ²Ellen MacArthur Foundation, 2019b. ³The Waste (England and Wales) Regulations 2011 (SI: 2011/988), 2011). ⁴(Welsh Government, 2017b). ⁵(Welsh Government, 2018a) ⁵(Economia and European Environmental Bureau, 2017)

Employment in the Waste Management Sector in Wales



Over **4,180 full time equivalent posts** in municipal and waste processing services³



18.3% employed in process plant, machinery operative, and elementary occupations⁷



The **water, sewerage and waste management sector** employs **13,000 people**⁷



Around **two thirds** of people employed in **repair activities** are **skilled workers** e.g. motor repairs⁸



Only **38.8%** of adults aged 16-64 years have a **qualification level of NVQ4 and above**⁹.

Key Positive impact Negative impact
 Mixed positive & negative impact

Impact of Covid 19 Pandemic on Circular Economy approaches



Mental Health & Well-Being



Waste Disposal & Recycling



Specific Waste Streams



Waste Management Sector



Circular Economy



Climate Change, Biodiversity & Planetary Health



Reduce & Reuse Outlets including 3rd sector



Waste Services



Findings

1. A need to ensure **positive and negative impacts, unintended consequences, and opportunities are understood** including those arising during a projected period of transition to a Circular Economy.
2. Achieving zero waste requires an **evolution in thinking about how resources are used** - from a linear to a circular approach.
3. Negative impacts are assessed to be felt in the **short term but with lower intensity**, paving the way for **more intense long-term positive impacts**.
4. In contrast to reduce, reuse and recycle approaches generally, many of the impacts related to the COVID-19 pandemic were **immediate and impacted in the short-term**.



Opportunities

Potential public health co-benefits to be gained from prioritising reduce and reuse policies:

- **To reduce long-standing inequalities** (for example create skilled jobs and fair work)
- **To deliver the goal of zero waste by 2050** and a Circular Economy in Wales
- **For change in the manufacturing sector** and for public bodies and industry to collaborate to influence change



Potential Areas for Action

- **Use of Health impact Assessment** when developing Circular Economy policies and interventions
- **Supporting community action and initiatives** for reduction and reuse of resources
- **Prioritising waste reduction** towards zero waste
- **Reducing all energy** consumption
- **Reducing plastic** use and plastic waste
- **Reducing waste** through **sustainable procurement**
- **Reducing food waste**
- **Increasing levels of reuse**
- Continuing to **support recycling**
- **Collaborative action** across all sectors and public bodies to consider **the health and well-being impacts and any inequalities**
- **Public bodies leading by example** towards zero waste and a Circular Economy ('Be the Change')

1.0 Introduction

The environmental, social and economic benefits of waste reduction as part of broader circular economy approaches are increasingly acknowledged and understood (Welsh Government, 2021a; WRAP, 2021). However, the impacts on the wider determinants of health and well-being in Wales, including access to services, macro-economic factors, health behaviours, and mental health are less well established.

Welsh Government has over a sustained period set out policies with an aim for zero waste, including: a national waste strategy 'Towards Zero Waste' (Welsh Assembly Government, 2010); a low carbon plan that responds to the Environment (Wales) Act (2016); Prosperity for All 'A Low Carbon Wales' (Welsh Government, 2019b); 'Net Zero Wales' (Welsh Government, 2021), and most recently a strategy to create a circular economy in Wales 'Beyond Recycling' (Welsh Government, 2021a) and zero waste by 2050.

Zero waste will be an important part of a response to Welsh Government's declaration of a Climate Emergency (Welsh Government, 2019a). This declaration states that addressing the climate emergency requires collective action across Welsh Government, public bodies, industry, and Welsh communities. Public bodies have an important role in implementing the legislative and policy levers to significantly reduce the amount of resources that they use; to be carbon neutral by 2030 (Welsh Government, 2019a); and for the whole of Wales to reach net zero carbon by 2050 (Welsh Government, 2021c).

In support of this, Welsh Government has set out the vision that:

"By 2050, Wales will be a country which instinctively thinks and plans to use as few resources as possible, keeps those resources in use for as long as possible and then finds new uses for these resources at the end of their first useful life."

(Welsh Government, 2021a: p.11)

In addition to this, Welsh Government have recently appointed a dedicated Minister for Climate Change to further address the climate emergency (Welsh Government, 2021b) and there is a clear focus on climate change and environmental sustainability in the 2021 Programme for Government (Welsh Government, 2021b).

Separately, the World Health Organization has identified that globally there is a lack of integration of health issues into circular economy strategies; studies have focused on the negative health impacts of interventions more than the potential positive health impacts; and, there is a need to assess the impact of circular economy principles, including reduce and reuse approaches, in an evidence informed, transparent, and logical way (World Health Organization, 2019).

This Health Impact Assessment (HIA) seeks to partially address this identified gap. It investigates impacts resulting from waste reduction and reuse approaches, especially as these are increasingly given higher priority alongside an existing and successful focus on recycling in Wales. The impact on public bodies and their role in applying these approaches is also considered. Finally, this HIA makes a preliminary assessment of the evolving impact of the COVID-19 pandemic on circular economy approaches, and existing waste management systems.



This HIA is part of a set of two related to the environment and environmental sustainability and health. The **first (this report)** assesses the potential and, where possible, observed positive health and well-being impacts as well as any negative impacts or unintended consequences derived from **waste reduction, reuse, and recycling approaches as part of enhancing circular economy approaches in Wales, particularly Public Bodies' role** within this. The **second is a comprehensive HIA that assesses the health impact of climate change on Wales** and those in the population who may be affected by it.

Background

The total amount of local authority municipal waste generated has gradually decreased in Wales since the early 2000s. The total amount of local authority municipal waste generated in Wales decreased by 2.5% from 1,590 thousand tonnes to 1,550 thousand tonnes between 2016/17 and 2017/18 (Welsh Government, 2018a).

Recycling rates in Wales are high; however, to date, there has been less focus on the hierarchy of reducing waste and reusing products to prevent them becoming recyclable waste. Arguably, these policies have driven Wales' recognised position as a global leader in recycling rates of municipal waste (64%), second only to Germany (66%) (Eunomia and European Environmental Bureau, 2017).

A focus on recycling, however, risks obscuring the holistic picture of total resource use and achieving zero waste within a circular economy. This includes consideration of greenhouse gas emissions and other forms of pollution associated with waste including incineration and waste sent to landfill. For example, whilst Wales' recycling rate is ahead of other UK nations, the total amount of municipal waste (kilogram per capita) created in Wales is higher than in England and Scotland (Eunomia and European Environmental Bureau, 2017).

Circular Economy

What is a Circular Economy approach?

The circular economy is simply conceptualised as changing from a linear economy to a circular one as shown in Figure 1. This butterfly or circular model is detailed further in Figure 2.

Figure 1: Conceptual figure of linear versus circular economy (Redrawn from Raworth, 2018)

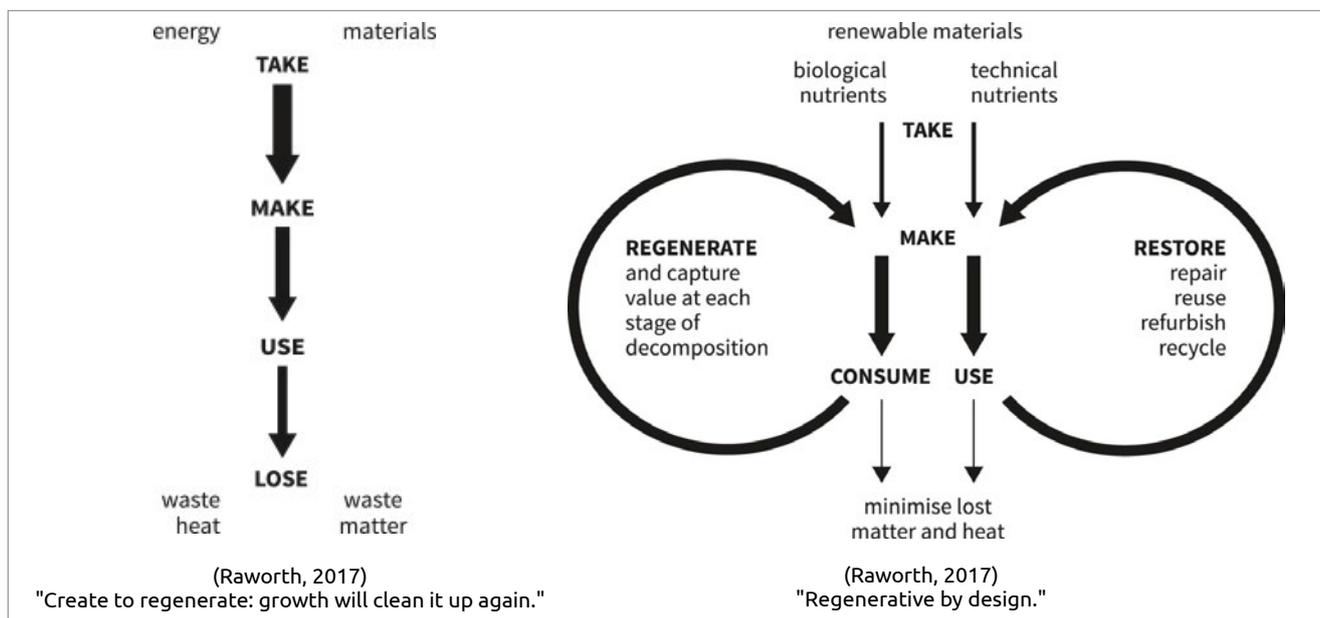
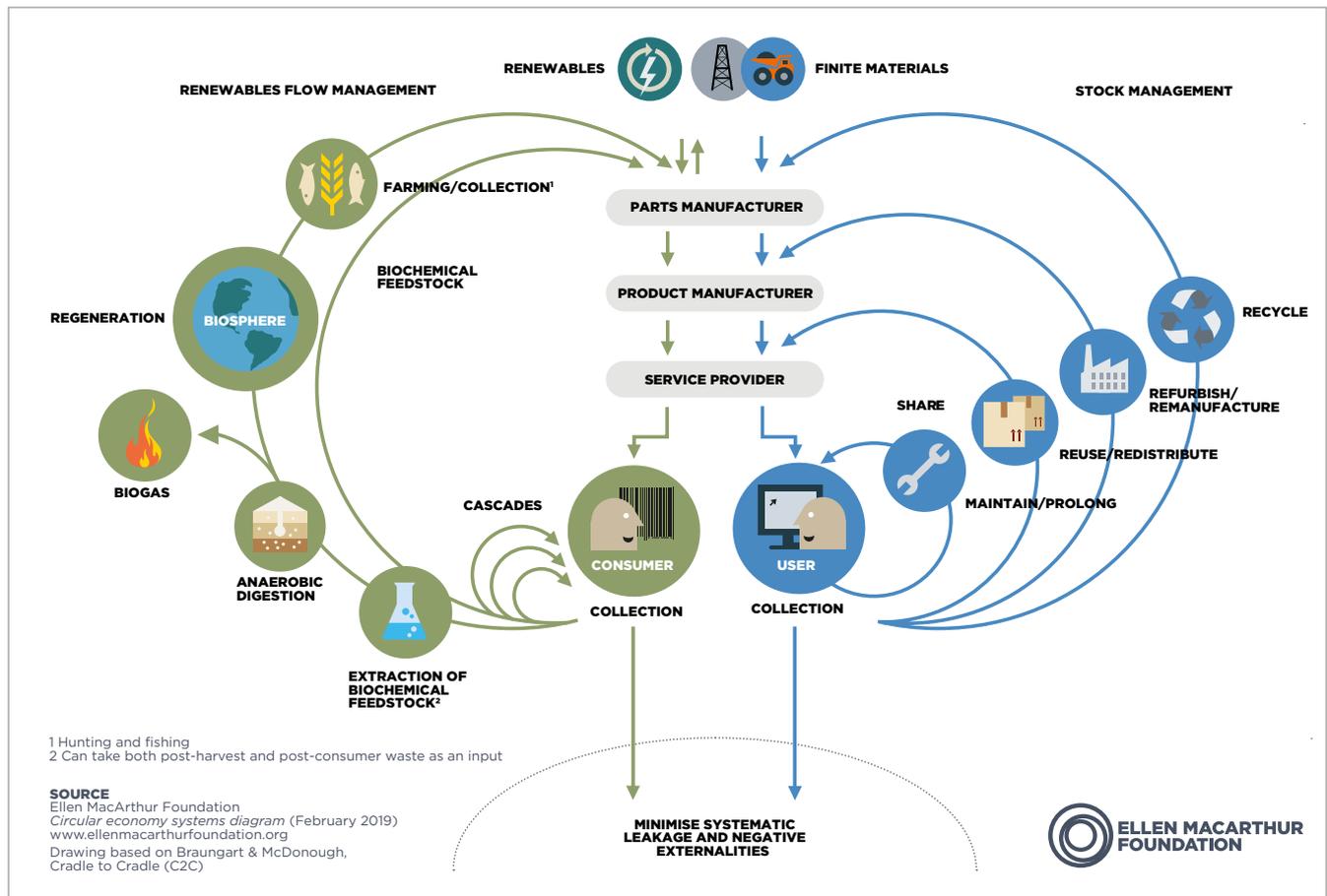


Figure 2: Circular Economy Diagram (Ellen MacArthur Foundation, 2019a)



Circular economy approaches design out waste and, if Wales is to become a country that ‘instinctively thinks and plans to use as few resources as possible’, this implies a different approach to resources and natural wealth. Terminology is important and what is today called waste needs to be valued in future as essential and valuable resources. Therefore, whilst this HIA has a focus on waste reduction and reuse, it is important to highlight that circular economy, or resource economy, principles are based on designing out waste and associated emissions and pollution.

This HIA is focussed on the population of Wales, therefore impacts elsewhere globally were not assessed, although impacts which may cut across communities globally were identified within the assessment. Circular economy approaches can support the well-being goal of a globally responsible Wales by considering not just where resources are used in Wales, but the entire lifecycle and reducing waste to zero, including waste that is currently exported from Wales and which may result in negative health impacts in other countries.

The waste¹ hierarchy, usually shortened to ‘reduce, reuse, recycle’ sets out the following priority for waste prevention and management in order of priority:

- Waste prevention (reduce)
- Preparing for reuse
- Recycling
- Other recovery (e.g., energy recovery)
- Disposal (e.g., landfill)

¹ For the purposes of this HIA, waste means, “any substance or object which the holder discards or intends or is required to discard...” (The Waste (England and Wales) Regulations 2011 (SI: 2011/988), 2011).

New concepts and terminology are also constantly emerging, including during the preparation of this assessment. This assessment is focussed on waste hierarchy but at the same time, it also reflects increased mainstreaming of circular economy approaches generally (Ellen MacArthur Foundation, 2013, 2019a; Raworth, 2018) and more recent policies in Wales (Welsh Government, 2021a) using that terminology.

The circular economy is concerned with the cycling of all resources available to society, both biological (biodegradable like food and cotton) and technical (not biodegradable like metal and most plastic). Therefore, to assess the impact of moving to a circular economy in Wales, it is important to consider these impacts as part of a wider web or system of interconnections.

Circular economy approaches are frequently discussed in relation to the climate emergency and the two are closely related because, for example, production of material resources accounts for such a large proportion (45%) of global emissions currently (Ellen MacArthur Foundation, 2019b). Whilst another HIA on climate change will report separately, key interrelations and impacts that cross over with the circular economy are noted in this assessment.



The COVID-19 pandemic context

Since the start of 2020 (and initial evidence gathering for this HIA), severe acute respiratory syndrome coronavirus 2, SARS-CoV-2 (commonly known as coronavirus or COVID-19) presented a global emergency. COVID-19 has caused illness (morbidity), death (mortality), and widespread upheaval across the world.

In light of COVID-19, Public Health Wales has published a HIA of Home and Agile Working in Wales (Green et al., 2020a) and the Staying at Home and Social Distancing Policy in Wales (Green et al., 2020b). This report complements these previous assessments by highlighting the interrelated impact on circular economy approaches and waste management systems.

COVID-19 response measures and other health protection measures have had a direct impact on existing waste management systems, as well as on wider goals to reduce and reuse more waste.

To investigate these challenges this HIA: describes positive and negative impacts of reduce and reuse approaches; identifies which population groups are most likely to be affected in Wales; highlights opportunity areas; and summarises actions that can be taken now to maximise positive impacts, mitigate negative impacts, and reduce their unequal distribution.



2.0 Methods

HIA is a process which systematically considers the impact of a policy, plan, or proposal on a population, through the lens of the determinants of health and well-being. These determinants include social and community impacts, behaviours affecting health such as smoking or diet, and wider environmental and economic impacts. It is an evidence-based method to appraise which population groups have, or may be, impacted by a policy (such as reduce and reuse within the waste hierarchy) and how they will be affected, whether positively or negatively. This assessment follows established HIA methodology developed by the Wales Health Impact Assessment Support Unit (WHIASU) in Public Health Wales (PHW) (Chadderton et al., 2012).

The Health and Sustainability Hub of Public Health Wales (which supports Public Health Wales to respond to the Well-being of Future Generations (Wales) Act (2015)) and WHIASU scoped the HIA with a view to focus on the preventative approaches of waste reduction and reuse, as often the emphasis is on recycling in public bodies in Wales. A comprehensive, participatory, and concurrent approach to HIA was carried out. The full methodology is included in the Supporting Information report (see Section 2.0).

HIAs can identify positive impacts or opportunities, and negative impacts or unintended consequences. HIA provides evidence-informed actions to address such findings and identifies opportunities to mitigate negative impacts and enhance positive impacts. The baseline data and evidence collection for this HIA was carried out during 2019 (publication in spring 2020 was paused due to the pandemic). The HIA was restarted in early 2021, and further work was carried out to assess impacts in the context of the evolving COVID-19 pandemic. These are identified separately throughout the assessment.

The HIA is based on several sources of evidence:

- A community health profile and health intelligence
- Published peer-reviewed journal papers
- Survey data and grey literature
- Interviews with key stakeholders – early 2019
- A facilitated workshop with key stakeholders (9 participants) – December 2018
- Small group discussions with key stakeholders (19 participants) – early 2019

Evidence was gathered from a range of sources, including peer-reviewed journals, grey literature, websites of public bodies, and the above workshops with stakeholders - 15 public bodies in Wales were represented in these. Only evidence published up to 2019 and in the English language was included in the literature review and therefore the impact assessment.

In 2021, to supplement the initial assessment, additional evidence was sought relating to the impact of the evolving COVID-19 pandemic on waste reduce and reuse approaches. This was a rapid review within the time and resources available. An emergent peer-reviewed literature up to and including March 2021 was identified relating to COVID-19, waste management, and personal protective equipment (PPE). This was supplemented by purposeful sampling of grey sources including media reports. This additional evidence was analysed by a first reviewer (Mark Drane) with the characterisation of impacts reviewed by a second and third reviewer (Liz Green, Richard Lewis).

The full health intelligence, literature review, and interview summaries synthesised within this assessment can be found in the Supporting Information report (see Sections 3.0, 4.0, 5.0).

Appraisal of the literature, qualitative evidence, and information from the 44 public bodies' websites (for list see Supplementary Information Section 6.0) identified areas for action that could enable public bodies and wider organisations in Wales to refocus on waste reduction and reuse (see Table 3, Section 4.3).

The evidence was analysed for themes and this analysis was supplemented and refined considering routine data and health intelligence sources, e.g., Census data, the Public Health Outcomes Framework and National Survey for Wales. The health impacts (both positive and negative) and any unintended consequences were identified, along with the population groups with the greatest potential to be affected.

Figure 3: Descriptors of Impact

Positive – impacts that improve or maintain health status or provide an opportunity to do so	Negative – impacts that diminish health status
 Major – Significant in intensity, quality, or extent. Significant or important enough to be worthy of attention, noteworthy.	
 Moderate – average in intensity quality or degree	
 Minimal – of a minimum amount, quantity, or degree, negligible	
 Confirmed – Strong direct evidence e.g., from a wide range of sources that an impact has already happened or will happen	
 Probable – more likely to happen than not, direct evidence but from limited sources	
 Possible – may or may not happen. Plausible, but with limited evidence to support.	
 Short – less than 1 year	
 Medium – 1–5 years	
 Long term – 5 years or more	

3.0 Analysis

This summary report presents those **health impacts that have been identified as being major or major-moderate** in terms of **circular economy approaches and public bodies and their workforces**. Further information on impacts that are classified as moderate or minimal in nature can be found in the accompanying Supporting Information report (See Section 8.0). A summary of all the impacts identified and evidenced in this HIA can be found in Table 1 in the Appendix and a further analysis of impacts as related to the COVID-19 pandemic are also included in Table 2 in the Appendix.

It is important to note in this assessment that many public bodies and wider organisations are at the early stages of implementing policies to move from linear to circular approaches including an increased emphasis on reduce and reuse. How these policies are implemented has a material impact on any assessment. The effects of new policies such as Beyond Recycling (Welsh Government, 2021a) are yet to be evidenced, and the extent to which such policies are successfully implemented across Wales will have an effect on the direction and intensity of impacts identified. This HIA assumes the position that strategies for circular economy, net zero carbon, and addressing the climate emergency, whilst a challenging ask, will be implemented consistently and successfully in Wales, driven by strong leadership, and assesses the impact on health and well-being based on this assumption.

3.1 Key Findings

The **HIA was initially scoped and carried out as a comprehensive and concurrent HIA of the impact of waste reduction, reuse, and recycling on public bodies in Wales prior to the pandemic**. However, whilst keeping this central focus, this HIA report also considers the **wider context of circular economy approaches which are important mitigators for climate change for example, and the impact of the pandemic on reduce, reuse, and recycling**. A broad ranging literature search including both peer-reviewed and grey literature identified a small and emerging evidence base for the health and well-being impacts of reducing, reusing, and recycling waste materials.

The key findings include:

- The evidence identified focuses on the positive impacts of reduce, reuse, and recycle policies as part of wider circular economy approaches. However, few of these impacts are conceptualised in the literature for their pathway to health and well-being impact. There is a need to ensure positive and negative impacts, unintended consequences, and opportunities are understood including those arising during a projected period of transition to a circular economy (see Section 3).
- Achieving zero waste requires an evolution in thinking about how resources are used - from a linear to a circular approach. Policy and action need to focus on resources within a cycle, and the elimination, as far as possible, of waste. This matters for several reasons:
 - in the context of the climate and nature emergencies;
 - in the context of the seven well-being goals for Wales and the 17 Sustainable Development Goals;
 - to advocate for and enhance circular economy approaches in Wales;
 - to ensure resources are maintained in use for as long as feasible to ensure maximum value is obtained from them before recovering and regenerating these products;
 - and for public bodies and wider stakeholders to operationalise in practice the aim for Wales to reach zero waste by 2050.

- **'Reduce, reuse, recycle'** is the strapline for the waste hierarchy yet some evidence suggests policies for recycling can in fact conflict with those intended to reduce waste in the first place and keep resources at their highest level of value for as long as possible. It should not be assumed policies for reduce and reuse can therefore be simply added to existing policies without the risk of unintended consequences – a systemic approach is needed. A complex systems approach can support evaluation of outcomes and greater understanding of the necessary actions to ensure policy is implemented in practice throughout all levels of the decision-making and operational process.
- A focus on reduce, reuse, and recycle policies would have major, probable, positive long-term health benefits at a whole population level in Wales. Major probable impacts are identified for groups that have historically suffered health inequities: people in low and mid-level occupations; and separately people living in areas exhibiting poor economic indicators and disadvantaged areas. A possible major-moderate positive impact in the medium-term is identified for employees of public bodies (see section 3.2.4).
- Neither major nor major-moderate negative health impacts were identified for the general population. A key indirect positive impact is the indirect role circular economy approaches play in mitigating general population risks associated with climate change. The scale of change however should not be underestimated and implies significant changes across the Welsh economy. If such a large change were not to be achieved, then those indirect risks are more likely to be manifest as negative health risks across several determinants of health including emotional and physical well-being, community resilience, and other environmental determinants. A possible major-moderate negative impact is identified in the medium term for employees of public bodies who play an important role in setting and implementing policies that address these issues (see Section 3.2.4).
- Negative impacts are assessed to be felt in the short-term but with lower intensity, paving the way for more intense long-term positive impacts. So, there is an important period of transition where public bodies and wider organisations play an important role in establishing policies and modifying behaviours to mitigate medium term negative health impacts, whilst equally making big enough changes soon enough to achieve goals such as zero waste by 2050.
- In contrast to reduce, reuse and recycle approaches generally, many of the impacts related to the COVID-19 pandemic were immediate and impacted in the short-term (see Section 3).
- Some policies for reduce, reuse, and recycle within wider circular economy approaches are at the early stage of implementation, so several impacts have been considered prospectively and are therefore potential: there is therefore a need to also assess these concurrently as they are implemented and track any impacts as they emerge.
- In Wales, interventions implemented in response to the COVID-19 pandemic in relation to waste have focused on the control of infection, managing healthcare waste, maintaining household and commercial waste collections, and avoiding disruption to existing food and other recycling waste management systems. This has had positive health impacts, including: protection from COVID-19 infection; protecting workers from infected healthcare waste; and avoiding the loss of existing environmental health protections that household and commercial waste collections provide already (see section 3).



A key indirect positive impact is the role circular economy approaches play in mitigating general population risks associated with climate change.

- COVID-19 has led to an increased awareness of the value and importance of the work carried out by all critical key workers in Wales including those working in the waste management sector who, at the start of the pandemic, worked to ensure most waste streams were collected and processed safely (see section 3.2.4).
- During the COVID-19 pandemic, reuse facilities like charity shops and reuse hubs (including local authority provision) have been classed as 'non-essential retail' and therefore closed, and community ventures such as 'Freecycle' and 'Repair Cafes' stopped many activities for extended periods of time. This has impacted on both reducing waste, on volunteering, and income generation for those retailers and services. There are also potential demographic differences as to how these impacts have been distributed, including but not limited to gender, age, employment status and groups at higher risk of discrimination see section 3.2).



3.2 Population Groups



3.2.1 Whole Population

★ Major	✓ Probable	L Long-term	★ Moderate	? Possible	M Medium-term
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Positive:

The HIA captured evidence which shows that policies of public bodies and wider organisations focusing on reduce and reuse can have a range of positive impacts for the whole population. The whole population impacts identified and assessed are indirect impacts (or impact through a pathway) and an example of an area of complex interconnection is with climate change impacts.

Positive impacts of reduce, reuse, and recycle, as part of a wider circular economy approach, identified through this assessment include:

- Improved air quality, through reduced greenhouse gas emissions (waste collection and management including landfill emissions).
- An indirect impact through a pathway addressing the climate emergency.
- Improvements to diet through more sustainable production of food (affordability and availability).
- Improved mental health and well-being.

Broad ranging health impact through response to climate emergency: The whole population could be positively impacted, through the contribution of reuse and reduce approaches to addressing climate change health risks. These are indirect impacts and not the core focus of this HIA. However, given the close links between circular economy approaches and the climate emergency response they are important to note and are integral to the triple challenge for health in Wales comprising climate change, Brexit, and the COVID-19 pandemic (Green et al., 2021).

Examples of these indirect pathways include: by reducing overall demand for natural resources thereby reducing emissions of greenhouse gases through natural resource extraction and processing into new goods (Ellen MacArthur Foundation, 2019b); avoiding damage to natural systems and human living environments, such as “better places to live and work, clean air and water, and better health” (Welsh Government, 2019b, p.10); and the potential to mitigate psychological health impacts such as from solastalgia².

Reduce and reuse approaches also align with a number of areas identified in The Future Generations Report (Future Generations Commissioner for Wales, 2020), highlighting the potential of reduce and reuse to contribute to overall population well-being through a range of pathways.

Energy waste: approximately two thirds of greenhouse gas emissions result from total energy supply (including but not limited to public bodies) to businesses and industry, which is continuing to rise (Welsh Government, 2018b). Therefore, reducing energy waste in these sectors can contribute to reduced emissions and associated health impacts. The transport sector is the second biggest emitter of greenhouse gases (12.7%) (Welsh Government, 2017b).

Public bodies in Wales have a role in reducing energy waste, including through setting performance-based targets for energy use in their built environment and infrastructure (such as performance-based standards like the Passivhaus³ standard); and, setting standards to minimise energy use and therefore waste in procurement processes. More broadly, public bodies and their staff have a role in leading by example on environmental sustainability, including waste reduction.

Air pollution: a key co-benefit of reducing greenhouse gas emissions is the positive health impacts of reduced exposure to outdoor air pollutants. Reducing exposure could reduce the risk of poor health and mortality. Such benefits could benefit disproportionately affected vulnerable population groups including children, older adults, people with underlying disease, and those exposed to higher concentrations by geography (Public Health Wales, 2018).

Jobs and economy: the positive impacts of responding to the climate emergency sit within a wider opportunity to refocus effort and resource into developing Wales as a low carbon economy. This has the potential to deliver positive opportunities within the energy sector, development of quality jobs, and global market advantages (Andreoni, Saveyn and Eder, 2015). As evidence for this potential impact, the UK low carbon economy supports over 430,000 jobs and is predicted to grow by around 11% per year to 2030. This is four times faster than the average growth rate for the UK economy as a whole and therefore has the potential to counter negative economic or employment impacts resulting from the transition to a low carbon economy. It is further estimated exports of low carbon goods and services could be worth between £60 billion and £170 billion by 2030 for the UK (Welsh Government, 2019b).

Food availability, affordability, and security: reducing the amount of food that is wasted is an important step (Welsh Assembly Government, 2010). People who live in the most deprived fifths in Wales are significantly less likely to be able to afford everyday goods and activities (Public Health Wales Observatory, 2019). Therefore, reducing food waste has the potential to benefit the most deprived communities who are at greatest risk of impacts such as by reducing monthly food shop totals. (Sharp, Giorgi and Wilson, 2010).

2 Solastalgia refers to “Degradation of a familiar environment... distress associated with environmental change.” (Whitmee et al., 2015, pp.1995–1996). As opposed to displaced peoples, solastalgia relates to experience of “...place-based distress in the face of the lived experience of profound environmental change.” (Albrecht et al., 2007, pp. S96).

3 Passivhaus is a construction industry standard and an example of a performance-based standard. To achieve certification buildings must for example meet specific, measurable requirements for energy demand and airtightness. “A Passivhaus is a building in which thermal comfort can be achieved solely by post-heating or post-cooling the fresh air flow required for a good indoor air quality, without the need for additional recirculation of air.” (Passivhaus Trust, 2021).

Negative:

The HIA did not capture clear evidence showing that policies of public bodies focusing on reduce and reuse can have negative impacts at a whole population level; however, there are a few plausible negative impacts that should be considered by public bodies in assessing policy interventions, for example:

- Negative impacts on some jobs and certain parts of the economy during a transition to greater reuse and recycling.

Evidence: not identified as part of assessment.

COVID-19 Impact:

It is important to emphasise that little was known about COVID-19 at the start of 2020, and this impacted on waste policy. For example, COVID-19 was designated as a high consequence infectious disease (HCID) in the UK until being downgraded from March 2020 (Public Health England, 2020) with a consequence of how certain wastes are categorised, and therefore treated, for example in healthcare settings (NHS Wales, 2013). COVID-19 has also directly impacted on aspects of testing and vaccination programme waste; PPE across varying sectors and settings; and waste from sanitising agents. Some of this waste results in pollution and litter, especially for marine environments, and is projected to reverse previous actions to reduce plastic waste pollution globally (Benson, Bassey and Palanisami, 2021). Regular washing and sanitising hands is a recommended health protection measure, and at the same time studies identified a problem of increased sanitiser container waste (Benson et al., 2021; Benson, Bassey and Palanisami, 2021; Dharmaraj et al., 2021; Rosadi et al., 2020; Sharma et al., 2020). A further study from Indonesia identified sanitiser liquids themselves as a potential risk to health (Rosadi et al., 2020).

Equally powerful drivers of COVID-19 implications for waste management and reduce and reuse approaches in Wales include stay at home lockdowns; public body staff working from home; requirements to isolate at home if suffering COVID-19 symptoms or in case of a positive test; closure of food services such as restaurants and cafes, alongside increase in single-use catering containers and utensils; closure of non-essential shops including those involved in reuse activities; the provision of childcare for key workers allowing those in the waste sector to continue employment despite lockdown measures; and actions to maintain most household and commercial waste collections.

Impacts from COVID-19 at a whole population level are those identified under the individual determinants of health headings in subsequent sections.

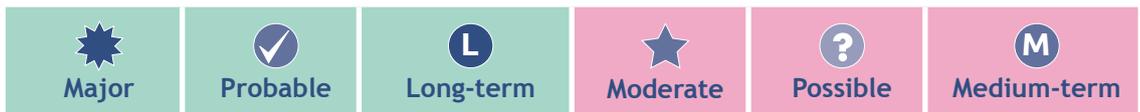
More research needed:

At whole population level and given the interrelation with climate change impacts the research gaps reflect those identified as research priorities within the UK Climate Change Risk Assessment. These documents provide advice to the UK and devolved administration governments on meeting carbon budgets and preparation for climate change. Research priorities are identified under headings of: natural environment and natural assets; infrastructure; people and the built environment; business and industry; and international dimensions (Climate Change Committee, 2021; Committee on Climate Change, 2017).

Continued evaluation of the benefits and co-benefits of reduce and reuse as part of a complex system of health and well-being improvement related to systems such as climate change.



3.2.2 People in Low and Mid-Level Occupations



Positive:

Around two thirds of people employed in repair activities are skilled workers, reflecting the skilled jobs required for the original manufacturing. Therefore, a growth of reuse and remanufacturing could create a variety of opportunities for training and skilled employment (WRAP and Green Alliance, 2015). In Wales, only 38.8% of adults aged 16-64 years have a qualification level of NVQ4 and above (Office for National Statistics, 2021). The creation of a circular economy, with public bodies and wider stakeholders increasing reduce and reuse activities, could promote the opportunity to pursue skills training at this level or above, thus creating higher skilled occupations including for existing and future employees of public bodies. This would have a positive impact on the overall skill level of the population in Wales, which public bodies have a role in supporting, and more research is needed in this field (Office for National Statistics, 2021a).

Britain is already experiencing a loss of low and mid-level occupations, a 2015 study (WRAP and Green Alliance, 2015) notes further declines projected in categories including 'administrative and secretarial', 'skilled', and 'plant and machinery operatives'.

The same study identifies that circular economy approaches offer the possibility to create jobs in particular sectors and at mid-levels of occupation and are projected to have the potential for net job creation in Britain by 2030 of between 54,000 and 102,000 jobs. Wales' existing economy is identified as well placed to benefit from this growth with WRAP stating that "*...low skilled labour would continue to be a significant proportion for reuse and recycling. Remanufacturing, closed loop recycling and biorefining would continue to require more mid-level skilled employment. Biorefining⁴ and, to a lesser extent, servitisation⁵ were also thought to need some higher end professional and technical skills*" (WRAP and Green Alliance, 2015, p.12).

Negative:

People in lower paid occupations were identified in the literature (WRAP and Green Alliance, 2015) and by stakeholders as a population group at risk of being negatively impacted by changes to waste management processes including those directly employed by public bodies, and the wider workforce. This is due to the high proportion of people with low qualifications currently working within the waste sector. It is estimated 41% of workers within waste management and recycling are in low paid jobs (WRAP and Green Alliance, 2015). In Wales, 23.5% of adults aged 16-64 years have a qualification level of NVQ1, other qualification or no qualification (Office for National Statistics, 2021b). This impact could disproportionately affect young people living in locations in the most deprived fifth and the second most deprived fifth in Wales who have a lower level of skills and qualifications on leaving school than young people in other areas (Public Health Wales Observatory, 2019).

The literature does not attribute job losses in this part of the economy directly to reduce and reuse however, but rather as part of existing wider economic trends (WRAP and Green Alliance, 2015). Public bodies in moving toward circular economy approaches have the opportunity to mitigate some of these losses.

4 Biorefining refers to the extraction of small quantities of valuable materials such as proteins from industries that create biowaste. These valuable materials are converted from waste into energy (WRAP and Green Alliance, 2015).

5 Servitisation is the reference to any system which increases the effective use of assets. A common example is the conversion from providing products to providing services (WRAP and Green Alliance, 2015).

This highlights the importance of skills and training during a period of economic transition. Closed and open loop recycling for example require a high proportion of low skilled roles and so does reuse, an area that requires significant growth.

The role of public bodies in the wider systemic transition from a linear reduce and reuse system to a circular economy is both directly in terms of their own actions and also to be facilitators and leaders of wider change through policies and interventions.

COVID-19 impact:

Specific impacts restricted to this group were not identified from the evidence available.

More research needed:

Evidence of circular economy approaches and their impact on the labour market are needed at a Wales level, and also up to date data following the COVID-19 pandemic which has arguably accelerated losses in certain sectors, for example retail.



Positive:

The HIA captured evidence which shows policies focusing on reduce and reuse can have a range of positive impacts for people living in areas which exhibit poor economic indicators and other forms of disadvantage.

People who live in the most deprived areas of Wales will have 18 years lower healthy life expectancy on average compared to people in the least deprived areas. This gap is also present for life expectancy, with people who live in the most deprived areas dying earlier compared to people from the least deprived areas (Public Health Wales Observatory, 2018a).

As well as these differences, people who reside in the most deprived areas also experience significantly poorer mental well-being (Welsh Government, 2017a).

Pathways to the health impact from reduce, reuse, and recycle approaches as part of a wider circular economy approach for this group include:

- Job creation and economic benefit, including in the repair sector (WRAP and Green Alliance, 2015).
- Improved affordability through reused goods and second hand goods (Johansson and Corvellec, 2018): through a positive impact on living conditions, economic conditions, access to services, and sense of control.
- Broader indirect impact of addressing climate emergency: through the indirect positive impact on environmental and sustainability; sense of control; and macro-economic factors.

⁶ The literature related to COVID-19 is emergent and in line with descriptors of impact (Figure 3). A number of these are assessed as Possible meaning plausible but with limited supporting evidence at the time searches were conducted.

Negative:

This HIA did not capture direct evidence showing that policies focusing on reduce and reuse can have negative impacts for this group of people. There are however several plausible negative impacts that should be considered by public bodies and wider organisations. For example, the risk of negative impacts arising from the transition to a circular economy. This could include some disruption to job security for existing workers in the waste sector.

COVID-19 impact:

Specific impacts restricted to this group were not identified from the evidence available.

More research needed:

A gap is identified for further research in light of the COVID-19 pandemic to investigate how reduce, reuse, and recycle, as part of broader circular economy approaches, might impact on people living in areas which exhibit poor economic indicators/ disadvantaged areas.



3.2.4 Employees of Public Bodies

Major-Moderate

Probable

Long-term

Moderate

Possible

Medium-term

Positive:

Stakeholders identified employees of public bodies as a population group that may be positively impacted: if public bodies prioritised waste reduction and reuse then this could positively influence their behaviour and that of their wider households and social networks, ensuring that staff of public bodies were 'Be The Change'⁷ agents for waste reduction and other aspects of Wales' well-being goals.

Qualitative evidence highlighted examples of public bodies' staff taking the initiative within their organisation to reduce waste. For example, in several different public bodies, staff voluntarily started plastic reduction groups, following the media coverage of plastic pollution (Interview 3). Public bodies' staff also volunteered for roles such as 'green champion' to ensure staff concerns were raised with organisational leads. In addition, stakeholders identified that the mental well-being of staff in public bodies could be positively impacted if they had the opportunity to influence waste reduction decisions within their organisation. For example, by working with public bodies' fleet managers, facilities managers, procurement managers, and catering managers etc.

Negative:

Conversely, the HIA captured evidence which shows that the policies of public bodies focusing on reduce and reuse can also have a range of negative impacts for employees of public bodies.

Stakeholders identified employees of public bodies as a population group that may be negatively impacted by different waste collection options/ habits at home and at work.

There was also the potential of a negative impact on the sense of control felt by public bodies' staff if they saw opportunities for waste reduction and reuse but were unable to influence such decisions within their organisations (Interview 6).

COVID-19 impact:

Specific impacts restricted to this group were not identified from the evidence available.

More research needed:

There is a significant opportunity and need to segment this evidence further into the differing functions of specific public bodies, their staff roles, and groups of public bodies who have similar responsibilities. Employees of public bodies are important to the implementation of circular economy approaches, a key group in driving change, and carrying goals and policies through to implementation. The impact on waste of homeworking in the COVID-19 pandemic also needs to be further investigated.



3.2.5 COVID-19 impact for population groups

Major-moderate and major impacts from COVID-19 not included above are summarised as:

Waste sector workers:

COVID-19 impact:

★ Moderate	? Possible	S Short-term	★-★ Major-Moderate	? Possible	S Short-term
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Major or major-moderate impacts were not identified for waste sector workers in the main assessment (they were moderate positive and negative impacts, see Supporting Information Report Section 8.3.4). However, the impact of COVID-19 was assessed as a major-moderate negative impact: this is coupled with major-moderate, possible, short-term negative impacts in the domains of physical and mental health and well-being. The positive COVID-19 related impacts were assessed as moderate, possible, short-term positive impacts through pathways of governmental support for key workers and increased social cohesion such as the recognition of the role played by key workers.

Until the end of March 2020, COVID-19 was in the highest classification of pathogen risk similar to other highly infectious pathogens, and yet throughout this period workers in waste management continued to go to work and collect waste as ‘critical workers’⁸. The virus can stay on materials for varying timescales from hours to days (Sharma et al., 2020), and up to seven days (Dharmaraj et al., 2021). Potential mental health and well-being impacts from concerns about contracting COVID-19 are identified in the literature (Sharma et al., 2020).

Volunteers, workers, and service users in the reduce and reuse sector:

★ Moderate	? Possible	S Short-term	★-★ Major-Moderate	? Possible	S Short-term
---------------	---------------	-----------------	-----------------------	---------------	-----------------

This group was not identified from evidence in the wider assessment, this is possibly attributed to the pandemic highlighting the extensive influence of volunteers and key workers, making them more visible and shows a gap in previous thinking of the impact this group could have on reduce and reuse.

⁸ “Individuals whose work is critical to the COVID-19 response, or in certain parts of the one of the critical sectors of health and social care; education and childcare; key public services, local and national government; food and other necessary goods; public safety and national security; transport, utilities, communication and financial services” (Welsh Government, 2020a, p.3).

In relation to COVID-19 evidence, this group was identified as significantly impacted by COVID-19, especially due to policies in Wales that prioritised municipal waste collections and recycling over reduce and reuse activities – for reasons of health protection, which include minimising COVID-19 spread and also the existing protection from health risks that effective waste collection supports would otherwise stop. Positive impacts are assessed in terms of this level of health protection from COVID-19 and the prevention of unnecessary virus spread in the population. Negative impacts relate to the inability to participate in volunteering due to the closure of charity shops, voluntary groups, and third sector organisations, therefore taking away the associated positive health and well-being benefits of volunteering. Further, in the absence of these reuse services, more electrical, furniture, and bulky items are plausibly being disposed with consequent negative health impacts due to pollution.

3.3 Determinants of Health and Well-being

The summary below depicts the key impacts that have been identified from reduce and reuse approaches and the determinants of health affected. Please note that only those described as Major or Major- Moderate have been included in the Summary Report.



Positive:

Evidence identifies a major-moderate possible positive impact through reduce and reuse approaches providing people with an increased sense of control in their own lives over action in response to the climate emergency. The population groups most affected are the whole population; people with poor mental health / illness related to climate anxiety; people living in more deprived areas; children, adolescents, and young adults. These are prospective and emergent impacts.

The Lancet Commission on Planetary Health identifies the health issue of solastalgia⁹ and health outcomes related to environmental harm including (varies by setting / population): anxiety, depression, suicidality in rural populations, concerns about financial and work-related issues, a sense of powerlessness or lack of control, grief, and loss (Whitmee et al., 2015, pp.1995–1996).

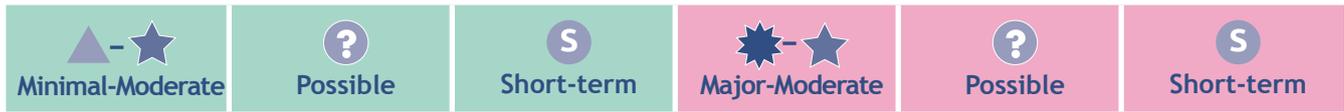
Negative:

Negative impacts were identified via interviews of both increasing complexity of waste sorting and management at home combined with changes of moving from a recycling focus to a reduce and reuse focus. Limited further evidence of this was identified. It should also be noted that implementation of such changes should be assessed and mitigated by public bodies where they negatively affect disabled people (population groups most affected: potentially whole population, and people with mental illness affected by such issues).

Possible negative impacts were evidenced for staff of public bodies trying to implement policies in the context of wider systemic challenges that are not supportive of the change – for example reduction of plastic products where alternative options are not available (Interview 4 & 5) (population groups most affected: staff of public bodies and wider organisations).

9 See footnote 3.

COVID-19 impact:



Mental health was identified as being significantly impacted through a range of domains and pathways, including emotional well-being; sense of control; sense of purpose; uncertainty and anxiety. This includes for example, the impact on waste sector workers at risk of exposure to COVID-19.

More research needed:

Evidence of impact pathways towards reduce and reuse; the potential population groups affected by these, especially those populations with protected characteristics; and intervention measures to mitigate identified negative impacts.



3.3.2 Living and environmental conditions affecting health



Positive:

Evidence within this assessment identified that a move to reduce and reuse approaches can contribute overall to reducing air pollution by reducing use of fossil fuels (especially reducing energy waste and transport). The population groups potentially most affected are children, older people, people with pre-existing health conditions, people living in urban areas and people living in areas of high deprivation who are often the most affected by these environmental conditions. An efficient management of waste can reduce the demand for primary materials, thus reducing wasted transport energy in supply chains and extraction of primary materials (Ellen MacArthur Foundation, 2019b).

Positive impacts were identified from reducing food waste with subsequent reduced traffic to sites and reduced greenhouse emissions. The population groups most affected are whole population, residents near landfill and waste management sites. Knowledge is still lacking at a local level with waste prevention, especially in the methods of monitoring the management of waste, however once these are addressed sufficiently, with the motivation to prevent waste, the positive impacts as highlighted above should be seen across all levels of the population (Zacho and Mosgaard, 2016).

Negative:

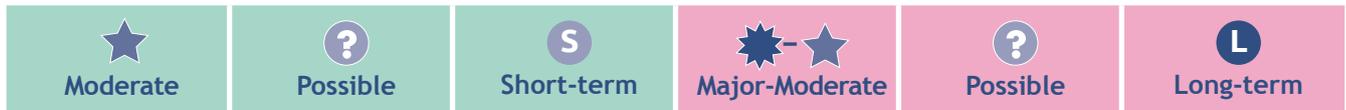
Participants at the workshops identified possible unintended consequences of a move away from plastic, driving consumers to materials that have a worse impact on waste such as single use compostable food containers where these are not part of a wider system or end up as contaminants in recycling waste collections. The population groups most affected are whole population and staff of public bodies. Although these have not been heavily researched, behavioural change programmes and education, including by public bodies, could support consumers to make better choices at a household level (Zacho and Mosgaard, 2016).

COVID-19 impact:

Several pathways to impact were identified from COVID-19 including for example, the health impacts resulting from: waste as a potential source of COVID-19 infection, and changes in waste management

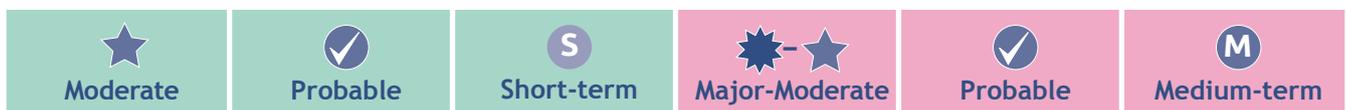
regimes; the use and waste generated as a result from personal protective equipment; and health impacts of increased use of sanitisers such as those that contain alcohol and biocides.

Waste disposal and recycling:



Most waste streams continued to be collected in Wales during the pandemic with a possible positive health protection impact, that is, the continued health benefits of waste collection being maintained. Potential increases in incinerated waste and production of packaging waste (such as through use in home deliveries) were identified as having a possible negative impact on health and making it harder to achieve zero waste for example where collections of recycled goods were combined with non-recyclable household waste. Possible impacts in both cases here mean plausible but with limited evidence available in this assessment (see descriptors of impact, Figure 3).

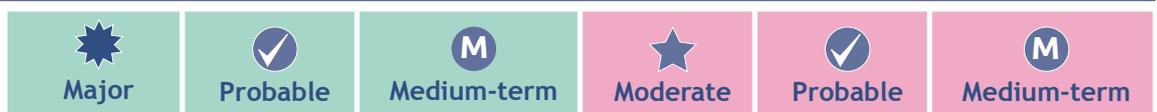
Specific waste streams:



Personal protective equipment (PPE), including face coverings, has been essential for positive health protection in the short to medium-term (and for longer term health benefit). Despite this positive impact of PPE, negative impacts were also identified with the associated waste including: changes in types of waste produced; increased biomedical and healthcare waste; potentially infected waste outside of healthcare settings where people are not familiar with how to safely handle this; more plastic waste; increased single use products; waste from increased online shopping; and hand sanitiser and disinfectant liquid with health impacts such as the potential for alcohol poisoning risk to children and increased exposure to biocides (Rosadi et al., 2020).



3.3.3 Economic conditions affecting health



Positive:

Probable impact was evidenced for the creation of new and higher skilled employment opportunities within the waste reuse / remanufacturing sectors (Zacho and Mosgaard, 2016) (population groups most affected: whole population; people on low income/ unemployed/ economically inactive; people with lower skills and qualifications; people who live in areas of high deprivation).

Along with this, development of social enterprise companies employing local people within the reuse and remanufacturing sectors was also identified as a positive impact (Zacho and Mosgaard, 2016) (population groups most affected: whole population; people on low income/ unemployed/ economically inactive; people with lower skills and qualifications).

Opportunity for policies of public bodies to target economic investment and development within the waste reuse/ remanufacturing sectors in areas experiencing high levels of deprivation would be advantageous (Workshop) (population groups most affected: people who live in areas with high levels of (for example) economic inactivity, unemployment, and low income).

Circular Economies and Sustainable Health and Well-being

Opportunities also exist in employment related to extend producer responsibility (EPR) and deposit return scheme (DRS)¹⁰ processes (Workshop and Interview 5) (population groups most affected: working age adults and future workforce).

Welsh Government policies, which endorse sustainable procurement can have a positive impact through supporting the transition to circular economy approaches including support of social enterprises and companies in the repair and reuse market segments (Interview 2).

Negative:

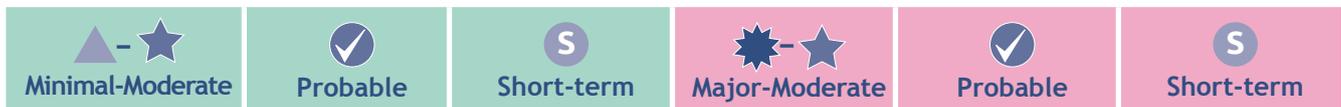
Evidence was identified of potential loss of employment within waste collection, recycling, incineration, and at landfill sites (WRAP and Green Alliance, 2015), if there was not an equal and equivalent creation of job opportunities of alternative employment. The population groups potentially most affected by these negative impacts are people who work in the waste collection and management sector; people in low and mid-level occupations; people with lower levels of skills and qualifications.

Possible evidence of loss of employment at Wales-based suppliers of single-use plastic items (Workshop, Interviews 1, 3, 5 & 6) (population groups most affected: people who work in manufacturing plastic products).

However, there are clear routes to mitigation of these impacts through positive impacts such as repair and reuse activities.

COVID-19 impact:

Waste management sector:



This sector was the main area of economic impact identified with minimal-moderate probable short-term positive impact for the waste management sector and those working in it, particularly in municipal waste management. Major-moderate probable and short-term impacts with a longer lasting effect were identified for the reduce and reuse operations which are often managed by third sector organisations.

Separately, COVID-19 has created opportunities for companies in Wales to manufacture PPE in response to the pandemic. This PPE ends up as waste with COVID-19 potentially pointing to opportunities for the manufacturing and waste sectors to create new ways of working collaboratively to create circular lifecycles for these products in Wales.

More research needed:

Further investigation should focus efforts on understanding the most negatively impacted workers, with a potential focus on those in the waste sector, in the context of a transition from reduce, reuse and recycle to a low carbon circular economy.

Investigation of effective interventions for transition of workers from these jobs to new jobs created including identification of skills gaps, training needs, and funding and support required.

¹⁰ See Supporting Information Report, Section 1.0' for definitions.



3.3.4 Macro-economic, environmental and sustainability factors: including circular economy and organisational policies

 Major	 Possible	 Long-term	 Moderate	 Possible	 Medium-term
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Positive:

Possible evidence was identified of a systemic positive impact through the pathway of responding to the climate emergency. This will reduce the risk of extreme weather events, air pollution and greenhouse gas emissions, and will increase the production of sustainable food and biodiversity and improve mental health and well-being (Workshop, Interviews 1,2,3,4 & 6) (population groups most affected: whole population).

Addressing the climate emergency will reduce air pollution and greenhouse gas emissions (Sharp, Giorgi and Wilson, 2010) (population groups most affected: people with pre-existing health conditions; people who live in urban areas; children).

Reduce and reuse approaches have the potential to make people, individually and wider society, feel they are making a material contribution to addressing the climate emergency. Improvements to mental health and well-being through a reduction of anxiety related to the climate emergency have been identified (Workshop, Interviews 1, 3, 5 & 6) (population groups most affected: people with poor mental health).

Possible macro-economic benefit of a shift in the economy and use of resources throughout their lifecycle leading to employment opportunities and resultant positive health impact (Wilson et al., 2012) (population groups most affected: people working, potentially working, or training to work in the reuse / remanufacturing sectors).

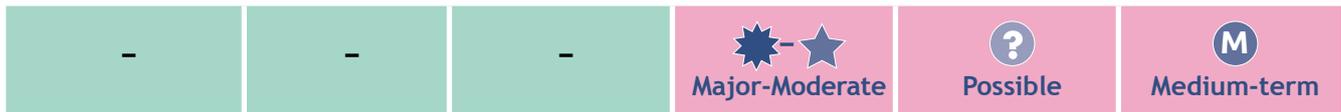
Negative:

Possible negative impact of transition from existing approach to resource use and waste to a system focused on reduce and reuse. For example, those working in sectors or market segments like plastic manufacturing or recycling that may face a decline in demand and employment (Andreoni, Saveyn and Eder, 2015). The populations most affected by these impacts would be people working in the recycling and landfill management areas of the waste sector.

COVID-19 impact:

Overall, the HIA takes a base assumption that zero waste will be achieved by 2050 in line with policy and not achieving this would potentially lead to additional or increased negative health consequences. COVID-19 has seen progress in some areas fall back highlighting how such progress can be set back.

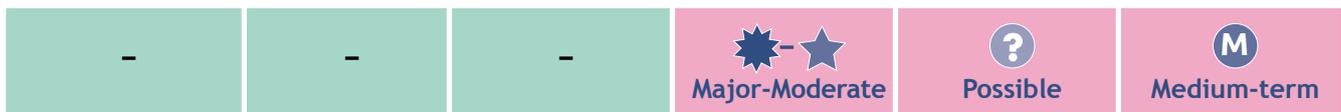
Circular economy:



Negative

The immediate demands of the pandemic have resulted in actions that have unintentionally negatively reinforced existing linear waste management approaches and impact on recycling processes. This presents a risk to progress on circular economy approaches and realising the associated health benefits of doing so.

Climate change, biodiversity, and planetary health:



Negative:

Despite a small and emerging literature base, several studies identified COVID-19 and policies responding to the pandemic as setting back responses to the climate emergency and increasing plastic pollution in particular:

“The overwhelming consequence of [the] COVID-19 pandemic coupled with strategic response measures taken by governments and healthcare providers around the world have created more challenges for combating plastic pollution. There is no doubt that COVID-19 will reverse the momentum of a years-long global battle to cut down single-use plastics.” (Benson, Bassey and Palanisami, 2021: p.7)

As part of a complex system of impacts, such measures will have contributed to harm to health. Action is required at a global scale to mitigate the unintended negative consequences of these vital health protection measures undertaken during the pandemic.

More research needed:

Future research is needed with a focus on setting circular economy approaches to materials and resource use within economic research and thinking. As Velis (Velis, 2018, p.759) notes, ***“...while ‘circular economy’ contains the term ‘economy’, strangely enough, it is not necessarily a theory about economics – macro or micro – but mainly a theory for how to manage material flows. The concept enjoys little traction and understanding among the current theoretical economists... We need to ensure that the actual and perceived societal benefits of a new circular model are established in a more fundamental and sound manner than just traditional cost-benefit analysis...”***



3.3.5 COVID-19 impact for determinants of health

Major-moderate and major impacts from COVID-19 not included above are summarised as:

Access and quality of services:

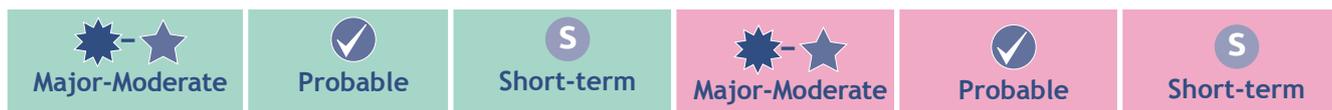
Reduce and reuse outlets including third sector:



These impacts are primarily through the closure of many outlets associated with reuse and consequent impacts on lower levels of reuse during the pandemic; reduction in volunteering opportunities; and community initiatives stopping operating for periods of time (including at the time of this review during mid-2021).

Households unable to dispose of large bulky items with a potential negative impact on mental health from having waste stored at home.

Waste services:



Major-moderate, probable, short-term positive impacts of waste collection are being treated as a public health priority in Wales as in many European countries (Sharma et al., 2020). COVID-19 impacts highlight the systemic complexities of waste and reduce and reuse: including concerns that if household recycling collections were stopped it would be difficult to get householders back into a routine; and food waste collection anaerobic digestion plants require a continual supply of waste and take 4-6 weeks to restart if stopped, which would also impact methane emissions (Welsh Government, 2020b). These closures are also potentially linked to an increase in the incidence of fly tipping (Green et al., 2020b).

Major-moderate, probable, short-term negative impacts are related particularly to reduce and reuse services especially where the third sector has seemingly been severely curtailed and potentially damaged by enforced closures. This could have a material impact on achieving zero waste targets and moving towards a circular economy if these are not fully supported in future.

4.0 Opportunities and Potential

4.1 Opportunities

Overall, an approach to prioritise reduce and reuse policies has the potential for significant public health co-benefits in Wales. Some of these have the potential to help reduce long-standing health and other inequalities within Wales, such as creating skilled jobs and fair work.

Reduce and reuse policies are an essential ingredient and significant opportunity to deliver the goal of zero waste by 2050 and a circular economy in Wales. This in turn is directly linked to addressing the climate emergency – as challenging as that appears.

Appraisal of the literature, qualitative evidence, and information from the 44 public bodies' websites (for list see Supplementary Information Section 6.0) identified areas for action that could enable public bodies and wider organisations in Wales to refocus on waste reduction and reuse (see Table 3, Section 4.3).

There are opportunities for significant changes in the manufacturing sector, and this is where public bodies and industry can work in collaboration to influence the change needed to implement a circular economy in Wales.

Such a transition presents the opportunity not only to decrease greenhouse gas emissions but also positively impact waste management, air quality and overall environmental health (Ellen MacArthur Foundation, 2019b).

The HIA identified that leading by example, prioritising measures to reduce waste in all areas of public bodies' work, developing sustainable procurement processes, and harnessing the huge resource of employees within public bodies to 'Be the Change' for Wales' well-being goals, are key actions that could enable public bodies to make zero waste and the circular economy realities.

There are opportunities at different levels and times for public bodies to integrate the routine HIA of circular economy policies and interventions. The benefits that this would support include identifying "additional health-related actions to be included within action plans, to boost opportunities and manage risk" (World Health Organization, 2019: p.viii).

... an approach to prioritise reduce and reuse policies has the potential for significant public health co-benefits in Wales.

4.2 Evidence Gaps

For some groups there needs to be more research or evidence gathered to gain a better understanding of the implications of reduce and reuse policies.

These groups include:

- Whole population: especially related to climate change risk and the complex and systemic pathways to health impact (see Section 3.2.1).
- Employees of public bodies: who are identified as a key group in driving change and carrying goals and policies through to implementation (see Section 3.2.4).

- People who work within the waste management sector
- People with mental health conditions
- People who live in accommodation with communal facilities, including houses in multiple occupation (HMOs) and apartments
- People who live close to landfill / incinerator sites
- People living in coastal and low-lying areas
- People living in rural / dispersed communities
- People living and working in farming communities
- People who are homeless
- Older adults
- People working from home or agilely

To aid public bodies in supporting health equity and broader equalities duties, more research is needed into any differential impacts including but not limited to those by sex, gender, age, ethnic group, and disabled people.

It is also important that the impacts related to COVID-19 are also investigated by these characteristics.

Across all wider determinant domains, the pathways to health impact from reduce and reuse policies are identified as requiring further research and investigation including mapping impacts through the complex system of reduce, reuse, and recycle, as part of wider circular economy approaches. However simply describing or mapping systems is not sufficient, and there are gaps in evidence around the effects of interventions (such as implementing circular economy approaches) on the wider system and determinants of health. Rutter et al. call for research investment in a “multidisciplinary suite of methods for both intervention research and evidence synthesis... to support effective policy responses.” (Rutter et al., 2017, p.2).

Specific gaps in research of the impact of these determinants in relation to reduce, reuse, and recycle as part of wider circular economy approaches are:

- Economic conditions affecting health: investigation of sectors and workers most impacted and effective interventions to support workers and jobs during the economic transition.
- Access and quality of services: a key impact for public bodies in Wales where they can have a positive impact on outcomes.
- Macro-economic, environmental and sustainability factors: sustainable development and circular economy: the need to set circular economy approaches to materials and resource use within economic research and thinking and for this thinking to become the mainstream.
- Macro-economic, environmental and sustainability factors: health impact of climate change in Wales requires further investigation.

Specific gaps in the literature include:

- Evidence evaluating interventions during implementation - much evidence was prospective. This includes evaluation of interventions on complex systems.
- There is a focus on municipal / household waste, but little on:
 - Commercial solid waste
 - Effluent waste – both residential and commercial
 - Water efficiency – use of natural resources and drinking / treated water
 - Energy efficiency – and a reduction in energy use separate to decarbonising energy production
- A risk of bias in researchers and funders investigating positive long-term effects more regularly than negative effects especially during a period of economic transition to a circular economy.

4.3 Future Actions

Future actions that could potentially be implemented derived from this HIA have been developed based on the evidence gathered about the impact of reduce, reuse, and recycle approaches as well as wider circular economy goals. These actions are relevant to a range of organisations and people in Wales. These include Public Services Boards; public bodies; business and industry organisations; communities; and individual employees and citizens. Table 3 summarises these.

Table 3: Potential Areas for Action

- Use of Health Impact Assessment when developing circular economy policies and interventions
- Supporting community action and initiatives for reduction and reuse of resources
- Prioritising waste reduction towards zero waste
- Reducing all energy consumption
- Reducing plastic use and plastic waste
- Reducing waste through sustainable procurement
- Reducing food waste
- Increasing levels of reuse
- Continuing to support recycling
- Collaborative action across all sectors and public bodies to consider the health and well-being impacts and any inequalities
- Public bodies leading by example towards zero waste and a circular economy ('Be The Change')

For health and well-being in Wales, the findings mean that many wider determinants of health can be addressed through a wide range of interventions involving a broad number of public bodies and wider stakeholders in Wales. Examples of these pathways include through skills and training like the creation of employment opportunities including in higher skilled occupations. Volunteering opportunities and the role of the third sector in a circular economy are important to consider. The mental health impacts are potentially significant and circular economy approaches including toward zero waste can make a real contribution toward mitigating some of these such as by increasing sense of control in responding positively to the climate emergency. The creation of an improved environment with less pollution and better water quality could also have a positive impact on health and well-being. All of these can also help make a healthier, resilient, prosperous, and globally responsible Wales.



Policy

- **Specific roles and duties of individual public bodies:** The scope of duties and roles in relation to waste will vary by type of public body so will need to be interrogated. Collaboration on common themes across Wales should be encouraged, for example through Public Services Boards and intrasectoral and intersectoral action.
- **Integrate health impact screening:** Public bodies should utilise HIA as a method of assessing reduce and reuse policies to promote positive actions to implement the circular economy strategy and mitigate for any unintended consequences / negative impacts.
- **Consumption of resources:** Public bodies should closely monitor, report, and evaluate their consumption of resources and their actions to reduce waste to zero by 2050 (Welsh Government, 2021a).
- **Procurement:** Public bodies should drive forward the actions identified in 'Prosperity for All: A Low Carbon Wales' regarding sustainable procurement (Welsh Government, 2019b).
- **Waste strategy:** Public bodies and agencies should consider the findings of this HIA when consulting on their updated or revised waste strategies.
- **Pandemic planning:** Waste management should be considered within emergency management planning. In particular, what actions would be required in a circular economy to respond to a future pandemic – waste from energy and incineration options have played a significant role in managing waste during the current pandemic – this should be considered further and how it is managed in a zero-waste future.

Implementation

- **Community response:** Supporting Public Services Boards and communities to develop locally relevant responses and actions: through funding and skills and knowledge development to enable health and well-being.
- **Scale up successful pilots to the mainstream:** Scaling up support for community examples of successful pilots where relevant and effective so that these become part of the mainstream.
- **Public body employees driving change:** Public bodies to harness the huge resource/opportunity with their employees to 'Be the Change' for Wales' well-being goals, whether based in workplace, home, or agile workspace. There are supportive tools available to do this¹¹.
- **Circular economy skills gaps and training:** Skills gaps identified both directly within reduce and reuse approaches and indirectly through circular economy approaches are important drivers to be considered by Regional Skills Partnerships and wider organisations. This will support working-age adults and learners to move into good work that is better paid and supports a transition to a circular economy with sustainable jobs distributed across Wales. All jobs have the potential to become green jobs and "every job of the future will be directly or indirectly shaped by the transition to net zero" (Green Jobs Task Force, 2021).

11 <https://phw.nhs.wales/topics/health-and-sustainability/be-the-change-toolkit/>

5.0 Conclusion

This HIA is the first of two that assesses the impact of climate change, the environment and environmental sustainability on health in Wales. It has appraised the impact on health in Wales of moving from linear resource use that generates significant waste to reduce, reuse, and recycle as part of broader circular economy approaches, which are essential to reach zero waste by 2050. The second HIA (publication pending) is a comprehensive assessment of the health impact of climate change on Wales and those in the population who may be affected by it.

This HIA identifies that the very concept of waste needs to be reshaped: Wales needs to collectively focus on the sustainable use of resources, keeping products and goods in use at their highest level of value for as long as possible. Wales is a leading example globally in recycling: the next step is for circular economy approaches to make recycling the “loop of last resort” (Ellen MacArthur Foundation, n.d.).

The COVID-19 pandemic has created new challenges that undo some past progress on reduce, reuse, and recycling: this needs to be urgently mitigated.

Circular economy and climate change are separate but closely related complex systems – they cannot easily be disentangled because our use of material resources accounts for 45% of greenhouse gas emissions. This HIA assumes a successful response to the climate emergency yet the impact of COVID-19 on today’s reduce, reuse, and recycling provides an insight into the alternative scenario and highlights the need to urgently embed action for change today and at all levels.

Positive impacts are highlighted, such as, for people in low and mid-level occupations to gain employment in the circular economy; for people living in areas that have historically exhibited poor economic indicators; and for employees of public bodies and other organisations to make changes and contribute to a sustainable and more healthy future. Yet some of these positives will take time to be felt and this HIA has also identified negative impacts which may occur sooner, so there is a period of transition where support will be needed.

Negative impacts identified include the potential loss of employment in the existing waste collection industry, which could impact on people working in lower-level occupations. However, opportunities to materially mitigate these impacts are also identified.

This HIA can provide a greater understanding of the major impacts and can support public bodies, organisations, communities, and indeed individual workers in Wales to foster an approach that promotes health, well-being, and equity to enable effective, productive, and positive delivery of policies and services related to reduce and reuse as well as the circular economy more broadly. There is a role for public bodies (and all employees), wider organisations, communities, and individuals in Wales to play, both now and in the future.



Appendix

Table 1: Summary of all impacts identified and evidenced in this HIA. Full rationale is provided in the supporting information document.

	Positive			Negative		
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Population groups						
Whole population	Major	Probable	Long term	Moderate	Possible	Medium term
Groups at higher risk of discrimination or another social disadvantage						
People with physical health conditions	-	-	-	Moderate	Possible	Medium term
People with mental health conditions	Moderate	Possible	Medium term	Minimal	Possible	Long term
People in low and mid-level occupations	Major	Probable	Long term	Moderate	Possible	Medium term
Income related groups						
People who are economically inactive	Moderate	Probable	Medium term	-	-	-
Geographical groups and / or settings						
People who live in houses in multiple occupation (HMOs)/ apartments/ flats	Minimal	Possible	Medium term	Minimal	Possible	Medium term
People living in areas which exhibit poor economic indicators/ disadvantaged areas	Major	Probable	Long term	Moderate	Possible	Medium term
People living in rural areas	Moderate	Possible	Medium term	Moderate	Probable	Medium term
People who live close to landfill / incinerator sites (current and historic sites)	Moderate	Possible	Long term	-	-	-
Public body employees	Major-moderate	Possible	Medium term	Moderate	Possible	Medium term
People who work within the waste management sector	Moderate	Probable	Medium term	Moderate	Possible	Medium term
Potential determinants of health and well-being affected						
Behaviours affecting health	Moderate	Probable	Medium term	Moderate	Possible	Medium term
Social and community influences on health	Minimal	Possible	Medium term	Minimal	Possible	Medium term
Mental health & well-being	Major-moderate	Possible	Medium term	Moderate	Possible	Long term
Living & environmental conditions affecting health	Major-moderate	Possible	Long term	Moderate	Possible	Short term
Economic conditions affecting health	Major	Probable	Medium term	Moderate	Probable	Medium term
Access and quality of services	Moderate	Possible	Medium term	Moderate	Possible	Short term
Macro-economic, environmental and sustainability factors: sustainable development & circular economy	Major	Possible	Long term	Moderate	Possible	Medium term

Table 2: Summary of all impacts identified and evidenced in this HIA as a result of COVID-19 on reduce and reuse in Wales.

	Positive			Negative		
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration
Population groups						
Income related groups						
Households with resources below minimum needs ¹²	-	-	-	Moderate	Possible	Short term
Settings related groups						
Workers in waste management	Moderate	Possible	Short term	Major-moderate	Possible	Short term
Volunteers, workers, and service users in the reduce and reuse sector	Moderate	Possible	Short term	Major-moderate	Possible	Short term
Potential determinants of health and well-being affected						
Behaviours affecting health	-	-	-	Moderate	Possible	Medium term
Social and community influences on health	Moderate	Possible	Short term	-	-	-
Mental health and well-being	Minor-moderate	Possible	Short term	Major-moderate	Possible	Short term
Living and environmental conditions affecting health	Moderate	Possible-Probable	Short term	Major-moderate	Possible-Probable	Medium-Long term
Economic conditions affecting health	Minimal-moderate	Probable	Short term	Major-moderate	Probable	Short term
Access and quality of services	-	-	-	Major-moderate	Probable	Short term
Macro-economic, environmental, & sustainability	-	-	-	Major-moderate	Possible	Medium-term

12 (Joseph Rowntree Foundation, 2021)

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Circular Economies and Sustainable Health and Well-being

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Our Priorities 2018-2030

Building and mobilising knowledge and skills to improve health and well-being across Wales

Influencing the wider determinants of health

Improving mental well-being and resilience

Supporting the development of a sustainable **health and care system focused on prevention** and early intervention

Working to Achieve a Healthier Future for Wales

Promoting healthy behaviours

Protecting the public from infection and environmental threats to health

Securing a **healthy future** for the next generation

Our Values:

Working together with trust and respect to make a difference



GIG
CYMRU
NHS
WALES

Iechyd Cyhoeddus
Cymru
Public Health
Wales



World Health Organization
Collaborating Centre on Investment
for Health and Well-being



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