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Iechyd Cyhoeddus Cymru
Public Health Wales

Winter well-being: shared actions and impact

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Executive summary

Winter can challenge us all – bringing increased demands on individual health and significant challenges to services across all sectors in Wales.

In 2019 Public Health Wales published *Improving winter health and well-being and reducing winter pressures in Wales: A preventative approach* [1] to describe the impacts of winter on health and well-being and the subsequent effects on health and care services. The report provided evidence on the determinants of ill-health in winter, risk factors for ill health and vulnerable populations, and evidence-based solutions to reduce morbidity and mortality. The report took a preventative approach, seeking to apply public health principles to improving winter well-being and reducing winter pressures.

Winter well-being: shared actions and impact, seeks to refresh and build on our 2019 report, and is focused on improving health outcomes for the population and helping to take the pressure off the NHS. Based on an updated assessment of needs, risk factors and evidence of effective interventions this report presents tangible priority actions in the following key areas:

1. Preventing and managing infectious diseases
2. Staying warm and well
3. Accessing the right care at the right time
4. Supporting mental health and well-being
5. Supporting vulnerable populations
6. Healthcare workforce resilience

To support a busy system, already planning and preparing for increased strain, the report is action-oriented and uses an approach of offering considerations and checklists that can fit with extant key winter pressure processes. This approach cannot replace expertise but instead aims to support delivery, even among experts operating under stress, fatigue, or emergency conditions.

The report applies a behavioural science lens to the headline challenges to improving and protecting health in winter, recognising that effective solutions require both individual actions and system-wide enabling interventions. This *dual focus framework* recognises that while personal responsibility and action matters, the environment, policies, and services must be designed and implemented in ways to enable and support these actions.

Getting what you need from this report:

What are you looking for?	Where is it?	What's available?
Individual (public) actions to improve winter well-being	**Page 9-16**	Ready-to-use wording on priority actions, with a reasoning aid, and one-line **mental model** to assist delivery.
Organisation considerations and checks to optimise impact of service in winter	**Page 9-17**	Priority considerations checklists. Behavioural-informed to optimise impact, help balance demand/supply, and risk, resilience and response.
Summary of the impacts of winter cold weather on health and well-being	**Page 18**	Data, evidence and references on the headline winter health impacts in Wales. Further evidence-based contemporary influences on health, for consideration.
Summary of the risk factors for winter-related morbidity and mortality	**Page 22**	Evidence based, referenced listing of individual level risk factors – that impact health and increase demand for care in winter.
Interventions to improve health during cold weather and prevent winter pressures	**Page 25**	Referenced listing of impactful interventions to improve health during winter. Actions focused on health, community, housing and transport.
Implementation ideas	**Page 31**	Suggestions for use of the dual focus framework in support of existing efforts.

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1. Winter well-being: challenges and contexts

Wales faces significant health challenges during the winter months, with higher rates of mortality and morbidity compared to other seasons. Avoidable deaths peak in December and January, the numbers of people requiring care because of respiratory conditions and falls also rises in winter, highlighting the substantial changes in population health needs in the colder months.

While extreme cold and weather conditions have traditionally been considered the primary winter health hazards, the 2019 report *Improving winter health and well-being and reducing winter pressures in Wales* [1] suggests that moderately cold temperatures (8°C and below) are responsible for a large proportion of excess cold-related morbidity and mortality. These moderate temperatures particularly affect vulnerable populations, such as those aged 75 and over and those with existing health conditions.

Winter health impacts extend beyond those arising from temperature changes - seasonal factors such as influenza and norovirus outbreaks are more prevalent during winter months, disproportionately affecting the most vulnerable populations. Additionally, there are numerous indirect health and psychosocial effects including cold housing influencing mental health, depression, and social isolation; reduced physical activity and mobility; and increased heating costs leading to fuel poverty (being unable to afford to keep one's home adequately heated), and related financial stresses and strains.

The cumulative effects of cold weather and winter-related illnesses create significant strain on Wales' health and care services. These include increased emergency department attendances, hospital admissions and primary care consultations, exceeded bed occupancy rates, ambulance delays, longer treatment waiting times, cancelled elective procedures, and medical staff working increased hours while experiencing work-related stress and exhaustion.

Welsh policies supporting particularly preventative approaches to reducing winter pressures include the Well-being of Future Generations Act 2015 with its mandate around longer-term thinking and preventative measures; the Social Services and Well-being Act 2014, emphasising prevention and early intervention; and "A Healthier Wales" strategy, promoting community-focused, preventative approaches through integrated health and social care systems. This report acknowledges the above challenges and contexts, and focuses on actions to improve health outcomes for the population in Winter, including by suggesting approaches to reducing pressure on the NHS.

2. Shared actions for prevention

Winter well-being: shared actions and impact, offers an up-to-date description of the population health and well-being needs in winter, alongside a synthesis of the literature on risk factors and interventions (renewing that in the 2019 report), from UK comparable countries, critically in a post-pandemic context.

The report uses available data sources to provide an updated analysis of winter-related health and social challenges, including patterns in mortality and morbidity. It uses a health inequalities lens to; identify communities at highest risk.

The renewed literature synthesis (see Supplementary Appendix A1 and B for methodology) summarises relevant research since December 2018 with a focus on evidence from the UK and comparable countries (e.g. with similar climate and healthcare system characteristics). It provides a structured review of individual-level interventions, community-level initiatives, and system-level responses to winter pressures, critically in a post-pandemic context.

This report does not provide 'the answer' to dealing with the complex impacts of winter, but instead aims to support a busy system, already planning and preparing for increased strain. This report is action-oriented and uses a behavioural science informed approach. It offers considerations and checklists that can fit well with extant key winter pressure processes and recognises both individual actions and system-wide enabling interventions are required for optimised action. This approach cannot replace expertise but instead aims to support delivery, even among experts operating under stress, fatigue, or emergency conditions.

The approach is offered to enable delivery of the Welsh Government's annual winter plans, building on the 2024/25 World Health Circular, which described the public health context moving into autumn/winter, highlighted priority areas of focus to help mitigate system pressures (particularly from respiratory viruses, with modelling for respiratory viruses), and described expectations of the health and social care system in responding to respiratory viruses.

3. A dual focus framework for winter well-being

The framework below offers a set of tangible priority actions to reduce the pressure of winter on individuals and on the health and care system. It is based on health needs (detailed in Section 4), the evidence around risk factors (Section 5) and evidence of effective interventions (Section 6).

The actions are arranged around six key areas drawing on the framework presented in *Improving winter health and well-being and reducing winter pressures in Wales* [1]:

1. Preventing and managing infectious diseases
2. Staying warm and well
3. Accessing the right care at the right time
4. Supporting mental health and well-being
5. Supporting vulnerable populations
6. Healthcare workforce resilience

For each key area the **dual focus framework** presents individual-level behaviours and system/organisation actions, that can combine to influence well-being in winter. A range of cognitive and psychological, social and environmental influences have been considered, then accounted for, in the framework. While personal responsibility and actions matter, the environment, policies, and services must be designed and implemented in ways to enable and support these actions. This dual framing can guard against an over reliance on individual choices and decision making, and ensuring sustainable impactful services.

The following principles can support shared action and impact – by individuals and systems/organisations, regardless of topic, setting or target audience:

- explain the why; to build intrinsic motivation and to help underpin mental models; focus on rationale (e.g. transmission prevention, reducing risk of injuries, spreading the burden on an NHS owned by all of society);
- emphasise collective efforts; acknowledge the value of collective responsibility/goals/outcomes; frame actions in terms of collective care and concern, and in collective and personal gains, rather than 'tasking';
- emphasise normalising preventative behaviours and provide feedback where possible (e.g. leveraging social proofing around vaccine uptake).

In the dual focus framework, **individual action components** focus on evidence-based knowledge and information about winter health risks and protective behaviours; practical capabilities such as home heating management, recognising health warning signs, and accessing support services; and addressing psychological barriers, building self-efficacy, and leveraging social influences, to call on intrinsic motivation. These aspects are in a form of words that are 'ready-to-use', and presented alongside a summary of the reasoning to support a mental model for individuals, to carry through to action. A summary of advice and signposting for individuals is also available here: Cold Weather - Public Health Wales

System/organisation enabling components in the framework focus on making the above behaviours normal, easy, attractive and routine (NEAR) and therefore more likely to occur. This includes using behavioural science principles like creating defaults and other changes to processes to guide actions. This can be around access, response, and resilience; built environment standards and considerations to reduce risks; and communications for information dissemination, early warning and community engagement. These aspects draw on the evidence of effective interventions and feature considerations for organisations and practitioners around services and approaches to optimise impact.

1. Preventing and Managing Infectious Diseases

Individual actions	Reasoning aid, and a *mental model*
Get your vaccinations against flu, RSV and COVID-19	Reduces your chances of serious illness this winter **Vaccines save lives, mine are my shield - they keep me and others safe**
Spot the signs early, that you might be getting ill, and get basic medication ready	Catching illness early helps you feel better faster **I know my body — I act early, not late**
Cover-up your coughs/ sneezes, and bin all used tissues	Clean hands help stop germs spreading and making people sick **Small habits protect big numbers of people**
Stay home when you are unwell	To help stop spreading bugs to others, if we all do the same, there's less chance of spread **Staying home helps me heal and protects others**
Wear face coverings in crowded indoor spaces	To help protect you, and others, when there are lots of germs around **I wear a mask to protect others and myself**
Let fresh air into indoor spaces as often as you can	Fresh air helps blow germs away **Fresh air is like a silent protector**
Take vitamin D every day	Helps your body stay strong and healthy, especially in winter **Vitamin D is my daily boost — I take it to stay well**
System/organisation actions	**Considerations check**
Utilise **behavioural science** in vaccination programme delivery	• Break the audience into smaller groups with tailored messaging, identify the main barriers stopping each group from acting, give them timely prompts or reminders, focus on showing the benefits of action ('what you can gain') and how most people are already doing it • Use the WHO Tailoring Immunisation Programmes guide to help plan • For each audience group, tackle the priority things that make action harder and strengthen the things that make it easier, using a programme with several different parts working together
Minimise friction in accessing vaccinations	• Offer services in a wide range of locations with operating hours and drop-in options that suit priority groups and/or larger population segments • Make the process simpler by reducing paperwork, speeding up registration, and giving vaccines together where possible. Making things easy often works better than just providing more information

Develop clear decision trees for symptom assessment	• At each point where a decision is made, give clear instructions on what to do next - even if it's just to monitor symptoms or to 'take care of yourself' • Give people simple ways of thinking through their options so they don't get stuck when deciding, and can take effective action more quickly
Design public-space environments that facilitate hand hygiene	• Place handwashing or sanitising stations where people naturally pause or make decisions, with clear visual reminders to use them • In healthcare settings this design should account for the WHO Five moments for hand hygiene
Enact supportive policies for sick leave and working from home	• Make it clear what's expected when someone is sick, and have simple processes for taking sick leave and returning to work, so people don't feel pressured to come in when unwell
Precision prevention for those at highest risk from infectious disease	• Identify people most at risk of needing hospital care (using tools like algorithms), and take steps to keep them stable - such as checking blood pressure, managing medications, and providing vaccinations

2. Staying Warm and Well

Individual Actions	Reasoning aid, and a *mental model*
Heat the rooms you use most to at least 18°C	Having a small number of spaces warm helps you stay comfortable **Warmth is health — I heat the rooms I use most**
Check your house heating or heaters before cold weather arrives	Making sure heating or heaters work now stops problems when it does get cold **I check now so I'm not stuck later**
Wear lots of layers of clothes, not one thick layer	Layers trap air, that can keep you warm and you can add or take off layers easily **Lots of layers keeps me warmer**
Move around as much as you can	Moving makes your body make heat and helps you feel warmer **Movement is my body's heater**
Eat warm food and drink hot drinks	These can heat you from the inside **Warm food and drink are body fuels**
Use draft excluders at outside doors and close curtains when its dark	Stopping cold air getting in keeps your home warmer, and saves energy **I seal in warmth**
Check on vulnerable neighbours during times of cold weather	Helping others makes everyone feel safer and less alone **A quick check can make a big difference**
System/organisation actions	**Considerations check**
Simplify and optimise access to financial support for home heating	• Automatically sign people up and make the application process as simple and quick as possible • Targeted welfare benefits check for people most at risk of hospital admission because of cold homes or energy problems

Default home visits and SHIINE (with two I's !) checks for vulnerable individuals	• Use combined data from different sources and work with home visitors from various agencies to identify and support people in need
	• Carry out basic checks around 'SHIINE':
	  • **S**afety (hazards);
	  • **H**eating,
	  • **I**solation,
	  • **I**mmunisation,
	  • **N**utrition/Medicines,
	  • **E**mergency plan-of-action

Utilise 'warm spaces' in accessible community locations, with engaging activities	• Publicly available locations, open to all, no stigma/barriers to entry • Use social rewards or positive recognition to help people feel comfortable asking for help
Carry out **climate-change risk assessments** – and make adaptations to premises	• Use the climate change risk assessment questionnaire template included at Appendix G in the Supplementary Appendices document, as a basis for planning and making building adaptations • The risk assessment considers: notifications, monitoring, vulnerable users, protective measures, and business continuity, to identify adaptations necessary to protect the users of buildings
Structure energy advice to address psychological barriers to optimal heating	• Address mental models to help people understand the benefits by focusing on health and comfort, using clear and encouraging language that fits their situation • Provide actionable and simple steps and tools like thermometers and room temperature cards to help people manage their homes and feel less worried about costs

3. Accessing the Right Care at the Right Time

Individual Actions	Reasoning aid, and a *mental model*
Help the NHS help you	Discover many ways to get the right care, in the right place, first time Help Us to Help You | GOV.WALES [www.gov.wales/help-us-help-you]
Check common symptoms using NHS 111 online or the phone	Check symptoms safely without needing to leave home or wait in queues. **I can get trusted advice quickly without burdening emergency services**
Use community pharmacies for minor health concerns	Fast access, frees up GP appointments, where often there is no need for prescriptions **My local pharmacy is a first stop for everyday health issues**
Order repeat prescriptions early before holiday periods	Avoid running out of essential medication when services may be closed **Planning ahead keeps me safe and avoids last-minute stress**

Stock-up on paracetamol and ibuprofen, plasters and bandages and some hand sanitiser	Cheap basic things to help with caring for yourself and your family at home **I'm not waiting until I'm unwell to get what I need to feel better**
Think about what I'd do – if I got poorly	Having a bit of a plan helps you stay calm and get the right help when you need it **I know what's normal, what's not, and what to do to get help**
System/organisation actions	**Considerations check**
Design decision architecture to guide people to appropriate services	• Set up default choices and clear prompts to guide people to the right service • Keep choices simple to avoid confusing or overwhelming people with too many options • Include helpful nudges and suggestions in both online and in-person services (for example, "Most people with this symptom choose…") • Make sure the information is consistent across all places people see it—GPs, pharmacies, the NHS App, and signs
Map patient journeys to identify and remove behavioural barriers	• Work together across all organisations to map out the whole patient journey from start to finish • Find the points where people get stuck or have problems, like confusion, fear, or not being able to use digital tools • Use example profiles (personas) to represent different groups of people, like older adults, carers, and those with limited health knowledge • Ask people using the services to talk through their experience out loud while trying new approaches, to spot any issues
Implement service navigation support through community touchpoints/ navigators/peers	• Have trusted community helpers or peers available in busy places like libraries, food banks, and warm spaces to guide and support people • Use trusted people/organisations to share messages that build trust and help reduce shame around getting help • Provide guides and tools to help helpers give clear directions, making sure the experience is easy for users • Engage with County Voluntary Councils for leadership around reach and trust
Provide real-time waiting information across services to distribute demand	• Show live wait times for urgent care, pharmacies, and NHS 111 callbacks • Use colour-coded alerts to help people choose services that are less busy • Make sure services are easy to use for people who aren't comfortable with digital tools
Structure feedback loops on service appropriateness without blame	• Ask users for their feedback on what makes it easier or harder to use services and make decisions • Use kind, non-judgmental language (for example "Was this the best place for your concern?") • Use these insights to improve how services are designed and how staff are trained • Share what's learned across organisations to make triage and guidance better

Create visual journey maps in public spaces showing service options	• Get users help to design simple, easy-to-understand signs in GP surgeries, pharmacies, and community centres • Create common care pathways based on symptoms (like "If you have a sore throat…") • Make maps that everyone can use, including versions in different languages and easy-to-read formats • Highlight the effective social norms people take, and note that collective care and concern benefits everyone
Enable front-line staff use of behavioural approaches to signposting	• Understand how people make decisions when they're stressed • Use techniques like motivational interviewing and gentle nudges to encourage positive choices • Practice with real-life examples to build confidence in guiding people • Support this with easy-to-use mental reminder tools

4. Supporting Mental Health and Well-being

Individual Actions	Reasoning aid, and a *mental model*
Chat everyday with family, friends, or other people like you	Talking openly can help us cope through difficult times and boosts our mood, even when things are going well **Connection is protection, for my head**
Have daily routines and move about outdoors every day	Patterns can help us keep stable, have energy and help with sleep, mood and staying warm **Routine is my anchor**
Do self-care things everyday - like mindfulness and relaxation, try www.hapus.wales/ for ideas	Reduces stress and supports our mental well-being **I recharge to stay strong**
Low or no alcohol is best for our health	Alcohol can make our moods worse and stop us sleeping. If you do drink – get at least two drink-free days a week **Less alcohol, more clarity, better health**
Ask for help early if you have mental health problems	Early help reduces suffering and makes getting better happen quicker **Asking for help is strength, not weakness**
Volunteer or take part in community activities	Helping others boosts self-worth and makes us all stronger **Giving back gives me purpose**
Use light therapy if you have seasonal affective disorder (SAD)	Light exposure helps regulate mood and sleep **Light lifts my winter blues**
Think about the things that help you feel good and ready to cope with things	Having a bit of a plan makes you feel calmer, and ready for when things are not right **I'm feeling good in my self**
Call NHS 111 and press option 2 to chat to someone straight away about your mental health	A free call to a mental health worker in your area, ready to chat about your mental health, or if you're concerned about a family member **There's always an expert at the end of the phone-line**

System/organisation actions	Considerations check
Design community spaces that facilitate social connection	• Let users assess and help improve how welcoming and inclusive the spaces are • Place services alongside others that people already use, like libraries, warm hubs, or food support • Make sure the spaces are accessible for people with different physical, sensory, cultural, or digital needs
Structure mental health campaigns around implementation intentions	• Share www.hapus.wales as launch pad for actions • Deploy "if–then" framing (e.g. "If I feel anxious, then I will…") • Deliver specific, achievable actions rather than general advice • Use reminders and planning tools like fridge cards or text messages to help people stay on track • Tailor messages to specific audience groups (e.g. age groups and cultural contexts) • Have trusted people like GPs, teachers, or community leaders share important messages to support well-being
Reduce stigma through social norm messaging about help-seeking	• Messaging like "1 in 4 people seek help for mental health - and the help works." • **Stories over stats** – Share personal stories instead of just statistics, especially from people who relate to different groups • Avoid wording that makes it sound like getting help means you're weak or only for a crisis

5. Supporting Vulnerable Populations

Individual Actions	Reasoning aid, and a *mental model*
Make a winter well-being plan if you feel vulnerable or have chronic conditions, like asthma or diabetes	Having a bit of a plan helps you stay calm and get the right help when you need it **I know what's normal, what's not, and what to do to get help**
Register for priority services with electric, gas and water companies – go to the Priority Services Register www.thepsr.co.uk	You can get extra support if there's power cuts or service problems **I'm on the radar for when it matters most**
Make an emergency kit with a torch, radio, power-bank for your phone, and water www.prepare.campaign.gov.uk/get-prepared-for-emergencies	Being prepared reduces panic and improves safety **I've got what I need, just in case**
Give your telephone numbers to your neighbours and local support services	Being prepared to stay in touch is like a community safety net **We look out for each other**

Trusted local services are there to help – say yes to that offer	Sometimes we all need a helping hand, and services help lots of people like you everyday **It's okay to say yes**
Use telecare and telehealth services to give automatic support for your health	Fall sensors, glucose meters and lots of our helpful devices prevent problems and help you live independently and safely in your own home **Help and health, in your home**
Set reminders to stock up on your medication	Avoids running out during bad weather or holidays **I'm stocked and steady**
To stop falls – remove things that could trip you up, have good lighting, and wear supportive shoes	Falls are a big cause of going into hospital during winter, for those over 65 years old **I keep my space safe to move around**
System/organisation actions	**Considerations check**
Predictive analytics to identify those at risk	• Use systems to spot risks early and automatically alert frontline teams • Include human review to make sure decisions aren't based only on algorithms • Use data that is accurate, up-to-date, and handled with respect for privacy • Share information across agencies like health, housing, and social care
Develop simplified access pathways for emergency support	• Map out current care pathways and let users help find confusing or repeated steps - to fix them • Create clear flowcharts and decision trees to show how the process works • Test these tools with users from different backgrounds and abilities

Use behaviourally informed communications	• Use the SCALE approach from the Behaviourally Informed Communications Guide:
	  • **S**pecify the behaviour – define exactly what you want who to do, when and where.
	  • **C**onsider people's Capability, Opportunity, and Motivation to undertake the action
	  • **A**ssemble the content, reader response outpowers writer requirement, which behavioural change techniques are needed
	  • **L**ayout – order, tone, timing, personalisation and reading-age
	  • **E**valuate and test changes with real users

Support **trusted touchpoints** in communities	• Use trusted places like pharmacies, schools, food banks, and warm spaces to reach people • Train staff and volunteers in basic guidance and listening skills • Provide quick-reference guides and local service maps • Let the County Voluntary Council lead to build trust and reach more people

Seize moments to optimise quality care through prevention	• Use the quick WARM SNUG checks as opportunities arise (e.g. WAST Non-Emergency Patient Transport Service) • **W**armth (heating, layered clothing) • **A**ccess to food (nutrition, hot meals, food banks and food pantries) • **R**eady(ness) plan (emergency contacts, medication, using HU:HY) • **M**edicines & vaccines (vaccination eligibility check & book; medications before holidays and stocked up the basics) • • **S**afety at home (falls prevention, fire safety, carbon monoxide) • **N**eighbours & networks (checking in, reducing isolation) • **U**tilities (energy cost advice, staying connected, Priority Services Register www.thepsr.co.uk) • **G**etting help (signpost to Help Us to Help You | GOV.WALES)

6. Healthcare Workforce Resilience

Individual Actions	Reasoning aid, and a *mental model*
Practice self-care routines every day	Balancing the effects of physical and emotional stress allows you to engage positively with family, friends and colleagues, and deliver your best work **I can't pour from an empty cup**
Talk regularly with peers and speak up about concerns	Talking helps you feel supported, reduces stress, and improves team morale. **We're stronger together**
Take regular breaks to prevent decision fatigue	Sharper thinking, fewer errors, better well-being, and more sustainable performance comes from rest. **Rest is part of doing my job well**
Use decision support tools during complex cases	Right tools, right job - reduces errors, saves time, supports better outcomes **I don't have to carry it all in my head**
Participate in reflective practice and stress reduction techniques	Reflecting can help us learn and let go of stress - improving emotional regulation, resilience and your impact **I pause to process, not power through**
Maintain work-life boundaries every day	Boundaries protect your well-being and prevent overload – so your impact remains, and so too does your mental health **I protect my energy to keep going**
Engage in team-based problem solving rather than individual heroics	Working together leads to higher quality work **No heroes - just good teams**

System/organisation actions	Considerations check
Design work environments to reduce cognitive load	• Build a team culture that keeps spaces clear and uses only necessary signs • Use colour coding and consistent layouts for equipment and information • Reduce multitasking by grouping tasks together and limiting interruptions • Provide quiet areas for focus and rest • Design digital systems to be easy to use and avoid repeating work (UX)
Maintain mandatory breaks through scheduling systems	• Use automated reminders to encourage staff to take breaks • Build protected break times into schedules and shift plans • Ensure enough staff are available so breaks don't cause guilt or disruption • Monitor break compliance and make taking breaks a normal, expected part of work
Structure decision support with behavioural science principles	• Use checklists, reminders, and default choices to make decisions easier • Highlight important warning signs, like red flags for when to escalate issues • Design tools to support shared decision-making, not just following rules • Test tools with frontline staff to make sure they work well under pressure • Present information clearly by prioritising what's important, cutting out what's unnecessary, and breaking it into chunks – shrink-it, junk-it, chunk-it
Create psychological safety through leadership behaviours	• Leaders show it's okay to be open and admit when they don't have all the answers • Encourage asking questions, giving feedback, and speaking up without fear • Notice and respond to emotions within the team • Make regular check-ins and debriefs a normal part of team life, including everyone's voice • Team leaders practice kind communication and active listening
Structure workflow to match cognitive capacity during pressure periods	• Rotate tasks to help reduce mental tiredness • Provide real-time support like float staff and decision tools • Keep track of workloads and adjust expectations together during busy times • Build in short recovery breaks, like 2-minute pauses and reminders to drink water

4. Impacts of winter and cold weather on health and well-being

The range of significant adverse impacts of winter and cold weather on health and well-being have been described in *Improving winter health and well-being and reducing winter pressures in Wales* [1]. The impacts are succinctly summarised below with up-to-date references added where these existed (see Section 4.1). Additional evidence on health impacts (Section 4.1.1) and further contemporary considerations that influence health and well-being over winter (Section 4.2) are also highlighted. Evidence on the impacts of winter on health and mortality using data in Wales is also summarised (Section 3.3).

4.1 Summary of health impacts from the 2019 report [1]

Respiratory disease

Colder weather facilitates the spread of respiratory viruses such as respiratory syncytial virus (RSV) and influenza [2] and can increase risks of morbidity and mortality from chronic respiratory conditions (e.g. asthma [3], chronic obstructive pulmonary disease (COPD) [4].

Cardiovascular disease (CVD)

Cold temperatures can affect cardiovascular functioning and increase the risk of CVD morbidity and mortality [5] (e.g. out-of- hospital cardiac arrest [6], stroke [7], ruptured abdominal aortic aneurism [8]; see Box 1). Winter increases in CVD events can also be linked to increases in respiratory disease [9].

Dementia

Colder weather can increase the risk of mortality and hospitalisation from dementia [10,11]. Factors such as disturbed physiological processes and difficulties making adaptive choices can make people with dementia particularly vulnerable to colder weather [10].

Unintentional injury

Adverse weather conditions and longer hours of darkness contribute to increases in road traffic crashes and falls [12,13]. For older people in particular, there are winter peaks in fractures [14,15] and hospital attendance for falls (see Box 2 and Table 1).

Mental health

Reduced hours of natural light over winter contribute to increases in symptoms of some mental health conditions, including depression and seasonal affective disorder (SAD) [16].

Hypothermia

Hypothermia-related mortality increases in winter [17], although it can occur at any time of year. Deaths are often linked to outdoor activities, or alcohol or drug use [17,18].

4.1.1 Additional evidence for health impacts

Respiratory disease

COVID-19 adds to winter healthcare pressures from respiratory disease. However, the seasonality of COVID-19 has not yet been established. While reviews have associated it with colder temperatures [19,20], it is not solely a winter respiratory disease. Peaks in COVID-19 mortality are seen in winter, but also at other times of the year, including in summer [21].

Dementia

The number of people living with dementia in Wales is increasing, linked to population ageing and longer survival following diagnosis [22].

4.2 Further contemporary considerations (on health impacts)

- **Influenza vaccination rates** have declined in Wales since the COVID-19 pandemic, among both eligible members of the public and NHS staff (see Section 5) [23].
- **Antimicrobial resistance rates** increase in winter, likely linked to greater use of antibiotics for respiratory diseases [24].
- **Energy costs** soared during the cost-of-living crisis that followed the COVID-19 pandemic and Russia's invasion of Ukraine. Average domestic gas and electricity bills doubled between 2020 (£1,167) and 2023 (£2,307). Costs have since reduced but remain high (£1,881 in 2024 [25]). The End Fuel Poverty Coalition estimated that **cold homes** caused 4,950 excess winter deaths in the UK in winter 2022/2023 [26].
- Accidental **fires** in dwellings are more commonly reported in winter months [27].
- Extreme weather events are becoming more frequent with climate change (see Supplementary Appendix F). A review of UK studies found 30% of people exposed to **house flooding** reported post-traumatic stress disorder, 21% reported depression and 20% reported anxiety in the 12 months following the event [28].

Box 1: The health impacts of cold homes

A systematic review conducted by Public Health Wales identified consistent evidence that indoor temperatures below 18°C are associated with negative health effects including cardiovascular, respiratory and self-reported health [29]. Children, older adults, and those with chronic health conditions were found to be more vulnerable.

Public Health Wales conducted the Housing Warmth Survey (Wales) in 2022 and 2023, to explore household heating regimes and their association with health and well-being [30,31]. Key findings included that private renters were more likely to report living in a colder home (vs homeowners) and that those living in colder homes were more likely to be reluctant to invite guests into their home due to difficulties keeping it warm (than those in warmer homes). There was no significant association between living in a colder home and reporting poor self-rated health, low mental well-being, or falls at home.

4.3 Impacts on mortality

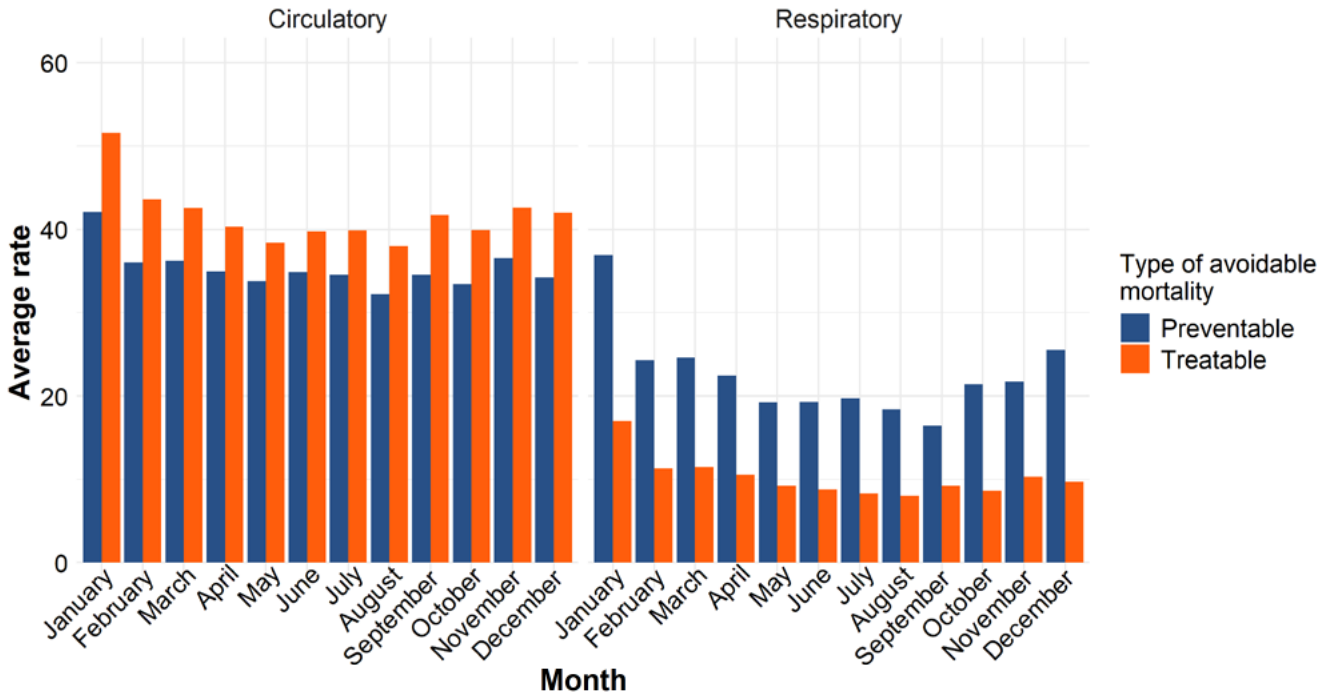
Avoidable deaths - those occurring in people aged under 75 and due to causes considered treatable or preventable given timely and effective healthcare or public health interventions - have shown some increase in the winter months between 2011 and 2023, particularly in females. The average number of deaths in Wales considered avoidable peaks in December and January in females, and in January for males.

Avoidable deaths can be split into those which are preventable, like injuries and vaccine-preventable diseases, and those which are treatable, like digestive diseases and some cancers [32]. There is relatively little variation between months in the average number of deaths from causes considered treatable, though there is a peak in preventable deaths in December and January in females. However, in males, preventable deaths peak in March.

There is strong evidence of seasonal variation in preventable deaths from respiratory diseases like influenza, and treatable circulatory diseases-related deaths. The average avoidable mortality rate from respiratory and circulatory conditions is highest in January, illustrated in Figure 1. There is less evidence of a winter peak in avoidable deaths from cancers, alcohol misuse, and injuries.

Avoidable mortality rates are higher in men than women, and much higher in those in the most deprived areas of Wales compared to the least deprived.

Figure 1: Average monthly European age-standardised avoidable mortality rate in people aged under 75, Wales, 2011 to 2023. Public Health Wales analysis of Public Health Mortality and mid-year population estimates (Office for National Statistics)



The winter mortality index (WMI) can be used to compare how many deaths occur in winter months (December to March) with the average of the number of deaths in two adjacent non-winter periods (the preceding August to November, and the following April to July) [33]. The most recent data shows that winter mortality in Wales decreased substantially in 2021/22 compared with the previous winter, but that generally winter mortality has fluctuated in recent decades. The WMI is highest in older people, particularly older females, and most of the WMI in Wales can be attributed to dementia and Alzheimer's disease and respiratory diseases [33].

There are other methods used to explore winter deaths in people aged 75 and over, but official methods for calculating this for Wales are currently under review and limited recent information is available (see Supplementary Appendix D).

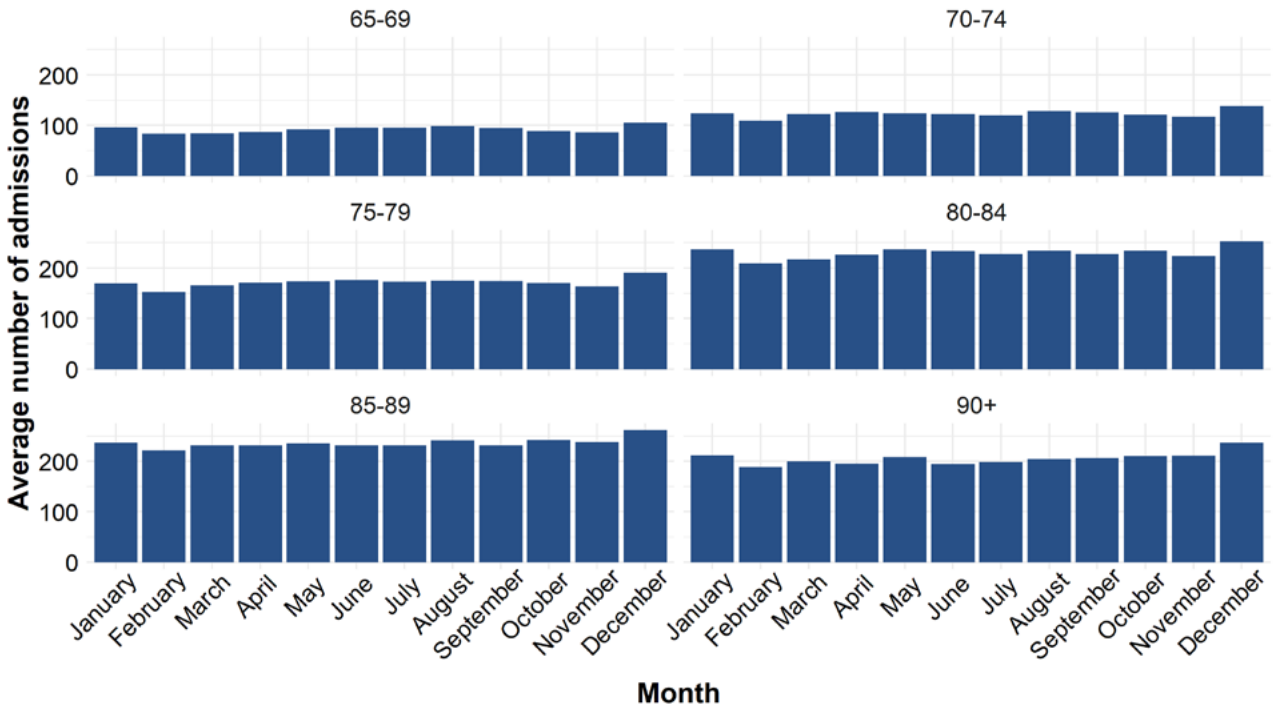
The impacts of winter on health outcomes have mixed consequences for the health system:

- In general, emergency hospital admissions in Wales have increased slightly in winter between 2015 and 2025. The steepest increase in admissions is seen in those from the most deprived fifth of areas in Wales.
- The main driver of this increase is admissions for respiratory diseases (including influenza and RSV), which increase from August onwards, peaking in December. There is strong statistical evidence of substantial seasonal variation in respiratory admissions, which is not found for other causes of admissions.
- The proportion of NHS beds occupied on an average day varies across the year, peaking in recent years in January [34].

Box 2: Falls

Our analysis (see Supplementary Appendix C) indicates a moderately strong seasonal pattern in hospital admissions for falls in those aged 65 and over. Between April 2002 and December 2023, the highest average monthly number of emergency admissions for falls occurred in December (1,187 admissions). Admissions were also high in August for those aged 65 to 79, but in those aged 80 and over the second highest average monthly number of admissions occurs in January. Emergency Department attendances for falls peak in December, but there is more uncertainty in the data about the reasons for Emergency Department attendance.

Figure 2: Average monthly number of emergency hospital admissions for falls by age, 2002 to 2023, Public Health Wales analysis of Patient Episode Database for Wales (PEDW)



5. Risk factors for winter-related morbidity and mortality

Improving winter health and well-being and reducing winter pressures in Wales [1] identified evidence of the risk factors for experiencing poor health in winter. Table 1 presents a summary of updated and additional evidence on the risk factors for winter-related morbidity and mortality, including evidence from epidemiological data in Wales.

5.1 Further contemporary considerations (on risk factors)

Between January and March 2025 nearly a third (28%) of adults in Great Britain reported hybrid working, with 14% working exclusively from home [35]. However, working from home has been linked to an increase in physical inactivity and sedentary behaviour, loneliness and health-harming behaviours (e.g. alcohol consumption worsened) [36,37]. Longer periods spent at home can also influence vulnerability to ill health, if homes are cold.

Table 1. Summary of risk factors for winter-related morbidity and mortality updated from [1]

Risk factor	Evidence
INDIVIDUAL FACTORS	
Age	• Older adults are at increased risk of winter-related morbidity and mortality [6,38–40], hospital admission [41,42], falls (see Box 2), and severe outcomes from respiratory infections (influenza, RSV, COVID-19, pneumococcal disease; [43–49]). • Young children (particularly those aged under 5 years) also face a higher risk of severe outcomes from winter respiratory infections (influenza, RSV; [45,46,50]), as well as ill health from cold exposure [51].
Chronic diseases	• Underlying and chronic conditions (e.g. chronic respiratory disease, dementia, diabetes, CVD, neuromuscular disorders, and immunocompromised status) are associated with increased infectious disease incidence and severity, and worse outcomes (e.g. hospitalisation, mortality), from seasonal respiratory infections [48,52,53] and other conditions such as gastroenteritis [54].
Pregnancy	• Pregnancy is associated with increased risk of influenza-related morbidity [55–57] and poor neonatal outcomes [55,58,59], although evidence on maternal mortality is mixed [55,59]. Risk is further elevated by gestation, obesity, minority ethnicity and underlying conditions [55,56,59]. • Cold exposure and COVID-19 during pregnancy are also associated with negative outcomes, including preterm birth and stillbirth [60,61].
Vitamin D levels	• Lower levels of vitamin D (common during winter) are associated with increased risk of morbidity, and severe outcomes from respiratory infection [62].

Risk factor	Evidence
INDIVIDUAL FACTORS	
Weight	• Being overweight or obese increases the risk of respiratory infections [63], severe outcomes following infection [64,65], and other conditions such as gastroenteritis [54].
Physical activity	• In children and adolescents, lower physical activity is a potential mediator for higher blood pressure in winter [66]. Childhood blood pressure levels are shown to predict those in adulthood and elevated levels increase risk for cardiovascular events.
Risk factor	**Evidence**
INDIVIDUAL FACTORS	
Alcohol consumption	• Excessive alcohol use is associated with increased susceptibility to respiratory infections and severe outcomes from infection [67]. • Alcohol-related deaths in older adults decrease slightly during winter [40].
Smoking	• Current or past smoking increases the risk of poor health outcomes during winter, including increased severity of respiratory infections (COVID-19, influenza, RSV), as well as higher all-cause mortality [67,68]. • Low flu vaccination uptake has also been linked to smoking [69].
SOCIAL, ECONOMIC AND ENVIRONMENTAL FACTORS	
Socio-economic status	• A low socio-economic status is linked to increased winter-related morbidity and mortality, severe outcomes from respiratory infection (e.g. hospitalisations) [48,67,70,71] and lower flu vaccine uptake [69]. • Data for Wales identifies avoidable mortality rates are consistently higher in the most deprived areas compared to the least deprived [73]. • Unemployment increases vulnerability to cold weather [73].
Fuel poverty	• Fuel poverty is associated with increased susceptibility to respiratory infection, all-cause mortality and excess winter deaths [74–76]. • Fuel poverty has also been linked to a higher risk of poor health outcomes (e.g. cardiovascular and respiratory diseases, arthritis, and falls or fractures [74]), and social isolation [74,77].
Cold housing	• Cold indoor temperatures can exacerbate existing health conditions [29] and increase risks of ill health, social isolation, falls and injuries, and excess winter mortality [29,78,79] (see also Box 1). • The evidence linking cold housing to sleep disturbances and self-rated general health is mixed [29].

Carbon monoxide and other air pollutants	• Higher levels of air pollutants (e.g. sulphur dioxide, nitrogen dioxide, particulate matter) are linked to increased morbidity and mortality in winter [80]. Cases of carbon monoxide poisoning also increase in winter [81], often due to faulty or poorly maintained gas boilers.
Rurality	• There is mixed evidence of the impact of rurality on respiratory infections and outcomes such as hospitalisation and excess winter mortality [70,82].
Homelessness	• People experiencing homelessness are at increased risk of winter morbidity (hypothermia, pneumococcal disease, cold-related injury) and mortality [83].
Social isolation	• Living alone and social disengagement have been associated with an increased risk of hospital admission for respiratory disease in older adults [84,85].
Occupation*	• Certain occupations (e.g. healthcare, social work, construction-related and those working in poultry and avian industries) are associated with higher rates of respiratory infections (e.g. influenza [67,86]). • The risk of cold-related occupational injury is higher for certain occupations, e.g. those working in transport or utilities [87].
Frailty*	• Frailty increases vulnerability to cold weather [88] and risk of severe outcomes from respiratory infections (pneumococcal disease and COVID-19) [67].
Ethnicity*	• During winter, ethnic minority groups are at increased risk of morbidity and severe outcomes from infectious diseases [55,89,90].

*New evidence not previously reported in the 2019 report [1].

6. Interventions to improve health and well-being during cold weather and prevent winter pressures

The range of interventions to improve health and well-being during the winter months have been collated and structured into those focused on a) individuals' health, and those resulting from b) community, c) housing and d) transport related activities (following the framework used in *Improving winter health and well-being and reducing winter pressures in Wales* [1]). Interventions are listed in this section, with up-to-date references underlining their potential impact, along with additional evidence identified in very recent literature searching and Welsh data. The sections are very succinct summaries of the headline interventions for consideration in each of the priority areas.

6.1 Health-related interventions from the 2019 report

Influenza vaccination

Influenza vaccination is a cost-effective way to prevent influenza transmission and infection, lessen virus severity, and reduce mortality in vulnerable groups [91–93].

Pneumococcal vaccination

Pneumococcal vaccination can protect against invasive pneumococcal disease and pneumococcal pneumonia [94].

Hygiene measures

Measures such as increased and regular handwashing and staying home whilst ill, can reduce transmission of viral and infectious diseases, particularly influenza.

Vitamin D supplementation

Vitamin D supplementation can boost protection against influenza and benefit respiratory health in winter months [95,96].

Falls prevention in older adults

Home safety modifications and exercise interventions focusing on balance, coordination and muscle strengthening can reduce falls risk in older adults [97,98].

Appropriate clothing and footwear

Wearing appropriate clothing can conserve body heat. Anti-slip devices and studded footwear and reduce risk of slip and fall accidents [99].

Health forecasting and weather alerts

Severe winter weather predictions and health surveillance data can be used to inform timely preventive action by health and social care services.

Healthy behaviour interventions

Interventions can target the prevention of sedentary behaviour, over-eating and heavy alcohol use in winter including over the festive season.

6.1.1 Further contemporary evidence for health interventions

RSV immunisation

RSV immunisation can prevent infection and severe outcomes in young children and older adults, including reducing emergency department attendance, hospitalisations, critical illness and death [100, 101]. Evidence from England and Wales shows that RSV immunisation has the potential to be cost effective [102].
An RSV vaccination programme was introduced in Wales in September 2024.

COVID-19 vaccination

Good levels of effectiveness and safety have been found for COVID-19 vaccination [103–105].

Public health and social measures

The use of public health and social measures during the COVID-19 pandemic, including social distancing, mandatory face mask use, increased handwashing, self-isolation and lockdowns has been associated with reductions in other seasonal respiratory infections, including influenza [106–110].
A Welsh study found substantial reductions in influenza transmission, hospitalisation and deaths over the COVID-19 pandemic. The proportion of hospital admissions with a positive influenza test per 100,000 population reduced from 17.0 in 2019 to 2.7 in 2020 and 0.6 in 2021, while the proportion of laboratory-confirmed deaths due to influenza per 100,000 reduced from 0.4 in 2019 to 0.0 in 2020 and 2021. The authors concluded that strategic use of public health and social measures could reduce influenza incidence and improve outcomes. [111].

Vitamin D supplementation

Vitamin D supplementation may have protective effects against COVID-19 infection, severity and mortality [112,113].

Weather alerts

A Canadian programme that issued cold weather alerts and activated services (e.g. shelters) for vulnerable people was found to have no impact on cold-related morbidity or mortality [114].

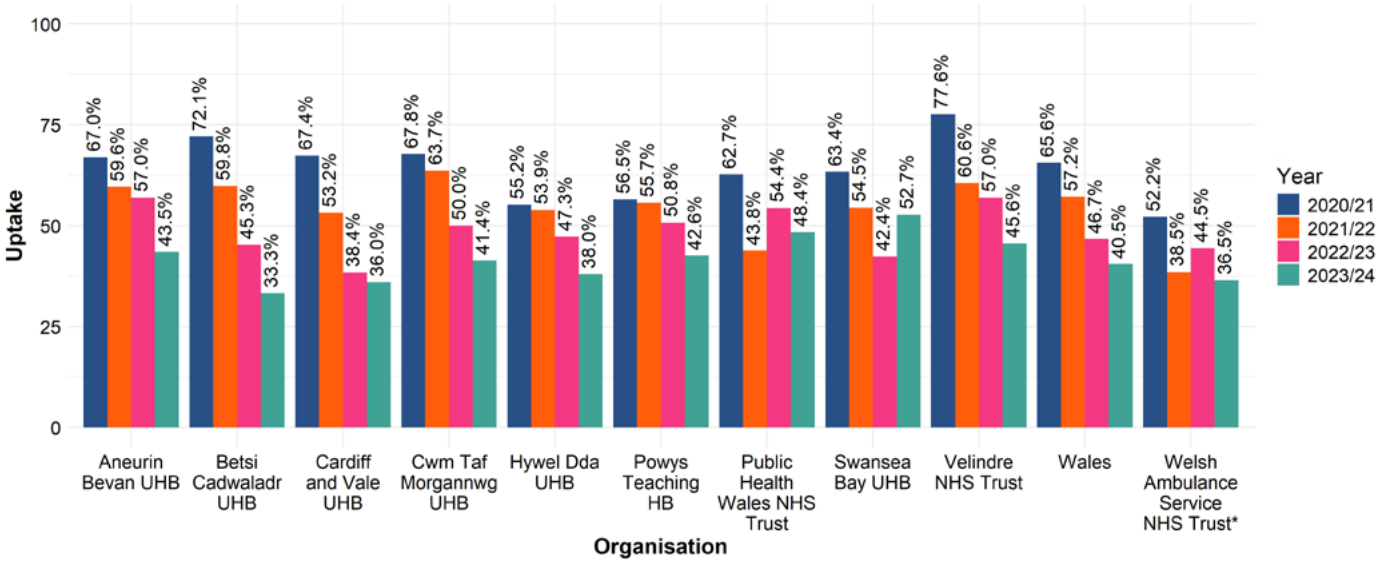
Home blood pressure monitoring

Home blood pressure monitoring may help mitigate seasonal fluctuations in blood pressure [115].

Influenza vaccination uptake

In recent years, there has been a decline in influenza vaccination uptake across all eligible groups in Wales. There are also persistent gaps in uptake between those in the most and least deprived areas of Wales [116]. Prior to the pandemic, influenza vaccination uptake in NHS staff with direct patient contact was increasing. This has since reversed, and in 2023/24 no Health Board or NHS Trust achieved the 75% uptake target (Figure 3) [116].

Figure 3: Annual uptake of influenza vaccination, NHS staff with direct patient contact, Wales [116].



* All staff data used for Welsh Ambulance Service NHS Trust for 2021/22 to 2023/24

Box 3: Vaccination hesitancy

Evidence suggests that vaccine hesitancy may have increased in recent years, though this is variable [117]. Vaccine hesitancy appears higher for COVID-19 vaccination than other vaccinations, though many respondents to a survey said they would require more information before accepting an RSV vaccine if offered it [118,119]. Older people tend to be more likely to say they will accept vaccines, and surveys suggest vaccine hesitancy is driven by concerns about side effects and long-term health, vaccine testing, and a lack of information about vaccinations [117].

Box 4: Interventions to increase vaccine uptake

Educational interventions for communities [120] and healthcare workers [121] can improve influenza vaccine uptake. **Mandatory vaccination** is effective for influenza vaccine uptake among healthcare workers but may not apply to COVID-19 nor community settings [122]. **Financial incentives** show limited impact [122], while **free vaccines** can effectively increase uptake [123,124]. **Communications** highlighting personal benefits of vaccination [123], **vaccination reminders** [123,124], and **chatbots** [125] can also increase vaccine uptake. **Midwife-led clinics** in the UK boost flu vaccination in pregnant women [126,127].

Box 5: Interventions related to discharge planning and integrated care to reduce winter pressures on hospitals

A mapping review of UK evidence for interventions related to discharge planning and integrated care to minimise hospital winter pressures found few initiatives specific to winter. Overall, the review found good research evidence for acute medical units, discharge-to-assess, and hospital-at-home interventions. Weaker evidence was found for other interventions which are commonly used (such as bed management), with a lack of studies considering patient, family and provider needs in intervention development. Furthermore, few studies measured longer term impact [128].

6.2 Community interventions

Tackling social isolation and loneliness

While there is limited evidence specific to winter periods, interventions that support social interaction can reduce social isolation and loneliness.

Gritting and clearing pavements

Gritting and clearing ice and snow from pavements is recommended to reduce the risk of unintentional injuries in winter weather.

Services for the homeless

Services such as winter shelters can protect people who are homeless from winter-related morbidity and mortality.

6.2.1 Further contemporary evidence for community interventions

Services for the homeless

Multi-component interventions that provide **prompt access to shelter** can reduce winter deaths among people experiencing homelessness, although evidence of effectiveness is limited [83].

6.3 Housing-related interventions [1]

Advice on energy and keeping warm

Advice on energy use, staying warm and health risks from severe weather can be targeted at vulnerable groups, although there is limited evidence of effectiveness.

Housing/energy efficiency improvements

Installing energy efficiency measures, insulation and central heating can raise indoor temperatures and lower energy costs for households. See also Boxes 6 and 7.

Financial help to keep warm and healthy

Financial support can be provided to vulnerable groups to help with the costs of heating a home over winter.

6.3.1 Further contemporary evidence for housing-related interventions

Housing/energy efficiency improvements

Structural housing interventions for cold homes (e.g. providing heating, insulation) have benefits for mental health, quality of life, social interaction and health service use. Mixed evidence was found for behavioural interventions and no evidence for financial interventions [129].

Evidence from Spain indicates that a home visit providing **energy saving information**, advice and support to welfare benefit recipients can reduce primary care visits but have no impact on self-perceived health [130].

A programme, in Australia, providing **thermal comfort and home energy efficiency upgrades** to vulnerable households was found to reduce exposure to cold conditions, improve mental health and social care-related quality of life, and reduce healthcare use and costs over winter [131].

6.4 Transport-related interventions [1]

Winter road maintenance

Gritting roads and clearing snow can help reduce road traffic crashes in winter.

Reducing speed limits

Reducing speed limits in winter has been found to reduce road crashes and fatalities in Finland. See also Section 5.5

Encouraging use of winter tyres

In colder countries, use of winter tyres can be recommended or mandatory to improve driver safety.

6.4.1 Further contemporary considerations

- The **World Health Organization Commission on Social Connection** published a report in 2025 identifying loneliness and social isolation as major public health challenges requiring urgent action [132]. The report outlines current knowledge, solutions and steps to support action. Wales was one of the first countries in the world to produce a national strategy to address loneliness and social isolation [133].
- It has been estimated that the **health gains of eradicating cold housing** would be comparable to those from existing public heath interventions such as use of statins and mandatory labelling on processed food [134].
- In September 2023, the Welsh Government introduced a **default 20mph speed limit** on restricted roads, with some revisions in July 2024. Overall road casualties in Wales fell by 11.8% in the year following the policy's implementation, and air quality was not affected [135]. The introduction of 20mph limits in other UK areas have also reduced road traffic collisions and casualties; for example, in Belfast, road traffic fatality rates decreased by 44.3% [136].

Box 6: The Warm Homes Fund in the UK

The Warm Homes Fund, a major fuel poverty programme, was delivered across the UK between 2019 and 2022, installing central heating systems to 27,239 fuel-poor and vulnerable households, along with provision of energy advice and other improvement measures. While implementation was hampered by the COVID-19 pandemic, evaluation reported substantial benefits. Beneficiary households reported improvements in their ability to keep their whole homes warm and afford energy, with the new heating systems found to improve energy efficiency and save an average of £922 per year. Households in Wales showed the largest range of cost savings, potentially due to the targeting of rural communities with less efficient housing stock. The programme was estimated to save the NHS around £2.5 million per year, with wider societal benefits estimated at almost £42 million per year [137]. A blueprint for the delivery and design of future fuel poverty and energy efficiency programmes was published based on learning from the programme [138].

Box 7: Nest scheme, Wales

Nest [139] is a Welsh Government scheme offering free advice to assist households in accessing benefits, managing energy bills and home improvements to improve the energy efficiency of homes.

7. Implementation: co-producing well-being

The dual action framework can be used in winter planning for health and social care, and act as a collaborative tool for local teams to examine winter preparedness. It is not a rigid checklist but can help build on existing winter planning processes and structures already in place. It can be used in existing design and implementation efforts with frontline staff, patients, and communities who experience winter pressures most directly, ensuring their lived experiences shape how actions are undertaken and applied locally. The observable actions collated in the framework are not 'another ask' – they recognise people across the health and care system are working hard, and the considerations for organisations/systems recognise and reference many of the following existing/planned initiatives and support:

- NHS 111
- Your Medicine: Your Health
- Help Us: Help You
- Stay Warm: Stay Well
- Steady on: Stay Safe
- www.dewis.wales

The dual action framework can be used alongside the Welsh Government's *'Planning Together for Winter' toolkit*, and *Science Research Evidence: winter modelling 2025 to 2026*[1], to support professionals, providers and commissioners to create and maintain high quality care. It can also be used in local, regional and all-Wales efforts, and particularly campaigns, deploying the individual actions, reasoning and mental models, from the dual focus framework.

Individuals' and system/organisational responses to winter are inherently developmental, so reflection and collective sense-making about what winter resilience means is critical. The framework can be used as a prompt for meaningful conversations about individual capabilities and system enablers, before and during winter, and is not an audit tool. This type of application would allow teams/partnerships to identify gaps and accommodate local adaptation and continuous learning. Any application of this framework should be transparently data-led, using (and responding to) existing winter monitoring data such as vaccine uptake, service utilisation and staff absence rates.

8. Conclusion

Winter Well-being: shared actions and impact reinforces the need for integrated, evidence-informed, and person-centred approaches to reduce winter pressures and improve health outcomes across Wales. Drawing on the PHW 2019 report *Improving winter health and well-being and reducing winter pressures in Wales* and bringing behavioural science lens, this report presents considerations and checklists designed to complement existing plans, support delivery, and help navigate the unique challenges of winter, particularly in a post-pandemic world. The dual action framework offers a framework to support preparedness for winter, recognising both individual and organisational levels actions are critical.

[1] https://www.gov.wales/science-research-evidence-winter-modelling-2025-2026-contents

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Winter well-being: shared actions and impact

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