



UK Health  
Security  
Agency

# Adverse Weather and Health Plan Annual Report

April 2023 to March 2024

# Contents

1. Performance report.....	3
2. Introduction.....	4
3. AWHP high-level achievements .....	5
4. AWHP programme of work.....	7
4.1 Plan.....	7
4.2 Supporting Evidence Document (SED).....	10
4.3 Weather-health alerts.....	11
4.4 Guidance materials .....	12
5. AWHP governance .....	13
6. Progress against the plan’s goals.....	14
7. Progress against the plan’s objectives .....	15
7.1 Service delivery.....	16
7.2 Capacity building.....	16
7.3 Organisational arrangements.....	16
7.4 Communication .....	17
7.5 Risk management .....	17
7.6 Early warning systems .....	17
7.7 Research and data analysis.....	18
7.8 Quality assurance .....	19
7.9 Policy development and accountability .....	19
8. Next steps .....	20
9. Appendices.....	21
9.1 Appendix 1 – summary of annual report recommendations.....	21
9.2 Appendix 2 – AWHP monitoring indicators analysis .....	24
9.3 Appendix 3 – global indicators analysis .....	29
9.4 Appendix 4 – list of AWHP publications .....	32

# 1. Performance report

We are pleased to present this annual report, summarising the advancements, accomplishments, and insights gained during the 2023 to 2024 implementation period. This period has been marked by substantial progress in our efforts to safeguard public health and enhance community resilience against adverse weather events, reflecting our commitment to excellence and adaptability in the face of a changing climate.

The Adverse Weather and Health Plan (AWHP), first launched in April 2023, introduced a comprehensive and integrated approach that built upon the previous Heatwave and Cold Weather Plans for England. One of our significant achievements this year was the release of 35 guidance products designed to support a broad range of stakeholders in preparing for and responding to adverse weather. These materials, which include detailed action cards and public advice documents, have been made accessible through translation into 11 languages and the development of easy-read versions, enabling their use by diverse communities.

The launch of the impact-based Weather-Health Alerting System, developed in collaboration with the Met Office, marked a transformative step in how we issue early warnings. The system issued 9 weather-health alerts, which were further extended or updated 15 more times, offering detailed information to over 40,000 registered users. Our extensive stakeholder engagement efforts have been equally impactful, with over a total 6,000 participants joining capacity-building events and training sessions. These engagements, which included webinars on summer and cold weather preparedness, fostered collaboration across national, regional and local platforms and demonstrated the plan's far-reaching influence.

The supporting evidence base for the AWHP was also significantly enhanced. Updates to the Supporting Evidence Document incorporated emerging risks, such as drought and thunderstorm asthma, while reflecting on the socio-economic and behavioural factors influencing public health outcomes. These enhancements underscore our commitment to grounding the plan in scientific evidence.

This report is a testament to the collective effort of the AWHP Steering Group, implementation teams, and delivery groups whose dedication has driven the success of this year's objectives. As we look ahead, these achievements lay a strong foundation for the continued evolution of the AWHP, ensuring it remains a crucial tool in protecting public health and building resilience against the challenges posed by adverse weather.

AWHP Steering Group  
Paul Davison  
Chair 2021 to 2024  
Sarah Bird  
Chair 2024 to 2025

AWHP Implementation Team  
Agostinho Moreira de Sousa  
Coordinator 2021 to 2025

## 2. Introduction

The [Adverse Weather and Health Plan](#) (AWHP) was initially published on the 27 April 2023 by the UK Health Security Agency (UKHSA). The AWHP aims to protect individuals and communities from the health effects of adverse weather and to build community resilience.

It fulfilled the UKHSA's commitment within the [National Adaptation Programme 2](#) (NAP 2) and UKHSA 2022 to 2023 priorities to develop a single adverse weather and health plan. The AWHP was published alongside:

- a new [Weather-Health Alerting \(WHA\) system](#) early warning system
- a comprehensive [evidence review](#) of the science underpinning the impacts of adverse weather on health and wellbeing
- a collection of [guidance](#) for health and social care organisations, professionals and the general public on how stay healthy and well during periods of adverse weather – since April 2024, these resources have been complemented with the latest editions of cold and flooding guidance

A further iteration of the AWHP, alongside its supporting materials was published on 21 March 2024. The supporting materials published alongside included:

- a new iteration of the Supporting Evidence Document (SED)
- updates to a collection of guidance for health and social care organisations, professionals and the general public on how to stay health and well during periods of adverse weather.
- [Adverse Weather and Health Plan Equity Review and Impact Assessment 2024](#)

UKHSA is committed to regular reporting on the implementation of the AWHP, led by the Extreme Events and Health Protection team (EEHP), based in UKHSA's Centre for Climate and Health Security (CCHS). This report provides a comprehensive assessment of the activities conducted between April 2023 and March 2024 and outline recommendations for improvement in future AWHP iterations.

Each section of this report provides a list of recommendations for the AWHP 2025 to 2026 onwards, considering the recommendations from the AWHP 2023 to 2024 Midterm report and the changes already made in the AWHP 2024 to 2025. These recommendations are summarised in the Appendix 1 of this report.

### 3. AWHP high-level achievements

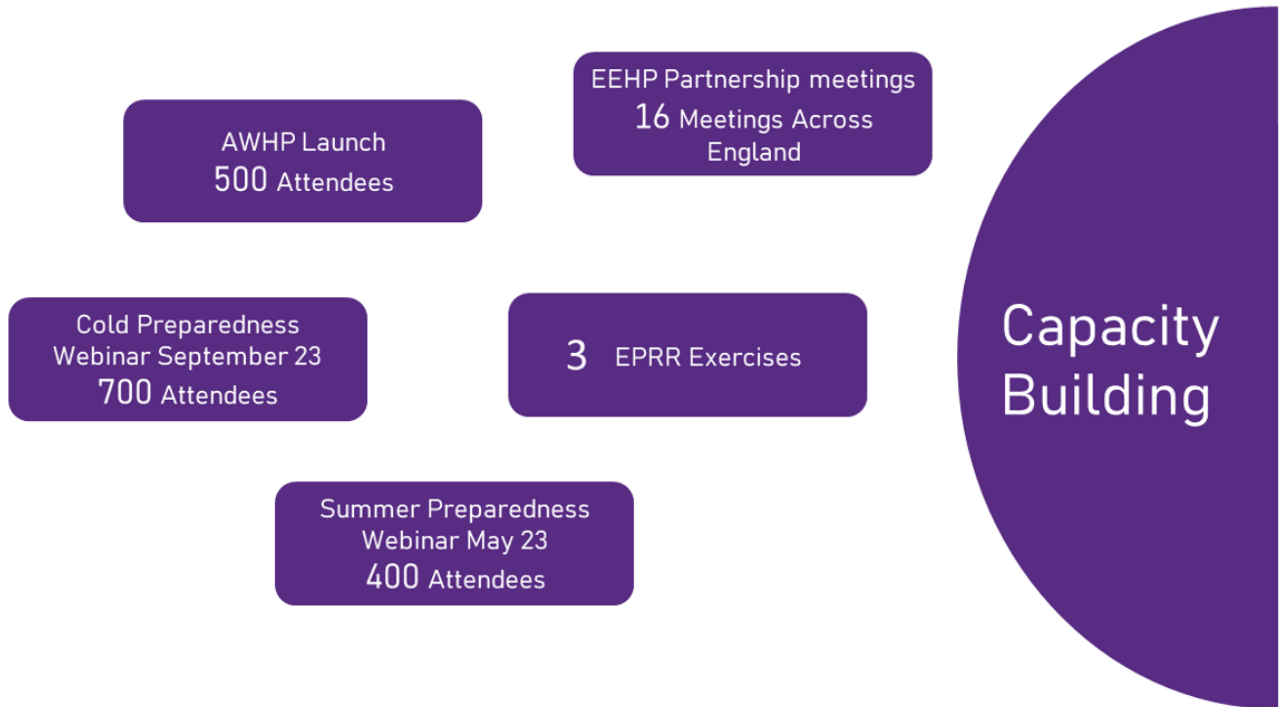
Figure 1. Publications



**Text version of Figure 1. Publications**

- Adverse Weather and Health Plan: first and second editions
- Supporting Evidence Document: first and second editions
- Adverse Weather and Health Plan: Equity Review and Impact Assessment
- Beat the Heat: BSL, easy-read and 11 translations
- Guidance and Support Materials: Heat, Cold, Flood and Drought
- Weather Health Alerts
- Heat Mortality Monitoring Report 2023

**Figure 2. Capacity building**



**Text version of Figure 2. Capacity building**

- AWHP launch: 500 attendees
- Cold Preparedness Webinar September 2023: 700 attendees
- Summer Preparedness Webinar May 2023: 400 attendees
- EEHP partnership meetings: 16 meetings across England
- Three EPRR exercises

## 4. AWHP programme of work

### 4.1 Plan

The AWHP was initially published on 27 April 2023. This plan brought together and built on the Heatwave Plan for England, which was first published in 2004, and the Cold Weather Plan for England, first published in 2011. The AWHP defined a clear strategy with specific goals and objectives and established an annual operational timeline. It incorporated detailed monitoring and evaluation mechanisms and developed a framework for a quality management system.

The AWHP has adopted an all-hazards approach, ensuring comprehensive preparedness and response to a broad spectrum of weather-related risks, integrating lessons learned from prior plans while addressing emerging and evolving climate-related challenges.

The feedback received from the delegates who attended the AWHP launch webinar was largely positive, with the average score from the 84 attendees who provided feedback on the question 'Overall, how satisfied were you with the launch' being 4.4 out of 5. UKHSA has also hosted a series of operational webinars to help different stakeholders to gain a better understanding of the plan's implementation. The plan leveraged the ISO 9001 quality management principles to enhance its implementation and effectiveness. These principles served as a structured guide for improving its quality and resilience. The 7 principles – people focus, leadership, engagement of people, process approach, improvement, evidence-based decision-making, and relationship management – were interwoven into the AWHP's strategy.

For example, the focus on people ensured that the plan prioritises vulnerable populations, fostering preparedness and resilience at the community level. Leadership established accountability across multi-agency governance structures, while engagement of people involved stakeholders to optimise responses. A process approach aligned actions systematically with the plan's objectives, and a commitment to improvement ensured iterative enhancements based on feedback and data. Using evidence-based decision-making, the AWHP grounded its interventions in scientific insights, and relationship management strengthens collaboration across sectors to mobilise effective responses.

The plan refined whole-of-government coordination by clearly defining roles and responsibilities across national, regional, and local levels, as outlined in Appendix 1 of the plan. By formalising these roles, the AWHP created a robust framework that fosters collaboration and enhances the effectiveness of its strategies.

The plan reflected strong commitment and leadership to respond to the weather threats under a changing climate, serving as an important deliverable of the UK's National Adaptation Programme. This commitment is further strengthened by targeted initiatives, such as the Equity Review and localised interventions for vulnerable populations, which exemplify the plan's alignment with broader public health goals.

An independent report by REFORM foundation, [Health security from the ground up](#), highlighted the AWHP as an example of an iterative approach to developing national threat response planning documents that should be replicated across UKHSA. Nevertheless, it was worth to note that further work is required to allow the AWHP to go through a public consultation, allowing external scrutiny and feedback on future editions of the plan.

A monitoring framework underpinned the plan, ensuring transparency and accountability in its implementation. An analysis on the progress of the AWHP 2023 to 2024 monitoring indicators (plan's Appendix 5) is provided in Appendix 2 of this report. The monitoring framework is also aligned with global processes such as the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction. More information can be found in Appendix 3 of this report. Tools like the AWHP BI will provide a foundation for evidence-based decision-making and tracking the plan's progress.

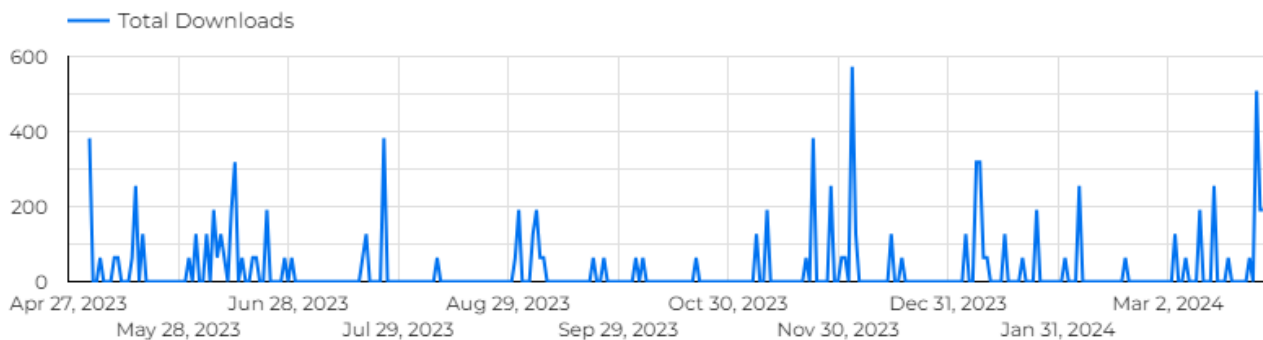
By integrating stakeholder feedback and conducting evaluations of health equity and capacity building, the AWHP continuously refines its approach to meet evolving needs. The feedback received from the delegates who attended the AWHP launch webinar was largely positive, with the average score from the 84 attendees who provided feedback on the question: 'Overall, how satisfied were you with the launch' scoring on average 4.4 out of 5. UKHSA have also hosted a series of operational webinars to help different stakeholders to gain a better understanding of the plan's implementation, which will be mentioned later in the report.

Regular updates, such as [AWHP 2023 2024 Midterm report](#) and the publication of new editions, reflect the plan's continuous quality improvement. All the recommendations of the midterm report for the AWHP 2024 to 2025 were already implemented, such as the mapping of AWHP activities, the definition of which weather related hazards are in or out of scope, the mapping of activities required with relation to thunderstorm asthma and the review of the duration of the AWHP 2024 to 2025 launch webinar.

In the period covering the first edition of the AWHP from April 2023 to March 2024, the AWHP collection page was viewed 16,925 times. The plan itself was downloaded 2,736 times. As demonstrated in Figure 3, peak number downloads occurred in the summer months of June and July 2023 and in November 2023.



**Figure 3. Total daily downloads of the AWHP materials between 27 April 2023 and 31 March 2024**



The second iteration of the plan was unveiled published on 21 March 2024. This iteration of the Plan continued to build on existing measures taken by government, its agencies, NHS England and local authorities to protect individuals and communities from the health effects of adverse weather. This iteration considered the comments and feedback provided by stakeholders across the first year of the plan. Furthermore, this edition of the plan was updated based on our experience in implementing the plan over the previous year, including feedback from users of the plan and the recommendations of the [2023 to 2024 Midterm report](#).

Recommendations for future iterations of the plan are to:

- clarify the role of the plan as technical document and its target users by quarter 4 (Q4) 2024 to 2025
- explore mechanisms that would allow the AWHP format to go through a period of public consultation by Q4 2025 to 2026
- develop a template for local-level planning and AWHP implementation by Q4 2025 to 2026
- provide more detail on sections related to long-term climate adaptation by Q4 2024 to 2025
- develop an acknowledgment section in GOV.UK for the AWHP Steering Group, implementation team members and people involved in guidance reviews by quarter 3 (Q3) 2025 to 2026
- define methods to collect data in terms of media engagement by quarter 2 (Q2) 2025 to 2026

## 4.2 Supporting Evidence Document (SED)

Following publication of the first edition of the SED in the period from March 2023 to April 2024, the SED was downloaded 675 times. A gap analysis was undertaken in collaboration with internal and external partners to update and inform the development of the second edition of the SED, which was published in parallel with the plan in March 2024.

The SED considers the health effects of adverse weather and key populations who are most at risk from hot and cold weather. The second edition also includes new sections on the policy and legal context related to adverse weather and health, on the health effects of emerging risks (drought, storms and thunderstorm asthma), on socioeconomic factors and the built environment, and on other behavioural factors.

The first edition of the SED included a list of 77 recommendations to inform action on adverse weather risks to health that were identified through a review of a series of national policy plans from a wide range of sources, including national government and executive agencies, as well as independent, academic and other research bodies.

In addition, it was informed by primary and secondary evidence (including evaluation and guidance documents). This long list of recommendations informed the development of a series of high-level recommendations for best practice to improve health and wellbeing with respect to adverse weather events and climate change. For the second edition, the recommendations have been further reviewed and revised in light of emerging evidence.

The second edition of the SED also draws on the [Health Effects of Climate Change \(HECC\) report](#) (2024) and the [Equity review and impact assessment of the AWHP](#) (2024).

Recommendations for supporting evidence document are:

- conduct a stakeholder engagement process to identify key evidence gaps and needs to inform future workstreams by Q2 2025 to 2026
- develop a comprehensive methodological framework for systematically updating and reviewing evidence underpinning the AWHP to ensure alignment with the latest academic research and public health best practices, transparency around sourcing and robustness of evidence, and effectiveness and relevance of outputs by Q3 2025 to 2026
- conduct an audit on the SED to identify areas for improvement and produce an audit report with actionable recommendations by Q3 2025 to 2026
- major updates of SED content to occur on a 5-yearly cycle

## 4.3 Weather-health alerts

A new Weather-Health Alerting (WHA) system was launched in time for summer 2023. As noted in the AWHP, a new 'impact-based' warning system was developed in collaboration with the Met Office (MO) and is overseen by UKHSA. The new system aligns better with other alerts issued by the Met Office through their [National Severe Weather Warning Service](#) (NSWWS). UKHSA's new WHA system was developed in response to previous user feedback and is supported by a [user guide](#) and a series of [action cards](#) that provide sector-specific suggested actions by alert level. There are currently more than 40,000 users signed up for the WHA email service.

The [Midterm report](#) highlighted a list of recommendations for the weather-health alerts to help drive further improvement. The key recommendations to improve the alerting service have already been implemented – for example, the temporary PowerBI dashboard has been replaced with the alerts being included in the UKHSA Data Dashboard, which is the central public-facing data portal for UKHSA. Consideration of how to make further improvements will be undertaken in the coming year, following further user feedback, and will be reviewed in the 2024 to 2025 edition of the annual report.

UKHSA commissioned the University of Surrey to undertake a follow up analysis of the WHA system to assess if the new system was meeting the needs of users that had been flagged in previous stakeholder engagement undertaken when designing the new system.

This involved several workshops where users of the WHA were invited to answer questions on their views and opinions on the new approach to alerting and provide feedback that could help the continued development and improvement of the service.

Overall feedback was positive, and the additional information on expected impacts combined with the likelihood of those impacts being observed allowed users to make more informed decisions. Users suggested that while the system is working well, this could only be tested following a truly extreme weather event, which we did not see in the first year of operation. Users also asked if the alerts could be issued at finer geographic resolution. These will be considered in addition to any further recommendations that result from ongoing work around developing a monitoring and evaluation framework for the WHA system.

Recommendations for the WHA system are:

- further refinement of alerting information provided to users on the UKHSA Data Dashboard by Q3 2025 to 2026
- a framework for ongoing monitoring and evaluation of the WHA system that includes recommendations to be published by Q4 2025 to 2026

- development of a work programme to implement recommendations from this framework, such as developing a standardised survey to be issued to a sample of registered users following an amber or red WHA by Q3 2025 to 2026
- development of a work programme to explore user needs and technical capability required to deliver WHA at smaller geographic resolution by Q3 2025 to 2026

## 4.4 Guidance materials

The plan is supported by a series of guidance materials to support stakeholders to prepare for, and respond to, significant adverse weather events. The collections of guidance describe the potential impact of each hazard on health, who is at risk and the actions to be taken before and during periods of adverse and extreme weather events in England. They detail what preparations national, regional, and local organisations; and health and social care professionals, can take to prepare for extreme weather events and reduce health risks.

This includes measures to protect vulnerable groups, as well as advice for the public and new resources and updates to previously published guidance.

The list of all the guidance relating to the AWHP, which was produced as part of the 2023 to 2024 edition of the AWHP can be found in appendices 2, 3 and 4 of the plan.

Between March 2023 and April 2024, a total of 35 products were released, including 17 guidance documents, 7 action cards and 11 summary action cards. The AWHP and WHA system user guide is available in 'easy-read' versions and 'Beat the heat' guidance has been translated into the 11 most commonly spoken languages in Britain.

Recommendations for guidance development are to:

- develop a comprehensive methodology framework for updating and reviewing guidance and evidence under the AWHP, ensuring alignment with the latest academic research and public health best practices by Q3 2025 to 2026
- conduct an audit of existing AWHP guidance to identify areas for improvement and produce an audit report with actionable recommendations by Q3 2025 to 2026
- establish standard operating procedures (SOPs) for the development and periodic review of AWHP guidance documents to enhance consistency and quality by Q2 2026 to 2027

## 5. AWHP governance

The AWHP emphasises the importance of a whole-of-society approach, involving diverse stakeholders such as the private sector, academia, community organisations, and the general public. The multi-agency AWHP Steering Group, which oversees the effective and timely delivery of the plan, reflects this approach. The group included local, regional, and national level stakeholders, as well as stakeholders experienced in preparedness, policy, science, and response. The current Steering Group has 27 members, from UKHSA, Cabinet Office, Met Office, the Department of Health and Social Care, the Office of Health Improvement and Disparities (OHID), the Department of Environment Food and Rural Affairs, the Ministry of Housing, Communities and Local Government (MHCLG), the Department for Energy Security and Net Zero (DESNZ), the Local Government Association, NHS England, the Environment Agency, the Voluntary and Community Services Emergencies Partnership, the Ministry of Justice, the Department for Education and the National Institute for Health and Care Research (NIHR) Health Protection Research Unit on Environmental Change and Health. Eight meetings were held during the period from November 2021 to March 2024.

UKHSA has an implementation team responsible for the development and improvement of the AWHP programme of work. This team is currently dedicating a total of 2.8 full-time equivalent (FTE) to the AWHP. This will be useful to ascertain whether the progress of the plan's implementation matches the amount of resource committed to its development and management.

## 6. Progress against the plan's goals

The AWHP is focused on achieving the following 4 goals:

- Goal 1. Prevent the increase in years of life lost due to adverse weather events
- Goal 2. Prevent mortality due to adverse weather events
- Goal 3. Prevent morbidity due to adverse weather events
- Goal 4. Reduce the use of healthcare services due to adverse weather events

However, demonstrating progress toward the AWHP goals is challenging due to the complex relationship between adverse weather and health impacts. Efforts to measure and report these impacts are continuing. Since the AWHP's launch, methodologies for routine collection, analysis, and reporting have been developed to help better monitor progress.

For example, in 2022, UKHSA started comparing the observed heat-associated mortality during heat episodes to the number of heat-associated deaths we would have expected based on the historical relationship between temperature and mortality and the observed temperatures. This approach allows us to comment on how the observed heat-associated mortality in 2023 compares to estimates from modelling. For heat, UKHSA's annual [Heat mortality monitoring reports](#) address Goal 1 (from summer 2023 onwards) and Goal 2 (from 2016 onwards). Key metrics for summer 2023 are presented in Table 1.

**Table 1. Heat mortality in summer 2023**

Number of heat episodes	5	
Number of heat episode days	28	
Observed heat-associated deaths	2,295 (95% Confidence Interval (CI): 1,681 to 2,910)	
Observed heat-associated deaths per day	82	
Difference between observed and modelled predicted heat-associated deaths	+17 (difference not statistically significant)	
Observed heat-associated years of life lost by age group	65 to 74 age group	5,127 (95% CI: 1,132 to 9,122)
	75 to 84 age group	7,499 (95% CI: 4,381 to 10,617)
	85 and over age group	3,613 (95% CI: 2,223 to 5,002)
Observed heat-associated years of life lost	16,239	
Observed heat-associated years of life lost per day	580	

Source: [Heat mortality monitoring report: 2023](#)

Ongoing work aims to expand these into an annual heat impact report, including estimates of morbidity and health system usage (Goals 3 and 4), which will be designated as Official Statistics. In addition, bespoke epidemiological assessments of risk factors such as ethnicity, for example, are also being planned to supplement the annual surveillance reports outlined above. Similar efforts are underway for cold-related deaths and impacts, with further exploration planned for other adverse weather events like flooding, drought, and thunderstorm asthma, in collaboration with academic partners.

## 7. Progress against the plan's objectives

The plan outlined a structured approach with 9 key objectives designed to guide national efforts. These objectives served as a comprehensive framework for local authorities, the NHS, national government and other stakeholders to implement evidence-based actions aimed at mitigating the impacts of adverse weather on health. All the objectives were met during the period of April 2023 to March 2024:

- **O1. Service delivery** – updated guidance for cold, heat and flooding risks ensured stakeholders are well-prepared for adverse weather events
- **O2. Capacity building** – initiatives engaged over 3,700 participants through webinars and training sessions
- **O3. Organisational arrangements** – strengthened collaboration clarified roles and responsibilities among delivery groups at national and regional levels
- **O4. Communication** – 3.1 million 'Keeping Warm and Staying Well' flyers and publication of communication toolkits
- **O5. Risk management** – 40 Joint Dynamic Risk Assessments, 43 horizon scanning meetings and publication of the WHA system user guide
- **O6. Early warning systems** – new impact-based WHA system issued 24 alerts, benefiting over 40,000 users
- **O7. Research and data analysis** – mention in 8 peer-reviewed publications, alongside interim and final analyses of heat-associated mortality
- **O8. Quality assurance** – progress was made on developing a Quality Management System to enhance the plan's activities and deliverables
- **O9. Policy development and accountability** – new chapter on policy and legal context was introduced to support climate-resilient health initiatives

Actions taken against the 9 areas illustrate how the objectives were met through the reporting period and they are detailed below.

## 7.1 Service delivery

In the past year, UKHSA has delivered a range of products to support colleagues in these organisations better prepare for and build resilience to extreme weather events such as updating guidance for cold, heat and flooding. The hot weather guidance and accompanying action cards were updated in March 2024 and the [Flooding guidance](#) was updated in December 2023. Finally, the [Cold guidance](#) was updated in the autumn of 2023. It has been planned that these guidance documents will be reviewed on a 5-year cycle.

## 7.2 Capacity building

UKHSA delivered a series of capacity building webinars aimed at health and social care professionals and stakeholders, such as the community and voluntary sector and the public. These webinars have attracted significant stakeholder engagement from across the country and a range of organisations.

In the period from April 2023 to March 2024, UKHSA hosted:

- the AWHP launch webinar for which there were 692 registrants
- a summer preparedness webinar for which there were 656 registrants
- a cold preparedness webinar for which there were 1,272 registrants
- a flooding and health workshop guidance webinar workshop at which there were 40 attendees from national and local organisations involved with flood response
- a mid-year AWHP webinar for which there were 789 registrants
- the AWHP 2024 to 2025 operational webinar for which there were 263 registrants

Additionally, 45 presentations were delivered to internal and external stakeholders including 4 international groups (Australia, Japan, Ireland and Portugal). Additionally, 2 lectures were delivered on the effects of climate change and adverse weather at the University of Bristol and Brighton and Sussex Medical School between March 2023 and April 2024. Furthermore, 3 EPRR training sessions were delivered.

## 7.3 Organisational arrangements

UKHSA co-operated with other national responders to enhance co-ordination and efficiency as described under the duties of Category 1 responders under the [Civil Contingencies Act](#). There was also collaboration across delivery groups on national and regional level with the respective responsibilities of delivery organisations and partners.

Additionally, there was also EPRR national and regional engagement (for example hot weather and cold weather preparedness webinars and exercises).



## 7.4 Communication

The team delivered 12 newsletters highlighting articles about extreme weather events and the impact on public health. Furthermore, in collaboration with AgeUK and NHS, the team prepared the 'Top tips for Keeping Warm and Stay Well this Winter' flyers. There were 3,154,486 flyers sent to people aged 55 over between March 2023 and April 2024.

A series of communications toolkits were published to provide basic health information that can be communicated during adverse weather events so that the right messages reach the right people at the right time:

- hot weather toolkit published in June 2023
- cold weather toolkit published in November 2023
- a warm spaces toolkit published in November 2023
- flooding toolkit published in November 2023

## 7.5 Risk management

During the reporting period, 40 Joint Dynamic Risk Assessments (JDRA) with governmental partners were conducted. UKHSA and the Met Office also held 43 horizon scanning meetings. These activities played a crucial role in identifying emerging risks, evaluating potential impacts of adverse weather events, and ensuring timely and effective responses. The JDRA sessions facilitated cross-agency collaboration, enabling decision making based on real-time scenarios and improvement of action plans, while the horizon scanning exercises provided valuable insights into future threats, informing strategic planning and preparedness efforts.

A review of Community Risk Registers (CRRs), developed by Local Resilience Forums (LRFs) in England to Respond to Climate Change Related Hazards, was conducted during the report period. This work focused on identifying and sharing good practices in communicating adverse weather-related risks through CRRs. The objectives included exploring how LRFs communicate these risks to their communities, identifying discrepancies in LRF processes for risk communication, and compiling actionable insights to support LRFs in updating CRRs in alignment with the new National Risk Register (NRR).

## 7.6 Early warning systems

In June 2023 UKHSA, in collaboration with the Met Office, launched the [new impact based Early Warning System](#). This was different to the previous alert system, which used a temperature threshold to determine whether an alert was issued. This new approach allows a level of flexibility that allows each event to be assessed using more information than before

to make alerting decisions. In addition, this additional detail can be used by local organisations to make informed decisions about the resources required for an appropriate response.

There were 9 Weather Health Alerts issued, which were further extended or updated 15 more times between March 2023 and April 2024. Six were Heat-Health Alerts (from which 2 were escalated to AMBER) and 3 were Cold-Health Alerts (from which 2 were escalated to AMBER). There were 24 Weather Health Alerts issued, extended or updated between March 2023 and April 2024.

## 7.7 Research and data analysis

UKHSA have continued to use research and data analysis to support the overall goals of the AWHP. On 1 June 2023, UKHSA published the [Heat mortality monitoring report: 2022](#) which contains the annual statistics on the impact of adverse heat on the population. This followed the publication of an [interim report on heat mortality in summer 2022](#) issued jointly with the Office for National Statistics (ONS) in October 2022. UKHSA published an interim analysis of heat mortality data over the 2023 summer in February 2024, followed by a final report in July 2024. In addition, the NIHR-funded Health Protection Research Unit (HPRU) in Environmental Change, co-led by UKHSA and London School of Hygiene and Tropical Medicine, resulted in 36 deliverables and 6 milestones, including academic publications, workshops and summary reports on topics including heat, drought, wildfire, thunderstorms and coastal and flood risks.

Over the reporting period, members of the UKHSA have authored 2 peer-reviewed journals related to the AWHP programme of work. Additionally, 4 peer-reviewed studies referenced AWHP, underscoring its influence on governance approaches, the development of health indicators, and the evaluation of climate-related mortality trends.

The plan was also highlighted in 6 key governmental publications, including the National Risk Register, Chief Medical Officer's Annual Report, and the UK Third National Adaptation Programme, demonstrating its alignment with national resilience and adaptation strategies.

Furthermore, 2 academic policy briefs from the Grantham Research Institute on Climate Change and the Environment focused on lessons learned from past heatwaves and strategies for heat resilience, further emphasising AWHP's role in shaping policy discussions. A mention in a leading think tank report showcased AWHP as a model for strengthening health security frameworks. The National Audit Office Report on Government resilience: extreme weather also recognised the AWHP as an instrument to improve resilience to adverse weather in the UK. More information can be found in Appendix 4 of this report.

On 22 January 2024, UKHSA published the results of a qualitative study conducted in collaboration with UKHSA's Behavioural Science and Insights Unit (BSIU): [Hot weather and health: exploring extreme heat in adult social care](#).

## 7.8 Quality assurance

The quality management system will continue to be developed through 2024 to 2025, which will continually aim to keep improving the quality of the plan and all the activities implemented and products delivered which are associated with the plan. Work on the AWHP BI is progressing and it will be published in late 2024. The quality management system will continue to be developed through 2024 to 2025, which will continually aim to keep improving the quality of the plan and all the activities implemented and products delivered which are associated with the plan. Work on the AWHP BI is progressing and it will be published in late 2024.

## 7.9 Policy development and accountability

The second edition of the AWHP included the addition of a chapter on policy and legal context. This chapter highlights the responsibility which UKHSA has in protecting the health of the population against adverse weather events. This work will be led by the CCHS and will be delivered in conjunction with all partners, including Devolved Governments (DGs) to offer scientific advice and support to ensure that the impacts of climate change are considered and embedded in the design and delivery of climate change policies across local, national government and with international partners.

In addition, the team also responded to 185 enquiries of which 12 were Parliamentary Questions (PQs).

This report marks a critical milestone in evaluating the implementation of the AWHP, highlighting our achievements, insights and forward-looking strategies aligned with the plan's 9 core objectives. With a firm commitment to continual improvement, these findings serve as a cornerstone for shaping future iterations, which will be produced annually to maintain relevance and strategic alignment.

All deliverables committed to in the AWHP 2023 to 2024 were successfully completed, although some faced timeline adjustments. Moving forward, to enhance flexibility and accountability, we are introducing a quarterly allocation of target deadlines. This strategic adjustment allows us to balance consistency with adaptability, ensuring that each deliverable receives focused attention and timely delivery.

This report was also presented to the AWHP Steering Group that oversee the strategic direction and delivery of the plan. The Steering Group reviewed the progress of the implementation of the plan against its objectives.

## 8. Next steps

This report marks a critical milestone in evaluating the implementation of the AWHP, highlighting our achievements, insights and forward-looking strategies aligned with the plan's 9 core objectives. With a firm commitment to continual improvement, these findings serve as a cornerstone for shaping future iterations, which will be produced annually to maintain relevance and strategic alignment.

All deliverables committed to in the AWHP 2023 to 2024 were successfully completed, although some faced timeline adjustments. Moving forward, to enhance flexibility and accountability, we are introducing a quarterly allocation of target deadlines. This strategic adjustment allows us to balance consistency with adaptability, ensuring that each deliverable receives focused attention and timely delivery.

This report was also presented to the AWHP Steering Group which oversees the strategic direction and delivery of the plan. The Steering Group reviewed the progress of the implementation of the plan against its objectives.

## 9. Appendices

### 9.1 Appendix 1 – summary of annual report recommendations

Programme area	Code*	Recommendation	Due date
Plan	AR23P1	Clarify the role of the plan as technical document and its target audience	Q4 2024/25
Plan	AR23P2	Explore mechanisms that would allow the AWHP format to go through a period of public consultation	Q4 2025/26
Plan	AR23P3	Development of a template for local-level planning and AWHP implementation	Q4 2025/26
Plan	AR23P4	Provide more detail on sections related to long-term climate adaptation	Q4 2024/25
Plan	AR23P5	Development of acknowledgment section in GOV.UK for the AWHP Steering Group, Implementation team members and people involved in guidance reviews	Q3 2025/26
Plan	AR23P6	Define methods to collect data in terms of media engagement	Q2 2025/26
Guidance	AR23G1	Develop a comprehensive methodology framework for updating and reviewing guidance and evidence under the AWHP, ensuring alignment with the latest academic research and public health best practices	Q3 2025/26
Guidance	AR23G2	Conduct an audit of existing AWHP guidance to identify areas for improvement and produce an audit report with actionable recommendations	Q3 2025/26

<b>Programme area</b>	<b>Code*</b>	<b>Recommendation</b>	<b>Due date</b>
Guidance	AR23G3	Establish standard operating procedures (SOPs) for the development and periodic review of AWHP guidance documents to enhance consistency and quality	Q2 2026/27
Evidence	AR23E1	Conduct a stakeholder engagement process to identify key evidence gaps and needs to inform future workstreams	Q2 2025/26
Evidence	AR23E2	Develop a comprehensive methodological framework for systematically updating and reviewing evidence underpinning the AWHP to ensure alignment with the latest academic research and public health best practices; transparency around sourcing and robustness of evidence; and, effectiveness and relevance of outputs	Q3 2025/26
Evidence	AR23E3	Conduct an audit on the Supporting Evidence Documents (SED) to identify areas for improvement and produce an audit report with actionable recommendations	Q3 2025/26
Evidence	AR23E4	Major updates of SED content to occur on a 5-yearly cycle	N/A
Weather-Health Alerts	AR23WHA1	Further refinement of alerting information provided to users on the UKHSA Data Dashboard	Q3 2025/26
Weather-Health Alerts	AR23WHA2	Framework for ongoing monitoring and evaluation of the WHA system that includes recommendations to be published	Q4 2025/26
Weather-Health Alerts	AR23WHA3	Development of work programme to implement recommendations from this framework, such as developing standardised survey to be issued to a sample of registered users following an AMBER or RED WHA	Q3 2025/26

Programme area	Code*	Recommendation	Due date
Weather-Health Alerts	AR23WHA4	Develop a work programme to explore user needs and technical capability required to deliver WHA at smaller geographic resolution	Q3 2025/26

\*AR = Annual report, P = Plan, G = Guidance, E = Evidence, WHA = Weather-Health Alerts

## 9.2 Appendix 2 – AWHP monitoring indicators analysis

Indicator type	Indicator	Source	Metric	Global indicator	Report	Date   Period
Contextual	Children in absolute low-income families (under 16) <sup>1</sup>	DWP   ONS	Number and %	SDG 1.2.2	1,645,068 15.45%	21/03/2024
Contextual	Children in relative low-income families (under 16) <sup>2</sup>	DWP   ONS	Number and %	SDG 1.2.2	2,091,958 19.65%	21/03/2024
Contextual	% households living in fuel poverty under the Low-Income Low Energy Efficiency (LILEE) indicator definition	Fuel Poverty Statistics, DESNZ	%	SDG 11.1.1	13.0%	15/02/2024
Outcome	Population vaccination coverage: flu (aged 65 years and over) <sup>3</sup>	OHID	%	N/A	77.8%	2023-2024
Contextual	% of EPC certificates awarded that year which are grade C or above	MHCLG statistical releases	%	SDG 11.1.1	59.7%	24/10/24
Contextual	% of England house stock likely to be considered 'Cold Homes'	Fuel Poverty Statistics, DESNZ	%	SDG 11.1.1	12.7%	2023/24 13 September 2024

<sup>1</sup> Indicator updated to under 16 instead of aged 16 and under

<sup>2</sup> Indicator updated to under 16 instead of aged 16 and under

<sup>3</sup> Indicator updated to focus on the 65 over group.



Indicator type	Indicator	Source	Metric	Global indicator	Report	Date   Period
Output	Number of households claiming Cold Homes payment	DWP	Number	SDG 11.1.1	7,753,542	2023-24 20/09/2024
Contextual	% of private and social tenants as overall tenure types	English Housing Survey, MHCLG	%	N/A	35.2%	2022-23 18/07/2024
Contextual	% of occupied dwelling stock that have had problems with damp in last year (modelled)	English Housing Survey, MHCLG	%	SDG 11.1.1	4.1%	2022 18/07/2024
Contextual	Number of households initially assessed as homeless or threatened with homelessness and owed a statutory homelessness duty	MHCLG	Number	SDG 11.1.1	324,990	2023-24 03/10/2024
Activity	% of AWHP guidance aimed at the public which are translated into at least 3 languages	UKHSA	%	N/A	100%	13/03/2024
Activity	Information on number of views and downloads of the AWHP related materials added to the annual report of the AWHP	UKHSA	Yes or No	N/A	Yes	11/2024
Output	Number of alerts issued by alert level	UKHSA	Number	SF G-2	9 Alerts 5 Yellow	04/2024

Indicator type	Indicator	Source	Metric	Global indicator	Report	Date   Period
					4 Amber	
Output	Number of different countries represented in webinars hosted by UKHSA to an international on weather and health	UKHSA	Number	N/A	12	28/11/2024
Outcome	% of LRFs with updated and published community risk register on heat, cold and flooding risks <sup>4</sup>	UKHSA	%	SDG 13.1.3; SF E-2	5.26%	02/2024
Impact	Years of life lost due to heat <sup>5</sup>	UKHSA	Years of life lost	SDG 1.5.1/13.1.1; SF A-2	16,239	Summer 2023 (01/06/2023-30/09/2023)
Impact	Rate of mortality due to heat <sup>6</sup>	UKHSA	Deaths per million	SDG 1.5.1/13.1.1; SF A-2	40	Summer 2023 (01/06/2023-30/09/2023)

<sup>4</sup> Criteria: links and references to national guidance documents; local health guidance and local service information; reference to individual adverse weather hazards (for example heat, cold) rather than as a single, aggregated category; reference to specific UKHSA guidance materials.

<sup>5</sup> Indicator changed from 'Years of life lost due to adverse weather events' due to current limitations in data availability.

<sup>6</sup> Indicator changed from 'Rate of mortality due to adverse weather events' due to current limitations in data availability.

Indicator type	Indicator	Source	Metric	Global indicator	Report	Date   Period
Impact	Rate of emergency hospital admissions due to falls in people aged 65 and over	OHID	Rate per 100,000	SDG 1.5.1/13.1.1	1,933	2022-2023 <sup>7</sup>
Impact	Deaths due to extreme cold weather <sup>8</sup>	UKHSA	Number	SDG 1.5.1/13.1.1; SF A-2	1,438	Winter 2023-2024 (02/10/2023-31/03/2024)
Impact-Research	Number of published peer-review papers referencing AWHP or associated guidance	MEDLINE	Number	N/A	6	2023-2024

SDG – Sustainable Development Goal | SF – Sendai Framework

The following indicators were excluded from the analysis considering methodological challenges:

- percentage of recommendations acted on in a period of one year
- percentage of recommendations acted on in a period of 5 years
- number of media interviews given by UKHSA on weather and health
- Excess Winter Deaths Index

<sup>7</sup> Data is not yet available for 2023 to 2024.

<sup>8</sup> This estimate comes from UKHSA annual flu reporting and considers extreme cold only. It cannot be compared directly with figures from annual heat mortality monitoring reports. In future, UKHSA will publish an annual cold mortality monitoring report which will include calculations of the number of deaths due to cold weather, mortality rate and years of life lost.

- percentage of LRFs that have at least one representative registering for training sessions or webinars

The percentage of recommendations indicators did not consider a specific list of activities to be matched against. This challenge was already addressed in the AWHP 2024 to 2025. The number of media interviews given by UKHSA indicator will required further work in terms of data collection and analysis, which will be conducted in 2025 to 2026. The ONS no longer publish the Excess Winter Deaths Index, their latest release is for winter 2021 to 2022. Information on participants region for LRF analysis will be collected in future registration form.

## 9.3 Appendix 3 – global indicators analysis

Indicator ID	Global indicator	AWHP indicator	Metric	Report	Date   Period
SDG 1.2.2	Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	Children in absolute low-income families (under 16)	Number and %	1,645,068 15.45%	21/03/2024
		Children in relative low-income families (under 16)	Number and %	2,091,958 19.65%	21/03/2024
SDG 1.5.1/13.1.1 SF A-2	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	Years of life lost due to heat	Years of life lost	16,239	Summer 2023 (01/06/2023-30/09/2023)
		Rate of mortality due to heat	Rate per 100,000	4.0	Summer 2023 (01/06/2023-30/09/2023)
		Rate of emergency hospital admissions due to falls in people aged 65 and over <sup>9</sup>	Rate per 100,000	1,933	2022-2023
		Deaths due to extreme cold weather	Number	1,438	Winter 2023-2024 (02/10/2023-31/03/2024)
SDG 11.1.1	Proportion of urban population living in slums,	% households living in fuel poverty under the Low-Income Low Energy	%	13.0%	15/02/2024

<sup>9</sup> Only SDG 1.5.1/13.1.1

Indicator ID	Global indicator	AWHP indicator	Metric	Report	Date   Period
	informal settlements or inadequate housing	Efficiency (LILEE) indicator definition			
		% of EPC certificates awarded that year which are grade C or above	%	59.7%	24/10/24
		% of England house stock likely to be considered 'Cold Homes'	%	12.7%	2023/24 13/09/2024
		Number of households claiming Cold Homes payment	Number	7,753,542	2023-24 20/09/2024
		% of occupied dwelling stock that have had problems with damp in last year (modelled)	%	4.1%	2022 18/07/2024
		Number of households initially assessed as homeless or threatened with homelessness and owed a statutory homelessness duty	%	324,990	2023-24 03/10/2024
SDG 13.1.3 SF E-2	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	% of LRFs with updated and published community risk register on heat, cold and flooding risks	%	5.26%	02/2024

Indicator ID	Global indicator	AWHP indicator	Metric	Report	Date   Period
SF G-2	Number of countries that have multi-hazard monitoring and forecasting systems.	Number of alerts issued by alert level	Number	9 Alerts 5 Yellow 4 Amber	04/2024

SDG – Sustainable Development Goal | SF – Sendai Framework

## 9.4 Appendix 4 – list of AWHP publications

AWHP related products:

- Adverse Weather and Health Plan (AWHP) 2023 to 2024 | Published 27 April 2023
- Adverse Weather and Health Plan (AWHP) 2024 to 2025 | Published 21 March 2024
- Weather Health Alerting system: User guide | Published 1 June 2023
- Adverse Weather and Health Plan: supporting evidence 2023 to 2024 | Published 27 April 2023
- Adverse Weather and Health Plan: supporting evidence 2024 | Published 21 March 2024
- Adverse weather and health plan equity review and impact assessment 2024 | Published 21 Mar 2024
- Supporting vulnerable people before and during hot weather: healthcare professionals | Published 21 March 2024
- Supporting vulnerable people before and during hot weather: social care managers | Published 21 March 2024
- Beat the heat: hot weather advice | Published 13 March 2024
- Keeping warm and well: staying safe in cold weather | Published 13 March 2024
- Heat mortality monitoring interim report: 2023 | Published 29 February 2024
- Adverse Weather and Health Plan – Midterm report | Published 30 November 2023
- Warm spaces in England: an evidence review and toolkit | Published 23 November 2023
- Flooding and health: public advice | Published 27 October 2023
- Flooding and health: advice for frontline responders | Published 27 October 2023
- Cold-Health Alert action card for commissioners | Published 20 October 2023
- Cold-Health Alert action card for health and social care providers | Published 20 October 2023
- Cold-Health Alert action card for the voluntary and community sector | Published 20 October 2023
- Cold weather and health: supporting vulnerable people | Published 11 September 2023
- Supporting vulnerable people before and during cold weather: for adult social care managers | Published 11 September 2023
- Supporting vulnerable people before and during cold weather: healthcare professionals | Published 11 September 2023
- Supporting vulnerable people before and during cold weather: people homeless and sleeping rough | Published 11 September 2023
- Heat mortality monitoring report: 2022 | Published 1 June 2023
- Looking after children and those in early years settings before and during hot weather: teachers and other educational professionals | Published 10 May 2023



- Supporting vulnerable people before and during hot weather: people homeless and sleeping rough | Published 10 May 2023
- Hot weather and health: events and mass gatherings | Published 10 May 2023
- Heat-Health Alert action card for the voluntary and community sector | Published 5 May 2023
- Heat-Health Alert action card for providers | Published 5 May 2023
- Heat-Health alert action card for commissioners | Published 5 May 2023
- Heat-Health alert action card for national government | Published 5 May 2023
- Supporting Evidence Document (SED) 2023 to 2024 | Published 27 April 2023

UKHSA peer-reviewed work:

- Romanello M, Napoli CD, Green C and others. 'The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms' Lancet 2023: volume 402, issue 10,419, pages 2,346-2,394
- Leggat J, Dearman C, Bainbridge S, De Zoete E, Petrokofsky C. 'Heatwaves and homelessness' Perspectives on Public Health 2024: volume 144, issue 2, pages 70-71

Other peer-reviewed work that referenced the AWHP:

- Srinidhi Ravishankar, Candice Howarth. [Exploring heat risk adaptation governance: A case study of the UK](#) Environmental Science and Policy 2024: volume 157
- Murage P and others. [Indicators to support local public health to reduce the impacts of heat on health](#) Environment International 2023: volume 183
- Hajat S, Gampe D, Petrou G. [Contribution of Cold Versus Climate Change to Mortality in London, UK, 1976-2019](#) American Journal of Public Health 2023: volume 114, issue 4, pages 98-402
- Sisodiya S. [Hot brain: practical climate change advice for neurologists](#) British Medical Journal 2024

Mentions in other UK publications:

- [UK National Risk Register 2023](#) (governmental): the AWHP is mentioned in the context of high temperatures and heatwaves as well as low temperatures and snow, in the Response Capability Requirement section
- Chief Medical Officer's Annual Report 2023: [Health in an Ageing Society](#) (governmental)
- [UK Third National Adaptation Programme](#) (NAP3) (governmental)
- House of Commons (2024) [Environmental Audit Committee consultation on heat resilience and sustainable cooling](#) (governmental)

- REFORM (2023) [Health Security from the group up | 5 lessons for the future of the UKHSA](#) (think tank)
- Grantham Research Institute on Climate Change and the Environment (2023) [Policy brief: The 2022 heatwaves: England's response and future preparedness for heat risk](#) (academia)
- Grantham Research Institute on CC and the Environment (2024) [Turning up the heat](#) (academia)
- National Audit Office Report (2023) [Government resilience: extreme weather](#) (governmental)
- Care Quality Commission (CQC) [Single assessment framework](#) (2024) (governmental)

# About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

[UKHSA](#) is an executive agency, sponsored by the [Department of Health and Social Care](#).

© Crown copyright 2024  
Version 1.0

Prepared by: UKHSA Extreme Events and Health Protection  
For queries relating to this document, please contact: [awhp@ukhsa.gov.uk](mailto:awhp@ukhsa.gov.uk)

Published: December 2024  
Publishing reference: GOV-17642



You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, visit [OGL](#). Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.



UKHSA supports the  
Sustainable Development Goals

