This document was developed in collaboration with the Ministry of Health, the World Health Organization (WHO), the WHO Regional Office for Europe and the United Nations Framework Convention on Climate Change (UNFCCC). Financial support for this project was provided by the Norwegian Agency for Development Cooperation (NORAD) and the Wellcome Trust.
HOW TO USE THIS PROFILE

This health and climate change country profile presents a snapshot of country-specific climate hazards, climate-sensitive health risks and potential health benefits of climate change mitigation. The profile is also a key tool in monitoring national health sector response to the risk that climate variability and climate change pose to human health and health systems. By presenting this national evidence, the profile aims to:

- Raise awareness of the health threats of climate change within the health sector, other health-related sectors and among the general public;
- Monitor national health response;
- Support decision-makers to identify opportunities for action;
- Provide links to key WHO resources.

Tools to support the communication of the information presented in this country profile are available. For more information please contact: nevillet@who.int

The diagram below presents the linkages between climate change and health. This profile provides country-specific information following these pathways. The profile does not necessarily include comprehensive information on all exposures, vulnerability factors or health risks but rather provides examples based on available evidence and the highest priority climate-sensitive health risks for your country.

**CLIMATE CHANGE AND HEALTH**

**NATIONAL CONTEXT**

- Climate hazards
- Exposures
- Vulnerability factors

**Health risks due to climate change**

- Injury and mortality from extreme weather events
- Heat-related illness
- Respiratory illness
- Waterborne diseases
- Zoonoses
- Vector-borne diseases
- Malnutrition and foodborne diseases
- Noncommunicable diseases
- Mental and psychosocial health

**NATIONAL RESPONSE**

- **Greenhouse gas mitigation**
  - Health co-benefits
  - Nationally Determined Contribution (NDC)
  - Long-term low emissions and development strategies (LT-LEDS)

- **Health system capacity and adaptation**
  - Leadership and governance
  - Health workforce
  - Vulnerability and adaptation assessment
  - Integrated risk monitoring and early warning
  - Health and climate research
  - Climate-resilient and environmentally sustainable technologies and infrastructure
  - Management of environmental determinants of health
  - Climate-informed health programmes
  - Emergency preparedness and management
  - Climate and health financing

**OPPORTUNITIES FOR ACTION**

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Bulgaria

1
COUNTRY BACKGROUND

Located in southeastern Europe, Bulgaria’s topography consists of hills and mountains (around 60%) and forests (around 34%) (1). Classified as an upper-middle income country, Bulgaria’s economy predominantly depends on the private sector, which accounts for more than 80% of the national GDP; scientific and technological research are at the top of the budgetary expenditure (2). Bulgaria’s overall population has decreased, but the urban population is increasing, while the rural population is decreasing (1).

Bulgaria’s climate is temperate continental with an influence from the subtropical climate of the Mediterranean. High altitude areas receive the most precipitation. Bulgaria has experienced a rise in temperatures; changing precipitation patterns (including drought and flood events); less snow cover; and severe storms. Climate-related health risks include atypical infectious diseases, such as malaria; ambient air pollution; and heat stress (affecting outdoor workers in particular) (1,3).

There have been many extreme weather events in Bulgaria in recent years, with injuries, deaths and material losses; for example, flash floods (in January 2021 and June 2014), droughts, tornadoes and storms. Indeed, the number of extreme weather events has risen by 30% in Bulgaria in the period 1991–2007, compared with the period 1961–1990, and is estimated to have risen by 50% in 2020. By 2050, the number of extreme weather events in Bulgaria could triple (data provided by the Ministry of Health).

Bulgaria, as a member of the European Union (EU), is committed to the European Nationally Determined Contribution (NDC), which seeks to mitigate at least 55% of its greenhouse gas emissions by 2030 compared with the 1990 levels (4). Bulgaria’s National Adaptation Strategy identifies health adaptation options, such as education and awareness programmes, and assessing health vulnerability at the national and local level (3).

CLIMATE-SENSITIVE HEALTH RISKS – BULGARIA

<table>
<thead>
<tr>
<th>Health risks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Health impacts of extreme weather events</td>
<td>O</td>
</tr>
<tr>
<td>Heat-related illnesses</td>
<td>O</td>
</tr>
<tr>
<td>Respiratory illnesses</td>
<td>O</td>
</tr>
<tr>
<td>Waterborne diseases and other water-related health impacts</td>
<td>O</td>
</tr>
<tr>
<td>Zoonoses</td>
<td>O</td>
</tr>
<tr>
<td>Vector-borne diseases</td>
<td>O</td>
</tr>
<tr>
<td>Malnutrition and foodborne diseases</td>
<td>O</td>
</tr>
<tr>
<td>Noncommunicable diseases</td>
<td></td>
</tr>
<tr>
<td>Mental/psychosocial health</td>
<td>O</td>
</tr>
<tr>
<td>Impacts on health care facilities</td>
<td></td>
</tr>
<tr>
<td>Effects on health systems</td>
<td></td>
</tr>
<tr>
<td>Health impacts of climate-induced population pressures</td>
<td></td>
</tr>
</tbody>
</table>

Source: Government of Bulgaria, 2014 (5).
CURRENT AND FUTURE CLIMATE HAZARDS

CLIMATE HAZARD PROJECTIONS FOR BULGARIA

Country-specific projections are outlined up to the year 2100 for climate hazards under a ‘business as usual’ (BAU) high emissions scenario compared to projections under a ‘two-degree’ scenario with rapidly decreasing global emissions (see Figures 1–5).

The climate model projections given below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 (RCP8.5 – in orange) and a low emissions scenario (RCP2.6 – in green). The text describes the projected changes averaged across about 20 global climate models (thick line). The figures also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and the annual and smoothed observed record (in blue). In the following text the present-day baseline refers to the 30-year average for 1981–2010 and the end-of-century refers to the 30-year average for 2071–2100.

Modelling uncertainties associated with the relatively coarse spatial scale of the models compared with that of geographically small countries are not explicitly represented. There are also issues associated with the availability and representativeness of observed data for some locations.

FIGURE 1: Mean annual temperature, 1900–2100

Under a high emissions scenario, the mean annual temperature is projected to rise by about 4.8°C on average by the end-of-century (i.e. 2071–2100 compared with 1981–2010). If emissions decrease rapidly, the temperature rise is limited to about 1.5°C.

FIGURE 2: Total annual precipitation, 1900–2100

Total annual precipitation is projected to decrease by about 15% on average under a high emissions scenario, although the uncertainty range is large (-33% to +2%). If emissions decrease rapidly, there is little projected change on average with an uncertainty range of -6% to +8%.

NOTES

a Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.

b Observed historical record of mean temperature and total precipitation is from CRU-TSv3.26. Observed historical records of extremes are from JRA55 for temperature and from GPCC-FDD for precipitation.

c Analysis by the Climatic Research Unit, University of East Anglia, 2018.
The percentage of hot days\(^d\) is projected to increase substantially from about 15% of all days on average in 1981–2010 (10% in 1961–1990). Under a high emissions scenario, about 60% of days on average are defined as ‘hot’ by the end-of-century. If emissions decrease rapidly, about 30% of days on average are ‘hot’. Similar increases are seen in hot nights\(^d\) (not shown).

**Drought frequency and intensity**

The Standardized Precipitation Index (SPI) is a widely used drought index which expresses rainfall deficits/excesses over timescales ranging from 1 to 36 months (here 12 months, i.e. SPI\(^{12}\)). It shows how at the same time extremely dry and extremely wet conditions, relative to the average local conditions, change in frequency and/or intensity. SPI is unitless but can be used to categorize different severities of drought (wet): above +2.0 extremely wet; +2.0 to +1.5 severely wet; +1.5 to +1.0 moderately wet; +1.0 to +0.5 slightly wet; +0.5 to -0.5 near normal conditions; -0.5 to -1.0 slight drought; -1.0 to -1.5 moderate drought; -1.5 to -2.0 severe drought; below -2.0 extreme drought.

Under a high emissions scenario, SPI\(^{12}\) values are projected to decrease from about 0 to -0.6 on average by the end-of-century (2071–2100) indicating an increase in the frequency and/or intensity of dry episodes and drought events. If emissions decrease rapidly, there is little change although year-to-year variability remains large.

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\(^d\) A ‘hot day’ (‘hot night’) is a day when maximum (minimum) temperature exceeds the 90th percentile threshold for that time of the year.

\(^e\) The proportion (%) of annual rainfall totals that falls during very wet days, defined as days that are at least as wet as the historically 5% wettest of all days.
HEALTH RISKS DUE TO CLIMATE CHANGE
HEAT STRESS

CLIMATE HAZARDS\textsuperscript{a}

\begin{itemize}
  \item Up to 4.8°C mean annual temperature rise by the end-of-century.
  \item About 60% of days could be ‘hot days’ by the end-of-century.
\end{itemize}

EXPOSURES

Population exposure to heat stress is likely to rise in the future, due to increased urbanization (and the associated urban heat island effect) and climate change increasing the likelihood of severe heat waves (periods of prolonged heat).

EXAMPLE VULNERABILITY FACTORS\textsuperscript{b}

\begin{itemize}
  \item Age (e.g. the elderly and children)
  \item Biological factors and health status
  \item Geographical factors (e.g. urbanization)
  \item Socioeconomic factors (e.g. occupation and poverty)
\end{itemize}

HEALTH RISKS\textsuperscript{c}

\textbf{FIGURE 6:} Attributable deaths per warm season in Bulgaria expected for the future time period 2036–2064 and 2071–2099 under the reference scenario (apparent temperatures at the historical levels observed during the period 1971–2001) and additional attributable deaths in relation to this counterfactual as expected under the RCP4.5 and RCP8.5 scenarios (6)

The health risks of heat stress include heat-related illnesses such as dehydration, rash, cramps, heatstroke, heat exhaustion and death.

Under a high emissions scenario (RCP8.5), additional attributable deaths per warm season are projected to rise to 3463 in 2071–2099. A reduction in emissions (RCP4.5) could reduce attributable deaths per warm season in 2071–2099 to 1742 (6).

\textsuperscript{a} For details see “Current and future climate hazards”.

\textsuperscript{b} These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans.

\textsuperscript{c} See “National health response: health system capacity and adaptation” for the national response to heat stress.
FOOD SAFETY AND SECURITY

CLIMATE HAZARDS

- Up to 4.8°C mean annual temperature rise by the end-of-century.
- Total annual precipitation could decrease by about 15% by the end-of-century.
- About 60% of days could be ‘hot days’ by the end-of-century.
- Large year-to-year variability in drought conditions.

EXPOSURES

**FIGURE 7:** Percentage change in crop growth duration in Bulgaria in 1981–2020, relative to the 1981–2010 average, expressed as the running mean over 11 years (5 years before and 5 years after) (7,8)

Reliable food resources are essential to good health. Climate change significantly increases exposure to changes in the safety and sustainability of food systems, directly through its effects on agriculture and indirectly by contributing to underlying risk factors such as water insecurity, dependency on imported foods, urbanization and migration, and health service disruption.

EXAMPLE VULNERABILITY FACTORS

- Age (e.g. the elderly and children)
- Biological factors and health status (e.g. pregnant women)
- Environmental factors (e.g. loss of biodiversity)
- Gender and equity
- Socioeconomic factors

HEALTH RISKS

Food safety and security problems can lead to malnutrition, micronutrient deficiencies, other non-communicable diseases (NCDs), foodborne diseases and mortality. Increasing temperatures can also lead to increases in foodborne illnesses through spoiled food from refrigeration failure in transport/storage or changes in patterns of salmonella growth. Around half of Bulgaria’s land is used for agricultural purposes, which contributes around 5% to the country’s GDP. Agricultural production has already been affected by climate change in Bulgaria, with extreme weather events (including droughts and floods) and overall rising temperatures posing significant challenges (9).

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a For details see “Current and future climate hazards”.
b These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans.
c See “National health response: health system capacity and adaptation” for the national response to food safety and security.
WATER QUANTITY AND QUALITY

CLIMATE HAZARDS

- Up to 4.8°C mean annual temperature rise by the end-of-century.
- Total annual precipitation could decrease by about 15% by the end-of-century.
- Annual rainfall from very wet days could increase by the end-of-century.
- Large year-to-year variability in drought conditions.

EXPOSURES

**FIGURE 8**: Change in population exposure to riverine flooding in Bulgaria from 2010 (baseline) to 2080 (under a BAU scenario)

Climate change increases the intensity and frequency of extreme weather events including drought and floods. These events can lead to population displacement and affect water and sanitation infrastructure and services, contaminate water with faecal bacteria (e.g. *E. coli*, salmonella) from run-off or sewer overflow. Increasing temperatures and precipitation can also lead to water contaminated with Vibrio bacteria or algae blooms.

EXAMPLE VULNERABILITY FACTORS

- Access to clean and safe water and sanitation services
- People living near flood and drought zones
- Socioeconomic factors
- Gender and equity

HEALTH RISKS

Physical injury and drowning are direct health risks from extreme weather events associated with climate change. Indirectly, the impact of climate change on water quality and quantity can lead to waterborne diseases (such as diarrhoeal disease) and noncommunicable diseases. Increasing extreme weather events and changing precipitation patterns are likely to increase water security issues for Bulgaria. There is a particular need to update infrastructure and implement integrated water resource management and integrated risk management of floods and droughts, to ensure future sustainability of water resources under increased climatic variability.

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*a* For details see “Current and future climate hazards”.

*b* This analysis, conducted by Aqueduct, shows projections for changing population exposure to riverine and coastal flood risk under a BAU scenario, which reflects RCP8.5 and SSP2. SSP2 is the socioeconomic pathway representing “middle of the road”, whereby global social, economic and technological trends do not shift significantly from historical patterns.

*c* These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: [https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans](https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans).

*d* See “National health response: health system capacity and adaptation” for the national response to water quantity and quality.
VECTOR DISTRIBUTION AND ECOLOGY

CLIMATE HAZARDS\(^a\)

- Up to 4.8°C mean annual temperature rise by the end-of-century.
- Total annual precipitation could decrease by about 15% by the end-of-century.

EXPOSURES

In Bulgaria, the local burden of malaria has been eliminated for more than 55 years. However, a recent study on the spatial analysis of imported cases of malaria in Bulgaria shows that many areas with a significant reduction in the time for sporogony and correspondingly accelerated malaria transmission rates fall into the clusters with the highest number of reported cases of imported malaria. These clusters are identified as areas at increased risk of re-establishment of malaria transmission (12).

EXAMPLE VULNERABILITY FACTORS\(^b\)

- Environmental factors
- Biological factors and health status (e.g., pregnant women or pre-existing conditions)
- Disease dynamics
- Socioeconomic factors

HEALTH RISKS\(^c\)

There is a potential risk of re-establishment of local malaria transmission in Bulgaria, which is determined by receptivity and vulnerability. Currently, vulnerability is identified as moderate and is determined by the number of imported malaria cases from endemic countries. However, vulnerability is dependent upon a number of factors, including migration, economic, social and cultural factors, which could change in the future. Therefore, the vulnerability of Bulgaria to malaria transmission must be continually monitored (12).

\(^{a}\) For details see “Current and future climate hazards”.

\(^{b}\) These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans.

\(^{c}\) See “National health response: health system capacity and adaptation” for the national response to vector distribution and ecology.
HEALTH RISKS DUE TO AIR POLLUTION

Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution. Air pollution is now one of the largest global health risks, causing approximately seven million deaths every year. There is an important opportunity to promote policies that both protect the climate at a global level, and also have large and immediate health benefits at a local level.

EXPOSURES

All of the top ten most populated cities in Bulgaria for which air pollution data were available had annual mean PM$_{2.5}$ levels that were above the WHO guideline value of 5 µg/m$^3$ (see Figure 9) (13).

**FIGURE 9:** Annual mean PM$_{2.5}$ in top ten most populated Bulgaria cities, for which data were available, compared with the WHO guideline value of PM$_{2.5}$ of 5 µg/m$^3$. Source: Ambient Air Pollution Database, WHO, 2018. A standard conversion has been used on some data points; see source for further details (13).

EXAMPLE VULNERABILITY FACTORS

- Age (e.g. the elderly and children)
- Biological factors and health status (e.g. pre-existing conditions)
- Gender and equity
- Geographical factors (e.g. rural/urban areas)
- Socioeconomic factors (e.g. poverty)

HEALTH RISKS

Ambient air pollution can have direct and sometimes severe consequences for health. Fine particles, which penetrate deep into the respiratory tract, subsequently increase mortality from respiratory infections, lung cancer and cardiovascular disease.

- **8613 deaths** from ambient air pollution in Bulgaria in 2016 (14)
- **29.5%** economic costs of premature deaths from ambient particulate matter pollution and household air pollution as a percentage of GDP (2010) (15)

---

*a* PM$_{2.5}$ is atmospheric particulate matter (PM) with a diameter of <2.5 µm.

*b* These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans.

*c* See “National health response: health system capacity and adaptation” for the national response to air pollution.
HEALTH CO-BENEFITS FROM CLIMATE CHANGE MITIGATION

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce greenhouse gas emissions.

GLOBAL EXAMPLES

**TRANSPORT**
A shift towards active transportation and sustainable public transport systems could see reductions in greenhouse gas emissions; decreases in illnesses related to physical inactivity, reduced outdoor air pollution and noise exposure. Compact urban planning can also improve health equity by making urban services more accessible to the elderly and poor.

**ENERGY**
The health benefits of transitioning from polluting fuels, such as coal, to lower carbon sources and renewables are clear: reduced rates of cardiovascular and respiratory diseases; cost-savings for health systems; improved health equity where populations are disproportionately affected by household or ambient air pollution; and improved economic productivity from a healthier and more productive workforce.

**FOOD AND AGRICULTURE**
Food systems emissions constitute a significant proportion of total global greenhouse gas emissions. Interventions to build sustainable and secure food systems can have significant public health benefits, by addressing malnutrition associated with food and nutrition insecurity while reducing diet-related noncommunicable diseases (NCDs).

**HEALTH CARE SYSTEMS**
Health care activities are an important source of greenhouse gas emissions. Major sources include procurement and inefficient energy consumption. Low-carbon and efficient energy solutions can lower the health sector's carbon footprint while improving the quality and reliability of energy services in many settings.
HEALTH IN THE NATIONALLY DETERMINED CONTRIBUTION (NDC)

HEALTH IN THE NDCs

- Ambitious national climate action can have significant health benefits.
- NDCs can be strengthened by considering health protection and health promotion.
- National reporting to the UNFCCC and negotiations provide opportunities to link climate and health action.

Total 2018 emissions
57,815.6 kt CO₂ equivalent (16)

NDC target
At least a 55% reduction in greenhouse gas emissions by 2030 compared with the 1990 levels (4)

The EU NDC does not outline specific health adaptation targets (4).
NATIONAL HEALTH RESPONSE: HEALTH SYSTEM CAPACITY AND ADAPTATION

The following section measures progress in the health sector in responding to climate threats based on country reported data collected in the WHO Health and Climate Change Global Survey (17).

GOVERNANCE AND LEADERSHIP

National planning for health and climate change

<table>
<thead>
<tr>
<th>Has a national health and climate change strategy or plan been developed?*</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title: National Climate Change Adaptation Strategy and Action Plan</td>
<td></td>
</tr>
<tr>
<td>Year: 2019</td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td></td>
</tr>
<tr>
<td>Are health adaptation priorities identified in the strategy/plan?</td>
<td>yes</td>
</tr>
<tr>
<td>Are the health co-benefits of mitigation action considered in the strategy/plan?</td>
<td>no</td>
</tr>
<tr>
<td>Have performance indicators been identified?</td>
<td>yes</td>
</tr>
<tr>
<td>Level of implementation of the strategy/plan</td>
<td></td>
</tr>
<tr>
<td>Portion of estimated costs to implement the strategy/plan covered in the health budget</td>
<td></td>
</tr>
</tbody>
</table>

Intersectoral collaboration to address climate change

Is there an agreement in place between the ministry of health and this sector which defines specific roles and responsibilities in relation to links between health and climate change policy?

<table>
<thead>
<tr>
<th>Sector*</th>
<th>Agreement in place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>no</td>
</tr>
<tr>
<td>Electricity generation</td>
<td>no</td>
</tr>
<tr>
<td>Household energy</td>
<td>no</td>
</tr>
<tr>
<td>Agriculture</td>
<td>no</td>
</tr>
<tr>
<td>Social services</td>
<td>no</td>
</tr>
<tr>
<td>Water, sanitation and waste-water management</td>
<td>no</td>
</tr>
</tbody>
</table>

* In this context, a national strategy or plan is a broad term that includes national health and climate strategies as well as the health component of national adaptation plans (HNAPs).

* Specific roles and responsibilities between the national health authority and the sector indicated are defined in the agreement.
EVIDENCE AND IMPLEMENTATION

Vulnerability and adaptation assessment for health

Has an assessment of health vulnerability and impacts of climate change been conducted at the national level?

Title: Analysis and assessment of the vulnerability of Bulgarian economy sectors from climate change. Government of Bulgaria; 2020
Year: 2020

Have the results of the assessment been used for policy prioritization or the allocation of human and financial resources to address the health risks of climate change?

<table>
<thead>
<tr>
<th>Policy prioritization</th>
<th>Human and financial resource allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Minimal</td>
<td></td>
</tr>
<tr>
<td>Somewhat</td>
<td></td>
</tr>
<tr>
<td>Strong</td>
<td></td>
</tr>
</tbody>
</table>

Vulnerability and impacts (Health surveillance system exists*)

- **Thermal stress (e.g. heat waves)**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Vector-borne diseases**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Foodborne diseases**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Waterborne diseases**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Nutrition (e.g. malnutrition associated with extreme climatic events)**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Injuries (e.g. physical injuries or drowning in extreme weather events)**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Mental health and well-being**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

- **Airborne and respiratory diseases**
  - Health surveillance system exists: yes
  - Health surveillance system includes meteorological information: yes
  - Climate-informed health early warning system (EWS) in place: yes

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* A positive response indicates that the surveillance system is in place, it will identify changing health risks or impacts AND it will trigger early action.

* Meteorological information refers to either short-term weather information, seasonal climate information or long-term climate information.

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[14] Health and Climate Change Country Profile
### Emergency preparedness

<table>
<thead>
<tr>
<th>Climate hazard</th>
<th>Early warning system in place</th>
<th>Health sector response plan in place</th>
<th>Health sector response plan includes meteorological information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat waves</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Storms (e.g. hurricanes, monsoons, typhoons)</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Flooding</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Drought</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Air quality (e.g. particulate matter, ozone levels)</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

### CAPACITY, INFRASTRUCTURE AND SUSTAINABILITY

#### Human resource capacity

- **International Health Regulations (IHR) Monitoring Framework Human Resources Core Capacity (2018) (18)**: 60%

- Does your human resource capacity, as measured through the IHR, adequately consider the human resource requirements to respond to climate-related events?
- Is there a national curriculum developed to train health personnel on the health impacts of climate change?

#### Health care facilities, infrastructure and technology

- Has there been an assessment of the climate resilience of any public health care facilities?
- Have measures been taken to increase the climate resilience of health infrastructure and technology?
- Is there a national initiative/programme in place to promote the use of low-carbon, energy-efficient, sustainable technologies in the health sector?
OPPORTUNITIES FOR ACTION

1. STRENGTHEN MULTISECTORAL COLLABORATION ON HEALTH AND CLIMATE CHANGE

There are no multisectoral agreements in place on climate change and health. Enhance collaboration between health and health-determining sectors with agreements on climate change and health action (e.g. with transport, energy, water and sanitation, national meteorological and hydrological services sectors). Promote climate mitigation and adaptation policies that protect and promote health and strengthen health systems.

2. STRENGTHEN INTEGRATED RISK SURVEILLANCE AND HEALTH EARLY WARNING SYSTEMS

Meteorological information is not currently used to inform risk surveillance of climate-sensitive diseases. The use of climate/weather information can be integrated into health surveillance systems and used to predict outbreaks of climate-sensitive diseases (i.e. climate-informed health early warning systems) to help ensure a preventive approach to specific climate-sensitive health programmes.

3. ASSESS THE HEALTH CO-BENEFITS OF NATIONAL CLIMATE MITIGATION POLICIES

Health co-benefits of mitigation are currently not included in Bulgaria’s Nationally Determined Contribution (NDC). Ensure that climate mitigation policies include the health risks posed by climate change, identify health adaptation priorities and measure and optimize the health co-benefits of climate mitigation action.

4. BUILD CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABLE HEALTH CARE FACILITIES

Measures can be taken to prevent the potentially devastating impacts of climate change on health care facilities and health service provision while decreasing the climate and environmental footprint of health care facilities. A commitment towards climate-resilient, environmentally sustainable health care facilities can improve system stability, promote a healing environment and mitigate climate change impacts.
WHO RESOURCES FOR ACTION

- Operational framework for building climate-resilient health systems
  https://www.who.int/publications/i/item/operational-framework-for-building-climate-resilient-health-systems

- WHO guidance to protect health from climate change through health adaptation planning
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