

# Chapter 10. Conclusions

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## Overall conclusion: the need to expand the number, coverage and reach of HHAPs

The evidence has become increasingly clear that trends in frequency and in relative and absolute intensity of heat-waves are accelerating throughout the WHO European Region. Projections for the Region under a changing climate indicate that heat-related exposures and impacts could increase substantially through the combined effects of climate change, urbanization and ageing, among other factors. Against this background, progress in the expansion of HHAP implementation and coverage has been slow, and many countries either do not have a functioning plan or their plan does not cover a significant proportion of the core elements of a HHAP.

Countries are at different stages of preparing, developing and implementing HHAPs, and no organized public health response to heat is available in several countries where heat has significant impacts on health. While the last decade saw a small increase in the number of national and subnational HHAPs, this growth occurred mainly in EU countries. These policies are urgently needed in other countries in the Region that are facing

an increasing risk of high temperatures and heat-waves. Further, despite the nominal increase in plans among countries, information about their actual coverage and reach remains limited. Many plans lack organized monitoring and evaluation provisions, without which fundamental questions remain about their effectiveness.

With the 2017 Ostrava Declaration (WHO Regional Office for Europe, 2017), Member States committed to establishing national portfolios of action on environment and health. Such portfolios should comprise actions on climate change and health, including policies and measures relevant to managing heat–health, such as:

- strengthening natural risk reduction policies and early warning surveillance and preparedness systems for extreme weather events and climate-sensitive disease outbreaks; and
- developing information, tools and methodologies to support authorities and the public to increase their resilience against extreme weather and climate health risks.

## Individual conclusions for the elements in the report

Complementing this overarching conclusion, some specific conclusions for the areas covered in the report can also be derived.

### Good heat–health governance

Preparing for and responding to heat extremes, with consideration of climate change and fit-for-purpose governance arrangements, are areas of urgent priority for health policy and practice. Most

current HHAPs are designed and operationalized in a static fashion, and do not integrate available information on climate change and on demographic and other variables and trends. Moreover, even though good heat–health governance elements and principles are outlined in international and national guidance, their translation into practice is highly context-dependent, with no generally agreed-upon best practice. The integration of HHAPs with other climate-sensitive early warnings, health adaptation and strengthening climate-resilient health systems, as well as other areas of governance, could result in synergies and efficiency gains.

WHO's 2019 survey of heat–health action planning revealed important insights regarding HHAP implementation and governance at the national/federal level.

- The number of countries with a functioning, comprehensive national HHAP has not increased since previous assessments in the published scientific literature.
- The WHO Regional Office for Europe's guidance on heat–health action planning (Matthies et al., 2008) has played a significant role in the design and revision of several HHAPs in the Region.
- The level of implementation of different core elements of HHAPs varies widely: warning systems are nearly universally fully implemented, while heat-protective long-term urban planning interventions are relatively uncommon.
- A clear shift towards web-based communication of warnings, heat–health risks and recommendations has been seen in the last decade.
- Many HHAPs lack adequate economic and human resources for implementation.
- While most HHAPs specify roles and responsibilities at the national level, these specifications are far less common at the subnational and local levels, including for non-state actors.
- HHAPs are relatively well integrated with national climate change policies, but less so

with national health, disaster/emergency or environmental policies.

### **Systematic monitoring and evaluation**

Suggestions of a reduction in heat-related impacts have been reported in recent years in a number of countries, as well as clear indications of the role of HHAPs in such reductions. Formalized, generalized and systematic efforts of HHAP process and outcome monitoring and evaluation are crucial. They help to address user needs and to improve effectiveness by determining which elements are truly protective, and which may not be working and should be boosted or changed. Considering the future changes in climate and in demographics (an ageing European population and increases in chronic conditions) anticipated across most of the WHO European Region, as well as potential converging risks (such as the recent COVID-19 pandemic), it is especially important to encourage continuous and timely monitoring of health outcome indicators and systematic evaluation of HHAPs. This is crucial to document health impacts and their potential changes over time, as well as the definition of best practice measures. It is important that the evaluation process is formally defined, and that results are written up and disseminated to stakeholders involved in the HHAP. Evaluation entails multidisciplinary activity and collaborative action between different stakeholders to address the different components and processes of the HHAP, user needs and caveats.

Outcome evaluation can be more solidly based on health indicators, providing additional information on the causal pathways of the effectiveness of HHAPs. Evaluation frameworks should therefore invest in defining surveillance indicators capable of monitoring heat-related symptoms, both during and after extreme events. They should also endeavour to define and enhance integrated health surveillance systems, considering both mortality and morbidity outcomes associated with heat and ad hoc indicators (such as helpline or GP calls and social services notifications). The dual use of

health surveillance indicators to inform health care systems and stakeholders of current impacts will assist with better targeted action. Evaluation of

health impacts after a heat event is vital for ongoing improvement of current HHAPs and the response measures introduced.

## Communicating heat risk to specific audiences

Evidence from the last decade shows generally good awareness but low risk perception of heat by the general public, vulnerable groups and possibly health care providers. Psychological mechanisms and the familiarity and low-dread factor of heat may hinder the effectiveness of heat risk communications. A well developed heat-related information plan remains a central component of any effective HHAP, but can be more finely tailored to specific audiences.

It is crucial to gain better research-based understanding of the knowledge, attitudes and behaviour of high-risk groups and their carers when designing information and communication campaigns. Heat–health warnings and recommended actions should be understood across the system by different stakeholders and end users. Such improved understanding, adapted and customized to local settings and audiences, should both inform and drive heat-related health information plans.

### Including heat and health considerations in urban planning

At the city level, published evidence keeps confirming the protective effect of urban greening, to which a much wider range of interventions can be added to reduce hazardous heat exposure through modification of the urban landscape. Adequate intersectoral mechanisms for health authorities to promote these interventions are lacking, however. Entry points to include heat and health considerations in urban planning and management can make a lasting difference.

### Integrating data on factors affecting indoor and urban overheating

Prevention can be improved if it integrates data on factors affecting indoor and urban overheating and possible interventions to address them. Current preventive strategies do not make full use of the availability of fine grid information that can help predict hot spots of indoor overheating risks, in both residential and care settings.

### The role of AC

In terms of heat-protective technologies, AC remains the most prevalent, but concerns remain about its adverse environmental and economic impacts and about equitable access to it by vulnerable groups, with energy poverty a problem to be highlighted and acted upon. It is vital that those most vulnerable to heat can access the preventive benefits of AC, either as a product or as a service, while minimizing the societal and environmental drawbacks of the technology throughout its life-cycle. A wide range of effective passive cooling interventions can afford health protection from heat while minimizing energy consumption and greenhouse gas emissions.

### Greater focus on vulnerable population groups

The diversity within vulnerable groups should be acknowledged, and information campaigns and recommendations for vulnerable subgroups should be defined and updated regularly on the basis of new evidence and emerging risk factors.

The scope and definition of vulnerable groups is evolving, and public health response measures need to adapt accordingly. Subgroups most at risk change over time and evidence on vulnerable

groups is more consistent both in terms of health impacts and potential biological mechanisms.

Key aspects to be promoted within HHAPs are the formal identification of vulnerable groups, the definition of specific public health response measures and active health and social care surveillance schemes; these should be enhanced during extreme events. Monitoring of the health status and impacts of heat among vulnerable groups should be undertaken to account for potential changes over time and ensure that prevention and response measures are tailored to their needs, thereby minimizing the health burden.

## Evidence and research gaps

Several gaps in knowledge continue to hinder prevention efforts throughout the Region. The following subsections address several across the topics presented in this report.

### **Evidence lacking on good governance**

Limited evidence is available on what constitutes good governance of the public health prevention of heat, although national data point at directions for improvement. The indication that some HHAPs may not have enough human and financial resources to be able to deliver on their mandate merits further investigation.

The opportunities for better reach and efficiency gains attainable through further engagement of subnational authorities and non-state actors (possibly including the private sector) are also topics for additional research. In addition, the possible benefits and synergies of integration of HHAPs into national health, environmental, disaster risk reduction and climate change policies are questions to be explored in greater detail.

### **Better planning and response measures in health and social care settings**

With some exceptions, little progress has been made in planning for heat risks in health systems and care facilities, and it is often underreported. Greater effort needs to be made with sharing best practice planning and response measures in the health sector. Preparedness and planning within the health care system need to be promoted in HHAPs.

Structural measures addressing overheating and adaptive solutions undertaken in hospitals, residential care homes and other settings should be enhanced. Heat preparedness and response need to be managed in the context of increasing demands for sustainability and decarbonization in the health sector.

### **Heat–health prevention hindered by significant gaps in knowledge**

A critical concern relates to the coverage of data and epidemiological studies on the health impacts of heat and their prevention. Although studies on heat and health have a wider geographical coverage now than they did a decade ago, several countries in the WHO European Region are still unrepresented, with no evidence of heat–health impacts. Furthermore, findings are still very much focused on urban areas, with sparse evidence related to suburban and rural areas.

The gradient in coverage has a clear geographical, economic and institutional capacity component, with western European, EU and high-income countries much better represented in heat–health research output than eastern European, Balkan, central Asian, Caucasian and low- or middle-income ones. Without basic epidemiological estimations on the relationship between temperature and health, the drive to implement HHAPs is limited. It is also possible that such studies are available nationally

but have not been processed for publishing in indexed scientific journals, either national or international. In that case, targeted support and capacity-building could help release and distribute that knowledge.

### **Data needed on the results of the transition to web-based and mobile platforms**

The benefits and drawbacks of the fast and clear transition to web-based and mobile platforms for heat–health communications in the last decade need to be assessed. While this transition has seemingly obvious benefits in terms of timing and reach, it also entails risks of exclusion of vulnerable groups less familiar with newer information technologies.

Additional research could clarify the extent of the risk that potential exclusion adds to an increasingly clear systematic underestimation of the health risks of heat by the general public, and most importantly by vulnerable individuals and possibly health practitioners.

### **More evidence needed to interpret observed trends accurately**

Suggestions of a reduction in heat-related impacts have been reported in recent years in several countries. This is an important signal to implement and encourage the surveillance of health impacts and evaluation of HHAPs. Moreover, vulnerability factors may change over time and these need to be quantified and monitored in order to adapt health recommendations, response measures and actions.

### **Research needed on protection in health and nursing care facilities**

In recent years increased awareness of the vulnerability of people in residential care has led to improvements in care in these settings. More research is needed, however, to understand how hospitals, care-related buildings and facilities are

at risk of overheating and the solutions to address overheating. Likewise, further research is needed on the varied impacts of heat-waves in health care settings among workers, patients and residents, as well as effective responses and barriers to implementation.

More effort is also required to understand how the health care system can improve preparedness and planning for heat. Since these heat risks are increasingly expected to be managed in the context of demands for greenhouse gas emission reductions in the health sector, operational research is needed on how to attain health system decarbonization while ensuring health system function performance across the board. Greater effort needs to be put into sharing best practice planning and emergency response measures in the health sector. Evaluation of measures and actions carried out in health care settings is a highly relevant element of any HHAP evaluation schemes.

### **Epidemiological evidence required on the benefits of urban heat interventions**

A significant proportion of the evidence on exposure reduction and health benefits from urban heat interventions is based on modelling rather than epidemiological evidence. With the relative exception of urban greening, the reported effects of several built environment interventions are not based on individual-level measurements. While there is no reason to doubt the overall protective nature of the interventions, models may fail to capture the complexity of urban interactions, thereby limiting their usefulness in practice for public policy design. In addition, it is not yet clear how far realistic urban management interventions can reduce temperatures in the places where dangerous heat exposures tend to occur.

Further, urban planning interventions remain largely disconnected from HHAPs, pointing to a lack of tools and incentives for intersectoral action to integrate health protection considerations into mainstream urban planning and management.

Additional questions extend to aspects of the cost–effectiveness of various types of interventions versus their public perception and political desirability. In practice, the health benefits of proposed urban interventions are rarely considered and/or evaluated. Better understanding is needed of which interventions provide better “health value for money”; this can come only from more and better operational research.

### **Remaining questions on links between the built environment, heat exposure and health**

Much knowledge has been gained in the last decade about heat in indoor environments and on heat–health interventions at the building scale and below, but much of it has been obtained in controlled environments or through models. Real-life, empirical evidence on the role these interventions may play in thermal comfort, heat stress reduction and health protection for vulnerable groups is scarce. This lack of evidence extends to what “thermal

comfort” means for vulnerable groups, with reviews reporting widely varying estimates, even in relatively comparable groups.

These knowledge gaps highlight a broader problem of research on heat and health – namely, the difficulty and costs involved in studies below the population level, and particularly those involving vulnerable subjects. While various technological options are becoming available in terms of personal cooling, AC has become the main technology for protection from overheating. Given its drawbacks, there is a clear case for research on both personal cooling devices and strategies to ensure the protective benefits of AC for vulnerable groups, for whom access to effective cooling is tantamount to a potentially life-saving medical device. More applied research is also needed into the regulatory, financial, procedural, knowledge and other types of barrier that may inhibit effective action on preventing indoor overheating as a public health risk.

## **References**

Matthies F, Bickler G, Cardeñosa N, Hales S, editors (2008). Heat–health action plans. Copenhagen: WHO Regional Office for Europe (<https://www.euro.who.int/en/publications/abstracts/heathealth-action-plans>).

WHO Regional Office for Europe (2017). Declaration of the Sixth Ministerial Conference on Environment and

Health. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/media-centre/events/events/2017/06/sixth-ministerial-conference-on-environment-and-health/documentation/declaration-of-the-sixth-ministerial-conference-on-environment-and-health>).