PROTECTING HEALTH
FROM CLIMATE CHANGE

A SEVEN COUNTRY INITIATIVE

Project results and compendium
of project documents in the
Republic of Macedonia
2008 - 2011

Ministry of Health

Suported by

Federal Ministry for the
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and Nuclear Safety

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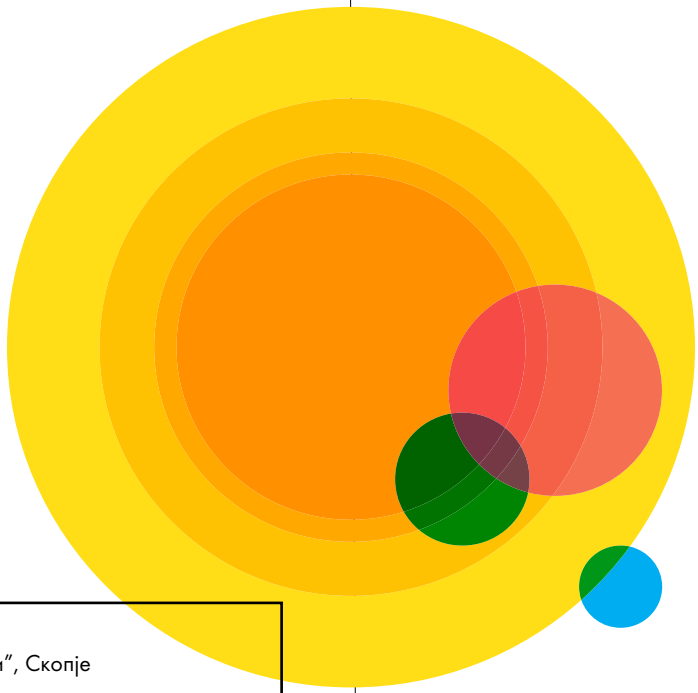

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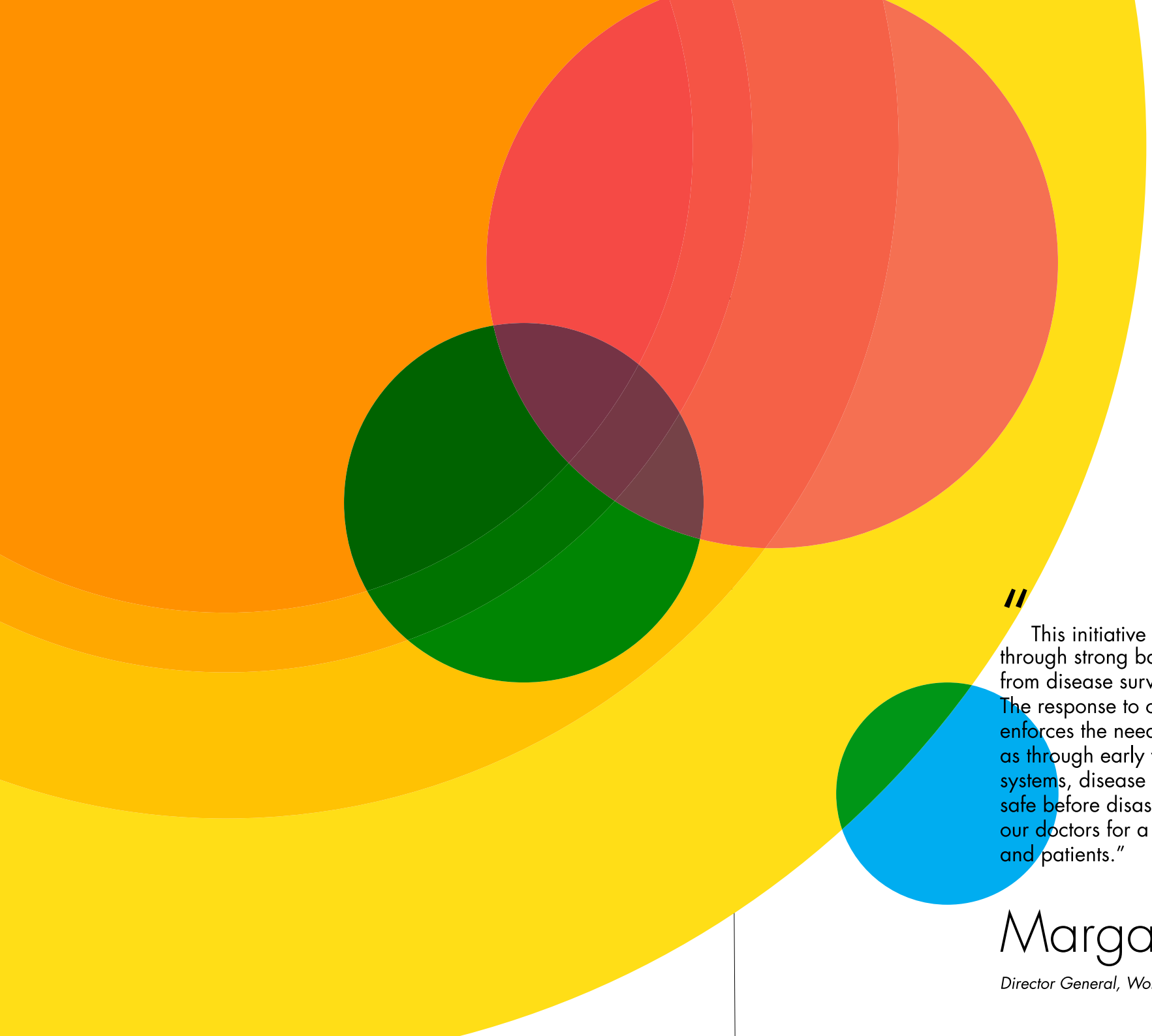


"This initiative is all about preparedness through strong basic services, from disease surveillance to clean water. The response to climate change enforces the need for foresighted action, as through early warning systems, disease forecasting, making hospitals safe before disaster strikes,and preparing our doctors for a surge in emergency needs and patients."

Margaret Chan,

Director General, World Health Organization

Introduction

The climate affects all aspects of our health and wealth. Adaptation throught public health plays a key role in this process and helps decision-makers choose the right way forward. This publication presents and summarizes achievements in this area in the Republic of Macedonia over the duration of the project.

It is now generally acknowledged that the global climate is changing, as the earth becomes warmer. This change has the potential to affect human health in a number of ways, for instance by altering the geographical range and seasonality of certain infectious diseases, disturbing food-producing ecosystems, and increasing the frequency of extreme weather events, such as heat - waves. Economic activities, human settlements and human health will experience direct and indirect effects. The poor and disadvantaged are the most vulnerable to the consequences of climate change.

The Republic of Macedonia is a small country with 2 million inhabitants in a mostly hilly and mountainous land-locked territory in south-east Europe, covering an area of 25 713km^2.

The country has a transitional climate from Mediterranean to continental. The summers are hot and dry and the winters are moderately cold. Average annual precipitation varies from 1700 mm in the western mountainous area to 500 mm in the eastern area. In July the average temperature is 20–23°C and in January it is -20–0°C. The warmest regions are Demir Kapija and Gevgelija, where the temperature in July and August frequently exceeds 40°C. More frequent and more severe periods of drought and heavy rainfall are expected. The total availability of water in the country (the basin of the River Vardar) is expected to reduce by an average of 18% by 2100. In the coming decades, a decrease in the percentage of the total average monthly morbidity in the country is expected in some of the colder months (January 4%, October 4% and November 2%) as a result of climate change. On the other hand, the direct health effects of heat-waves could be a significant problem, especially in the context of increased urbanization. More than 60% of the population lives in the cities. According to projected scenarios for mortality trends in the country and in Skopje for the period after 2035, an increase in average monthly temperatures of only 1°C compared to the period 1996–2000 will significantly influence the distribution of total mortality expressed as a monthly average. This increase in the monthly mortality rate would be higher in the months of April, May and June (4–11%) and on average 10% higher compared to the period April, May and June 1995–2004. People with chronic diseases, especially cardiovascular and respiratory diseases, have a high risk of increased mortality during heat-waves. The indirect effects of climate on food production, water supply and epidemic outbreaks of diseases transmitted through water, food and vectors can also contribute to the consequences of

climate change for people's health. Projections for the seasonal index of food poisoning caused by salmonella in the Republic of Macedonia in 2030, in the context of the increase in average monthly temperatures, suggest a possible additional peak in the colder months as a result of higher temperatures in the future.

Recognizing that global climate change is posing ever growing threats to public health security, in 2008 the WHO Regional Office for Europe started a two-year project funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Protecting health from climate change – a seven-country initiative focuses on taking action against the health effects of climate change in seven European countries: Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the Republic of Macedonia and Uzbekistan. The project pilots action in countries that are already experiencing climate-related exposures such as extreme events, water scarcity, melting glaciers and thawing permafrost, and where projected health effects are severe. All countries ratified the United Nations Framework Convention on Climate Change and are committed to engage further in protecting health from climate change by increasing awareness and improving cooperation between environment and health. Project activities are carried out through bilateral agreements with WHO/Europe in the framework of the WHO global workplan on climate change and health. Project activities began in the Republic of Macedonia in April 2009, with the active participation of the department ministries and institutions that carry out climate change activities. On 17 June 2009 the Ministry of Health set up a National Committee for Climate Change and Health as responsible body for surveillance of activities and decision-making. To address and prevent potential health threats from climate change, the project in the Republic of Macedonia undertook an assessment of the health impact of and vulnerability and adaptation to climate change, as a basis for the development of a national health adaptation strategy.

Specific actions aimed to implement heat-health action plans and pilot energy-efficient health services, through investments and technology transfer, as a means to protect health from heat. In addition, activities to raise awareness on climate change and communicable diseases were put in place. Activities also included a contribution to WHO information platforms by sharing data, tools, results and lessons learned.

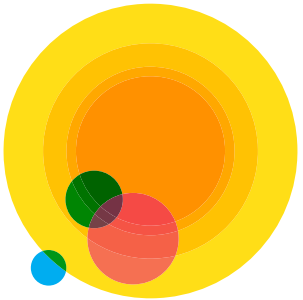
This project fills an important gap in knowledge on the health effects of climate change and adaptation mechanisms. The first workshop held under the project,

Developing a climate change health protection strategy in the Republic of Macedonia, oriented policy action and strengthened responsibilities of decision-makers and key technical experts.

This publication summarize the achievements of intensive activity by the members of the National Committee for Climate Change and Health as well as many national and foreign experts during the last two years, involving assessment, workshops, implementation of studies, peer-review process. Much that was included in the original reports remains of value and detailed accounts of some approaches to quantification of effects have not yet been reported in the Republic of Macedonia.

On behalf of the National Committee for Climate Change and Health, I wish to express my sincere gratitude to all of them for providing us with an opportunity to bring the project work to a conclusion. Many people have contributed to the success of this project. I also wish to express gratitude to the national officials and WHO staff members as well as to donors for their help and for their kind cooperation in the completion of our activities. Last but not least, I wish to take this opportunity to express a sense of gratitude and appreciation to all my friends and colleagues for their technical support in the development of the manuals for project activities, as well as for their hard work and commitment to achieving the aims of the project.

Associate Professor Dr Vladimir Kendrovski
President of the Climate Change and Health Committee
Ministry of Health



Protecting health from climate change – A seven countries initiative

PROTECTING HEALTH FROM CLIMATE CHANGE IN THE REPUBLIC OF MACEDONIA

Project results

The overall goal of the WHO/BMU project Protecting health from climate change – a seven-country initiative was to strengthen the capacity of health systems to protect health from climate change, and in particular:

- to develop capacity, assess the risks and develop national or subnational health adaptation strategies for protecting health from climate change;
- to build institutional capacity on climate change in relation to preparedness and response for extreme weather events, infectious disease surveillance and response, respiratory disease early detection and response, and water, food safety and malnutrition;
- to foster innovation in energy efficiency and the use of renewable energy for health services;
- to provide intelligence and facilitate the exchange of knowledge and experience on effective adaptation and mitigation measures.

The objectives of the project in the Republic of Macedonia were:

- to assess the health impacts of climate change and develop a coherent set of recommendations for intersectoral policy-making;
- to develop capacity in assessing risks from climate change and acting thereon in environment and health professionals;
- to develop and implement heat health action plans;
- to equip two medical facilities with solar equipment (two general hospitals in the provinces with the highest solar index) to pilot energy efficiency and self-sustainability in areas vulnerable to summer heat and interruption in energy supply, thus enabling decreases in CO2 emissions;
- to develop early information on climate-related infectious disease risks at municipal and national levels.

The project was implemented in cooperation with the World Health Organization, the Ministry of Health and other partners, such as the Ministry of the Environment and Physical Planning, National Institute of Public Health, Public Health Centres, Emergency Medical Services (Skopje), Hydrometeorological Institute, Crisis Management Centre, Directorate for Protection and Rescue, Red Cross, City of Skopje, NGO MACEF, etc. The results achieved include:

Strengthening the national capacity for assessing the health impacts of climate change:

- More than 600 health professionals, environment professionals, journalists and other professionals received training on the influence of health on climate change.
- An assessment was carried out of the health effects of climate change in the Republic of Macedonia and published in March 2012 in three languages: Macedonian, English and Albanian.
- A study was undertaken to examine the impact of heat-waves on morbidity in the summer months in the Republic of Macedonia for the period 1994–2009.
- A study was carried out on the correlation between the occurrence of salmonella infection and average weekly temperature distribution for the period 1996–2009.
- A study was carried out on the presence of the vector Aedes albopictus in the Republic of Macedonia and published in November 2011in two languages: Macedonan and Albanian.
- A study on the impact of climate change on pollen microflora related to respiratory allergies among the adult population in the city of Skopje was published in November 2011in two languages: Macedonan and Albanian.
- A study was carried out on the health and economic damage and adaptation costs of climate change due to heat-waves.
- A publication entitled The effects on health of climate change in the Republic of Macedonia was developed and published in November 2012 in three languages: Macedonian, English and Albanian.

Developing the Climate change health adaptation strategy of the Republic of Macedonia:

- The strategy was developed and adopted by the Government in February 2011, and published in June 2011 in three languages: Macedonian, English and Albanian.

Developing the Action plan to protect the health of the population in the Republic of Macedonia from heat-waves:

- The Heat-wave Action Plan was adopted by the Government in February 2011 and published in 2011 in three languages: Macedonian, English and Albanian.

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- A heat-health early warning system has been developed, for timely announcement of heat-waves, including design of software and donation of equipment for its functioning. It is available online at http://www.toplotnibranovi.mk.
- Information leaflets for protection against heat-waves, aimed at the general population, managers in health and social institutions, general practitioners and workers have been developed and printed in three languages: Macedonian, English and Albanian.

- More than 300 health professionals, environment professionals, journalists and other professionals have received training on the influence of health on climate change, with to the emphasis on heat-waves.

Investment in energy efficiency and technology transfer in two pilot health institutions, the general hospital in Gostivar and clinical hospital in Shtip:

- Energy efficiency and hospital safety assessments were performed in the general hospital in Gostivar and clinical hospital in Shtip and reports developed.
- Solar heating systems and thermostatic valves were installed in the two pilot hospitals.
- Study of the economic and environmental impact of the interventions undertaken in the pilot hospitals was performed, including projection of reduction of CO_2 emissions at municipal level as well as the long-term economic benefit forecast.
- Five professionals from the Republic of Macedonia participated in a study tour on energy efficiency and renewable energy sources, which was orga nized to LVR-Klinik, Bonn.
- A publication entitled *Energy efficiency and renewable energy sources – A manual for managers in the health sector* was developed and published in December 2011 in three languages: Macedonian, English and Albanian.
- Training was organized for health managers, as well as medical and non-medical personnel, on the importance of energy efficiency in the health sector.
- Activities were put in place to raise the awareness of health managers, as well as medical and non-medical personnel, on the importance of energy efficiency in the health sector.

Early information on climate-related infectious disease risks at municipal and national levels:

- *Guidelines on climate change and communicable diseases – A manual for health workers* was developed and published in three languages (Macedonian, English and Albanian) to increase awareness of health professionals and the general population about the risks from infectious disease outbreaks.
- Over 300 epidemiologists, infectious diseases and hygiene specialists and other health professionals received training related to climate change and communicable diseases.
- Numerous expert missions and training workshops, seminars and confer ences have been carried out.

Activities on building media capacities on issues related to climate change and health (workshops, field visits, production of videos, etc.) have been organized:

- A group of fifteen young journalists was created, who had expressed willingness to cooperate in a network of young journalists who focus on health and environment issues, with the emphasis on climate change.

Partnership between agencies and ministries has been built, and coordintion has been improved. Information sharing and training, capacity building and improved public awareness are essential.

PROTECTING HEALTH FROM CLIMATE CHANGE IN THE REPUBLIC OF MACEDONIA

Compendium of project documents and leaflets

THE EFFECTS ON HEALTH OF CLIMATE CHANGE

Kendrovski V. Spasenovska M.

Climate-change-associated diseases are estimated already to comprise 4.6% of all environmental risks. Climate change is expected to increase the burden of climate-sensitive diseases such as heat-related illness, vector-borne disease, diarrhoeal disease, injuries from extreme events, and respiratory diseases. The Republic of Macedonia was the country most affected by disasters in Europe in 2007, with a rate of 488 affected people per 1000 inhabitants, which means that almost half of the population was affected by wildfire. During July 2007, daily temperatures reached 43 °C and caused more than 200 fires destroying over 2000 hectares of forests, and almost 1000 excess deaths. Under conditions of heat–-wave, an increase of temperature of 1 °C above the heat cut-point (30.8 °C) leads to an increase in mortality of 4.8%.
About 10% of the population still lacks access to clean and safe water, be it for drinking or for meeting their basic needs. In addition, there are year-on-year growing trends for certain groups of communicable diseases, especially those associated with contaminated food and water (salmonellas, alimentary toxic infections, shigelloses). Recent studies on foodborne diseases show that disease episodes caused by Salmonella bacteria increase by 5–10% per each degree Celsius rise in temperature. During 1991–2008, 6969 cases of salmonellosis were reported, with total morbidity of 340.3 per 100 000, or an average of 387 cases a year, with an increasing trend in recent years.
The study on the climate change impact on pollen found out that the prevalence of sensitivity to standard pollen allergens in Skopje shows an increase from 16.9% in 1996 to 19.8% in 2009/2010.
Each chapter of this report referees to a specific climate change health- associated risk, summarizing the main points and putting forward a number of recommendations for mitigating the effects of climate change on health, including the need for the Government to focus on this problem and the measures which individuals can take to mitigate the effects of climate change on their health, as well as the need for further research.
The document recommends proactive steps to engage people and communities in the Republic of Macedonia to develop resilience and capacity to prepare for changing climate conditions and extreme weather events.

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Protecting health from climate change – A seven countries initiative

CLIMATE CHANGE HEALTH ADAPTATION STRATEGY AND ACTION PLAN

National Climate change health steering committee.

Identifying areas where vulnerability is particularly high – threats that exhibit distinct climate sensitivity – can help clarify where efforts to increase adaptive capacity should be focused. Poor communities, without access to good health protection and support from the social sector, are more susceptible to the unpleasant health effects that arise from the climate and other changes in the living environment. In the coming decades, a decrease in the percentage of the total average monthly morbidity in the country is expected in some of the colder months (January 4%, October 4% and November 2%) as a result of climate change. On the other hand, the direct health effects of heat-waves could be a significant problem, especially in the context of increased urbanization. More than 60% of the population lives in the cities. According to projected scenarios for mortality trends in the country and in Skopje for the period after 2035, an increase in average monthly temperatures of only 1°C compared to the period 1996–2000 will significantly influence the distribution of total mortality expressed as a monthly average. This increase in the monthly mortality rate would be higher in the months of April, May and June (4–11%) and on average 10% higher compared to the period April, May and June 1995–2004. People with chronic diseases, especially cardiovascular and respiratory diseases, have a high risk of increased mortality during heat-waves.
On the basis of analysis made in the vulnerability assessment report, the Climate Change Health Adaptation Strategy and Action Plan was developed and endorsed by the Government in February 2011 with the following priority domains of action:

- Raising awareness of climate change and the effect on health in the Republic of Macedonia;
- Identifying, registering and monitoring risks connected with climate change and their influence on people's health; and
- Improving the health system in its promotion and prevention activities.

The general goal of the Strategy is to plan climate change adaptation measures for the health system in order to prevent and/or overcome both existing and future risks and to respond promptly to the risks and problems for people's health and well-being that are expected as a result of climate change in the Republic of Macedonia.
The implementation of the Health Sector Adaptation Strategy for climate change will be monitored and evaluated regularly, and the Ministry of Health and the other institutions in authority will monitor the flow and dynamics of the implementation of the activities and will suggest any necessary changes for achieving the defined goals.

WHOLIS: e95094

HEAT – HEALTH ACTION PLAN TO PREVENT THE HEALTH OF THE POPULATION FROM HEAT WAVES

National Climate change health steering committee.

The absolute highest air temperatures in the Republic of Macedonia were recorded in July 2007: 43.5 °C in Štip, 45.3 °C in Gevgelija and 45.7 °C in Demir Kapija. The evidence shows that over the last fifteen years, the number of days with maximum temperatures higher or equal to 30 °C (tropical days), days with maximum temperatures higher or equal to 35 °C (hot days), and the number of days with minimum air temperatures higher or equal to 20 °C (tropical nights) have increased. The Macedonian Government declared a nationwide heat-wave emergency in 2007. During July, daily temperatures reached 43 °C and caused more than 200 fires destroying over 2000 hectares of forests, and almost 1000 excess deaths (compared to the averages for 1994–2008).

This document provides a summary of key measures to be undertaken by the responsible sectors and institutions to decrease morbidity connected with heat-waves through issuing heat and health warnings, to encourage planning in the relevant sectors, to raise the public's and health workers' awareness, as well as to mobilize the resources for managing the heat effects.

The action plan consists of a string of previously agreed activities, to be carried out by the health and other institutions included in the plan, in order to raise the awareness of heat risks, as well as activities connected with the preparations to be put in place by the institutions and the population in order to reduce the risks. Furthermore, the plan gives guidance for the responsibilities of the institutions and individuals for taking measures after the announcement of a heat-wave by the Hydrometeorological Institute.

WHOLIS: e95093

CLIMATE CHANGE AND COMMUNICABLE DISEASES. A MANUAL FOR HEALTH WORKERS

Kendrovski V., Karadzovski Z., Milenkovic Z., Kostovska J.

The link between weather impacts and infectious diseases has led to the development of scenario models to predict the expansion of infectious diseases due to climate change. Changed lifestyles, food production, modern urban planning, climate change and variations in the quality of the environment increase the danger of expansion of zoonoses. Investigation of the relationship between environmental temperature and reported salmonella infections among the population in five cities (Skopje, Kumanovo, Bitola, Strumica and Veles) shows seasonal patterns of salmonella infections, with a peak in the summer months after the peak temperatures. For Skopje, an increase in the weekly temperature of 1 °C above detected threshold of 17.9 °C is associated with a 2.8% increase in salmonellosis cases. The primary goal of this manual is to raise the awareness of health-care practitioners, at national, regional and local level, regarding the health risks related to climate change and communicable diseases. Reducing the effects of communicable diseases related to climate change requires continuous epidemiological surveillance, as well as preparedness to take immediate epidemiological measures to respond to the threats. Furthermore, consideration should be given to investigating the routes of transmission and improving the safety of drinking water and food, controlling the insects and vectors that transmit disease, as well as providing a rapid response by the public health sector in the event of outbreaks. The activities encompassed by the health care sector should include strengthening the capacities of health care practitioners and strengthening the laboratory diagnostic system for identification and diagnosis; obtaining knowledge; adaptation; and health promotion.

WHOLIS: e95095

ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES IN HEALTH SECTOR–MANUEL FOR MANAGERS AND HEALTH PROFESSIONALS

Dimitrov K., Ilievski Z., Markovska N., Kendrovski V., Spasenovska M., Kisman M.

The general hospitals in Shtip and Gostivar are piloting the implementation of measures to reduce greenhouse gas emissions by the health sector. This is achieved by improving energy efficiency and introducing renewable sources of energy. Solar thermal collectors were installed in the two pilot hospitals. Total energy savings are estimated at 233721 kWh/year. Cost per emission reduction is estimated at 4.33 €/tCO_2.
The primary objective of this Manual is to raise awareness and knowledge among the managers and health workers in the health sector in the Republic of Macedonia, at national, regional and local level, of the importance of energy efficiency in health-care facilities and the possibility of using renewable energy sources. By increasing energy efficiency in all its various institutions, the health sector can directly contribute to the reduction of greenhouse gas emissions, thus significantly mitigating them. The main motivating factor for the health sector to make the shift towards energy efficiency, i.e. mitigation of emissions and adaptation, is the fact that it is a win-win situation in terms of protection of the environment and improving population health.

ISBN 978-608-4518-21-1

STUDY ON PRESENCE OF AEDES ALBOPICTUS IN THE REPUBLIC OF MACEDONIA

Stefkov G., Hristovski S., Prelik D., Gjorgjievska Cvetkovska A., Mitev T.

Climate is an important factor for the distribution of vectors, in addition to other factors such as the destruction of their habitats, pest control and the density of hosts. Recently, some vector-borne diseases sensitive to climate change (e.g., Lyme disease, malaria) have been reported in neighbouring countries and other infections have occured in the country (e.g., West Nile fever).The main purpose of this study was (1) to investigate presumable presence and possible distribution of Aedes albopictus in the country as a potential disease vector; (2) to establish a European network for sharing information about the species; and (3) to propose recommendations for monitoring its further dispersement in the Republic of Macedonia.
In today's global economy and changing climate, disease vectors have the opportunity to invade new regions with unprecedented frequency, and with concomitant impacts on global human health. Preparedness and prevention requires integrating knowledge of invasion biology and vector ecology.

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Protecting health from climate change – A seven countries initiative

CLIMATE CHANGE IMPACTS ON POLLENS AND ALLERGY RESPIRATORY DISEASE DISTRIBUTION AMONG ADULTS IN SKOPJE- RESULTS OF THE STUDY

Karadzinska Bislimovska J., Kendrovski V., Minov J., Milkovska S., Kisman M., Spasenovska M.

Plants, a source of many clinically important allergens, are particularly sensitive to climate change as a result not only of their response to changes in maximum temperature, as reported in the study, but also to rainfall and other climate variables. The impacts of climate change on aeroallergens, and in particular pollen, as a result of higher temperatures in the coming decades will include impacts on pollen production and pollen season, the airborne pollen spectrum, the weekly dynamics of the most important taxa, the influence of maximum temperature and the changing distribution (onset of flowering, maximum and end of the seasons). The weekly pollen count for Platanus, Urticaceae, Betula, Quercus, Fraxinus, Plantago, Chenopodiaceae and Poaceae in 1996, 2003, 2007 and 2009 within the city of Skopje was related to the average weekly maximum temperature. Generally, distribution of pollens increases during three main periods and will also have the potential to increase the risk of allergy: early spring (March), with Cupressaceae, Fraxinus and Poaceae; spring (April–June), characterized by Platanus, Betula and Quercus pollens; and summer (July–August), characterized by Urticaceae, Plantago and Chenopodiaceae pollens, which are the main cause of allergies during these months. The prevalence of sensitivity to standard pollen allergens in Skopje during the same period shows an increase from 16.9% in 1996 to 19.8% in 2009/2010.

ISBN 978-608-4518-28-0

WHAT TO DO IN A HEAT-WAVE?
General information for the public during the heat waves;

WHAT TO DO IN A HEAT-WAVE?
Recommendations for general practitioners;

WHAT TO DO IN A HEAT-WAVE?
Recommendations for managers of health, social and educational institutions;

WHAT TO DO IN A HEAT-WAVE?
Recommendations for protection of workers' health during heat waves;

CONCLUSION

Thanks to the financial support from Germany, significant steps towards reducing the influence of climate change on the health of the population in the Republic of Macedonia have been undertaken. These steps are very important for the country, where in the last two decades very little has been done in this field.

The project ends in March 2012 having reached its objectives:

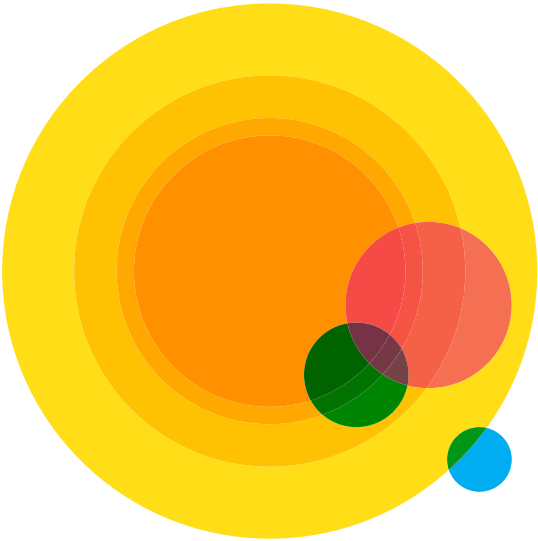
- Health impacts of climate change have been assessed and a coherent set of recommendations for intersectoral policy-making developed.
- Heat health action plans and system for timely announcement of heat-waves have been established.
- Two medical facilities have been equipped with solar systems to pilot energy efficiency and self-sustainability in areas vulnerable to summer heat, enabling decreased CO_2 emissions.
- Awareness of health professionals has been raised on the issues related to climate change and communicable diseases, and guidelines on climate change and communicable diseases have been developed and published.

Climate change poses great challenges and it is important to plan ahead for the consequences for health. The document Effects on Health of Climate Change recommends proactive steps to engage people and communities in the Republic of Macedonia to develop resilience and capacity to prepare for changing climate conditions and extreme weather events in ways that promote and protect public health and safety, protect and enhance our natural resources and environment, and promote an equitable and prosperous society.

However, it must be clearly understood that the health sector alone cannot carry out the tasks identified. Success will only be achieved through the total involvement of all governmental, private and nongovernmental sectors.

The overall implementation of actions will require substantial financial and other resources. As climate change is a cross-cutting issue, various sources of funds can be tapped. In addition, donor funding is available for various aspects of climate change work. The country needs to develop a framework to effectively access and manage these funds. While it is extremely important to understand the reality and constraints of the country's economy, no door must be closed to any action based on sound economic principles which can bring tangible benefits to the country and its people. Both physical and economic vulnerability are relevant.

Future financial support in the area of climate change and health will be necessary for the country to monitor the adaptation of the national climate change adaptation plan, to continue to build the technical capacities, to support development of a cold weather early warning system as well as to continue the work in the area of energy efficiency in the health sector.



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