

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

Member States

Albania
Andorra
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
The former Yugoslav Republic of Macedonia
Turkey
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

5072464

ISBN

WHOLIS number

Original:

**World Health Organization
Regional Office for Europe**

Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark

Tel.: +45 39 17 17 17. Fax: +45 39 17 18 18. E-mail: postmaster@euro.who.int

Web site: www.euro.who.int



EUROPE



Housing, Energy and Thermal Comfort

**A review of 10 countries within the
WHO European Region**



HOUSING, ENERGY AND THERMAL COMFORT

**A review of 10 countries within the
WHO European Region**



ABSTRACT

The impact of climate and temperature on health has been receiving increased attention in recent years. Although a precise assessment of the burden of disease caused by low indoor temperatures is not yet available, indoor thermal discomfort and fuel poverty may be of great importance in many European countries.

The report summarizes a project on the health impact of low temperatures based on a review of 10 European countries. Based on the available evidence, the phenomenon of excess winter deaths is significantly related to housing characteristics. A considerable number of death cases could therefore be reduced through adequate housing standards, heating systems and energy supply.

Based on the review of the country policies and the scientific evidence, available policy options and intervention strategies addressing this issue are discussed and recommendations for national policies on housing, energy and thermal comfort are made.

Keywords

HOUSING - STANDARDS
HEATING - STANDARDS
ENVIRONMENT HEALTH
DATA COLLECTION
FRANCE
GERMANY
IRELAND
KAZAKHSTAN
KYRGYZSTAN
LITHUANIA
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA
THE NETHERLANDS
SLOVENIA
UNITED KINGDOM

EUR/06/5072464

Address requests about publications of the WHO Regional Office for Europe to:

Publications
WHO Regional Office for Europe
Scherfigsvej 8
DK-2100 Copenhagen Ø, Denmark

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the WHO/Europe web site at <http://www.euro.who.int/pubrequest>.

© World Health Organization 2007

All rights reserved. The Regional Office for Europe of the World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Where the designation "country or area" appears in the headings of tables, it covers countries, territories, cities, or areas. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use. The views expressed by authors or editors do not necessarily represent the decisions or the stated policy of the World Health Organization.

CONTENTS

	<i>Page</i>
Introduction	1
Evidence review	1
Review of housing and thermal comfort policies	4
Data collection, methods and definitions	7
Housing policies and thermal comfort	8
The Way Forward	9
Conclusions of the meeting	10
Evidence	10
Defining the problem	10
Interventions and policies on protection	10
Other definitions and recommendations	12
The Future	12
Annex 1 - Scope and Purpose.....	13
Annex 2 - Programme.....	14
Annex 3 - Participant list.....	16
Annex 4 - List of WHO publications on thermal comfort ranges and health.....	19
Annex 5 - Meeting contributions.....	20
Annex 6 - Country data on excess winter deaths	21
Annex 7 - Overview of country information on housing, energy and thermal comfort.....	22

Introduction

This document summarizes a review of housing, energy and thermal comfort in 10 Member States of the WHO Regional Office for Europe. The presented information is drawn from expert contributions and discussions at a WHO expert meeting held at the European Centre for Environment and Health (ECEH) in Bonn, Germany, on 9th and 10th October 2006. The meeting was supported by the German Federal Ministry of the Environment and carried out by the housing program of the WHO ECEH.

The objectives identified for the expert meeting were:

- a) To present the existing evidence on the health impacts of low temperatures in the home setting.
- b) To review and discuss policy responses and countermeasures in selected countries, with particular reference to the criteria used for identifying affected households.
- c) If possible to find consensus on general approaches and recommendations.

Evidence review

1. Global Climate Change – Current Evidence

Simon Hales, ECEH Rome office

Simon Hales outlined the causal pathways of climate change and how it can affect health. He discussed the implications of climate change for housing and outlined some of the projected changes in the climate. He reported on projects investigating the short term relationship between temperature and mortality and on current estimates of the Burden of Disease attributable to climate change in Europe.

There are two causal pathways connecting housing, climate and health: (a) modification of the health effects of weather extremes (predominantly a local, short-term effect) and (b) burning of fossil fuels for home heating and cooling leads to emission of greenhouse gases (principally CO₂) which has a long-term effect on global climate.

Housing especially provides protection from temperature related illnesses and deaths. As energy use in housing contributes to climate change, improvements in energy efficiency had two potential benefits – (1) by avoiding extremes of temperature, it protects the health of the occupiers for affordable costs; and (2) by reducing energy use it reduces the contribution to climate change from the housing sector.

Data given in the presentation clearly showed that in Europe, under current conditions, the health effects of cold are more substantial than the effects of heat.

2. Fuel Poverty and Excess Winter Deaths in Relation to Housing Conditions – the UK Experience

Geoff Green, Sheffield Hallam University, UK

Firstly Geoff Green gave a review of the situation in the UK which had led to research studies on cold homes, the UK Fuel Poverty Strategy and the Warm Front initiative. The Warm Front project included measures of thermal insulation and heating improvements and its findings supported the hypothesis that improving the energy efficiency of housing does reduce fuel

poverty; advance thermal comfort, improve health, and thus provides less demand on the health services.

Geoff Green stated that there was clear evidence that excess winter mortality is temperature related, especially in elderly, and that the risk is widely distributed and not closely related to socio-economic status. In the UK the problem is much more linked to the age of the houses- the older the house, the less energy efficient, and so the greater the risk. As well as reducing the threat to physical health, improving the energy efficiency has psychosocial benefits, one of which is to make the whole of the house available (comfortable) for use by making heating affordable in all rooms.

However, in the UK it appeared that after intervention low temperature was chosen as an economic saving strategy by a significant number of households (20-25%). In some other cases the fuel consumption even increased, although the reason for this was not known.

It was mentioned that the effect of a good heating system is greater than the effect of thermal insulation, although the latter is more cost-effective due to reduced heating costs. Since the year 2000 over a million households have benefited from Warm Front at a cost of up to £4,000 (approx 6,000 Euros) per dwelling.

3. Ambient Temperature and Mortality – Data from Skopje, Macedonia

Vladimir Kendrovski, Republic Institute for Health Protection, Macedonia

After giving an overview of the geographical and demographical situation of Macedonia, Vladimir Kendrovski presented some findings from a study on the impact of ambient temperature on mortality among the urban population of Skopje. The objective of the study was to investigate the impact of the climate on health in a densely populated area in Macedonia during the period 1996 to 2000.

Vladimir Kendrovski outlined the fact that while the mortality rate in the urban area of Skopje increased during winter months, it varied considerably and different winters showed large variation of excess winter deaths.

The conclusion was that a part of the excess winter deaths could be prevented and that the general public should be made more aware of the problem of excess winter mortality in Macedonia.

4. Excess Winter Deaths in Eastern and Central Asian Countries

Kubanychbek Monolbaev, WHO Urban Environment and Health Officer, Kyrgyzstan

Kubanychbek Monolbaev reviewed the background of excess winter deaths in Europe, pointing out that warm climate countries show higher excess winter deaths rates compared to countries with more severe climates. He suggested that this may be because of a greater appreciation of cold such as adequate home heating, behavioural features and effective protection against cold by clothing in the colder countries.

Then he presented a study estimating excess winter deaths for the whole population in Central and Eastern Europe. The highest excess winter deaths rate were found in Bulgaria and the lowest rate in Kyrgyzstan.

Kubanychbek Monolbaev explained the logistical requirements for the climate and mortality data. The statistical data was often based on monthly and quarterly reporting systems and not on daily reported systems, making detailed analysis of temperature-mortality relationships difficult. In some cases the monthly statistics existed only for some regions and not nationwide. The available data could therefore only give an idea of the situation.

Discussion: What proportion of excess winter deaths could be prevented through adequate housing conditions?

At the beginning of the discussion it was mentioned that surveys within cities in Siberia did not report any excess winter deaths. This could be a result of housing regulations, clothing and better thermal insulation. For example in Scandinavian countries, people know about the severe climate and consider this before building a house or before going outside. This did not seem to have been the case in England in the past. However, it was reported that in Sheffield the excess winter deaths have decreased over the last ten years partially due to better housing and heating conditions. However, all participants agreed that the problem was quite complex because of the wide range of influencing factors.

Looking at the existing studies which provide a quantitative assessment of the number of excess winter deaths due to housing conditions, estimation would be that the attributable fraction of excess winter mortality related to inadequate housing is ca. 40%. Thus, a large number of excess winter deaths could be prevented through improved housing conditions, other relevant factors being lack of vaccination, lifestyle and clothing, etc.. However, it seems that the evidence so far is restricted to the UK and Ireland, with little data on other countries.

For identifying to what extent housing could be a causal factor for excess winter mortality, it was argued that first of all the focus of investigations should be on the national scale to identify the variation of the quality of the national housing stock and the related impacts on cold exposure and health. This suggestion was done because it is hard to compare different countries because of the lack of equal data, incomparable housing stocks and housing markets, and different factors like income and fuel prices. Better data is needed to compare countries in order to better inform national policies. WHO was requested to provide methodological advice on what data is required and how to collect it.

The experts agreed that the aim of this action is to alert governments to the problem and provide evidence that housing conditions are affecting health through thermal comfort problems. Once a country has identified its housing stock as more problematic than in other countries, scientific research may turn to the question why this is the case, and what housing characteristics are responsible. In conclusion, participants therefore agreed that comparing data within a country would be the right way to find evidence, but to make politicians aware of the issue, international comparisons would be needed.

Review of housing and thermal comfort policies

Access to Housing as a Social Right

Karl-Friedrich Bopp, Council of Europe

Karl-Friedrich Bopp introduced the Council of Europe and presented its key objectives, focusing on: Human rights; Democracy; Rule of Law and Social Cohesion.

He presented the CoE-developed policy guidelines referring to social rights and housing. At the end he introduced a future guideline on the contribution of housing policies for vulnerable groups to social cohesion that will be published in early 2007. Regarding the monitoring of compliance to the guidelines in the different countries, he said that the guidelines act like a kind of soft policy and were based on recommendations to the national experts.

He noted that definitions of energy efficiency and heating costs are not mentioned in the booklets.

National strategies / regulations / policies for preventing the population from indoor cold

[See Annex 5 for summaries for each country]

1. Country overview Ireland – Jonathan Healy

Firstly, Jonathan Healy gave an overview of the different programmes aimed at tackling fuel poverty in Ireland. The main anti-fuel poverty project is the Fuel Allowance. He said that in Ireland the rate of fuel poverty has fallen from 31.9% in 1995 to 19.7% in 2000. Nevertheless, he pointed out that excess winter deaths in Ireland are still among the highest in the EU.

A fuel poor household is defined as one that needs to spend more than 10% of its income to heat its home to an adequate standard of warmth (21°C in the living room and 18°C in the other occupied rooms, as recommended by the WHO).

2. Country overview UK – Jonathan Healy

Reviewing the UK fuel poverty strategies, Jonathan Healy pointed out that despite all the ambitious programmes there were still over 2 million fuel-poor households in the UK in 2003, with additional 1.5 million ‘vulnerable’ households. However, there had been a substantial fall of 4.5 million household since 1998 but excess winter deaths continue to be higher in the UK than the EU average.

The definition of fuel poverty was similar to the Irish definition, although slight variations do exist (also within the UK).

It was pointed out in the discussion that the term “fuel poverty” did not necessarily mean that the household was ‘poor’ in the traditional sense, and it was suggested to consider a definition that is less based on a concept of poverty and is more targeting the home. It was agreed that the risk factor was inadequate housing, and that fuel poverty is to be seen as a result and not as a cause.

3. Country Overview France – Didier Chérel

Didier Chérel explained that in France there are emergency mechanisms for people who cannot pay their energy expenses which are currently financed by the ‘Départements’, the State, energy suppliers and other social services. However, he said that each Département has its own financial policy and that no common support mechanism, as well as no nationally applicable criteria or definition for eligibility would exist. He also pointed out that in France the supplier can limit the

amount of energy to households unable to pay the bill, but that it would be illegal to cut the energy supply during the time a social worker is intervening.

Referring to energy efficiency for dwellings it was said that in France, for the last 25 years there have been controls on standards for new buildings. But, the problem would be the existing housing stock and, at the moment there would exist no programme to improve existing buildings. Therefore one step would be the energy certificate, obligatory in 2007 for dwelling transactions, because of its visibility and transparency.

4. Country Overview the Netherlands – Wouter Borsboom

Wouter Borsboom reported that in the Netherlands a new regulation prohibits energy suppliers from cutting off gas and electricity supply during winter time. In some regions energy suppliers could call for public assistance when private households have problems with payments.

For low-budget households, a large number of benefits are available (housing, health care etc.), but this is not the case for energy costs specifically. He noted that especially elderly people have problems making use of these benefits.

He outlined some national programmes for the reduction of energy in existing houses, and the regulations for lower energy consumption for new houses.

Wouter Borsboom also mentioned that there are no specific subsidies to reduce the cost of energy but that some direct support mechanisms to the poor would exist. Referring to future projects, he said that there were some plans to combine re-development of poor districts with energy savings.

5. Country Overview Germany – Barbara Litke

Barbara Litke gave an overview of the housing and rent statistics in Germany pointing out that 57% of German households are tenants. She said that energy standards in housing are controlled by the German energy saving ordinance ENEC 2002 and that energy saving measures are obligatory in the construction of houses.

The contract between landlord and tenant ensures that faults in dwellings have to be remedied by the landlord, and this included full liability for failures in the heating system as well as inadequate thermal insulation. Households dependent on social welfare can get the costs for accommodation and heating paid by the social welfare office at the municipality. However, other social support for heating expenses to vulnerable groups does not exist.

She also argued for increased transparency on heating costs as brought forward in the European Union through the energy certificate for buildings (EU Directive on the energy performance of buildings 2002/91/EC). In Germany the energy certificates from 01/2007 would have a positive effect.

Such certificates will be required whenever a new tenancy is initiated and when a dwelling or a house is sold. Based on the certificate, insulation and heating improvements of the rental housing stock may be anticipated, but how effective it will be for owner-occupied dwellings is not clear.

6. Country Overview Slovenia – Peter Otorepec

Two programmes aimed at tackling the public health effects of fuel poverty in Slovenia were explained by Peter Otorepec: the National policy programme and the Local Community Programme. He indicated that the National policy programme allows households to get a special annual support for fuel, meant for heating the home in cold seasons. Both the National policy

programme and the Local Community Programme focus on indirect support which means that the support payment is transferred to the energy provider and not to the household. It was noted, that during the winter months people on low incomes could apply for more subsidy in addition to the general support they received throughout the year. The criterion for the support would be the income and was not dependent on the temperature.

There is no national programme directed at improving housing.

He explained that the monthly mortality levels in Slovenia show an increase in cold winter months and that some of these deaths can be attributed to homeless people.

7. Country Overview Macedonia – Vladimir Kendrovski

Vladimir Kendrovski reported on the energy situation in Macedonia. He said that the Government of Macedonia is considering embarking on an Energy Efficiency and Renewable Energy Strategy.

He mentioned that in the Republic of Macedonia about 20% of the total population is below poverty line and that the average expenditure for heat and electricity is 14% of the available income. Furthermore Vladimir Kendrovski explained the Annual Programme for the realisation of the social protection for 2006 that would include the opening of the Centre for homeless people in winter for the urban area of Skopje. He noted that there would be no specific subsidies for fuel and energy, but some direct support paid to poor households.

8. Country Overview Lithuania – Irina Gudaviciene

Irina Gudaviciene introduced some projects addressing energy efficiency in the housing stock in Lithuania, the 'Demonstrational Project of Energy saving at home' and the 'Block of flats renovation programme'. The programmes provide a renovation of the old buildings, in which insulation is poor, to provide increased energy efficiency. However, the programme can only be advanced step by step due to the amount of funding available. In addition to the housing programmes, there is state support for low income households to ensure that they do not have to spend more than 20% of income on central heating expenses. No information was available on support to households without central heating systems.

Irina Gudaviciene also reported on a disaster that occurred in January 2006 when the temperature outside fell to -30 degrees, and there was a disruption to the central heating supply which was dealt with through national emergency agencies.

9. Country Overview Kazakhstan – Raushan Issayeva

Raushan Issayeva reported about the three types of heat supply in Kazakhstan: (a) the centralized heat supply with combined output of heat and electric power at thermal power plants; (b) the centralized heat supply from large regional boiler plants; and (c) the decentralized heat supply from independent systems for separate buildings or houses and small boiler plants for compact groups of consumers. All supply in Kazakhstan is governed by general laws which are also affecting the price level of energy. Direct support mechanisms exist for vulnerable groups as well as some heating renovation programmes. It was said that in Kazakhstan there was a dual system with subsidies for low-income groups and a limit on fuel costs.

10. Country Overview Kyrgyzstan – Mairamkul Turdumambetova

Mairamkul Turdumambetova stated that in Kyrgyzstan more than 60% of the population is below the poverty line. The measures taken by the Government could not improve the situation but still some direct support mechanisms to vulnerable households already exist, although there was no housing improvement programme. It was mentioned that circulatory diseases are the number one cause of mortality.

It was intended that the heating systems for the cities would shift to electrical heating as the country has resources to produce sufficient energy. In this context, electricity is seen as one of the cheaper energy resources, and the national focus would be more on production and less on the saving of energy.

Data collection, methods and definitions

In general, all participants agreed that one of the major challenges of cross-country comparison was how to classify and compare the different situations in the countries. It was furthermore agreed that - with the new mandatory energy certificates for housing within the EU countries, it will still be difficult to provide a comparable data set for each of the countries.

During the discussion, the distinction was made that for deriving evidence on the impact of thermal comfort and housing conditions on health, national comparisons would be the best solution as in such case there is no problem with varying housing stocks and regulations (which is a major problem for international comparison). Looking at the national level only, it could become feasible to identify the fraction of excess winter deaths that can be attributable to inadequate housing conditions and specific problems (such as bad heating, inadequate insulation, fuel poverty etc.) On the other hand, it was felt that – in order to highlight the issue and provide information on which countries may perform worse than others – the evidence on the threat to health and the amount of excess winter deaths should be provided on an international level. In this context, it was pointed out by the World Health Organization that data on excess winter deaths could be obtained relatively easily but that the major challenge was to link it to housing and then to create useful solutions. This statement was in line with the national experts presentations, as the evaluation part of national strategies and solutions was missing with the exception of the UK (Warm Front project).

It was therefore pointed out that more studies are needed to show that better and energy-efficient housing makes a considerable contribution towards protecting health.

For most countries, the reviews by the national experts provided evidence that fuel poverty was usually not defined. Definitions only existed in the UK and Ireland and used a threshold of 10% of available household income for heating expenses to identify fuel poor households. Several participants mentioned that the existing UK definition was not applicable internationally and that – in order to provide a more comparable indicator - WHO should propose a new definition not exclusively based on income. However, it was also suggested to distinguish between different purposes of the definition: If the aim of a fuel poverty study was to raise awareness and highlight a problem, the definition does not need to be as scientifically accurate as it needs to be if the aim is to identify people in need, or to monitor and detect trends over time.

In this context, it was also stated that the term “fuel poverty” is problematic as it focuses on a socio-economic understanding of being poor although empirical data shows that poverty and fuel poverty is not the same. Therefore, a new definition would be required that focuses on the

building as the major cause for fuel poverty (and consistently also as the target of mitigation strategies), and not the socio-economic status of the household.

Housing policies and thermal comfort

Objective of the discussion was the question to what extent housing-related strategies could be considered for preventing health threats from cold dwellings and/or fuel poverty. Referring to the effects on health it was generally agreed by the meeting participants that it is important to provide support to people who are vulnerable in order to save lives and protect health. Despite the focus of the meeting on housing factors, it was noted that thermal comfort in dwellings depends upon energy policy as well as the quality of housing. Therefore, it is important to consider energy policy, including access to clean, affordable energy sources, as well as housing factors.

Based on the diverse approaches presented by the national experts, it was agreed that a distinction should be made between ‘subject-oriented strategies’ (focusing on support to the household) and ‘object-oriented strategies’ (focusing on an improvement of the dwelling). The key question was whether a consensus could be found on a common approach that would take advantage of both approaches.

Quick consensus was reached that in general terms, thermal regulations for the renewal of the existing housing stock and better thermal regulations for new buildings were required. It was agreed that the biggest problem is upgrading the energy efficiency of the existing housing stock rather than new buildings which can be required to be built according to better standards.

In this context, it was agreed that an energy certificate was an important first step to a more transparent market but that it would be far from sufficient (depending on their scope, such certificates can still be vague; they may have different threshold values in different countries; and they do not include owner-occupied dwellings).

Looking at that the best way to deal with subject- and object-oriented strategies, the participants then discussed whether repeated social support to vulnerable households are a sustainable mitigation strategy. The conclusion was drawn that - as the key risk factor is the “inadequate housing” - the necessity for improved energy performance and ‘object-oriented policies’ (towards upgrading existing housing) needed to be inserted into the practice of ‘subject-oriented policies’ of support. It was suggested that the provision of financial support to a household for fuel expenses could be linked to the requirement to undertake housing improvements to increase the energy performance of the building.

It was a strong consensus that improving the housing stock is the only efficient way to affect the problem in an adequate manner. Therefore, object-oriented subsidies (support to the renovation of the housing stock) would provide the appropriate mechanisms leading towards a long term solution, while subject-oriented subsidies were necessary and useful only as a short-term solution to avoid acute health risk.

Another part of the discussion focused on the mechanism of tariff control and energy price reduction which was applied by few countries. Although this strategy reduces energy expenses for the population, it was not considered a suitable solution as it is detrimental to any attempt to provide a more energy-efficient housing stock and will rather increase energy consumption due

to artificially reduced prices. In addition, such interventions support the whole population but make it less feasible to specifically support vulnerable households.

The Way Forward

Based on the discussion of evidence and existing policies, the question was raised how WHO could best provide support to its member states, and which kind of WHO service the experts would find useful for national governments.

One suggestion by the experts was the provision of clear methodological advice on the calculation of excess winter deaths, and the publication of national estimates through WHO in order to highlight the problem and raise awareness.

On the complexity of defining fuel poverty, it was discussed whether a common or a national definition would be more useful. It was pointed out that one single definition would probably not work for all of Europe. It was therefore suggested that it could be defined in different quantitative or also in qualitative ways, not fixed on the income but – for example – asking how many rooms of the dwelling a household is able to heat in winter time. The development of such an indicator on “fuel poverty”, “fuel precariousness” or “cold dwellings” was seen as a potential task for WHO in order to provide methodological advice to countries on how to assess the problem on national level. As a minimum advice, it was asked to define the key criteria to identify the fuel poor (leaving out the decision on thresholds). However many experts felt that the provision of a clear WHO definition would help to create an action level for national governments.

It was furthermore noted by some experts that the existing WHO references and recommendations for safe temperature ranges (18-22°C, depending on room function) are weak and not well known to the public as well as to policy-makers, and are sometimes even ignored by scientists quoting scientific publications instead of the WHO recommended values. It was seen as a useful task for WHO to strengthen those references, to review their scientific validity and most of all to make them more accessible. In addition, the experts suggested that WHO could provide advice on which room(s) in which temperatures should be measured to have health-relevant exposure data indicating the thermal comfort in the dwelling.

In general terms, the experts agreed that WHO should provide detailed references on the health effects of cold dwellings and promote research on how to mitigate fuel poverty and inadequate thermal comfort. It was clearly stated that – in order to raise awareness of political actors – evidence must be provided that shows the health benefit of housing improvement, and it was common understanding that currently there is significant lack of information on this issue. Therefore, it was suggested that the focus of the work should be on the integration of health arguments into housing policies with evaluation of housing interventions and support strategies as an integral part.

Finally, a WHO framework statement or concept paper on healthy housing was seen as a helpful document on a long term perspective. The proposal was made that the WHO could develop guidelines for healthy housing, addressing a variety of issues not covered by the meeting.

Specifically on the topic of thermal comfort, it was recommended that the WHO provides a clear position on thermal comfort. It was also mentioned that WHO guidelines should consider specific recommendations on the population over 65 years of age.

Conclusions of the meeting

Evidence

As yet there is little direct evidence concerning health effects of indoor temperatures. However, there is sufficient robust evidence of the relationship between ambient (outdoor) temperatures and mortality, and some studies showing that a substantial proportion of these excess winter deaths (suggested proportion is at 40%) are related to inadequate housing conditions. This evidence is based on UK and Ireland and is more than sufficient to justify action by countries aimed at reducing the likelihood of households being exposed to low indoor temperatures. The health costs to the populations justify action, and housing intervention will reduce those costs.

The meeting discussion indicated that there is a great need for studies to assess the health impact of thermal insulation and housing improvement in order to provide the necessary evidence to policy-makers and housing practitioners.

Defining the problem

The term 'Fuel Poverty' is widely used, but it is more a symptom and implies that the problem as well as the solution is related to the individual or the household. The solution would be to e.g., relieve the 'poverty' by making sure the 'fuel poor' can afford to obtain sufficient fuel. It also implies that there is some relationship between socio-economic status (which is not supported by some empirical evidence which found a much stronger relevance of housing conditions). Perhaps another term would help acknowledge that fuel poverty is a symptom rather than the cause (e.g., 'Cold Homes' or 'Energy Precariousness'), and put the focus on inadequate housing as the fundamental problem.

Based on the expert opinions at the meeting, it appears that a pan-European definition of 'Fuel Poverty' would not be useful. It may be more appropriate to give guidance on the factors to be taken into account in developing a national definition.

Interventions and policies on protection

Given the trends of recent years, the cost of energy will most likely not go down, but will rather continue to rise. Without housing interventions, the number of excess winter deaths will increase as will the number of individuals (at present unquantified) suffering adverse effects on health caused by low indoor temperatures.

Housing interventions are suitable means to –

1. Reduce excess winter deaths, and provide better health generally.
2. Reduce the demands made on health services.
3. Reduce the contribution to climate change from domestic energy use.

The meeting identified two possible targets for housing intervention:

1. **Subject – targeted interventions** focused on householders and intended to try to ensure occupiers can afford to obtain sufficient energy to maintain their homes at healthy and comfortable temperatures.

This route can be broken down into three options –

- a. Subsidies paid direct to the householder. The intention being to supplement the householder's available finances, allowing the householder to purchase sufficient energy. This leaves control in the hands of the householder, who may decide to use the subsidy on energy or not.
- b. Payments made to the energy supplier for the householder's energy. This can cover the full cost of energy, or be a contribution. This is more likely to ensure that there is sufficient energy available or used.
- c. Control of the cost of energy by tariff or profit controls. This is intended to make energy available at a cost affordable by households.

This approach is necessary to protect vulnerable households and to avoid the immediate consequences of energy inefficient housing. It will reduce excess winter deaths and the prevalence of any other temperature-related health effect. However, it is to be considered as short term 'First Aid' measure and is not recommended as a long term solution: with energy prices expected to rise in the future, larger groups of the population may face the problem of being unable to pay for sufficient heating which will make the total costs of subsidies required higher every year without curing the actual problem.

It should be noted that there is a major disadvantage with option (c) in that it does not provide any incentive to improve the energy efficiency of housing and so does nothing to reduce the contribution to climate change from domestic energy usage.

2. **Object – targeted interventions** focused on improving the energy efficiency of housing to reduce the cost of maintaining healthy and comfortable temperatures.

First, the energy efficiency of new housing can be controlled through regulations. This approach will have benefits in the long term, but as existing housing makes up more than 90% of the housing stock of countries and the renewal rate is currently around 1% per year in many countries, the impact will be slow.

Action should - mostly but not exclusively - be directed at improving the energy efficiency of the existing housing stock, particularly of older housing which will be the most energy inefficient. This could involve improving and making more efficient the heating system as well as the ventilation options, improving the thermal insulation of the dwelling, or (ideally) both. Public awareness could be raised by adopting an energy rating 'labelling' system, where each dwelling is rated (similar to the energy rating system for appliances). Any intervention should be for all housing sectors – the public and the private sectors, and both the rented and the owner-occupied.

This approach cannot be immediately effective, but will in the long term provide a more effective solution than the subject-targeted approach.

The two approaches are not mutually exclusive, and ideally should be used in combination. The subject-oriented approach is most applicable to avoid the immediate health effects of energy inefficiency; while the object-oriented approach leads to a more permanent reduction in the

numbers exposed to threats to health from low indoor temperatures with a longer term vision. In addition, it helps to reduce the contribution to climate change from domestic sources.

Other definitions and recommendations

There is a need for a definition of what is a safe and healthy dwelling in general terms, and specifically of the recommended thermal comfort ranges. In this context, a strong position of WHO on the potential health effects of thermal discomfort is required.

In detail, the meeting asked WHO to investigate and provide information on –

- a) the temperature range for thermal comfort (taking into account possible differences between countries),
- b) the safe temperature range (the range to avoid negative health effects), and
- c) potential health effects (possibly updating the references given above).

Specific attention was requested for the thermal comfort ranges of the elderly population, and to collect data on the average percentage of heating expenditures of total household income within the poorer population groups.

A list of relevant references of WHO is provided as Annex 4.

The Future

WHO committed to providing details on sources of evidence and information that could be useful. WHO would welcome the opportunity to work with national experts and organisations to investigate housing energy issues and related health effects, and to promote national as well as international action to reduce the threats to health from low indoor temperatures.

ANNEX 1 - SCOPE AND PURPOSE

The impact of climate and temperature on health has been receiving increased attention in recent years, partially related to the global climate change and the number of extreme weather events. This is also the case for the impact of low temperatures, which can be reduced through adequate housing standards, heating systems and energy supply.

Although a precise assessment of the burden of disease caused by indoor thermal discomfort and fuel poverty is not yet available, low indoor temperatures may be of great importance in many European countries. Considering climate as well as economic and housing conditions, it may be expected that the situation is especially serious in the Eastern part of the WHO European Region.

To discuss the potential policy options and current actions addressing this issue, WHO convenes this expert meeting. Its main objective is to develop a better knowledge of the current strategies to address the problem of low temperatures in selected member states of the WHO Regional Office for Europe.

The agenda foresees to

- Present the evidence existing on the health impacts of low temperatures (in relation to housing conditions, to the extent possible)
- Review and discuss policy responses and countermeasures in selected countries.

A group of experts and national representatives will be convened by WHO in Bonn, Germany. The expert group will include scientists, policy-makers and practitioners.

ANNEX 2 - PROGRAMME

Monday, 9 October

10.30	Registration
10.45-11.00	Welcome address Introduction of participants, appointment of rapporteur, and adoption of agenda Objectives of the meeting
11.00	EVIDENCE SESSION (Chair: Jonathan Healy)
11.00-11.25	Simon Hales Global climate change – current evidence
11.25-11.50	Geoff Green Fuel poverty and excess winter deaths in relation to housing conditions – the UK experience
11.50-12.10	Vladimir Kendrovski Ambient temperature and mortality – data from Skopje, Macedonia
12.10-12.30	Kubanychbek Monolbaev Excess winter deaths in Eastern and Central Asian countries
12.30-13.30	Lunch break
13.30-14.30	Discussion What proportion of excess winter deaths could be prevented through adequate housing conditions?
14.30	POLICY SESSION I (Chair: Geoff Green)
14.30-15.00	Karl-Friedrich Bopp / Council of Europe Access to Housing as a Social Right
15.00-15.30	National strategies / regulations / policies for preventing the population from indoor cold <ul style="list-style-type: none">• Ireland and the UK (Jonathan Healy)• France (Didier ChereL)
15.30-16.00	Coffee break
16.00-17.45	<ul style="list-style-type: none">• The Netherlands (Wouter Borsboom)• Germany (Barbara Litke)• Slovenia (Peter Otorepec)• FYRO Macedonia (Vladimir Kendrovski)

- Lithuania (Irina Gudaviciene)
- Kazakhstan (Raushan Issayeva)
- Kyrgyzstan (Mairamkul Turdumambetova)

Tuesday, 10 October

9.00 **POLICY SESSION II**
 (Chair: Geoff Green)

9.00-10.30 Discussion on national examples

What are the main characteristics of the national strategies?
What are the main mechanisms that seem to be efficient?

10.30-11.00 Coffee break

11.00-12.30 Discussion

What housing-related strategies could be considered for preventing health effects as
a result of cold spells and/or fuel poverty?

12.30-13.30 Lunch break

13.30 **THE WAY FORWARD**
 (Chair: David Ormandy)

13.30-14.30 Exploring future projects

14.30-15.00 Summary of discussion
 Conclusions and recommendations

15.00 Closure of meeting

ANNEX 3 - PARTICIPANT LIST

Karl-Friedrich Bopp
Head of Access to Social Rights Division
Council of Europe
Directorate General III - Social Cohesion
Social Policy Department
Avenue de l'Europe
67075 Strasbourg Cedex
France

Wouter A. Borsboom
Building and Systems
Business Unit of TNO Built Environment and Geosciences
P.O. Box 49
2600 AA Delft
The Netherlands

Didier Chérel
Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME)
Sophia-Antipolis
500, route des Lucioles
06560 VALBONNE
France

Geoff Green
Professor of Urban Policy,
Centre for Regional Economic and Social Research
Sheffield Hallam University
City Campus, Howard Street
Sheffield S1 1WB
United Kingdom

Dr Irina Gudaviciene
Specialist
Emergency Situations Division
Health Emergency Situations Centre
Didzioji 7
01128 Vilnius
Lithuania

Dr Jonathan Healy
Policy and Research Analyst
Combat Poverty Agency
Bridgewater Centre
Conyngham Road
Islandbridge
Dublin 8
Ireland

Dr Raushan Issayeva
Kazakhstan State Medical University

51 Abbay str., App. 21
480091 Almaty
Kazakhstan

Dr Vladimir Kendrovski
Republic Institute for Health Protection
ul. 50 Divizija 6
1000 Skopje
The former Yugoslav Rep. of Macedonia
F.Y.R.O. Macedonia

Mrs Barbara Litke
Deutscher Mieterbund e.V.
Littenstr. 10
10179 Berlin
Germany

Dr Peter Otorepec
National Institute of Public Health
Ministry of Health
IV2 RS
Trubarjeva 2
1000 Ljubljana
Slovenia

Dr Mairamkul Turdumambetova
Chief Sanitary Physician of the Railway Administration of the Kyrgyz Republic
Krylova Str. dom 5a
720020 Bishkek
Kyrgyzstan

World Health Organization

Matthias Braubach
Technical Officer Housing and Health
WHO European Centre for Environment and Health, Bonn office
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

Simon Hales
Global Change and Health
WHO European Centre for Environment and Health, Rome office
Via Francesco Crispi 10
00187 Rome
Italy

Nadja Kabisch
Intern, Housing and Health
WHO European Centre for Environment and Health, Bonn office
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

Dr Rokho Kim
Scientist, Housing and Noise
WHO European Centre for Environment and Health, Bonn office
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

Dr Kubanychbek Monolbaev
WHO Urban Environment & Health Officer
Frunze Str. 535
State Department of Sanitary -Epidemiological Surveillance,
Ministry of Health
720033 Bishkek
Kyrgyzstan

David Ormandy
Scientist, Housing and Health
WHO European Centre for Environment and Health, Bonn office
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

Nuria Aznar
Programme Assistant
WHO European Centre for Environment and Health, Bonn office
Hermann-Ehlers-Str. 10
53113 Bonn
Germany

ANNEX 4 - LIST OF WHO PUBLICATIONS ON THERMAL COMFORT RANGES AND HEALTH

Guidelines for healthy housing

Author: Ranson, Ray P.

Publisher: WHO Regional Office for Europe

Year: 1988

Accessible in two parts at:

http://whqlibdoc.who.int/euro/ehs/EURO_EHS_31_part2.pdf

http://whqlibdoc.who.int/euro/ehs/EURO_EHS_31_part1.pdf

Indoor environment : health aspects of air quality, thermal environment, light and noise

Author: World Health Organization. Environmental Health in Rural and Urban Development and Housing Unit.

Publisher: World Health Organization

Year: 1990

Accessible at:

http://whqlibdoc.who.int/hq/1990/WHO_EHE_RUD_90.2.pdf

Health impact of low indoor temperatures : report on a WHO meeting, Copenhagen, 11-14 November 1985

Author: World Health Organization. Regional Office for Europe

Publisher: WHO Regional Office for Europe

Year: 1987

Accessible at:

http://whqlibdoc.who.int/euro/ehs/EURO_EHS_16.pdf

ANNEX 5 - MEETING CONTRIBUTIONS

The original background documents / country reviews provided by the experts can be requested from WHO by email. Statements and opinions in these documents are those of the respective authors and do not necessarily represent WHO position.

For requesting the background documents, please contact Ms Nuria Aznar at naz@ecehbonn.euro.who.int

ANNEX 6 - COUNTRY DATA ON EXCESS WINTER DEATHS

Estimated number of Excess Winter Death cases (EWD) by country per year

Country	Coverage of years	Average number of EWD per year
Germany	1992-2003	32.119
Poland	1991-2002	14.680
Portugal	1991-2003	9.047
Romania	1991-2004	17.538
Turkey	2001-2003	8.622
F.Y.R.o. Macedonia*	1995-2004	884

The data on mortality comes from the national statistical centers.

* Data for the Former Yugoslav Republic of Macedonia has been provided by Vladimir Kendrovski.

An article with additional data for Lithuania, Kyrgyzstan, Armenia and Bulgaria has been submitted to a scientific journal and is being peer-reviewed.

The approach towards identifying excess winter deaths is described in: WHO Environmental Health Series, No 16, 1985: Health impact of low indoor temperatures: report on a WHO meeting (page 16), available at: http://whqlibdoc.who.int/euro/ehs/EURO_EHS_16.pdf.

The definition of excess winter deaths - as used in this document - is the number of deaths in winter months over the average for the other seasons. In the Northern climates, EWD are deaths occurring in the four months December to March minus the average number of non-winter deaths (i.e. the deaths occurring in the eight months April to July of the current year and August to November of the previous year; divided by two).

For further information, see: The Eurowinter Group (1997): Cold exposure and winter mortality from ischaemic heart disease, cerebrovascular disease, respiratory disease, and all causes in warm and cold regions of Europe. In: Lancet 349: 1341-1346.

For calculation, all causes of mortality by month are being used.

Further information is available at: http://www.euro.who.int/Housing/Activities/20041013_3

ANNEX 7 - OVERVIEW OF COUNTRY INFORMATION ON HOUSING, ENERGY AND THERMAL COMFORT

		France	Germany	Ireland	Kazakhstan	Kyrgyzstan	Lithuania	T.F.Y.R.o. Macedonia	The Netherlands	Slovenia	United Kingdom
Is there data on...	Housing Energy Efficiency	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes
	EW Mortality	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
	EW Morbidity	No	No	Yes	No	No	No	No	Yes	No	No
	Number or % of households affected by Fuel Poverty	No	No	Yes	No	No	No	No	No	No	Yes
	Number or % of households disconnected from energy supply	No	No	Yes	No	Yes	No	No	Yes	No	No
	Number or % of population below poverty threshold	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Policies and Laws	Are there energy efficiency requirements for new dwellings?	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes
	Are there energy efficiency requirements for renovation of existing dwellings?	No	Yes	Yes	No No	No	Yes	No	No	No	Yes
	Is there control of fuel prices (tariff control) through the government?	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No
	Are there awareness campaigns to inform and affect heating and ventilation behaviour?	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
Are there subsidies...	Toward energy costs for eligible households	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Toward cost of upgrading the energy efficiency of housing	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes
Is it possible for...	A supplier to disconnect a household from the energy supply in case of non-payment	No	Yes	Yes	No	Yes	No	Yes	No	No	No
	A municipality to require upgrading of the energy efficiency of a building	No	No	Yes	Yes	No	No	No	No	No	Yes
Definitions etc	Is there a definition of 'Fuel Poverty'	No	No	Yes	No	Yes	No	No	No	No	Yes
	Are there national criteria for eligibility for subsidies toward energy costs?	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes

NB - Comments and explanations to each answer are only visible in the Electronic Excel Format