

HEALTH EFFECTS OF CLIMATE CHANGE AND ADAPTATION MEASURES IN THE UK



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Background



Health Effects
of Climate
Change 2002

Health Effects
of Climate
Change 2008

Health Effects
of Climate
Change 2012

UKCIP02

Climate Change Act
2008

UKCP09

Climate Change Risk
Assessment
January 2012

National Adaptation
Programme
2013

Committee on
Climate
Change

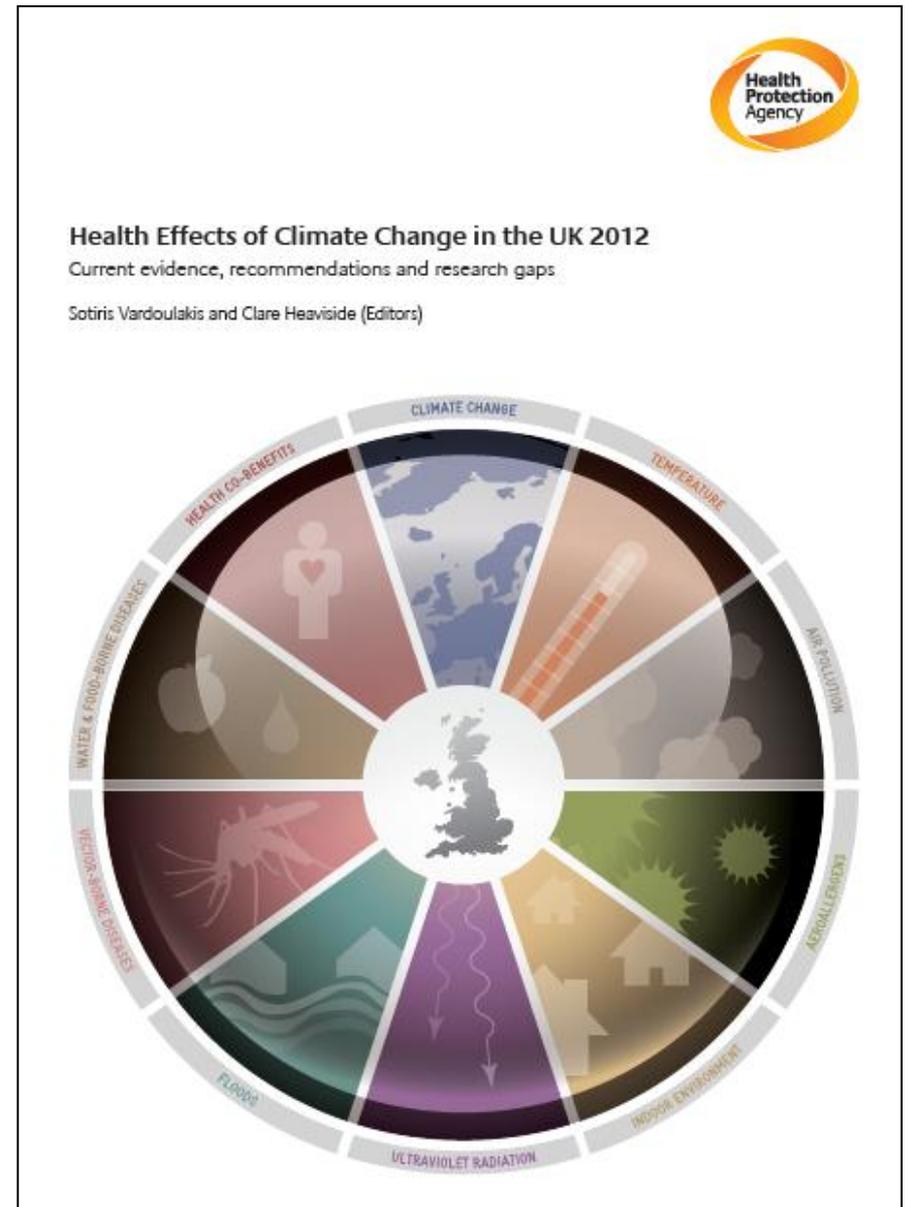
Adaptation
Economic
Assessment

Health Effects of Climate Change in the UK (2012)

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10. Health co-benefits

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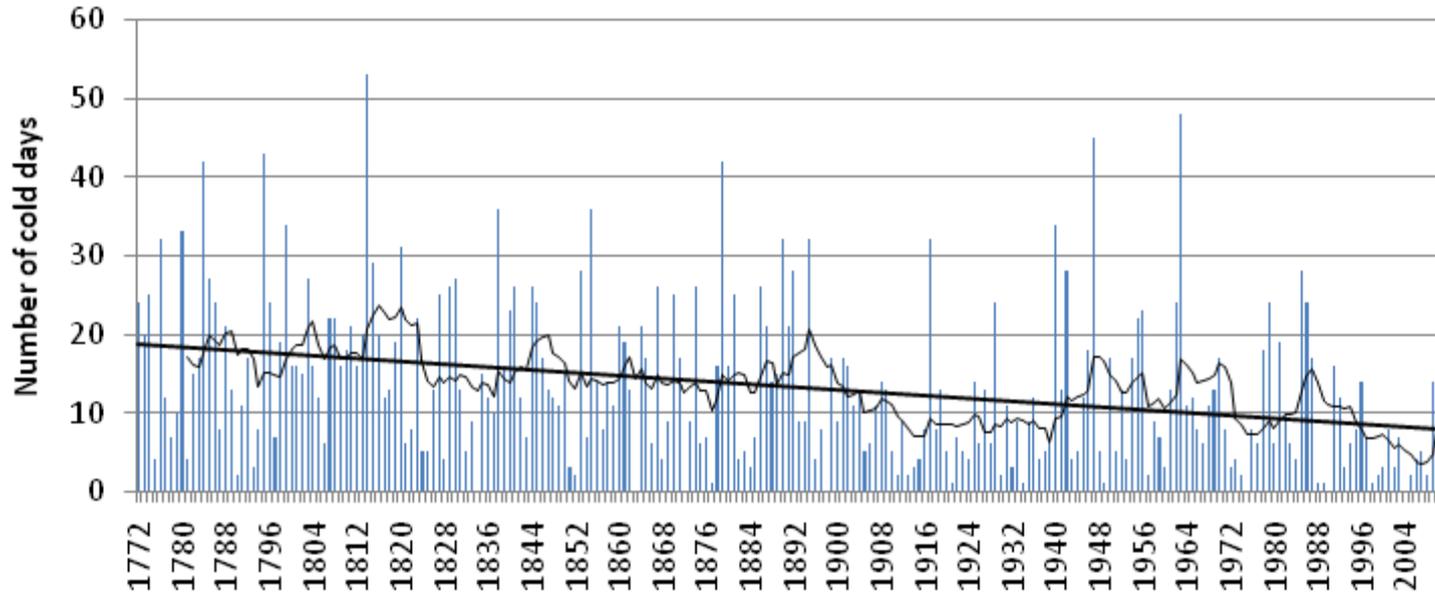
Questions

- Current evidence
 - Estimates of current and future health impacts
 - Geographical variability
 - Vulnerable populations groups
 - Adaptation to climate change
- Public health recommendations
- Research gaps



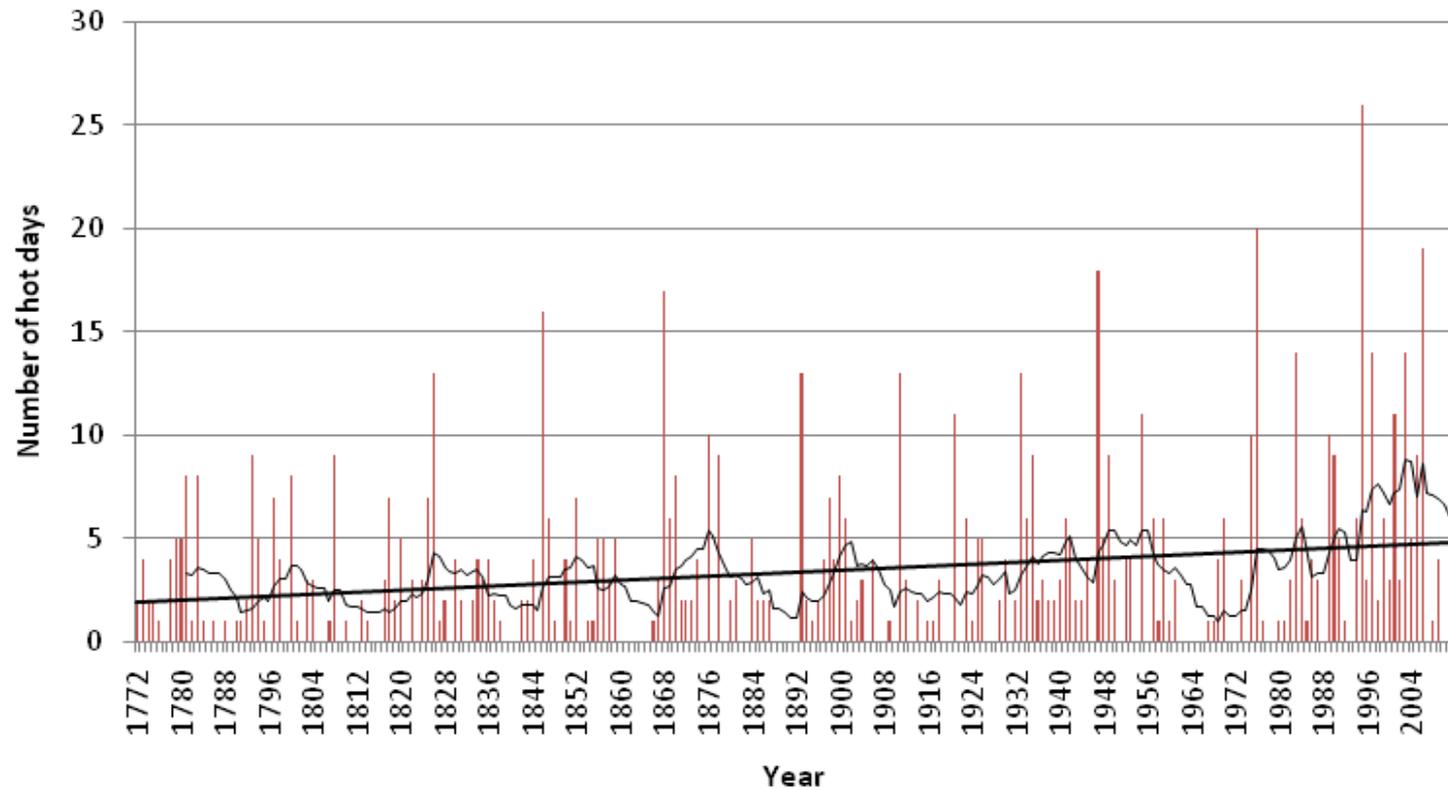
Climate change in the UK: current evidence and projections

- Increases in annual mean temperatures of around 2 to 5°C under a medium emissions scenario by 2080.
- Largest increases expected in the south and the smallest in the north.
- Precipitation levels vary geographically and by season, with central estimates showing:
 - winter rainfall increasing
 - summer rainfall decreasing
- Heatwaves are likely to become more frequent in the future due to anthropogenic influences.



Days per year with CET < 0°C

Days per year with CET > 20°C



Temperature effects of climate change on human health

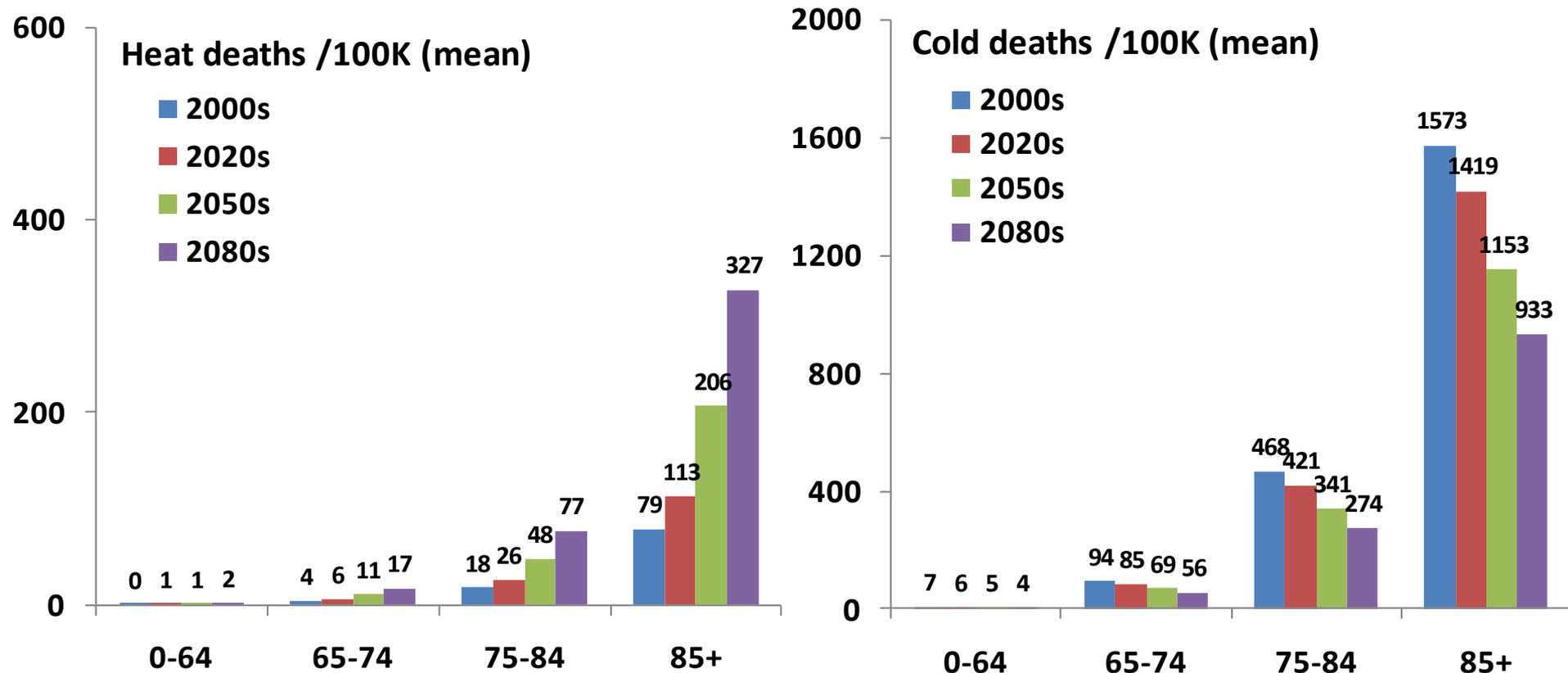


- Heat-related mortality projected to increase steeply in the 21st century.
- Cold-related mortality projected to decline, but will remain substantially higher than heat-related mortality.
- The South East, London, Midlands, East of England and South West most vulnerable to hot weather.
- The elderly are much more vulnerable to extreme heat and cold.

Public health recommendations

- Promotion of measures to avoid heat stress and dehydration during hot weather.
- Focus on elderly and other vulnerable populations such as those with pre-existing illnesses.
- Additional advice to residents of urban areas likely to be more heavily affected by hot weather due to the Urban Heat Island effect.

Current and projected temperature related mortality



Mean estimates of heat- and cold-related deaths in the UK per year per 100,000 population

Health effects due to changes in air pollution under future scenarios

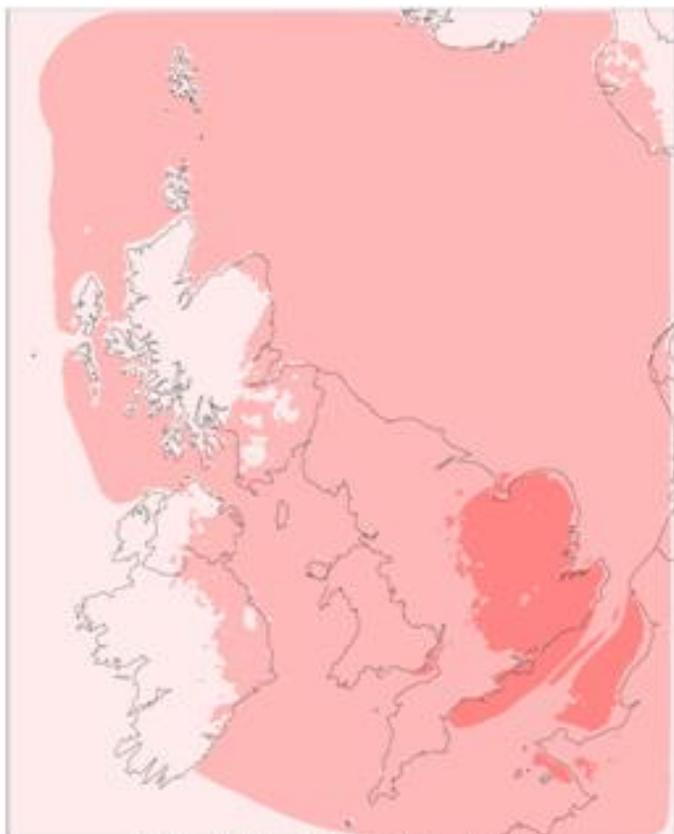


- Changes in ground level O₃ for a +5°C temperature scenario are smaller than potential changes due to different precursor emissions scenarios.
- For a 5°C temperature increase, ozone-related deaths increase by around 500 on the 2003 baseline mortality of around 11,900.
- The largest mortality increases are likely to be in London, South East and East of England.

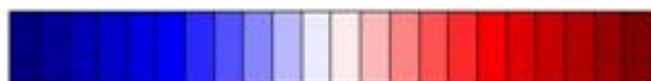
Public health recommendations

- Strengthen warning systems based on air pollution forecasting.
- Target ozone alerts to high risk groups (individuals with pre-existing illness and elderly).

Annual mean

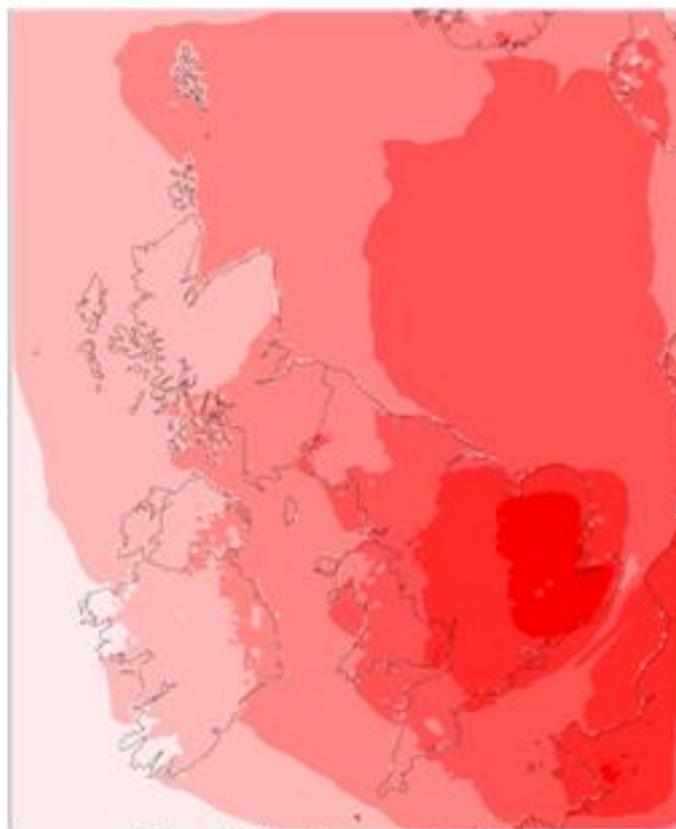


Exp (+5) - Base: O₃ (ppb)



-5 -4 -3 -2 -1 0 1 2 3 4 5

Summer mean



Exp (+5) - Base: O₃ (ppb)



-5 -4 -3 -2 -1 0 1 2 3 4 5



Change in ground level O₃ simulated by EMEP4UK for a +5°C increase in temperature relative to the base simulation for meteorological year 2003.

Effects of aeroallergens on human health under climate change



- Climate change may result in earlier seasonal appearance of respiratory symptoms and longer duration of exposure to aeroallergens.
- Changes in plant distribution can expose the population to pollen from more plants with different flowering seasons.
- Variations in the potency of aeroallergens (pollen grains).

Public health recommendations

- Expand and improve the monitoring network of aeroallergens, with emphasis on greater coverage and a move toward automated techniques.
- Contain the spread of invasive plants such as ragweed.
- Improve the quality of information about the type and seasonal occurrence of aeroallergens provided to health care professionals.



Grid map of *Ambrosia artemisiifolia* (common ragweed) plants recorded in the UK (1991-2010).

(Source: NBN, 2011)

Health effects of climate change in the indoor environment



- Climate change may exacerbate health risks and inequalities associated with building overheating, indoor air pollution, and flooding damage indoors.
- Mitigation and adaptation policies in the built environment can reduce GHG emissions and bring ancillary public health benefits.
- Increased airtightness of dwellings may have negative effects on human health (indoor air pollution).

Public health recommendations

- Promote long-term, energy efficient building design interventions to ensure adequate ventilation in increasingly airtight buildings.
- Monitor and prepare for emerging biological risks to health. Identify risk reduction strategies in the indoor environment.

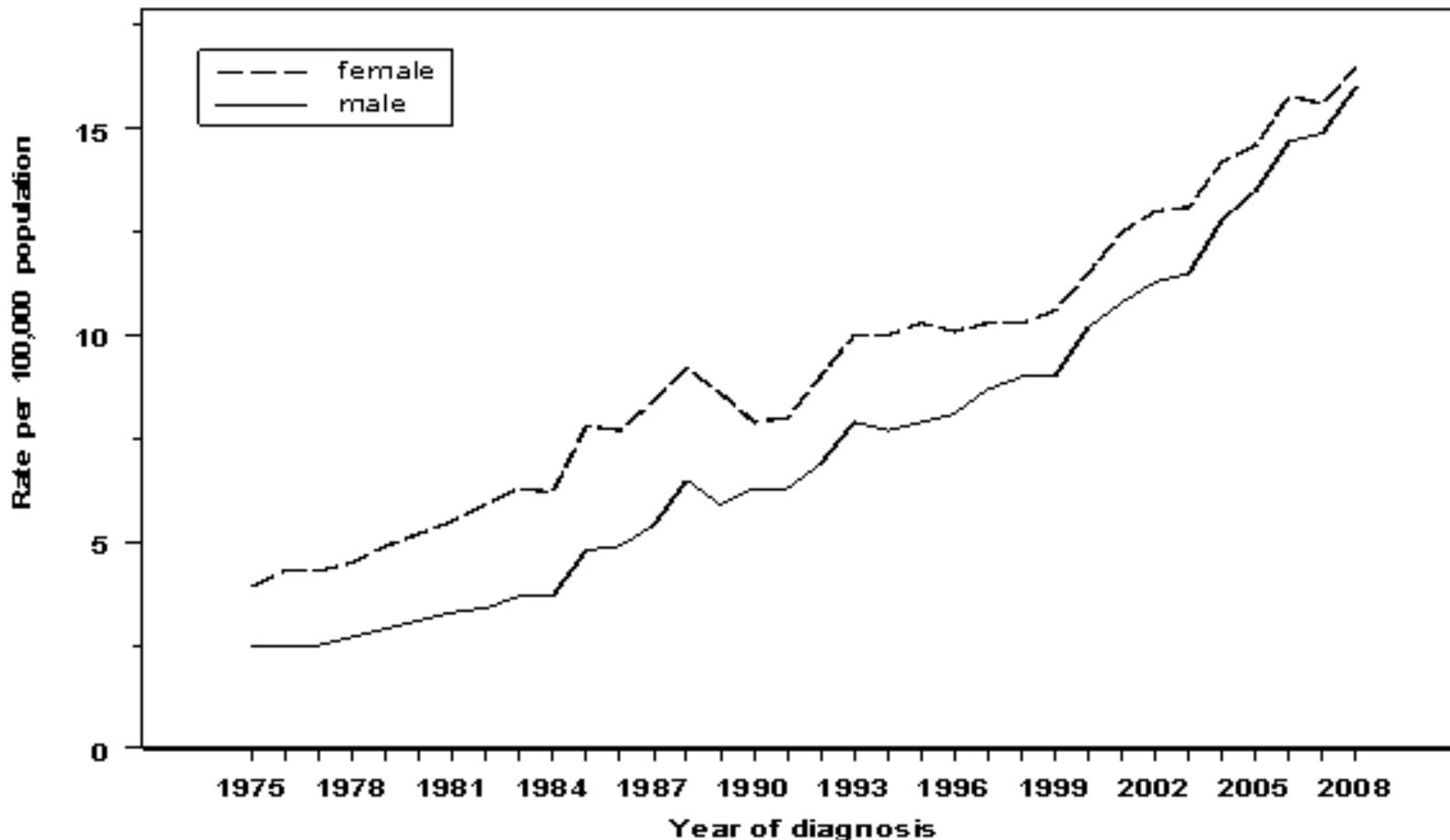
Climate change, ultraviolet radiation (UVR) and health



- Climate change may affect ambient levels of UVR.
- The critical factors affecting human exposure are lifestyle and behaviour.
- In a warmer climate, people may spend more time outdoors in the UK, which could increase the risk of non-melanoma skin cancers.
- Fewer holidays overseas to sunny climates could result in fewer malignant melanomas.
- Reasonable sun exposure is likely to be beneficial for the production of vitamin D, and may be linked with physical exercise and healthier lifestyles.

Public health recommendations

- UVR related public health messages for specific target groups such as young people and the elderly.
- Guidelines on how to optimise sun exposure protection based on skin sensitivity.



Malignant melanoma, age standardised incidence rates per year in the UK.

(Source: <http://info.cancerresearchuk.org/cancerstats>)

Health effects of flooding, and adaptation to climate change



- Climate change is likely to affect river and coastal flood risk.
- Some areas are particularly vulnerable to coastal floods: South Wales, NW Scotland, Yorkshire and Lincolnshire, East Anglia and Thames Estuary.
- Flooding has short-term effects (deaths and injuries) as well as long-term mental health effects and implications for critical infrastructure.

Public health recommendations

- Development of a cross government flood plan to include health impacts, possibly mirroring the Cold Weather Plan or the Heatwave Plan for England.
- Effective surveillance and monitoring systems.
- Ensure that hospitals and health centres are protected from floods.

Effects of climate change on vector-borne diseases



- It is likely that the range, activity and vector potential of ticks and mosquitoes will increase up to the 2080s.
- Adaptation strategies (expansion of inland wetlands, coastal marshes, and habitat defragmentation) may have an influence on tick and mosquito distributions.
- The incidence of Lyme disease transmitted by ticks is likely to increase.
- Possible increase in the number species and abundance of mosquitoes, with implications for transmission of arboviruses (e.g. West Nile virus).
- The risk from autochthonous transmission of malaria remains low.

Public health recommendations

- Effective messages to public health professionals, exposed groups, and general public to reduce vector-borne disease risks.

Water and food-borne diseases under climate change



- Most water, food-borne and enteric pathogens show seasonal variation, which may be directly or indirectly influenced by climate change.
- Warmer weather will allow pathogens (e.g. Salmonella) to grow more readily in food, and will favour flies and other pests that affect food safety.
- For some pathogens (Salmonella and Campylobacter) there are intervention programmes at relevant stages of food production.
- Climate change is likely to elevate food prices which may reduce the nutritional status of some population groups.

Public health recommendations

- Ensure that surveillance and monitoring systems for protecting against food- and water-borne infections are maintained, strengthened and harmonised.

Health co-benefits of policies to reduce greenhouse gas emissions



- Policies to reduce GHG emissions may:
 - Reduced particulate air pollution as a result of reduced coal combustion
 - Reduced dietary saturated fat consumption from animal products
 - Increased physical activity as result of reduced private car use in cities
- Taking into account health co-benefits suggests that such policies could offset part of the mitigation costs.
- Mitigation policies may achieve health, GHG and economic benefits simultaneously ('the triple bottom line').

Public health recommendations

- Public health professionals should capitalise on the potential to reduce GHG emissions and improve public health.
- GHG emissions from health services should also be assessed as part of the assessment of the performance of health systems.

Conclusions

- **Climate change poses great challenges to public health in the UK** by aggravating existing public health problems, such as heat and flood related impacts, air pollution, allergies, and mental health.
- Some UK regions (flood risk and densely populated areas) and population groups (elderly, deprived, ill) are more vulnerable.
- Research needed on current and future interactions between climate, and environmental and behavioural drivers that may affect public health.
- The UK public health sector needs to respond to these challenges by:
 - strengthening monitoring and surveillance systems
 - improving the resilience of public health infrastructure
 - improving the assessment and communication of climate related risks
 - working in partnership with UK and international stakeholders
 - reducing its own carbon emissions



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On 1 April 2013 we transfer to Public Health England