

# Health effects of climate change

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# The NHS carbon footprint

## NHS in 2001

£54bn funding

**3.18 million tonnes of CO<sub>2</sub>**  
(excluding transport)

**46 million outpatient visits**

**16 million A+E visits**

**25 billion km** travelled by  
patients and staff =

**4 million tonnes of CO<sub>2</sub>**

Consumed **54,000**

**tonnes of food**

Produced **400,000**

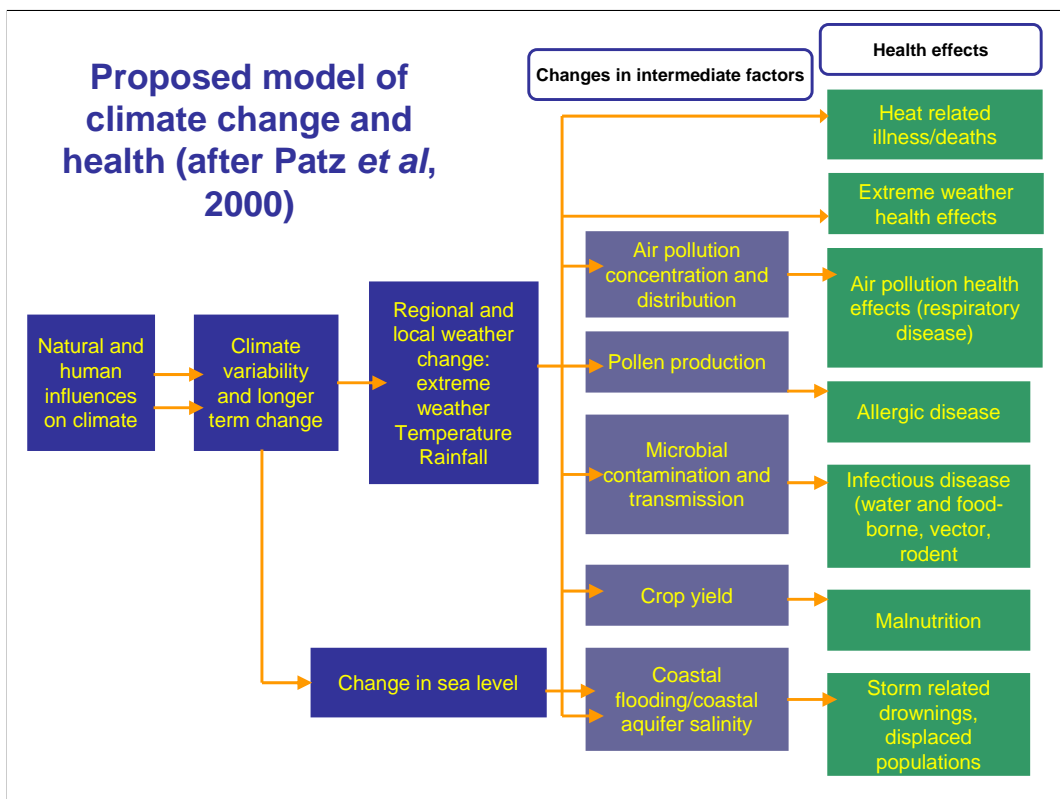
**tonnes of waste**

## NHS in 2010

£110bn funding

**? Tonnes CO<sub>2</sub>**

Source: 2004 report *Material health*



This model was developed by work in the US and takes a global view of the links between environment, climate and health – some of it applies to South West England. Mainly useful to understand that this is a dynamic process with many different factors affecting health – but there are also opportunities to intervene to prevent these effects

## Climate change in the South West

- 1.0 to 2.5°C warmer by 2050 (1.5 to 4.5°C by 2080)
- Winter depressions more frequent including deepest ones
- Winters 5 to 15% wetter (10 to 30% by 2080's)
- Summers 15 to 30% drier (25 to 55% by 2080's)
- Winter rainfall more intense
- Decreased snowfall
- Reduction in summer & autumn cloud – increased radiation

(Source: UKCIP)

Basic forecast predicts rise in mean annual temperatures – up to 4.5 degrees by 2080

More frequent storms, especially in winter; wetter winters, drier summers, less cloud cover due to less moisture in atmosphere

## Temperature change

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- Heat-related deaths in UK begin when mean daily temperature rises above 15.6-18.6°C
- 1976 heat wave in UK forecast to occur every 5-6 years by 2050
- Elderly most at risk + those with existing disease (CHD, respiratory disease)
- Extra 2,800 deaths per year due to heat

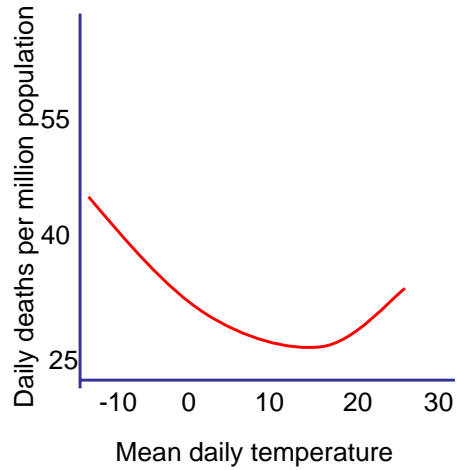
Minimum mortality temperature band where death rate falls in a population to its lowest observable level

More common heatwaves – already seeing effects of more extreme summer temperatures

Impacts most on elderly and chronically ill

## Temperature change

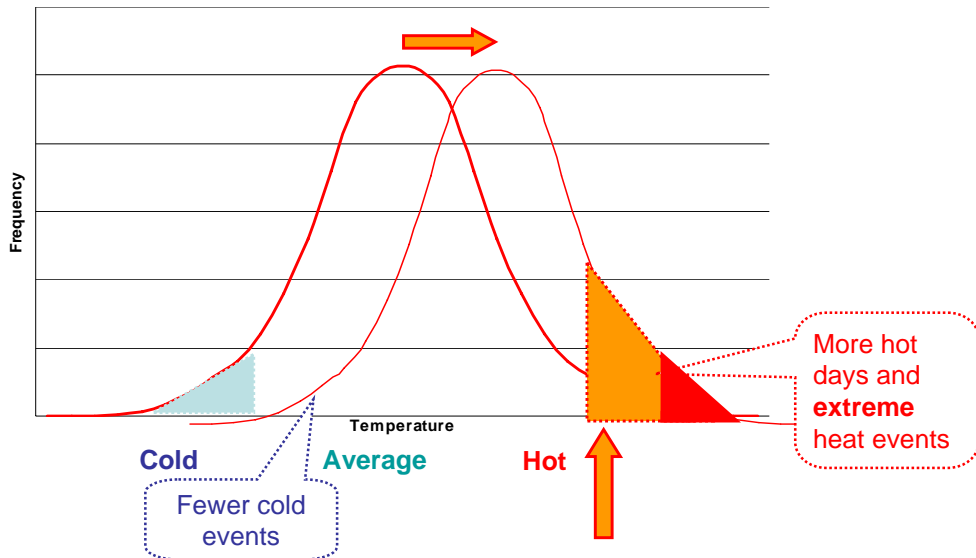
- Fall in cold-related deaths due to milder winters
- Fewer hospital admissions
- 20,000 fewer deaths compared with 1990 excess winter mortality



Increase in heat related deaths likely to be more than offset by fall in cold-related deaths

Don't know true impact due to unknown ability to adapt

## Effect of change in mean annual temperature



## DH Heat wave plan 2004, 2006

- Based on threshold temps
- Four levels:
  - 1 – awareness from 1 June to 15 September
  - 2 – alert (forecast increase in temp)
  - 3 – confirmed (PCTs, social services commission extra care and support to vulnerable)
  - 4 – prolonged severe heatwave – emergency response

Temperature (degrees Centigrade)

Region	Day	Night
London	32	18
South East	31	16
South West	30	15
Eastern	30	15
West Mids	30	15
East Mids	30	15
North West	30	15
Yorks & Humber	29	15
North East	28	15

## Extreme weather effects

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- Severe gales likely to become more frequent
- Health risk = injuries due to people being blown over, hit by debris, traffic accidents
- 1963-1999 6 deaths per year plus 144 injuries (c.f. January 2007, ten deaths)
- Impacts on A&E workloads
- Mitigation – review building regulations for roofs and structures, advice to avoid travel

Gales likely to become more common, and higher windspeeds predicted  
Main risk is trauma and road traffic accidents

## Flooding

- Immediate medical problems:
  - Corpse recovery
  - Evacuating old and infirm
  - Supplies to frontline staff
  - Emergency hospitals for evacuated
  - Restoring hygiene + sanitation
  - Combating epidemics
- Impact phase
  - Drowning and exposure
  - 10% of deaths = inability to access medical care
- Recovery phase
  - Increase in death and disease in following months
  - Mental health problems

Coastal areas at risk of severe flooding as sea level rises plus effects of storms

Katrina – effects not just from storm and flooding, but impact on infrastructure and ability to respond to emergency

Range of immediate medical problems

Two phases of increased risk of death and disease

Do not underestimate mental health problems

Death rates have fallen due to flooding as we become better prepared – today effects on damage to property and loss of home

## Air pollution

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- Continued fall in particles, nitrogen dioxide and sulphur dioxide
- Large increase in ozone (20% by 2050, 40% by 2080)
- Ozone affects lung function. Daily ozone increases associated with increase in daily mortality rates and hospital admissions due to lung disease
- Main health effects are rise in premature deaths during peak ozone episodes in summer

Mixed news – as older style pollutants fall due to change in energy production and emissions controls, rise in ozone due to effect of increased UV radiation on atmosphere

Main impact on lung function – leads to rise in hospital admissions plus death rates

## Infectious disease

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- **Food** – higher summer temperatures could mean additional 10,000 cases of food poisoning each year
- Largely preventable with better advice on food handling, prep and storage
  
- **Water borne:** no good evidence at this stage on effects on climate change and infectious water borne disease
- Predicted main impact could be increase in *Campylobacter* and *cryptosporidium* outbreaks due to rainfall and temperature change.

Both these water borne diseases cause gastrointestinal symptoms like diarrhoea – healthy human adults should have no problems surviving infection, but dangerous to immunocompromised and elderly

## Infectious disease

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- **Vector-borne disease**
  - Mosquitos and ticks transmit variety of diseases
  - Malarial parasites able to survive UK climate for part of year?
  - Lyme disease uncertain, tick encephalitis also unclear
  - Need good surveillance for early warning of e.g. 'new' diseases  
e.g. West Nile virus

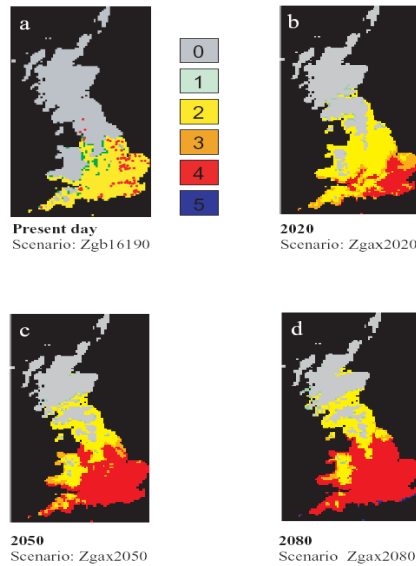
Stress need for ongoing surveillance of 'new' diseases – west nile, unknown in US before 1999. Flu like symptoms.

Complex dynamics of infectious disease as moves into new hosts, e.g. bird flu and changing migration patterns of birds

## Malaria transmission models

- Charts show number of months within which malaria (*Plasmodium vivax*) is theoretically transmissible in UK, from 19 Century to 2080
- Assumes vivax malaria is introduced again to the UK
- Most likely source infected travellers returning to UK

Present-day and Medium High Scenario for the 2020s, 2050s and 2080s.



## UV radiation exposure

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- Depends where you live in UK
- South West will have decreased cloud cover in summer, and greater UV exposure
- Behaviour change (better weather) increases UV exposure
- DH predicts 5,000 extra skin cancer cases, plus 2,000 extra cataracts by 2050

As we are likely to spend more of summer in uk outdoors on the beach etc (if there is a beach still after sea level rise) UV risks will increase unless advice is followed to minimise exposure

## Health impacts will depend on response

### Adaptation

- Better prepared to deal with extremes
- Modify local environments to cope with changes (sea levels, buildings etc)
- Physiological adaptation to e.g. temp change

### Mitigation

- Low carbon lifestyle
- Health benefits from more walking, cycling
- Local food production, change in growing season
- Fitter, slimmer population?

## Local NHS action

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- Audit energy efficiency, waste and use of resources
- Implement travel plans
- Local procurement
- Emissions standards for new NHS buildings including primary care
- Mainstream thinking at corporate governance and board level – no longer preserve of committed few but essential duty of care

## Summary

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- Interplay of many factors important in final effects of climate on health
  - Environment change
  - Adaptation
  - Population characteristics
- Impacts in Bournemouth and Poole:
  - extreme weather events including heat waves, flooding, UV exposure and ozone
  - Relatively elderly population may increase numbers at risk

Remember importance of local factors – this is a complex dynamic

As environment changes, important to adapt.

Looking at evidence from how UK has handled past extreme weather events, we may not be so good at responding when the climate changes due to fact that we live in a remarkable temperate climate zone. Sudden snow fall, leaves on the line etc.. Need to be more adaptable

## Questions?

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- Happy to answer questions via email  
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# Smart Metering in the Domestic Sector

## The Annual National Home Energy Conference 2008

Tuesday 13 May 2008

Russell Hamblin-Boone

Director of Corporate Affairs



# What is the ERA?

- It is the only dedicated trade association for energy suppliers
- All the main energy suppliers operating in the domestic market in GB are members

The logo for npower, featuring the word "npower" in a lowercase, sans-serif font. The "n" is green, and "power" is red.The logo for Scottish and Southern Energy, featuring a stylized globe icon to the left of the text "Scottish and Southern Energy". "Scottish and Southern" is in blue, and "Energy" is in green.The logo for EDF ENERGY, featuring a large blue lowercase "e" above the text "EDF ENERGY" in a smaller, blue, uppercase font.The logo for British Gas, featuring the text "British Gas" in a blue, serif font next to a stylized flame icon.The logo for POWERGEN, featuring a stylized sun and a person's profile above the text "POWERGEN". Below it, it says "A company of e-on" in a smaller font.The logo for ScottishPower, featuring the text "ScottishPower" in a blue, serif font above the tagline "gas and electricity" in a smaller, green, lowercase font.The logo for the energy retail association, featuring a stylized circular icon above the text "energy retail association" in a lowercase, sans-serif font.

First I'd like to explain about the organisation I represent

# Smart Meters in Great Britain

- UK Government has announced their expectation for smart meters to be in every GB home within ten years
- Supplier obligation post-2011 is to reduce carbon emissions, energy and encourage consumers to use less energy
- Energy Services Directive

HM Government



HM  
2011 Energy  
White Paper  
A White Paper on Energy

 energy retail association

# Energy Services Directive



*...based on actual energy consumption, and is presented in clear and understandable terms...to provide consumers with a comprehensive account of energy costs.*

*Comparisons of the final customer's...consumption with consumption for the same period in the previous year.*



According to Ofcom 61% of UK households have internet access and could receive their bills online.

# Opportunities for smart metering

- *Final customers ...are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use.*



energy retail association

ERA questions the appropriateness of mandating the provision of such information for all consumers in the domestic energy market.

There is currently no clear evidence to suggest that consumers will respond to the provision of historical data.

[Although the results of the demand research trials may provide an indication of the most successful formats and suppliers will wish to consider these results before making any decisions. ]

# Smart Metering is coming...

- Within the next ten years - smart meters in 25 million homes (subject to a mandate)
- 2-way communication systems will give real time information on energy use in the home.
- **...applies to gas and electricity**



**GAS**



**ELECTRICITY**

energy retail association

The nature of the display will be a competitive market issue and will allow suppliers to continue to differentiate themselves in the market.

Smart meters will enable suppliers to introduce flexible tariffs that measure consumption over set time periods.

Automatic and actual meter reads will bring an end to estimated bills.

Smart meters will have the capability for import and export, which will facilitate microgeneration technology.

Suppliers will cater for both credit and debit customers for electricity (in other words a customer will be able to switch between credit and prepayment) and dependent upon the cost issues from manufacturers the same benefits could apply to gas customers.

For electricity customers suppliers will be able to remotely disconnect and reinstate supply, which will reduce the costs of debt recovery.

# Benefits of smart metering

- Accurate, understandable, up-to-date information
- An end to estimated bills
- Positive impact on fuel poverty and carbon emissions
- Credit and prepay option for all
- Removes the additional cost to service pre-payment meters
- Flexible tariffs
- Sell energy back to the supplier
- Facilitate microgeneration technology
- Better forecasting of energy demand



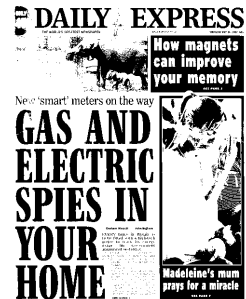
This is only the cost of purchasing the electricity smart meter asset

[there are a number of other costs that need to be considered in addition to the asset cost:]

[External communication device (the BEAMA defined meter has an interface, but no communications device)]

# Challenges of British roll-out

- Market challenges
  - Fiercely competitive retail market
  - Active, de-regulated metering market
- Government challenges
  - Demands on industry to provide free Electricity Display Devices
- Customer challenges
  - Misunderstandings of potential for smart meters
  - Need for national communications campaign
- Industry challenges
  - Interoperability of devices
  - Stranded assets



# Issues to be resolved

Before the first smart meter can be fitted we have to resolve:

- Interoperability
- Communications methods – internal and external
- Options for roll-out
- Delivery Approach
- Market Regulation and Market Design



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Programme is about comms, infrastructure, data, systems.

Asset is the easy bit

# Microgeneration



Still presents challenges:

- Industry capacity: not yet confident that all measures would be available for take up.
- Consumer understanding: need to help consumers understand how microgen can improve their homes and household expenditure.
- Cost: the most cost-effective microgeneration technologies may be supported at the end of the CERT period in 2011.
- Smart metering supports microgeneration with import/export capability.
- Financial incentives: the Low Carbon Buildings Programme is not enough



Whilst we have supported the inclusion of microgeneration measures in offering greater flexibility to meet the CERT targets, without any 'spare' capacity in cavity wall and loft insulation, these measures no longer offer that flexibility but are instead an essential component.

We are not yet confident that a number of these measures would be available for take up at the levels suggested: the supply chain for some of these measures is not yet stabilised and the public understanding and demand for them is still growing. In particular, we are concerned about the fuel supply chain of wood chip (& pellet) boilers and whether they can work efficiently and reliably in domestic sized properties.

The aim of getting micro-CHP units in the market between 2008 and 2011 also seems highly ambitious, especially in light of the difficulties encountered by some microgeneration businesses. There is more work to be done to help consumers understand how microgeneration can improve their homes and household expenditure.

Mixed messages, for example, about the benefits of micro-wind products only add to the confusion for consumers. However, we shall be looking to build on the recent increased awareness of climate change and translate that into a demand level that allows economies of scale to bring prices within reach of more than just the most affluent consumers.

Analysis by the Micropower Council indicates that the most cost-effective microgeneration technologies may be supported under CERT, but that this would only occur towards the end of the CERT period in 2011, when lower cost energy efficiency measures have been realised.

We would like to think that there could be more help from Government beyond a limited fund from the Low Carbon Buildings Programme.

Ground source heat pump cost = Defra £8.4k, supplier £15k inc siteworks – this influences translation factor for 3 years of CERT.

# Now is the Golden Opportunity

- 'It's the right thing to do'
- It will revolutionise our sector
- Supply business and customer benefits
  - End of estimated bills
  - End of house-to-house meter readings
  - Facilitate hassle-free switching process
  - Increased tariff flexibility
- Need governance and ownership for delivery of smart metering roll-out



# But we are still waiting...



- Energy Reduction Trial initial results
- Further work on impact assessment
- ERA and ENA analytical work
- Assess environmental benefits to Consumers
- Explore small business case

# In conclusion

- Smart metering has the potential to revolutionise the relationship between suppliers and their customers
- Co-operation from all parties is vital for success
- Unique challenge of GB market, market, but real commitment from the Government is essential





**Thank you.**

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