Climate Change and Health: Director of Public Health Annual Report for Sheffield 2014

Sheffield DPH Report
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Version History

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1 Introduction: why climate change is the biggest Public Health challenge of the 21st century

Introduction

Climate change is the defining public health issue of this century. In this report I hope to show you why, how it may affect Sheffield, and what we can do, and already are doing about it.

In the medium to long term, climate change is significantly more threatening to public health than any of the other problems we spend our time dealing with. Although smoking, physical inactivity, alcohol and so on are all major public health issues that we have to address, they are not universal in their impact, and they do not threaten the fundamentals of human society. We quite rightly spend a lot of time and energy seeking to ensure the Best Start for our children, and ensuring they are safe, but if we do not tackle climate change effectively, their future will be very bleak. There are however links between present public health problems and the kind of steps we have to take to tackle climate change. Many of the things we need to do to reduce greenhouse gas emissions will benefit our health in the short term, too. We describe some of those things.

Climate change is caused by global warming, which in turn is caused by the accumulation of greenhouse gases in the atmosphere. Chief amongst these is carbon dioxide (CO_2) released by the burning of fossil fuels, but other gases also contribute. Average global temperatures have risen by about 0.5 degrees centigrade (^{o}C) in the last 50 years, and by 0.8^{o}C from pre-industrial times. Each of the last three decades has been hotter than the previous one, by about 0.2^{o}C[1]. The Intergovernmental Panel on Climate Change (IPCC) says it is virtually certain that human influence has warmed the global climate system, and extremely likely that more than half of the observed increase in global temperature is related to human activity.

Global warming changes the climate in a number of different ways. As well as increasing average temperatures, it increases the frequency and severity of heatwaves. Warmer air carries more water vapour, so global warming increases rainfall, particularly in storms. Storms contain more energy and so are more intense, as well as being more frequent. In addition global warming is causing melting of the permafrost, glaciers and arctic sea ice, all of which have the effect of further increasing the warming of the planet. The sea level is rising, and the sea itself becoming more acidic. This is a real problem when fish feed so much of the world.

All of these changes are happening already. What happens in future depends primarily on the trajectory of global greenhouse gas emissions, but also changes in agriculture, diet, land use, rates of economic development and population growth. The development and use of carbon capture and storage may also play a part. But first we need to recognise that because carbon dioxide is a very long lived atmospheric pollutant, we are already committed to significant further global warming based simply on the amount already in the atmosphere.

The Intergovernmental Panel on Climate Change has described four different scenarios for different trajectories of greenhouse gas emissions up to the year 2100[2]. The best case scenario assumes a radical reduction of emissions starting almost immediately, which leads to a slow rate of temperature increase that levels off at about 1 degree increase over current levels by the middle of this century. By contrast, in the worst case scenario, with unabated greenhouse gas emissions, average temperatures will rise by 2 degrees by the middle of the century and nearly 4 degrees by the end. A summer like that of 2003 would be a cool one.

The Long Range Weather Forecast for Sheffield

> ➢ Hotter, drier summers

> ➢ Milder, wetter winters

> ➢ More frequent extreme high temperatures

> ➢ Decrease in annual rainfall

> ➢ More frequent heavy downpours

> ➢ Lower summer soil moisture content

> ➢ Greater number of days when temperatures above 5°C leading to longer growing / breeding season

> ➢ Higher wind speeds during storms

> ➢ Reduced cloud cover leading to increased bright sunshine

> ➢ Cooler and wetter in the west of Sheffield.

> ➢ Higher temperatures and lower rainfall in the east of Sheffield

Sheffield Local Climate Impacts Profile (Weston Park data) and the *South Yorkshire Weather Trends* report (UKCP09 data)

What does all of this mean for health? This report outlines briefly how climate change can threaten the health of our population. All of the key social determinants of health – food, water, shelter, even the normal function of human society - are threatened by climate change. How bad the effects will be will depend on how much global warming happens, which in turn depends primarily on how effectively we can collectively control greenhouse gas emissions. How we do this is the most important challenge facing human civilisation.

If, globally, we achieve the rapid reduction in greenhouse gas emissions necessary for the IPCC's best case scenario, the public health consequences of climate change will still be significant, but manageable. On the other hand if we continue with business as usual, leading to a four degree centigrade increase in global temperatures, the public health consequences could well be catastrophic. The Lancet has recently warned that it would lead to a "discontinuity in the long term progression of humanity"[3]. In other words, a breakdown of society, and the loss of what humankind has built up over centuries to make life worth living.

Unfortunately at the moment global carbon dioxide emissions are increasing. Burning more than a quarter of known fossil fuel reserves would release enough CO_2 to put the world on a trajectory to over 4 degrees of warming. It is therefore perhaps not surprising that the World Health Organisation (WHO) Director General Margaret Chan has stated that climate change is the greatest threat to public health and the defining issue of the 21 century[4]. She is supported in this conclusion by both the Lancet[5] and the British Medical Journal[4], which now states that the WHO should declare a public health emergency.

However there are signs that increasing numbers of people are recognising the dangerous position we are in, and exploring ways in which a global economy has to change[6,7], including the establishment of the Green Commission here in Sheffield. In addition there are many things that we can do, and are already doing, that would be beneficial both to health and to the climate.

On the 16 September 1948, Aneurin Bevan, the founder of the NHS, said in a speech to the Society of Medical Officers of Health (the forerunners of Directors of Public Health) that they should be "like some watcher of the skies – for portents, not merely of epidemic disease, but of anything likely to have an adverse effect on health"[8]. Climate change is certainly one such portent.

References

1. The science of anthropogenic climate change: what every doctor should know. McCoy D., Hoskins B. *BMJ* 2014: 349: g5178.

2. Intergovernmental Panel on Climate Change: http://www.ipcc.ch/ (accessed on 9th October 2014).

3. Health risks of climate change: act now or pay later. Haines A., Elbi K.L., Smith K.R., Woodward A. *Lancet* 2014: vol 384: p1073-5.

4. Climate Change. WHO should now declare a public health emergency. Godlee F. *BMJ* 2014: 349: g5945.

5. Lancet Commission 2009, *Managing the health effects of climate change,* http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60935-1/fulltext (accessed on 9th Oct 2014).

6. The Economics of Low Carbon Cities: A Mini-Stern Review for the Sheffield City Region http://www.lowcarbonfutures.org/reports/economics-low-carbon-cities-mini-stern-review-sheffield-city-region (accessed on 9th Oct 2014).

7. New Climate Economy report: *Better Growth Better Climate*, http://newclimateeconomy.report/ (accessed on 9th Oct 2014).

8. Speech to Society of Medical Officers of Health. Quoted at: http://www.sochealth.co.uk/resources/national-health-service/the-sma-and-the-foundation-of-the-national-health-service-dr-leslie-hilliard-1980/aneurin-bevan-and-the-foundation-of-the-nhs/bevans-speech-to-the-society-of-medical-officers-of-health-16-september-1948/ (accessed on 9th Oct 2014).

2 How will a changing climate affect health in Sheffield?

2.1 Direct health effects of climate change and global warming

Stephen Morton and Angie Bone, Public Health England

The potential impacts of climate change have been well summarised by the Intergovernmental Panel on Climate Change[1]. In the House of Commons, the Energy and Climate Change Committee concluded 'there is no reason to doubt the credibility of the science or the integrity of the scientists involved'[2]. The UK Climate Change Risk Assessment (2012) concluded that the most significant risks to health in the UK are likely to be from increased summer temperatures and overheating in buildings, and flooding[3].

Heatwaves

The prolonged high temperatures in August 2003 caused 2000 excess deaths in England[4], with elderly people with chronic heart and lung disease being most at risk. Projections indicate that heat-related deaths may increase to 7000 per year by 2050[5].

Overheating in buildings is thought to be an important factor in heat-related illness and death. Purpose-built or top floor flats and terraced houses are most at risk, particularly un-insulated loft conversions in pre-1919 properties, and flats built after the 1960s[6]. In the relatively cool summer of 2007, 21% of bedrooms were found to be overheated[7]. Overheating in hospitals is also a significant concern, with one study suggesting that 90% of wards are prone to overheating[6].

During heatwaves there can be considerable temperature variation, especially within urban areas. Urban heat islands are caused when natural surfaces (vegetation and soil) are replaced by built surfaces consisting of non-reflective and water resistant construction materials[8]. This leads to higher daytime temperatures, and night time temperatures not falling. Sheffield has some protection from this because of the large amount of green space within the City boundaries[9].

Floods and storms

Direct deaths and injuries occur in Britain from floods and storms; mainly from drowning, or being crushed by falling trees and masonry, but the biggest health impacts are due to the disruption and distress caused by

these events. During the summer storms of 2007, two people in South Yorkshire were drowned, many hundreds were rescued by boat or helicopter, and 700 people, who lived near the Ulley reservoir, were evacuated[10]. A report on the psychological impact of the 2007 floods found that 'the prevalence of all mental health symptoms was significantly higher among individuals who reported flood water in the home'[11]. Symptoms of psychological distress, anxiety, depression, and post traumatic stress disorder were greater among the unemployed and elderly.

Sheffield's topography means that severe rain in the Peak District is channelled downstream into water courses constrained by over a century of building and development. Some of this burden can be mitigated by sustainable urban drainage systems.

Severe cold weather

Whilst severely cold weather is likely to become less frequent[3] we may still experience very cold winters. Winter morbidity and mortality are predicted to remain a problem[12]. Excess winter deaths can be expressed as the number of extra deaths that occur in the winter compared to the non-winter months, expressed as a percentage. The majority of these deaths are from cardiovascular, respiratory diseases, and dementia. The number may be exacerbated by poor air quality.

Around 30% of excess winter deaths may be attributed to living in a cold home[13]. Fuel poverty is certainly an important contributor to this, but other factors such as occupant attitudes, behaviour and ability to operate heating also play an important role. Sheffield has higher levels of fuel poverty (measured as the 'low income – high cost' (LIHC) indicator – the percentage of households that have high fuel costs and low incomes) than the England average, but lower levels than many other core cities (Table 1). We have lower levels of excess winter deaths than the England average, and the lowest of all the Core Cities.

Table 1 Three year all age excess winter death index and fuel poverty indicators

City	3 year EWDI 2009-2012 (all age)	Fuel poverty LIHC indicator (2012)
Sheffield	12.7 (9.0 -16.6)	11.3 (11.2-11.4)
Nottingham	15.1 (9.6 – 20.9)	18.4 (18.1 – 18.6)
Birmingham	15.6 (12.7 – 18.7)	20.1 (20.0-20.3)
Newcastle	15.7 (10.3 – 21.3)	13.4 (13.2 – 13.6)
Bristol	16.0 (11.3 – 20.8)	11.1 (10.9-11.2)
Manchester	16.2 (11.7-20.9)	15.9 (15.7 – 16.0)
Leeds	16.5 (13.1-19.9)	11.6 (11.5-11.7)
Liverpool	16.8 (12.7 – 21.0)	14.4 (14.3 – 14.6)
England	16.5 (16-16.9)	10.4 (10.4 – 10.4)

Source: Public Health Outcomes Framework online tool http://www.phoutcomes.info/

Win-win opportunities in adaptation for climate change

There are a number of strategies to reduce the direct effects of climate change that would have potentially wider public health benefits.

- The planting of more trees and shrubs in the City could be part of sustainable urban drainage systems[10] and reduce heat island effects[14]. They can also attract wildlife and contribute to recreational green space, thus benefitting physical and mental health[15].

- Schemes to improve energy efficiency can reduce fuel poverty in low income households, reduce the harmful health effects of cold homes, and also reduce the emission of greenhouse gases [16]. Insulation is also important in protecting against heat, as long as ventilation is also considered [17].

- Good neighbour schemes can reduce the risks of isolated and elderly or disabled people from cold related illnesses and also improve social capital in an area.   Indeed asset based community development is potentially a very useful tool for improving sustainability and tackling the risks of climate change.

References

1. IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C. *et al* eds.)]. Cambridge University Press, Cambridge, United Kingdom and NewYork, NY, USA, pp. 1-32.

2. Commons Select Committee*.* MPs report *IPCC processes and conclusions robust* http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/news/report-ipcc-5-assessment-review/ (accessed on 28th Aug 2014)

3. Department for Food, Rural Affairs and Environment. *UK Climate Change Risk Assessment Government Report.* https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-government-report (accessed on 28th Aug 2014)

4. Public Health England. *Heatwave Plan for England 2014.* https://www.gov.uk/government/publications/heatwave-plan-for-england (accessed on 09 Oct 2014)

5. Hajat S, Vardoulakis S, Heaviside C, Eggen B. Climate change effects on human health: projections of temperature-related mortality for the UK during the 2020s, 2050s and 2080s. *J Epidemiol Community Health*. 2014, doi:10.1136/jech-2013-202449

6. Adaptation Sub-committee of the Climate Change Committee. *Managing climate risks to well-being and the economy: ASC progress report 2014*. http://www.theccc.org.uk/publication/managing-climate-risks-to-well-being-and-the-economy-asc-progress-report-2014/ (accessed on 28th Aug 2014)

7. Beizaee, A; Lomas, K; Firth, S. National survey of summertime temperatures and overheating risk in English homes. *Building and Environment,* 2013, 65: 1-17.

8. Urban Heat Islands. *The urban heat island effect*, http://www.urbanheatislands.com/ (accessed on 10th Oct 2014)

9. Lee, S. and Sharples, S*. An analysis of the Urban Heat Island of Sheffield? the impact of a changing climate,* [*PDF, 290KB],* Proceedings of PLEA 2008, 25th International Conference on Passive and Low Energy Architecture, Dublin, 22-24 October 2008

10. Cabinet Office. *The Pitt Review: Learning lessons from the 2007 floods* http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/thepittreview.html (accessed on 29th Aug 2014)

11. Paranjothy et al. *Psychosocial impact of the summer 2007 floods in England* BMC Public Health 2011, 11:145 http://www.biomedcentral.com/1471-2458/11/145 (accessed on 9th Oct 2014)

12. Hajat, S; Vardoulakis, S; Heaviside, C; Eggen, B. Climate change effects on human health: projections on

temperature-related mortality for the UK during the 2020s, 2050s and 2080s. *J Epidemiol Community Health,* 2013, 0:1-8.

13. WHO Europe. *Environmental burden of disease associated with inadequate housing. Methods for quantifying health impacts of selected housing risks in the WHO European Region* Edited by: Braubach, M., Jacobs, D.E., Ormandy, D. http://www.euro.who.int/__data/assets/pdf_file/0003/142077/e95004.pdf (accessed on 9th Oct 2014)

14. Forestry Commission, *Air temperature regulation by urban trees and green infrastructure* http://www.forestry.gov.uk/pdf/FCRN012.pdf/$FILE/FCRN012.pdf (accessed on 9th Oct 2014)

15. Douglas I. *Urban green space and mental health*. http://www.green-space.org.uk/resources/aboutparks/health.php (Accessed 18 February 2014)

16. Marmot Review Team, *The Health Impacts of Cold Homes and Fuel Poverty*, http://tinyurl.com/Marmot-Review-Cold-Homes (accessed on 9th Oct 2014)

17. Bone A, Murray V, Myers I, Dengel A, Crump D. Will drivers for home energy efficiency harm occupant health? *Perspect Public Health,* 2010; 130:233-8

2.2 Indirect health effects of climate change

Ruth Speare, Public Health England

Changes in temperature and an increased frequency of extreme weather events not only have immediate effects on health and infrastructure but also indirect impact on the availability of food and water, and on the distribution of disease. While these changes are more difficult to predict, the threats they pose to our health and wellbeing are potentially greater, and need to be recognised and addressed.

Food and water supply

Predicting the effects of climate change on food and water security is difficult. Although in the United Kingdom we may be less vulnerable than elsewhere, we will still be affected. Food security involves producing enough food globally and getting the produce to those who need it at an affordable price. All of these factors are likely to be affected by climate change.

Approximately half of the food consumed in this country is produced here. Climate change may impact on food supply by affecting the length of the growing season[1]. It may now be possible to grow crops that previously could not be grown in northern climates, because of increased temperatures. However crop production is vulnerable to the extreme weather associated with climate change. Drier spells increase demand for irrigation, which places a strain on water supplies, so a significant shortfall in water supply for farming in the UK is predicted by the 2020s[2]. Conversely heavy rain or floods may damage crops and cause soil erosion, leading to poorer soil quality and reduced yields. Climate change is likely to increase the spread of existing and emerging crop pests, which may encourage greater use of pesticides. Livestock will probably benefit from milder winters but could be harmed by hotter summers. Fish stocks will decline as a result of ocean acidification.

The UK relies heavily on overseas markets both for food for human consumption as well as animal foodstuff, in particular soybean protein[3]. Extreme weather events, such as drought, storms and floods elsewhere are likely to impact on food security in the UK by reducing yields and by disrupting the infrastructure needed to harvest, process and transport food[4].

Global population growth and failure of crops elsewhere will contribute to food insecurity and scarcity in the UK. Scarcity of food globally, where demand outstrips supply, will drive up food prices, even for UK produced crops. A poor global harvest in 2008 led to wheat prices doubling. Rising costs of fuel and efforts

to curb greenhouse gas emissions will also affect food prices. This will impact more on those already in food poverty, reducing their ability to sustain a healthy, balanced diet. This is likely to particularly affect low income families, the elderly and those whose health is already poor. Costs of other commodities that are largely imported, including energy, are also likely to rise and again will place a disproportionate burden on vulnerable people.

The IPCC Working Group 2 stated that temperature increases of more than 2 ^{o}C are projected to lead to a decline in production of major crops, at a time of increasing global demand. Modelling world food production shows that from 2030 the number of scenarios in which there is a net fall in food production is significantly greater than those where there is an increase. There is also increased likelihood of year on year variability. Global temperature increases of more than 4 ^{o}C would pose large risks to food security globally and regionally[5].

Freshwater supplies will also be threatened, through drought, contamination of water supplies by flooding, or the drying up of melt waters when the glaciers disappear[5].

Water-borne disease

The risks of water-borne diseases are strongly affected by flooding and warmer temperatures. Water-borne diseases are spread when soil, water or food becomes contaminated with animal or human faeces. Heavy rain and water run-off can wash pathogens into water courses, or overwhelm sewerage systems, leading to contamination of water supplies[6]. Studies of outbreaks in the UK due to water-borne diseases, for example Cryptosporidiosis and Vero cytotoxin-producing Escherichia Coli (VTEC), have shown them to be linked to heavy rainfall[7]. Flooding may also cause rodents to be displaced from their normal habitats, and lead to a greater likelihood of disease transmission to humans. Increased incidence of Leptospirosis has been associated with episodes of flooding[7].

Disease causing organisms can also contaminate recreational water and people can become infected whilst swimming or taking part in water sports. Conversely periods of drought reduce the amount of water in river and lake systems available to dilute the concentration of pathogens, and this has also been shown to be associated with disease outbreaks[8]. Warmer houses and warmer water, combined with increased use of air conditioning or other cooling equipment, is likely to cause an increase in cases of Legionnaire's disease[7].

Food-borne infections

Many of the infectious organisms that cause illness in humans, for example Salmonella, thrive in warm water and weather[9]. Warmer temperatures lead to faster replication so that the threshold of numbers required to cause infection is reached more quickly[10].

Warmer weather and milder winters will encourage flies and other pests to multiply, which can also affect food safety by spreading disease. Warmer, wetter weather increases the reproductive potential of rats and other rodents[11], leading to increased risk of disease transmission to humans[7].

Insect-borne disease

Other infectious diseases are caused by arthropods, such as mosquitos and ticks carrying and transmitting disease through their bites.   One such disease is Lyme disease, which is normally associated with mild flu-like symptoms but can also affect the nervous system. Around 2,000 to 3,000 cases of Lyme disease occur in the UK per year, and the number of cases is rising both here and in Europe[12].

There is evidence that changes in weather patterns and extreme weather events affect the transmission of these diseases [13].   In other parts of Europe, increased international travel, trade and transportation in combination with climate change have allowed new arthropods to become established in areas where they have been absent in recent years [12]. Climate change may make the UK more suitable for the establishment of tick populations, as they are carried by animals and birds from other countries, and also allow the re-introduction of mosquito borne illness[14].

Ticks are found in woodlands, grassland, moorland, heathland but also some urban parks and gardens. This may be an increasing concern in Sheffield because of its proximity to the Peak District and its many green spaces. Flood alleviation schemes and adaptation measures such as the establishment of wetlands, will also alter the distribution and abundance of mosquitoes and ticks, and this may increase the incidence of associated diseases already present in the UK[14] .

References

1. UK Met Office, *Climate: Observations, projections and impacts.* UK Government Department of Energy and Climate Change, Crown Copyright, 2011.
2. Managing the land in a changing climate. Adaptation Sub-Committee Progress Report, 2013.

3. The UK Climate Change Risk Assessment 2012: Evidence Report. Crown Copyright, 2012.

4. Kovats S, Valentini R. Intergovernmental Panel on Climate Change Report. Chapter 23. Europe, 2014.

5. IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and NewYork, NY, USA, pp. 1-32.

6. Miraglia E et al. Climate change and food safety: An emerging issue with special focus on Europe. *Food and Chemical Toxicology*, 2009;47:1009-1021.

7. Vardoulakis S, Heaviside C (Eds). *Health effects of climate change in the UK 2012: Current evidence, recommendations and research gaps.* Health Protection Agency, 2012

8. Semenza J, Menne B. Climate change and infectious diseases in Europe. *Lancet,* 2009; 9:365-75

9. Assessing the potential impacts of climate change on food- and waterborne disease in Europe. European Centre for Disease Prevention and Control, 2012, Stockholm.

10. Public Health England, *Gastrointestinal Infections Data: Summary of Salmonella surveillance,* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337647/Salmonella_surveillance_tables.pdf (accessed 5th September 2014).

11. Chartered institute of Environmental Health, *The impact of climate change on pest populations and public health*. CIEH, 2008

12. Gage K, Burkot T, Eisen R, Hayes E. Climate and vectorborne diseases, *American Journal of Preventive Medicine*, 2008; 35(5):436-450.

13. Bezirtzoglou C, Dekas K, Charvalos E. Climate changes, environment and infection: Facts, scenarios and growing awareness from the public health community within Europe. *Anaerobe,* 2011;17: 337-340.

14. Adaptation Sub-group Committee, *Managing climate change risks to well-being and the economy*. *Progress Report,* Committee on Climate Change, 2014.

2.3 Social and demographic impacts of climate change

David McCoy, Queen Mary University London

Climate change and the other effects of greenhouse gas (GHG) emissions (such as ocean acidification) are truly global phenomena. It is an issue that connects and binds all peoples and all nations.

People in the UK are connected to all who suffer the effects of climate change because of our contribution to global warming, both in the past and now. The way we eat, travel, commute, relax, shop, cook, bathe and warm ourselves is generally done in a way that far exceeds our 'fair share' of the earth's capacity to absorb GHG emissions without causing catastrophic global warming.

Earlier this year, the IPCC's second Working Group (IPPC-WG2) published its latest report on the current and projected impacts of climate change [1-4.] The report describes how most of the worst effects of climate change will be experienced by countries and communities that are poorest, and which have made the least contribution to global warming. The burden of the negative consequences of global warming that we will bear in the UK will be much lower than a 'fair share'.

The impacts of climate change will vary across regions and will depend on many factors, including what are called 'non-climate stressors' (things that will aggravate the effects of climate change including continued deforestation, rapid population growth and war), as well as the extent to which societies are able to mitigate or adapt. Of particular note in the latest IPCC-WG2 report was its emphasis on the potential for climate change to precipitate systemic crises and wholesale social disruption, including large-scale migration as well as conflict (between countries or within countries).

Among the 'key risks' (defined as risks with potentially severe or irreversible adverse consequences, or risks for which there is limited potential to avert through adaptation or mitigation) identified by IPCC-WG2 were extreme weather events leading to breakdown of infrastructure networks and critical services such as electricity, water supply, and health and emergency services; and the breakdown of food and water systems. Some places will become uninhabitable or prone to emergencies and disasters, undermining livelihoods and breaking down social solidarity. Although the future cannot be predicted with certainty, there is a sound, scientific basis for highlighting the potential of climate change to lead to significant chaos, violence and suffering.

One example of the potential for climate change to do this is the link that has already been made between drought in eastern Europe and the subsequent reduction in the Russian grain harvest in 2010. The rise in wheat and hence bread prices that followed are thought to have helped precipitate the 'Arab spring', and the subsequent political instability in the region. This in turn aggravated existing tensions and conflicts, including the armed conflict that now engulfs Syria and Iraq – a situation which will ultimately affect the security and well being of people in Britain, and Sheffield.

While the direct negative impacts of climate change may well be greater in other parts of the world than in northern Europe, this provides little comfort. Europe will also experience the direct effects of climate change and global warming (flooding and extreme weather events), but it will also be affected by the effects of climate change elsewhere. Drought, extreme heat and social disruption will affect the production of basic commodities on which we all depend. New wars over scarce resources will contribute to further global warming and ecological degradation, which will affect our single and shared global weather system. War is not only harmful locally where it is occurring, but also further afield. Mass migration, including of refugees, will inevitably place greater social pressures on countries in western Europe.

Sheffield is proud to be a City of Sanctuary that welcomes refugees and asylum seekers. It cares for the health of new arrivals to the City, which is sometimes made worse by the journeys they have endured, though it is aware that this can place a strain on our services. Climate change will cause more civil conflict and war, and more displacement of peoples and mass migration. Whether we're living in Sheffield or Shanghai, Doncaster or Dacca, we share one world.

References

1. IPCC, *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects.* Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Field C.B., *et al* , 2014.

2. IPCC, *Climate Change 2014: Impacts, Adaptation, and Vulnerability.* Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Barros, V.R. *et al*, 2014.

3. IPCC, *Summary for Policymakers*. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report

of the Intergovernmental Panel on Climate Change, Field, C.B. *et al*, 2014

4. IPCC, *Technical Summary*. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Field, C.B. *et a*l, 2014

3   What should we be doing about it?

3.1   Adaptation or mitigation?

David Pencheon, Director, NHS Sustainable Development Unit, NHS England / Public Health England

Recent commentators have focused attention on the problems that make climate change the most important threat to health for this century[1-3]. The first part of this report has described the damage that climate change could do to health and wellbeing in our communities in Sheffield if we continue business as usual.

We now turn to the solutions - what we need to do, especially what we need to do now. There are five principles which underpin the necessary actions.

1. The first observation derives from the scale of the challenge facing us. This means that almost every effective action that helps us both adapt to and mitigate climate change is needed. Instead of wasting time deciding if we should take one action or another, we should spend time and effort understanding how to do all of those we know to be effective.

2. Secondly, the actions are only likely to be effective at sufficient pace and scale if we help each other (organisationally and personally) do them together. Hence the importance of sectors like the health and care sector, groups such as Health and Wellbeing Boards, serving, and being served by, strong, resilient, well led and well supported communities.

3. Thirdly, the public sector has an important duty to set a highly visible example in the way it behaves, and the way it expects others to behave from whom it buys products or commissions services. The public sector, especially local government and the NHS, can, in their own operations, save money, reduce waste, improve legal compliance, and improve the quality of services in sustainable ways by taking very visible and practical actions in a more integrated and collaborative way.

4. Fourthly, as we shall see, one piece of good news is that many of the actions that help both adapt to and mitigate climate change also offer immediate health benefits too: the food we eat, the way we travel, the homes we live in and the air we breathe…

5. Lastly, we do not have much time left, so we should not wait for yet more evidence about exactly how harmful unrestrained climate change will be to health and wellbeing, before we start ambitious actions now.

As the climate changes, it is important to prepare for the inevitable: more extreme weather events, heat waves, storms, warmer wetter summers, and drier winters. But we need to take actions in ways that adapt to inevitable change without making the longer term even worse. For instance, we do not need universal air conditioning, but we do need almost universal passive warming and cooling of our schools, hospitals, workplaces, and homes. We must manage natural water supplies in a way that provides water every day, but avoids flooding and droughts over months, years, and decades ahead. We must develop strong local communities which are good places to live and work, but are also resilient assets for themselves in times of stress and crisis.

In the health and social care system, the greatest sustainable (and usually the most cost effective) health benefits come from preventing unnecessary mental and physical illness. This includes addressing the conditions that cause them, and cause them to be distributed so unfairly. A more integrated city wide approach to developing the most important asset we have (ourselves as citizens) can lead to more appropriate models of care, creating the conditions where health, wellbeing, fairness and resilience flourish naturally, helping us to live lives we have reason to value. This means valuing and rewarding people, organisations and systems that actively contribute to preventing the preventable, rather than simply paying isolated parts of the health and care system for treating what should have been prevented. A shared vision, with shared leadership and shared rewards is fundamental to this approach. Health and care professionals and organisations such as primary care centres, GPs, nurses, and social workers have an important chance here to re-frame how we help each other.

The following sections of this report give examples of the actions that we must take now - where actions have additional and almost immediate benefits: "co-benefits". Making the right choices about how we feed ourselves and how we move about can improve health now, and also mitigate climate change in the longer term. For instance, local government and the NHS together can actively stimulate a local

food economy which creates more fulfilling jobs, produces fresh, healthy and tasty food, and strengthens local social links on which our future community resilience depends. This would make our diets more healthy and enjoyable, make tasty food more accessible and affordable, and help to prevent harmful climate change.

Local government and the NHS together account for the movement of many people, goods and services. Many more services can be delivered closer to home using technology better. Improving access to active travel (walking and cycling) and public transport increases physical activity and social connections, improves physical and mental health, helps people stick to a healthy weight, and reduces harmful air pollution and greenhouse gas emissions.

The remainder of this report shows how preventing the preventable, adapting to inevitable changes that have already been set in motion, and ensuring we do not continue to make the problem worse, can all create both immediate *and* longer term benefits.

Every city and community, in every generation, is faced with challenges that are both life threatening and life affirming. Our responsibility is to create the right conditions to help people live lives worth living. This depends on us all taking an active and responsible approach to our physical and social environment. If we want to leave a fair and healthy legacy we can be proud of, then tackling climate change and embedding sustainable development at every level and in every area of our lives is that challenge now.

Adaptation consists of managing the unavoidable. Mitigation involves avoiding the unmanageable. We must do both, we must do them together, and we must do them now.

References

1. Lancet Commission 2009, *Managing the health effects of climate change,* http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60935-1/fulltext (accessed on 9th Oct 2014).
2. Lancet leader Sept 20th, *Climate change and health—action please, not words* http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)61656-1/fulltext (accessed on 10th Oct 2014)
3. BMJ Editorial Oct 4th. Climate Change: WHO should now declare a public health emergency, *BMJ* 2014;349:g5945

3.2 Active travel:

Dawn Lockley, Duncan McIntyre and Mark Daly, Sheffield City Council

Why is this important?

Changes to the way in which we travel can lead to a reduction in air pollution and physical inactivity and the burden of ill health and early death associated with these, as well as a reduction in greenhouse gas emissions. Health and the climate would both benefit.

Our over-reliance on fossil fuelled cars and buses increases both carbon emissions and non CO_2 air pollution. Exposure to air pollution, particularly of vulnerable people, increases the risk of acute and chronic diseases such as heart attacks and strokes, lung cancer and asthma[1]. Equally, lack of physical activity, including for many people making even the shortest of journeys by car rather than walking or cycling, contributes to the rise in obesity in the City. Physical inactivity and obesity are associated with a range of medical conditions including type 2 diabetes, heart disease, strokes, certain cancers, arthritis, and poor mental health[2].

Promoting active travel – walking and cycling - therefore plays an important role in responding positively to climate change and improving health.

Current position

Domestic transport use currently accounts for 21% of the UK's CO_2 emissions, with more than half of this coming from the use of private cars[3]. The total emissions from transport (measured in kilo tonnes of CO_2 ($KtCO_2$)[4] declined in Sheffield between 2005 and 2012 (from 585.0 to 530.0 $KtCO_2$). Emissions per person due to transport use are estimated to have reduced from 1.1 to 1.0 tonnes of CO_2 during the same period[5]. We have also seen modest reductions in mortality attributed to air pollution caused by fossil fuelled transport, but the current figure of approximately 500 deaths per year, is still unacceptably high[6].

In Sheffield only 55% of adults self-report achieving 150 minutes of moderate physical activity a week (the recommended level). 30% report not even achieving 30 minutes a week[7]. Whilst it is not known how many car journeys are made in Sheffield for short distances (under 2 miles), if these journeys were made on foot or by bicycle, the potential for reducing the level of disease associated with physical

inactivity would be significant[8]. Currently only 3% of the population report using a bicycle as a means of travel.

What can we do?

There are many reasons why people continue to rely on motorised transport rather than on more active travel. Perceived barriers include the terrain (too many hills), fears about road safety, over estimation of distances and the physical effort needed to cover them, and the requirements for showers in workplaces. There are a number of ways in which we can encourage and support people to overcome these barriers.

Sheffield's commitment to active travel was outlined in our 2010 strategy 'A vision for excellent transport in Sheffield'. This set out an approach where transport would contribute to a competitive low carbon economy and a better environment, create a culture where the car would not always be the first choice, and most importantly lead to a healthier population[9].

In addition, the recently published 'Move More' plan sets out a 5 year framework for increasing physical activity and reducing sedentary lifestyles in Sheffield[10]. One of the key aims of the Plan is to support the creation of active environments which make it easier for people to build physical activity into their daily lives. For example, the Streets Ahead project provides the City with the opportunity to build new road layouts within the existing road network, creating more cycle paths on roads and, where possible, shared walking and cycling paths[11]. Signposting walking routes, with times taken to walk to the destination, which is often overestimated, rather than distances, would encourage more people to walk.

In response to the Department of Health's 'Get Britain Cycling' report, the Economic and Environmental Wellbeing Scrutiny and Policy Development Committee conducted a cycling inquiry earlier in the year to review the impact of cycling on the local economy, environment and health. The inquiry endorsed the aim of the Get Britain Cycling report, to increase the proportion of all local journeys undertaken by bicycle to 10% by 2025 and 25% by 2050[11], along with implementing a range of other measures to support an increase in cycling. This was then endorsed by Cabinet in July 2014[12].

Reducing speed limits on roads will also contribute to a modal shift away from car usage to more walking and cycling. Sheffield currently has seven 20 mph zones, and there is a commitment to increase

this number to 108 over time[13]. Whilst improved road safety alone justifies 20 mph limits, air pollution and traffic noise drop when speed is reduced and streets become more pleasant and attractive places. Increased use of shared public space contributes to an increase in social capital.

Recommendations

- The Council should develop and implement a programme of signposting walking routes with the time it takes to reach the destination.
- Sheffield people should consider traveling short distances on foot or by bicycle rather than by car, and sign up to 'Move More' at www.movemoresheffield.com.
- The Council should commit to increasing the number of 20 mph zones within the City as quickly as possible.

References

1. World Health Organisation (WHO), *Ambient (outdoor) air quality and health*, World Health Organisation, Fact Sheet No 313, March 2014

2. Department of Transport, *Creating Growth, Cutting Carbon. Making Sustainable Local Transport Happen,* 2011

3. Local CO_2 is not monitored. The data shown is modelled with a 2 year time lag in reporting. DEFRA

4. Department of Energy and Climate Change, *Local Authority Carbon Dioxide Emissions*, www.gov.uk/government/publications/local-authority-emissions-estimates (accessed on 9th Oct 2014)

5. Mortality attributable to air pollution is an indicator in the Public Health Outcomes Framework – www.phoutcomes.info (accessed on 9th Oct 2014)

6. Sport England. *Active People Survey,* http://archive.sportengland.org/research/active_people_survey.aspx   (accessed on 13th Oct 2014)

7. National Institute for Health and Clinical Excellence (NICE). *Physical Activity: Brief Advice for Adults in Primary Care. NICE Public Health Guidance 44.* www.nice.org.uk/ph44 (accessed on 9th Oct 2014)

8. Sheffield City Council, *A Vision for Excellent Transport in Sheffield*, 2010

9. Sheffield City Council, *Creating a Culture of Physical Activity. The Move More Plan: A framework*

for increasing physical activity in Sheffield 2014-2019. www.movemoresheffield.com (accessed on 9th Oct 2014).

10. Sheffield City Council Streets Ahead Programme, https://www.sheffield.gov.uk/roads/works/schemes/streetsaheadproject.html (accessed on 10th Oct 2014)

11. Sheffield City Council, *Cycle Enquiry*, July 2014

12. Sheffield City Council, *Cabinet Report*, 23/07/2014

13. Sheffield City Council, *Transport Planning*, 2014

3.3 Reducing meat consumption

Jess Wilson, Sheffield City Council

Why is this important?

The amount of meat we eat has risen significantly over the past few years. Meat production and transport is a major cause of greenhouse gas emissions, and excess meat consumption, particularly processed meat consumption, is bad for health. Changing our diet can therefore benefit both climate and health.

Current position

Global meat production is predicted to more than double between 2000 and 2050[1], driven in large part by economic growth and increasing population. For many people meat is now artificially cheap and plentiful due to agricultural subsidies. Where historically meat would have been regarded as a treat, it is now a staple part of many people's diet[2]. In 2009 meat consumption in the UK was 84kg per person per year, compared to a worldwide average of 42kg[3].

Meat production is a driver of deforestation and land use change which generates greenhouse gas emissions and destroys valuable carbon sinks and wildlife habitat[4]. It produces significantly more greenhouse gases than vegetable production. For example, producing beef releases 30 kg of CO_2 per kg, while carrots, potatoes and rice produce 0.42, 0.45 and 1.3 kg respectively[5]. 14.5% of greenhouse gas emissions can be attributed to livestock. Beef and milk production account for the majority of the sector's emissions, respectively contributing 41% and 20%, while pork contributes a further 9% and poultry and eggs 8%[6].

Compared to growing crops for direct consumption, rearing animals for food uses large areas of agricultural land (30% of the world's land surface is used to feed livestock[4]) and vast quantities of water (almost 50 times more water is needed to produce 1 kg of beef than is needed to produce 1 kg of vegetables[7]). This creates both environmental and social justice arguments for eating less meat.

Over consumption of meat in the west is contributing to the obesity epidemic, whilst many people in the developing world experience drought and famine that could be alleviated if more food were grown for

human direct consumption. For example the grain that is currently grown to feed livestock would be enough to feed about 840 million people following a vegetarian diet[8].

More than 10 times the amount of fossil fuel energy is used to produce 1 Kcal of meat based protein than is used to produce 1 Kcal of grain based protein[9]. Because of this, it is estimated that if everyone in the UK abstained from eating meat for just one day a week it would save 13 million tonnes of carbon per year – a greater saving than taking 5 million cars off the road[6].

A diet that consisted of less meat, particularly processed meat, and less highly processed food would be more healthy and sustainable. This change should incorporate eating more fruit and vegetables, less fat, salt and sugar, and eating seasonal and locally produced (i.e. fresher) food[2]. Switching to a healthier diet would lead to a reduction in cardiovascular disease, fewer cancers (especially bowel cancer) and in conjunction with being more physically active, contribute towards an overall reduction in obesity and premature mortality in the City[10]. Overall, diet in Sheffield is poor. Only 25% of Sheffield adults eat five or more portions of fruit or vegetables a day, lower than the national average of 28%. An estimated 580 deaths in Sheffield a year could be prevented if diets complied with national nutritional guidelines[11].

What can we do?

Whilst there is little evidence about how to effectively reduce meat consumption *per se,* the effectiveness of strategies to change eating habits is well reported [12,13]. To reduce meat consumption we need to encourage individuals to *choose* to eat less meat by raising awareness of the health benefits, including lower risk of cancer, and environmental impact, and also influence the cultural norms that serve as barriers to behaviour change. Changing socially constructed ideas of what constitutes a 'normal' meal, for example the belief that it must contain meat in addition to vegetables and carbohydrates, will also be necessary [14].

Social marketing and pricing mechanisms could be used to bring about change in meal choices by challenging conventions of sociable dining, or intervening in the form and content of meal routines. Local level interventions might include hospitals, schools and workplace canteens promoting meat free options, or excluding meat on some days each week. Any diet related work, such as teaching cooking skills, or weight management interventions, is an opportunity to promote meat free options.

Sheff Steak-Out is a city-wide campaign to encourage the citizens of Sheffield to adopt a meat-free day to help minimise the human impact on the environment. The campaign has a 5-point plan to help raise awareness of eating and living more sustainably through:

- Eating less meat
- Shopping locally and buying locally grown and sourced produce
- Growing your own, from herbs to veg to fruit
- Reducing reliance on ready meals
- Reducing waste by buying only what you need and saying no to excessive packaging

Ultimately, our aim is for people to have a better knowledge and understanding of the true value of food and the benefits for everyone when more sustainable choices are made.

Helen Davies, Sheff Steak-Out
Twitter **@SheffSteakOut**

Recommendations

- Sheffield City Council and local hospital Trusts should develop their food purchasing arrangements to reflect environmental and health factors, including reduced reliance on meat and dairy in menus.

- Sheffield people should consider reducing the amount of meat they eat by adopting at least one meat free day per week.

References

1. Erb, K.H. *et al*. *Eating the Plant: Feeding and fuelling the world sustainably – a scoping study.* Potsdam: Ecology and PIK, 2009.

2. Friends of the Earth, *Healthy Plant Eating: How lower meat diets can save lives and the plant. London.* Friends of the Earth, 2010.

3. Food and Agriculture Organization of the United Nations (FAO), *Current Worldwide Annual Meat Consumption Per Capita, Livestock and Fish Primary Equivalent*, 2013.

4. Food and Agricultural Organization, *Livestock's Long Shadow: Environmental issues and options,* United Nations, 2006

5. Carlsson-Kanyama, A. et al. Potential contributions of food consumption patterns to climate change. *American Journal of Clinical Nutrition, 2009, Vol 89(5), 1704S-1709S*

6. Food and Agricultural Organization, *Tackling climate change through livestock – a global*

assessment of emissions and mitigation opportunities. United Nations, 2013

7. Mekonnen, M., *The green, blue and grey water footprint of farm animals and animal products, Value of Water Research Report Series No 48.* Delft: UNESCO, 2010

8. Pimental, P.*Food, Energy and Society.* USA: CRC Press, 2007

9. Pimental, P. Sustainability of meat-based and plant-based diets and the environment. The American *Journal of Clinical Nutrition*, 2003; 78(3) 660-663

10. Public Health England. *Longer Lives* http://longerlives.phe.org.uk/   (accessed on 13th Oct 2014)

11. Public Health England. *Public Health Outcomes Framework* http://www.phoutcomes.info/ (accessed on 9th Oct 2014).

12. Wansink, B. Changing Eating Habits on the Home Front: Lost Lessons from World War II Research. *Journal of Public Policy & Marketing* 2002; 21(1) p90-99

13. Spurling, N. *et al. Interventions in practice: re-framing policy approaches to consumer behaviour*. Sustainable Practices Research Group Report, *2013*

14. Mitchell J. The British Main Meal in the 1990s: Has it Changed its Identity? *British Food Journal 1999;* 101: 871-883.

3.4 Warmer homes

Chris Shaw, Robert Almond, Sheffield City Council

Why is this important?

In 2012 31% of total carbon emissions in England came from the domestic sector[1], most of which comes from heating of homes. At the same time fuel poverty, and cold damp housing, are significant causes of poor health. Homes that are better insulated are healthier, cheaper to heat (so reducing fuel poverty), and their heating involves lower carbon emissions.

Current position

The Government's 2011 Carbon Plan[2] was clear that, if we are to mitigate climate change and reach our target of cutting our greenhouse gas emissions by 80% by 2050, 'energy efficiency will have to increase dramatically across all sectors'.

It set out four possible scenarios for 2050, relative to 1990, which imply a per capita energy demand reduction of between 31% and 54%. 80% of the buildings which will be occupied in 2050 have already been built, so reliance on improved buildings standards for new-build homes is not enough. The rate of refurbishment and adaptation for the current stock has to accelerate.

Increasing summer temperatures will increase the risk of building overheating especially in UK cities, increasing the health risk associated with heat stress[3].

Rising indoor temperatures increase mortality and morbidity from respiratory and cardiovascular diseases, an effect made worse by heat exhaustion and air pollution. High temperatures and strong sunlight lead to high levels of ozone and increased levels of aeroallergens, both damaging to health.

Fuel poverty and health impacts of under-heating

Although climate change predictions suggest an increase in average winter temperatures, they also point to greater extremes during periods of cold weather. Investment in house insulation and more efficient heating should lead to warmer homes and reduce excess seasonal mortality and morbidity.

However currently the greatest weather related health risk is that of illness due to cold weather, caused by a significant proportion of our housing stock being old and poorly insulated, and by high energy prices and low incomes. The adverse health consequences of overheating are not likely to exceed those

of cold in the foreseeable future, although this will be an increasing risk as heatwaves become more frequent and more intense.

Sheffield was already reducing emissions from domestic property between 1995 and 2005 through property adaptation and improvement, despite increasing demand for power for electrical appliances and higher indoor living temperatures, with a fall of 4% over that decade. (Average indoor temperatures have risen from 12C in 1970 to 18C in 2007.)[4]

Since then, domestic CO_2 emissions per capita have fallen faster, with a 20% drop, from 2.5 tonnes to 2.0 tonnes over the period 2005-12. This compares with a fall from 2.5 tonnes to 2.2 tonnes for England as a whole in the same period[5].

The Council has invested in local initiatives that make the most of national funding programmes for energy efficiency upgrades in housing, such as the Decent Homes Programme for social housing and the Free Insulation Scheme. This ran from 2009-2012, and reached 80% of private sector properties in the city, generating savings of over 28,000 tonnes of carbon emissions per year.

This illustrates the positive outcomes from large scale domestic retrofit programmes for heating and insulation. The current council-endorsed Sheffield Heat & Save partnership offers discounted prices on heating and insulation, weighted towards the most vulnerable households, but national changes are affecting its impact.

The Sheffield Housing Company (SHC) is currently building 305 homes across 3 development sites in north and south Sheffield. Two key objectives for these developments are **environmental sustainability** and **future adaptability.** They respond to climate change and contribute to improved public health in a number of different ways: Each of the properties in this first phase achieves Code for Sustainable Homes level 3. The Code ensures that; the building fabric conforms to high energy efficiency standards, all white goods are designed for low water usage, the homes reduce energy demands and provide a healthier living environment by being orientated to maximise light and solar gain, and each home is a lifetime home which ensures generous space standards and flexibility for a good quality of life whatever your circumstances or needs. Cycle stores are provided for every property to make it easier to use healthier, more sustainable, methods of transport. 30% of the properties are fitted with rain water harvesting tanks, and 10% of their energy requirements will come from photovoltaic panels.

While advances have also been made in energy efficiency in the private rented sector, it lags behind other tenures. Furthermore, the private rented sector is growing, having doubled in the past ten years with one in five houses now privately rented. According to the Homes & Communities Agency[7], the

average energy rating (Standard Assessment Procedure, SAP) in the social sector has risen from 47 to 57, while in the private sector it has risen from 41 to only 47.

What can we do?

It is important that the City continues to improve the thermal efficiency of the existing stock, on a targeted basis, aiming to maximise the impact of schemes designed primarily as 'carbon reduction' initiatives, on health.

There is a challenge in Sheffield to insulate older, typically solid-wall or hard to treat cavity wall, homes. Internal wall insulation (dry lining) of 6cm would typically reduce the u-value of a solid wall from 2.1 to 0.45. External cladding is also possible in many cases.

The average SAP rating for a council owned property in Sheffield now exceeds 70. There is already a target for the City under the Home Energy Conservation Act (1995) to raise the minimum rating of viable council housing to SAP 65 by 2023/24. This is the minimum SAP rating that will take a household out of fuel poverty.

Although improved thermal efficiency will reduce cold related illness and fuel costs, and may help the building to remain cool in hotter weather, it may also increase the risk of overheating during periods of hot weather as it can reduce heat loss from buildings. Ventilation must be maintained to avoid this, to prevent a rise in indoor air pollutants, and condensation, dampness and mould. Thermal insulation has been shown to have a considerable impact on indoor temperatures in London dwellings[6]. Combined retrofitting of roof insulation and window upgrades reduces daytime living-room temperatures during the warmest periods, while internal retrofitting of wall and floor insulation increased daytime living-room temperatures.

There is also an imminent opportunity within the domestic private rented sector. The Tenant's Energy Efficiency Improvement Regulations will be in force by 1 April 2016, and will empower tenants in the sector to request consent for energy efficiency measures to be installed, that may not unreasonably be refused. We need to incentivise landlords to invest in the energy efficiency of their properties in line with the legislation.

Recommendations

- The Council's forthcoming fuel poverty strategy should include steps to increase the standards of insulation in the private rented sector, so that the average SAP for the sector is 65 by 2020, and the minimum SAP is 65 by 2025.

- Health and care professionals should systematically identify the people and properties most vulnerable to fuel poverty, and ensure that advice and assistance is available to them to address that.

References

1. Communities and Local Government Committee. *Existing Housing and Climate change 2008* Department for Communities and Local Government, HC432-I, 2008.

2. Department of Energy and Climate Change, *The Carbon Plan: Delivering our low carbon future,* HM Gov, 2011.

3. Haines A, et al. Climate Change and Human Health - Impacts, Vulnerability and Public Health. *Journal of Public Health*, 2006, V120 :585-596.

4. Vardoulakis, S. *et al.* Health Effects of Climate change in the indoor environment. In Vardoulakis S and Heaviside C (eds) Health effects of climate change in the UK 2102, 978- 0-85951-723-2, 2012.

5. Department for Energy & Climate Change. *Statistical release Local Authority* CO_2 *emissions.pdf* . https://www.gov.uk/government/statistics/local-authority-emissions-estimates (accessed on 19 Aug 2014).

6. Mavrogianni, A. et al. Building characteristics as determinants of propensity to high indoor summer temperatures in London dwellings , *Building and Environment,* 2012, Volume 55, September 2012, 117–130.

7. Homes and Communities Agency. (accessed on 13th Oct 2014) http://www.homesandcommunities.co.uk/

3.5 Strengthening the local economy and increasing social capital

Jeremy Wight, Chris Shaw and Chris Nield, Sheffield City Council

Why is this important?

Sheffield is part of a globalised economy that is dependent on cheap oil and ever increasing consumption of natural resources, both of which are major contributors to carbon emissions and climate change. Globalisation of the economy, and the increasing dominance of multinationals, has a tendency to lead to poorer working conditions, lower wages and increased inequality[1].

Socio-economic inequality is not only bad for the health of the less well off, but also the health of the better off [1]. It leads to disconnection at local level, lack of connectedness and erosion of social capital. This leads to reduced levels of mental wellbeing and increased levels of physical illness.

Current position

Sheffield rightly has an ambition to be a 'Competitive City of European Significance'[2.] There has been major international investment into the City, in particular into the advanced manufacturing park. We will shortly have one of the most advanced factories in the world within the City's boundaries[3]. However the industrial and commercial sector generated 1.3Mt CO_2 in 2012, which though down from 1.8Mt CO_2 in 2005, still accounted for 41% of the City's emissions[4].

Sheffield has not yet recovered from the global economic crisis of 2007-8, with unemployment, underemployment and poor quality employment still a significant social problem. This is undoubtedly a major driver for poor health, and lies behind the 8 year gap in life expectancy across the City, as well as the other aspects of health inequality[5].

What can we do?

A city such as Sheffield cannot divorce itself from the global economy, and nor should it seek to. But we do need the economy to develop in a way that is good both for the climate and health. The Stern Review[6] in 2006 argued that the economic costs of addressing climate change were significantly less than the cost of not doing so. Locally, the 'Mini-Stern Review' of the Sheffield City Region (SCR) looked at options for de-carbonising the economy[7]. It found that the SCR could reduce its carbon emissions by 16.5% by 2022 (compared to 1990) through investment in energy efficiency measures and small scale renewables. This would require investment of £7.8Bn, but generate annual savings (in energy bills) of

£1.02Bn, giving a payback time of 7.7 years, and annual savings for the lifetime of the measures. If external factors, including reduced consumption consequent on increased energy prices, and the decarbonisation of the national electricity supply are included, an overall drop of 44% could be achieved.

More recently, the New Climate Economy Report: *Better Growth, Better Climate*[8] has argued that 'countries at all levels of income now have the opportunity to build lasting economic growth at the same time as reducing the immense risks of climate change', and set out a ten point plan to do so. The report recognises that cities are the engine of economic growth, but argues that the way they are developing has to change. Two particular recommendations that could have resonance for Sheffield are that there should be a substantial reduction in the capital cost of low carbon infrastructure investment, and that innovation in low-carbon and climate-resilient technologies should be scaled up. Sheffield should build on its cutting edge engineering capabilities to develop further the low carbon industries of the future, including carbon capture and storage. The low carbon sector group of the Local Enterprise Partnership (LEP) clearly has a potential role to play here.

> Sheffield is leading the region on increasing uptake of low emission vehicles. We are working with businesses to provide subsidised electric vehicles and charging points, as well as establishing a network of public access points for rapid charging and fast charging of electric vehicles across South Yorkshire. Work is also underway on setting up infrastructure to use natural gas, bio-methane and hydrogen as a vehicle fuel. These alternative fuels produce less air pollution and carbon emissions, benefitting both the environment and health.

At the same time, we must make sure that the way the local economy develops is one that increases rather than undermines social capital, building on the ideas of the *Transition Towns* movement[9]. This places emphasis on small scale local projects in areas of food, transport, energy, and housing, among other things, as a means of shifting away from high energy, high carbon, climate damaging economies to ones that are more locally based, resilient, and nurturing of social capital and health. Sheffield's 'Successful Centres' policy of promoting local shopping centres and encouraging independent traders contributes towards this. We should also question our overall consumerist lifestyles, not least since there is scant evidence that above a certain threshold increasing material wealth and consumption leads to greater wellbeing.

Recommendations

- Sheffield City Council and the Local Enterprise Partnership should work to implement the findings of the *Mini-Stern Review* and explore opportunities for low carbon infrastructure investment and the development of low carbon technologies.
- Sheffield City Council, working with voluntary sector and other organisations, should continue work to develop social capital in local communities.

References

1. Wilkinson, R. and Pickett, K. *The spirit level: why equality is better for everyone.* Penguin, 2009.

2. Sheffield First Partnership. *Sheffield 2020: Where People Shape the future. The Sheffield City Strategy 2010 – 2020*, Sheffield City Council, 2011.

3. University of Sheffield. *Factory 2050 aims to be the World's most advanced factory when completed in 2015* www.sheffield.ac.uk/news/nr/amrc-factory-2050-1.278634 (accessed on 9th Oct 2014).

4. Department of Energy and Climate Change. *Local Authority Carbon Dioxide emissions* https://www.gov.uk/government/statistics/local-authority-emissions-estimates (accessed on 9th October 2014).

5. Director of Public Health. *New Opportunities: Director of Public Health Report for Sheffield 2013*, Sheffield City Council, 2013.

6. Stern, N. *Stern Review on the Economics of Climate Change*, HM Treasury, London, 2006.

7. The Economics of Low Carbon Cities: A Mini-Stern Review for the Sheffield City Region http://www.lowcarbonfutures.org/reports/economics-low-carbon-cities-mini-stern-review-sheffield-city-region (accessed on 9th Oct 2014).

8. The Global Commission on the Economy and the Climate. *Better Growth, Better Climate: The New Climate Economy* http://www.newclimateeconomy.report (accessed on 9th October 2014).

9. Transition Network. *About Transition Network* www.transitionnetwork.org A 'transition town' is a grass-root community project that seeks to build resilience in response to peak oil, climate destruction and economic instability.

3.6 Developing a low carbon health and social care economy

Jeremy Wight, Sheffield City Council, and Tim Furness and Marion Sloan, NHS Sheffield CCG

Why is this important?

Health and social care comprises about 10% of the economy of the City, and just over 10% of the City's carbon emissions. Being responsible for the health and wellbeing of the City must mean not only preventing ill health and treating illness, but also striving to ensure that the way the health and social care system is managed and run, does as little damage as possible to the climate, and so to the health of people in the future.

Current position

The NHS Sustainable Development Unit has estimated that the carbon footprint of the NHS, public health and social care system in England was 32 mega tonnes of CO_2 equivalent (Mt CO_2e) in 2012[1]. This suggests that the figure for Sheffield would be about 320 kilo tonnes of CO_2, just over 10% of the City's overall carbon footprint of 3.055 Mt CO_2e. Of this, approximately half is attributable to the activities of Sheffield Teaching Hospitals, though this has reduced significantly in recent years[2].

The NHS generates three quarters of the carbon footprint of the health and social care system, with social care generating 22% and public health activity the remaining 3%. However public health and social care services can help reduce the demand for NHS care, and therefore have an impact on the overall carbon footprint of the health and care system that is more than simply attributable to their own activities.

57% of the health and social care system's carbon footprint is attributable to embedded carbon in goods and services procured, including 16% to pharmaceuticals and 9% to medical instruments. 15% of the overall footprint is attributable to building energy use and services commissioned from outside the public sector, and 13% due to travel. Applying these national proportions to Sheffield would suggest that pharmaceuticals account for 51Kt CO_2e, medical instruments 29Kt CO_2e, building energy use 48Kt CO_2e and travel 42Kt CO_2e. (All figures are annual)

Overall, the health and social care system accounts for approximately 40% of the public sector's carbon footprint. NHS Trusts are actively encouraged by the NHS nationally to reduce carbon usage and have

set targets to do so. The joint incentive of protecting the environment and reducing expenditure means that organisations are committed to achieving their targets.

What can we do?

The health and social care system is clearly a significant contributor to carbon emissions overall, and any reduction will contribute to the necessary reduction in overall carbon emissions. There are a number of ways in which this can be done that would lead to better health.

First, any activity that reduces the demand for health and social care, whether this is in the form of health improvement programmes or changes to care pathways, will reduce activity and hence CO_2 emissions. It will also save money. Clearly the overall impact on CO_2 emissions will depend on how any resources that are released, are redeployed. The nett effect will clearly be different if the same overall resource is used on preventive activity that is overall less carbon intensive, as compared to changing care pathways in a way that reduces activity and saves money, but then allows that money to then be reinvested in alternative health care which is more carbon intensive.

Secondly, increased efficiency of management and business processes is likely to lead to both reduced cost and reduced carbon emissions. For example, greater efficiency of building energy use, e.g. through insulation, or better heating systems, will save both money and carbon. Again, the overall carbon footprint of the health and social care system will depend on how any saved resources are used. Increased efficiency can also include a reduction in travel and transport where it is possible to do this without compromising clinical outcomes, through for example care pathway redesign.

Thirdly, substitution, innovation and adoption of new technologies can help increase efficiency and reduce cost and carbon emissions. For example the use of new technologies in telecare and telehealth should reduce the need for travel, and may be expected to improve clinical outcomes overall. It has to be said, however, that the empirical evidence on this is not very strong to date.

Fourthly, there are changes in behaviour among staff, patients and clients which could improve both their health and reduce carbon emissions. In particular a move towards active travel or public transport, rather than the use of private motorised transport, and reduction in the consumption of meat and animal products. These are dealt with elsewhere in this report.

What needs to happen next?

The Climate Change Act of 2008 requires a reduction in carbon emissions of 80% by 2050 based on a 1990 base line, with reductions of 34% by 2020 and 50% by 2025. The carbon footprint of the health and social care system in England in 1990 was 35Mt CO_2e, so the 2012 figure of 32Mt CO_2e represents a fall of less than 9%. Significant further reductions, of the order of a further 28% of the 2012 figure, will be required if the 2020 targets are to be met. This will require concerted actions by all commissioners and providers within the health and social care system in the City.

Actions should include the following.

First, there needs to be an explicit recognition, at the highest level, that further significant step changes in the way that health and social care is planned, commissioned for, and delivered, will be necessary in order to achieve further significant reductions in carbon dioxide emissions. The Health and Wellbeing Board should take a lead on this, but it will require clinicians and practitioners throughout the health and social care system to change what they do.

Secondly, the principles of sustainable development should be considered throughout the commissioning cycle and procurement process. This would mean that considerations for sustainability were given equal weight to financial and clinical considerations in commissioning policy. This shift of emphasis then needs to be built into the monitoring and evaluation of services.

Thirdly, health and social care providers need to be encouraged further to consider carbon hot spots (those elements of the health and social care system that are accountable for particularly high levels of carbon emissions) in their businesses. Health and social care providers also need to adopt a whole lifecycle and responsible sourcing approach to the procurements of goods. This should include the 4 steps in the "procuring for carbon reduction hierarchy of interventions" approach, namely reducing demand, increasing efficiency, substitution and innovation, and supply chain management.

Finally, leaders of the health and social care system in the City have a duty to be exemplars of sustainable behaviour. General Practitioners in particular are visible members of the community, and their adoption of active travel, public transport, and other low carbon work-styles could be influential.

Adopting these approaches do not guarantee that the necessary reduction in the carbon footprint of the

health and social care system will be achieved, but without taking them it is highly unlikely that significant progress will be made.

The Yorkshire Ambulance Service (YAS) has been leading the nation's ambulance services on a carbon reduction strategy. YAS established the Green Environmental Ambulance Network (GrEAN) in 2011 with the aim of bringing together the 13 UK ambulance services to deliver cost savings and carbon reductions that result in improved patient care. The network encompasses fleet, estates, ancillary services, finance, procurement as well as paramedics and other staff. Overall its aims are to:

- Raise awareness of carbon consumption
- Reduce the impact of the ambulance service on air emissions, carbon emissions and public spending
- Share information on trials being carried out across the country
- Quantify the amount of money and carbon that can be saved through the carbon management and reduction programme
- Improve ambulance fuel economy and aerodynamics
- Network effectively to reduce the carbon footprint of the British ambulance services
- Save money through carbon reduction

For more information see: - http://aace.org.uk/implement-a-carbon-management-programme-in-your-organisation-with-grean/

Recommendations

- The Health and Wellbeing Board, and Sheffield's NHS Foundation Trusts, should adopt an explicit sustainability policy aimed at ensuring that Sheffield meets its carbon reduction obligations by 2020. This should be underpinned by the adoption of a sustainability manifesto for the health and social care system in the City.

- The Health and Wellbeing Board should give urgent consideration to the ways in which the implications for carbon emissions of different approaches to the delivery of health and social care in the City can be evaluated. A system of carbon accounting needs to be developed.

References

1. Sustainable Development Unit. *NHS, Public Health and Social Care Carbon Footprint 2012.* www.sduhealth.org.uk/report (accessed on 9th October 2014). The SDU is funded by, and accountable to, NHS England and Public Health England to work across the NHS, and the public health and social care

system. Much of this section is based on information available on the SDU website.

2. Phil Brennan, Director of Estates, Sheffield Teaching Hospitals NHS Foundation Trust. Personal communication. September 2014.

3.7   Preparing for extreme weather events

Ruth Granger, Sheffield City Council, and Peter Whitwam, Rotherham Borough Council

Why is this important?

A first step to adaptation to future climate change has to be to reduce the vulnerability and exposure of populations to the climate variability that they are already experiencing.

Current position

In the UK, the most significant early impacts of climate change are likely to be increases in the frequency and severity of extreme weather events[1]. An extreme event can be defined as any weather event or hazard which has the potential to adversely impact on human health. This can include drought, heatwaves or cold weather, storm events, flooding, earthquakes and volcanic ash release. Climate change will be a factor in the severity, timing or frequency of extreme weather events. Summer temperatures are projected to increase, with more frequent hot spells, which could be exacerbated by heat island effects. Whilst winter temperatures are also projected to increase, there will still be cold spells, and winter rainfall will increase, as will the number of storms and floods.

Public Health England have calculated that since 2002-03 there have been on average 26,500 excess winter deaths a year in England, with the UK having approximately twice the rate of excess deaths compared to some colder countries such as Finland[2]. This will have included excess winter deaths in Sheffield. The 2003 heatwave caused excess deaths (extra deaths that would otherwise have not occurred) across Europe, including approximately 2000 excess deaths in England. Urban areas like Sheffield are more likely to feel the effects of heatwaves due to the density of buildings.

Floods cause substantial harm to property, business and livelihoods, as we are well aware in the City. Two people died in the Sheffield floods of 2007, and the social and well being impacts were significant[1]. All groups are affected, but the negative effects tend to fall disproportionately on the most vulnerable and disadvantaged in society. Disadvantaged groups also have fewer resources to be able to protect themselves against the effects of extreme weather and to recover from extreme weather events[3, 4]. Our population is ageing and therefore is becoming more susceptible to both heat and cold related events.

What can we do?

First, we need to help our communities to become more resilient to climate change. This will require both physical adaptive measures as well as steps to increase the social capital and resilience of communities themselves. Physical measures include works such as river channel clearance to reduce the risk of floods, and increasing sustainable urban drainage. Green spaces and water features help to reduce high temperatures in urban areas, and provide cooling in summer. Sheffield City Council has recently been successful in securing funding for further flood defence schemes in the Lower Don Valley and elsewhere.

As part of its Flood Risk Management Strategy (2013) the Council has successfully registered 6 schemes for Government flood grant in aid funds for the period 2014 to 2021. This programme aims to improve the standard of flood protection to around 6,000 households and 2,000 commercial properties as well as providing capacity to support the building of thousands of homes across the City over the coming years. The schemes seek to address flooding from the City's main rivers including the River Sheaf and River Don – the source of devastating flooding in 2007. A Lower Don Valley Flood Protection scheme is scheduled to begin construction in late 2014 with further schemes being planned for the Upper Don towards Stocksbridge and the Sheaf catchment including the Porter Brook. A sustainable drainage scheme will also support new house building in the Manor and a flood protection scheme for the Upper Blackburn Brook. The programme will also provide opportunities to regenerate riverside locations and deliver wider environmental benefits through habitat creation and improved water quality.

We also need to take steps to protect people, in particular the vulnerable, from overheating. Currently one fifth of homes in England could experience overheating even in a cool summer. 90% of hospital wards are vulnerable to overheating. Cost effective cooling of existing homes is possible, and passive cooling should be built into new homes[5].

Social measures should include steps to increase social capital, thus ensuring that people, families and communities have a suitable level of mental and physical health, wellbeing and connectedness to be resilient to sudden and disruptive events. Individuals and communities can be equipped with the skills and tools to help them to help themselves and others, particularly the most vulnerable people in the community. This could be developed through the *Community Wellbeing Programme* and provided by local voluntary and community sector organisations.

The national Cold Weather[6] and Heatwave Plans[7] are helpful frameworks for action by public sector

organisations during extreme weather. These are implemented in Sheffield by local organisations. These plans include using alerts from the Meteorological Office to determine when to cascade information to staff about anticipated cold weather or heatwave events. However there are some concerns that current measures to prevent flooding and reduce the health risks from overheating do not appear to be keeping pace with the growing risks from climate change.

Public sector organisations have emergency planning arrangements in place to respond to hazards including those that arise as a result of climate change. The Civil Contingencies Act provides a strong framework for emergency preparedness. Organisations in Sheffield have responsibilities under the Civil Contingencies Act to prepare and respond to emergencies including those caused by extreme weather events. In addition the Council's Major Incident Plan, which documents how the organisation will respond to any emergency, includes specific plans on responding to extreme weather incidents such as flooding. However we need to improve the way we help communities to prepare themselves for extreme weather emergencies, for example by encouraging households to sign up to alerts about weather warnings including floods.

Local Health Resilience Partnerships (LHRPs) have been established to oversee the health service's plans for emergency preparedness. The LHRP has a key role to ensure that climate resilience is embedded in the health and social care system. It must also lead the health sector's contribution to wider multi-agency planning for extreme weather events undertaken by the Local Resilience Forum.

Recommendations:

- The Health and Wellbeing Board should consider how to enforce and report on actions set out in the Heatwave Plan for health and social care facilities such as care homes before next summer.
- All organisations should promote uptake of The Environment Agency's 'Floodline Warnings Direct' service https://fwd.environment-agency.gov.uk/app/olr/home for local residents and businesses to help preparedness for flooding. This could be promoted by providing a link to sign up for the alerts on organisations internet sites.
- The Local Health Resilience Partnership (LHRP), and Local Resilience Forum (LRF), should audit local organisations' plans for dealing with the health consequences of severe weather events, and ensure that they are adequate.

References

1. *Managing Climate Risks to Well Being and the Economy*: Committee on Climate Change , 2014.

2. Office for National Statistics, http://www.ons.gov.uk/ons/datasets-and-tables/ (accessed on 10th October 2014).

3. Sustainable Development Unit: *Under the Weather: Improving health, wellbeing and resilience in a changing climate* http://www.sduhealth.org.uk/resources/ (accessed on 22nd Aug 2014).

4. Your Climate. Climate Change Partnership for Yorkshire and Humber: http://www.yourclimate.org/pages/local-health-wellbeing-changing-climate (accessed on 22nd Aug 2014).

5. Committee on Climate Change: Adaptation sub-committee progress report, *Managing climate risks to well-being and the economy.* http://www.theccc.org.uk/publication/managing-climate-risks-to-well-being-and-the-economy-asc-progress-report-2014/ (accessed on 9th Oct 2014).

6. Public Health England. *Cold Weather Plan for England 2013*, Public Health England, 2013.

7. Public Health England, *Heatwave Plan for England 2014,* Public Health England, 2014.

3.8   Designing healthy urban spaces and places

Louise Brewins and Jeremy Wight, Sheffield City Council

Why is this important?

The design of our urban environment has a critical role to play in helping the people of Sheffield to adopt lifestyles that are both healthier and have a lower carbon footprint, both as a result of that behaviour change as well as through more carbon efficient infrastructure. By improving the quality of our urban environment we can help to deliver a greener, stronger and healthier Sheffield. Our City needs to become a place that is not only resilient to the adverse effects of climate change, but also one that encourages behaviour that improves health and the environment. We need to develop and strengthen the City's 'green infrastructure' by ensuring that the design and development of land, open spaces, water and public buildings in Sheffield contributes directly to reducing CO_2 emissions, increases resilience to extreme weather effects and promotes healthier places in which to live and work.

Current position

The European Commission defines green infrastructure as 'the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits. It includes parks, open spaces, playing fields, woodlands, wetlands, road verges, allotments and private gardens. Green infrastructure can contribute to climate change mitigation and adaptation, natural disaster risk mitigation, protection against flooding and erosion as well as biodiversity conservation.'[1]

The Green Infrastructure Strategy for South Yorkshire (2011) shows that the green capital of South Yorkshire (i.e. natural assets and resources) has the potential to become one of the strongest and most distinctive features of the area, but it is currently falling short of reaching this potential[2]. Key gaps in policy and provision could be acting as barriers to future development. Two major aspects of development include de-centralised energy generation and sustainable urban drainage systems.

What can we do?

In the UK, and in Sheffield, our energy systems are largely centralised and reliant on imported fossil fuels. We want to be the first decentralised energy city in the UK, to be self-sufficient in energy, derived

from low carbon sources, and to offset all emissions[3]. The City is recognised as a leader in the field of decentralised energy, as a result of its well established city centre district energy network connected to the Energy Recovery Facility at Bernard Road, and the numerous smaller scale community heating schemes across the City. Nevertheless we also need to encourage other renewable energy systems, whether these are at the domestic or larger scale, and the work of organisations such as *Sheffield Renewables*. Planning policies should facilitate this.

Modern cities struggle to cope with heavy rainfall, which can lead to serious flooding. Most rainwater that is diverted into our drains does so as a result of the amount of paving and hard surfaces in the area. Our sewers are not large enough to cope with the amount of water that runs off our roofs. Sustainable urban drainage systems (SUDs) offer an alternative to traditional underground drains that will alleviate pressure on the existing drainage system and reduce flash flooding. Measures include controlling rainwater at source (through installing water butts in gardens, increasing the number of homes and buildings with green roofs, and using permeable paving), building infiltration trenches, filter drains, swales and basins and creating more ponds and wetlands. The planting of more trees and shrubs in the City could be part of sustainable urban drainage systems and reduce heat island effects[4]. They can also attract wildlife and contribute to recreational green space, thus benefitting physical and mental health[5,6].

As discussed elsewhere in this report, a major shift from motorised transport to active travel, and from private cars to public transport, could both reduce greenhouse gas emissions (and other forms of air pollution) and improve health. Our planning policies should therefore prioritise public transport over private car use, and walking and cycling over both.

Sharrow primary school is an excellent example of a small project on a single public building that was designed to have maximum environmental and community benefits. A key feature is the School's green roof which helps to alleviate extreme rainfall, humidity, noise, pollution and to provide insulation. The roof was designed to be multi-functioning, requiring low input, no artificial fertiliser or irrigation, to use locally sourced re-cycled materials, create a garden and be resilient to the local climate. The roof was declared a local nature reserve in 2009.

Recommendations

There are many actions we can and should be taking to promote a greener, healthier and resilient environment for Sheffield residents to live and work in, but in particular:

- The Council should ensure that health issues are built into local development and regeneration plans and integrate adaptation principles into the local planning framework.

References

1. European Commission (Environment): *Green Infrastructure.* http://ec.europa.eu/environment/nature/ecosystems/index_en.htm (accessed 10th Oct 2014).

2. South Yorkshire Forest Partnership (2011). *South Yorkshire Green Infrastructure Strategy*. http://www.syforest.co.uk/projects.php?p=273 (accessed on 9th Oct 2014).

3. Sheffield City Council*. Sheffield – The De-Centralised Energy City: Enabling Low Carbon Growth in the 21st Century,* 2005

4. Cabinet Office. *The Pitt Review: Learning lessons from the 2007 floods* http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pitt review/thepittreview.html (accessed 29 Aug 2014).

5. Forestry Commission. *Air temperature regulation by urban trees and green infrastructure.* http://www.forestry.gov.uk/pdf/FCRN012.pdf/$FILE/FCRN012.pdf (accessed on 10th Oct 2014).

6. Douglas I. *Urban green space and mental health.* Prepared for the UK Man And the Biosphere Urban Forum, May 2004. www.green-space.org.uk/downloads/articles/Urban%20green%20space%20and%20mental%20health.pdf (accessed on 13th Oct 2014).

4 Recommendations

Each year the DPH report makes recommendations about improving the health of the local population and directs these recommendations towards particular organisations or groups. In this chapter we begin by looking at the progress made against the recommendations in the previous DPH report (2013). This is followed by a list of the recommendations made in the individual sections of this year's report (2014).

4.1 Progress on 2013 Recommendations

	The Council should:	Progress
1	use proposals developed as part of the *Fulfilling Lives: A Better Start* bid to inform focussed investment in evidence based prevention and early intervention in the early years.	SCC's Early Years Strategy (now named Sheffield's Best Start strategy), sets out plans city-wide to transform early years' services in alignment with the Best Start Sheffield principles. Key to the Best Start Strategy is an expanded, integrated model of universal and targeted prevention and early help which is being delivered through Best Start teams, wrapped around Children's Centres. The model involves community based voluntary and paid staff and seeks to deliver excellence in the Healthy Child Programme, including providing the foundations for effective early learning. A new Best Start volunteer programme will also be commissioned, expanding and integrating existing arrangements alongside peer support. The model will include baseline training, co-ordinated support for volunteers and for specialist activities. It will provide a structured pathway for volunteers to help build their experience and skills, and assist volunteering in early years' settings to establish a solid foundation and achieve maximum outcomes.
2	ensure the Children and Young People's Joint Commissioning Group leads the redesign and	Comprehensive Emotional Wellbeing and Mental Health – Health Needs Assessment completed and universal prevention pilot completed at Park Academy. This pilot has been extensively evaluated and has resulted in approval to go ahead with the procurement of an extension to support work across 3 further families of schools, linking with MAST and the citywide targeted counselling resource in Community Youth Teams.

	commissioning of a universal prevention and early intervention emotional wellbeing and mental health service	
3	ensure all its portfolios provide appropriate representation at the Sexual Health Planning and Commissioning Group, and contribute towards the development of a citywide sexual health commissioning strategy	Work has been underway to develop the Sexual Health Integration Board to ensure representation from relevant providers and commissioners of sexual health services. A sexual health clinical advisory group has also been established and a review of the Sheffield Sexual Health Service is currently underway. This external peer review includes scrutiny of current reporting and governance arrangements and is expected to make recommendations about the future development of a broader sexual health commissioning group. The report will be finalised during October 2014.
4	systematically prioritise initiatives to encourage Sheffield people to 'Move More', making being physically active the norm by building physical activity into their daily life.	The Move More Board, (a partnership of VCF groups, statutory organisations, individuals and professionals) has now been established, and an officer appointed in May 2014 with responsibility for facilitating the implementation of the Move More plan. The plan will create a culture change in physical activity over the next five years. It has six outcomes, giving a holistic approach to increasing and building physical activity into daily life. • Empowered Communities • Active Environments • Active People and Families • Activity as Medicine • Active Schools and Active Pupils • Active Workplaces and Active Workforce. Work is being progressed in each of the areas with significant engagement being made in some areas already. As part of the Tour de France Legacy, Sheffield City Council has entered into partnership with British Cycling, thus increasing opportunities for Sheffield residents to join organised cycle rides throughout the year. The partnership also saw Sheffield hold its first mass participation bike ride in 2014 which was attended by 2,000 people. For further information on Move More please visit www.movemoresheffield.com

5	fully support a citywide programme to reduce the availability and supply of illicit tobacco, which will include targeted enforcement action by Trading Standards.	A programme to reduce availability and supply of illegal tobacco is a key part of the citywide strategic ambition to reduce smoking prevalence amongst adults; children aged 15 years of age and pregnant women. An action plan outlining key actions to reduce the availability and supply of illegal tobacco 2012-15 is in place. Progress is monitored twice yearly via the citywide Tobacco Control Programme Accountable Board. Key actions included in the plan are; (i) Developing partnerships and engagement, strategic and tactical with local and regional agencies, (ii) engaging health and community workers to raise awareness of the programme, (iii) generating and sharing intelligence to identify the extent of illegal tobacco use within the City and (iv) marketing and communications. In addition a small team of Tobacco and Alcohol Enforcement Officers are based in Sheffield City Council Trading Standards Team.
6	use the Care Homes Well Being Needs Assessment, to inform commissioning priorities for people who live in care homes.	A recommendation that has been taken forward from the Needs Assessment in 2013 is the Care Homes Settings Approach. Residential care homes for older people have been asked to choose activities to support residents with dementia, residents at risk of falls or new residents. This is a practical, 'plan-do-review' approach and at a meeting in September 2014 nine care homes signed up for a pilot period until March 2015. The following steps are being taken forward: • The Settings Approach is being led by the Care Home Activities Group • Care Homes will use their existing qualitative and quantitative data that they feel is relevant to the wellbeing of their residents. Capturing this data will enable the Activities Group to decide which wellbeing priority is the most pertinent to the care home at this time. The purpose of the 'REVIEW' phase is to: • evaluate achievement of outcomes; • review, share and celebrate improvements in residents wellbeing; • and review care home's provision for residents' wellbeing. Care Homes will look back at their action plans and assess what outcomes were achieved. They should also consider what they have learnt from the process. This pilot will contribute to adult social care commissioning by working in partnership with Providers to understand market decisions and input into key strategic decisions to make sure older people in residential care get the best on offer.
7	seek to enhance the	SCC developed a social model of public health recognising the wider determinants of health and the need to

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resilience and social capital of the most deprived communities in Sheffield by: • using the skills and experience of the Healthy Communities staff in the new locality model • increasing the capacity of lay workers and volunteers, by working in collaboration with the Voluntary, Community and Faith sector • enhancing the ability of mainstream services to promote community resilience through developing their public health skills.	develop social capital to address health inequalities. The Community Wellbeing Programme (CWP), previously known as the Healthy Communities Programme, will have a greater focus on social capital. This programme aims to challenge health inequalities by working with voluntary sector Providers in neighbourhoods and with communities who experience the poorest health. The Public Health team will continue to work closely with appropriate Council staff, including Locality, Library and Housing teams. The team will further develop links between local communities and the NHS, particularly with regard to the Integrated Health and Social Care agenda. The Sheffield 'Communities Got Talent' conference was widely recognised as being very successful in demonstrating the value of using an asset based approach. It was attended by over 180 delegates including national and local speakers and presentations from GPs and local people. The CWP supports delivery of the Health Trainers and Health Champions programmes. Evaluation reports indicate increased confidence, self- esteem and motivation for individuals involved; these factors are the foundation for improving health and building community resilience. Progress with regard to increasing the capacity of lay workers and volunteers in specific programmers includes: • The Health Trainers Programme has extended to cover additional areas gaining national recognition. This is mainly funded through the CCG, • Practice Champions were successfully introduced as a new development from the existing Health Champions' project. This lottery funded project is as a partnership between a VCF Provider and 4 GP Practices, • The Community Health Champions provided by Sheffield Cubed and funded through the Public Health grant. This successful approach continues to act as a good model for other volunteer health initiatives. Community resilience has been promoted: • by enhancing the public health skills of front line staff delivering mainstream services in Housing and Social Care, • through the creation of a Public Health Learning and Development post to support the development of public health skills across the council, • from securing additional resources through the STH charitable trust, in conjunction with SCHARR and CLAHRC, to develop the role of frontline staff and Make Every Contact Count. • through the Community Development and Health course which now offers a range of training opportunities to build community resilience. A comprehensive study of the Social Return on Investment has illustrated the benefits of this course	

8	through the implementation of the Health and Wellbeing Strategy work programme, *Building mental wellbeing and emotional resilience*, invest in public mental health, and instigate a renewed approach to improving mental wellbeing in the City.	The programme working group has begun to meet, with lots of interest and commitment from partners. An action plan will follow, aiming to raise awareness of the 5 ways to wellbeing: **Connect; Give; Be active; Take notice; Keep learning**; and to maximise opportunities to influence individual wellbeing and community resilience. While delivering a programme for the Joint Health and Wellbeing Strategy, this work will be overseen and supported by the Mental Health Partnership Board.
9	use its outreach to raise awareness of, and promote, schemes such as the Fixed Penalty Notice Waiver, and ensure that all parts of the organisation that have an influence on alcohol consumption and related harm.	In 2013/14 224 individuals successfully completed an alcohol assessment, brief advice and education session, following being issued with a fixed penalty notice as part of a local waiver scheme; this was an 87% completion rate. 1,327 individuals received Identification and Brief Advice through assertive outreach. 2,025 individuals received an alcohol triage assessment through the Single Entry and Assessment Point for access to community alcohol services. 1,810 treatment places were used in 2013/14: 680 individuals took up the offer of extended brief interventions (3-12 sessions of 'talking treatment'); 473 individuals took up the offer of psychosocial interventions (6-12 sessions of 'talking treatment'); and 657 individuals received a medical prescribing intervention in the community. 55 offenders, where alcohol was implicated in their offending, successfully completed a community sentence (Alcohol Treatment Requirement).
10	increase employment opportunities by removing health barriers, especially for those affected by mental health conditions and where appropriate, for the same group, seek to develop employment as a way out of poor health.	Secured £175,000 to deliver £400k pilot project with SCC Learning and Skills team, Job Centre Plus and GPs in North Sheffield to increase employment rates of residents on Employment Support Allowance with a mental health condition. Specification agreed, currently out to tender and due to commence October /November 2014 for two years Currently reviewing supported employment provision across the City and Adult Social Care, the CCG and VCF sector. Initial review completed. Consultation planned in partnership with Adult Social Care in October /November 2014. Pathway to be designed by December 2014 and the Commissioning Strategy by Spring 2015. Revised provision in place late summer 2015.

		"Employer of Choice' award being developed as part of our Fairness Commission delivery. The Award criteria will include provision for employees with disabilities or Mental Health conditions. Launch due Autumn 2014.
11	contribute towards improved uptake of the Health Check through: • encouraging employees to take up their Health Check • using contracting mechanisms to ensure Council contractors are encouraged to support their employees to take up their Health Check invite • using existing outreach into disadvantaged communities to encourage the uptake of Health Check	Health checks have been included in the CCG's 'basket of services' to ensure universal coverage of all GP practices across Sheffield. Practices serving the most disadvantaged communities have been offered additional support in setting up and running the health check programme. There are current discussions at the SCC Employee Health and Wellbeing Steering Group about how health checks can be offered to employees in the workplace.

4.2 Recommendations for 2014

1. The Council should develop and implement a programme of signposting walking routes with the time it takes to reach the destination.

2. Sheffield people should consider traveling short distances on foot or by bicycle rather than by car, and sign up to 'Move More' at www.movemoresheffield.com.

3. The Council should commit to increasing the number of 20 mph zones within the City as quickly as possible.

4. Sheffield City Council and local hospital Trusts should develop their food purchasing arrangements to reflect environmental and health factors, including reduced reliance on meat and dairy in menus.

5. Sheffield people should consider reducing the amount of meat they eat by adopting at least one meat free day per week.

6. The Council's forthcoming fuel poverty strategy should include steps to increase the standards of insulation in the private rented sector, so that the average SAP for the sector is 65 by 2020, and the minimum SAP is 65 by 2025.

7. Health and care professionals should systematically identify the people and properties most vulnerable to fuel poverty, and ensure that advice and assistance is available to them to address that.

8. Sheffield City Council and the Local Enterprise Partnership should work to implement the findings of the *Mini-Stern Review* and explore opportunities for low carbon infrastructure investment and the development of low carbon technologies.

9. Sheffield City Council, working with voluntary sector and other organisations, should continue work to develop social capital in local communities.

10. The Health and Wellbeing Board, and Sheffield's NHS Foundation Trusts, should adopt an explicit sustainability policy aimed at ensuring that Sheffield meets its carbon reduction obligations by 2020. This should be underpinned by the adoption of a sustainability manifesto for the health and social care system in the City.

11. The Health and Wellbeing Board, should give urgent consideration to the ways in which the implications for carbon emissions of different approaches to the delivery of health and social care in the City can be evaluated. A system of carbon accounting needs to be developed.

12. The Health and Wellbeing Board should consider how to enforce and report on actions set out in the Heatwave Plan for health and social care facilities such as care homes before next summer.

13. All organisations should promote uptake of The Environment Agency's 'Floodline Warnings Direct' service https://fwd.environment-agency.gov.uk/app/olr/home for local residents and businesses to help preparedness for flooding. This could be promoted by providing a link to sign up for the alerts on organisations internet sites.

14. The Local Health Resilience Partnership (LHRP), and Local Resilience Forum (LRF), should audit local organisations' plans for dealing with the health consequences of severe weather events, and ensure that they are adequate.

15. The Council should ensure that health issues are built into local development and regeneration plans and integrating adaptation principles into the local planning framework.

5 Glossary

Adaptation (Climate change)	Any change made to natural or human systems in response to climatic changes which reduces risks or exploits beneficial opportunities.
Aeroallergens	Any airborne substance, such as pollen or spores, which triggers an allergic reaction (e.g. hay fever).
Arthropods	An invertebrate animal having an external skeleton, a segmented body, and jointed appendages. Arthropods include insects, spiders, and crustaceans.
Biodiversity	The degree of variation of life.
Carbon accounting	The processes used to "measure" amounts of carbon dioxide equivalents emitted by organisations or systems of organisations.
Carbon capture (and storage)	The process of capturing waste carbon dioxide from large sources, such as fossil fuel power plants, transporting it to a storage site, and depositing it where it will not enter the atmosphere, normally underground.
Carbon footprint	The "total" amount of greenhouse gas emissions caused by an organisation, event, product or person.
Carbon sink	A natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period.
Cryptosporidiosis	A parasitic disease that affects the intestines and is typically an acute short-term infection that is often spread through contaminated water.
Deforestation	Removal of a forest or stand of trees where the land is thereafter converted to a non-forest use. Examples include conversion of forestland to farms or for housing.
Fossil fuels	Energy sources formed by natural processes such as decomposition of buried dead organisms. They contain high percentages of carbon and include coal, petroleum, and natural gas.
Global warming	The observed rise in the average temperature of the Earth's climate system.
Greenhouse gas	A gas in the atmosphere that absorbs and emits radiation within the thermal infrared range. The main greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Greenhouse gases greatly affect the temperature of the Earth.
Infiltration trenches	A shallow, excavated ditch that has been filled with rubble or stone to create an underground reservoir.
Legionnaire's disease	A serious lung infection caused by legionella bacteria. The bacteria are commonly found in sources of water, such as rivers and lakes. However, they can rapidly multiply if they find their way into artificial water supply systems such as air conditioning systems.
Leptospirosis	A type of bacterial infection spread by soil or water contaminated with the urine of animals (commonly rodents). In its most severe form, leptospirosis is also known as Weil's disease.

Lyme disease	A bacterial infection spread to humans by infected ticks. Ticks are tiny arachnids found in woodland areas that feed on the blood of mammals, including humans.
Mitigation (Climate change)	Strategies to reduce or prevent human induced emission of greenhouse gases and enhance carbon sinks (e.g. new technologies, renewable energy, changing consumer behaviour)
Passive cooling	Building design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low or nil energy consumption.
Pathogens	In the broadest sense a pathogen is anything that can produce disease. Typically the term is used to mean infectious agents such as bacteria or viruses.
Permafrost	Soil at or below the freezing point of water for two or more years and mostly located in high latitudes such as land close to the North and South poles.
Resilience	An individual's or community's ability to properly adapt to stress and adversity.
Salmonella	A group of bacteria that can cause food poisoning. Foods such as eggs, chicken, pork and dairy produce can carry salmonellas. Fruit and vegetables can also become contaminated if they have been in contact with livestock, manure or untreated water.
Social capital	The pattern and intensity of networks of people and the shared norms, values and understandings that arise from and facilitate co-operation within and among those networks.
Standard assessment procedure (SAP)	The methodology developed by the Building Research Establishment in 1992 to assess and compare the energy and environmental performance of dwellings. The SAP quantifies a dwelling's performance in terms of energy use per unit floor area, a fuel-cost-based energy efficiency rating and emissions of CO_2. The higher the SAP rating the better.
Sustainable urban drainage system	A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.
Swales and basins	Swales are grassed depressions which lead surface water runoff from the drained surface to a storage or discharge system, such as a basin, typically using the green space that may run alongside a road or development. A basin is a dry or wet pond designed to attenuate storm water runoff for a few hours and to allow the settlement of solids.
Telehealth and telecare	Technology such as personal alarms and health-monitoring devices used to help people live more independently at home. They help to reduce the number of regular visits someone may need to make to the GP or hospital.
Thermal efficiency	How well a device, such as a boiler or refrigerator, converts energy into heat.
U-Value	A measure of heat loss in a building element such as a wall, floor or roof. A low U value usually indicates high levels of insulation.

Urban heat islands	A metropolitan area that is significantly warmer than its surrounding rural areas due to human activities. The main cause of the urban heat island effect is from the modification of land surfaces, which use materials that effectively store short-wave radiation.
Verocytotoxin producing E-Coli (VTEC)	A group of bacteria that cause infectious gastroenteritis. The main source for VTEC is cattle and other ruminants. Transmission to humans occurs through consumption of contaminated food or water, or exposure to a contaminated environment involving direct or indirect contact with animals or their faeces.
Wetlands	Land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. Main types include swamps, marshes, bogs and fens.

More information

This report can be downloaded from:

https://www.sheffield.gov.uk/caresupport/health/director-of-public-health-report-2014.html   (Full Report of the Director of Public Health for 2014)

A summary version of this report can be downloaded from the same website.

Your Views

We are keen to hear your views on this report. If you would like to make any comments, please contact the Director of Public Health:

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