

infertility services rather than an economic one it is time to re-evaluate postcode prescribing.

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1 National Institute for Clinical Excellence. *Fertility: assessment and treatment for people with fertility problems. NICE guideline, second draft for consultation.* London: National Institute for Clinical Excellence, 2003. [www.nice.org.uk/pdf/Fertility\\_Fullguideline\\_2ndconsultation.pdf](http://www.nice.org.uk/pdf/Fertility_Fullguideline_2ndconsultation.pdf) (accessed 30 Aug 2003).

2 Dobson FA. *Secretary of state's speech.* 31 March 1999. [www.nice.org.uk/Embcats.asp?page=oldsite/back/frank\\_dobson.htm&d=907](http://www.nice.org.uk/Embcats.asp?page=oldsite/back/frank_dobson.htm&d=907) (accessed 30 Aug 2003).

3 Boseley S. Huge NHS bill for infertility rights: Guidelines give couples new hope to start families. *Guardian* 26 August 2003:2. [www.guardian.co.uk/guardianpolitics/story/0,3605,1029317,00.html](http://www.guardian.co.uk/guardianpolitics/story/0,3605,1029317,00.html) (accessed 30 Aug 2003).

4 British Fertility Society. *BFS response to NICE provisional guidance on fertility services.* 26 August 2003. [www.fertility.org.uk/news/pressrelease/03\\_08-nice\\_guidance.html](http://www.fertility.org.uk/news/pressrelease/03_08-nice_guidance.html) (accessed 30 Aug 2003).

5 BBC News. *NHS "should offer free IVF."* 26 August 2003. <http://news.bbc.co.uk/1/hi/health/3174753.stm> (accessed 30 Aug 2003).

6 Smith R. The failings of NICE. *BMJ* 2000;321:1363-4.

7 Rawlins M. The failings of NICE. *BMJ* 2001;322:489.

8 Hutton W. *New life for health. The commission on the NHS.* London: Vintage, 2000.

9 Weindling P. *Health, race and German politics between national unification and Nazism 1870-1945.* Cambridge: Cambridge University Press, 1989.

10 Emanuel E. *The ends of human life: bioethics in a liberal polity.* Cambridge, Mass: Harvard University Press, 1995.

11 Daniels N. Accountability for reasonableness. *BMJ* 2000;321:1300-1.

12 Rawls J. *A theory of justice.* Oxford: Oxford University Press, 1973.

## Death in heat waves

*Simple preventive measures may help reduce mortality*

**I**ncreasing evidence shows that atmospheric carbon dioxide levels are rising and are causing global warming.<sup>1</sup> Record air temperatures were recorded in Britain during the last month. Accurate estimates of the consequences of these must wait until daily mortality data are available, but press reports indicate that the hot weather caused around 1000 deaths during one week alone in Britain and perhaps 10 000 overall in France, where temperatures were higher.

Mortality in Britain is lowest when the mean daily temperature is 17-18°C. The number of heat related deaths per year, obtained as the number of excess deaths on days hotter than this, has averaged around 800 in recent years.<sup>2</sup> Most of those deaths are of people over 70 years of age, and most occur in the first day or two of a period of high temperature.<sup>3</sup>

Few of these deaths are recognisable clinically as being due to heat.<sup>4</sup> Heat stress causes loss of salt and water in sweat, causing haemoconcentration, which in turn causes increases in coronary and cerebral thrombosis.<sup>6</sup> Other deaths in heat waves are probably due to overload of already failing hearts, unable to meet the need for increased cutaneous blood flow in the heat. Very few heat related deaths in British conditions are caused by hyperthermia, overheating sufficient to cause denaturation of the body tissues, but patients unable to sweat because they have diabetic peripheral neuropathy or are taking anticholinergic drugs are known to be at risk in American heat waves. So are patients taking drugs such as barbiturates or phenothiazines, which depress reflex regulation of body temperature. Alcohol can also be dangerous in the heat, both through depression of the central nervous system and by causing diuresis and consequent dehydration.

According to some predictions heat related mortality will increase drastically as global warming develops,<sup>7</sup> but recent evidence is relatively reassuring. Heat related mortality is similar in hot and cold parts of western Europe<sup>8</sup> and in hot and cold parts of the United States.<sup>9</sup> This implies that the populations of hot regions have adjusted by physiological or other means to their hotter summers. In Britain annual heat related

deaths are in any case far fewer than cold related deaths, so that the initial effect of increased temperatures all year round, before such adjustment, would be to reduce net annual mortality.<sup>2</sup>

Analysis of actual changes in heat related mortality during global warming since 1971 is even more reassuring. Despite rises in mean summer temperatures of at least 1°C in southeast England and North Carolina heat related mortality has not risen in southeast England and has virtually disappeared in North Carolina.<sup>10</sup> The latter represents something more than adaptation as it could prevent the mortality rising with higher temperatures but could not make it fall. The likely explanation is the increase in air conditioning (from 57% to 72% between 1978 and 1997) that has occurred in households in that region of the United States and is in turn attributable to increasing prosperity.

However reassuring these facts may be, they do not mean that nothing needs to be done. As the recent hot weather has reminded us climatic warming is not continuous but is interrupted by unpredictable fluctuations. As in the recent heat wave these can suddenly present populations with temperatures that they have never encountered before and are not prepared for. People with heat exhaustion need to be given fluids by mouth and sometimes intravenous saline and dextrose, but by far the most important measures are preventive ones.

Air conditioning can allow people to continue to work effectively in hot weather and may become necessary to prevent mortality, but it uses a large amount of energy, which can itself accelerate global warming. Simpler measures can be very effective in protecting elderly and other vulnerable people from the levels of heat likely to occur in Britain over the next decade. Continuing to eat regular meals and drink enough water will normally prevent dehydration during heat stress. An open window, fan, light and loose fitting clothing, avoidance of unnecessary exertion, and if necessary sprinkling water on the clothing, can prevent the heat stress.

Such action is effective only if it is taken in time, and it needs to be taken by the general public as well as staff working in homes caring for elderly people. The time to check that windows can be opened, and that a fan is available, is when hot weather is forecast, not when it occurs; delay until temperature reaches a peak may mean that nobody can free a jammed window, or find a fan, for many hours. Elderly people unable to do this themselves, or to get help from relatives or neighbours, need to be given a number to call for help. Brief messages, giving simple advice on these lines in news broadcasts and daily press when hot weather is forecast, could be the most effective way to reduce illness and death in heat waves.

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- 1 Hume M, Jenkins G, Brooks N, Cresswell D, Doherty R, Durman C. What is happening to global climate and why? In: Maynard RL, ed. *Health*

- effects of climate change in the UK*. London: Department of Health, 2001:18-47.
- 2 Donaldson GC, Kovats, RS, Keatinge WR, McMichael RJ. Heat- and cold-related mortality and morbidity and climate change. In: Maynard RL. *Health effects of climate change in the UK*. London: Department of Health, 2001:70-80.
  - 3 MacFarlane A, Waller RE. Short term increases in mortality during heat waves. *Nature* 1976;264:434-6.
  - 4 Ballester F, Corella D, Peres-Hoyos S, Saez M, Hervas A. Mortality as a function of temperature. A study in Valencia, Spain, 1991-1993. *Int J Epidemiol* 1997;26:551-61.
  - 5 Shen T, Howe HL, Alo C, Moolenaar RL. Towards a broader definition of heat-related death: comparison of mortality estimates from total death differentials during the July 1995 heat wave in Chicago, Illinois. *Am J Forensic Med Path* 1998;19:113-8.
  - 6 Keatinge WR, Coleshaw SRK, Easton JC, Cotter F, Mattock MB, Chelliah R. Increased platelet and red cell count, blood viscosity, and plasma cholesterol levels during heat stress, and mortality from coronary and cerebral thrombosis. *Am J Med* 1986;81:795-800.
  - 7 Kalkstein LS, Greene JS. An evaluation of climate/mortality relationships in large US cities and the possible impacts of a climate change. *Environ Health Perspect* 1997;105:84-93.
  - 8 Keatinge WR, Donaldson GC, Cordioli E, Martinelli M, Kunst AE, Mackenbach JP, et al. Heat related mortality in warm and cold regions of Europe, observational study. *BMJ* 2000;321:670-3.
  - 9 Curriero FC, Heiner KS, Samet JM, Zeger SL, Strug L, Patz JA. Temperature and mortality in 11 cities of the eastern United States. *Am J Epidemiol* 2002;155:80-7.
  - 10 Donaldson GC, Keatinge WR, Nayha S. Changes in summer temperature and heat-related mortality since 1971 in North Carolina, South Finland, and Southeast-England. *Environ Res* 2003;91:1-7

## Polypharmacy and comorbidity in heart failure

*Most patients have comorbidities that need to be addressed*

The care of patients with heart failure has become increasingly complex. For some patients treatment based on evidence and recommended by guidelines now includes agents that prolong life, alleviate symptoms, and reduce admissions to hospital.<sup>1,2</sup> Simultaneously, the treatment of underlying causative factors, including hypertension, coronary artery disease, and dyslipidaemia has evolved rapidly, increasing the number of pharmacological agents that are considered necessary for many patients with heart failure. The characteristics of the typical patient further complicate management. The burden of heart failure falls disproportionately on elderly people, who often are simultaneously afflicted with many other conditions.<sup>3,4</sup> In a recent study of older Americans admitted to hospital with heart failure, diabetes (38%), chronic lung disease (33%), atrial fibrillation (30%), and prior stroke (18%), were remarkably common.<sup>5</sup> Thus practitioners typically face the challenge of managing not a single condition but multiple conditions requiring multiple medications. As the population ages this scenario will become more common.

Unfortunately little evidence is available to guide the inevitable polypharmacotherapy in patients with heart failure and multiple comorbidities. The strongest evidence supporting individual drug treatment derives primarily from randomised trials, which have typically either implicitly or explicitly excluded older patients and patients with multiple comorbidities.<sup>6</sup> In addition, some trials implement run in periods to assess tolerance to regimens—an approach that may constrain the applicability of the results.

Given the paucity of data to inform the comprehensive management of the typical patient with heart failure, what can be recommended? Collabora-

tive disease management programmes that include the careful review of medication lists have been shown to reduce hospital admission rates and reduce the costs of care.<sup>7,8</sup> Whenever possible, patients with heart failure, particularly those with multiple competing comorbidities and polypharmacy, need to be enrolled in such programmes.

Regardless of the availability of disease management programmes, clinicians need to have systems in place to review medication lists carefully at every visit of a patient, with the goal of eliminating medications that are not known to provide a clear benefit. When initiating new medications, particular attention needs to be paid to the possibility of adverse drug interactions—for example, adding spironolactone to a regimen that includes potassium supplements, or amiodarone to a regimen that includes coumadin.

In treating coexisting conditions many commonly used medications need to be avoided whenever possible in patients with heart failure, based on known pharmacological principles and recommendations from guidelines. For example, many antiarrhythmic drugs, particularly the class I agents, have cardio-depressant and proarrhythmic effects. Non-dihydropyridine calcium channel blockers may also adversely affect left ventricular function. Thiazolidinediones are not recommended in patients with diabetes with advanced symptomatic heart failure because they cause fluid retention and may exacerbate heart failure. Metformin is contraindicated in patients with heart failure who require drug treatment or with renal insufficiency, owing to the risk of producing life threatening lactic acidosis. Non-steroidal anti-inflammatory drugs are not recommended because they antagonise the effects of angiotensin converting