

SHORT REPORT

Cold related mortality in England and Wales; influence of social class in working and retired age groups

G C Donaldson, W R Keatinge

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Percentage increases in mortality in winter were generally higher among lower than higher social classes in 1970–72,¹ but recent studies show no clear association with regional estimates of deprivation.^{2,3} We now assess cold related mortalities (always expressed as a fraction of baseline mortality) among social classes in England and Wales, in working and retired age groups, to look for any current effects of social class, and to see whether any such effects are work related.

METHODS AND RESULTS

Daily deaths 1998–2000 from the Office of National Statistics, for men and women in England and Wales aged 65–74 years and 50–59 years, were extracted by class (when recorded), as 1 (professional), 2 (managerial and technical), 3N (non-manual skilled), 3M (manual skilled), 4 (partly skilled), or 5 (unskilled), with between 896 and 66 477 deaths in each age, sex and class group. Married women with only domestic occupations at home, assigned their husband's class, are classified as housewives. "Central England" temperatures, from the Meteorological Office, were daily means of Squire's Gate Lancashire, Manchester Airport, Malvern, Rothamstead.

Daily mortality at 18°C was estimated by generalised linear modelling with Poisson distribution, of mortality on temperature, over the linear range 0°C to 18°C. The regression coefficient of mortality on temperature and its standard error, expressed as percentage of deaths at 18°C, gave cold related mortality and standard error for each group. A second explanatory variable, mean influenza deaths 10 days before to 10 days after, allowed for influenza. Temperature was lagged three days to give the closest relation to all cause mortality.⁴ Statistical comparisons were assessed by the *t* test. To minimise problems from multiple comparisons, these were made only between and within classes 5 and 1.

Cold related mortality in the retired (65–74) age group was generally higher in men of class 5 (unskilled) than class 1 (professional), or other classes, with little difference between men, and women or housewives, of any class (table 1). In the working age group (50–59), women in class 5 had significantly higher cold related mortality than those in class 1, but in men in class 5 cold related mortality was on average lower than in men of any other class. It was also significantly lower in class 5 among men than women, or housewives who represented 62% of these women (table 1), both in direct comparison and in relation to comparisons of men and women in class 1.

CONCLUSION

In men of working age (50–59) cold related mortality was low in class 5 compared with any other class, though it was high in class 5 men of the retired age group (65–74). In the class 5, but not class 1, men of working age cold related mortality was also low compared with women or housewives of the same class and age group. This implies a beneficial effect of work related factors in men of class 5 but not class 1, independent of home environment and income. The simplest explanation is that internal heat production from manual work protected class 5 men against daytime cold stress.

International surveys also point to an important role of out of home factors. Cold related mortality in eight regions of Europe varied inversely with the effectiveness of measures taken by the people in the different regions to avoid both outdoor and indoor cold.⁵ Home heating and insulation has received much attention in Britain, but less attention has been paid to out of home factors. We suggest increased emphasis on reducing exposure to outdoor cold stress, in campaigns to reduce winter mortality.

Table 1 Cold related mortalities in 1998–2000; England and Wales, at ages 65–74 and 50–59 (as % change in mortality/°C, and 95% confidence limits)

Class	1	2	3N	3M	4	5
Age 65–74						
Men	1.196 (0.566 to 1.827)	1.485 (1.183 to 1.786)	1.659 (1.206 to 2.111)	1.399 (1.169 to 1.629)	1.805 (1.495 to 2.116)	1.791 (1.336 to 2.246)
Women	1.438 (0.312 to 2.565)	1.413 (1.062 to 1.763)	1.630 (1.267 to 1.993)	1.514 (1.153 to 1.876)	2.038 (1.666 to 2.410)	1.452 (0.960 to 1.944)
Housewives	1.428 (0.158 to 2.697)	1.714 (1.137 to 2.291)	1.745 (0.874 to 2.617)	1.974 (1.554 to 2.394)	1.960 (1.403 to 2.518)	2.215 (1.369 to 3.061)
Age 50–59						
Men	0.761 (–0.263 to 1.785)	1.108 (0.603 to 1.613)	2.092 (1.225 to 2.960)	1.285 (0.894 to 1.677)	1.086 (0.522 to 1.649)	0.443 (–0.311 to 1.197)
Women	–0.385§ (–2.040 to 1.270)	0.534 (–0.013 to 1.080)	0.269 (–0.352 to 0.890)	1.324 (0.606 to 2.042)	1.139‡ (0.472 to 1.807)	2.286‡** (1.139 to 3.432)
Housewives	0.136 (–2.025 to 2.296)	0.885 (–0.194 to 1.964)	1.165 (–0.726 to 3.057)	1.190 (0.368 to 2.012)	1.838 (0.699 to 2.976)	2.776‡* (0.888 to 4.664)

Difference from men in same class, **p*<0.05, ***p*<0.01. Men/women or men/housewife difference in class 5 differs from that in class 1, †*p*<0.05, ‡*p*<0.01. §*p*<0.01 for difference between class 1 and 5.

Key point

- Cold related mortality was generally low in class 5 men of working age (50–59) only, compared with men in other classes, and significantly compared with class 5 women or housewives. It implies a beneficial effect of work related factors, independent of home environment and income. The simplest explanation is that internal heat production from manual work protected against daytime cold stress.

Authors' affiliations

G C Donaldson, W R Keatinge, Medical Sciences Building, Queen Mary and Westfield College, London, UK

Both authors are guarantors.

Correspondence to: Professor W R Keatinge, Medical Sciences Building, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK; w.r.keatinge@qmul.ac.uk

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Policy implications

- Physical exertion and other daytime protection against cold stress need emphasis in campaigns to prevent winter mortality.

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THE JECH GALLERY**Influential women in occupational health****Alice Hamilton, MD: gaining visibility for industrial medicine**

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27 February 1869–22 September 1970
Country of birth: USA

First and foremost, Alice Hamilton was an expert on lead. Inside factory walls, she won respect—from labour and management—as an effective agent of change, appealing to morality rather than profit. A pioneer in industrial toxicology and an American social activist, Hamilton chaired the first state commission to survey occupational disease, and held the nation's first university appointment in industrial medicine. She brought credibility to a field rife with industrial bias. Her struggles were coupled to a pragmatic nature, lending itself to incremental change.

“For me, the satisfaction is that things are better now, and I had some part of it.”

In addition to authoritative work on the dangerous lead trades (for example, smelting, refining, painting, manufacturing), Hamilton conducted studies on mercury, carbon monoxide, rubber, and the munitions industries. In a span of 40 years, she authored over 80 scientific reports. Her pace slowed only in old age (she died at age 101). The US OSHA Act was enacted three months after her death in 1970.

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D F Salerno

Pfizer Global Research and Development, Ann Arbor Laboratories, Ann Arbor, MI, USA

I L Feitshans

Adjunct Faculty, Cornell University, School of Industrial and Labor Relations, Albany, NY, USA

Correspondence to: Deborah F Salerno, 2800 Plymouth Road, Ann Arbor, MI 48105, USA; deborah.salerno@pfizer.com