Commentary: Short days—shorter lives: studying winter mortality to get solutions

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"People who are getting up in years ... die in the winter when the days are short, and in the hours after midnight. Life is at a low ebb after midnight and in the short days. Did you know that?" Ira Solenberger, quoted by Roy Redd ‘An Osark gardener. 86, awaits coming of the greening season’. NY Times 12 April 1976

"Clearly, if disease is manmade, it can also be man-prevented. It should be the function of medicine to help people die young as late in life as possible." Dr Ernst Wunder, President, American Health Foundation: NY Times 30 September 1975

The papers by Aylin and colleagues and by van Rossum and colleagues in this volume of the International Journal of Epidemiology explore the seasonality of mortality. These are two papers with different approaches and differing specific aims, but both are broadly focused on the same issues: what is the nature of the higher mortality rate Britain experiences in winter, what are its correlates and what are the implications?

The agreement and disagreement in the results of these two interesting, innovative and valuable studies is typical of British literature from this field. Despite Britain’s relatively benign climate (the average January minimum temperature for Greenwich, London is 1.9°C, with July’s minimum at 13.0°C), higher rates of mortality in winter have been noted for over 150 years. Such 'seasonality' was noted in the Registrar General’s 2nd report in 1839 with several pages devoted to London's winter mortality rates in the 3rd report. Since then, empirical studies have tried to determine which population groups experience greatest increases in the risk of mortality during winter, what they die from and whether this seasonal effect is increasing. These two papers do not entirely agree in their answers to these questions but do confirm the existence of a seasonal pattern to mortality rates—Ira Solenberger was at least right about life being at a low ebb during the shorter days.

The two papers concur with each other and with the wider literature (especially contemporary work) in finding weak or absent relationships between deprivation or poor socioeconomic circumstances and the risk of winter mortality. Such a result seems counter-intuitive to me, and I suspect that it will to others. I would expect poverty to be strongly related to an elevated risk of winter death through its associated consequences of poor quality housing, fuel poverty, inadequate clothing and elevated risk factors for illness which winter is known to exacerbate (respiratory and cardiovascular disease). It is my supposition that...
elements of winter mortality are manmade, through material inequalities. This is not to suggest error in the two studies presented here, but rather highlights my own concerns about how we approach this whole topic.

I would like research of this kind to pay more attention to the complexities of the individual/accommodation/climate relationship through a consideration of the aetiology and physiology of cold-related respiratory and cardiovascular disease. Cold temperatures induce changes in the respiratory tract as the mucosal surfaces cool and dry, and induce bronchoconstriction. That non-ideal hygrothermal conditions within a home can damage the respiratory health of occupants is well known, and these internal conditions are known to reflect outside climate, mediated by the building’s structure, heating and ventilation properties, and of course the occupants and their actions. Recent surveys suggest that more than 2 million households live in properties where the warmest room is below 16°C (the British legal minimum temperature to which sedentary workers can be exposed, for fear of adverse respiratory effects). Colder homes tend also to be damp, especially when the winter climate is wet with moderate, rather than extreme, cold. Damp air breeds mould which causes problems through allergy and infection. Cold outdoor and indoor temperatures may thus damage the natural defences of the respiratory system, with cold housing providing a fertile environment for micro-organisms.

Goodwin’s analysis of the relationship between cold, circulatory stress and the elderly population demonstrates the further complex relationships between physical activity and residence in a cold house. Haematological and haemodynamic responses to cold air may be less effective in the elderly than in the younger population (see ref. 7 for example), leading to a potentially greater adverse reaction to temperature change (e.g. moving from a warm room to a cold room) and/or physical activity (e.g. going out to the shops on a cold day). All this tells us that housing quality varies (almost always in relation to poverty), that good quality housing protects against cold more effectively than poor quality housing, and that the combination of poor quality housing and cold is a potent recipe for adverse respiratory and cardiovascular effects.

So, we know much about how cold might influence or hasten particular causes of death, even if the identity of the most vulnerable groups remains disputed (van Rossum et al. argue that elderly people are not more sensitive to seasonal effects, for example). Current understanding of possible mechanisms for winter deaths suggests a complex relationship between climate and the health of an individual, mediated by housing and the nature of day-to-day life. Perhaps such complexity shields the relationships between health, wealth and environment from conventional empirical investigation? These two papers make an excellent pairing because they tackle the issues from complementary perspectives. Van Rossum et al. have worked at the individual level of analysis but have not attempted to include housing as a mediating factor influencing a seasonal effect on mortality. Aylin et al. worked at an aggregate level, attempting to include housing as a mediating factor (though found difficulty in doing so due to data constraints). However, neither approach pays much attention to what is known about the possible mechanisms behind winter deaths. One works at the aggregate level, when we suspect the relationships of interest are complex at the individual level, and the other takes no account of housing—the crucial mediator.

I suggest these papers are best read as catalysts for methodological developments in the field. One such development might be to embrace work focusing on ‘area effects’ in other health outcomes (and in other disciplines). The area-effect is that portion of the between-area variation in a health outcome which cannot be ascribed to the (measured) individual characteristics of the study population, i.e. that which is attributable to a feature of the area of residence, not the residents themselves. Climate, as a spatial variable, is obviously a potential explanatory factor for between-area differences in health. The area effects field has its own methodologies and techniques that might shed further light on the winter mortality conundrum. One approach might be to treat the severity of winter as an area-level variable, and explore its impact having controlled for housing quality and other individual-level circumstances. Even within Britain we have significant spatial variation in the duration and severity of the winter season and in the quality of housing. I wonder whether this variation can be used to create a natural experimental design to contrast differing climatic regimes, housing provision and mortality rates, or other health outcomes?

Such an approach would require data which describe individual circumstances in relation to housing and heating, activity, socioeconomic circumstances and medical histories, but which have sufficient spatial coverage to allow comparison between winter regimes. Aylin et al. have the spatial coverage, van Rossum et al. the individual detail, but these are currently (artificially) separated. The papers are important markers on the path towards more effective study of winter mortality in Britain and I very much welcome their contribution to the field and the new findings they present. I suspect that as new techniques and data are applied to the problem, we will discover that excess winter mortality is indeed partly a manmade problem—made through a combination of behaviour, poor quality housing and adverse individual circumstances.

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**References**


