Reviewer's report

Title: The association of cold weather and all-cause and cause-specific mortality in the island of Ireland between 1984 and 2007: a time-stratified case-crossover study

Version: Date: 23 August 2014

Reviewer: Adrian Barnett

Reviewer's report:

This was a classic time series study of cold that was well written and well executed. The pattern of results was as expected, with stronger associations at short lags that tails away, and stronger associations in the elderly. The results are not new internationally, but could well have important local implications.

Major Compulsory Revisions

I encourage the authors to include time as an effect modifier to answer the important question of are things getting better or worse? Given the long time series this would be worth testing. I would recommend winter season as a linear effect modifier, i.e., 2004=1, 2004/05=2, 2005/06=3, etc. This would test if things are gradually getting worse or better. One way things might be getting better is because of the fuel payments (noted in the discussion). It may be worth looking at individual years around the time of the fuel payments.

Minor Essential Revisions

- Page 12, in terms of confounding by air pollution see the excellent recently commentary: Commentary: Does Air Pollution Confound Studies of Temperature?

Buckley, Jessie et al, Epidemiology, Volume 25(2), March 2014, p 242–245

- Table 6, the stars for statistical differences are for what test? cold versus winter?

- The tables were quite large with a lot of numbers to take in. It might be worth considering a couple of plots to show the key results in a condensed form.

Discretionary Revisions

- Page 5, It took a while to understand definition of winter/cold. I think it would be easier to understand if the days were removed and just the months given.

- Page 6, "averaged over 3 days," use a colon rather than a comma

- Page 11, the greater size of your estimates could also be due to a longer lag compared with other studies. One argument against using a longer lag is that very long lags can start to pick up seasonal effects. Also longer lags are more prone to measurement error compared with shorter lags, as we need to assume that people remained in the same place for longer.
Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests