

# Authors' reply: Estimating the impact of the 2009 influenza A(H1N1) pandemic on mortality in the elderly in Navarre, Spain

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**To the editor:** We appreciate the comments by L Jossieran and A Fouillet [1] and agree with many of them. A number of the aspects they comment on were mentioned in our work, but we appreciate having another opportunity to discuss them.

Demonstrating the impact of influenza on general mortality entails considerable difficulty, and has been the object of interesting methodological discussions [2,3]. The difficulty lies largely in finding an adequate baseline reference for the comparison, ruling out the effect of other causes. An ecological study like ours, conducted in a small region, has limited capacity to provide definitive evidence for this association. Aware of this limitation, we restrict ourselves to describing the excess mortality observed in older people coinciding with the weeks of highest circulation of the pandemic influenza – and for which we have found no other arguments that could completely explain it. Similar excess mortality has also been observed to coincide with circulation of the seasonal influenza virus, but not in periods with little or no influenza activity.

In table 1 we showed the comparison between observed and expected values, both for the number of cases and for the crude and adjusted rates. Coinciding with the downward secular trend in mortality, the crude rate in the period before circulation of pandemic influenza was 1.3% lower than expected, despite ageing of the population, and the standardised mortality ratio indicated a reduction of 4%. In contrast, the crude rate observed in the pandemic period was 2% higher than expected, and the standardised mortality ratio of 1 indicated a stabilisation. We suggested that this different trend in the pandemic period could be related with the circulation of 2009 influenza A(H1N1).

The deaths occurring during the summer were compared with those of other summers when influenza activity was not detected, which facilitates detection of the impact of influenza on mortality, in the event that it occurred. In contrast, the deaths that occurred from week 47 on were compared with those of weeks with

some influenza activity in previous years. Thus, only if the impact of influenza on mortality is greater in the study year than in the reference years, can we say that there was an excess of deaths. In any case, mortality during the second pandemic wave was higher than in the first, which is consistent with the incidence of medically-attended influenza-like illness (MA-ILI).

In weeks 36 to 39 we continued to detect a non-negligible incidence of MA-ILI, but only 3% of the cases analysed were positive for influenza virus, indicating low virus circulation.

In 2009 the weekly or daily mortality thresholds were exceeded in June, July and August. In June and July the mean maximum and minimum temperatures were not significantly different from the means for the same months in the three previous years. In August, however, the mean maximum temperature was 4.0 °C higher (30.8 versus 26.8) and the mean minimum was 1.5 °C higher (15.8 versus 14.3) with respect to the three previous years, although at no time did it exceed the thresholds established for a heat alert. Daily mortality exceeded the threshold of deaths on six occasions during the summer of 2009, but on only two of them had the temperatures in the three previous days exceeded a maximum of 33 °C or a minimum of 18 °C. Although we do not totally rule out the effect of heat on mortality during the summer of 2009, it does not appear to completely explain the excess mortality detected.

The incidence of MA-ILI in persons aged 65 and older was 0.73 per 1,000 during the first pandemic wave and 3.67 per 1,000 in the second wave. Nonetheless, the repercussion of influenza on mortality in older people may be partly due to deaths in persons not previously diagnosed with ILI.

Finally, there are some arguments that would explain a certain impact of the influenza A(H1N1) pandemic on mortality in older people that may have gone unnoticed. The incidence of seasonal influenza is usually low in the elderly, but when its impact on mortality is

evaluated, relatively high values with respect to incidence are generally estimated. Mortality from pandemic A(H1N1) influenza has been evaluated in several studies, but most of them have focused on deaths occurring in laboratory-confirmed cases [4-5]. Although the number of influenza tests has increased greatly, it is still small in relation to the number of MA-ILI cases. Previous studies have suggested that influenza can trigger or exacerbate non-infectious pathologies such as cardiovascular diseases [6], and influenza may be hidden by the underlying pathology. It is also possible that some of the influenza-related deaths occurred outside the hospital.

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