Monitoring the intensity of influenza epidemics with the Moving Epidemic Method

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Introduction:
Influenza is an important burden on human health and a challenge for health services, making it a priority for surveillance activities, which can help to better prioritize the efforts in prevention and control.

A method to detect seasonal epidemics, to monitor their intensity and to compare their spatial spread has been used in Spain since 2003 with reliable results. A modified version of this approach named “Moving Epidemic Method (MEM)” is being implemented for systematic use in European countries. Although the main purpose of the method is to define baseline influenza activity based on historical data and to establish an epidemic threshold to detect the beginning of the epidemic period, it could be also used to assess intensity levels of epidemics.

Method:
MEM models a typical influenza epidemic based upon historical data from a specific country or region, splitting the seasons in three periods: a pre-epidemic, an epidemic and a post-epidemic period. After all epidemic seasons are moved in order to match their epidemic periods, the geometric mean of weekly rates is calculated and several one-sided confidence intervals are calculated at different levels (50%, 90% and 95%). The upper limits of these confidence intervals determine the levels of intensity of the epidemic.

Results:
Pandemic season (2009/2010) in Castilla y León (Spain) was modelled with an epidemic threshold weekly rate of 71 cases x 10^5. The levels of intensity were established as follows: low, if weekly rate remained below 311 (50%); medium, up to 779 (90%); high, up to 1010 (95%); and very high above this last limit. The epidemic period started in week 38/2009 and the highest weekly rate was 410 cases x 10^5 in week 43, confirming a ‘medium’ intensity for the pandemic season in the region.
Conclusions:
MEM has already shown its utility in monitoring influenza epidemics. Comparing ILI weekly data with levels of intensity calculated by the standard algorithm MEM would allow international comparisons of clinical influenza activity among different countries. Moreover, thresholds marking different levels of intensity may be modified depending on national objectives.


2 Available through an R library called “mem” that can be downloaded for free from The Comprehensive R Archive Network -CRAN- in http://www.r-project.org/