

# New method better predicts the onset of seasonal flu epidemics

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During the flu season, it is common for hospital emergency rooms and health care centres to become overcrowded, placing a high burden both on health services and on patients. A study from Instituto Gulbenkian de Ciencia (IGC; Portugal), led by Joana Goncalves-Sa, presents a new method to identify the onset of an epidemic, anticipating current official alerts by several weeks. This method, combined with the current surveillance system, may help health services to anticipate, prepare, and respond more promptly to the flu peak. This study was now published in the scientific journal *PLoS Computational Biology*.

The European Centre for Disease Control reports an estimated number of influenza cases weekly, based on data collected from sentinel medical doctors. It's an efficient surveillance mechanism, but this system has limitations and entails an inevitable delay between the actual onset of the seasonal epidemic and its detection. The method developed by Joana Goncalves-Sa's group tries to overcome some of the limitations of official surveillance mechanisms and offers close to real-time identification of the flu season onset. It integrates information from different sources: the official influenza incidence rates, the near-real-time searches for flu-related terms on Google, and an on-call triage phone service. This information is then used to feed a mathematical and computational model that can identify changes in number of cases, thus signaling the beginning of the epidemic. The research team analysed data from several European countries and used their new method to show that in at least 8 countries—Belgium, the Czech Republic, Hungary, Italy, Ireland, Norway, Portugal and Spain, it is possible to anticipate current

official alerts by several weeks.

Joana Goncalves-Sa says, "Our method has two main advantages. First, it can be used with a diversity of data sources, some of them close to real time, reducing sampling bias and delays in detection of the flu season onset. Second, the system is simple and reliable enough to be used by decision-makers. It basically offers a probability that the [flu season](#) has already started. When this probability crosses a certain threshold, [health services](#) should start preparing for the peak."

Results of this study also show that this system can be used in other countries and, eventually be applied to other seasonal diseases. Goncalves-Sa adds, "We believe that with our method, complementary to the current system, public health services could significantly improve their response and respond in a timely manner to the upcoming flu peak. This could be done by anticipating the provision or reinforcement of health professionals and facilities, and by providing better advice to the population. We also found that the on-call triage service has a unique potential that should be further explored: It can become a very efficient and relatively low-cost system to track and anticipate epidemics."

Seasonal influenza is a worldwide infectious disease estimated as the cause of 3-5 million cases of severe illness, and up to a half-million deaths every year.

**More information:** Miguel Won et al, Early and Real-Time Detection of Seasonal Influenza Onset, *PLOS Computational Biology* (2017). [DOI: 10.1371/journal.pcbi.1005330](https://doi.org/10.1371/journal.pcbi.1005330)

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