

# Prediction markets accurately forecast influenza activity

December 21 2006

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Influenza experts have borrowed a page from economists, creating a futures market for influenza activity that predicted outbreaks two to four weeks in advance. The influenza prediction market is presented in the Jan. 15 issue of *Clinical Infectious Diseases*.

Influenza outbreaks happen every year, but when they hit and how severe they are varies. Knowing the timing and severity of an outbreak would give public health workers time to prepare and to notify the public to get their influenza vaccinations.

In a prediction market, people with information about a future event buy and sell shares based on what they believe the likelihood of that event will be. For instance, if a health care worker started seeing more cases of influenza in her clinic, she would buy shares representing increased levels of flu in the coming weeks and sell shares representing decreased activity. The prices at which these shares trade reflect the group's consensus on the future event. Prediction markets have accurately forecast the outcomes of a wide range of future events including presidential elections, Oscar nominees, and the Federal Reserve's decisions about interest rates.

"For decades, farmers have used futures markets to make decisions about what crops to plant," says Philip Polgreen, MD, of the University of Iowa. "We're just borrowing that technology to help people in public health and health care make decisions about the future."

"Many health care workers possess current information that could be used to predict future infectious disease trends," explains Dr. Polgreen. But there is no mechanism to gather that data and digest it quickly enough to make it useful. "Prediction markets provide a way to collect and analyze information in real time in an easy-to-interpret graphical format," Dr. Polgreen says.

Dr. Polgreen and his collaborators set up a "flu market" for the 2004-05 influenza season in the state of Iowa. Sixty-one health care workers from a variety of backgrounds participated.

The traders bought and sold shares based on the level of influenza activity in Iowa as reported by the Centers for Disease Control and Prevention's five-level grading system. The market accurately predicted the activity levels at the end of a target week 71 percent of the time, and was within one level 93 percent of the time. Longer-term predictions were less accurate, but still beat predictions based solely on historical averages up to four weeks in advance.

Dr. Polgreen and his coauthors imagine that infectious diseases prediction markets could be created almost overnight to address emerging infectious diseases, such as SARS. In the near future, Dr. Polgreen and his colleagues plan to launch a market to ascertain flu vaccine effectiveness and a separate market to evaluate the probability of human-to-human transmission of avian influenza in different parts of the world. "We think prediction markets can accurately forecast the future activity of a wide variety of infectious diseases and related phenomena by aggregating the expert opinions of health care providers," said Dr. Polgreen.

Source: Infectious Diseases Society of America

Citation: Prediction markets accurately forecast influenza activity (2006, December 21) retrieved 2 May 2024 from <https://medicalxpress.com/news/2006-12-accurately-influenza.html>

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