Dual Seasonal Patterns for Influenza, China

To the Editor: Since 2000, the People’s Republic of China has had a nationwide surveillance network for influenza, which as of 2005 has been reported on the Chinese Center for Disease Control and Prevention website (www.cnic.org.cn/ch/). This surveillance has shown a remarkable dual pattern of seasonal influenza on mainland China. Whereas a regular winter pattern is noted for northern China (similar to that in most parts of the Northern Hemisphere), the pattern in southern China differs. In southern China, influenza is prevalent throughout the year; it has a clear peak in the summer and a less pronounced peak in the winter. Because this dual seasonal pattern of influenza has not been reported outside China and is relevant to pandemic (H1N1) 2009, we describe surveillance data for rates of consultation for influenza-like illness (ILI) and influenza subtypes in patients with ILI.

Sentinel hospitals were required to collect 5–15 nasopharyngeal swabs each week from ILI patients who had not taken antiviral drugs and who had fever (≥38°C) for no longer than 3 days. The swabs were sent to the corresponding influenza laboratories for virus isolation and identification; results were reported to the National Influenza Surveillance Information System within 24 hours.

From the National Influenza Surveillance Network, a database of surveillance information from April 2006 to March 2009 was established. For influenza surveillance purposes, mainland China was divided into northern and southern parts, basically following the Qinling Mountain range in the west and the Huai River in the east. The prominent influenza peaks in the winter in the north and summer in the
south were clear for adults and for children (Figure, panel A); the level of ILI was 3–5× for children. The influenza subtypes causing the 3 peaks in the north were preceded by a peak of the same subtypes in the south. During winter 2006–07, the influenza subtype was seasonal H1N1 and to a lesser extent H3N2. In winter 2007–08, the virus was B/Yamagata; and in 2008–09, it was again seasonal influenza A (H1N1), which was almost absent in the south during April–December 2007. Antigenic characteristics of the influenza virus from the north were similar to those from the south in the same epidemic episode (2). Furthermore, influenza A (H3N2) was in southern China throughout the year, whereas in northern China, this subtype only showed a clear peak in the first 2 winters of the study period. Subtype B/Victoria and B (unsubtyped) were both in northern and southern China in irregular and low numbers. Data from the 3 northern provincial areas with year-round surveillance confirmed that influenza cases during April–September were negligible (data not shown).

The influenza subtypes of seasonal influenza A (H1N1) and B/Yamagata that have caused the past 3 summer peaks in southern China were followed by an epidemic of the same subtypes in northern China during the subsequent winter. This finding may indicate that these peaks are regular epidemic phenomena for seasonal influenza in China. Another possible explanation is that other subtypes were cocirculating with the predominant subtype at the time of epidemics.

The dual pattern of seasonal peaks for influenza is well-known for the Northern and Southern Hemispheres, but apparently it is also possible on 1 side of the equator. China is a large country with climatic differences between north and south. Although most of southern China is above the Tropic of Cancer, it is warmer and more humid than northern China (Figure, panel B), which may explain the different seasonal patterns within mainland China (3). Knowledge of the dual patterns of influenza in China is relevant for determining effective control measures, and knowledge of the underlying mechanisms of such patterns is relevant to understanding the epidemiology of influenza in general.

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Yue-Long Shu,1 Li-Qun Fang,1 Sake J. de Vlas, Yan Gao, Jan Hendrik Richardus, and Wu-Chun Cao1

Author affiliations: Chinese Center for Disease Control and Prevention, Beijing, People’s Republic of China (Y.L. Shu, Y. Gao); Beijing Institute of Microbiology and Epidemiology, Beijing (L.-Q. Fang); University Medical Center Rotterdam, Rotterdam, the Netherlands (S.J. de Vlas, J.H. Richardus); and State Key Laboratory of Pathogen and Biosecurity, Beijing (W.-C. Cao)

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References

1. World Health Organization. WHO recommended surveillance standards, Second edition [cited 2009 Aug 19]. http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_ISR_99_2_EN/en/
2. Zhang Y, et al. Antigenic and genetic study of influenza virus circulated in China in 2006 [in Chinese]. Zhonghua Shi Yan He Lin Chuan Bing Du Xue Za Zhi. 2007;21:304–6.
3. Chan PK, Mok HY, Lee TC, Chu IM, Lam WY, Sung JJ. Seasonal influenza activity in Hong Kong and its association with meteorological variations. J Med Virol. 2009;81:1797–806.

1These authors contributed equally to this article.

Avian Influenza Prevalence in Pigs, Egypt

To the Editor: Since 1996, avian influenza virus (H5N1) has spread to ≥65 countries (1). The disease represents a serious threat for the poultry industry and public health. Egypt has the highest human infection and fatality rates outside Asia (2). Some isolates of influenza virus (H5N1) in Egypt are resistant to oseltamivir (3), and in others, virulent mutations have developed, leading to case-fatality rates of 100% (4).

Pigs have the largest epidemiologic role in the evolution of new influenza viruses (5). Recombination between the newly emerged influenza virus subtypes H1N1 and H5N1 in pigs would have catastrophic results. We therefore investigated the seroprevalence of influenza virus (H5N1) in pigs in Egypt.

In May 2008, we collected 1 serum sample and 1 nasal swab from each of 240 pigs (11 herds) in Cairo slums. May was selected because it directly follows the season of bird migration and the seasonal storms usually accompanied by airborne diseases. Cairo slums were selected because 1) pigs there feed on organic remains, including dead birds, and thus have a higher chance of becoming infected; 2) Cairo is at the base of the Nile Delta, where most subtype H5N1 foci occurred; and 3) Cairo is near Fayum, the main stopover site for migrating birds.

Address for correspondence: Wu-Chun Cao, Beijing Institute of Microbiology and Epidemiology, State Key Laboratory of Pathogen and Biosecurity, 100071, Beijing, People’s Republic of China; email: caowc@nic.bmi.ac.cn