

Influenza seasonality: timing and formulation of vaccines

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In all countries with temperate climates, a clear seasonal peak in influenza activity occurs during the winter months.¹ In countries with tropical or subtropical climates, however, influenza seasonality is more variable and influenza activity can be observed year-round – although it often is more intense during the rainy seasons.²

Effective surveillance is essential for understanding influenza seasonality and for determining the best strategies for influenza control. The extensive influenza surveillance network that was established by the World Health Organization (WHO) during the 1950s has developed into the Global Influenza Surveillance and Response System. The tropical and subtropical Asian countries that participate in this system have recently expanded their influenza surveillance. This expansion has revealed not only that the patterns of influenza virus circulation in southern and south-eastern Asia are complex but also that influenza activity in this area may show no marked seasonality.³

The results of a recent analysis of influenza surveillance data collected between 2006 and 2011 in Bangladesh, Cambodia, India, Indonesia, the Lao People's Democratic Republic, Malaysia, the Philippines, Singapore, Thailand and Viet Nam are published in this issue of the *Bulletin of the World Health Organization*.⁴ Although this analysis revealed year-round circulation of influenza viruses in all 10 study countries, two main patterns of influenza seasonality were also evident.⁴ In Indonesia, Malaysia and Singapore – i.e. the study countries that lie on or close to the Equator – there was no obvious discrete peak in influenza activity. In the whole or part of each of the seven other – more northern but still at least partially tropical – study countries, influenza activity showed a distinct peak between July and October, in the summer monsoon season. This peak contrasted with the winter peak that typifies influenza seasonality in the more temperate areas of the world.^{3,5} As a latitude of about 30°N appeared to mark the northern limit of influenza with a summer peak in activity, some study countries – such as India – had influenza with a summer peak in the south but influenza with a winter peak in the north. A similar relationship between latitude and the timing of peak influenza activity has been observed in Brazil and

China, which each have land masses that stretch for thousands of kilometres from north to south.^{6,7}

WHO's current recommendations for the formulation of the vaccine used depend primarily on whether the target populations are in the northern or southern hemisphere. Although WHO recommends that the choice of formulation to be used in Equatorial areas should be guided by epidemiological considerations, there has often been too little information available to make that choice in a rational manner. For the northern hemisphere, vaccination typically begins in September of each year and ends in December or a few weeks later. The vaccine used should be the “northern hemisphere” formulation, which reflects the strains of virus expected to be in circulation – globally – during the northern winter. For the southern hemisphere, vaccination with the most recent “southern hemisphere” formulation typically begins in April and ends in May or a few weeks later. Unfortunately, the varying patterns of seasonality complicate the optimal timing of influenza vaccinations and the optimal formulation to be used.⁶ As vaccine-induced immunity decreases over time, it is important to vaccinate in the months before epidemic peaks of influenza.⁸ Saha et al. demonstrate that influenza activity in most northern hemisphere countries that lie in tropical Asia peaks between July and October – or several months earlier than in the countries situated in temperate areas of the northern hemisphere.⁴ In tropical Asia, therefore, influenza vaccinations offered in September–December are provided too late and those vaccinated at this time would be expected to have declining vaccine-induced antibody titres during the next seasonal peak of influenza activity, in July–October of the following year. Tropical areas in southern and south-eastern Asia should consider vaccination – with the “southern hemisphere” vaccine formulation – in May–June of each year.

While strategies for influenza vaccination are well advanced in many temperate areas, data to support the timing of vaccination efforts in tropical areas of Asia have been quite limited. For this and other reasons, many countries in tropical Asia use little or no influenza vaccine – despite their considerable burdens of influenza disease.

The information collected by Saha et al.⁴ clearly demonstrates that country-specific recommendations on influenza vaccination should focus not only on whether the country lies to the north or south of the Equator but also on the number and types of seasonal patterns in influenza activity that exist within the country's borders. Countries with long latitudinal spans may need two distinct vaccine policies – one for the temperate areas and another for the more tropical areas – and to use both the “northern hemisphere” and “southern hemisphere” formulations.^{4,6,7} If appropriate vaccination policies – that couple the best timing of influenza vaccine administration with the most recent vaccine composition – are to be developed, the seasonality of influenza in many countries needs to be better understood. ■

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