A Tentative Global Map of Hemispheric Influenza Vaccine Recommendations Based on Seasonality

Wladimir Alonso[1*], Christine Yu[2], Cecile Viboud[1], Stephanie Richard[1], Cynthia Schuck-Paim[3], Lone Simonsen[2], Wyller Mello[4], Mark Miller[1]

[1.] Fogarty International Center / National Institutes of Health, [2.] George Washington University, DC, [3.] Origem Scientifica, [4.] Evandro Chagas Institute, WHO Global Influenza Surveillance Network

Background/Objective
Both the Northern and the Southern Hemisphere annual influenza vaccine recommendations issued by the WHO are designed for use before the peak viral circulation in each hemisphere, to minimize waning of vaccine-induced immunity and increase the match between circulating strains and vaccine strains. Influenza activity is strongly winter-seasonal in temperate regions of both hemispheres, therefore providing a predictable prospect for choosing the timing of routine annual immunization campaigns. However, influenza circulation patterns are more diverse in tropical regions (1), and can be out of phase with the dynamics predicted for the winter of their hemisphere (2). Our objective was to characterize influenza activity worldwide so as to identify the optimal timing of annual vaccination campaigns in each country

Method
We applied time series regression models available in the Epipoi freeware (3) to extract the timing of the major peak of influenza activity for 125 countries with sufficient weekly laboratory-confirmed influenza specimens reported in the WHO surveillance database (4). Of the countries studied, 73 were located in temperate regions and 52 in tropical regions.

Result
We found that 26 (25%) countries of the Northern Hemispheric countries should opt for annual vaccination in April, coinciding with the Southern Hemisphere vaccine schedule. Conversely, 9 (39%) Southern Hemisphere countries should opt for the vaccine available in September, which aligns with the Northern Hemisphere vaccine schedule. Those figures increase to 62% and 53% respectively when only countries in the tropical belt are considered, indicating that most tropical countries should receive the vaccine initially recommended for the opposite hemisphere.

Conclusion
Viral surveillance data collected as part of the national surveillance efforts can be extremely valuable to guide immunization programs. Routine influenza vaccination programs should not depend on the hemispheric localization of a region, but instead should be closely tailored to the observed patterns of local circulation.