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Influenza incidence, lineages, and vaccine effectiveness estimates in Lima, Peru, 2023

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Characterisation of influenza viruses in the southern hemisphere can guide local response and provide insights to northern hemisphere jurisdictions about their upcoming influenza season.[1,2] Here, we present the information on 2023 end of influenza season in the southern hemisphere about influenza lineages, incidence of medically attended, laboratory-confirmed influenza cases, and influenza vaccine effectiveness (VE) against the antigen from surveillance clinics and a hospital in San Juan de Lurigancho and San Martin de Porres, the two most populated districts of Peru.

From Jan 1 to Sept 30, 2023, surveillance nurses sought individuals with COVID-19-like illness (CLI) of any age seeking care at outpatient sentinel sites between Monday and Saturday. CLI was defined as presenting with at least two of the following symptoms or signs—fever, chills, rigors, myalgia, headache, or sore throat for not more than 7 days from illness onset.[3] On March 7, 2023, the nurses expanded their search to CLI cases hospitalised for not more than 72 h at Cayetano Heredia National Hospital.

Nurses obtained written consent to survey and swab CLI cases. Enrolled participants provided information on pre-existing conditions and influenza vaccination status. Individuals targeted for vaccination by Peru and vaccinated between Jan and Sept 2022, more than 14 days before enrolment, were considered vaccinated (appendix p 1).

Nasopharyngeal swabs were obtained from individuals at the clinic. Anterior nasal and oral swabs were obtained from hospitalised patients. Specimens were tested for influenza and SARS-CoV-2 via multiplex quantitative PCR (qPCR).[4] Positive specimens with a cycle threshold value of 25 or less were sequenced by the Illumina Respiratory Virus Panel (Illumina, San Diego, CA, USA).[5]

We estimated the incidence of laboratory-confirmed influenza CLI by dividing the number of qPCR detections by the population assigned to the sentinel clinics by the Ministry of Health (ie, 91 801), adjusting for the proportion of CLI cases seeking care at sentinel versus other clinics in San Juan de Lurigancho and the proportion of CLI enrolled versus not enrolled (appendix pp 2–3).

We calculated VE against medically attended influenza using a test-negative design.[6] For this analysis, influenza cases were defined as qPCR influenza-positive CLI, whereas controls were defined as qPCR influenza-negative and SARS-CoV-2-negative CLI. Age, any pre-existing condition, and calendar year quarter were used to adjust VE. Surveillance

activities were approved by the institutional review board of Universidad Peruana Cayetano (PRISA repository: EI0002439 and EI00002991) and the US Centers for Disease Control and Prevention as non-research (0900f3eb81ecbe9f and 0900f3eb820d72ac).

During the surveillance period, 8688 individuals sought clinic care for respiratory illness. Surveillance nurses screened 1951 (22·5%) individuals, of whom 1196 (61·3%) met the CLI criteria and 732 (61·2%) were enrolled and swabbed (appendix p 4). Influenza was detected in 106 (14·5%) participants; 79 (75%) had type A influenza and 27 (25%) B influenza (appendix pp 5,7). Most (34 [87%] of 39) specimens with a cycle threshold value of 25 or less were sequenced and 30 (88%) of 34 belonged to influenza A(H1N1)pdm09 clade 6B.1A.5a.2a and 4 (12%) belonged to influenza A(H3N2) clade 3C.2a1b.2a.2a.3. No influenza B/Yamagata lineage viruses were identified. From March 7 to Sept 30, 2023, 12 (3·5%) of 342 hospitalised CLI cases were qPCR-positive for influenza type A, none were type B.

The cumulative incidence of influenza CLI was 72·2 (95% CI 57·9 to 90·0) per 1000 population (appendix p 6); for participants enrolled at the clinic, 77 (10·5%) were vaccinated, 632 (86·3%) were not vaccinated, and 23 (3·1%) could not recall their vaccination status. The adjusted VE against medically attended influenza CLI at clinics was 51·8% (95% CI −5·7 to 78·0).

During the 2023 influenza season in the southern hemisphere, we identified a higher incidence of influenza than that estimated by pre-COVID-19 Peruvian cohorts using the more specific influenza-like illness case definition—ie, 44 per 1000 person-years (95% CI 42·0 to 46·0).[7] Only one in ten enrolled participants from the clinic were vaccinated against seasonal influenza. Vaccinated individuals showed a 50% reduction in medically attended illnesses. The A/Victoria/2570/2019 (H1N1)pdm09-like virus antigen in the southern hemisphere vaccine formulation was effective in protecting against the predominant A(H1N1)pdm09 clade 6B.1A.5a.2a virus. Southern hemisphere 2023 influenza VE protection was similar to that of southern hemisphere 2022,[1,2] US 2022–23, and early southern hemisphere 2023 seasons.[8]

Our findings have some limitations. Despite using a sensitive case definition, we probably missed non-respiratory influenza illnesses and underestimated influenza incidence. We relied on self-reported vaccination status and could not fully adjust our VE models for parameters associated with individuals' propensity to seek vaccination and care. Moreover, only half of the specimens had a cycle threshold value of 25 or less, and we might have missed emerging clades at the time of the evaluation.

Our findings suggest that mostly unvaccinated people sought care early during the southern hemisphere season for illnesses that were predominantly attributable to influenza A(H1N1)pdm09 clade 6B.1A.5a.2a. Vaccinated individuals benefited from the A/Victoria/2570/2019 (H1N1)pdm09-like antigen, which conferred good protection against medically attended CLI. If similar viruses predominate in the northern hemisphere, our estimates of 2023 southern hemisphere influenza VE suggest that 2023–24 northern hemisphere

influenza vaccines, which include similar H1N1 antigens, could provide similar protection during the upcoming northern hemisphere influenza season.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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