Preliminary population-based epidemiological and clinical data on 2009 pandemic H1N1 influenza A (pH1N1) from Lima, Peru

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To the editor:

Since early April 2009, the world has been responding to a pandemic of a novel H1N1 influenza A virus (pH1N1). Data on transmission and severity of pH1N1, especially from the Southern Hemisphere will help plan for the upcoming Northern Hemisphere influenza season. In mid-June 2009, the Naval Medical Research Center Detachment in Peru, the CDC and the Peruvian Ministry of Health implemented a prospective cohort population-based study of influenza in Peru. We report the first 6 weeks of this population-based data, specifically describing the evolution and clinical data of pH1N1. 343 households from San Juan de Miraflores District, Lima and their household members were randomly selected from a previous census list using a computer-based, randomly generated numbers table and invited to participate in the study. Subsequently, field workers performed screening visits to households three times per week to identify influenza-like illness (ILI) cases. The ILI case definition for individuals ≥5 years of age included sudden onset of fever >38°C, with cough and/or sore throat and for children <5 years old, we utilized the WHO-ILI case¹ definition with the addition of rhinorrhea and/or nasal congestion. Once an ILI case was identified, both nasal and oropharyngeal swabs were collected, combined and placed into viral transport media, transported at 4°C to the laboratory and stored at −80°C. For each identified ILI case, multiple follow-up site visits were conducted over a 15-day period to determine clinical symptoms duration. Identification of pH1N1 was conducted using the CDC 2009 pH1N1 real-time PCR (rRT-PCR) assay,² while seasonal influenza A viruses were identified using standard rRT-PCR procedures. Attack rates (AR) and incidence rates (IR) were estimated by age group for ILI and pH1N1 confirmed cases.

A total of 1747 individuals, living in 343 households, were enrolled in the study from May to June, 2009. Screening visits were initiated on June 25, 2009 and, as of August 1, 191 ILI cases had been identified. Of the 191 ILI cases, 134 were positive (70.1%) for pH1N1 – only one seasonal H3N2 isolate was identified from samples negative for pH1N1. The percentage of ILI due to pH1N1 was highest in the age group of 5–17 years (86.2%) compared with other age groups (Table 1). The most common symptoms at illness onset among pH1N1 cases of all ages were cough (92.5%), rhinorrhea (77.6%), malaise (69.4%), sore throat (67.9%) followed by headache (64.9%), red eyes (47.8%), vomiting (25.4%), and diarrhea (9.7%). Median symptom duration among all pH1N1 cases that completed 15 days of follow-up was cough 8 days (range 0–15 days), rhinorrhea 5 days (range 0–12 days), sore throat 2 days (range 0–12 days), fever 1 day (range 1–8 days), and headache 1 day (range 0–15 days). As of August 1, 2009, the cumulative attack rate for confirmed pH1N1 infection among all ages was 77%. Age adjusted IRs of pH1N1 were slightly higher among young adults and children (Table 1) and were equivalent with respect to gender (data not shown), although few confirmed cases were identified among adults >50 years of age. Weekly incidence rates of pH1N1 ranged from 11.7 to 27.8 cases/1000 person-weeks. We have begun to observe a reduction of pH1N1 IRs and ARs, as well as a reduction in ILI ARs over time (Table 1). By extrapolating from our
Table 1. Influenza-like illness (ILI) and pandemic H1N1 influenza (pH1N1) attack rates and incidence rates between June 14th and August 1st, 2009

| Dates         | Epi weeks | ILIs total (N = 191) | pH1N1 (N = 134) | Other ILIs (N = 57) | Other etiologies cumulative attack rate (%) | pH1N1 cumulative attack rate (%) | Weekly pH1N1 incidence rate x 1000 | Age specific weekly pH1N1 incidence rate x 1000 |
|---------------|-----------|----------------------|-----------------|---------------------|---------------------------------------------|---------------------------------|-----------------------------------|-----------------------------------|
| Jun 14–20     | Week 24   | 1                    | 0               | 1                   | 0.00                                        | 0.00                            | 0.00                              | <5 (n = 196) 5–9 (n = 160) 10–17 (n = 315) 18–29 (n = 478) 30–49 (n = 402) 50–59 (n = 133) >=60 (n = 63) |
| Jun 21–27     | Week 25   | 20                   | 9               | 6897                | 1.15                                        | 0.06                            | 11.45                             | 5.10 5.0 28.57 2.09 0.00 7.52 0.00 |
| Jun 28–Jul 4  | Week 26   | 47                   | 13              | 7833                | 3.84                                        | 1.32                            | 27.23                             | 51.28 85.53 49.02 12.58 7.46 0.00 0.00 |
| Jul 5–11      | Week 27   | 54                   | 15              | 7222                | 6.07                                        | 2.18                            | 11.59                             | 48.65 71.94 27.49 23.35 2.51 0.00 0.00 |
| Jul 12–18*    | Week 28   | 19                   | 10              | 6576                | 2.71                                        | 0.57                            | 5.19                              | 22.73 46.51 10.60 8.70 5.03 0.00 0.00 |
| Jul 19–25     | Week 29   | 12                   | 6               | 5000                | 7.50                                        | 3.09                            | 3.70                              | 5.81 8.13 7.14 2.19 0.00 7.58 0.00 |
| Jul 26–Aug 1  | Week 30   | 6                    | 3               | 5000                | 7.67                                        | 3.26                            | 1.86                              | 5.85 0.00 0.00 4.40 0.00 0.00 0.00 |
*School closing from July 15th to August 9th
†All tested for influenza A and B, one H3N2 identified

Many investigators have suggested that 11–35% of outpatient ILI cases, globally, are due to seasonal influenza A and B viruses. As a result, one important question that remains is what proportion of the pandemic and seasonal influenza cases observed in young children and young adults may have been due to pH1N1. Alternatively, our results will help to address these questions. We also note that our data demonstrate the need for continued surveillance efforts to better understand the impact of pH1N1 on different age groups. In addition, the results of this study may provide insight into the potential impact of pH1N1 on other countries. In conclusion, this study provides important information on the epidemiology of pH1N1 in Peru and highlights the need for continued surveillance efforts to better understand the impact of pH1N1 on the local population.
arises is whether or not pH1N1 will displace seasonal influenza viral strains. Although our data are limited by short time period, most ILI cases had laboratory-confirmed pH1N1 during the typical winter influenza season in Lima, 70-1% in total, with very little seasonal influenza virus circulation within this population. As mentioned previously, individuals <18 years of age in our population had the highest proportion of pH1N1 as an etiologic agent of ILI (86-2%), opposed to what is normally observed in a prepandemic influenza season, whereby in this age group influenza virus is not the most common cause of respiratory illness\textsuperscript{11,12} These data may suggest a trend in displacement of seasonal influenza by pH1N1 as has been observed in other countries, including those in the Southern Hemisphere\textsuperscript{13,14} during this same period of time.\textsuperscript{15} Additional weeks of surveillance will help to clarify this finding.

Epidemiologic data on the impact of pandemic influenza from the Southern Hemisphere winter may help inform planning for the upcoming Northern Hemisphere influenza season. Data generated by this population-based study has allowed calculation of measures of disease impact for a larger population. Such data may help inform pH1N1 mitigation strategies, surveillance strategies, and vaccine policy.

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**Disclaimers**

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the US Government.

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**Disclosure**

None of the authors has a financial or personal conflict of interest related to this study. The corresponding author had full access to all data in the study and final responsibility for the decision to submit this publication.

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**Appendix**

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