were not part of the study, none were diagnosed with pandemic (H1N1) 2009 during the study period.

Our study began during the week in September 2009 in which the overall rate of incidence of pandemic (H1N1) 2009 in Spain reached 77.8 cases per 100,000 inhabitants (4), a level that was above the threshold established for the previous influenza season, and ended during the week in which influenza activity fell below this threshold level (5). Therefore, the study spanned the full cycle of the epidemic. The national peak, with an overall rate of incidence of 372.7 cases per 100,000 inhabitants, occurred in week 10 of our study.

This series included 1 asymptomatic carrier. We do not know if that finding could reflect a false-positive or a low-virulence viral presence.

Notably, among the population of health care workers taking part in the study, only 4 (11%) had been vaccinated against the novel form of the influenza A virus, and none of them had positive PCR results for pandemic (H1N1) 2009 virus. On the other hand, 5 (15%) of workers not vaccinated had a positive PCR result. This finding suggests that, despite the climate of uncertainty concerning the evolution of the influenza outbreak, hospital workers had a greater fear of possible side effects of the vaccine than of the disease itself.

References

1. Centers for Disease Control and Prevention. Interim guidance for infection control for care of patients with confirmed or suspected swine influenza A (H1N1) virus infection in a healthcare setting. 2010 [cited 2010 Mar 31]. http://www.cdc.gov/h1n1flu/guidelines_infection_control.htm
2. Perez-Padilla R, Rosa-Zamboni D, Ponce de Leon S, Hernandez M, Quiñones-Falconi F, Bautista E, et al. Pneumonia and respiratory failure from swine-origin influenza A (H1N1) in Mexico. N Engl J Med. 2009;361:680–9. doi:10.1056/NEJMoa0904252
3. Jain S, Kamimoto L, Bramley AM, Schmitz AM, Benoit SR, Louie J, et al. Hospitalized patients with 2009 H1N1 influenza in the United States, April–June 2009. N Engl J Med. 2009;361:1935–44. doi:10.1056/NEJMoa0906695
4. Sistema de Vigilancia de la Gripe en España, Red Nacional de Vigilancia Epidemiológica, Área de Vigilancia de la Salud Pública, Centro Nacional de Epidemiología. Vigilancia de la gripe en España. Semana 38/2009 (del 20 al 26 septiembre de 2009) [cited 2010 Mar 31]. http://vgripe.isciii.es/gripe/documentos/20082009/boletines/grn3809.pdf
5. Sistema de Vigilancia de la Gripe en España, Red Nacional de Vigilancia Epidemiológica, Área de Vigilancia de la Salud Pública, Centro Nacional de Epidemiología. Vigilancia de la gripe en España. Semana 51/2009 (del 20 al 26 diciembre de 2009) [cited 2010 Mar 31]. http://vgripe.isciii.es/gripe

Address for correspondence: Julián Olalla, Unidad de Medicina Interna. Hospital Costa del Sol, Ctra. Nal. 340, km 187, Marbella 29603, Spain; email: julio.olalla@gmail.com

Pandemic (H1N1) 2009 and HIV Infection

To the Editor: In the United States during spring and fall of 2009, pandemic (H1N1) 2009 influenza A virus resulted in 2 major outbreaks of disease. Initial reports identified immunosuppression, including HIV infection, as a risk factor for the development of severe influenza (1–5). Subsequent reports did not confirm this association, but the number of HIV-infected patients in these studies was small (6,7). We describe the clinical course of pandemic (H1N1) 2009 in HIV-infected persons in a US hospital.

During 2009, 23 cases of laboratory-confirmed pandemic (H1N1) 2009 in HIV-infected persons were identified at Harborview Medical Center (Seattle, WA, USA) by querying the University of Washington HIV Information System (a database that enables complete capture of all HIV testing results at Harborview Medical Center) and by querying the Harborview Infection Control Registry for influenza subtype H1N1 infections. Most cases occurred during October and November. Baseline patient characteristics are noted in the Table. Most patients who sought care had fever and cough; median duration of symptoms before seeking care was 4 days. Overall mortality rate for the entire cohort was 8.7%.

Of the 23 patients, only 2 were not treated for influenza; each had mild signs and symptoms and neither required hospital admission. Each of the remaining 13 outpatients received a 5-day course of treatment with oseltamivir. The 8 patients who required hospitalization received therapy for a median of 6 (range 1–22) days.

Overall mortality rate among HIV-infected patients hospitalized for pandemic (H1N1) 2009 infection was 25% (2 of 8 patients). The 2

Julián Olalla, Miguel Marcos, Fernando Fernández, Jaouad Oulkadi, Natalia Montiel, Alfonso del Arco, Víctor Fuentes, Javier de la Torre, José Luis Prada, and Javier García-Alegría

Author affiliation: Hospital Costa del Sol, Marbella, Spain

DOI: 10.3201/eid1706.100577
Table. Baseline characteristics for HIV-infected patients with pandemic (H1N1) 2009, Seattle, Washington, USA, 2009*

| Patient characteristics                                                                 | All patients, \( n = 23 \) | Inpatients, \( n = 8 \) | Outpatients, \( n = 15 \) | \( p \) value† |
|----------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------|---------------------------|----------------|
| **Demographics**                                                                                           |                             |                         |                           |                |
| Male sex                                                                                                    | 19 (83)                     | 5 (63)                  | 14 (93)                   | 0.1            |
| Median age, y (range)                                                                                       | 43 (22–72)                  | 46 (34–72)              | 42 (22–64)                | 0.5            |
| Race/ethnicity                                                                                             |                             |                         |                           | 1.0            |
| White                                                                                                       | 14 (61)                     | 5 (63)                  | 9 (60)                    |                |
| Black                                                                                                       | 5 (22)                      | 2 (25)                  | 3 (20)                    |                |
| Hispanic                                                                                                    | 4 (17)                      | 0                       | 4 (27)                    | 1.0            |
| Other/refused to answer                                                                                     | 4 (17)                      | 1 (13)                  | 3 (20)                    |                |
| **History**                                                                                                 |                             |                         |                           |                |
| Received 2009–10 seasonal influenza vaccine before illness                                                   | 14 (61)                     | 6 (75)                  | 8 (53)                    | 0.1            |
| Ever smoked                                                                                                 | 15 (65)                     | 7 (88)                  | 8 (53)                    | 0.2            |
| **HIV-associated factors**                                                                                   |                             |                         |                           |                |
| CD4 count, cells/\( \mu L \), median (range)                                                               | 308 (32–1,024)              | 147 (32–1,024)          | 438 (119–833)             | 0.06           |
| Undetectable HIV-1 RNA                                                                                       | 19 (83)                     | 6 (75)                  | 13 (87)                   | 0.6            |
| Receiving antiretroviral therapy                                                                             | 21 (91)                     | 8 (100)                 | 13 (87)                   | 0.5            |
| **Predisposing risk factors**                                                                               |                             |                         |                           |                |
| Prior lung disease                                                                                          | 15 (65)                     | 6 (75)                  | 9 (60)                    | 0.5            |
| Cardiovascular disease                                                                                       | 8 (35)                      | 5 (63)                  | 3 (20)                    | 0.07           |
| Obesity, body mass index >30                                                                                | 4 (17)                      | 1 (13)                  | 3 (20)                    | 1.0            |
| Neutropenia                                                                                                 | 3 (13)                      | 2 (25)                  | 1 (6.7)                   | 0.3            |
| Receiving immunosuppressive agent                                                                            | 3 (13)                      | 3 (38)                  | 0                         | 0.03           |
| Malignancy                                                                                                  | 4 (17)                      | 2 (25)                  | 2 (13)                    | 0.6            |
| Diabetes                                                                                                    | 2 (8.7)                     | 0                       | 2 (13)                    | 0.5            |
| **Signs and symptoms**                                                                                       |                             |                         |                           |                |
| Fever                                                                                                       | 18 (78)                     | 7 (88)                  | 11 (73)                   | 0.6            |
| Fatigue                                                                                                     | 5 (22)                      | 2 (25)                  | 3 (20)                    | 1.0            |
| Malaise                                                                                                     | 11 (48)                     | 7 (88)                  | 4 (27)                    | 0.009          |
| Myalgia                                                                                                     | 10 (43)                     | 3 (38)                  | 7 (47)                    | 1.0            |
| Sore throat                                                                                                 | 5 (22)                      | 2 (25)                  | 3 (20)                    | 1.0            |
| Cough                                                                                                       | 21 (91)                     | 8 (100)                 | 13 (87)                   | 0.5            |
| Dyspnea                                                                                                     | 8 (35)                      | 4 (50)                  | 4 (27)                    | 0.4            |
| Nausea/vomiting                                                                                             | 10 (43)                     | 2 (25)                  | 8 (53)                    | 0.4            |
| Median duration of symptoms before seeking care, d (range)                                                  | 4 (0–30)                    | 4.5 (0–10)              | 3 (1–30)                  | 0.6            |
| **Physical examination findings**                                                                            |                             |                         |                           |                |
| Median temperature, °C (range)                                                                              | 38.0 (35.7–40.2)            | 39.1 (37.3–40.2)        | 37.7 (35.7–38.5)          | 0.001          |
| Median heart rate, beats/min (range)                                                                         | 96 (69–129)                 | 109 (80–127)            | 94 (69–129)               | 0.1            |
| Mean arterial blood pressure, mm Hg (range)                                                                 | 94 (66–116)                 | 89 (66–98)              | 97 (75–116)               | 0.05           |
| Median respiratory rate, breaths/min (range)                                                                | 20 (14–40)                  | 22 (18–40)              | 19 (14–36)                | 0.04           |
| Abnormal lung sounds                                                                                         | 11 (48)                     | 8 (100)                 | 3 (23)                    | 0.001          |
| **Laboratory findings**                                                                                      |                             |                         |                           |                |
| Leukocyte count, cells \( \times 10^9/\mu L \) (range)                                                      | 4.53 (0.53–10.8)            | 3.2 (0.53–10.8)         | 5.4 (2.8–9.4)             | 0.4            |
| Leukopenia, <5,000 cells/\( \mu L \)                                                                        | 9 (39)                      | 5 (63)                  | 4 (40)                    | 0.6            |
| Chest radiograph findings, new infiltrate                                                                    | 6 (26)                      | 5 (63)                  | 1 (13)                    | 0.1            |
| **Care received**                                                                                            |                             |                         |                           |                |
| Antiviral treatment for influenza                                                                            | 21 (91)                     | 8 (100)                 | 13 (87)                   | 0.5            |
| Intensive care unit admission                                                                               | 3 (13)                      | 3 (38)                  | NA                        |                |
| Mechanical ventilation                                                                                       | 2 (8.7)                     | 2 (25)                  | NA                        |                |
| Vasopressors                                                                                                | 2 (8.7)                     | 2 (25)                  | NA                        |                |
| **Outcomes**                                                                                                |                             |                         |                           |                |
| Secondary pneumonia                                                                                          | 3 (13)                      | 3 (38)                  | 0                         | 0.03           |
| Thrombotic complications                                                                                     | 1 (4.6)                     | 1 (13)                  | 0                         | 0.4            |
| Died                                                                                                        | 2 (8.7)                     | 2 (25)                  | 0                         | 0.1            |

*Values are no. (%) patients except as indicated. Among the 15 outpatients, 13 had a lung examination documented, 10 had a leukocyte count performed, and 8 had a chest radiograph taken. NA, not applicable.
†For comparison of characteristics between inpatients and outpatients.
inpatients who died had each received ≥14 days of therapy with oseltamivir. Three inpatients were admitted to the intensive care unit (ICU); of these, 2 had hypoxic respiratory failure and bilateral infiltrates at the time of admission and a later diagnosis of acute respiratory distress syndrome, and 1 was hospitalized with fever and hemodynamic instability. Each patient with acute respiratory distress syndrome subsequently died; 1 had methicillin-resistant Staphylococcus aureus pneumonia at the time of admission, and 1 had severe hypoxic respiratory failure requiring the use of rescue therapies (e.g., prone positioning and inhaled nitric oxide) and later treatment for ventilator-associated pneumonia. Of the 2 patients who died, 1 had concurrent conditions, including preexisting interstitial lung disease (believed to be associated with crack cocaine use) and a low CD4 cell count of 127 cells/μL, and 1 had a preserved CD4 cell count >1,000 cells/μL, but 8 days passed before anti-influenza therapy was started, and thrombotic complications developed before death. The lengths of ICU stay for the patients who died were 13 and 29 days. Our findings are similar to those reported by others, suggesting that HIV infection alone does not appear to be a risk factor for severe pandemic (H1N1) 2009, provided that patients are not severely immunocompromised, do not have other risk factors associated with poor outcomes, and are treated for influenza soon after signs and symptoms develop (6–9). Most of the 23 patients described here had mild disease and were treated as outpatients. Only 3 required ICU admission, and 2 of these died. Although the mortality rate reported here is higher than that reported in other studies, our sample size was relatively small, and the patients who died had additional risk factors for poor outcomes.

Our study has several limitations. It is a retrospective study, and HIV-infected patients at Harborview Medical Center were not all prospectively tested for pandemic (H1N1) 2009. Most pandemic (H1N1) 2009 virus was detected by reverse transcription PCR of nasal swab specimens; this testing was only available after October 2009, during the second wave of influenza. Infections occurring during the spring were diagnosed by insensitive testing with fluorescent antibody and culture, diagnosed by clinical criteria alone and not included in this analysis, or missed altogether.

Because of differences in pandemic (H1N1) 2009 virus testing, we were unable to compare the incidence of pandemic (H1N1) 2009 virus infection and outcomes between HIV-infected and HIV-uninfected patients. A total of 189 persons received a diagnosis of pandemic (H1N1) 2009 at Harborview Medical Center in 2009, and 79 were hospitalized. A total of 8 (10%) of 79 patients with pandemic (H1N1) 2009 died, including the 2 HIV-infected patients reported here. However, during the peak of the epidemic, many HIV-infected outpatients, who were receiving antiretroviral therapy and had preserved CD4 cell counts, were advised to remain at home if they had mild influenza-like symptoms and were therefore not tested for influenza. This circumstance could have produced a bias toward diagnosing and reporting only more severe disease. Outpatients who had influenza-like symptoms were tested and treated empirically pending test results. Our case series of HIV-infected patients with pandemic (H1N1) 2009 at a single institution in the United States suggests that HIV itself does not appear to be as major a risk factor for severe disease as are other previously reported concurrent conditions, delays in treatment, and development of secondary bacterial pneumonia.

Shireesha Dhanireddy, Robert D. Harrington, Heidi M. Crane, Matthew R. Gingo, Alison Morris, Laurence Huang, and Kristina Crothers

Author affiliations: University of Washington, Seattle, Washington, USA (S. Dhanireddy, R.D. Harrington, H.M. Crane, K. Crothers); University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, USA (M.R. Gingo, A. Morris); and University of California, San Francisco, California, USA (L. Huang)

DOI: 10.3201/eid1706.102018

References

1. Jain S, Kamimoto L, Bramley AM, Schmitz AM, Benoit SR, Louie J, et al. Hospitalized patients with 2009 H1N1 influenza in the United States, April–June 2009. N Engl J Med. 2009;361:1935–44. doi:10.1056/NEJMoA0906695
2. Fatal H1N1 infection in an HIV positive woman. Negative flu tests, HIV infection delay treatment. AIDS Alert. 2010;25:9–10.
3. Klein NC, Chak A, Chengot M, Johnson DH, Cunha BA. Fatal case of pneumonia associated with pandemic (H1N1) 2009 in HIV-positive patient. Emerg Infect Dis. 2009;16:149–50.
4. Mora M, Rodriguez-Castellano E, Pano-Pardo JR, González-García J, Navarro C, Figueira JC, et al. Influenza A pandemic (H1N1) 2009 virus and HIV. Emerg Infect Dis. 2010;16:1175–6. doi:10.3201/eid1607.091339
5. Centers for Disease Control and Prevention. Use of influenza A (H1N1) 2009 monovalent vaccine: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2009. MMWR Recomm Rep. 2009;58(RR-10):1–8.
6. Isais F, Lye D, Llorin R, Dimatafatc F, Go CJ, Leo YS, et al. Pandemic (H1N1) 2009 influenza H1N1 in HIV-infected adults: Clinical features, severity, and outcome. J Infect. 2010;61:437–40. doi:10.1016/j.jinf.2010.08.002
7. Perez CM, Dominguez MI, Ceballos ME, Moreno C, Labarca JA, Rabagliati R, et al. Pandemic influenza A (H1N1) in HIV-infected patients. AIDS. 2010;24:2867–9. doi:10.1097/QAD.0b013e3283e92d5
8. Riera M, Payeras A, Marcos MA, Viasas D, Farinas MC, Segura F, et al. Clinical presentation and prognosis of the 2009 H1N1 influenza A infection in HIV-1–infected patients: a Spanish multicenter study. AIDS. 2010;24:2461–7. doi:10.1097/QAD.0b013e32833c508f
Swine Influenza Virus A (H3N2) Infection in Human, Kansas, USA, 2009

To the Editor: Triple-reassortant swine influenza viruses (SIVs), which contain genes from human, swine, and avian influenza A viruses, have been enzootic among swine herds in the United States since the late 1990s (1). Although uncommon, occasional transmission of triple-reassortant SIVs from swine to humans has occurred (2–4). Before April 2009, only limited, nonsustained human-to-human transmission of SIVs had been reported (5–7). Although an animal source for pandemic (H1N1) 2009 virus has yet to be identified, the pandemic strain resulted from the reassortment of 2 different lineages of SIV (8).

On July 28, 2009, a 12-year-old Kansas boy sought treatment for fever, cough, and sore throat. Results of an influenza rapid antigen test were positive, and a specimen was sent to the Kansas Department of Health and Environment for further testing. Real-time reverse transcription PCR (rRT-PCR) testing determined the virus contained the surface hemagglutinin (HA) gene of influenza A (H3) and the internal nucleoprotein gene common to all triple-reassortant SIVs (9). The

9. Feiterna-Sperling C, Edelmann A, Nickel R, Magdor K, Bergmann F, Rautenberg P, et al. Pandemic influenza A (H1N1) outbreak among 15 school-aged HIV-1–infected children. Clin Infect Dis. 2010;51:e90–4. doi:10.1086/657121

Address for correspondence: Shireesha Dhanireddy, Harborview Medical Center, Box 359930, 325 9th Ave, Seattle, WA 98104, USA; email: sdhanir@u.washington.edu