

Severe influenza in 33 U.S. hospitals, 2013-2014: risk factors for death in 507 patients

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Objective: Influenza A H1N1 pdm09 became the predominant circulating strain in the 2013-2014 influenza season in the U.S. Our objective was to determine risk factors for mortality among severely ill patients in the US with Influenza infection during the 2013-2014 season. Also we described characteristics, spectrum of disease, management and outcomes of severely ill patients.

Methods: We performed a retrospective cohort study of patients with severe influenza between September 2013 to April 2014 in 33 intensive care units (ICUs) in the U.S., including academic, private, pediatric and Veterans Administration hospitals. Bivariate analyses were performed to compare potential risk factor variables for death during the ICU stay. A multivariate logistic regression model using a stepwise negative selection method was performed to determine which of the significantly associated variables in bivariate analyses were independently associated with death.

Results: 444 adults and 63 children developed severe illness. 223 (50.2%) adults and 28 (44.4%) children were female. The greatest number of severely ill patients was in the 50-64 year age group followed by the 18-49 year age group. 213 adults (46.4%) were obese or morbidly obese and 10 females were pregnant. 110 (26.4%) adults and 32 (56.1%) children received antivirals within 48 hours of symptom onset and 58 (31.5%) adults and 18 (37.5%) children received the influenza vaccine at least 14 days prior to symptom onset. Death occurred in 95 (21.4%) adults and 4 (6.4%) children. Characteristics independently associated with mortality among adults in a logistic regression analysis included older age (> 65 years, OR 3.4 [1.5-7.8], p = 0.003 and 50-64 years, OR 2.7 [1.4-5.3], p = 0.004), male sex (OR 1.8 [1.1-3.2], p = 0.034), history of malignancy with chemotherapy administered within the prior 6 months (OR 8.6 [2.9-25.0], p <0.001) and a higher SOFA score (for each increase by 1 in SOFA score, OR 1.3 [1.2-1.3], p <0.001).

Conclusions: Older age, male gender, history of recent chemotherapy administration for malignancy and an elevated SOFA score were independent risk factors for death in patients with severe influenza. While enterally administered antiviral medications and prior immunization prevent the development of influenza infection, once a patient has severe illness, these interventions in our cohort did not appear to have an impact on the risk of death.

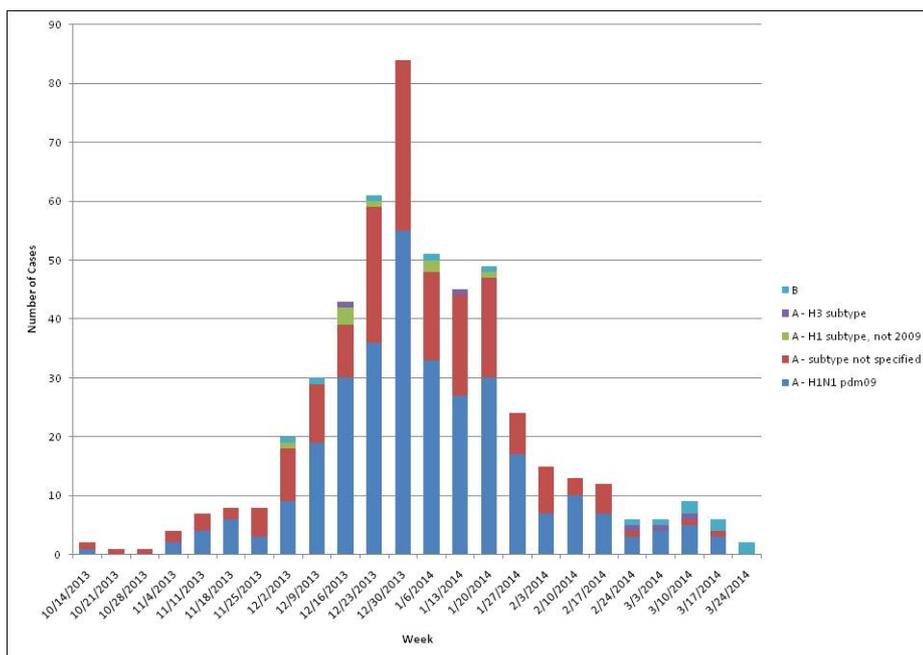


Figure 1. 507 patients with influenza admitted to 33 U.S. intensive care units by week between October 1, 2013 and April 1, 2014, by influenza type and subtype.