A novel H1N1 influenza A virus emerged in the United States in the spring of 2009 and rapidly became a global pandemic. While seasonal influenza typically affects the elderly and infants, the 2009 pandemic strain affected a broader population, with 45% of hospitalized cases being 18 years of age and younger. Children who are hospitalized as a result of seasonal influenza are likely to have an underlying medical condition, receive mechanical ventilation, and have neurologic complications, resulting in extended hospital stays and increased hospital costs. Despite the extensive geographic distribution of the 2009 pandemic strain, our knowledge is limited on how the H1N1 Influenza A strain affected children who required hospitalization. Understanding the risks associated with disease severity in children will allow for better identification of patients at risk for adverse outcomes of influenza. This retrospective electronic medical record review study aimed to identify clinical predictors of disease severity of influenza A/H1N1pdm infection in pediatric patients to aid clinicians in triaging during future A/H1N1pdm influenza pandemic.

### Methods

Records were available for 695 children who presented to the Emergency Department (ED) at Texas Children’s with confirmed A/H1N1pdm influenza infection from April 2009 to June 2010. Demographic and clinical information was abstracted from the patients’ medical records using a standard data collection form. Descriptive statistics were used to describe the three outcome groups: non-hospitalized, hospitalized, and ICU admitted. Proportional-odds ordinal logistic regression models were used to identify risk factors associated with adverse outcomes. The Brant test was used to verify that the model met the assumption of proportional-odds regression and that the odds of disease severity increased consistently across risk groups. Goodness of fit was verified using Hosmer-Lemeshow test statistics. The ordinal regression model was assessed for its validity by comparing the three outcome groups in terms of length of hospital stay, time between symptom onset and presentation in the ED, use of medications, and presence of disease complications.

### Results

- Children with one or more pre-existing health condition(s) had 2.5 greater odds of being hospitalized. Specifically, seizure disorders, obesity, chronic lung disease, history of premature birth, developmental delay, and hemoglobin disorders.
- Children presenting to the TCH ED with dyspnea, tachycardia and tachypnea had 2 to 5 times greater odds of requiring hospitalization or ICU admission for management of their A/H1N1 influenza infection.
- Residential distance from hospital increased with disease severity. Those living >42 miles from TCH were at highest risk for being an ICU admitted case.
- Statistical tests (Hosmer-Lemeshow, Brant, and Goodness-of-fit) verified the fitness of our models.

### Conclusions

Our findings suggest that children can be triaged for disease severity from pandemic A/H1N1 influenza based on specific admitting disease presentations and pre-existing conditions. According to model fitness tests, presenting symptoms are the best predictor for children who will subsequently become hospitalized or admitted to the ICU from this pandemic influenza strain.

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