(*10*), might confer a high degree of virulence to these strains. It also might explain the severity of the clinical findings associated with STEC O104:H4 infections.

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Complicated Pandemic (H1N1) 2009 during Pregnancy, Taiwan

To the Editor: Pregnant women with pandemic (H1N1) 2009 virus infection are at increased risk for severe illness and complications (*1*–*3*). Recent reports have shown that this infection causes disproportionate illness and death in pregnant women and has been associated with adverse fetal and neonatal outcomes. We characterized the severity of pandemic (H1N1) 2009 virus infection among pregnant women in Taiwan.

Complicated influenza infection, defined as influenza-like illness and evidence of pneumonia, neurologic symptoms, myopericarditis, or invasive bacterial infections, has been a notifiable disease in Taiwan since 2002 (*4*). We reviewed reports and medical records of complicated pandemic (H1N1) 2009 virus infection, confirmed by real-time reverse transcription PCR in women 15–49 years of age who had onset of illness during July 1–December 31, 2009. Data were obtained for demographics; pregnancy status and outcome; gestational age at illness onset; preexisting medical conditions; onset of illness; treatment; and severity, including intensive care unit (ICU) admission.

To calculate rates of complicated pandemic (H1N1) 2009 virus infection, we estimated the pregnant population during July 1–December 31, 2009, by using the National Health Insurance computerized database for Taiwan (*5*). Women who were 15–49 years of age and had been assigned International Classification of Diseases, 9th Revision, Clinical Modification (www.cdc.gov/nchs/icd/icd9cm.htm), codes of V22* (normal pregnancy) and V23* (supervision of high-risk pregnancy) during the study were considered pregnant. Number of nonpregnant women was estimated by subtracting the calculated number of pregnant women from the number of women 15–49 years of age from 2009 household registration data (*6*). We estimated 95% confidence intervals (CIs) for rates by using exact binomial methods.

During July 1–December 31, 2009, data were reported for 10 pregnant women and 138 nonpregnant women 15–49 years of age who had confirmed, complicated pandemic (H1N1) 2009 virus infections. Dates of illness onset ranged from August 3 through December 31, 2009. Median age of the 10 pregnant women was 24.5 years (range 22–32 years), and median

gestational age at illness onset was 24 weeks (range 5–37 weeks). Other than pregnancy, none of these women had high-risk conditions for influenza complications recognized by the Advisory Committee on Immunization Practices (*7*). Seven women gave birth during hospitalization; 4 fetuses were stillborn, and 3 were live-born. At birth, the 3 live-born infants were at 27, 32, and 37 weeks' gestation and weighed 824, 1,850, and 3,270 g, respectively; all were admitted to a neonatal ICU.

Four (40%) pregnant and 84 (63%) nonpregnant women received oseltamivir treatment within 48 hours of illness onset (p = 0.19) (Table). Acute respiratory distress syndrome developed, mechanical ventilation was required, and extracorporeal membrane oxygenation was required in a higher proportion of pregnant women than nonpregnant women. Median length of hospital stay was 8 days (range 3–47 days) for pregnant women and 5 days (range 0–100 days) for nonpregnant women (p = 0.03). Five (50%) pregnant and 31 (22%) nonpregnant women were admitted to an ICU (p = 0.06); 3 (30%) pregnant women and 5 (4%) nonpregnant women died (p = 0.01).

There were 168,364 pregnant women and 6,220,197 nonpregnant women 15–49 years of age in Taiwan throughout the study period. The rate of complicated pandemic (H1N1) 2009 virus infection was 5.94 per 100,000 pregnant women (95% CI 2.85–10.92) and 2.22 per 100,000 nonpregnant women (95% CI, 1.86–2.62). Pregnant women were at greater risk for complicated pandemic (H1N1) 2009 virus infection than nonpregnant women (risk ratio 2.68, 95% CI 1.41–5.09).

Findings from this study have several limitations. Ascertainment of patients with complicated pandemic (H1N1) 2009 virus infection relied on passive surveillance. Therefore, data collection varied in completeness and quality between hospitals and different surveillance periods. The small number of pregnant women with confirmed complicated pandemic (H1N1) 2009 virus infection limited statistical power for stratified analyses by patient demographics and other characteristics. On November 1, 2009, Taiwan concurrently began a nationwide vaccination program against pandemic (H1N1) 2009 (*8*). As of December 31, 2009, a total of 8% of pregnant women and 13% of persons ≥15 years of age had been vaccinated (Taiwan Centers for Disease Control, unpub. data). Calculated rates of complicated pandemic (H1N1) 2009 virus infection could be affected by variable vaccine coverage among pregnant and nonpregnant women.

In Taiwan, oseltamivir treatment was provided free during the 2009 influenza pandemic to patients with influenza-like illness who had positive results for influenza by rapid influenza diagnostic tests, signs that signal progression to severe diseases (*9*), and clinical evidence of complicated influenza infections. The government recommended that pregnant women receive the vaccine against pandemic (H1N1) 2009, regardless of stage of pregnancy, and made this group a priority. Our findings are consistent with those of other studies (*1–3*) and suggest that pregnancy is a risk factor for severe or fatal pandemic (H1N1) 2009 virus infection in Taiwan. These findings justify policies to treat and vaccinate pregnant women against pandemic (H1N1) 2009.

Table. Characteristics of women ages 15–49 y who had confirmed pandemic (H1N1) 2009 infection, by pregnancy status, Taiwan, July 1–December 31, 2009*

Characteristic	Pregnant, n = 10	Nonpregnant, n = 138	p value†
Age, y	24.5 (22–32)	27.5 (15–49)	0.39
ACIP high-risk condition other than pregnancy	0	28 (20)	0.21
Pneumonia	9 (90)	134 (97)	0.30
ARDS	5 (50)	14 (10)	0.003
Admission to hospital	9 (90)	138 (100)	0.07
Time from symptom onset to hospitalization, d	2 (0–7)	2 (1–12)	0.78
Length of hospital stay, d	8 (3–47)	5 (0–100)	0.03
Admission to ICU	5 (50)	31 (22)	0.06
Length of ICU stay, d	16 (6–33)	5 (0–83)	0.07
Oseltamivir treatment	9 (90)	135 (98)	0.25
≤48 h after illness onset	4 (40)	84‡ (63)	0.19
Mechanical ventilation	5 (50)	19 (14)	0.01
ECMO	3 (30)	1 (1)	<0.001
Death	3 (30)	5 (4)	0.01
Time from illness onset to death, d	16 (2–37)	9 (1–32)	0.57

*Values are median (range) or no. (%). ACIP, Advisory Committee on Immunization Practices; ARDS, acute respiratory distress syndrome; ICU, intensive care unit; ECMO, extracorporeal membrane oxygenation.
†Medians were compared by using Wilcoxon rank-sum test, and proportions were compared by using Fisher exact test.
‡For 4 nonpregnant women, information on date of initiation of oseltamivir treatment was unknown.

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Pandemic (H1N1) 2009 and Seasonal Influenza A (H3N2) in Children's Hospital, Australia

To the Editor: We read with interest the report by Carcione et al. of clinical features of pandemic influenza A (H1N1) 2009 and comparison of these with 2009 seasonal influenza infection in a population-based study from Western Australia (*1*). Here we share our experience of hospitalizations for influenza in a tertiary care children's hospital in Sydney, New South Wales, Australia, during the 3 peak influenza seasons of the last decade.

During the 2009 Southern Hemisphere single influenza wave (June–September), we prospectively studied every child <15 years of age who was hospitalized with laboratory-confirmed influenza (74% had proven pandemic [H1N1] 2009) in Children's Hospital at Westmead (CHW), Sydney, as part of a collaboration between the National Centre for Immunisation Research and Surveillance and the Australian Paediatric Surveillance Unit. The study was approved by the Human Research Ethics Committee at CHW and supported by the state (New South Wales) health department. Data from hospitalizations for seasonal influenza at CHW in 2003 and 2007 (previous peaks in the last decade) were analyzed by using our previous studies and medical records (*2–4*). To compare pneumonia rates, we used the same case definitions in 2007 and 2009 (radiologic changes consistent with pneumonia). Proportions were compared by using the χ^2 statistic.

In 2009, the numbers of children with laboratory-confirmed influenza admitted to the hospital and to the pediatric intensive care unit (PICU) at CHW (226 and 22, respectively) were nearly double those admitted in 2007 (122 and 12) but similar to the number in 2003 (257 and 22). The proportion of case-patients admitted to the PICU, the length of hospital stay, and the length of PICU stay were similar in 2003, 2007, and 2009.

In 2009, among the 226 influenza-associated hospitalizations, 167 (74%) were for pandemic (H1N1) 2009 infection; in 2007, 119 of 122 influenza-associated hospitalizations were for seasonal influenza A (H3N2) infection (Table). During the 2009 pandemic wave, of all children admitted with laboratory-confirmed influenza, the proportion hospitalized with pandemic (H1N1) 2009 who were <6 months of age was similar to the proportion of children <6 months of age hospitalized with seasonal (H3N2) influenza in 2007 (21 [13%] of 167 and 21 [18%] of 119, respectively; p = 0.31). The proportions of those ≥5 years of age were significantly higher (61 [37%] and 15 [13%]; p = 0.0001). However, the proportion of those ≥5 years of age admitted to PICU in 2009 was less than in 2007 (10 [16%] of 61 vs. 3 [20%] of 15; p = 0.71). Similar percentages of children with preexisting conditions were admitted in 2009 and 2007 (47% and 49%, respectively). However, pneumonia was a more frequent complication in 2009 than in 2007 (42 [25%] of 167 vs. 15 [13%] of 119; p = 0.01). In 2009, the proportion of children with pandemic (H1N1) 2009 who needed mechanical ventilation (7 [4%] of 167) was similar to the proportion in 2007 who had seasonal influenza (H3N2) (6 [5%] of 119; p = 0.77). Furthermore, no child at CHW in 2007 or in 2009 received extracorporeal membrane oxygenation.

Vomiting occurred much more frequently in 2009 than in 2007 (59 [35%] of 167 vs. 16 [13%] of 119; p = 0.0001). In 2009, of 62 children who did not exhibit vomiting when first examined, and who were subsequently treated with antiviral drugs, only 1 had vomiting develop in the hospital. This condition resolved within hours, and