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## Maternal death from influenza in tropical Thailand

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At 0033 h on Sept 9, 2015, a 17-year-old Thai woman, 33 weeks and 4 days into her first pregnancy and no medical history of note, presented to the emergency room of Phon Thong district hospital with a 1 day history of fever, cough, and sore throat. On presentation she was febrile (temperature 39.2°C) and tachycardic (pulse 129 beats per min) with a respiratory rate of 22 breaths per min and blood pressure 130/81 mm Hg. She was diagnosed with bronchitis, prescribed amoxicillin, paracetamol, and bromhexine, and discharged home.

She attended a scheduled antenatal care clinic appointment the next morning at 0800 h and was afebrile (temperature 37.1°C). Ultrasonography showed twin infants with estimated bodyweights of 1900 g and 2000 g and on stress test fetal heart beats were normal. She returned to hospital for a third time at 2030 h after experiencing contractions. On examination, her cervix was found to be dilated to 3 cm. She was febrile (39.0°C) and tachycardic (pulse 136 beats per min), with a respiratory rate of 20 breaths per min and blood pressure 144/81 mm Hg. At 2045 h, her blood pressure rose to 150/100 mm Hg and she reported mild dyspnoea. Fetal heart monitoring showed fetal tachycardia. At 2100 h, her respiratory rate increased to 28 breaths per min with oxygen saturation (SpO<sub>2</sub>) 86% on room air and 96% on 10 L oxygen. Fine crepitations were noted on lung examination, and she was started on ceftriaxone. At 2130 h, before being transferred to the provincial hospital, she developed tachycardia (pulse 140 beats per min), tachypnoea (respiratory rate 30 breaths per min), hypertension (blood pressure 200/120 mm Hg), and hypoxia (SpO<sub>2</sub> 70% on room air). She was intubated (400 mL of pink frothy sputum was noted on endotracheal aspiration) and given 4 g of intravenous MgSO<sub>4</sub> to prevent seizures. During transfer she was started on external positive end expiratory pressure ventilation, and SpO<sub>2</sub> improved to 88–90%. Fetal heart sounds decreased to 80–90 beats per min.

At 2345 h, in the emergency room of Roi Et provincial hospital, she suffered a cardiac arrest and required cardiopulmonary resuscitation (CPR). Electrocardiogram showed sinus tachycardia. She was admitted to the intensive care unit and a chest radiograph showed patchy infiltrates in the upper and middle lobes of her right lung. Her total white blood cell

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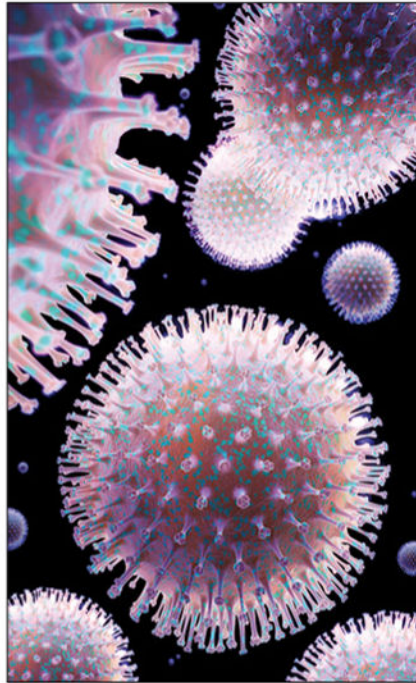
All authors contributed to patient care and writing of the report. Written consent to publication was obtained from the patient's family.

count was  $13.4 \times 10^9/L$ , platelet count  $139 \times 10^9/L$ , haemoglobin 112 g/L, and haematocrit 0.361. At 0130 h she had a second cardiac arrest and CPR was attempted for 30 min. She died at 0200 h on Sept 10, 2015, with cause of death recorded as severe community acquired pneumonia with sepsis and respiratory failure. On post-mortem examination she was found to have three dead infants in utero. Real-time PCR of her lung and heart tissue were positive for influenza A (H3N2) virus and negative for influenza B virus and 16 other common respiratory viruses. Haemoculture did not grow any pathogens. The family confirmed that she had not been vaccinated against influenza during her pregnancy.

Pregnant women are at increased risk for severe complications from influenza, including maternal death and adverse fetal outcomes.<sup>1,2</sup> Presence of multiple fetuses might increase the potential for complications because they further reduce maternal tidal volume and lung function, particularly in the third trimester. In Thailand, 26 deaths of pregnant women associated with influenza have been reported since 2009 (Bureau of Epidemiology, Ministry of Public Health, personal communication), but as influenza testing is not routine, the real number of influenza deaths in pregnancy is likely to be much higher. Only five (19%) of these cases had underlying chronic disease. Thailand's clinical practice guidelines recommend early initiation of antivirals before laboratory confirmation for influenza-like illness in high-risk groups, including pregnant women, to prevent severe complications.<sup>3</sup> Our patient became ill in September, at the typical peak of influenza transmission in Thailand, and presented within 48 h of illness onset, when antivirals are most effective at preventing severe disease. Both hospitals that treated this patient had oseltamivir in stock. However, as influenza was not suspected by her treating physicians, she was not given antiviral treatment. Influenza has not been considered an important cause of respiratory disease in Thailand and other tropical Asian countries until recently,<sup>4</sup> so influenza is rarely included in differential diagnoses of severe respiratory infections and rapid and laboratory-based tests for influenza are used infrequently.

Vaccination is the best way to prevent influenza during pregnancy. Thailand's Ministry of Public Health has recommended influenza vaccination during the second and third trimester of pregnancy since 2009; in 2012, however, fewer than 1% of pregnant women received influenza vaccine.<sup>5</sup> Although most (75%) Thai physicians surveyed about their knowledge, attitudes, and behaviours about influenza vaccination of pregnant women reported a favourable attitude towards the vaccine, only 25% routinely recommended the vaccine to their pregnant patients (Prphasiri P, Thailand MOPH-US CDC Collaboration, personal communication).

This case highlights the need to increase awareness in tropical countries that influenza can be a cause of severe disease during pregnancy, particularly during periods of increased influenza transmission. Physicians in tropical countries should be encouraged to vaccinate pregnant women against influenza, and prompted to provide early empirical treatment with antivirals for all pregnant women with influenza-like illness.



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