

A(H1N1) swine influenza, Mexico and USA

25 April 2009

Introduction

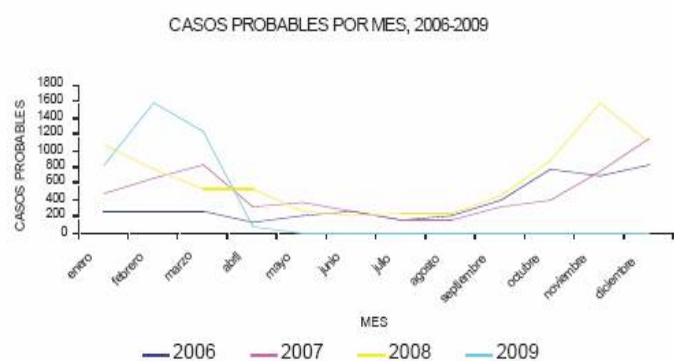
Cases of A(H1N1) swine influenza have been reported over the past 48 hours in Mexico and in the USA.

I. In Mexico

II.1. Context (Mexico)

- Seasonal influenza is usually transmitted in Mexico from October to February and peaks in December.
- In 2009, Mexican authorities have registered an unusual peak of severe influenza illness in March and April (see Figure 1)

Figure 1: Monthly surveillance data for suspected seasonal influenza cases, Mexico, 2006-2009 (Source: MoH).



I.2. Reported cases (Mexico)

- Since March 2009, health authorities in Mexico have reported human cases of lower respiratory illness (LRI) in three separate events and locations stretching across the country (see Figure 2):
 - ✓ Mexico City and Federal District of Mexico: Cases began to rise in mid-March. As of April 23rd, more than 854 cases (59 deaths; CFR: 7%) of pneumonia have been registered in Mexico City.
 - ✓ State of San Luis Potosi (SLP): 24 cases (3 deaths; CFR : 12.5%)
 - ✓ Mexicali, State of Baja California: 4 cases, no deaths.
 - ✓ Cases have seemingly also occurred in Oaxaca (not confirmed by all sources).

- Among these cases:

- ✓ 18 have been confirmed in Canada as being infected with the A(H1N1) swine influenza of which, 12 with the strain identified from California, USA (see section II.4.) and,
- ✓ 8 of 14 other Mexican samples have been confirmed for porcine A(H1N1) in the USA.
- ✓ 20 of the fatal cases were confirmed porcine A(H1N1) strain.

- Most cases have been reported in healthy, young adults aged 20-45.
- People aged below 2 years and over 60 years have not been heavily affected in Mexico. These age groups have recently benefited from seasonal influenza immunization campaigns. It is unclear whether the two are linked.
- On 22/04/09 authorities in Mexico City have declared a state of national alert. Schools and universities have remained closed.

II. In the USA

- The US CDC in Atlanta confirmed 8 human A(H1N1) swine influenza cases: 2 cases on April 14, 2009, and 6 others since April 23rd.

II.1. Context (USA)

- The A(H1N1) swine influenza virus (SIV) is frequently isolated in pigs. It is different from human A(H1N1) strains.
- Over the last decades, symptomatic sporadic human cases of A(H1N1) swine influenza infections have been described in healthy or immuno-compromised people in the USA and elsewhere (former Czechoslovakia, Russia, Netherlands, Spain, Switzerland, Canada). In most cases, exposure to pigs has been documented.
- Some events have been associated with severe forms of swine influenza and limited human-to-human transmission:
 - ✓ In 1976, an outbreak among young soldiers in New Jersey, USA, caused 1 death and 12 respiratory disorders requiring hospitalisation. Nearly 230 other soldiers were found to have antibodies.

- ✓ In 1988, in Wisconsin, USA, a 32 year-old woman died of A(H1N1) SIV infection after attending an agricultural fair. Among 25 breeders who participated to this fair, 19 samples were positive to for specific A(H1N1) SIV antibodies. A(H1N1) SIV was transmitted to at least one healthcare worker who cared for the fatal case.
- A seroprevalence study conducted in Iowa (USA) between 2002 and 2004 reported antibodies against A(H1N1) SIV in 17.4% of 111 breeders and 10.9% of veterinarians.
- Until December 2005, the CDC used to report one human symptomatic swine influenza case every 1 to 2 years in the USA.
- Between 1958 and 2005, at least 31 documented symptomatic cases were reported in the USA: 18 cases among civilians and 13 among soldiers (see above).
- Between December 2005 and January 2009, 12 human cases were reported in the USA:
 - ✓ 11 among people who had been in direct or indirect contact with pigs;
 - ✓ 1 whose exposure was unknown;
 - ✓ This increase in cases may be due to the improvement of diagnostic capabilities and of case reporting (which became national in 2007).

II.2. Reported cases (USA)

- Since the beginning of 2009, 6 cases have been described in California and 2 in Texas.

Case 1

- A 10 year-old boy living in San Diego County, California, USA, on the border with Mexico.
- Date of symptoms onset: 30/03/09.
- Symptoms disappeared after one week and he recovered fully.
- Early April: Tests for human A(H1N1), H3N2, H5N1 influenza were negative.
- On April 17th, 2009: The CDC confirmed a strain of A(H1N1) swine influenza.
- The boy was not vaccinated against seasonal influenza.
- Suspected cases (not sampled) in the child's entourage:
 - ✓ Case's mother: respiratory symptoms without fever in early April;
 - ✓ An 8 year-old brother: respiratory symptoms and fever on April 11th. He recovered fully;
 - ✓ No hospitalisation was required and no sample was taken from these persons at the time of symptoms.

Case 2

- A 9 year-old girl from Imperial County (bordering San Diego County), California, USA.
- Date of symptoms onset: 28/03/09.

- She recovered fully.
- On April 17, 2009: the CDC biologically confirmed a strain of A(H1N1) swine influenza.
- The girl was not vaccinated against seasonal influenza A.
- Suspected cases in the child's entourage:
 - ✓ A 13 year-old cousin, living in the same house, presented symptoms compatible with influenza on 25/03/09 (3 days before Case 2's date of symptoms onset).
 - ✓ A 13 year-old brother: symptoms compatible with influenza on 01/04/2009. He recovered fully;
 - ✓ No hospitalisation was required and no samples were taken from these persons at the time of symptoms.
- These two children (case 1 and 2) are residents in two adjacent counties of Southern California and according to the CDC, they have never been in contact.

Case 3

- A 16 year-old girl from San Diego County, California, USA.
- Symptoms onset on 05/04/09.

Case 4

- 54 year-old man, father of Case 3, also from San Diego County, California, USA.
- Symptoms onset on 06/04/09.
- He had been vaccinated.

Case 5

- A 41-year old woman from Imperial County, California, USA.
- No other details are available at this stage.

Case 6

- A 16-year old boy from Guadalupe County, near San Antonio, Texas.
- Symptoms onset on 10/04/09.
- Did not require hospital care.

Case 7

- A 16-year old boy from Guadalupe County, near San Antonio, Texas.
- Symptoms onset on 14/04/09.
- Did not require hospital care.

Case 8:

- 7 year-old boy from San Diego, California, USA.

II.3. Epidemiological data (USA)

- Among these 8 cases, only 1 case required hospitalisation for a short duration of time.
- To date, all the cases are in good condition
- No exposure to pigs was documented in any of these 8 cases.
- Case n°1 had recently stayed in Dallas, Texas, for a prolonged period of time.
- The two 16 year-old boys (cases n°6 and 7) from Texas, are friends and attend the same school, in Guadalupe county, near San Antonio, Texas.

- The 2 first cases in California were documented thanks to a reinforced surveillance system implemented during an exercise.
- Other cases have been identified through systematic laboratory surveillance implemented along the Mexico frontier.

II.4. Description of the viral strain (USA)

- For both cases, genetics tests done by CDC (Atlanta, USA) showed two very similar but unidentical A(H1N1) swine influenza strain variants. This strain is not similar to any strain previously identified neither in the USA nor in the rest of the world, including the strain which was responsible for the 1976 outbreak in New Jersey.
- These viruses result from recombination and show polymorphisms previously identified in other strains;
 - ✓ 1 gene segment identified in a human influenza strain which circulates in North America;
 - ✓ 1 gene segment identified in a swine influenza strain which circulates in North America;
 - ✓ 2 gene segments identified in a swine influenza strain which circulates in Europe and Asia;
 - ✓ 1 gene segment identified in an avian influenza strain.
- There is no data regarding the impact in terms of pathogenic or epidemic potential of these genetic modifications at this stage.
- According to available data, the analysed strains are resistant to amantadine and rimantadine but remain susceptible to treatment by oseltamivir and zanamivir.

III. Comments

The system implemented in Mexico is likely to detect severe respiratory illness cases and may underestimate benign cases. However, the concurrence of the USA outbreak and the fact that young adults have died in Mexico are a cause for concern. The analysis of the situation is made more difficult by the co-circulation of several human influenza strains these past weeks in Mexico. The fact that authorities have triggered a national alert bears witness to the extreme attention they have given these outbreaks and the commendable thoroughness they have shown.

In the absence of contact with pigs, the U.S. CDC considers that limited inter-human transmission of an emerging A(H1N1) swine influenza strain has occurred and may still be occurring in California and Texas, probably linked to events in Mexico.

In terms of implemented control measures, Mexico City schools have been closed. To date, no travel restrictions have been reported by national public health agencies. In several countries, it has been recommended for influenza routine surveillance systems to be extended for a longer period of time.

As investigation progresses in Mexico and the USA, further cases are to be expected in the coming days. At this stage all the identified cases in the USA presented mild symptoms. As the number of documented cases increases, clinical presentation may vary.

Episodes of limited human transmission have already been reported in the past in the U.S. (especially in 1976 and 1988) and in Europe. Some of these episodes have been associated with limited human-to-human transmission and some fatal cases.

At this point, it is unclear how the events in Mexico and in the USA are exactly linked.

Figure 2: Areas reporting H1N1 swine influenza cases in Mexico, up to 25 April 2009 (Source: WHO).

