Community transmission of influenza A (H1N1)v virus at a rock festival in Belgium, 2-5 July 2009

I Gutiérrez (ignacio.gutierrez@iph.fgov.be)[1,2], A Litzroth[2], S Hammadi[2], H Van Oyen[2], C Gérard3, E Robesyn[4], J Bots[5], M T Faidherbe[6], F Wuillaume[2]

1. European Programme for Intervention Epidemiology Training (EPIET), European Centre for Disease Prevention and Control, Stockholm, Sweden
2. Department of Epidemiology, Scientific Institute of Public Health, Brussels, Belgium
3. National Reference Laboratory for Influenza, Scientific Institute of Public Health, Brussels, Belgium
4. Department of Public Health Surveillance, Agency for Care and Health, Flemish Community, Brussels, Belgium
5. Health Inspectorate, Brussels Region, Brussels, Belgium
6. Health Inspectorate. Health Surveillance, French Community, Brussels, Belgium

On 6 July 2009 the Belgian enhanced surveillance system for influenza-like illness among travellers returning from influenza A(H1N1)v affected areas detected a case linked to a rock festival which took place on 2-5 July. The health authorities implemented communication and control measures leading to the detection of aditional cases. This paper describes the outbreak and its impact on the management of the influenza pandemic in Belgium.

Background

In response to the ongoing influenza A(H1N1)v pandemic, first detected in North America in April 2009 [1], many European countries developed active surveillance systems for influenza-like illness among travellers returning from affected areas [2,3,4,5].

Amplifying events, like school outbreaks of influenza A (H1N1)v infections reported by the United Kingdom (UK) and France [6,7,8] confirmed sustained community transmission [9] and required the surveillance systems to adapt accordingly [5,10].

In Belgium the enhanced surveillance system for influenza-like illness in travellers returning from affected areas [11] detected an outbreak around the "Rock Werchter" festival that took place from 2 to 5 July 2009.

This communication describes the epidemiology of this outbreak and the control measures taken as well as the impact of this event on the management of the current influenza A(H1N1)v pandemic in Belgium.

The index case and initial investigation

The first case found was an Israeli citizen who arrived in Belgium (via London) on 2 July 2009 and visited the festival from 3 to 5 July. He felt sick on 3 July but only sought medical care at the festival, in the Belgian Red Cross facility, on 5 July. The same day respiratory tract swabs were taken from this patient and sent to the National Reference Laboratory for Influenza where influenza A(H1N1)v infection was confirmed by real-time reverse transcription PCR on 6 July. The patient was isolated and treated with oseltamivir. Four of his friends, considered as close contacts, were also isolated and given post-exposure doses of oseltamivir.

Descriptive epidemiology

Setting

The outbreak occurred at the Rock Werchter festival, one of the four biggest annual rock music festivals in Europe. It lasts four days and can host 80,000 guests at a time. It is estimated that about 69,000 participants attend all four days, which adds up to a total of 113,000 different attendees. Visitors come mainly from Belgium but also from the Netherlands, the UK, and many more countries.

Case definitions

The case definitions used for identifying cases of influenza A(H1N1)v at the Rock Werchter festival are summarised in Table 1.

Outbreak description

We found 12 confirmed cases of A(H1N1)v infection out of a total of 30 people with influenza-like symptoms who were linked to the festival and were tested for influenza A(H1N1)v virus from 2 to 13 July in Belgium.

These cases are shown in the Figure, together with all confirmed cases reported in Belgium from 12 May to 13 July 2009 by date of onset of symptoms. Note that the Interministerial Influenza Coordination Committee decided to stop the enhanced surveillance system on 13 July, which may explain the smaller number of cases for whom symptoms onset was 11 or 12 July.

The mean age of cases linked to the festival was 23 years (range 18-45) and median 20 years. There were nine men and three women among the cases (ratio male: female = 3).

Taking the index case as the common source, the generation interval for secondary cases ranged from 3 to 7 days (median four days)

After a request to the UK, Spain, Germany, France and the Netherlands, an aditional case linked to Werchter was notified by the Dutch surveillance system: a 22-year-old man with onset of symptoms on 6 July 2009. Luxembourg reported another laboratory-confirmed case: a 20 year-old man with symptoms onset on 7 July.* These two cases were not included in our analysis.

Clinical epidemiology

The distribution of symptoms among the cases is illustrated in Table 2. These were typical of influenza-like illnesses. No cases were admitted to hospital.

The public health response

Medical care at the festival was ensured by the Belgian Red Cross in collaboration with the university hospital of the Catholic University of Leuven. No active case finding was set up at the festival site but the abovementioned medical care facilities had procedures in order to diagnose, notify and manage cases in line with the national enhanced surveillance system.

Case finding: Communication through the press, the festival's website and case definition update

The official daily press releases on the influenza pandemic from the Belgian Interministerial Influenza Coordination Committee reported cases linked to the festival on 6 July and from 8 to 12 July. Mass media (including press, internet, TV and radio) published this information and conducted a carefull follow up of the event describing every confirmed case of influenza A(H1N1)v related to the festival [12,13]. On 6 July a separate message for those having visited the festival was published on the official Belgian influenza website [14]. Aditionally on 7 July, a communication in Dutch, English and French was displayed on the festival's website in coordination with the festival organisers. All these messages advised the participants of the festival to visit a physician if fever or respiratory symptoms appeared [15].

As a consequence of this outbreak, the case definition used by the national surveillance system was updated to include participation in the festival and the criterium of travel to an affected area was removed as of 6 July 2009.

Case management and contact tracing

Cases were managed individually, within the regular healthcare system, by general practitioners in coordination with provincial health inspectors. According to the protocols, patients were isolated at home, contact tracing was performed and prophylactic treatment for close contacts recommended [11]. No epidemiological link, apart from attending the same event, was found for any of the cases linked to Werchter festival.

Beside the index case from Israel, three of the cases linked to the festival consulted their physician on 7 July, one on 8 July, five on 9 July, one on 10 July and one on 11 July 2009.

Discussion and conclusions

This outbreak of influenza A(H1N1)v is one of the first associated with a mass gathering event. The index case, detected by the enhanced surveillance system, was imported probably from Israel or, less likely, from the UK, where he was in transit the day before the onset of symptoms.

An initial assessment led to isolation and post-exposure prophylaxis of four close contacts. The fact that the index case had attended the "Rock Werchter festival" for three days while being

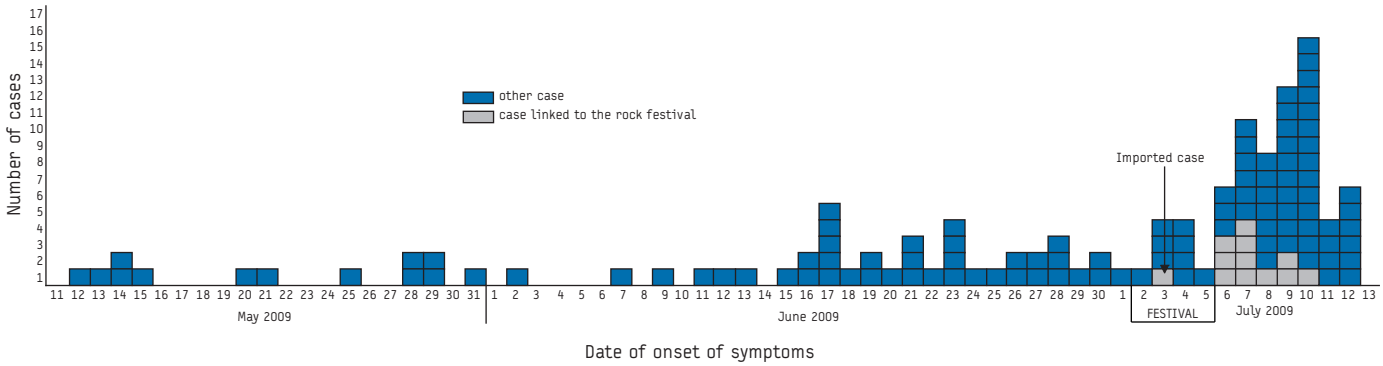
Table 1

Case definition of influenza A(H1N1)v used for investigating cases linked to Rock Werchter festival in Belgium, 2-5 July 2009

Case linked to Werchter	A person with onset of influenza-like ilness symptoms from 2 to 12 July 2009 AND laboratory confirmation by real time reverse transcription PCR for influenza A(H1N1)v AND one of the following epidemiological criteria: 1) Having visited the "rock Werchter festival" between 2 and 5 July 2009 OR 2) Being a close contact (less than one metre distance) to a laboratory confirmed case that had visited the "rock Werchter festival"
Other case	A person with a laboratory confirmation for influenza A(H1N1)v, with date of onset of influenza-like ilness symptoms betwen 12 May and 13 July 2009 who is not a case linked to Werchter

Figure

Distribution of laboratory-confirmed cases of influenza A(H1N1)v by date of onset, including cases with epidemiological link to "Rock Werchter festival", Belgium, 12 May-28 June 2009 (n=123)*



*Note: The total number of confirmed cases for this period is 131 but for eight cases the date of onset of symptoms was not available. None of these were linked to the festival.

symptomatic prompted the Belgian Interministerial Committee for Influenza to implement further communication and control measures.

The eleven cases found in Belgium as well as the one reported in the Netherlands and one in Luxembourg* might have acquired the infection at the festival. This is plausible because their symptoms started within five days after the end of the festival hence within the incubation period estimated to be from one to seven days for influenza A(H1N1)v [16].

However, given the lack of epidemiological link among the cases and the fact that community transmission existed in neighbouring countries where many attendees came from, we believe that other cases, apart from the index case identified, were present at the festival and could therefore have been seeding cases as well. The average generation interval (number of days between onset of symptoms in the source case and in the secondary case) for secondary cases found in our previous analysis of influenza A(H1N1)v cases in Belgium (not published) was two days compared to three found in the Netherlands [4]. This makes it difficult to believe that all eleven cases were contaminated by the same index case, as for eight cases the generation interval was estimated to be four to seven days, i.e. at least twice as long as expected.

The likelihood of community transmission having occurred independently of the festival can not be ruled out either. If this was the case, increased awareness of physicians and patients, after the public health messages by the press and the authorities, might have contributed to the detection of some of the cases, especially those with latest symptoms onset.

This latter possibility highlights the role of chance in detecting this outbreak: had the index case not been an imported one, it would not have been detected and subsequently cases linked to Werchter would not have been diagnosed either because at that time the case definition included a visit to an affected country.

This outbreak demonstrated that community transmission was taking place in Belgium. The festival itself could have been the seeding event leading to community transmission although other sources must have played a role because the number of cases not linked to Werchter was already rising steeply. The outbreak also challenged the surveillance system at that time forcing us to update the case definition. Furthermore a shift into a mitigation strategy was decided on 13 July 2009, one week after the index case had been diagnosed.

Communication measures raised public awareness; this is shown by the fact that after the information on the first case linked to the festival was published, subsequent cases sought medical attention and were identified.

As pointed out by this investigation, mass gatherings can concentrate infectious diseases and amplify their transmission. Once more, preparedness and communication become essential in order to detect and respond to infectious disease outbreaks in complex situations.

Table 2

Distribution of symptoms among cases of influenza A(H1N1)v linked to Rock Werchter festival in Belgium, 2-5 July 2009 (n=12)

Symptom	Number of cases	Percentage
Cough	12	100%
Disconfort	11	92%
Fever	11	92%
Dyspnoea	2	17%
Diarrhoea	1	8%
Vomiting	1	8%

Acknowledgements

We would like to acknowledge Belgian general practicioners and staff of the National Reference Laboratory for Influenza for their continuous work and the European Programme for Intervention Epidemiology Training (EPIET) fellows and coordinators for their valuable information and support.

*Authors' correction

Information on the case detected in Luxembourg was added after the publication of the article, upon the request of authors. This change was made on 10 August 2009.

References

1. Centers for Disease Control and Prevention (CDC). Swine influenza A (H1N1) infection in two children – Southern California, March-April 2009. MMWR Morb Mortal Wkly Rep. 2009;58(15):400-2.
2. Health Protection Agency, Health Protection Scotland, National Public Health Service for Wales, HPA Northern Ireland Swine influenza investigation teams. Epidemiology of new influenza A (H1N1) virus infection, United Kingdom, April – June 2009. Euro Surveill. 2009;14(22):pii=19232. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19232
3. Surveillance Group for New Influenza A(H1N1) Virus Investigation and Control in Spain. New influenza A(H1N1) virus infections in Spain, April-May 2009. Euro Surveill. 2009;14(19):pii=19209. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19209
4. Hahné S, Donker T, Meijer A, Timen A, van Steenbergen J, Osterhaus A, et al. Epidemiology and control of influenza A(H1N1)v in the Netherlands: the first 115 cases. Euro Surveill. 2009;14(27):pii=19267. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19267
5. Influenza A(H1N1)v investigation teams. Modified surveillance of influenza A(H1N1)v virus infections in France. Euro Surveill. 2009;14(29):pii=19276. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19276
6. Smith A, Coles S, Johnson S, Saldana L, Ihekweazu C, O'Moore E. An outbreak of influenza A(H1N1)v in a boarding school in South East England, May-June 2009. Euro Surveill. 2009;14(27):pii=19263. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19263
7. Health Protection Agency West Midlands H1N1v Investigation Team. Preliminary descriptive epidemiology of a large school outbreak of influenza A(H1N1)v in the West Midlands, United Kingdom, May 2009. Euro Surveill. 2009;14(27):pii=19264. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19264
8. Guinard A, Grout L, Durand C, Schwoebel V. Outbreak of influenza A(H1N1) v without travel history in a school in the Toulouse district, France, June 2009. Euro Surveill. 2009;14(27):pii=19265. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19265
9. European Centre for Disease Prevention and Control (ECDC). ECDC Situation Report. Influenza A(H1N1)v infection. Update 16 June 2009. Available from: http://ecdc.europa.eu/en/files/pdf/Health_topics/Situation_Report_090616_1700hrs%20.pdf
10. Department of Health, United Kingdom. A(H1N1) swine influenza: from containment to treatment. Available from: http://www.dh.gov.uk/en/Publichealth/Flu/Swineflu/InformationandGuidance/index.htm
11. Belgian working group on influenza A(H1N1)v. Influenza A(H1N1)v virus infections in Belgium, May-June 2009. Euro Surveill. 2009;14(28):pii=19270. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19270

12. Demorgen.be. Werchter-bezoeker besmet met Mexicaanse griep [Werchter visitor infected with Mexican flu]. [Accessed on 28 July 2009]. Available from: http://www.demorgen.be/dm/nl/4352/Gezondheid/article/detail/919158/2009/07/06/Werchter-bezoeker-besmet-met-Mexicaanse-griep.dhtml

13. Destandaard. Bezoeker Rock Werchter besmet met Mexicaanse griep [Rock Werchter visitor infected with Mexican Flu]. [Accessed on 5 August 2009]. Available from: http://www.standaard.be/Artikel/Detail.aspx?artikelId=DMF06072009_053&word=griep+werchter

14. Le Commissariat Interministeriel influenza [Interministerial Influenza Coordination Committee]. A l'attention des visiteurs du Festival Rock Werchter 2009 [To the attention of visitors to the Rock Werchter festival]. 6 July 2009. Available from: http://www.influenza.be/fr/_documents/wechter0607.pdf

15. Rock Werchter Festival Official website. [Accessed on 28 July 2009]. Available from:http://www.rockwerchter.be/en/home/

16. Centers for Disease Control and Prevention (CDC). Interim Guidance for Clinicians on Identifying and Caring for Patients with Swine-origin Influenza A (H1N1) Virus Infection. 4 May 2009. Available from: http://www.cdc.gov/h1n1flu/identifyingpatients.htm

This article was published on 6 August 2009.

Citation style for this article: Gutiérrez I, Litzroth A, Hammadi S, Van Oyen H, Gérard C, Robesyn E, Bots J, Faidherbe MT, Wuillaume F. Community transmission of influenza A (H1N1)v virus at a rock festival in Belgium, 2-5 July 2009. Euro Surveill. 2009;14(31):pii=19294. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19294