

Measles outbreak in a refugee settlement in Calais, France: January to February 2016

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We report a measles outbreak in a refugee settlement in Calais, France, between 5 January and 11 February 2016. In total, 13 confirmed measles cases were identified among migrants, healthcare workers in hospital and volunteers working on site. A large scale vaccination campaign was carried out in the settlement within two weeks of outbreak notification. In total, 60% of the estimated target population of 3,500 refugees was vaccinated during the week-long campaign.

A measles outbreak occurred in a refugee camp in Calais, France, from January to February 2016 that affected both refugees and staff.

Outbreak setting

The current movement of refugees into European countries has challenged national public health systems not only with respect to ensuring adequate access to medical care, but also to implementing communicable disease surveillance and prevention in refugee populations. In France, several refugee settlements comparable to shanty towns have been established in the Northern Region (Nord-Pas-de-Calais-Picardie), notably around Calais. In January 2016 the population in the Calais settlement was estimated at 3,500 refugees whose objective is to transfer to the United Kingdom (UK). The stable part of the population in the two settlements is therefore a minority, which makes healthcare and monitoring a complex task. Refugees and volunteers move freely between these two main settlements [1]. The population consists primarily of men (96%) with a median age of 25 years (interquartile range (IQR): 21–30) [2]. The proportion of children younger than 15 years is estimated at 3.9% of the 5–9 year-olds at 1.1% and of the 10–14 year-olds at 1.7%. A second, smaller settlement of 2,500 refugees was

established at the end of 2015 at Grande-Synthe 30 km from Calais.

Medical centres run by non-governmental organisations (NGOs) including Médecins sans Frontières (MSF) and Médecins du Monde (MDM) are in operation in both settlements during the week. Specific consultation centres for vulnerable populations are also present in the Calais settlement and in Calais and Dunkerque hospitals. In addition, refugees have access to three local hospitals in the vicinity of the settlements (Calais, Dunkerque and Grande Synthe).

In France, disease surveillance relies mainly on mandatory notification of specific infectious diseases including measles and on reporting of health events to the regional health agencies (ARS).

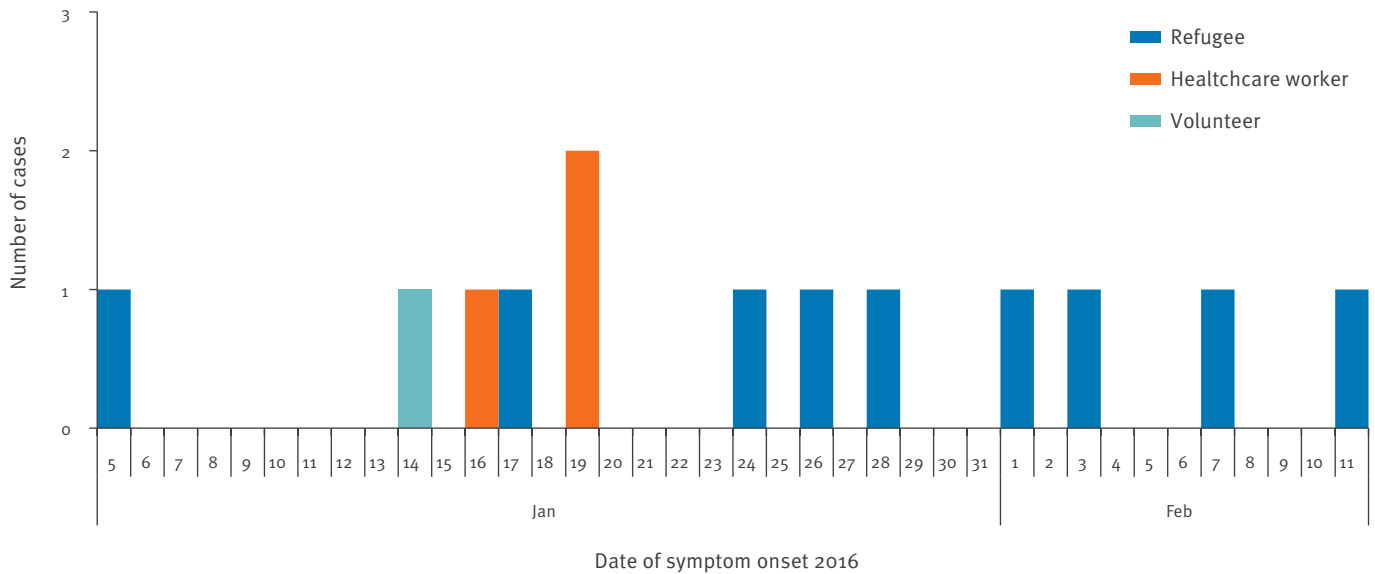
Outbreak description

While no case of measles had been identified around Calais since September 2013, the ARS was notified on 15 January 2016 of two measles cases related to the Calais refugee settlement. The index case was a refugee in their 30s who had been living in the settlement for a month before symptom onset on 5 January. The second case was a volunteer in their 20s living and working in the settlement.

The French Institute for Public Health Surveillance (InVS) regional office and the ARS immediately informed all volunteers and healthcare workers in the settlements, as well as the staff of the hospital emergency wards in Calais, Dunkerque and Grande-Synthe, about these measles cases in order to increase awareness, vigilance and rapid notification of any new suspected cases. In France a clinical case of measles is defined by the occurrence of fever $\geq 38,5$ °C, a maculopapular

FIGURE

Confirmed measles cases, refugee settlement, Calais, 5 January–11 February 2016 (n = 13)



rash and at least one of the following: conjunctivitis, coryza, cough, Koplik's spots. Between 5 January and 11 February, a total of 13 clinical measles cases, all confirmed by positive salivary test for measles-specific IgM antibody, were reported in Calais among people who consulted a doctor in the settlement's medical centres or in local hospitals. Four more suspected cases concerning three refugee children in Grande-Synthe settlement and one Calais hospital staff were finally excluded.

Of the 13 cases, nine were refugees living in the settlement, three were healthcare workers from a local hospital, all in contact with the index case, and one case was a volunteer working in the Calais settlement. Date of symptom onset of the confirmed cases ranged from 5 January to 11 February (Figure 1), and the index case was a refugee who had been living in the settlement for more than a month.

The cases were predominately male (9/13 cases) and the age ranged from nine to 46 years (mean age: 25 years). Ten cases were hospitalised. The immunisation status of the nine refugee cases and the volunteer was not available. Of the three healthcare workers, one was unvaccinated and two had been vaccinated with two doses in the 1990s. All cases were confirmed to be genotype B3 by the national reference centre (NRC) for measles.

The Calais settlement is divided into de facto neighbourhoods based on ethnic group or country of origin. The first two refugee cases and the volunteer case lived in the same area of the settlement.

Control measures

On 19 January, because of the impossibility to implement contact tracing in the settlements among

refugees and volunteers, the regional and national public health authorities agreed on a mass measles vaccination campaign in the Calais and Grande-Synthe settlements targeting refugees aged between one and 35 years. Thirty-five years of age was taken as an upper threshold following the French and international recommendations, assuming that the majority of people born before the 1980s have a high level of acquired immunity.

This immunisation campaign was carried out in the Calais settlement from 28 January to 5 February, and from 15 to 19 February in the Grande-Synthe settlement by teams of the French Ministry of Health (EPRUS) with the support of NGOs (MSF, MDM, Hands) in charge of primary healthcare in the settlement. Trivalent measles-mumps-rubella vaccines were mainly used, while measles monovalent vaccine was targeted to children between six months and one year of age and to women of child-bearing age, taking into account some of them may have been pregnant. A vaccination card as well as recommendations for the second dose were given to the people inoculated. In total, 2,051 refugees living in the Calais settlement and 466 in the Grande-Synthe settlement voluntarily accepted measles vaccination. No additional cases have been notified in either settlement since 11 February.

Discussion

The occurrence of a measles outbreak in the refugee settlement in Calais was not unexpected. A rapid risk assessment published by the European Centre for Disease Prevention and Control (ECDC) on 10 November 2015 concluded that while the risk of introduction of communicable diseases into Europe from the refugee population is extremely low, the living conditions of refugees (overcrowding, poor hygiene and sanitation, lack of adequate shelter in settlements) make this

population particularly vulnerable [3]. Furthermore, refugee populations may be at risk for certain communicable diseases as a result of disorganised health systems and low vaccine coverage in their countries of origin.

To date, reported communicable disease outbreaks in refugee populations in various European countries have included shigellosis, louse-borne relapsing fever and diphtheria [4-7]. In the settlement in Calais, an influenza A(H1N1) outbreak occurred in November 2015 during which 75 cases consulted the emergency room of the local area hospital, of whom 25 were confirmed for influenza (data not shown). This episode gave rise to the immediate implementation of an influenza vaccination campaign.

There are two possible sources for the introduction of measles into the refugee settlement in Calais: either through a refugee recently arrived in the settlement (given the long travel times for most refugees, the hypothesis of introduction directly from the country of origin into France is not likely) or through one of the numerous volunteers with unknown and possibly inadequate vaccination status working in the settlement. The latter hypothesis is supported by the fact that the index case arrived in Calais more than a month before symptom onset and had therefore been contaminated on the settlement. Furthermore, the genotype B3 measles virus identified during this outbreak is together with D8 the main genotype recently circulating in several European countries from which many volunteers originate, such as the UK or Spain [8,9]. In France, among all the positive specimens genotyped by the NRC, the genotype D8 was always nearly exclusive in 2015 [10], which supports the hypothesis that the B3 virus in the Calais outbreak was imported; a case who had not sought medical consultation in France would not have been identified. Finally, improved access to medical care in on-site consultation centres as well as an epidemiological surveillance system have been in place in the settlement since early December, which makes it unlikely that earlier measles cases would not have been detected.

This outbreak confirms the epidemic risk in refugee populations susceptible to communicable diseases circulating in Europe, such as measles [4]. In addition, the fact that several volunteers and healthcare workers were among the cases testifies to insufficient measles vaccine coverage in the European population, making them susceptible to contracting and also transmitting the virus. In March 2015, the ECDC indicated that measles cases in Europe had increased dramatically since 2010 and that in the past 10 years, on average 40% of cases were over 14 years-old [11]. In these circumstances, it is important that individuals in contact with refugee populations in settlements or in medical settings adhere to infection control measures and also verify that their vaccinations are up to date. This protects not only the volunteers and healthcare workers,

but also limits the risk of introducing communicable diseases into refugee populations that are highly susceptible for outbreaks.

The positive uptake of the vaccination campaign among refugees (60% of the estimated target population of 3,500 refugees in a one week campaign in the Calais settlement, and 40% of eligible individuals in the Grande-Synthe settlement) demonstrates that implementing vaccine strategies in these populations is feasible and should be undertaken before outbreak events. Immunisation efforts were aided by an awareness campaign organised by the NGOs present in the settlement and carried out before and during the immunisation campaign. It relied on representatives from different communities in the settlement informing residents of the upcoming immunisation campaign and of the benefits of vaccination.

In addition to the vaccination campaign, the limited size of this outbreak could also be attributed to a substantial herd immunity level in part of the refugees who originated from Middle-Eastern countries and had received vaccinations in their country of origin (status was verified on children's immunisation cards during the immunisation campaign) or had natural immunity following previous measles infection. It is unlikely that additional cases occurred in the settlements that were not identified, because access to medical care is sufficient, and because the implementation of the surveillance system is likely to have increased awareness and reactivity for the notification of disease events.

Given that the number of migrants is unlikely to diminish in the near future, European countries will have to continue to adapt medical and public health services in response to the needs of the refugee populations. The potential for introduction of communicable diseases by volunteers, including in this measles outbreak, cannot be excluded. Therefore, response strategies should ensure that volunteers and medical professionals involved in those settings have an updated vaccine status and target vaccination strategies for refugee populations when possible. In addition to public health measures and improved access to curative and preventive care, improving the living conditions of refugees by reducing overcrowding and providing shelter with adequate sanitation and hygiene will reduce the risk of communicable disease outbreaks.

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Conflict of interest

None declared.

Authors' contributions

G. Jones drafted the manuscript; S. Haeghebaert, K. Wyndels, P. Chaud and B. Merlin were in charge of data collection epidemiological surveillance and investigation; M. Janssens is MSF medical coordinator; N. Simon is medical coordinator for refugees in Nord-Pas de Calais-Picardie district; M. Elmouden, F. Battist were responsible for management of patients; S. Haeghebaert, K. Wyndels, P. Chaud, D. Antona revised the manuscript.

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