Syndromic surveillance of epidemic-prone diseases in response to an influx of migrants from North Africa to Italy, May to October 2011

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Citation style for this article:
Riccardo F, Napoli C, Bella A, Rizzo C, Rota MC, Dente MG, De Santis S, Declich S. Syndromic surveillance of epidemic-prone diseases in response to an influx of migrants from North Africa to Italy, May to October 2011.
Euro Surveill. 2011;16(46):pii=20016. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20016

Article published on 17 November 2011

Following civil unrest in North Africa early in 2011, there was a large influx of migrants in Italy. A syndromic surveillance system was set up in April to monitor the health of this migrant population and respond rapidly to any health emergency. In the first six months, the system produced 67 alerts across all syndromes monitored and four alarms. There were no health emergencies, however, indicating that this migration flow was not associated with an increased risk of communicable disease transmission in Italy.

Managing influx of migrants

Following civil unrest in North Africa (Egypt, Tunisia and Libya) in the first months of 2011, Europe witnessed an important increase in migration flow [1,2]. Official comprehensive estimates of the total number of people who arrived in Italy from the southern shores of the Mediterranean are not currently available, but the International Organization for Migration estimates that more than 25,000 people arrived from Libya alone [3]. The total number was certainly higher, as it does not include people who arrived from the other affected countries.

Italy declared a state of humanitarian emergency on 12 February 2011 and the Italian Civil Protection was charged of coordinating the reception of migrants with all regional and local authorities [4] according to a plan published in April [5] and currently in place. Ports of entry equipped with reception centres ensure registration and medical examinations on entry. If fit for travel, family units are then transferred to migration centres across Italy [6,7], where they stay until their migration status is cleared.

Migration centres are managed by diverse private and public organisations contracted by the Ministry of Interior and are equipped with internal, self-managed, outpatient services [8]. The fragmented distribution of the 2011 North Africa migrants across Italy and the migration centres' independent healthcare provision increased the need to ensure uniform and timely epidemiological surveillance.

We describe here the syndromic surveillance system set up in Italy in April 2011 to detect early signals of potential health emergencies among the migrants. Preliminary results obtained in the first six months of surveillance are also presented.

Setting up a syndromic surveillance system

On 11 April, syndromic surveillance was implemented in migration centres. This syndromic surveillance system complements, but does not substitute for, the existing mandatory infectious disease notification system. The Ministry of Health in collaboration with National Centre for Epidemiology, Surveillance and Health Promotion of the National Institute of Health (CNESPS-ISS) published an official guidance document [9], which was distributed to the 21 Italian regions and autonomous provinces, who then forwarded it to the migration centres in their territories.

The surveillance protocol used was based on the one used in a previously successful integrated surveillance system implemented during the 2006 Winter Olympic and Paralympic Games in Italy [10]. A total of 13 syndromes (Table) were defined as potentially indicative of infectious diseases and/or unusual adverse health events.

Migration centres or local /regional health authorities notified cases fitting the case definitions daily and also provided details of the population residing in each centre, stratified by age group. Notification forms were received via email or fax by the CNESPS-ISS, who entered and analysed the data.

Alert thresholds were calculated to detect statistically significant differences between the observed and

expected incidence of each syndrome. The expected incidence for each day was based on the moving average of the previous seven days. The threshold was calculated on the observed incidence using a Poisson distribution (99% confidence interval (CI) of the observed incidence). When the expected incidence was below the threshold (99% CI of the observed incidence), an alert was automatically issued. Whenever alerts were issued on at least two consecutive days, an alarm was defined.

Whenever an alarm is detected by the system, an analysis, stratified by reporting migration centre, is carried out. If an alarm arises from notifications from a single migration centre, the CNESPS-ISS contacts the reporting health officer of the centre and gives them a report of the analysis. A health emergency occurs when an alarm is epidemiologically confirmed (validated) as an outbreak by the immigration centre concerned, which then sets up appropriate control measures.

A national surveillance report is published each week with an updated public health risk assessment on the website of the CNESPS-ISS [11] and distributed to reporting health officers, Ministry of Health, regional health authorities and the Italian Civil Protection.

Table

Syndromes under surveillance and case definitions, migration centres, Italy, 2011

Syndrome	Case definition
Respiratory tract disease	Fever (>38 °C) and at least one of the following: – cough – sore throat – pharyngitis – bronchitis – pneumonia – bronchiolitis – chest rales – breathing difficulties – bloody sputum – lung infiltrates on X-ray
Tuberculosis (suspected)	– Productive cough lasting more than 3 weeks – Low-grade evening fever[a] – Night sweats[a] – Weakness, AND – Weight loss in the last 3 months
Bloody diarrhoea	Blood in stool[b] and at least one of the following: – frequent diarrhoea (at least 3 loose stools a day) – mucus or purulent material in the stool – abdominal pain – gastroenteritis with vomiting
Watery diarrhoea	At least one of the following: – frequent watery diarrhoea (at least 3 loose stools a day) – abdominal pain – gastroenteritis – vomiting
Fever and rash	Rash and fever (>38 °C) OR Clinical diagnosis of measles, rubella, varicella, erythema infectiosum (fifth disease) or exanthema subitum (sixth disease, roseola Infantum)
Meningitis/ encephalitis or encephalopathy/ delirium	Fever (>38 °C) and at least one of the following: – meningitis – encephalitis OR one of the following: – encephalopathy – confusion – delirium – altered consciousness
Lymphadenitis with fever	Fever (>38 °C) and at least one of the following: – enlarged lymph nodes – lymphadenopathy – lymphadenitis
Botulism-like illness	Absence of known chronic conditions causing the syndrome (e.g. myasthenia gravis, multiple sclerosis) and at least one of the following: - paralysis or paresis of cranial nerves - ptosis - blurred vision - double vision (diplopia) - speech impediments (dysphonia, dysarthria, dysphagia) - descending paralysis OR – diagnosed or suspected botulism
Sepsis (with or without shock) or unexplained shock	At least one of the following: - sepsis - septic shock - severe hypotension unresponsive to medical treatment AND absence of the following conditions: congestive heart failure, acute myocardial infarction or traumas causing the syndrome
Haemorrhagic illness	Fever (>38 °C) and at least one of the following[c]: – haemorrhagic rash – haemorrhagic enanthema
Acute jaundice	– Jaundice – Fever (>38 °C) – Headache – Malaise – Myalgia – Enlarged liver (hepatomegaly) with or without rash, AND – Exclusion of chronic or alcoholic liver disease
Parasitic skin infection	– Skin lesions caused by scratching – Papules, vesicles or small linear burrow tracks, AND – Presence of parasites
Unexplained death	Death of unknown cause

[a] Lasting for more than 3 weeks but less than one month.

[b] Cases presenting with primary gastrointestinal bleeding, for example due to an ulcer, should be excluded.

[c] Cases of acute leukaemia should be excluded.

Alerts and alarms issued

The surveillance system started operating on 11 April 2011. The first few weeks were dedicated to the recruitment of migration centres and familiarising them with the reporting requirements. For this reason, the data in this paper, are from 1 May.

From 1 May to 31 October 2011, 4,103 notifications were received from 97 migration centres in 11 regions (Figure 1). Throughout the six-month period, on average 5,261 people were under surveillance every day (median 5,322; range: 1,726–8,443). Until 23 May, 92% (2,680/2,905) of the population under surveillance every day were adolescents and young adults aged between 15 and 44 years. If the entire period is considered, however, this proportion decreases to 76% (3,143/4,120) due to the arrival of larger numbers of both younger and older migrants. Of all the reported syndromes under surveillance (n=3,401), the most common were respiratory tract disease (2,156 cases, 63%) and watery diarrhoea (970 cases, 29%).

Figure 1

Migration centres reporting through the syndromic surveillance system, per region, Italy, 1 May–31 October 2011

The numbers shown are the numbers of migration centres (n=97) reporting through the syndromic surveillance system, per region.

The system produced 67 alerts across all syndromes. These alerts led to four alarms being issued (Figure 2), which were triggered by respiratory tract disease (one alarm), parasite skin infection (one alarm) and watery diarrhoea (two alarms). None of these events qualified as a health emergency, based on the feedback of the migration centres involved. All alarms subsided within 24–72 hours as the number of cases decreased spontaneously. No outbreak response was required.

Value of syndromic surveillance

The high-profile situation triggered in early 2011 by the arrival of large numbers of people who had experienced very harsh travelling conditions challenged Italian authorities to set up appropriate emergency responses. Through early interaction with North African country partners of the CNESPS ISS-led EpiSouth Plus project [12], it became clear that the people arriving in Italy would be, for the most part, young adults in good health. The syndromic surveillance system was therefore a tool set up to detect potential outbreaks occurring after migrants had settled within the migration centres. This system became a primary source of timely health data for this population at a national level.

The usefulness of implementing a syndromic surveillance system to monitor situations of potential public health impact, when timely health data are needed, has been widely documented during uncertain and high-profile events – for example, during the 2009 influenza A(H1N1) pandemic [13], the Icelandic volcanic ash plume [14], waterborne outbreaks [15], heat waves [16] and mass gatherings [17,10]. Syndromic surveillance provides information at an earlier stage than laboratory confirmation [14] and therefore has the potential to inform timely actions that might reduce the impact of disease in a community.

The syndromic surveillance system set up in Italy has several limitations, such as uncertainty about the total number of migrants residing within migration centres at any given time, the fact that only some regions adhered to the protocol and the lack of zero reporting from some centres. Entry data are collected by the Italian Civil Protection and the police, so the data are complete and constantly updated. Once migrants are transferred to centres within the country, however, data collection is managed at the local level, making it difficult to update and verify the collation of national figures. The CNESPS-ISS is currently strengthening collaboration with the Italian Civil Protection in order to acquire a better understanding of this population and consequently of the representativeness of the surveillance system.

The experience of the first six months of this system in Italy, in addition to providing a timely description of the population migrating in 2011 through Italy into other parts of Europe, demonstrated the benefit of using syndromic surveillance to monitor this particularly vulnerable subpopulation group. It also filled a

potential reporting gap between migration centres and the National Health System and created an environment conducive to collaboration among the different stakeholders involved in this humanitarian emergency.

The continued availability of updated risk assessments was of great value during this emergency to avoid undue concerns triggered by anecdotal evidence disseminated by media. The absence of outbreaks during the first six months of surveillance provides strong evidence that this migration flow was not associated with an increased risk of communicable disease transmission in Italy. This approach has proved beneficial: other countries may choose to replicate it in similar situations.

Acknowledgments

We would like to thank all health professionals from regions, local health departments and migration centres that provide daily data.

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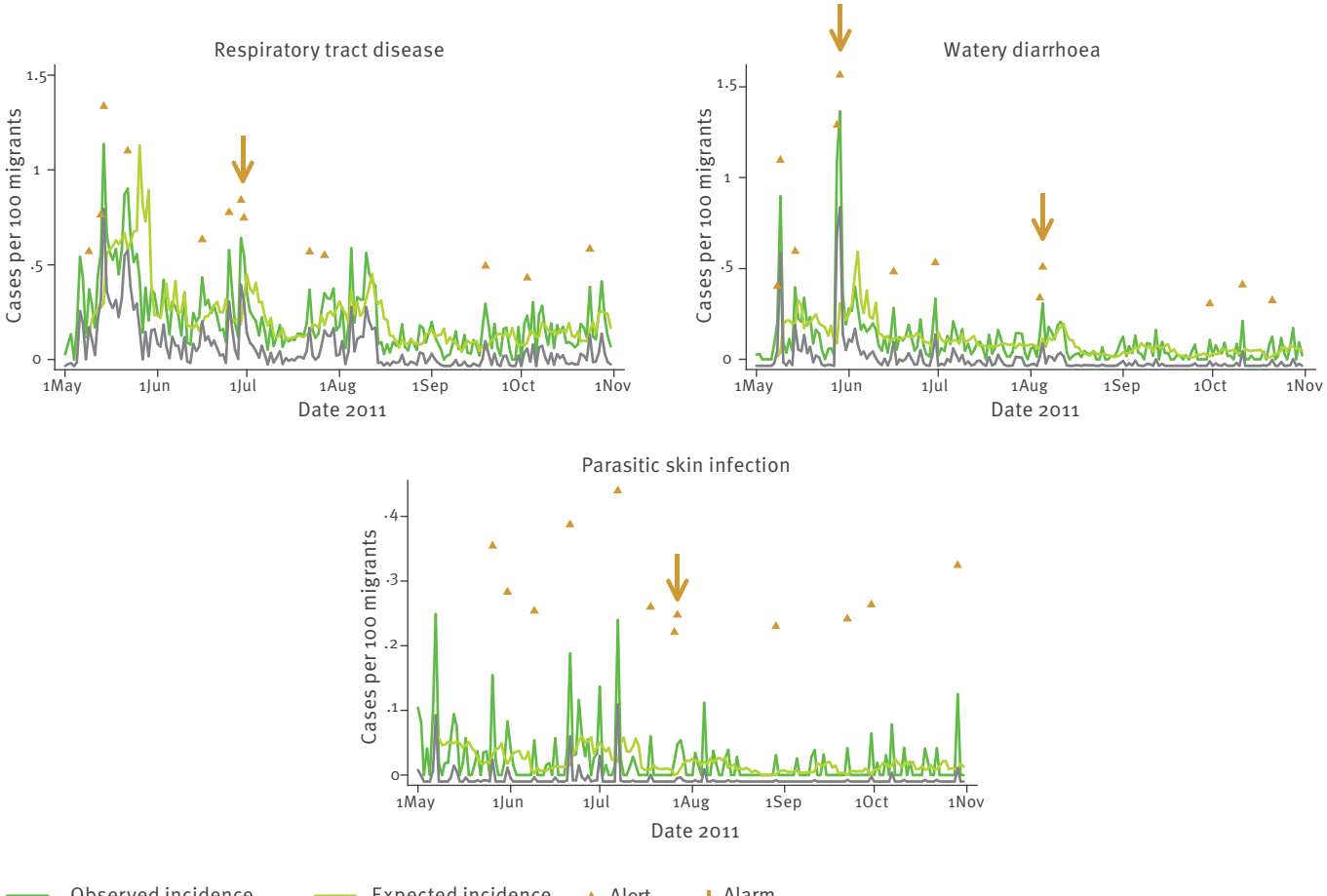
Figure 2

Alerts and alarms issued by the syndromic surveillance system triggered by notification of respiratory tract disease, watery diarrhoea and parasitic skin infection, migration centres, Italy, 1 May–31 October 2011



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