

INFECTIOUS DISEASES SURVEILLANCE ACTIVITIES IN THE NORTH OF PORTUGAL, DURING THE EURO 2004 FOOTBALL TOURNAMENT

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A European football tournament (EURO 2004) took place in Portugal, from the 12 June to the 4 July 2004. Portugal's Northern Regional Health Authority serves a population of 3.2 million people. This region hosted 12 matches, more than any other region. We describe the communicable disease surveillance activities in the region, during EURO 2004. Ten foodborne outbreaks, seven cases of meningococcal disease and one case of legionnaires' disease, were detected. Visitors were not affected, furthermore, cases among residents seemed not to be influenced by the presence of thousands of visitors. A similar pattern has been observed at other mass gatherings where special surveillance activities were implemented. This does not reduce the importance of public health surveillance during such mass gatherings. Furthermore, evaluation of this special activities should be an opportunity to put, issues of communicable disease surveillance resources, priorities, organisation and training back on the agenda.

Euro Surveill 2005; 10(4): 86-9

Published online Apr 2005

Key words: epidemiological surveillance, football tournament; infectious diseases, mass gatherings

Introduction

There is a potentially increased risk of transmission of infectious diseases at mass gatherings [1,2], including large sporting events. To deal with this increased risk, special surveillance activities have been prepared and implemented during previous Olympic Games (OG) [3-8] and big football tournaments [2,9-11]. Those surveillance activities have included the reinforcement of existing routine surveillance systems [4,5,7,9].

The routine surveillance of infectious diseases in Portugal is based on a statutory reportable disease (SRD) system. From a list of reportable diseases [12], physicians report individual cases to the local health authorities (LHA) who send anonymous copies to the district and national authorities. Data generated by this system are published regularly [13]. There is also an alert and response system known as SARA: certain representatives of all local, district and regional health authorities have mobile phones and most have access to the Health Ministry computer network. This system is intended to enable fast alert and appropriate response to some health events (like meningitis). For all diseases and syndromes, included in statutory reportable disease system and SARA, there are written case definitions. Official written guidelines on investigation and intervention exist for some specific diseases and syndromes.

During the European football tournament, thirty one games took place in eight Portuguese towns. Sixteen national football teams took part in the tournament and supporters came from all over Europe. The Northern Health Region (NHR) of Portugal, with 3.2 million people, was the region hosting the most games (twelve) extending over a wide period of time. The precise number of visitors to Portugal on this occasion is not known, but there were 2500 flights exclusively associated with the event, corresponding to 170 000 passengers [14].

Furthermore, 443 940 additional nights (113 867 in the north) were spent in Portuguese hotels by non-residents during in June 2004 [14]. Those additional numbers represented an increase of 20% in relation to the previous three years (47% in the north) [14]. Furthermore, 32 662 visitors (12 320 in the north), mainly from Spain, stayed less than one day [14].

As part of the EURO 2004 health strategy, in September 2003, the General Directorate of Health appointed a field epidemiology team (FET) coordinator to the Northern Health Region (NHR). The task of the coordinator was to develop an action plan for communicable disease outbreaks and incidents. The task of the FET, which was based at the regional coordinating centre (Centro Regional de Saúde Pública do Norte), was to support regional, district and local health authorities in implementing the plan. In March 2004, four members of the FET in the Northern Region were appointed full time to manage communicable disease risk at Euro 2004. We describe here the FET preparatory activities and the implementation of surveillance during the football tournament.

Methods

Preparatory activities

The role of the FET was secondary prevention, not primary prevention [15], although the FET were informed about actions that were being taken in that area; the task was clearly within the scope of the definition of secondary prevention: '*measures...for early detection and prompt and effective intervention to correct departures from good health*' [15]. The intervention of the FET could also cover some aspects of tertiary prevention if they could contribute to '*minimizing the effects of the health problem among those already ill*' [16]. Furthermore, nosocomial infection surveillance and control was not within the FET's scope. In order to prepare and implement the reinforcement of infectious disease surveillance activities, the FET devised an action plan defining the aim, specific objectives, strategies, time frame, criteria for choosing the target diseases, activities and procedures. This process was developed with input from colleagues from other health regions.

The aim: to act in response to the occurrence of specific adverse health events (AHE), in order to control them or minimise negative effects.

Specific objectives: to detect the adverse health events within 24 hours of onset and to initiate an appropriate response within 24 hours.

Strategies

- To identify and select target adverse health events.
- To reinforce existing surveillance programmes.
- To reinforce the role of hospitals in the detection and notification of adverse health events.
- To appoint specific health authorities to be direct contacts (HA-DC) of the hospitals.
- To standardize the procedures in all steps, from receiving the information to the responses.
- To support the LHA technically in the municipalities where AHE could happen.

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Time frame: 18 May to 11 July 2004 (covering the period of the EURO 2004 tournament).

Criteria for choosing the target diseases:

- Potential danger for public health.
 - Potential to originate outbreaks.
 - Increased risk due to the mass gatherings (EURO 2004).
 - Risk of importation of diseases eliminated from Portugal.
 - Short incubation period.
 - Having been identified has a target for surveillance activities at previous mass gatherings, like the Olympic Games and big soccer tournaments.
 - Feasibility (activities should be based on the previous experience of Portuguese public health services and resource limitations [17]).
- The target adverse health events (AHE) for increased public health surveillance during the EURO 2004, in the NHR, were:
- Foodborne outbreaks.
 - Legionnaires' disease.
 - Meningococcal disease.
 - Acute flaccid paralysis, diphtheria and measles (vaccine preventable diseases eliminated from Portugal, for which there was a risk of importation; surveillance of acute flaccid paralysis an essential surveillance tool in the activities leading to the poliomyelitis eradication [18,19]).
 - Unexpected adverse health events.

The inclusion of the ill defined group of 'unexpected events' intended to increase the sensitivity of the surveillance system. As part of the unexpected adverse health events, we included the case definitions of anthrax, plague, smallpox, tularaemia and haemorrhagic fevers.

We prepared and distributed written guidelines for each of the five groups of target adverse health events to all health authorities and hospitals. Case definitions were made clear as well as the procedures to transmit an alert and respond to each situation. For each AHE, the case definition included the classical categories of suspected, probable and confirmed, and also procedures to investigate isolated cases or outbreaks, and control the AHE. We tried to avoid conflict or ambiguity with already existing official written guidelines with case definitions and procedures.

We organised meetings with the 12 health authority direct contacts (HA-DC), the local health authority of each of the 5 districts and the hospitals. These meetings were used to discuss the objectives, the case definitions, the procedures, and to introduce all people involved before the EURO 2004. It was considered especially important to introduce hospital contacts to public health professionals with whom there would be telephone contact during the EURO 2004. Each hospital was given the mobile phone number of a HA-DC. As well as hospital physicians, we considered other potential sources of notifications: the normal statutory reportable disease system, a public health laboratory for cases of foodborne outbreaks, the general public or any other source, provided we could validate the information. Though we were expecting that most notifications would be transmitted from the hospitals to the HA-DC, the notification of an AHE could come from different sources to any of the three elements of public health services (HA-DC, local health authority and field epidemiology team (FET)) who would in turn share information. This was done taking into account the recognised need for flexible surveillance activities [7,20].

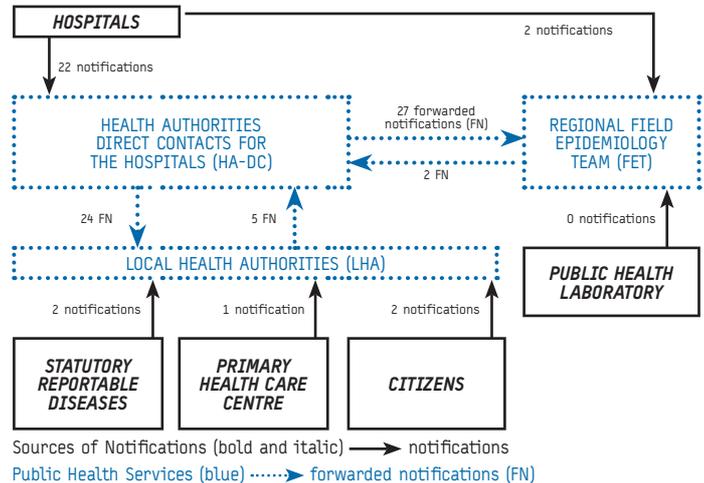
The members of the FET and all health authorities were public health physicians working within the Portuguese National Health Service (NHS).

Procedures

Communication procedures were as follows [FIGURE 1]: if a hospital identified a situation in the list of target events (case definitions), the HA-DC should be contacted as soon as possible, within 24 hours. The HA-DC should then contact the local health authority (corresponding to the geographic location of the event

and/or residence of the person with the disease) and the FET; within 12 hours, and the HA-DC should make sure that response was initiated locally, within 24 hours, following the guidelines, which included a preliminary assessment and standard procedures to investigate and respond to each specific situation. Even if the information source was not the hospital, the HA-DC, the local health authority and the FET, were to inform each other within 12 hours. We referred to the whole described process of communication as an 'alert'.

FIGURE 1
Data flow for the 29 notifications (mentioned in the table) from the sources to the public health services and information forwarded between these



The investigation and response after each type of adverse event notified were described in the written guidelines. Once the alert had been given, one member of the FET was in charge of following up the local health authority response, until it was considered to be concluded. The local health authority could request technical assistance from the FET at any time, but even if he/she did not do this, the follow up was always done.

On the days when no alert was received by the HA-DC, he/she was to send 'zero reports' to the FET, by telephone or email. The last zero report was to be sent on 12 July (Monday). Zero reports were not to be sent on weekends and holidays. Thus, at least on 38 of the surveillance period days, the HA-DC was to contact the FET. Since there were 12 HA-DCs, there were 456 possible contacts during these 38 days.

Every day the FET produced a standardised daily report, sent at the end of the afternoon to the twelve HA-DCs, the regional health authority, the hospitals providing an email address, and the General Directorate of Health in Lisbon. The daily report had a standard format, developed during the testing period, including a table for the situation in that day and another one with cumulative data; a specific format was given to additional information concerning each type of AHE.

All local health authorities, HA-DCs and the FET were on call every day, but the zero reports and the daily reports were not produced on weekends or holidays.

From 26 April to 14 May all procedures were tested as if the EURO 2004 was already taking place. The procedures and events described here implemented between 18 May and 11 July 2004.

Results

From 18 May till 11 July, the FET of the NHR received 29 notifications of suspected AHE under surveillance [TABLE, FIGURE1]. Eleven alerts were discarded because they did not fulfil the case definition criteria. The two 'unexpected' AHEs that originated an alert corresponded to two situations where foreign citizens sought care in emergency units of two hospitals, due to coronary heart disease and nephrolithiasis, respectively. A foodborne outbreak and a case of meningococcal disease occurred during the period considered but

were only reported some days after 11 July. The alert situations were transmitted by mobile phone, except for the two unexpected AHE that were notified to the FET by email.

TABLE

Notifications received by the field epidemiology team of the Northern Health Region of Portugal during the EURO 2004 tournament (18 May - 11 June)

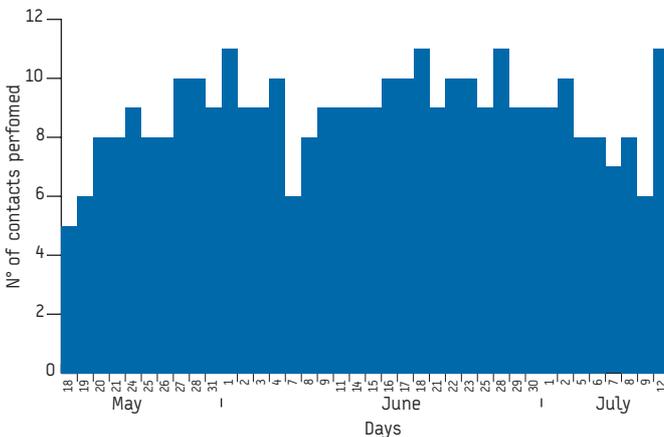
Adverse Health Event (AHE)	No. of notifications	No. of confirmed situations	No. of expected situations (*)
Foodborne outbreaks (FO)	11	10	5 to 11
Legionnaires' disease (LD)	2	1	4 to 6
Meningococcal disease (MD)	14	7	3 to 21
Acute flaccid paralysis (AFP)	0	0	0 to 2
Diphtheria (DIPH)	0	0	0
Measles (MSL)	0	0	0
Unexpected (UNEXP)	2	0	0
TOTAL	29	18	8 to 38

(*) Historical limits for the time period considered based in data from homologous periods from 2001 to 2003.

Zero reports were sent either by mobile phone or by email. During the 38 days, the twelve HA-DCs made 335 contacts with the FET, with a daily minimum of 4 on the 18 May [FIGURE 2]. These contacts represent 73.5% of the total 456 possible contacts (notifications and zero reports). Only one of the twelve HA-DCs never contacted the FET. The other eleven HA-DCs established, on average, 30.5 contacts with the FET. Whenever a daily contact was skipped, a telephone debriefing on the situation was done the following day.

FIGURE 2

Number of contacts performed by the twelve health authorities with the field epidemiology team, including notifications and zero reports, during the EURO 2004, North of Portugal



After any notification was received, the local health authority initiated a response, within 24 hours, following the guidelines. In all alert situations, the FET followed the response activities, with close email and telephone contact with the local health authority, discussing the situation and giving technical support whenever necessary. In some instances, the FET built and analysed databases, to support the outbreak research. A member of the FET was sent to the municipality where the AHE occurred, only once, during a big foodborne outbreak after a large lunch, in a restaurant.

In the 38 days specified in Figure 2, the FET produced a daily report that was sent by email to all HA-DCs, hospitals, the regional health authority and the general directorate of health in Lisbon (the national health authority).

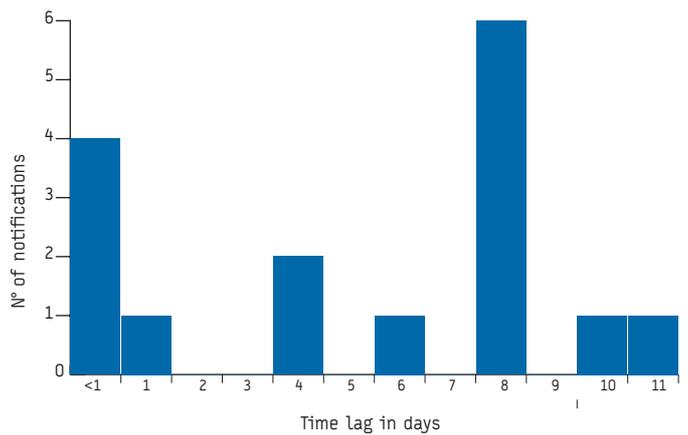
No AHEs were detected in visitors. In all AHEs that were detected and followed, no relationship was found with venues, events, or people directly related to the football tournament.

Foodborne outbreaks

Five of the confirmed 10 foodborne outbreaks were notified by the hospitals. The health authority knew of two outbreaks from the statutory reportable diseases system and one situation was reported by the primary health care centre. A patient and the owner of a restaurant reported the other two situations directly. The time lag between the day of onset in the first case and the notification varied between less than 24 hours and 11 days [FIGURE 3]. In all occasions the FET knew about the alert on the same day as the health authority. After the preliminary assessment, the foodborne outbreaks were investigated. Four case-control studies and one cohort study was done; in three foodborne outbreaks only patients were interviewed and in one of them it was not even possible to interview the affected people: information was given by the hospital doctors. Laboratory studies were performed in eight of the outbreaks: in patients, food items and food handlers for two outbreaks, in patients and food items for two outbreaks, in patients only in two outbreaks and in food handlers only in two other situations.

FIGURE 3

Time lag between onset and the notification of foodborne outbreaks during the EURO 2004, North of Portugal



No visitors were affected in the 10 outbreaks: neither football fans nor other tourists. Only Portuguese nationals, resident in the country, were affected, and there was no link with any venue or event related with the EURO 2004. At least 278 people became ill and 29 had to be admitted to hospital, but no deaths were observed. Since we were not able to know the total number exposed and ill in the biggest outbreak, it is likely that the number of cases was much larger.

The outbreak cause was laboratory confirmed for 5 outbreaks, all due to *Salmonella enterica*. The cause was not determined for 3 outbreaks and was presumed from clinical and epidemiological data in 2 other outbreaks: one due to the *Staphylococcus aureus* enterotoxin and another to *S. enterica*. Meals had been prepared in private households (4 outbreaks), restaurants (3 outbreaks), a canteen (1 outbreak) and a situation where food items had been prepared both in a private household and in a take-away restaurant. Several risk factors were identified, such as contaminated raw food, inadequate storage and transport, poor premises hygiene; bad hygiene practiced preparing the meals and long time lags between preparation and consumption.

The local health authority interventions included inspecting restaurants and imposing corrections, educating food handlers and treating two food handlers who tested positive for *Staphylococcus aureus*.

Legionnaires' disease

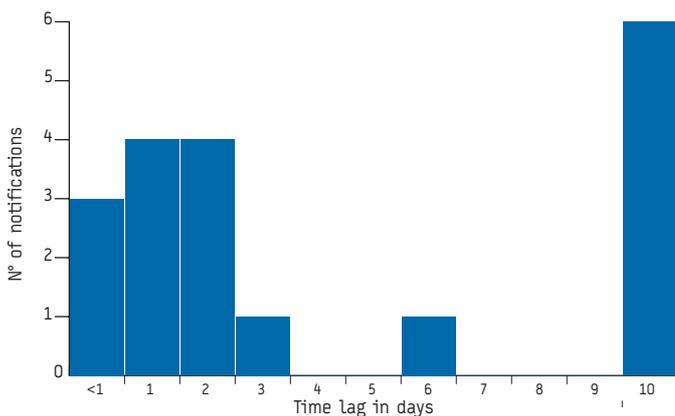
The only reported case of legionnaires' disease occurred in a woman aged 38 who had been admitted to hospital, with two important risk factors: she was a smoker, and had an HIV infection. In the epidemiological investigation performed, no source of infection was identified and no related cases of legionnaires' disease were detected.

Meningococcal disease

Seven of the fourteen alerts were discarded because meningitis was not caused by *N. meningitidis*. Only three alerts were sent within 24 hours of onset [FIGURE 4].

FIGURE 4

Time lag between onset and the notification of suspected meningococcal disease episodes during the EURO 2004, North of Portugal



Other adverse health events

No notification of any other AHE included in our list was detected. We did not know either of other AHE that, though not included in the case definitions in our written documents, might fill the criteria (above described) that we used to choose the health events under surveillance.

Discussion

The adverse health events (AHE) notified during the period of the EURO 2004 football tournament in the north of Portugal were within the range of values previously observed in similar periods of time, in the years 2001 to 2003 [TABLE]. Visitors were not affected; furthermore, cases among residents seemed not to be influenced by the presence of thousands of visitors.

As mentioned in the introduction, there is a consensus in the literature about the rationale for implementing special surveillance activities during 'mass gatherings': there is a potentially increased risk of transmission of infectious diseases [1,2]. But, on the other hand, no serious infectious diseases outbreaks occurred, and the numbers of cases observed seem not to be different from past experience; this was the case in Portugal 2004, as had been observed elsewhere [4,21,22]. How useful was it to undertake this special surveillance? We should consider what might have happened if no activities had been implemented. Furthermore, we should ask ourselves what could have happened, if an unexpected AHE had occurred.

Is this similar to the aerospace industry? If there are no adverse events, it is tempting to conclude that implementing redundant systems is a waste of money. But if no redundant system is implemented and there is any possibility of something going wrong, it will go wrong!

The performance of our operational procedures seems to be encouraging. But external evaluation [13,23] of public health surveillance of infectious diseases during mass gatherings should be an opportunity to put issues of resources, priorities, organisation and training back on the agenda. Evaluation is an important tool to support appropriate reinforcement of public health surveillance of infectious diseases [23,25].

Acknowledgements

The activities described would not have been possible without the work and commitment of the hospitals from the Northern health region of Portugal and all local health authorities. Special responsibilities were taken by Miguel Galaghar, the regional health authority, and the district and local health authorities who established the links between the hospitals and the regional field epidemiology team: Agostinho Castro-Freitas, Alcindo Maciel-Barbosa, Ana Cardoso, Arnaldo Araújo, Beatriz Lamas, Carlos Pinto, Jaime Batista, João Cruz, Manuel Dias, Manuel Pinheiro, Maria Lamas, Maria Paz, Rui Costa and Rui Marques.

The authors are also grateful to Cristina Paulo, Eugénio Cordeiro, Manuela Sousa and Mariano Ayala, for the valuable comments on a previous version of this manuscript.

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