

# Setting up a specific surveillance system of community health during mass gatherings

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During mass gatherings such as those that occur during international fairs or sporting events, there are no recognised standards for providing health surveillance of the general community (in contrast with the participant community). Data must be collected continuously as produced, so as to provide immediate information and permit prompt detection of epidemics. To monitor the effects of the 1998 World Football Cup (WFC) on the health of the general population of the host country, we set up a nationwide automated sentinel disease surveillance system. Its results have been published in detail elsewhere.<sup>1</sup> We describe here the implementation of the general practitioners' (GPs) sentinel system required by this surveillance system.

## Methods

Surveillance lasted two months (June and July 1998). Our protocol required that physicians communicate daily with the host computer, via an internet web site or a videotext terminal. The single page format included the total daily number of data for 11 items relating to the level of community medical activity, and to communicable, societal and environmental diseases.<sup>2–3</sup>

GPs were recruited for the programme on a voluntary basis, throughout France, from the Sentinel General Practitioners; system (SGPs),<sup>4</sup> and by random digit dial procedures, using the telephone list of the GPs working in the 10 cities receiving WFC matches, where recruitment was intensified so as to include 3% of these GPs (non-SGPs). Participation in the network was monitored. GPs used to communicating data (SGPs) were compared with those not used to doing so (non-SGPs), in order to find out if they differed according to the mean number of patients seen daily and the duration of participation in the study.

## Results

In all, 535 physicians (191 SGPs and 344 non-SGPs) accepted voluntary participation—that is, 10% of the physicians to whom participation was offered. During the study period, 262 279 medical encounters were reported via 18 178 connections to the host computer. The hours of connection ranged from 5 am to 2 am. The duration of connections to the host server averaged 139 (174) seconds (mean (SD)). The participation time curve was bell shaped. Median participation time was 65% of the surveillance period (calculated by the Kaplan-Meier survival method). Attrition from the network was not found to be associated with the physician's work load in terms of the total

number of patients seen daily, or with his proximity to an event's venue within a radius of 30 kilometres of a World Cup city (see reference 1 for details). SGPs reported the same mean number of patients seen daily as non-SGPs—that is, 18 (7.66) and 17.4 (7.5) patients, respectively (not significant, Wilcoxon test). They participated for a longer period than non-SGPs, for median periods of 45 and 38 days respectively ( $p = 0.0001$ , Wilcoxon test). The level of medical activity reflected by the items surveyed remained stable throughout the WFC, both in the cities that hosted matches and those that did not (data not shown).

## Discussion

For monitoring health issues in the general community during mass gatherings, a nationwide real time electronic active surveillance system based on sentinel physicians proved very feasible. It also proved acceptable in terms of participation time. The surveillance system was sensitive, because it would have captured one case of each disorder under surveillance with a 95% probability if at least 100 cases had been seen in general practice, according to the Poisson distribution, and because about 3% of the GPs were represented in the WFC cities. We may assume that our sample was fairly representative of French GPs, for four reasons: (1) the participating SGPs did not differ from all SGPs (data not shown) and the characteristics of the SGPs are comparable to those of all French GPs<sup>5</sup>; (2) non-SGPs were recruited by random digit dial procedures; (3) non-SGPs did not differ from SGPs as regards the declared incidences of the surveyed items; and (4) the overall male/female ratio of the GPs participating in this study was 4, compared with 3.8 for all French GPs. Real time electronic surveillance ensured appropriate timeliness. This system could therefore serve as a model for any ongoing monitoring of general community health during international special events, or for any other short-term intensive nationwide health surveillance.

During the study period, using the same model, other surveillance systems were implemented in emergency hospital departments, private emergency community services, community health centres, and the medical centre of the Paris airports.<sup>1</sup> Like the sentinel GPs, none of these sources detected any significant health events.

This initiative may be generalisable to countries without a sentinel surveillance system. Most of the physicians participating in the present surveillance programme had never been involved in a surveillance system and were

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not experienced in data communication. All the electronic devices used were especially created for this particular programme, and were distinct from existing computer developments. We used hardware equipment that was light (a single desktop PC), and software based on free access internet technologies. Internet access is now increasingly widespread. The expenses and resources necessary for such an operation were not excessive (marginal costs of the programme were evaluated at about US\$20 000).

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