

Mortality surveillance during a large chikungunya outbreak using a syndromic surveillance system

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OBJECTIVE

This paper describes the on going surveillance of mortality during the largest outbreak of chikungunya ever known. It is based on a new automatic gathering of mortality data and it is also the first opportunity to test this system in real condition.

BACKGROUND

Mortality data

Following the heat wave that scorched France in August 2003 a national daily gathering of mortality data was decided in link with the National Institute for Statistics and Economic Studies (Insee).

Such gathering is based on Public Records Office equipped with the appropriate software in order to transmit their data to Insee. Then data received daily are transmitted automatically to the National Institut for Health Surveillance (InVS). Data are encrypted and transmitted 7 days per week through direct FTP in a pretermind format. For each death certificate, the following information are recorded: zip code, age, sex, date of death.

A pilot test started in June, 2004 with 147 cities for one year. The good evaluation of the system pushed to enlarge it to all eligible cities in France.

The enlarged system started on November 1st 2005 and concerned 1,152 Public Records Office which represents around 75% of the daily French mortality.

Chikungunya outbreak

Reunion Island (population 770,000) is being affected by the most important outbreak of chikungunya disease ever described in the medical literature¹. Between March 1st, 2005 and May 30th, 2006, an estimated 255,000 cases have been reported in this French territory located in the Indian Ocean. The vast majority of the cases have been occurring from mid-December, with a peak of 45000 cases week 5, 2006¹.

The disease is a self-limiting febrile viral disease characterised by arthralgia or arthritis. The symptoms may last for several months but recovery was, until now, considered universal².

METHODS

The system already described counted 13 Public Records Office (out of 24) spread around the Reunion Island, representing 87% of the island's mortality.

In order to assess the impact of chikungunya on the mortality, we compared the crude death rate (CDR) observed during the outbreak with an expected death rate computed from the 2000-04 historical data.

The expected number of deaths was calculated following the methods of historical limits³.

The study covered the period Jan 1st 05 – Apr 30rd 06

RESULTS

Over the year 2005, monthly CDR remained within expected range of statistical variation. In January, February and March 2006, CDR were significantly higher than expected ($p < 0.01$). This corresponded to a 226 excess deaths in the 13 communes participating in the study and to a 260 excess deaths when extrapolated to the entire Island's population.

Excess mortality was mainly observed in the age group 75 and above, suggesting an "influenza-like" phenomenon with most vulnerable groups of the population paying the highest toll.

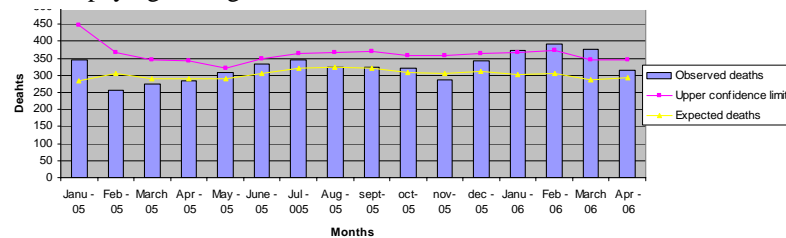


Figure 1 – Expected and observed deaths in 13 computerised registry offices in Reunion Island by months (historical limits methods)

CONCLUSIONS

Death rates started to exceed expected range during the last week of January and remained as such until the end of the study period, closely matching the kinetic of chikungunya's epidemic curve. No other abnormal health event affected the island at this time.

We believe that chikungunya outbreak was responsible for the excess mortality observed in Reunion during the first months of 2006. Our figures, consistent with the number of death certificates mentioning "chikungunya" over the same period ($n=213$) allowed a rough estimate of chikungunya's case fatality ratio around 1/1000 cases.

Death associated to chikungunya had seldom been reported before, but the outbreak in Reunion is the first ever described with such a high incidence in a setting where real time mortality reporting is in place. In such settings, CDR monitoring should be implemented in the event of abnormal health phenomenons affecting large populations.

REFERENCES

1. Enserink M Infectious diseases. Massive outbreak draws fresh attention to little-known virus. *Science*. 2006 Feb 24;311(5764):1085.
 2. Mackenzie JS, Chua KB, Daniels PW, et al. Emerging viral diseases of Southeast Asia and the Western Pacific. *Emerg Infect Dis*. 2001;7(3 Suppl):497-504.
 3. *MMWR Morb Mortal Wkly Rep*. 1991 Feb 22;40(7):124-5.
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