



Short Communication

Timeliness in the notification of spotted fever in Brazil: Evaluating compulsory reporting strategies and digital disease detection

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ABSTRACT

Spotted fever is caused by rickettsia species, and is the most important tick-borne disease. In Brazil, it requires national compulsory notification to the Ministry of Health. Since 2007, all suspected cases of spotted fever have been integrated into the Notifiable Diseases Information System (SINAN). In this descriptive study we evaluate the timeliness (expressed in number of days between time of clinical suspicion and reporting) of the compulsory notification of spotted fever cases in SINAN and the strategy for digital disease detection (DDD). This study analysed the information from the SINAN and from the digital detection strategy used by ProMED-Português. Results show that detection by the SINAN system was more efficient than Promed-Português, reporting 90.4% of evaluated suspected cases 20.5 days earlier. The surveillance strategy based on the mandatory case reporting using SINAN has proven to be more timely, but DDD can be considered as a complementary strategy providing a more disseminate epidemiological information to wide range readership globally.

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Introduction

Spotted Fever (SF) is an infectious tick borne disease that has been included by a specific federal statement on the national list of compulsory notifiable diseases in Brazil since 2001 (Ministério da Saúde, 2001). Considering the risk of rapid clinical progression to severe and fatal conditions and high lethality related to spotted fever in Brasil, in 2014 it became an immediate notifiable disease (within 24 hours of case detection) for all suspected cases, by any healthcare professional, to the Brazilian Ministry of Health (Ministério da Saúde, 2014; Oliveira et al., 2016a; Oliveira et al., 2017). All suspected cases of SF should be reported and included into the Notifiable Diseases Information System (SINAN) at the first moment of suspicion, and after clinical, epidemiological, and specific laboratory investigation must be concluded as a confirmed

or discharged spotted fever case in SINAN within a 60-day period after the notification. SINAN is the official and nationwide surveillance platform for epidemiological surveillance of all compulsory notifiable diseases.

Immediate notification to the three levels of the national epidemiological surveillance system (Municipal Health Secretariat, State Department of Health and Ministry of Health) within 24 hours after detection is intended to improve the quality and opportunity of epidemiological surveillance, case investigation, and adoption of specific control and prevention measures (Ministério da Saúde do Brasil, 2016a,b).

In addition, as a way to improve the sensitivity of detecting suspected SF cases, as well as other relevant diseases of public health concern, the Health Surveillance Secretariat of the Brazilian Ministry of Health utilizes routine digital disease detection (DDD). Allied to this is ProMED-mail (Program for Monitoring Emerging Diseases), an Internet-based reporting system dedicated to detect and disseminate, quickly and globally, information especially regarding emerging diseases, but also outbreaks and epidemics (Lawrence, 2004; Leal-Neto et al., 2016; ProMED, 2017). As observed in other DDD strategies, detection of events by ProMED-PORT is based on active searching by ProMED-mail staff and/or information received by reports sent by local observers,

Abbreviations: SF, Spotted Fever; DDD, digital disease detection; ProMED-mail, Program for Monitoring Emerging Diseases; SINAN, Notifiable Diseases Information System.

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official sources, organizations like HealthMap and Epicore (Carrion and Madoff, 2017).

While ProMED is an informal strategy for detecting, reporting and sharing a wide range of information regarding epidemiological events to a diverse readership including the general public, healthcare professionals and public health authorities, SINAN provides full information regarding each disease for analyses to the public health authorities; the general population and healthcare professionals and institutions, with respect to spotted fever, are able to access a limited range of SINAN information, usually series of cases (number of confirmed cases and deaths by year and State of occurrence).

Material and methods

This is a descriptive study that sought to evaluate the timeliness (expressed in number of days) of the SF notification by the SINAN and DDD sources using the information reported in Promed-Português (ProMED-PORT) (ProMED, 2017).

Cases detected were considered those who were reported based on the established definition criteria for suspected cases. On the other hand, ProMED detects cases from a wide range of sources, in some instances based on the mention of “febre maculosa” (spotted fever) or “febre maculosa brasileira” (Brazilian spotted fever) cases. Cases and deaths of unknown etiology in areas of risk for infection – reporting of tick exposure, presence of primary tick hosts, possible infection in known transmission areas – were also reported by ProMED-PORT but, in this context as suspected cases of spotted fever.

To search for SF records on the ProMED-PORT (ProMED, 2017) website, the keyword “spotted fever” was used. Despite the fact that spotted fever has been reported by ProMED since 1997; they were considered to be analysed posts reported after 2007; between 2007 and 2016 because SINAN became the surveillance system only in 2007. Each ProMED report was carefully analysed to exclude duplicity of reported cases. The identified cases at ProMED-PORT database were matched in the SINAN database; using information on the date of SINAN notification and ProMED-PORT publication. As a strategy to check the match case notification at the SINAN database and the reported case by ProMED-PORT; a group of individual patient information was used; such as sex and age; municipality where case was reported; date (day; month; year) when case was identified; healthcare institution where case was evaluated; clinical evolution for discharge and/or death. If the available information was in both the ProMED report and SINAN sources; it was not possible to match the cases as a same case in both databases; and these were discharged and not included as a case for analyses.

To calculate response differences in the two systems, the publication date on ProMED was subtracted from SINAN's notification date. It was considered that the trigger for the case notification to SINAN or report to ProMED mail was the date of first suspicion of the case. The difference between the dates when negative showed highest detection performance by ProMED-PORT, while values positive indicated superior detection capacity by SINAN.

Results

A total of 146 records of spotted fever were identified in the ProMED-PORT database over the study period. Of these, 80 cases contained information on dates of notification and 62 records could be matched and correlated to a reported case in the SINAN database (Figure 1).

Fifty-six records (90.4%) were a positive value (median of 20.5 days positive – ranging from 2 to 131 days), and six records

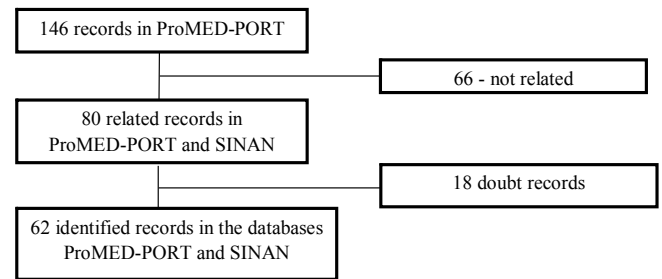


Figure 1. Flowchart with the inclusion and exclusion criteria of the study.

(9.6%) were negative value (median of 61 negative days – ranging from –10 to 145 days).

Detection in four states in the southeastern region of the country, where the disease is endemic, was analyzed: São Paulo 46 (74.19%), Minas Gerais 11 (17.74%), Rio de Janeiro 4 (6.45%) and Espírito Santo 1 (1.61%) records were found in both the ProMED-PORT and SINAN systems. In the states of Minas Gerais and Rio de Janeiro, SINAN was 100% more timely in the detection of SF cases in São Paulo 89.2%, while in Espírito Santo this was true in 100% for ProMED-PORT.

Discussion

Analysis showed SINAN was more efficient regarding timeliness in detecting SF cases. In 90.4% of the cases the national epidemiological surveillance system reported cases 20.5 days earlier than ProMED-PORT.

The strategy of immediate and compulsory nationwide notification of suspected spotted fever cases by any healthcare professionals recently incorporated into the epidemiological surveillance system may explain the timeliness of SINAN when compared with ProMED-PORT (Ministério da Saúde do Brasil, 2016b).

Many reasons for the lower timeliness of the DDD strategy for SF include the fact that ProMED-PORT depends on available data that not rarely come from informal and non-official sources. Considering the low incidence of SF, possibly resulting in a lack of recognition by both health professionals and the population in general, even in endemic areas (Oliveira et al., 2017; Oliveira et al., 2016b), the availability of reports and information for DDD detection is scarce. In addition, SINAN is notified about all suspected cases at the time of first suspicion but makes available the information only when a case is classified as confirmed, usually by specific laboratory criteria, which generally occurs about 30 days after notification (Ministério da Saúde do Brasil, 2016b). This results in delay of case confirmation and reports by the public health institutions and by general informal sources of information able to be captured by DDD.

If, on the one hand, the official recommendation to report suspected SF cases has resulted, as should be expected, in greater timeliness of the national surveillance system in those states where the disease has already been endemic for an extended period, DDD should be understood not as a substitute for the official surveillance system but potentially as a contribution to an earlier detection, for example, in those areas with lower SF incidence or unknown epidemiological scenarios. Additionally, despite the fact that it is not the objective in the present study, when we look at the complete list of SF-related ProMED-PORT reports, DDD does have some advantages over the national reporting system, notably, the capacity for early detection of clusters of suspected cases in situations that subsequently constitute outbreaks (PRO/PORT, 20150210.3158088; PRO/PORT, 20160707.4330546), and identification of cases in new transmission areas (PRO/PORT, 20150205.3144367; Oliveira et al., 2016c).

A further advantage of ProMED-PORT is that it provides more accurate and specific information about the precise areas of transmission to health professionals through e-mail reports or the use of the HealthMap platform (<http://www.healthmap.org/>). In contrast, the official format of data available to be accessed for consultation provides only the total number of confirmed cases and deaths, reported according to occurrence state and without specifying either the municipality of occurrence or the specific area of occurrence within each municipality (Brasil, 2017). As SF is a focal disease, the most precise characterization of the place of transmission is necessary for achieving an early suspicion and treatment, both drivers to reduce the relevant potential lethality related to spotted fever in Brasil 33% (Oliveira et al., 2016a).

The two most important limitations of the present study are the small number of cases analyzed and the possibility that analyzed cases considered as correspondents in the SINAN and ProMED-PORT were, in fact, false matches.

In conclusion, despite the fact that DDD can be used as an additional strategy by professionals and the healthcare system, providing information that contributes at the local level to increased awareness about risk of transmission in a specific area and providing a wide dissemination of more accurate data on outbreaks and specific transmission sites, the national SF surveillance system, based on the immediate mandatory reporting of suspected cases using SINAN, was shown to be more timely in detecting individual SF cases than DDD.

Conflict of interest

The authors have no conflicts of interest to declare.

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