

French National Health Insurance Information System for Malaria Surveillance

Francois Delon^{*1}, Marc C. Thellier², Aurélie Mayet¹, Eric Kendjo², Aïssata Dia¹, Rémy Michel¹, Gilles Chatellier³ and Guillaume Desjeux⁴

¹Epidemiologic surveillance department, French armed forces Center for epidemiology and public health, Marseille, France; ²French national reference center for malaria, Paris, France; ³Department of Clinical Epidemiology, European Hospital Georges Pompidou, Paris, France; ⁴French military health insurance, Toulon, France

Objective

Estimate the accuracy of the French National Health Insurance Information System (SNIIRAM) as a support for a nationwide malaria surveillance.

Introduction

The estimated incidence of imported malaria in France is about 4,000 cases per year (1). The epidemiological surveillance of malaria in France is mainly based on a hospital laboratory surveillance network, which captures around 50% of cases. There is no comprehensive population surveillance. The SNIIRAM provides data about hospital stays and outpatient drug reimbursements, procedures, examinations and sickness leaves for almost the whole French population(2). We aimed to evaluate the usefulness of the SNIIRAM for implementing epidemiological surveillance of malaria.

Methods

A case-identification algorithm was built in a two-steps process. Firstly, an expert panel defined sensitive inclusion criteria, built using hospital discharge diagnoses, emergency department admissions, outpatient biological procedures and drug deliveries. In case of malaria-nonspecific care events, we considered sequences of events. Secondly, we described data to identify clusters of cases and outliers. Based on this description, we defined exclusion rules, aiming to reduce the number of false-positive and to increase specificity. Results were validated comparing some characteristics of our data with those from the French National Reference Center for Malaria (NRC).

Results

The algorithm we built was reusable and automated. From July 1, 2013 to June 30, 2014, we identified 4,248 malaria cases corresponding to 4,099 distinct patients (figure 1). The SNIIRAM allowed us to collect data about the demographic characteristics of cases, the date and place of cares, the duration of hospital stays, the diagnoses, the medical procedures and drug deliveries of outpatients. Hospitalization and outpatient drug deliveries data allowed to capture more than 95% of the cases (table 1). Time-lapse from initial cares to data availability into the SNIIRAM was up to six months.

Our results appeared close to those from NRC: no statistically significant difference was observed in the distribution of age, gender, localization and date at onset.

Conclusions

We elaborated an accurate algorithm to implement an epidemiological surveillance of malaria based on the French National Health Information System. It allowed to study the population living in France as a whole, including sub-populations not accurately covered by existing surveillance methods. The long latency of the SNIIRAM data availability does not permit early alert. Our approach should be thus considered as an addition to the traditional epidemiological surveillance, though a formal validation framework for case-identification algorithms is still necessary.

Table 1: Distribution of care events among identified malaria cases (n=4,248)

Health Insurance Refund				n	%
Hospitalizations	Outpatient Drug Delivery	Laboratory Tests	Emergency Department Admissions		
X				2,639	62.12
X	X			136	3.20
X		X		307	7.23
X	X	X		48	1.13
X			X	4	0.09
X	X		X	13	0.31
X		X	X	1	0.02
X	X	X	X	9	.21
	X			977	23.00
	X	X		75	1.77
	X		X	28	0.66
	X	X	X	11	0.26

n: number of cases

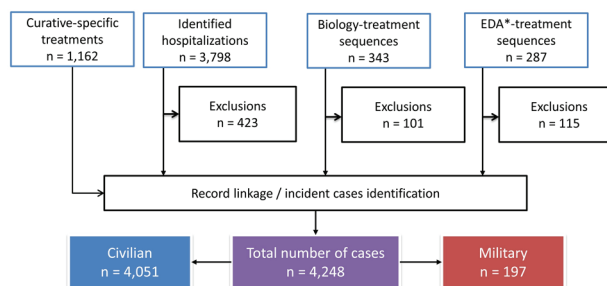


Figure 1: Flowchart illustrating malaria cases identification

Keywords

Malaria; Surveillance; Database; Health insurance

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*Francois Delon

E-mail: francois.delon@laposte.net

