

Institut Pasteur Madagascar and Institut Pasteur Paris

Plague epidemics in Madagascar

The current plague outbreak in Madagascar, compared to previous ones, is remarkable by the high proportion of pulmonary plague cases, the large number of cases in densely populated urban areas (Antananarivo and Toamasina), and as a result the risk of further spread by person-to-person transmission in Madagascar and abroad.

Since the beginning of the epidemic, the Institut Pasteur Madagascar (IPM) has played a key role for the epidemiological and bacteriological monitoring of the disease. More specifically, IPM is involved at all stages of plague diagnosis, by producing rapid diagnostic tests (RDTs) using a strip detecting F1 antigen for bedside use, and confirming results by repeating the RDT at IPM, and performing culture and PCR testing. Also, the IPM epidemiology unit, together with local authorities, is involved in compiling and checking data on suspect / probable / and confirmed plague cases for official reports. More than 2000 cases (suspect / probable/confirmed), 75% of them pulmonary, have been reported since the beginning of the epidemic. Of all strains isolated so far, including both bubonic and pulmonary cases, none were resistant to the antibiotics commonly used for plague treatment (treatment of hospitalized cases is based on streptomycin IM; contacts receive co-trimoxazole for prophylaxis).

In addition to diagnostic and control activities, the IPM, with the support of Institut Pasteur Paris, has developed several research activities. These research activities address in priority the urgent concerns raised by the pulmonary plague form of the disease, because of its potential for national and international spread. They include the following:

- 1) "Live" data cleaning and analysis for reporting, plus modeling of key epidemiological parameters (including epidemiologic and biologic data)
- 2) Validation of the RDT for pulmonary plague compared to validation previously performed for bubonic plague.
- 3) A protocol for describing the clinical and biological manifestations of pulmonary plague
- 4) A protocol for the long-term follow-up of patients who survived plague
- 5) Sequencing of currently circulating *Y.pestis* strains, to look for potential mutations and deletions that may be associated with the new clinical presentation of the disease and performance of diagnostic tests

Other activities such as the following are also developed:

- 1) Contribution of socio-anthropologists and health geographers from IPM to provide recommendations for communication messages to community and safe and dignified burials
- 2) Collection and appropriate storage of well-characterized strains and biological samples at IPM
- 3) Research capacity building activities