

1 ZOOBOTIC AND VECTOR-BORNE DISEASES

a Plague antibodies in a rat in Johannesburg, Gauteng Province

In March 2016, one of 11 rodents collected from the Mayibuye informal settlement in Midrand on March 16 and submitted by City Of Johannesburg Region A environmental health officers, tested positive for plague IgM antibodies in serum. Testing was by a highly-specific competitive enzyme-linked immunosorbent assay (ELISA), and the result was verified by re-testing. The conclusion was that the juvenile female (approximately 2 months of age) *Rattus* sp. rodent had come into recent contact with *Yersinia pestis* and had produced antibodies to the organism. The spleen sample from this rodent was cultured appropriately, but no growth was observed on any of the culture media. Impression smears were also done from the spleen sample for staining and microscopy, and also for a direct immunofluorescence test. No organisms were seen and it was concluded that the rodent was not actively infected with *Y. pestis* despite recent exposure to the bacterium. The origin of infection is not known, but the most likely source was a flea from a wild rodent from the vicinity; alternatively the rat may have been accidentally introduced to Mayibuye by road or rail transport from elsewhere.

Plague is an acute bacterial infection transmitted by fleas. Plague mainly affects rodents, and endemic plague exists independent of human populations in wild rodent colonies. Under suitable conditions plague has the potential to spread into urban rodent populations, and potentially, from them to humans. The last reported outbreak of plague occurred in Coega, Eastern Cape Province, in 1982, with 13 cases and 1 death. Susceptible wild rodent foci probably exist in several areas of South Africa, namely parts of the Eastern Cape, Northern Cape, Free State, Mpumalanga and Gauteng Provinces. Decades may lapse between the occurrences of isolated cases or epidemics; only surveillance of rodents and their vector populations can warn of the presence of plague during periods when no human cases are reported.

Rodent surveillance in the City of Johannesburg

The City of Johannesburg (COJ), comprising 7 regions (Regions A-G), participates in a plague surveillance program run by the NICD, and thus

routinely traps, and submits rodent specimens to the Special Bacterial Pathogens Reference Laboratory, Centre for Emerging and Zoonotic Diseases, for plague testing. This surveillance programme has been in place since February 2010 and the coverage has grown from 78 samples collected in 2010 to 862 samples in 2015, and continues to improve (Figure 1).

Surveillance programmes alert public health authorities to increased human plague risks, thus allowing prevention and control programmes to be implemented before human plague cases occur. Control of plague transmission is directed at regulating the rodent reservoirs and flea vectors of the disease. The objective of this is to reduce the density of the rodent-flea vectors as quickly and as completely as possible, by area-wide insecticide application to houses and rodent habitats, followed by intensified rodent control by trapping and poisoning, and discouraging rodents by basic sanitary methods, e.g. clearing up garbage that provides food and shelter for rodents. Surveillance in the City of Johannesburg has been intensified, with increased numbers of rodents submitted for testing. To date no further rodents have tested positive, and no suspected human cases of plague have been reported. Domestic rodents pose a number of human health problems, of which plague is only one. While the acute garbage accumulation problem following the Pikitup strike has improved in parts of Johannesburg, it must be emphasised that many communities have a longstanding rodent problem that requires a multipronged approach to solve; trapping and poisoning of rodents will only have temporary effects.

Source: Special Bacterial Pathogens Reference Laboratory, Centre for Emerging and Zoonotic Diseases, NICD-NHLS (jfrean@nicd.ac.za); City of Johannesburg Environmental Health Department.

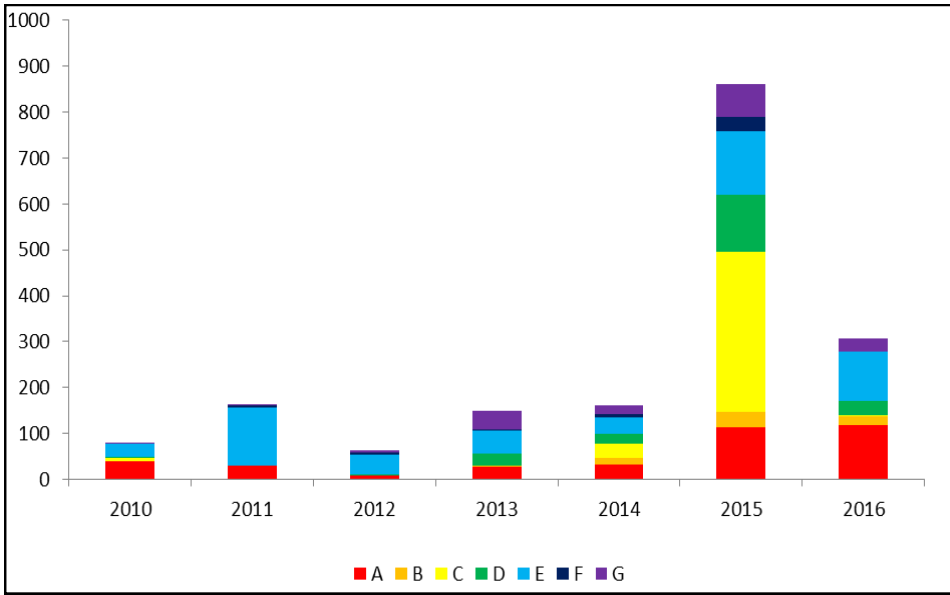


Figure 1. Number of rodents collected from the City of Johannesburg, February 2010-March 2016 (letters A-G signify the administrative regions of Johannesburg).