

Research Letter

COVID-19-related travel restrictions temporarily reduced the demand for rabies post-exposure prophylaxis in France

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The incidence of travel-related diseases was expected to be reduced by travel restrictions implemented in many countries in the spring of 2020 to limit the spread of COVID-19.¹ In countries free of dog rabies, such as France, exposures to a rabid animal while travelling in a rabies-enzootic country remain the main source of lyssavirus transmission to humans.^{2,3} To assess the impact of travel restrictions on the demand of rabies post-exposure prophylaxis (PEP), we analyzed the activity of the region Ile-de-France (Paris metropolitan area; 12 011 km², 12 174 880 inhabitants) rabies vaccination clinics in 2020. We compared the data of individuals seeking care at the two rabies vaccination clinics of the region Ile-de-France; Bégin military hospital (BH) and Institut Pasteur (IP) clinics, to those collected in the preceding years (2017–19).

A dramatic decrease of rabies PEP demand was observed in 2020 in the Ile-de-France region, compared with the 3 previous years (Figure 1). The mean of rabies exposures per week among outpatients in 2020 (10.4 (SD = 8.3)) was significantly decreased compared with the preceding period (34.7 (SD = 17.9), $P < 0.01$). Furthermore, in 2020, outpatients have been exposed significantly more often in France than abroad, more often to a dog or a bat and less frequently to a non-human primate (NHP) compared with previous years (Table 1). As exposures due to NHP are overrepresented in individuals exposed in tropical areas,^{3,4} the decline of international travels explains this decrease.

We believe that the decrease of PEP demand is mainly explained by the impact of COVID-19 movement restrictions

that have been declared since spring 2020. The number of individuals seeking medical attention after an exposure outside France dropped suddenly just after the announcement of the first lockdown in France (Figure 1). The collapse of international flights and the dramatic decline in business and leisure trips can have resulted in a marked reduction of exposures with suspect rabid animals in foreign countries and a reduction of consultations in rabies vaccination clinics. The drop of consultations after an exposure outside of France concerned all continents in a similar proportionate manner (Table 1). A significant decrease of PEP demand following exposures occurred in France in 2020 compared with previous years was also evidenced. We believe that this less pronounced decline is partly explained by the restrictions on outdoor activities caused by the COVID-19 pandemic (lockdowns, curfews).

We believe that the decline of rabies PEP demand evidenced in 2020 in the Ile-de-France region is the direct result of movement restrictions. The pandemic is not yet under control; however, we must anticipate a recovery of international travels which may lead to a rebound in rabies exposures. Furthermore, the risk for travellers to be exposed to a rabid animal may even be greater now than it was before 2020 as control measures in dogs have probably been reduced in many rabies-enzootic countries due to the pandemic.⁵ This potential increased risk need to be anticipated in individuals travelling for tourism after months of restrictions and in people travelling to visit friends and relatives in their country of birth. We believe that the end of travel restriction

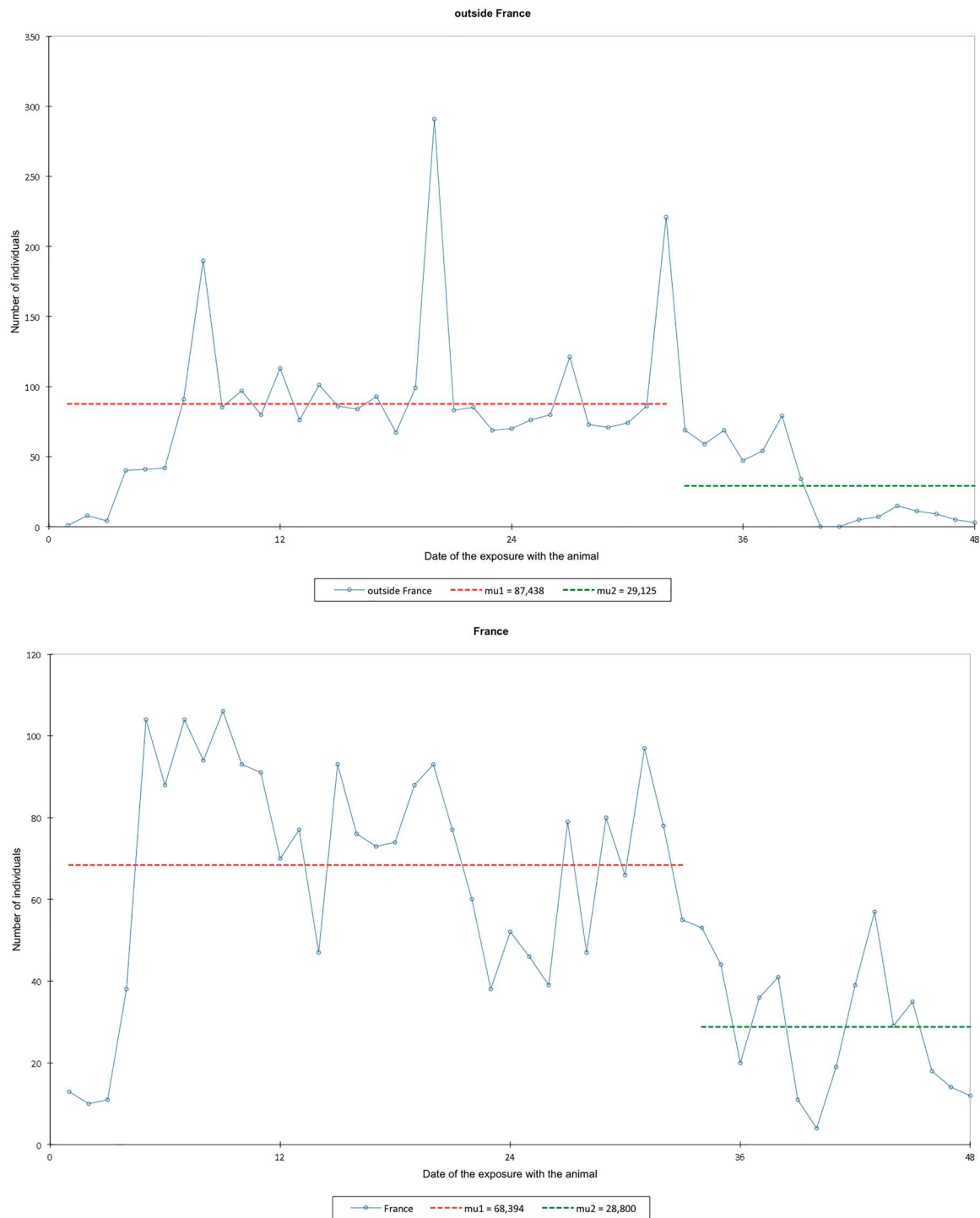


Figure 1. Monthly distribution of exposures to rabies risk in individuals seeking medical attention at Ile de France region rabies vaccination clinics, by location of exposure, 2017–2020. This figure illustrates the tendency of the time series. The Pettitt's test for homogeneity evidenced a change in the tendency of the time series in 2020 (exposure outside France $P < 0.0001$ and exposure in France $P = 0.001$).

Table 1. Characteristics of rabies clinics outpatients in Ile-de-France region rabies, by period of time, France, 2017–2020

	Period 2017–2019 (<i>n</i> = 5423)	Period 2020 (<i>n</i> = 537)	<i>P</i> -value
Mean age, mean (SD)	33.99 (18.22)	35.53 (17.96)	0.06
Male gender, <i>n</i> (%)	2845 (52.46)	286 (53.26)	0.76
PPE, <i>n</i> (%)	3420 (63.06)	289 (53.82)	<0.001
Animal exposure:			
Dog exposure, <i>n</i> (%)	3225 (59.47)	352 (65.55)	0.007
Cat exposure, <i>n</i> (%)	1037 (19.12)	84 (15.64)	0.056
NHP exposure, <i>n</i> (%)	750 (13.83)	35 (6.52)	<0.001
Bat exposure, <i>n</i> (%)	92 (1.70)	35 (6.52)	<0.001
Location of exposure:			
Exposure in France, <i>n</i> (%)	2376 (43.81)	315 (58.66)	<0.001
Exposure in Asia, <i>n</i> (%)	1706 (55.99)	117 (52.70)	0.38
Exposure in Africa, <i>n</i> (%)	824 (27.04)	64 (28.83)	0.62
Exposure in Americas, <i>n</i> (%)	307 (10.08)	24 (10.81)	0.81
Exposure in Europe (France excluded), <i>n</i> (%)	202 (6.63)	16 (7.21)	0.85

should be accompanied by prevention messages targeting people travelling to rabies-zoonotic countries to avoid risky behaviours and remind the management of potential rabies exposures.

Author's contribution

Study concept by P.P. and H.B.; acquisition of data was done by Ph.P., P.L.C., C.L., L.K., K.J., M.G. and C.F.; analysis of data was performed by P.P.; P.P., H.B. and C.F. had drafted the first version of manuscript; final approval of version published was done by all authors.

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