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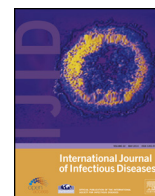
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## Short Communication

## Rabies in Saudi Arabia: a need for epidemiological data

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## SUMMARY

Rabies is endemic in animals in the Arabian Peninsula. Although Saudi Arabia is the largest country in the Peninsula, little has been published about the rabies situation in the country. A total of 11 069 animal bites to humans were reported during 2007–2009, and 40 animals suspected of rabies were examined for rabies infection from 2005 through 2010. Results suggest that animal-related injuries in Saudi Arabia remain a public health problem, with feral dogs accounting for the majority of bites to humans and for the majority of animals found to be rabid. Over the last 10 years, no confirmed human rabies case has been reported. More detailed information about the epidemiology of animal bites and that of animal rabies in Saudi Arabia would be of great interest, notably to provide a basis on which vaccination recommendations could be made for the numerous international travellers visiting the country.

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## 1. Introduction

Rabies is endemic in animals in the Arabian Peninsula, with the exception of the United Arab Emirates, Qatar, and Kuwait, which are considered rabies-free.<sup>1</sup> No information is available from Bahrain. Certain countries in the area have been reporting increasing numbers of cases of wildlife rabies, including Oman, Saudi Arabia, and Yemen.<sup>2</sup> Animal rabies in Oman is characterized by a red fox sylvatic cycle and cases reported in camels, cattle, goats, and sheep.<sup>3</sup> In Yemen, the majority of cases are reported mostly in dogs and, to a lesser extent, in cattle, sheep, and goats.<sup>6</sup> Although Saudi Arabia is the largest country in the Peninsula, little has been published about the rabies situation in the country.

## 2. Epidemiological data on the rabies situation in Saudi Arabia

Data from the years 1986–1992 indicate that most animal bites to humans in Saudi Arabia have involved dogs, cats, rodents, and

foxes, and that foxes are an important rabies reservoir.<sup>7</sup> According to the most recent data, it is believed that rabies is also transmitted through feral dogs in Saudi Arabia, but this is only presumptive since there are very few reports available.<sup>8</sup> To the best of our knowledge, no case of human rabies has been reported from Saudi Arabia over recent decades.<sup>9</sup> In 2007, a survey was conducted in Qassim region among 4124 camels, showing an incidence of 0.2% of clinical rabies, likely resulting from transmission by feral dogs (70%), followed by foxes (17%). A diagnosis of rabies was confirmed in 26 dogs, 10 foxes, eight camels, and seven cats in Qassim region between 1997 and 2006.<sup>10</sup> A total of 11 069 animal bites to humans were reported to the Saudi Ministry of Agriculture (MoA) and Saudi Ministry of Health (MoH) during the period 2007–2009 (Figure 1). Most injuries were caused by dogs and cats, accounting for 49.5% and 26.6% of all injuries, respectively, followed by mice and rats (12.6%), camels (3.2%), foxes (1.3%), monkeys (0.7%), and wolves (0.5%).

The monthly incidence showed some variation according to the animal species (Figure 2). Dog and cat bites were frequent throughout the year, with a tendency to decrease in April and in August through October. Fox bites increased in August through September. Camel bites were more frequent in December through March. These seasonal variations may reflect Saudi population habits, with people going to the desert for leisure activities during periods of good weather. No clear pattern was observed for rodent, monkey, and wolf bites.

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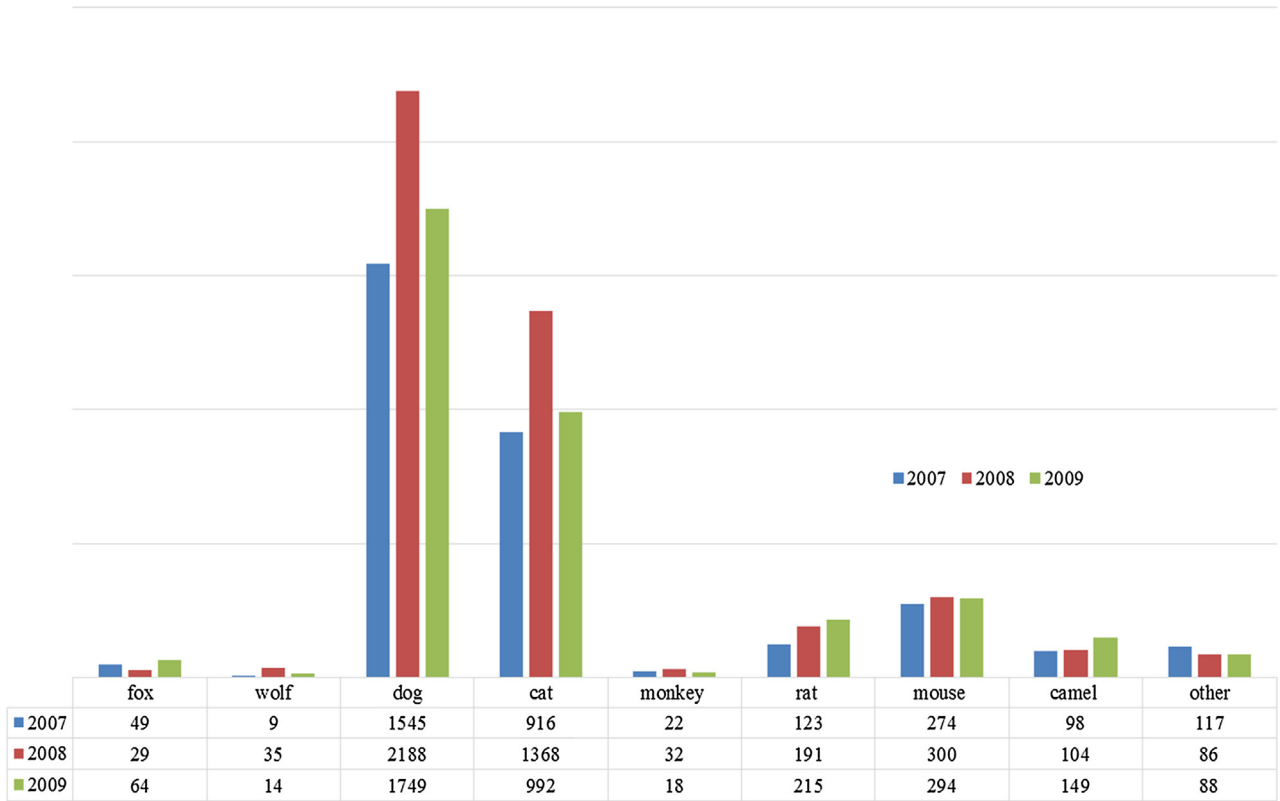


Figure 1. Number of animal bites to humans in Saudi Arabia according to the animal, for the years 2007, 2008, and 2009.

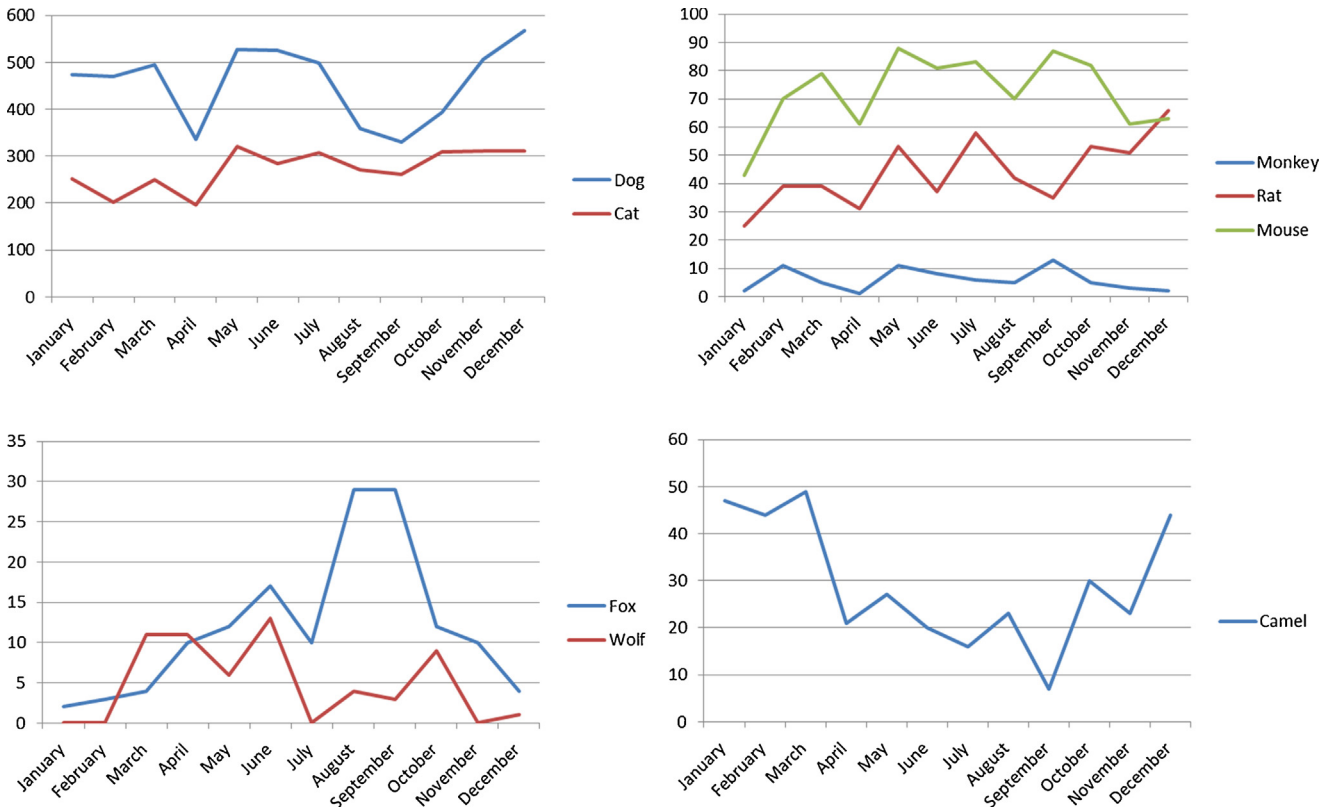


Figure 2. Number of animal bites to humans in Saudi Arabia according to the month, for the years 2007, 2008, and 2009.

**Table 1**  
Recorded cases of animal rabies in Saudi Arabia from 2005 through 2010

	2005		2007		2008		2009		2010	
	Suspected cases	Confirmed cases	Suspected cases	Confirmed cases	Suspected cases	Confirmed cases	Suspected cases	Confirmed cases	Suspected cases	Confirmed cases
Dog	6	6	1	1	2	2	1	1	1	1
Fox	-	-	1	1	5	2	3	3	-	-
Wolf	1	1	1	1	1	1	-	-	-	-
Sheep	-	-	2	2	1	1	2	2	1	1
Goat	1	1	3	3	-	-	-	-	-	-
Cow	-	-	1	1	-	-	1	1	-	-
Camel	-	-	1	1	-	-	3	3	1	1
Total	8	8	10	10	9	6	10	10	3	3

A total of 40 animals suspected of rabies were examined for rabies infection by histological observation of Negri bodies in the brain between 2005 and 2010 (Table 1). A total of 37 were positive, including 11 dogs (29.7%), six foxes (16.2%), six sheep (16.2%), five camels (13.6%), four goats (10.8%), three wolves (8.1%), and two cows (5.4%).

### 3. Discussion

Rabies is a reportable disease in Saudi Arabia and the MoH requests that all healthcare facilities in Saudi Arabia report suspected or confirmed human cases to the Public Health Directorate through the regional Health Directorate in each region. The MoA has assigned three national reference laboratories to the testing of suspected rabid animals for rabies; these are based in Qassim, Al-Hassa, and when needed Jeddah. A policy outlining the procedures for suspected rabid animal brain sample handling and the submission procedure is made available to all healthcare facilities by the MoA. In addition, detailed pre- and post-exposure prophylaxis and treatment for rabid animal human bite victims has been outlined by the MoH for all healthcare professionals in the Kingdom of Saudi Arabia. Over the last 10 years, no confirmed case of human rabies has been reported by the Saudi MoH.

Although the data presented here are scant, they suggest that animal-related injuries in Saudi Arabia remain a public health problem, with feral dogs accounting for the majority of bites to humans and for the majority of animals found to be rabid. More detailed information on the epidemiology of animal bites and that of animal rabies in Saudi Arabia would be of great interest. Every year more than 10 million pilgrims from 184 countries arrive at Makkah for the Hajj or the Umrah, and rabies vaccine is among the preventive vaccinations that should be considered before travelling to Saudi Arabia.<sup>11</sup> The US Centers for Disease Control and Prevention recommend rabies vaccine for specific groups at increased risk of acquiring rabies if they are travelling to Saudi

Arabia. These groups include the following: (1) Travellers involved in outdoor and other activities in remote areas that put them at risk of animal bites (such as adventure travel and caving). (2) People who will be working with or around animals (such as veterinarians, wildlife professionals, and researchers). (3) People who are taking long trips or moving to remote areas in Saudi Arabia. (4) Children, because they tend to play with animals, might not report bites, and are more likely to have animal bites on their head and neck (CDC Travel Guide <http://wwwnc.cdc.gov/travel/destinations/traveler/none/saudi-arabia>).

*Conflict of interest:* No conflict of interest to declare.

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