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Rabies vaccination for Walia and Koundoul, Chad

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Key words
Dog, rabies, control, N'Djaména, Chad, Africa

Aim of the study
During a previous project co-financed by BLV two mass vaccination campaigns have been conducted in 2012 and 2013, that covered all 10 districts of N'Djaména. These campaigns reached consecutively over 70% of the total canine population and led to interruption of rabies transmission among dogs.
From January 2015 onward single cases of canine rabies were observed in the 9th district (Walia) at the periphery of town and cases be-gan to rise steadily in this area. To prevent the rabies epidemic from again spreading over the whole city an emergency vaccination was initiated in District 9 and the neighbouring village. The hypothesis of the subproject was that the dog rabies cases in Walia were due to reintroduced into this district, which could be contained by re-vaccination of this single district and the village Koundoul neighbouring the district, not included in the previous citywide intervention. The objectifs were to vaccinate over 70% of the dog population of Walia and Koundoul in a 2 weeks campaign, estimate the dog population and coverage rate achieved in Koundoul (dog population of Walia is known from previous campaign) and evaluation of the effect of the vaccination on the epidemiology of rabies through on-going passive animal rabies surveillance

Material and methods
Based on the experiences gathered during the two vaccination campaigns in N'Djamena, a budget was established to vaccinate an ex-pected 5000 dogs in Walia and an additional 1000 dogs in Koundoul. Most material was reused from the campaigns in 2012/13 including banners, vaccination post equipment and cooler boxes. Also collars for marking the dogs were still in stock from 2013 and were reused in Koundoul. 10'000 Doses of Rabisin ® were procured from Merial, France.Vaccination coverage in Walia was assessed based on the total number of dogs vaccinated and to the population size estimated in 2013.
Vaccination was taking place Friday 11th to Sunday 13th March in Koundoul and Friday 18th to Sunday 20th March in Walia. The organisa-tion and performance followed the operational plan elaborated for and refined through the previous campaigns.
In Koundoul we estimated the vaccination coverage in line with the method applied in 2012/2013 through a household survey and a tran-sect count. The data from these two observations were then combined in a Bayesian model.

Results and significance
In the two weeks campaign a total of 6228 animals were vaccinated. The summary by specie and area is presented in table 1. The 4075 dogs vaccinated in Walia represent 72% of the estimated dog population of 5600 dogs in this district and lies between the number of dogs vaccinated in 2012 (3858) and 2013 (4402).
In Koundoul were a mass vaccination took place for the first time participation was also very high. For the coverage analysis only the village center was included. Vaccination coverage among owned dogs observed during the household survey was 91% (474 dogs recaptured of which 432 were vaccinated by the campaign) and with

the help of the Petersen-Bailey formula the owned dog population was estimated at around 1250 dogs. Confinement among owned dogs was observed to be 22%. Together with the data from the transect survey the total dog population was calculated to be around 1400 with an ownerless proportion of 11%. Overall coverage was observed to be 81%.

Vaccination site	Dogs	Cats	Primates	Total per site
Koundoul	1544	184	3	1731
Walia	4075	410	12	4497
Total per specie	**5619**	**594**	**15**	**6228**

Unfortunately the small scale campaign did not halt the spread of canine rabies in N'Djaména. Starting April 2016 case numbers reported from the city center north of the Chari river began to rise steadily until reaching the monthly incidence of 0.7/1000 dogs in June 2016, which was also reported in June 2012 before the mass vaccination intervention. We suspect that undetected rabies cases have introduced the virus to the city already before the emergency campaign. All virus isolated sampled during the study are currently being sequenced and will be compared with the isolates from the previous 10 years in a phylogeographic analysis. This study will give important insight into the dy-namics of the epidemiology of rabies during an elimination attempt.

Publications, posters and presentations

Zinsstag et al. : Mass dog vaccination rapidly interrupts rabies transmission and reduces human exposure in an African city; Under review in Science and Translational medicine

Léchenne et al. : Epidemiological follow up of a dog mass vaccination campaign: impact on dog rabies incidence, human bite exposure and PEP demand; to be submitted to Tropical Medicine and Hygiene

Léchenne et al. : Molecular dynamics of classical rabies virus during a mass dog vaccination campaign; to be submitted to PlosNTD

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