1.11.07 Vision: Rabies free cities in the Sahel Region of Africa

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

Aim of the study
The aim of this study to understand the population dynamics of dogs at the urban-rural interface and the molecular genetics of dog rabies virus between urban and rural areas in view of the potential of dog rabies elimination in N'Djaména, the capital city of Chad.

Material and methods
In a study involving 1200 households the dog-human ratio and the demographic parameters of the dog population was estimated. Households were selected by random geographical positions (GPS). Dog rabies surveillance was extended to rural areas of Chad by the training of 32 provincial veterinarians in dog rabies diagnosis using the direct immune-histochemical test (DRIT), in collaboration with Charles Rupprecht (formerly CDC, Atlanta, USA). The project was framed by a dog mass vaccination campaign which took place from October – December 2012 and 2013, whereby over 70% of the N'Djaména dog population was vaccinated consecutively.

Results and significance
In this project we could literally realize the vision stated in the project title. The two consecutive vaccination campaigns in N'djamena, Chad were realized thanks to co-funding by the UBS Optimus Foundation and the Chadian state. In 2012 and 2013, we vaccinated 18,200 and 22,300 dogs respectively, reaching in both years a vaccination coverage of more than 70%. The dog rabies incidence dropped from one rabid dog per week prior to the mass vaccination to less than one rabid dog in nine months. The last rabid dog was recorded in January 2014. A previously developed model of coupled differential equations (Zinsstag et al. 2009) was fitted to this data. The incidence started dropping at a coverage of 44% vaccinated dogs. The effective reproductive number (Re) dropped below one at a density of 66 dogs per km^2. Highly accurate data on dog densities could be collected showing the highest dog densities in the South-Eastern part of the city and the lowest densities in the Western and Northern parts. The dog human ratio could be confirmed at one dog for 33 persons. A Leslie matrix was constructed for the demographic parameters of the dog population. Briefly, over 70% of a newborn dog cohort enters the second year of life. The life expectation at birth is three years, indicating a high turnover of the dog population. We could only collect few rabies strains from outside N'Djaména. However, with the help of a new lateral flow test (Anigen^{TM}), efforts are continued to establish dog rabies diagnosis in rural Chadian areas. Currently, post-elimination rabies surveillance is enhanced by better communication between public health centres and the veterinary laboratory. The frequency of human post-exposure prophylaxis in N'Djaména has not strongly decreased, indicating a lack of communication between the public health and veterinary sectors, but also a positively high awareness of the danger of rabies among N'djamena citizens triggered by the project. A series of publications are forthcoming and will be provided.

Publications, posters and presentations
Léchenne et al. (2014) Applied systems thinking for rabies control: Experiences from the rabies control program in N'Djaména, Chad. Presentation at the Ecohealth conference in Montréal August 2014.
Léchenne et al. (2014) Of a success story and the challenges beyond: Rabies control through mass vaccination of dogs in N'Djamena, Chad. Presentation at the PARATROP meeting in Zürich July 2014.

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