

## Retrospective dog rabies vaccination evaluation at the University of Ibadan, Nigeria (1988-1992)

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### ABSTRACT

Registers, rabies vaccination records and some case notes of 755 dogs presented in the Small Animal and Preventive Veterinary Medicine Clinics of the University of Ibadan between January 1988 and December 1992 were analysed for anti-rabies vaccination coverage and booster immunization consistency. Two hundred and seventy-six (36.5%) of the 755 registered dogs were vaccinated against rabies during the 5-year period. One hundred and eighty-two (65.9%) of the 276 vaccinates obtained an adequate number of rabies vaccinations required for the dogs in respect of age. However, 149 (approx. 82%) of these adequately vaccinated dogs were in the primary (initial) age vaccination category. Also, 50 (59.5%) of the 84 dogs requiring booster vaccination in the dog population under study had received regular boosters. Inadequate vaccination coverage, urban rabies control problems and public health implications in Ibadan, the largest city in West Africa, are discussed.

**Key words:** urban rabies, dog-rabies vaccination coverage, rabies control, public health, Ibadan, Nigeria

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### Introduction

In Nigeria, as in many parts of the world, rabies endangers both human and animal health (RADOSTITS et al., 1995). This disease affects all warm-blooded animals, including man, and is generally fatal.

Rabies could be enzootic in urban areas where dog is the main reservoir host (ACHA and SZYFRES, 1987) and sylvatic, which involves wild animals. The epizootiology of rabies has been described in Nigeria by

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several authors, BOULGER and HARDY (1960), NURU (1973), OGUNKOYA et al. (1984), AGHOMO (1986) and OKOH (1989). Because of the dominant role dogs play in anthrophilic transmission of rabies to man (TEULIERES et al., 1988), the idea of routine prophylactic vaccination of dogs for control of urban rabies has been generally accepted (ANONYMOUS, 1988, 1989). Also, control of stray dogs, wildlife reservoirs and mass education of the public are necessary approaches for rabies control measures to be effective (EZEBUIRO et al., 1980; ANONYMOUS, 1990).

### *Principle of canine rabies control*

Rabies is an important public health problem and the early, inexpensive and most effective control of urban rabies is in dogs. Also, factors of rabies epidemiology, pathology, and immunology favour the control of the disease in dogs. Canine rabies control principles have been described by Veterinary Public Health Division of Communicable Diseases, World Health Organization (ANONYMOUS, 1989).

### *Dog rabies immunization*

Among the measures recommended for canine rabies control, vaccination constitutes the main solution that can be applied against dog rabies (LOMBARD et al., 1988) as well as to interrupt the rabies transmission cycle; WHO recommends 70% minimum vaccination coverage of the population at risk in all areas (ANONYMOUS, 1989).

Low and high egg passage (LEP, HEP) Flurry rabies vaccines for dog and cat, respectively, have been produced in Nigeria by the National Veterinary Research, Institute (NVRI) since 1956 (NAWATHE et al., 1981) and are the common prophylaxes for animal rabies control in Nigeria. Initial vaccination of dogs is at 3 months of age. Immunity lasts for 3 years but an annual booster vaccination is recommended in Nigeria because of the enzootic nature of rabies in most areas.

The voluntary, routine dog rabies vaccinations at private, University or government Veterinary Clinics method places responsibility on individual dog owners to bring their dogs to the clinic, or to book for ambulatory services. Vaccinations of this type are provided for a fee, with issuance of rabies vaccination certificate. This system excludes ownerless dogs. To be effective this method requires the enforcement of appropriate regulations on licensing, regular vaccination, dog movement control and elimination of stray (ownerless) dogs. The compulsory mass immunization campaign is usually a free and sponsored (mostly by the government) community-wide programme to prevent or interrupt, local outbreaks. Mass

immunization campaigns against dog rabies in different forms have been described (ANONYMOUS, 1987). This study attempts to evaluate acceptability or response of dog owners to routine dog rabies control by immunization, as well as an assessment of the impact of the routine vaccination coverage of dogs, and other influencing factors.

## Materials and methods

Data on date of initial registration, identification, age, sex, period of clinic attendance and rabies vaccination history of 755 dogs registered in a 5-year-period (1988-1992) were collated from small animal and Preventive Veterinary Medicine Clinic registers and case notes, and were analysed and evaluated.

### *Analysis of data*

Registered dogs were classified according to age, sex, vaccination status (vaccinated or unvaccinated, regular booster or irregular booster) and total period of clinic attendance between 1988 and 1992. The annual and total 5-year vaccination coverage of the dogs were determined and the booster vaccination regularity assessed.

### *Definitions:*

$$\text{Vaccination coverage (\%)} = \frac{\text{No. of dogs vaccinated}}{\text{Total No. of registered dogs}} \times 100$$

*Adequate rabies vaccination* - Recommended number of rabies vaccinations per dog with regard to age.

*Booster vaccination* - Annual revaccination following expiry of initial vaccination at the age of 3 months.

## Results and discussion

Between January 1988 and December 1992 a total of 755 dogs were registered both in the Small Animal and Preventive Veterinary Medicine Clinics of the University of Ibadan. Whereas 276 (36.6%) received anti-rabies vaccination, the majority (152) or 83.5% of 182 dogs that were adequately vaccinated had primary (initial) immunization. Also, regular booster vaccinations were low (59.5%). Tables 1, 2, 3, and Fig. 1 show details of the observations.

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Taking the total number of annual registered dogs as the clinic population base (mean=151±19.3), the annual and 5-year period of vaccination coverage (mean=37.9%±13.3) fall far short of the minimum vaccination coverage recommended (ANONYMOUS, 1989) to prevent epizootic spread of dog rabies in the community. This is despite regular annual instruction issued by the University Health Service to dog owners on the campus to register, vaccinate, and place tags (licensing) on their dogs. Earlier observations between 1988 and 1990 led to organization of a campaign and the mass vaccination of dogs against rabies in the University campus and other areas in Ibadan City.

Table 1. Rabies vaccination profile of registered dogs at the University of Ibadan (1988-1992)

Year	No. of registered dogs	No. of vaccinated	% vaccination	No. adequate vaccination	% adequate vaccination
1988	161	60	37.3	49	81.7
1989	176	56	31.8	40	71.4
1990	160	29	18.1	13	44.8
1991	122	71	58.2	42	59.1
1992	136	60	44.1	38	63.3
Total	755	276	36.6	182	65.9
Mean±SD	151±19.3	55.2±14	37.9±13.3	36.4±12.3	64.1±12.4

Table 2. Age and vaccination coverage of registered dogs at the University of Ibadan (1988-1992)

Year	Age distribution (months)							
	3		>3-12		>12-132		Not stated	
	No. of dogs	No. of vaccinated (%)	No. of dogs	No. of vaccinated (%)	No. of dogs	No. of vaccinated (%)	No. of dogs	No. of vaccinated (%)
1988	21	8 (38.1)	66	11 (12.1)	30	11 (36.7)	-	- (-)
1989	65	17 (26.1)	67	16 (34.3)	36	16 (44.8)	8	0 (0)
1990	2	2 (-)	6	20 (-)	20	20 (-)	132	1 (0.8)
1991	1	1 (-)	24	44 (-)	44	44 (-)	53	2 (3.8)
1992	3	3 (-)	27	25 (-)	25	25 (-)	81	5 (6.2)
Total	92	31 (33.7)	190	116 (63.7)	135	116 (74.8)	318	8 (2.5)

The campaign was carried out by the Nigerian Association of Veterinary Medical Students (NAVMS), University of Ibadan branch, in December 1990. Among the vaccinated dogs, young dogs (one year and

Table 3. Booster vaccination regimes among dogs requiring booster (1988-1992)

Year	Total No. of dogs vaccinated	No. of dogs re-quired booster	No. of dogs with complete booster	% adequate booster
1988	60	13	10	76.9
1989	56	15	9	60
1990	29	12	5	41.7
1991	71	29	18	62.1
1992	60	15	8	53
Total	276	84	50	59.5
Mean±SD	55.2±14	16.8±6.21	10±4.33	58.7±11.54

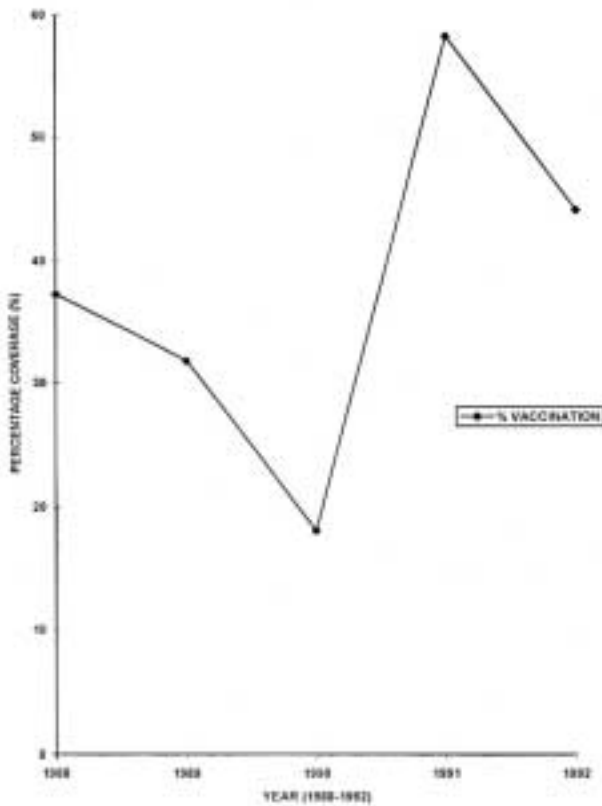


Fig. 1. Dog rabies vaccination coverage (% of registered dogs) at the University of Ibadan (1988-1992)

The campaign was carried out by the Nigerian Association of Veterinary Medical Students (NAVMS), University of Ibadan branch, in December 1990. Among the vaccinated dogs, young dogs (one year and under) requiring initial vaccination constituted the majority of adequately vaccinated dogs. Male dogs represented 58%, and 62% of the total dog population and vaccinated dogs, respectively, in the known sex group. Dogs unvaccinated against rabies that were above 3 months of age upon clinic attendance were regarded as "previously unvaccinated" and among this group; 52 dogs and 39 dogs were vaccinated out of 96 dogs and 103 dogs previously unvaccinated for 1988 and 1989, respectively. The decline was an indication of a decrease in dog owner response to rabies vaccination enlightenment and routine, whereas a similar assessment was not possible for the subsequent 3 years because of grossly incomplete records.

Generally, both initial and booster vaccinations against rabies in the study area were low. Also, between 1988 and 1990 the cost of dog rabies vaccination (per dog) increased by 600%, while vaccination coverage declined by 48.5%. The mass dog rabies vaccination campaign conducted in December 1990 in the city increased clinic dog rabies vaccination coverage for 1991 and 1992 by over 300% and 200%, respectively, when compared with 1990 clinic vaccination coverage. Age is crucial to the vaccination status assessment of dogs, and the record quality in this respect needs to be improved.

Low anti-rabies vaccination tendency builds up the susceptible dog population and favours large-scale epizootic or focal outbreaks with an increase of rabies risk to humans. Unfortunately, NVRI rabies vaccines have become costly and scarce in the recent times. Also, standardised quality control of LEP rabies vaccine for dog produced in Nigeria is lacking (ADEYEMI et al., 1993; SYLLA and PALYA, 1993).

Since trade in dogs across the country is common and unregulated, rabies control problems in Ibadan may exacerbate the public health problems of urban rabies in Nigeria. Although the voluntary vaccination routine approach best serves the control of urban rabies in dogs, it is less effective (on its own) in the community under study without government inducements, such as free or subsidized vaccination costs, enforced regulations for dog registration, vaccination, licensing, stray dog elimination, imported/inter-state dog movement control and quarantine, as well as consistent community-wide rabies monitoring and a dog rabies vaccination campaign, something that has proved effective in the control of urban dog rabies (LOMBARD et al., 1988). Some countries have

eradicated “domestic rabies” (urban rabies) in dogs (OKOH, 1989) and it is therefore also possible in Nigeria.

However, in addition to the need for improved vaccine and vaccination strategies, increased knowledge of the epidemiology of rabies (in humans) in modern cities of the developing countries is urgent in order to streamline policies and to modify regulations for multidisciplinary (Veterinary, Medical, Sanitary, etc.) and community participatory approach to improve rabies control programmes and eradication, especially in Nigeria.

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#### References

- ACHA, P. N., B. SZYFRES (1987): Zoonoses and communicable diseases common to man and animal. 2<sup>nd</sup> ed. Pan American Health Organisation..
- ADEYEMI, I. G., J. O. IKHELOA, G. A. T. OGUNDIPE (1993): Microbial contaminants found in low-egg passage rabies vaccine used in Nigeria. *J. Vet. Med. B* 40, 676-680.
- AGHOMO, H. O. (1986): Some aspects of the epidemiology of canine rabies in Nigeria. Virological and serological studies in clinically health dogs. Ph.D. Thesis. University of Ibadan.
- ANONYMOUS (1988): Animal diseases control decree. Federal Republic of Nigeria official gazettes. The Federal Government Press. Lagos, Nigeria. 75 (13), 477-501.
- ANONYMOUS (1989): Guidelines for dog rabies control. WHO. VPH/83. 43 Rev. 1, 5, 15.
- ANONYMOUS (1990): Guidelines for dog population management. WHO. WHO/ZOON/90165.
- BOULGER, L. R., J. HARDY (1960): Rabies in Nigeria. *W. African Med. J.* 9, 223.
- EZEBUIRO, E. O., A. H. FAGBAMI, V. O. ANOSA (1980): A survey of rabies in man and animals in Nigeria. A study commissioned by Federal Livestock Department, Federal Ministry of Agriculture. Lagos, Nigeria. pp. 142.
- LOMBARD, M., C. CHAPUIS, B. CHOMEL, T. D. DE BEUBLAIN (1988): Three years of serological and epidemiological results after a rabies dog vaccination campaign in Lima, Peru. *Proc. of the Int. Conference on epidemiology, control and prevention of rabies and brucellosis in Eastern and Southern African Countries.* Nov. 23-25, 1988. Garborone. pp. 71-79.
- NAWATHE, D. R., J. BANERJEE, E. N. OKEKE, J. N. TIYAGNET (1981): Production and use of avianised rabies vaccine in Nigeria. *Int. J. Zoon.* 8, 1-4.
- NURU, S. (1973): Epizootiology of canine rabies and its public health significance in Kano State, Nigeria. *Nig. Vet. J.* 2, 49-54.
- OGUNKOYA, A. E., L. A. WILL, C. O. EZEOKOLI (1984): Rabies in Oyo State, Nigeria 1971-1984. *Int. J. Zoon.* 11, 84-95.
- OKOH, A. E. J. (1989): Epizootiological analysis of antigenic variations of street rabies virus from Nigeria - detection by monoclonal antibodies. *Trop. Vet.* 7, 78-88.

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evaluation (1988-1992) in Nigeria

- RADOSTITS, O. M., D. C. BLOOD, C. C. GAY (1995): Veterinary Medicine, 8<sup>th</sup> ed. ELBS.
- SYLLA, D., V. PALYA (1993): Status of Panvac project activities. PANVAC vaccine Bulletin 3, 2-5.
- TEULIERES, L. N., M. AJJAN, ROUMIANTZEFF, P. SALIOU (1988): Prevention of human rabies. In: Proc. of the Int. conference on Epidemiology, control, and prevention of rabies and brucellosis in Eastern and Southern African Countries. November 23-25, 1988. Garborone. pp. 81-93.

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**ADEYEMI, I., K. ZESSIN: Pregled vrednovanja cijepljenja pasa protiv bjesnoće (1988.-1992.) na Sveučilištu u Ibadanu u Nigeriji. Vet. arhiv 70, 223-230, 2000.**

**SAŽETAK**

Analizirani su zapisnici o cijepljenju protiv bjesnoće i neke pojedinačne bilješke za 755 pasa u Klinici za male životinje i preventivnu veterinarsku medicinu Sveučilišta u Ibadanu u Nigeriji od siječnja 1988. do prosinca 1992. godine, da bi se utvrdila pokrivenost cijepljenjem protiv bjesnoće i dosljednost docjepljivanja. Tijekom pet godina protiv bjesnoće je cijepljeno 276 (36,5%) od 755 registriranih pasa. Odgovarajući broj cijepljenja s obzirom na dob obavljen je na 182 (65,9%) od 276 cijepljenih pasa. Međutim, odgovarajuće cijepljenih pasa, bilo je 149 (približno 82%) u prvotnoj dobi za cijepljenje. Od 84 psa, koji su trebali biti docijepljivani samo 50 (59,5%) ih je dobilo odgovarajuće doze dodatnog cjepiva. Razmatrani su nedovoljna pokrivenost pasa cijepljenjem, problemi kontrole urbane bjesnoće, te utjecaj na javno zdravlje u Ibadanu, najvećem gradu u zapadnoj Africi.

**Ključne riječi:** urbana bjesnoća, pokrivenost pasa cijepljenjem protiv bjesnoće, kontrola bjesnoće, javno zdravlje, Ibadan, Nigerija

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