Update on onchocerciasis-associated epilepsy in Cameroon

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First International workshop on onchocerciasis-associated epilepsy

12-14 October 2017, Antwerp, Belgium

Institut de Recherche pour le Développement
FRANCE
French National Research Institute for Sustainable Development

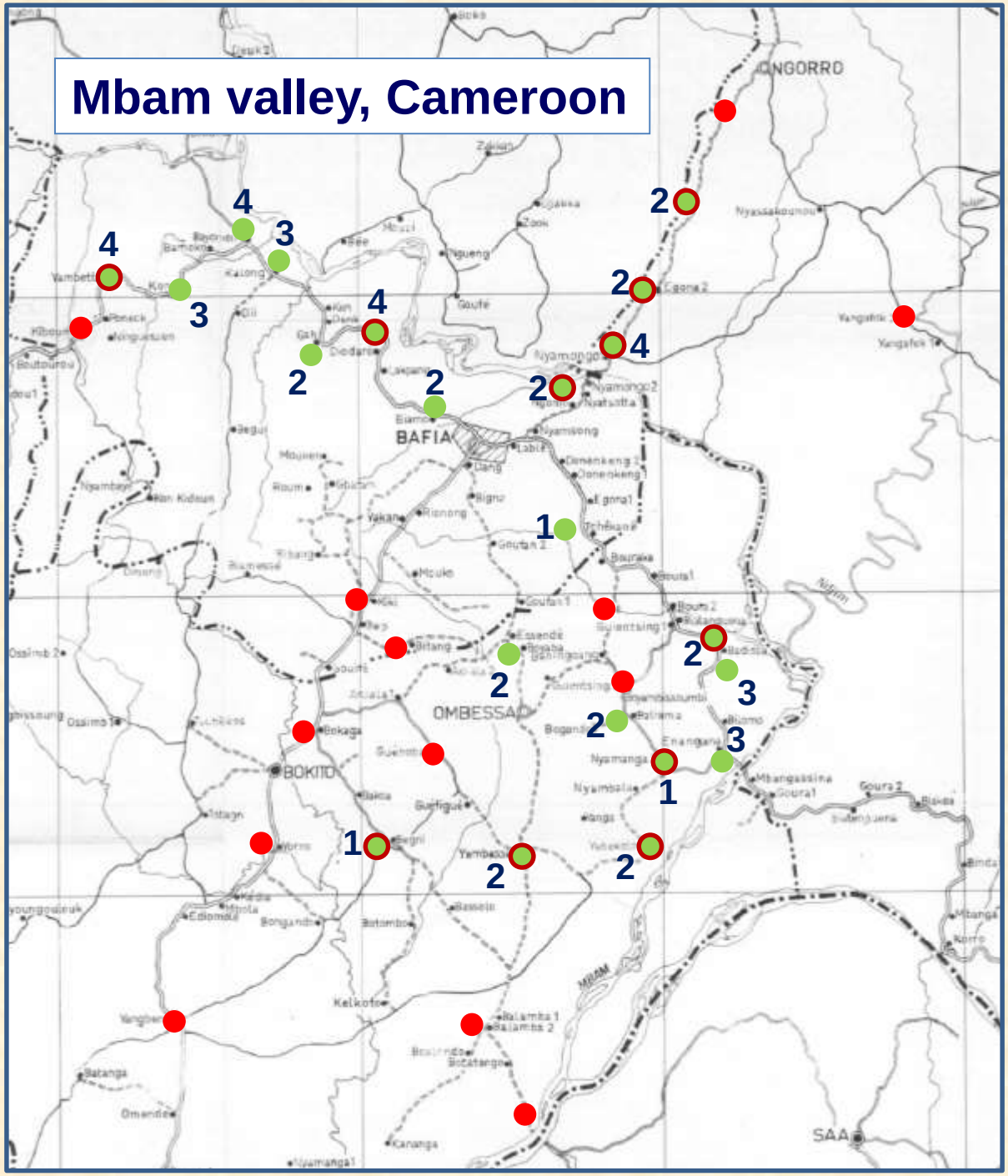
What was known before 2017

Surveys in the Mbam valley (1991-1993)

- Onchocerciasis survey alone
- Epilepsy census alone
- Oncho & Epil survey

Prevalence of epilepsy

1 = low	< 1%
2 = moderate	1 – 2.5%
3 = high	2.5 – 6%
4 = very high	> 6%



What was known before 2017

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE (2002) 96, 537–541

Relationship between onchocerciasis and epilepsy: a matched case–control study in the Mbam Valley, Republic of Cameroon

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Analyses at community level

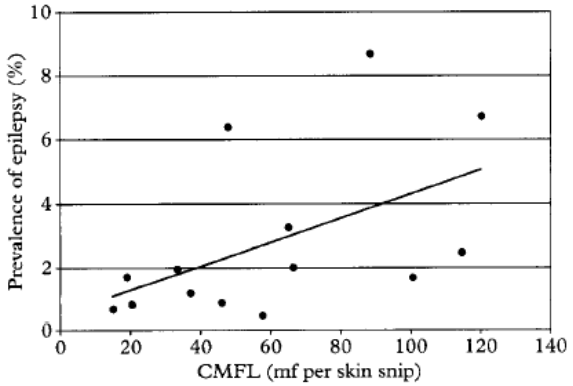

Fig. 1. Relationship between the prevalence of epilepsy (%), and the level of endemicity for onchocerciasis, as assessed by the community microfilarial load (CMFL), in 14 villages of the Mbam Valley (Cameroon). mf, *Onchocerca volvulus* microfilariae.

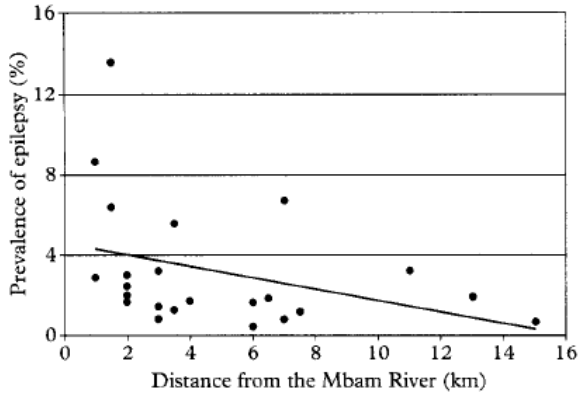

Fig. 2. Relationship between the prevalence of epilepsy (%), and the distance to the Mbam River, for the 23 villages of the Mbam Valley (Cameroon) where an exhaustive census of the epileptic individuals has been conducted.

Case-control study (72 PWE and 72 matched controls)

	No (%) mf+	Mean (Arith) mf/snip	Mean (Geo) mf/snip	Median mf/snip
PWE	71 (98,6)	288	148	216
Controls	68 (94,4)	141	45	63

What was known before 2017

Meta-analyses

- **At community level (2009)**
- **At individual level (2013)**

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PLOS NEGLECTED TROPICAL DISEASES

Epilepsy in Onchocerciasis Endemic Areas: Systematic Review and Meta-analysis of Population-Based Surveys

Sébastien D. S. Pion[1]*, Christoph Kaiser[2], Fernand Boutros-Toni[3], Amandine Cournil[1], Melanie M. Taylor[4], Stefanie E. O. Meredith[5], Ansgar Stufe[6], Ione Bertocchi[7], Walter Kipp[8], Pierre-Marie Preux[3], Michel Boussinesq[1]

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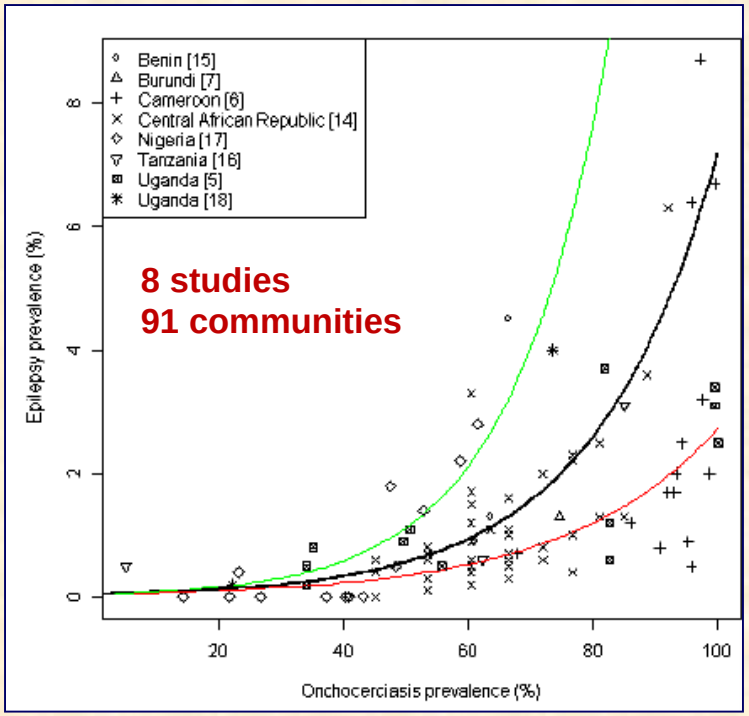
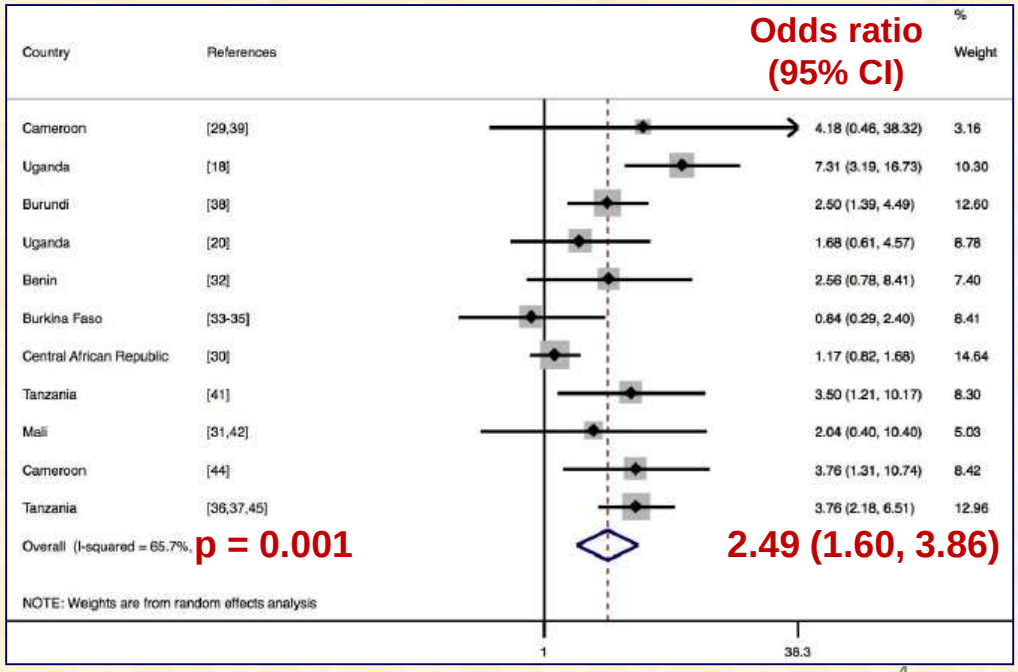
PLOS NEGLECTED TROPICAL DISEASES

Case-control Studies on the Relationship between Onchocerciasis and Epilepsy: Systematic Review and Meta-analysis

Christoph Kaiser[1]*, Sébastien D. S. Pion[2], Michel Boussinesq[2]





What was known before 2017

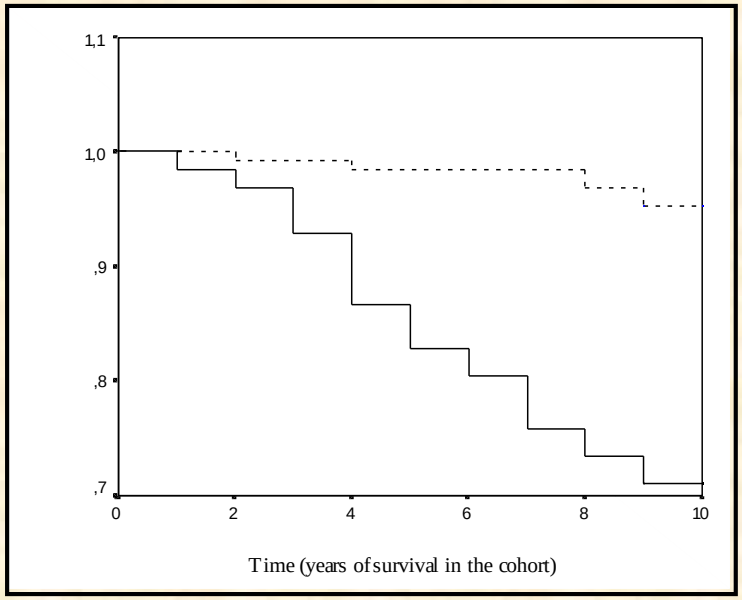
Demographic impact

(Kamgno et al., *Epilepsia* 2003)

128 PWE and 128 matched controls

10-year follow-up

- **Excess mortality**



- **Impact on nuptiality and fecundity**

Many Nakalanga cases

(Boussinesq et al., unpublished)

Studies in 2017 (1) Incidence study

- In 1991-1993, skin *O. volvulus* mf densities had been measured in thousands of people aged ≥ 5 years in the Mbam valley
- In 2017, 7 villages with various initial infection intensity (CMFL) were revisited to collect information on the vital status (live v. dead) and the occurrence of epilepsy for all 858 individuals who had been examined in 1991-1993 at the age of 5–10 years
- The classical 5-item questionnaire developed in Limoges was used to identify suspected cases of epilepsy
- A multi-variate analysis was conducted to assess the association between the occurrence of a suspected epilepsy and four factors (gender, age, CMFL and individual mf density in 1991-1993)
- Information could be obtained from the subjects themselves or from their family for 731 individuals (85.2%)

Studies in 2017 (1) Incidence study

- 60 cases of suspected epilepsy occurred between the initial and 2017 surveys and the incidence rate was 3.1 / 1,000 (60/19.075 PY)
- Initial individual mf density was very significantly associated with the occurrence of epilepsy

Factor	Categories	Incidence rate ratio	95% CI	p
Age (ref: 5 y.o.)	6	0.55	0.33-0.91	0.019
	7	0.71	0.46-1.11	0.132
	8	0.66	0.28-1.56	0.343
	9	0.45	0.22-0.91	0.027
	10	0.43	0.14-1.35	0.149
Sex (ref: female)	male	1.15	0.74-1.90	0.535
CMFL (ref: low)	medium	0.81	0.36-1.84	0.618
	high	1.33	1.04-1.69	0.021
individual	1-12.5	8.56	1.30-56.96	0.026
mf density	13-64.5	11.83	4.51-31.04	0.001
(ref: 0 mf/snip)	≥65	26.31	4.01-172.40	0.001

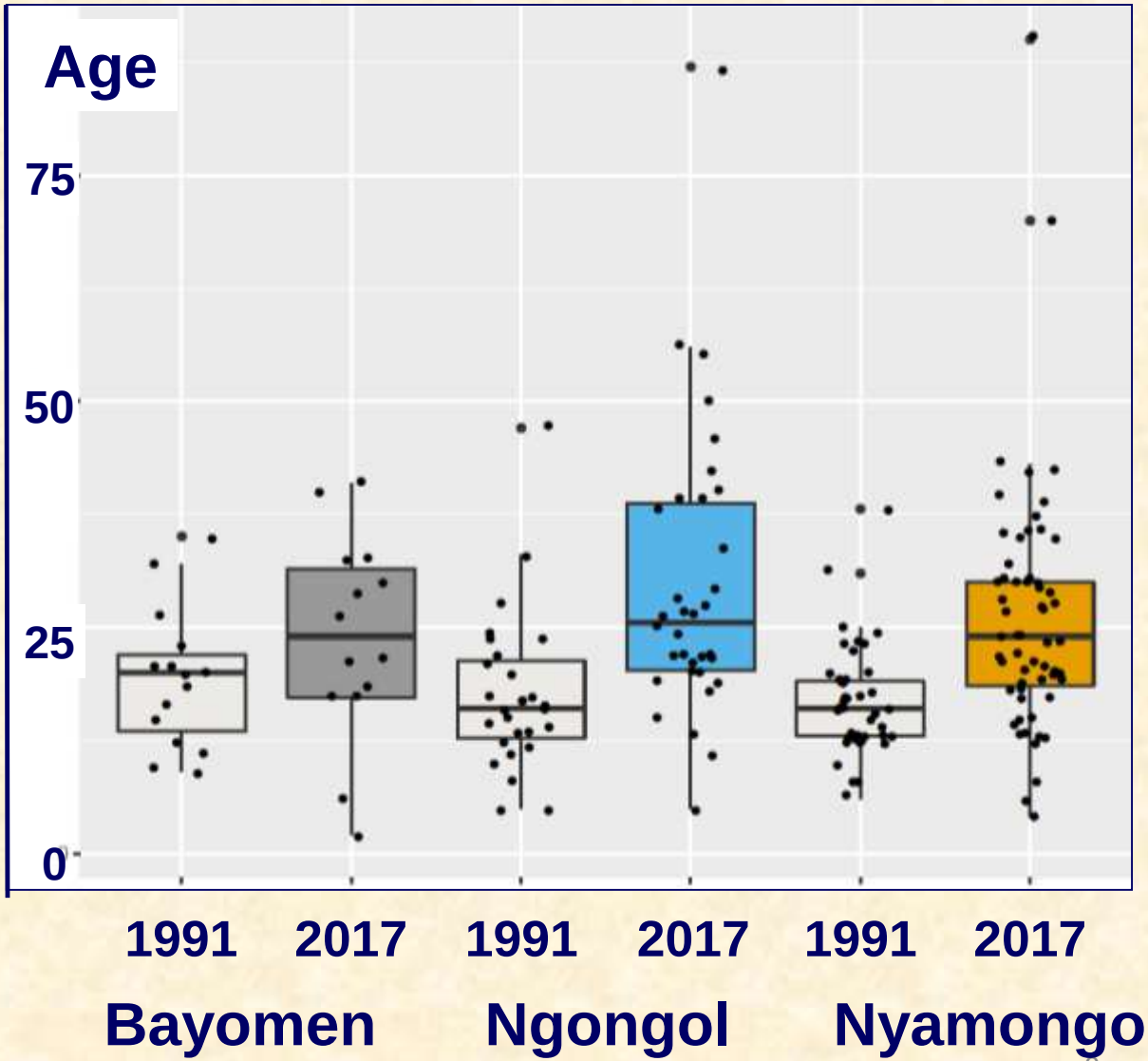
Studies in 2017 (2) Prevalence study

- A census of PWE using key informants was conducted in 21 villages in 1991-1993. Three of them were selected to measure the prevalence of epilepsy in 2017, using a door-to-door strategy
- In Bilomo, door-to-door surveys were conducted both in 1998 and 2017
- In 2017, the prevalence had not decreased significantly in three of the four villages, where it remained still very high

Village	Prevalence in 1991-1993 or 1998 (%)	Prevalence in 2017 (%)	p
Bayomen	13.6	2.5	0.001
Ngongol	8.7	6.6	0.335
Nyamongo	6.4	5.4	0.418
Bilomo	4.9	4.6	

Studies in 2017 (2) Prevalence study

- A very marked shift towards higher ages in the population of PWE between the early 1990s and 2017
- Probably due to the community-directed treatment with ivermectin which started in 1998



Studies in 2017 Conclusions

- The first longitudinal study on the relationship between oncho and epilepsy was conducted in the Mbam valley, Cameroon
- the *O. volvulus* microfilarial density in childhood in the early 1990s constituted a major risk to develop an epilepsy later on
- This might suggest that the association between the two conditions is due to a direct effect of the parasite, and not (only?) to autoimmunity phenomena, as suggested recently
- The age shift in the population of PWE suggest that MDA with ivermectin, by decreasing the *O. volvulus* mf densities, led to a decrease in the incidence of epilepsy
- Typical cases of nodding syndrome were identified for the first time in Cameroon and are being further investigated

Acknowledgements

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– and many others