Epileptic seizures in rural Africa
- prevalences and causes-

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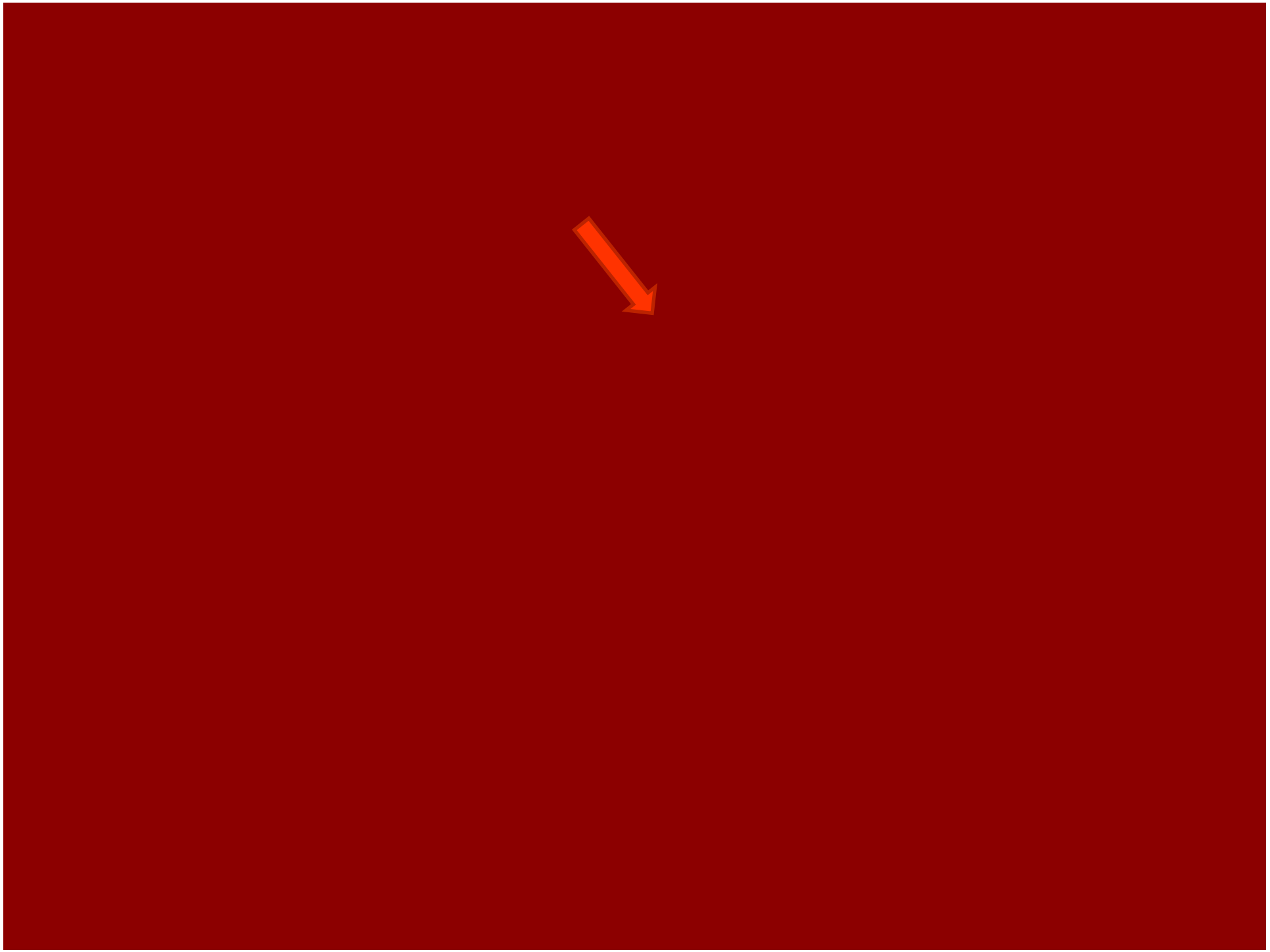
Epilepsy in Africa

- **50 million** people worldwide suffer from epilepsy; 90% live in low-income countries (WHO 2001).
- In sub-Saharan Africa **12 million** people live with epilepsy.

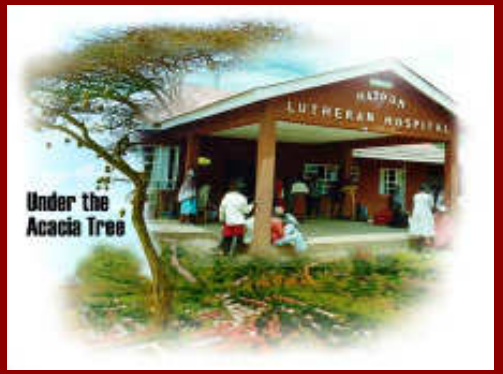
Approach to epilepsy in Africa

- Hospital-based study: idea of the size of the problem
- Community-based study: determination of exact prevalence
- Epilepsy clinic: reaction to the needs of the population under investigation



Epilepsy in Tanzania

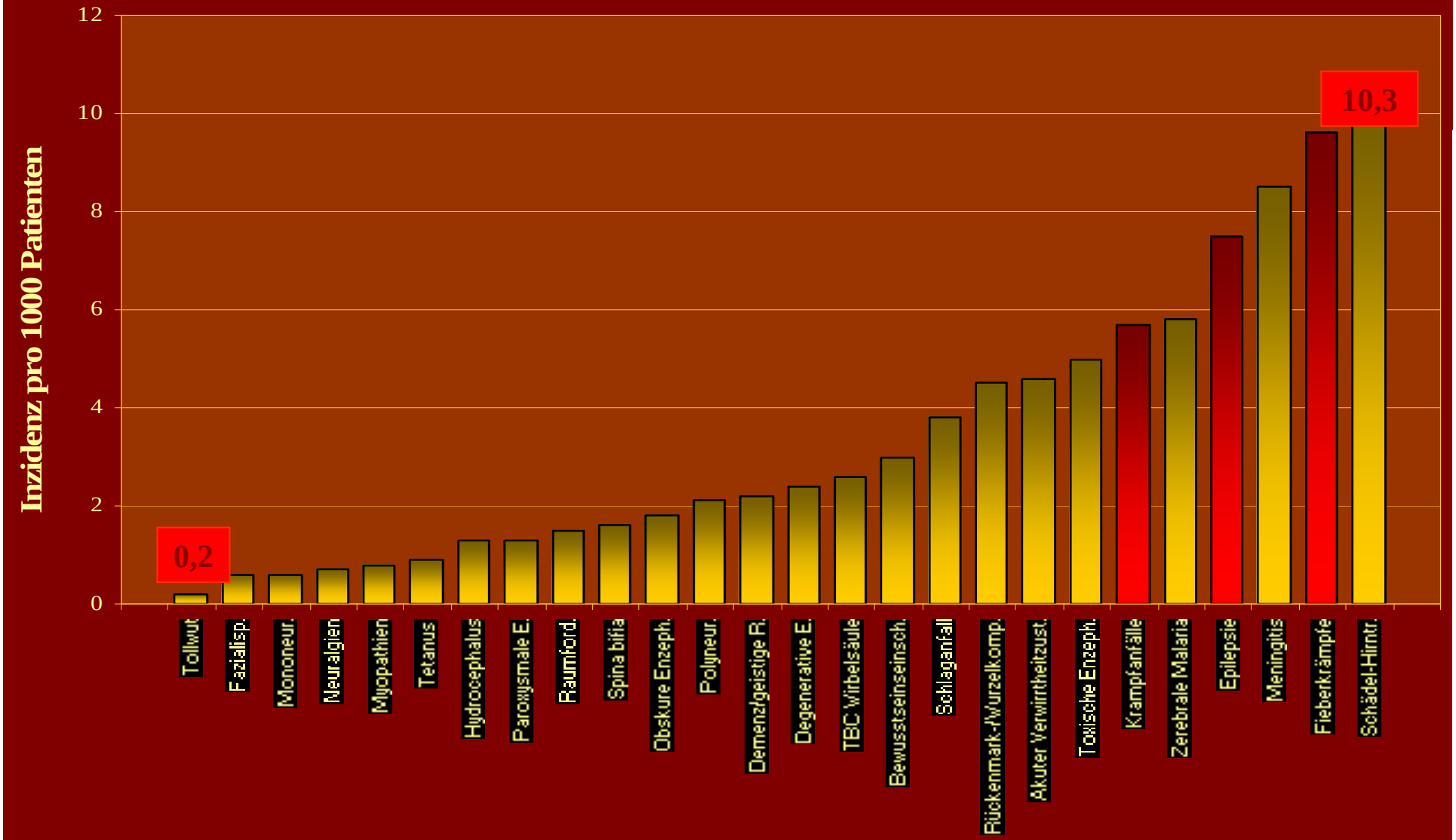
- Hospital-based study



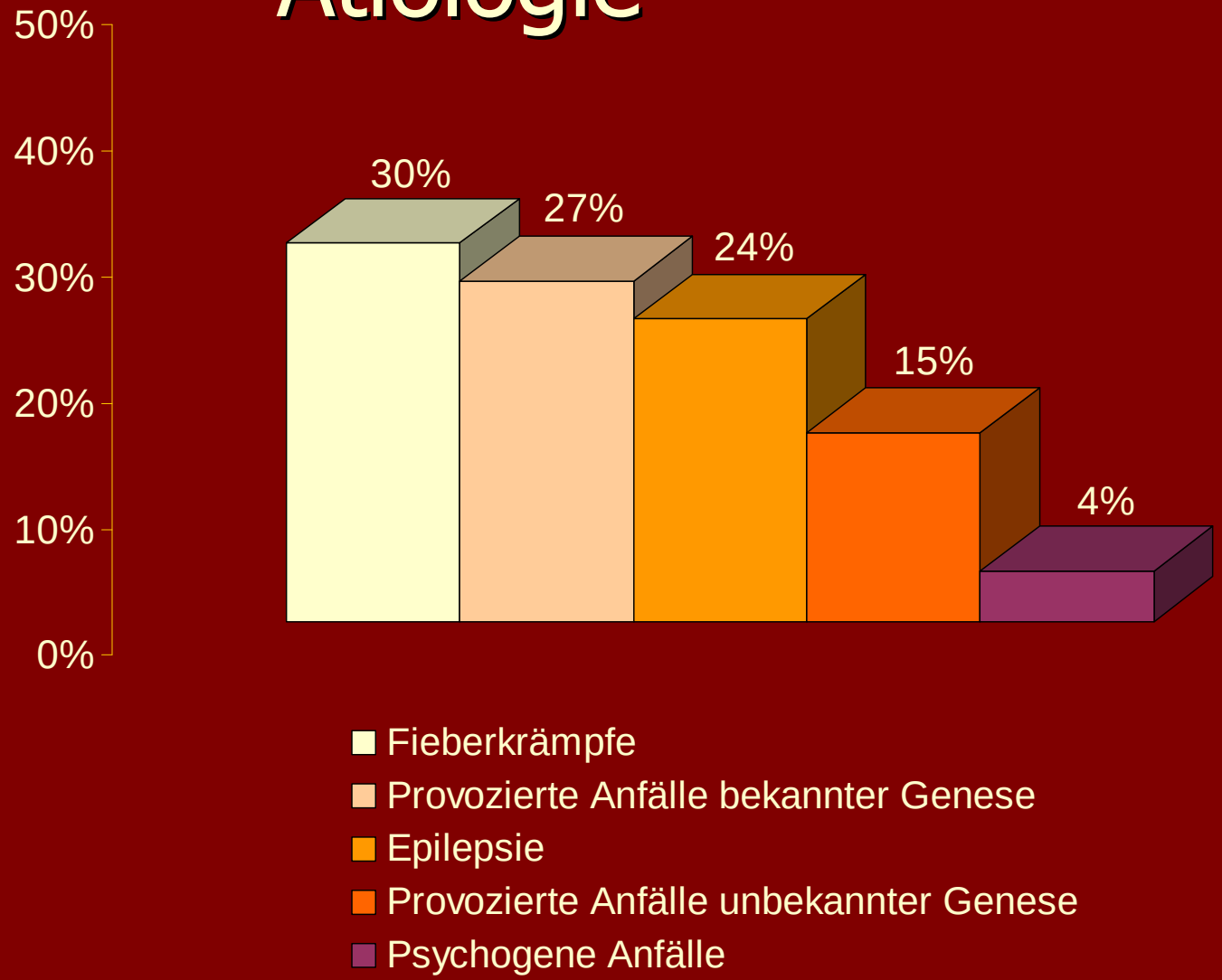
Hospital-based study

- Prospective cross-sectional study
- Period: overall 9 month 2002-2003
- 8676 patients presenting to the hospital were screened.

Prevalence of neurological disorders (n=740)



Ätiologie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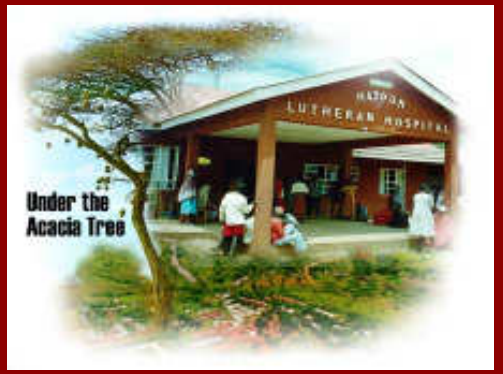
Fieberkrämpfe
Provozierte Anfälle bekannter Genese
Epilepsie
Provozierte Anfälle unbekannter Genese
Psychogene Anfälle

Epilepsy in Tanzania

- Community-based study



Community-based study: aims

- Determination of prevalence of epileptic seizures/epilepsy
- Comparison with results of other studies
- Aetiology
- Assurance of therapy
- Information of population

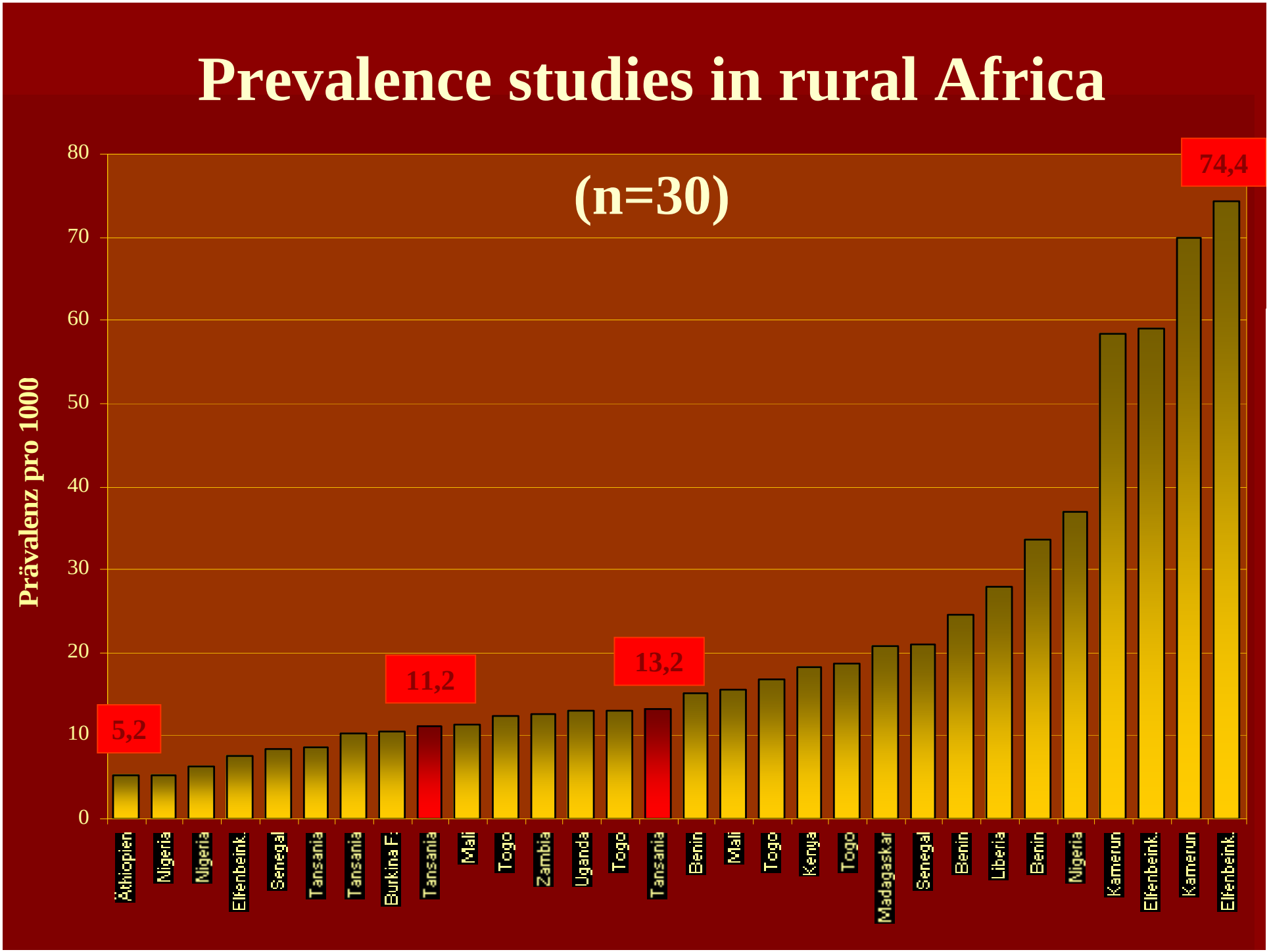
Results I

- 7399 people were recruited into the study.
- 142 people screened positive for epileptic seizures.
- 83 people had epilepsy (confirmed by re-interview and examination).
- 64 people suffered from active epilepsy.

Results II

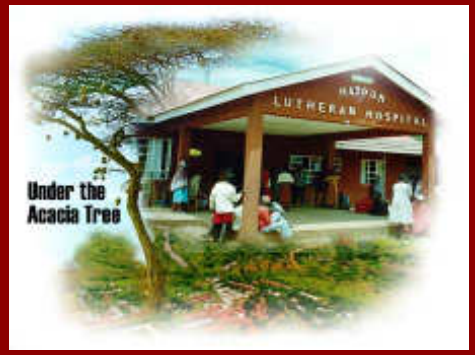
- Point prevalence: 11.2/1000 (CI 8.9-13.9)
- Age-adjusted prevalence: 13.2/1000
- Prevalence of epilepsy in high-income countries: 4-8/1000 (Forsgren 2005)

Prevalence studies in rural Africa



Epilepsy in Africa

- Reaction to the needs of the population – the Epilepsy Clinic



The Epilepsy Clinic

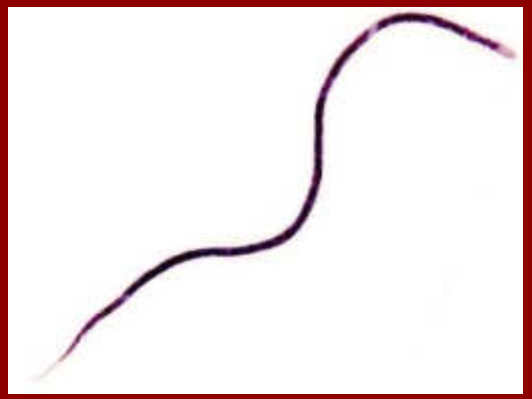
- Consecutive recruitment of 346 patients with epilepsy
- Period: 25 months (August 2002 - September 2004)
- Collection of data by means of standardized protocols

Special aspects of epilepsy in Africa

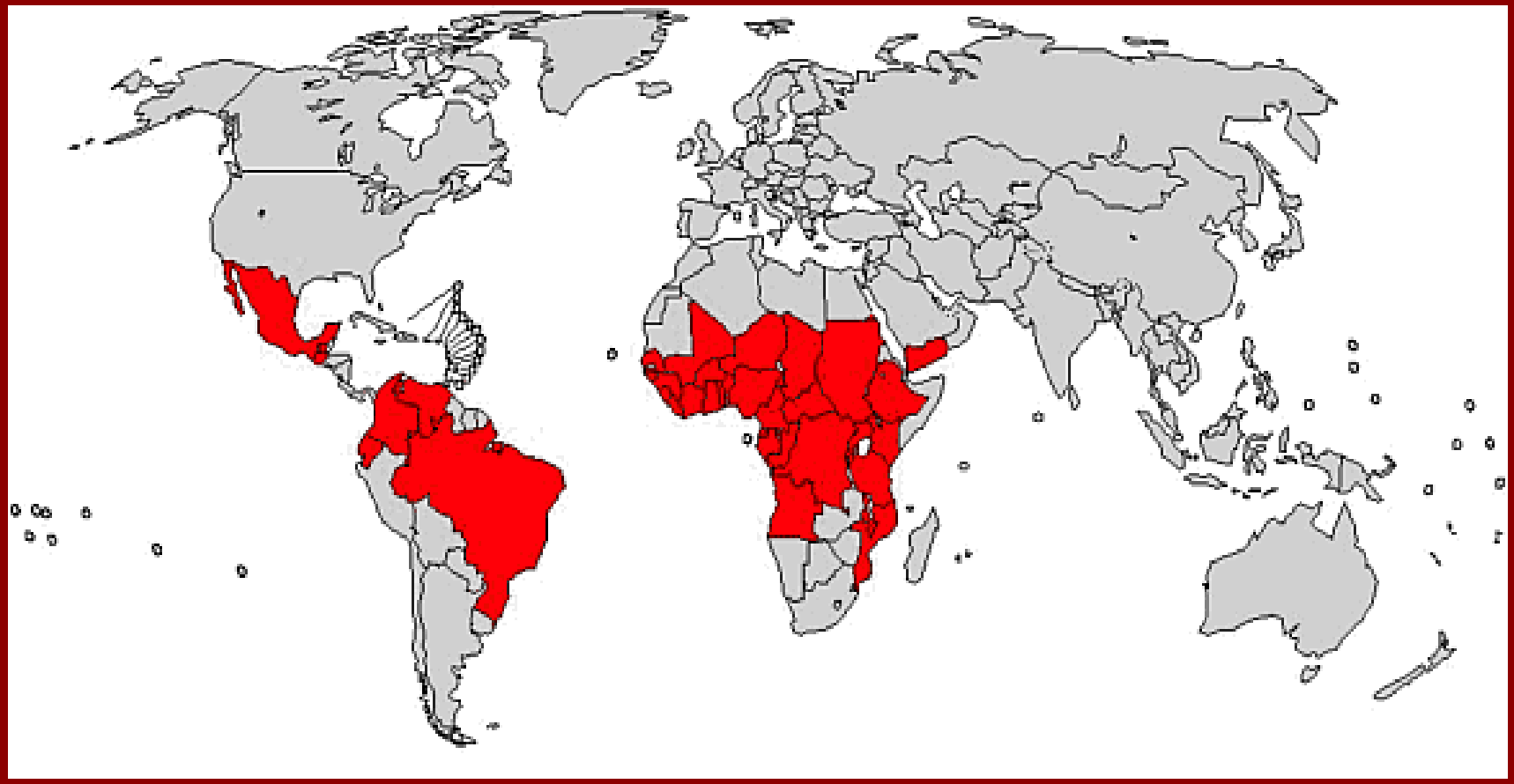
- Different causes (e.g. infections, perinatal brain damage)
- Limited diagnostic means (no EEG, CT, MRI)
- Few specialized clinics
- Few specialized personnel
- Limited medications

Special causes of epileptic seizures in sub-Saharan Africa

- Onchocerciasis (chronic infection with the filarial worm *Onchocerca volvulus*)



Distribution of onchocerciasis



Courtesy WHO (http://www.who.int)

Epidemiology and clinical features of onchocerciasis

- 37 million people infested with *O. volvulus* in Africa, 500.000 permanently blind (=river blindness)
- Subcutaneous nodules around adult worms (onchocercoma), dermatitis, lymphadenitis and ophthalmological pathologies, epilepsy ???
- *O. volvulus* savanna-type und forest-type with different clinical pattern

Life cycle of *Onchocerca volvulus*

Courtesy Department of Parasitic Diseases: CDC's website for parasite identification; http://www.dpd.cdc.gov/dpdx.

Onchocerca dermatitis

Onchocerciasis and epilepsy

Link prevalence of onchocerciasis and epilepsy:

1) Positive:

Mexico

Sudan

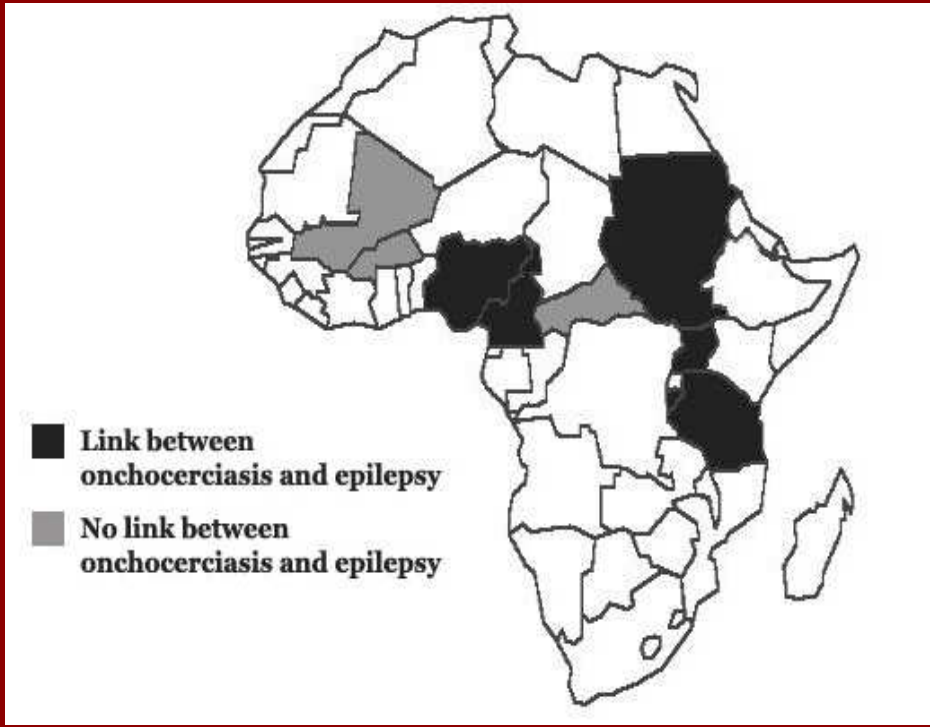
Uganda

Burundi

Tanzania

Cameroon

Nigeria



2) Negative:

Burkina Faso

Central African Republic

Mali

Hypothesis

- *O. volvulus* or its microfilariae can migrate into the brain and cause epileptic seizures.
- *Kipp et al. 1976* in Cameroon demonstrated microfilariae in CSF in 5 of 8 patients (before treatment with Ivermectin).
- All patients were heavily infested and in addition had ophthalmological symptoms/signs.
- Most patients with microfilariae in CSF suffered from the savanna-type.

Own results

- Study site: Mahenge, southern Tanzania (*O. volvulus* forest-type)
- Analysis of CSF with *O. volvulus* PCR in 199 patients

1) 127 with epilepsy und onchocerciasis
2) 60 with epilepsy only
3) 12 with onchocerciasis only

Own results

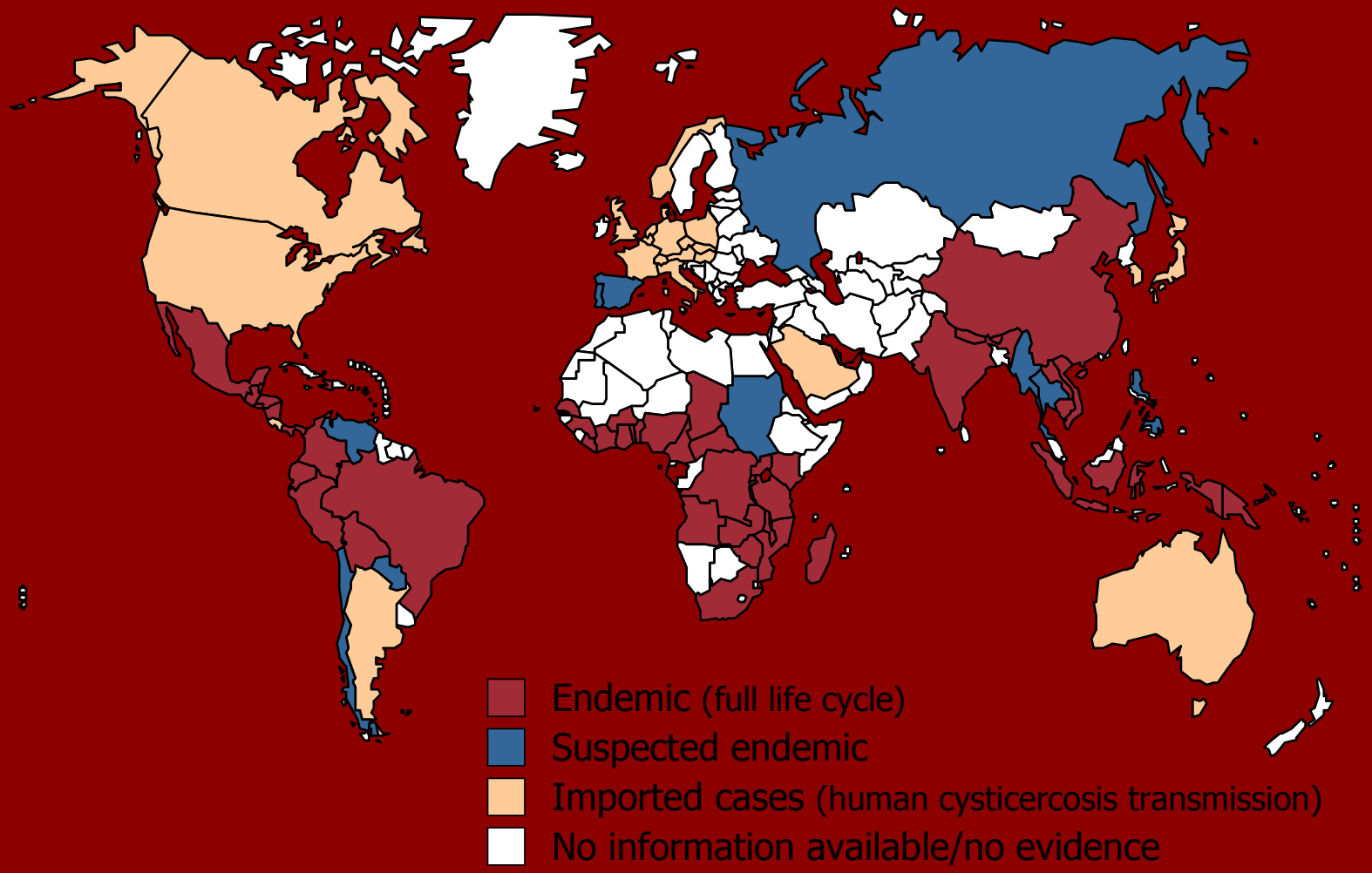
- No signs of an inflammatory syndrome
- *O. volvulus* PCR negative
- *O. volvulus* antibody index negative

But: significant link between positivity of *O. volvulus* skin-PCR and MRI lesions in selected patients

Special causes of epileptic seizures in sub-Saharan Africa
- Neurocysticercosis (NCC) -

- Cysticercosis (chronic infection with larval stage of *Taenia solium*)

Distribution of cysticercosis



Roman et al. 2000, updated by designated country managers

Epidemiology of neurocysticercosis

- Morbidity:

- 50 million people worldwide suffer from human cysticercosis. (WHO 2005)

- 2-3 million people in sub-Saharan Africa have epileptic seizures/epilepsy caused by NCC.

  (Preux et al. Neurological Infections and Epidemiology1996)

- Mortality:

  Worldwide 50.000 death/year

  (Roman et al. Bull WHO 2000)

Clinical characteristics cysticercosis

- Neurological symptoms, such as epileptic seizures/epilepsy (= neurocysticercosis)
- Ophthalmological pathologies
- Subcutaneous nodules around larvae of *T. solium* (cysticercoma)

Own results

- Study site: Haydom, northern Tanzania
- Ab-ELISA and CT in 212 people with epilepsy and 198 controls

- 13.7% NCC in people with epilepsy
- 2% NCC in controls

(Winkler et al. Epilepsia 2009)