**_Taenia solium_ elimination versus control: what is the best way forward for Sub-Saharan Africa?**

*Taenia solium* taeniosis/cysticercosis is a neglected zoonotic parasitic disease complex with significant economic and public health impacts, occurring primarily in developing countries. As a final host, humans are the carriers of the tapeworm (taeniosis, TS); the normal intermediate pig host develops the metacestode larval stage (porcine cysticercosis, PCC). However, people can also act as accidental intermediate hosts and develop human cysticercosis (HCC) or neurocysticercosis (NCC) when the central nervous system is involved. In Zambia, recent results from a study carried out by the proposers indicate over 50% of cases of acquired epilepsy are due to NCC.

The scattered efforts of researchers into evaluation of control programmes in Sub-Saharan Africa (SSA) have focussed on single control options. It is becoming clear that these stand-alone options have the potential to reduce the occurrence of the parasite, however either long term or more integrated efforts seem to be required to reach an elimination status. This has never been studied, and these hypotheses are based on a disease transmission model that still needed to be improved. Also, the costs of the interventions have hardly been calculated. No large-scale studies according to the Peruvian example (elimination was achieved in a large scale study in a low endemicity area using integrated control tools) have been carried out in SSA, where they are most needed (high endemicity).

The objective of the current study is to evaluate the cost-effectiveness/acceptability of elimination (to be achieved on a short term via integrated measures), and control (single measures, with an elimination goal on a longer term) of *T. solium* in a highly endemic area in SSA.

The specific objectives are:
To conduct a large scale intervention study to evaluate the elimination and control option.

- Is the integrated system of elimination possible under the African conditions of disease transmission?
- What is the cost and cost-effectiveness of both systems?
- What is the perception/acceptability of the proposed measures by the local communities?
- Does an intensive elimination program have an added value over a simple control strategy in SSA?
- What are the economics related to pig keeping and the economic impacts of *T. solium* on both individual and societal levels?
- What is the impact of a computerised health education package on *T. solium*-related knowledge, attitudes and practices in school-going children?

A systematic review was carried out to a) determine which control tools are currently available and have been evaluated both on a cost-effectiveness and local acceptability level; and b) select the most promising strategies. Simultaneously, the current disease transmission model was optimised, using available data. The selected strategies were firstly pre-tested in the disease transmission model, and will now be implemented in the large-scale intervention study. This intervention study will entail an elimination study arm in which multiple control options are combined (integrated) aiming at the final human host (MDA and health education) and pig intermediate hosts (pig treatment and vaccination). In a second study arm a single control option will be carried out (pig treatment). In both study arms (health) education will be implemented. At baseline and in the final sampling year, prevalence of human taeniosis/cysticercosis and porcine cysticercosis will be determined in all study villages. Active ongoing surveillance and 6 monthly (biannual) human and pig sampling will be conducted in the elimination study arm, as well as two-yearly (biennial) sampling of the pig intermediate host ('sentinel' animals) in the control study arm. Additionally, (open ended) questionnaires and focus group discussions will be administered/held to obtain data on the cost of pig keeping, *T. solium*, the interventions and the perception/acceptability of the proposed control measures to the local communities.

This will lead to results on effectiveness, cost and acceptability of the proposed control measures, and to a conclusion on the best way forward for *T. solium* control and/or elimination in SSA.

At the completion of the study, it is expected that the following will be demonstrated:

- Elimination of *T. solium* occurrence is possible under the sub-Saharan African conditions of disease transmission using an integrated approach.
- *T. solium* control and elimination methods have a significant impact on disease occurrence.
- Integrated intervention methods have a higher impact on *T. solium* transmission, than a single control measure.
- *T. solium* has a significant socioeconomic impact on the local endemic communities.
- Local acceptability of control and elimination measures in endemic communities is variable and dependent on a number of factors
- Use of the interactive educational program 'The Vicious Worm' in school-aged children has a significant impact on knowledge of *T. solium* in school-going children in endemic communities.

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