

# CURRENT KNOWLEDGE ON EPIDEMIOLOGY AND CONTROL OF SLEEPING SICKNESS

by

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**Summary.** — African trypanosomiasis (sleeping sickness) occurs in some 200 known foci within tsetse inhabited areas in sub-saharan Africa, where an estimated 50 million people are at risk of acquiring infection. Only 25,000 new patients are reported each year but this is an underestimate. Where medical surveillance was inadequate or lacking, serious epidemics could occur and this potential risk makes the disease one of the serious health problems in sub-saharan Africa. The chronic *gambiense* form of sleeping sickness occurs in West and Central Africa, while the acute *rhodesiense* form occurs in East and Southern Africa. Recent advances in science have improved knowledge on the epidemiology of the disease and provided tools for improved diagnosis, treatment and vector control. The current strategy for control of the disease is based upon continuous suppression through diagnosis and treatment and limited vector control with community participation. Nevertheless, long-term solution to the problem of African trypanosomiasis lies in effective land-use management and rural development.

## 1. Introduction

African trypanosomiasis (sleeping sickness) is a parasitic disease caused by trypanosomes transmitted by various species of tsetse (*Glossina*). The disease occurs in some 200 known foci within areas inhabited by tsetse. It is estimated that some 50 million people in rural Africa are exposed to tsetse bites and run the risk of acquiring infection, but only about 15 million currently have access to health services capable of diagnosing trypanosomiasis, or are protected by tsetse control activities. If left untreated, the disease is fatal. Approximately 25,000 new cases are reported annually, but this is an underestimate (8). The true estimate must be higher due to failures in diagnosis and inadequate reporting. Experience has shown that, where medical surveillance was inadequate or lacking, serious epidemics could occur, which are difficult and costly to control and have long-term social and economic consequences. This potential risk of epidemics makes African trypanosomiasis one of the serious health problems in sub-saharan Africa.

There are two forms of sleeping sickness: the chronic form due to *Trypanosoma brucei gambiense* occurring in West and Central Africa and the acute form due to *T.b. rhodesiense* which occurs in East and Southern Africa. The epidemiology and transmission of sleeping sickness is affected by an intricate interrelationship between humans, the parasite and tsetse and a number of environmental factors.

Transmission cycles can be classified according to the causative species of trypanosome and hence, *T.b. gambiense* (*gambiense*) and *T.b. rhodesiense* (*rhodesiense*) forms exist. In the *gambiense* form, the classical man-fly-man cycle occurs. Man is an important reservoir of infection due to

the long prepatent period of the disease and the initially mild symptoms. By means of biochemical techniques and DNA analysis, trypanosomes similar to those occurring in humans have been identified in domestic animals: dogs (3, 9), pigs (4), sheep (6), wild animals: kob (*Kobus kob*) and hartebeest (*Alcelaphus bucelaphus major*) (4). However, the significance of these reservoir hosts in the transmission of the disease is not clear. It is possible that fly-game-fly and fly-domestic animal-fly cycles also exist and that the link hosts to the man-fly-man cycle are the bushbuck (*Tragelaphus scriptus*) which lives in close proximity to human habitation and the domestic pig.

The *rhodesiense* form may occur in endemic (savanna) and epidemic (domestic) cycles. In the former, savanna species of tsetse (*Glossina morsitans*, *G. swynnertoni* and *G. pallidipes*, which feed preferentially on wild animals, transmit the disease. A wide variety of wild animals have been described as reservoir of *T.b. rhodesiense*. Man becomes infected when he intrudes on tsetse infested areas and hence, the disease is an occupational hazard for hunters, fishermen, honey collectors and road builders. Infection, therefore, occurs predominantly in men. The bushbuck (*Tragelaphus scriptus*), an important reservoir host, may also constitute a link host between the savanna and domestic cycles, in view of its proximity to human habitation. Among domestic animals, cattle is an important reservoir of infection (1, 5) and dogs (2).

In epidemic situations, man-fly-man and/or domestic animal-fly-man cycles of transmission occur. *G. fuscipes fuscipes*, a lacustrine species, which has become adapted to peridomestic situations along the shores of Lake Victoria in East Africa, is an efficient vector and the disease is equally distributed in men, women and children. The role of cattle as reservoir of infection has been described in Alego, Kenya (5), and Busoga, Uganda (2).

## 2. Control Strategy

The current strategy for the control of sleeping sickness is based on the diagnosis and treatment of infection and, where applicable, limited vector control (7):

### 2.1. Medical surveillance

A regular medical surveillance is an indicator of the local epidemiological situation and provides an early warning of increase in prevalence. Furthermore, it reduces the reservoir of infection in humans and allows early detection and treatment of infected individuals and hence avoids the complications due to late-stage disease.

### 2.2 Treatment

Once diagnosis has been confirmed, patients must be treated. Three drugs currently available have more or less adverse side effects. Until recently, only melarsoprol has been available for late-stage disease. However,

a new drug, Ornidyl® (difluoromethylornithine) has provided dramatic cure for *gambiense* disease and holds promise for the chemotherapy of sleeping sickness.

### 2.3. Vector control

The objective of tsetse control for the prevention of sleeping sickness is to reduce man-fly contact. Simple devices such as traps, screens and targets are best suited for this purpose and are acceptable to the rural communities. However, under epidemic conditions, transmission may be reduced by one or a combination of the following methods of tsetse control: groundspraying of insecticides, simple trapping devices or, where applicable, aerial application of insecticides, preferably by helicopter.

## 3. Conclusions

In spite of recent advances in the development of new tools for the control of sleeping sickness, it is evident that no permanent solution is feasible in the near future. Due to the phenomenon of antigenic variation, immunization against trypanosomes is not feasible at present and the eradication of tsetse is not feasible either due to reinfestation. It has long been recognised that long-term solution to the problem of African trypanosomiasis lies in effective land-use management and rural development. In the short term, the choice of control methods depends upon a sound knowledge of the local epidemiological situation, available personnel and their technical skill, structure of the health services, and available financial resources.

Acknowledgments. — *La présente étude a bénéficié du soutien financier du Programme spécial PNUD/Banque mondiale/OMS de Recherche et de Formation concernant les Maladies tropicales.*

### Connaissances actuelles en épidémiologie et contrôle de la maladie du sommeil.

*Résumé.* — La trypanosomiase africaine (maladie du sommeil) est endémique dans quelques 200 foyers dans la région sub-saharienne où sévissent les mouches tsétsé. Une population de 50 millions de personnes court un risque d'être infectée. Seulement 25,000 nouveaux patients sont rapportés chaque année mais ce chiffre est sous-estimé. Là où la surveillance médicale était inadéquate ou manquante, des sérieuses épidémies pouvaient se déclarer et ce risque potentiel fait de cette maladie un sérieux problème de santé en Afrique sub-saharienne. La forme chronique de la maladie du sommeil à *gambiense* se trouve en Afrique de l'Ouest et en Afrique Centrale, alors que la forme aiguë à *rhodesiense* se trouve en Afrique de l'Est et du Sud. De récents progrès en science ont amélioré les connaissances à propos de l'épidémiologie de la maladie et ont fourni les moyens pour l'amélioration du diagnostic, du traitement et du contrôle des vecteurs. La stratégie actuelle pour le contrôle de la maladie est basée sur la suppression continue au travers du diagnostic et du traitement et du contrôle limité de vecteurs avec la participation communautaire. Néanmoins, une solution à long terme au problème de la trypanosomiase africaine dépend d'une exploitation efficace de la terre et du développement rural.

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