Commentary: Sleeping sickness—a growing problem?

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This Ugandan sleeping sickness research is timely.[1] After five years of intensified control, the human African trypanosomiasis landscape has changed. Before 2000, the sleeping sickness epidemic was spreading in Africa. Approximately half a million people living in the poorest areas were expected to be infected by this killer disease. Early detection of cases, before the parasites start to destroy the central nervous system, is essential for effective treatment. This is the only way to avoid using existing potent drugs (melarsoprol) or drugs that are very difficult to administer in remote areas (eflornithine requires an infusion every six hours for 14 days). In 2000, the availability of drugs was threatened and the treatment of patients challenged. The establishment of a large programme based on ensuring access for populations to health facilities, diagnosis, and treatment was conceived. This led to a long term donation of drugs—pentamidine, melarsoprol, eflornithine (Sanofi-Aventis), and suramin (Bayer)—with access to financial support (from Sanofi-Aventis, France and Belgium), which led to a drastic reduction in epidemics, assisted in the training of technicians, and ensured an efficient drug supply system, as well as promoting the use of the most efficient diagnostic tools and mobilising the international community.[2][3] Considering the achievements made in the area of control of sleeping sickness, leading to a current reduction of new cases and increase of surveillance activities, the International Scientific Council for Trypanosomiasis Research and Control (at its 28th conference in Addis Ababa in September 2005) recommended that WHO "Launch an elimination programme of sleeping sickness, to adapt control strategies towards this goal and advocate partners who have permanently provided support to maintain their efforts and assistance."

Elimination of sleeping sickness as a public health problem through use of existing tools for diagnosis and treatment can be considered achievable. However, owing to the lack of safe oral drugs to treat both early and late stages of the disease, the integration of control activities in basic health system might be impossible and may lead to a non-sustainable elimination as it has been seen in the past.[2]

The key for the integrated management of the disease by local health facilities is the availability of very simple cheap diagnostic tools and safe oral drugs to treat both *Trypanosoma brucei rhodesiense* and *T b gambiense*. Finding new diagnostics and drugs will be the key for an achievable and cost effective sustainable elimination. But as a down side of success, entry into the elimination stage might cause control of sleeping sickness to be seen as less of a major public health problem. A low priority is being given to the disease and its research and development.[3] The main challenge today is to avoid creating a situation in which the re-emergence of the disease might occur, after huge efforts had been expended in achieving a situation in which we are close to its elimination.

In this context, the Ugandan case is of great interest,[1][4] because the possible overlap of *T b rhodesiense* and *T b gambiense* could provoke big difficulties for the diagnosis and treatment of patients, taking into account the fact that no easy way exists to identify the two strains of parasites.[5] It could also provoke a high burden because the treatments are different.[2] A close surveillance of this phenomenon is a priority. In addition, as cattle are the main reservoir of *T b rhodesiense*, this should encourage authorities to treat cattle systematically to avoid new epidemics.[4] This kind of large mass chemotherapy for cattle will be advantageous if done in partnership with the medical sector.

Competing interests: None declared.

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Entry screening for severe acute respiratory syndrome (SARS) or influenza: policy evaluation

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The appearance of severe acute respiratory syndrome (SARS) and recent outbreaks of avian influenza have raised the question of how best to protect the population of England and Wales from such infections. Entry screening is at present of unknown benefit.

We assess the possible benefit of entry screening for SARS and pandemic influenza should an epidemic occur.

Methods and results

Throughout this analysis, we assume that effective exit screening is in place, that symptomatic patients will not

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Predicted percentage of initially asymptomatically infected individuals (detectable cases) arriving in the United Kingdom from the most common sources of international passengers, who would be expected to develop symptoms en route

| | Mean % of individuals symptomatic on arrival (range) | | No of airports | No of seats available/day |
	SARS	Influenza		
Europe	1 (0-3)	4 (1-9)	35	86 001
Middle East	3 (2-4)	10 (7-12)	8	6986
Africa	4 (3-5)	12 (10-15)	4	3751
North America	4 (3-9)	13 (10-23)	13	28 918
East Asia	6 (4-9)	17 (12-23)	12	12 489

be allowed to board flights, and that the value of entry screening is to detect people who develop symptoms in flight.

We estimated the incubation periods for influenza and SARS from published sources.[1][2] We used these distributions to estimate the proportion of individuals with initially latent SARS and influenza infection developing symptoms during a flight from any of the top 100 sources of international airline passengers to the United Kingdom, given information on the mean duration of a direct flight from these destinations (www.britishairways.com/travel/schedules/public/en_gb). For influenza, given an overall prevalence of individuals with latent infection, we used existing transmission models[2] to estimate the proportion expected to have been infected one, two, or more days previously, during the increasing phase of the epidemic. We back calculated corresponding proportions for SARS from the incidence of infection in Hong Kong at the start of the epidemic.

For SARS, the probability of in-flight progression rises slowly with the duration of the flight. During a six hour transatlantic flight, an infected passenger would have a 0-11% chance of progression, depending on the time since infection. Between 1% and 21% of such infected individuals arriving from East Asian cities (10 hour flight) would be expected to be detected.

Influenza has a much shorter incubation period than SARS, so the probability of progression during the flight is higher. A passenger infected two days before departure would have a 50% chance of progression during a 10 hour flight. As most flights are of much shorter duration, the mean predicted proportion of people infected with influenza and progressing during the flight was less than 10%. The proportion of infected individuals detected is highest from cities with the longest flight duration (table). Screening passengers from the Far East and Australasia therefore derives the most benefit. Even then, the sensitivity for cities in these areas would still be low.

Comment

Entry screening is unlikely to be effective in preventing the importation of either SARS or influenza. The incubation period for SARS is too long to allow more than a small proportion of infected individuals to progress to symptomatic disease during a flight to the UK from any destination. Removing a maximum of 9% of infected individuals will have a negligible impact on the course of any subsequent epidemic. The proportion of individuals infected with influenza that is potentially detectable by screening is larger but still small, and most would be missed. The short period between generations of cases of influenza means that it

would take little time for those missed by screening to infect secondary cases, replacing those detected.

We have ignored the possibility of in-flight transmission. Such transmission has been documented for SARS as well as influenza.[3-5] However, because time would be insufficient for new secondary cases to develop symptoms and become detectable by screening, this omission will tend to overestimate rather than underestimate the proportion of infected individuals detected by entry screening. Adopting a policy of quarantining all exposed passengers on the detection of a single case could, however, substantially increase the benefit of entry screening. However, this still leaves the principal problem that the sensitivity of entry screening is low.

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What is already known on this topic

In the event of a new SARS or influenza epidemic, air travel would represent the principal route of international spread

Airport entry screening has been advocated, but not formally evaluated as a means of protecting populations from these infections

What this study adds

Entry screening is unlikely to be effective in preventing or delaying an epidemic resulting from the importation of SARS or influenza