Creating an enabling environment for sustained efforts on human African trypanosomiasis elimination

Khartoum, 8th September 2013.
Outline

• Describe the historical framework which has led us to talk about elimination of the sleeping sickness

• Describe the context in which this elimination is built-in

• Describe the challenges and roadblocks need to be overcome

• Describe the knowledge gaps and technical gaps that we need to solve
New cases reported and supporting frame

- 300,000 estimated cases
- 20,000 estimated cases

Yearly distribution of reported cases:
- Rhodesiense HAT 2%
- Gambiense HAT 98%
New cases reported and supporting frame

- WHA resolution for reinforcement of surveillance and control
- WHO public-private partnership
- Lome Declaration. Launch PATTEC.
- WHA resolution for HAT elimination
- HAT included in WHO NTD road map
- WHO NTD STAG
- DEC meeting on HAT elimination
- WHO HAT Expert Committee
- WHA NTD resolution
- Elimination of HAT as public health problem in 2020
- Elimination of HAT as zero cases
- Elimination of HAT as public health problem in 2020, but zero cases in 2030
- HAT eliminated in WHO/AFRO Committee and ISCTRC

Number of cases reported

Year

HAT elimination: Objectives

Goal of WHO Roadmap:

“To eliminate gambiense HAT as a public health problem” by 2020. This is an intermediate step, defined as <1 new case in 10,000 inhabitants in at least 90% of foci, with < 2000 cases reported annually at continental level.

Final goal of WHO and DEC:

"To interrupt transmission of gambiense HAT"
This is a sustainable final step, defined as reduction to zero of the incidence of infection caused by gambiense HAT in endemic countries. Continued actions will be required to prevent re-establishment of the disease.

Being a zoonosis, the elimination of rhodesiense HAT as the total interruption of transmission of rhodesiense HAT is not feasible at this time.
Considerations

The generic term of HAT covers different epidemiological situations in relation to the two forms of the disease.

Control and elimination strategies are defined according to the epidemiological settings, being flexible and dynamic enough to be adapted to:
- the disease progress
- the changes affecting the local health services.

HAT is a focal disease and the strategies have to be defined for each focus as the different foci have different patterns instead of country level.

The unit to plan interventions is the village according to its own epidemiological status.
5 million people at risk

234,000 km² at risk
14.5 million people at risk
460,000 km\(^2\) at risk
37.5 million people at risk
687,000 km² at risk
Grey settings

There are still some areas that need further investigation to assess disease intensity transmission

- known active foci with difficult access due to topography or to security constraints.
  \(\textit{need to assess intensity of transmission}\)

- foci which have not reported cases in the last decades and have no effective surveillance system (Gambia, Guinea-Bissau, Liberia, Niger, Senegal and Sierra Leone).
  \(\textit{need to verify or not the absence of transmission}\)
Risk of *T. b. gambiense* infection
[No. cases/inhabitants/year]
- Very high \( (\geq 1/10^2) \)
- High \( (<1/10^2 \text{ to } \geq 1/10^3) \)
- Moderate \( (<1/10^3 \text{ to } \geq 1/10^4) \)
- Low \( (<1/10^4 \text{ to } \geq 1/10^5) \)
- Very low \( (<1/10^5 \text{ to } \geq 1/10^6) \)

Risk of *T. b. rhodesiense* infection
[No. cases/inhabitants/year]
- High \( (<1/10^3 \text{ to } \geq 1/10^4) \)
- Moderate \( (<1/10^3 \text{ to } \geq 1/10^4) \)
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32th ISCTRC Conference
Khartoum, 8th - 12th September 2013

1,430,000 people at high risk
10,900,000 people at moderate risk
22,000 people at high risk
1,430,000 people at moderate risk
10,900,000 people at low risk

1,600 km^2 at high risk
23,600 km^2 at moderate risk
145,900 km^2 at low risk

Risk of *T. b. gambiense* infection
[No. cases/inhabitants/year]

- Very high: \( \geq 1/10^2 \)
- High: \(<1/10^2 \text{ to } \geq 1/10^3 \)
- Moderate: \(<1/10^3 \text{ to } \geq 1/10^4 \)
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Predicted distribution of tsetse flies (Genus: *Glossina*)
Gambiense HAT elimination: Feasibility

- *T. b. gambiense* is epidemiologically vulnerable. Humans are the significant reservoir.
- Proof of principle exists.
- Scope and geographic distribution of infection is limited.
- Detailed knowledge of the geographical distribution of infection.
- New test for individual screening could expand the diagnosis and surveillance within the health system.
- Treatment of all cases detected ensured by donations from pharma.
- New compounds under development could facilitate the involvement of health system.
- There is commitment and political will for HAT elimination.
Gamblense HAT elimination strategies

To combat gamblense HAT, it is necessary to appropriately combine four classical HAT control elements:

- Active case-finding through mobile teams,
- Passive case-finding involving available health facilities and
- Vector control to reduce the tsetse population.
- Treatment of detected cases.

The selection of the most appropriate combination and “dosage” of each method has to rely on

- the precise understanding of the epidemiological setting, including geographical and demographical data,
- the accessibility and capabilities of the existing health facilities and
- vector knowledge including the sites where vector control must be applied and methods to be utilized
## Control and surveillance approaches in gambiense HAT

<table>
<thead>
<tr>
<th></th>
<th>High prevalence (&gt; 1 / 1,000)</th>
<th>Moderate prevalence (&gt; 1 / 10,000)</th>
<th>Low prevalence (&gt; 1 / 100,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active screening</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile team</td>
<td>Every year</td>
<td>Every other year according to villages</td>
<td>N.A. (Reactive screening)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Passive screening</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>health care facilities</td>
<td>Permanent (extended)</td>
<td>Permanent</td>
<td>Permanent (sentinels sites)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vector control</strong></td>
<td>According to medical results</td>
<td>According to medical results</td>
<td>N.A.</td>
</tr>
</tbody>
</table>
Villages reporting ≥1 new case during the previous 3 years

- Active survey by mobile team every year
- Selective surveillance
- Vector Control in selected sites

New case

Villages reporting 0 cases during the previous 3 years but ≥1 new case during the previous 5 years

- Active survey by mobile team every 3 years
- Selective surveillance
- Vector Control in selected sites

New case

Villages reporting 0 cases during the previous 5 years

- No active survey
- Selective surveillance in sentinel sites

New case

No new case in 3 years

New case

No new case in 3 years

New case

No new case

All villages reporting 0 cases during the previous 5 years by mobile team or sentinel site

Request verification of elimination

International Validation Group
Rhodesiense HAT elimination: Feasibility

Being a zoonosis with domestic and wild animals as reservoirs, the elimination of rhodesiense HAT as the total interruption of transmission is considered as not feasible at this time.
To combat rhodesiense HAT, "One health" approach is required: That means to combine the different methods available in a multisectoral approach:

- Control of animal reservoir: Chemotherapy curative or prophylactic for livestock and domestic animals (not applicable in wild animals)
- Vector control, using the different tools available (traps and screens, insecticide treated cattle, spraying, SAT, SIT, …)
- Passive case-finding involving available health facilities
- Active screening when appropriate
## Control and surveillance approaches in *rhodesiense* HAT

<table>
<thead>
<tr>
<th></th>
<th>Areas with wild animals as main reservoir</th>
<th>Areas with cattle as main reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active screening Mobile team</strong></td>
<td>N.A. (applicable in some areas?)</td>
<td>N.A.</td>
</tr>
<tr>
<td><strong>Passive screening health care facilities</strong></td>
<td>Reinforced</td>
<td>Reinforced</td>
</tr>
</tbody>
</table>
| **Vector control**           | Key element                              | Important element  
- *Cattle selective insecticide impregnation* |
| **Cattle treatment**         |                                         | Key element                         |
Meeting on gambiense HAT elimination

Focal points of 14 SSNCP
Experts from WHO HAT CC and WHO HAT Expert Committee

WHO HAT Expert Committee

Control and surveillance of human African trypanosomiasis
Report of a WHO Expert Committee
Gambiense HAT elimination: Indicators

Progress toward elimination will be measured by two quantitative indicators updated annually:

- Number of cases reported
- Number of foci declared as eliminated

Qualitative indicators, to assess the quality and extent of the elimination activities:

- Rate of population at risk covered by control and surveillance activities
- Progress of population at different levels of risk
Gambiense HAT elimination: Essentials

In a turmoil free environment, elimination of gambiense HAT requires

- **Ownership by endemic countries of the objectives and process of elimination.** Policy-makers should prioritize elimination of gambiense HAT as a health objective when competing with other national priorities.
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- **Capacity of the health system in rural areas to implement control and surveillance activities.** The overall performance of the health system in rural areas where gambiense trypanosomiasis is prevalent is often characterized by unskilled staff, low attendance and low coverture. Therefore it must be reinforced to perform the activities included in the elimination strategies.
Gambiense HAT elimination: Challenges

- *Improving knowledge of current gaps in geographical distribution.* No data are available in several foci, mainly due to difficult access and an absence of effective surveillance.

- *Elucidating the role of seropositive/aparasitaemic human cases and healthy carriers in maintaining transmission of the disease.*

- Understanding fully the epidemiological role of *animal reservoir* on Gambiense trypanosomiasis transmission.

- *Sustainability* of the elimination process as essential to detecting the epidemiological risk of disease reintroduction.
Gambiense HAT elimination: Research gaps (I)

Screening, diagnosis and staging

- The current screening tools (CATT and rapid test) are based in the same antigen and there is a ceiling in the production of antigen. New screening tools using new antigens easy to produce are needed.

- The staging of HAT to define the treatment to be used is based in the analysis of CSF obtained by lumbar puncture. Tests for stage determination in blood or urine are encouraged.
Gambiense HAT elimination: Research gaps (II)

Treatment

- The current therapeutic schemas are complex to use with a cumbersome logistics distribution and having non-negligible safety concerns. Safe, if possible oral, drugs which are active against both disease forms and both stages are easy to use, are required.
Epidemiological knowledge

- Additional indicators and modeling tools for estimating location and the proportion of undetected cases have to be developed.

- The feasibility of detection of *T. b. gambiense* in vectors should be explored as a potential xeromonitoring tool for use in elimination of gambiense HAT.

- Operational research aimed at integrating HAT into existing health systems, and optimizing passive case detection, surveillance and management for HAT in these systems, is encouraged.
A lot of progress in HAT control has been achieved but the last beat is still not in the scope.