Economic analysis of visceral leishmaniasis control in Sudan

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LEAP LEISHMANIASIS EAST AFRICA PLATFORM

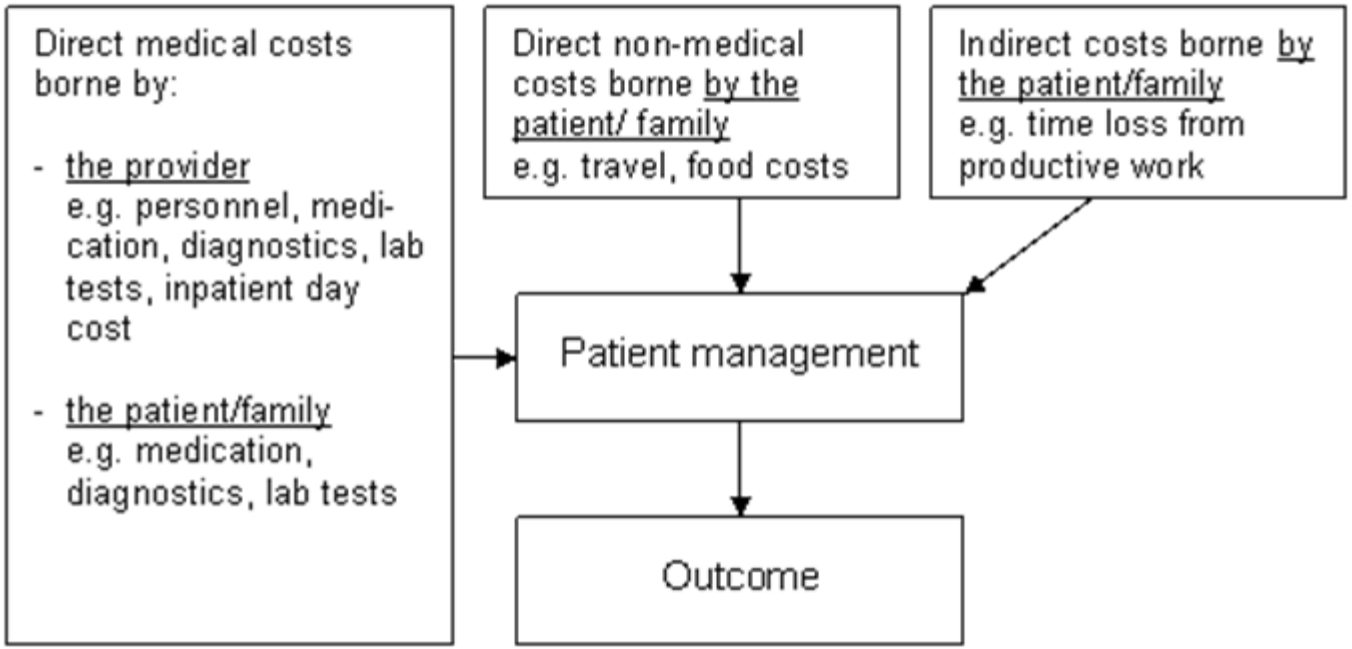
Ongoing economic studies

- Currently there are 2 economic studies ongoing in Gedaref State with the following aims:

1. To estimate the economic burden of VL on affected households
2. To estimate the cost and cost-effectiveness of treatment for VL with a particular focus on combination therapies

Study 1: The economic burden of VL

- This study will examine the costs associated with VL from the viewpoint of the health sector and the patient.
- These costs include:



Source: Meheus et al. 2006

Methods (i)

- The economic burden to the patient is the result of direct costs of seeking and obtaining care as well as costs associated with a reduction in productivity (i.e. income losses).
- This study will provide a better understanding of:
  - The VL patient management process in Sudan;
  - The diagnostic delay and the steps that can be taken to reduce the time between first presentation to a health facility and correct diagnosis;
  - The costs incurred by households to access treatment, especially the non-medical and indirect costs (transport, income loss, etc.).

Methods (ii)

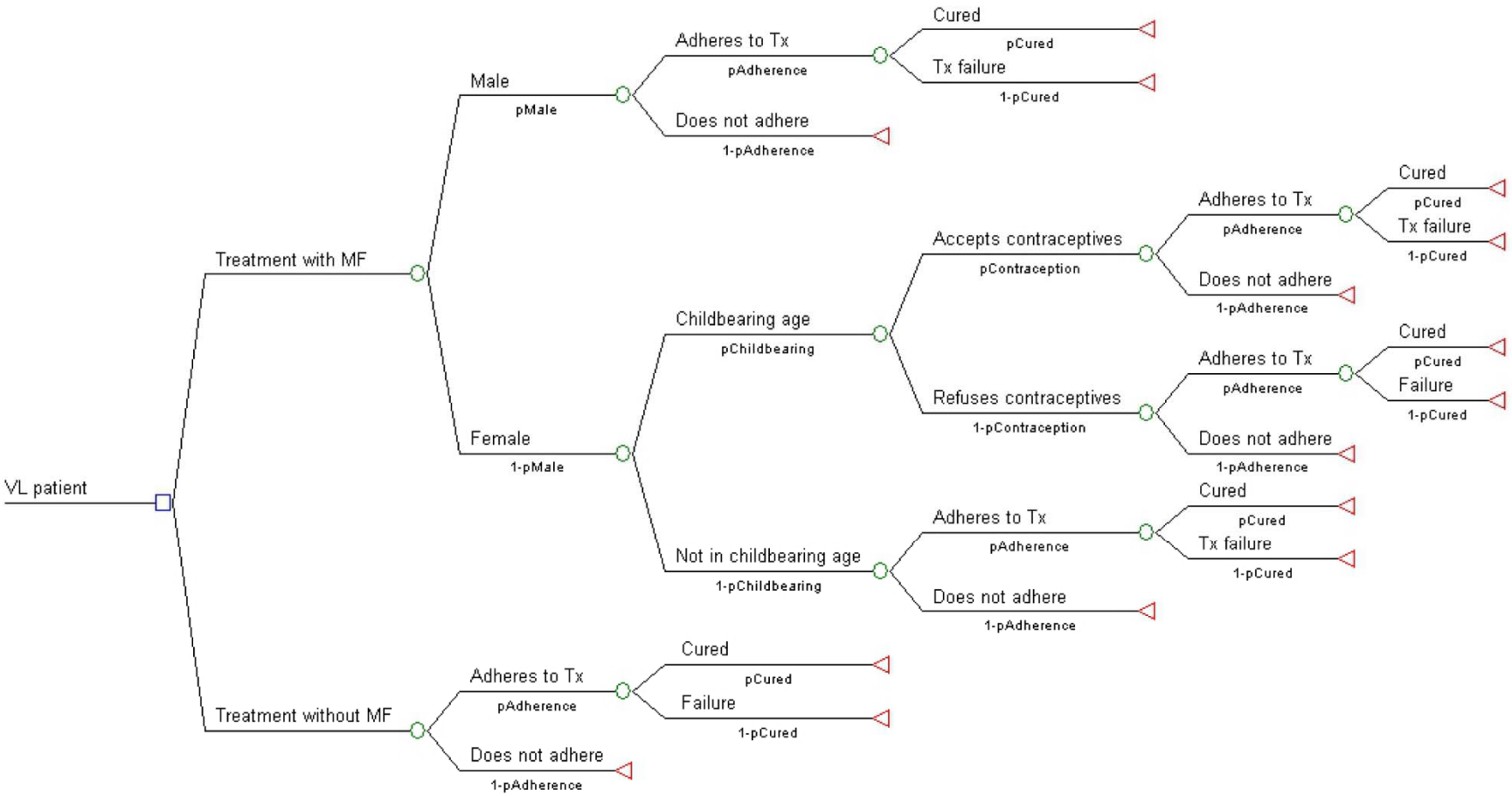
- Provider costing of 3 health facilities to estimate the cost per inpatient bed/day.
- Hospital exit survey; the survey collects information on:
  - The healthcare seeking behaviour of VL patients;
  - The direct (medical & non-medical) costs incurred;
  - The indirect costs resulting from illness and treatment (i.e. loss of income);
  - The strategies to cope with the cost of illness & treatment.
- So far, 15 patients have been interviewed; the aim is to interview approximately 120-150 patients.

Study 2: Cost-effectiveness analysis

- A model is constructed comparing the cost and outcome of combination and monotherapies used in Sudan at the individual level.
- The model is based on a decision tree
- The health outcome of treatment is reported in "natural units", namely in terms of number of deaths averted

  → Cost-effectiveness analysis
- The model determines the outcome of receiving VL treatment at a public healthcare facility and performed with reference to the outcome of a single confirmed patient.

Root decision tree with different pathways depending on whether miltefosine was included in the strategy



Treatment strategies

- The treatment strategies included in the study are:

	Strategies	Dosage	Duration
1	Lip. Amphotericin B & Miltefosine	L-AmB: 10 MK total dose & MF: 50/100 MKD	Day 1 Day 2-11
2	Lip. Amphotericin B & SSG	L-AmB : 10 MK total dose SSG : 20 MKD	Day 1 Day 2-11
3	SSG & Paromomycin	SSG : 20 MKD PM : 15 MKD	Day 1-17 Day 1-17
4	Lip. Amphotericin B	10 MKD single shot	Day 1
5	Lip. Amphotericin B	3 MKD	Day 1-10
6	SSG	20 MKD	Day 1-30
7	Miltefosine	50/100 MKD	Day 1-28
8	Glucantime	20 MKD	Day 1-20

Treatment efficacy (preliminary)

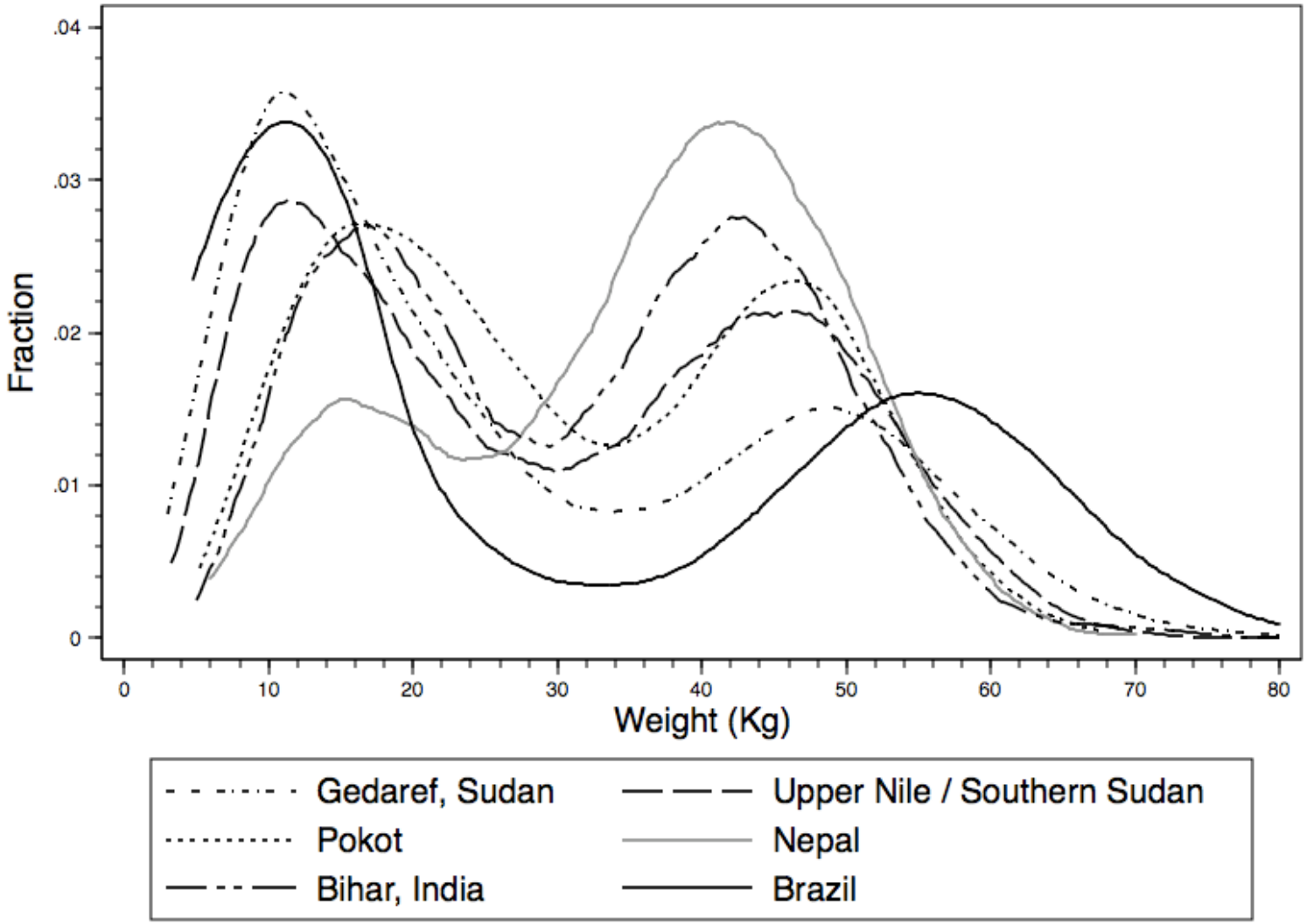
- Values estimated from literature and Delphi survey (round 1)

	Base	Low	High
L-AmB + MF	95	90	96
L-AmB + SSG	95	90	96
SSG + PM	94	90	96
L-AmB 10MKD sd	80	70	89
L-AmB 30MKD	96	90	98
SSG	94	90	96
MF	94	90	95
Glucantime	93	90	95

Costs

- Study from societal perspective; both provider and patient costs are included:
  - Provider costs: cost to provide VL treatment services to patients by the public/private not-for-profit sector.
    - Costing done in three sites: 1 public hospital, 1 public health centre, 1 not-for-profit hospital
  - Patient costs: treatment (i.e. direct medical) costs calculated on the basis of anthropometric data from 1 site; direct non-medical and indirect costs obtained from *study 1*.

Weight distribution of VL patients from anthropometric data



Produced by M Harhay, 2010

Expected output of CEA

- A similar study was done for the Indian subcontinent:

Strategy	Cost (C)	Incremental Cost*	Effectiveness (E)	Incremental Effectiveness*	C/E	Incremental C/E (ICER)**
MF + PM	82.5		0.900		92	
PM	96.6	14.1	0.799	−0.101	121	(Dominated)
SSG + PM	118.6	36.1	0.747	−0.153	159	(Dominated)
L-AmB + MF	129.1	46.6	0.942	0.042	137	1123**
L-AmB + PM	132.9	3.8	0.948	0.006	140	652
MF	135.4	2.5	0.761	−0.186	178	(Dominated)
L-AmB 10	153.4	20.6	0.950	0.002	162	8224
SSG	171.8	18.4	0.525	−0.425	327	(Dominated)
AmB	197.9	44.5	0.873	−0.077	227	(Dominated)
L-AmB 20	311.6	158.2	0.949	−0.001	328	(Dominated)

*Numbers in the table are rounded.
**Extended dominance.

Source: Meheus F, Balasegaram M, Olliaro P, Sundar S, Rijal S, et al. (2010) Cost-Effectiveness Analysis of Combination Therapies for Visceral Leishmaniasis in the Indian Subcontinent. PLoS Negl Trop Dis 4(9): e818.

Drug cost scenarios

- Drug costs for 1 patient (average 35kg):

	Dosage	Duration (days)	Unit cost (US$)	Total cost (US$)
PM + SSG	15 MKD & 20 MKD	17	0.71/amp & 7/vial	35
AmBisome	3 MKD	10	18/vial	378
SSG	20 MKD	30	7/vial	49
Miltefosine	100 MD	28	1.4/capsule	78

- Assuming 80% of patients receiving PM+SSG, 10% AmBisome and 10% miltefosine, the annual cost of drugs to treat 20,000 patients would be: US$ 1,472,800

Drug cost scenarios

- At the individual level, the costs of treatment are high and beyond reach for most patients.
  - Treatment with liposomal Amphotericin B would cost the patient US$ 378 per episode for the drugs only!
- Given the assumptions outlined above, the annual drug cost to governments, manufacturers or donors willing to subsidize treatment in EAST AFRICA would be approx. US$ 1,5 million.

Conclusions

- The aim of these studies is to provide much needed economic data to enable national and international policy makers to make informed decisions.
  - As well as raise awareness on the economic burden of VL.
- The results from these studies are expected in the first half of 2011.
- In the Indian subcontinent, we have shown that combination therapies are a cost-effective alternative to current monotherapy for VL.

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