Schistosomiasis Morbidity Control

PAHO Schistosomiasis Regional Meeting

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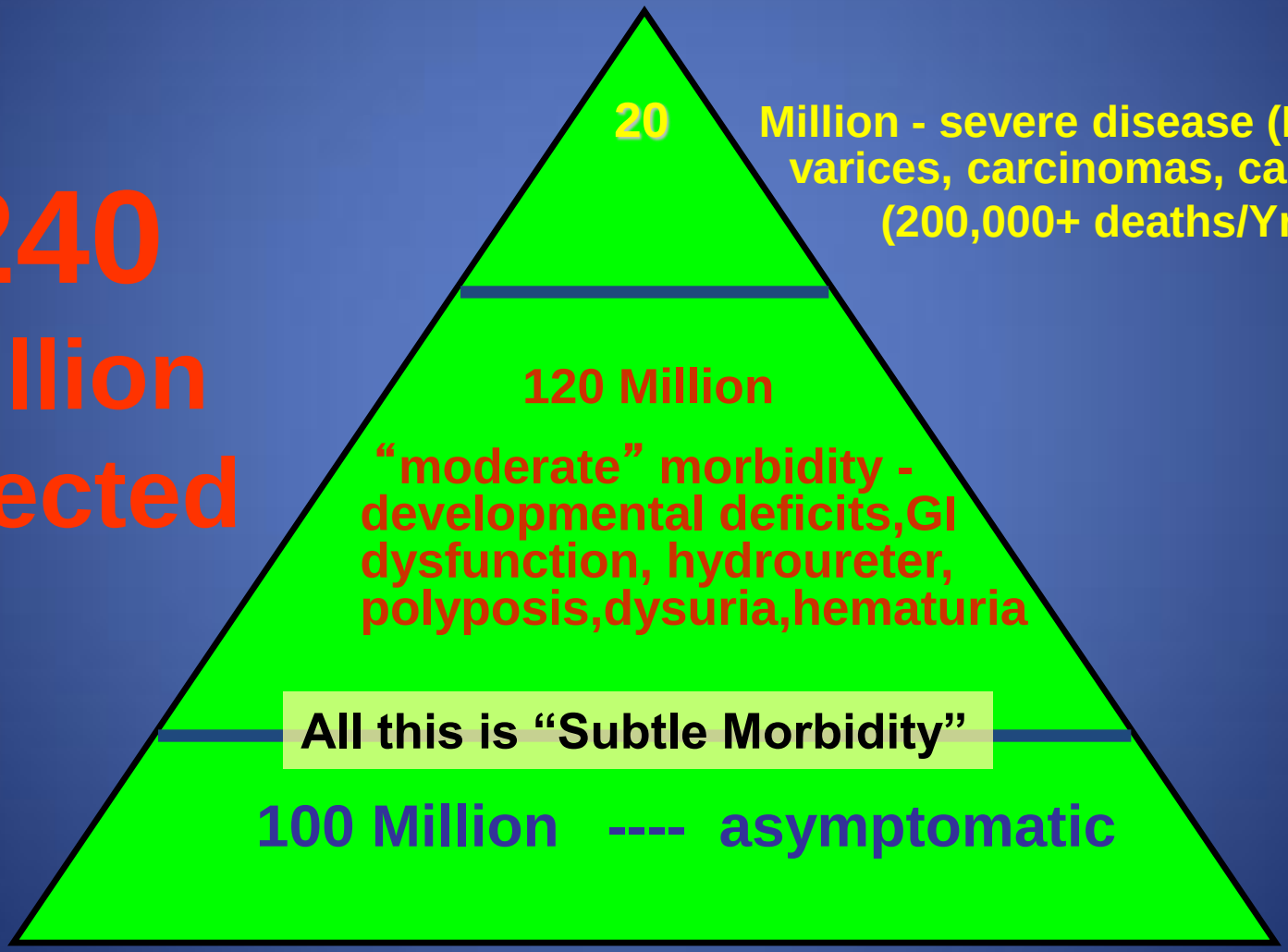
Morbidity control outline

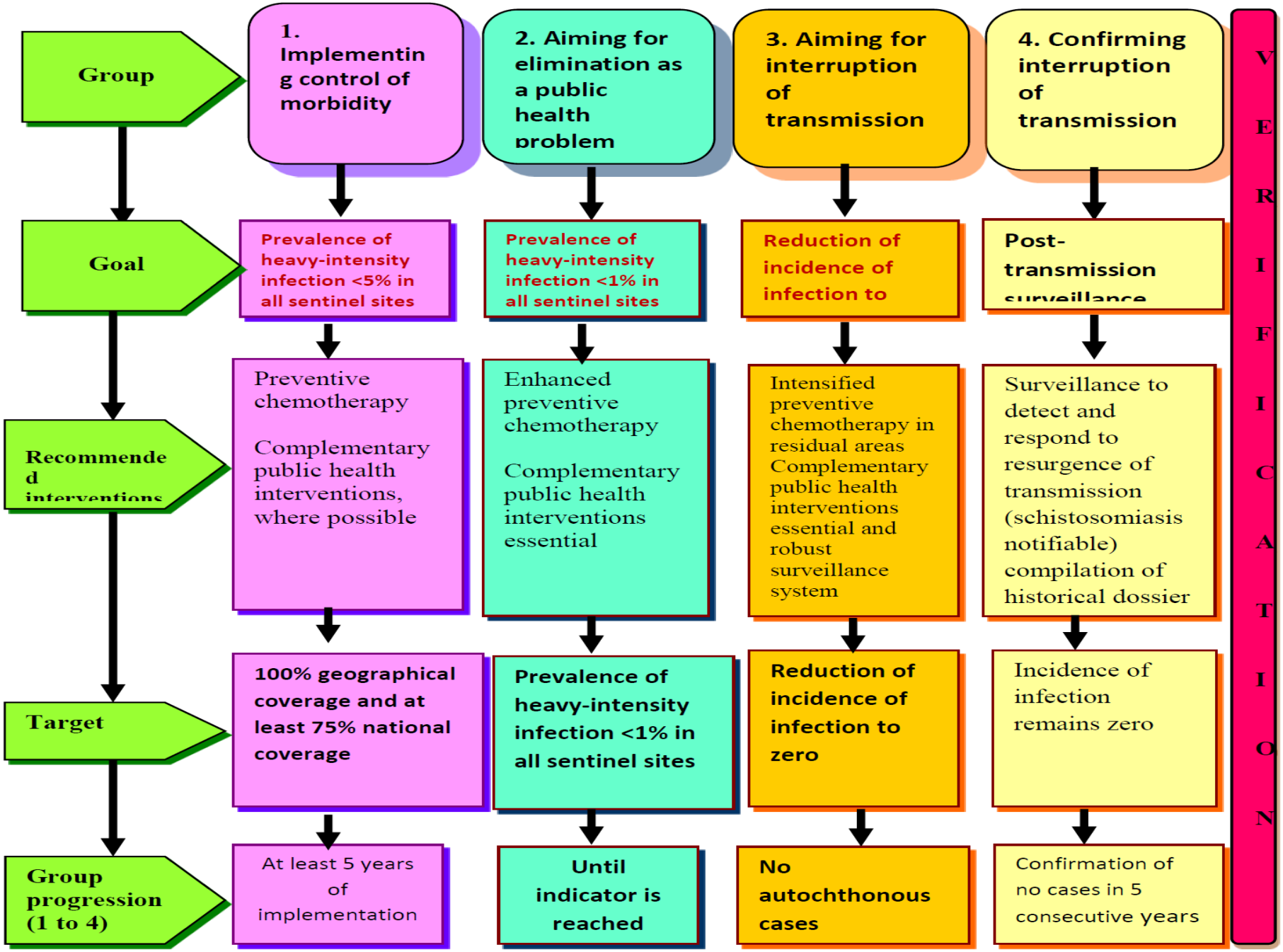
- Evolution of morbidity control –based on some studies on St. Lucia
- Morbidity control as an early program of schistosomiasis disease management
- Examples of morbidity control on a larger population basis

Global Schistosomiasis: Prevalence, Morbidity, Mortality

240 Million Infected



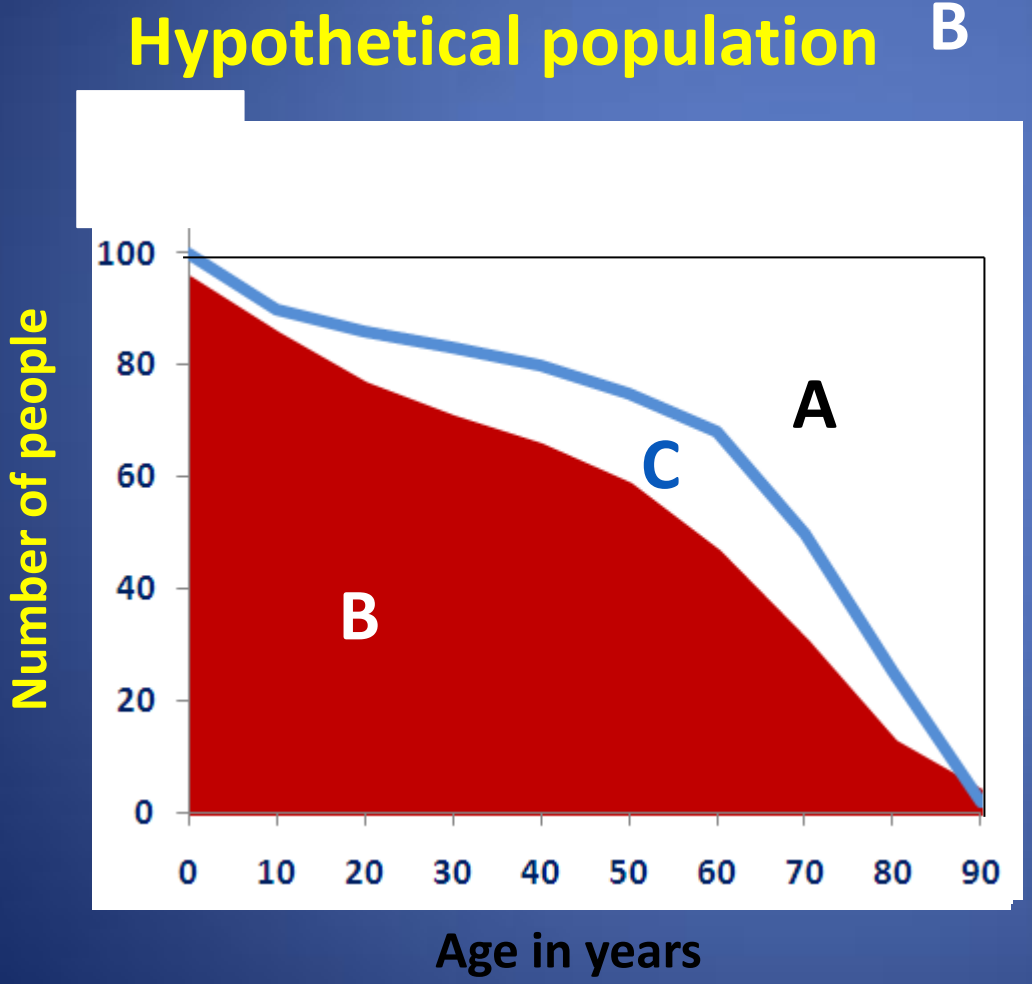
Progression towards elimination of schistosomiasis



Why morbidity control

- Ability to treat the most heavily infected—5-14 year olds
- Easier access to this group through schools
- Ability to reverse clinical signs of morbidity
- Ability to reach and reduce the largest % of eggs reintroducing infection into communities
- Cost effective: Initially high cost of drug and hesitancy to treat communities without definitive diagnosis

Calculation of DALYs



A Deaths

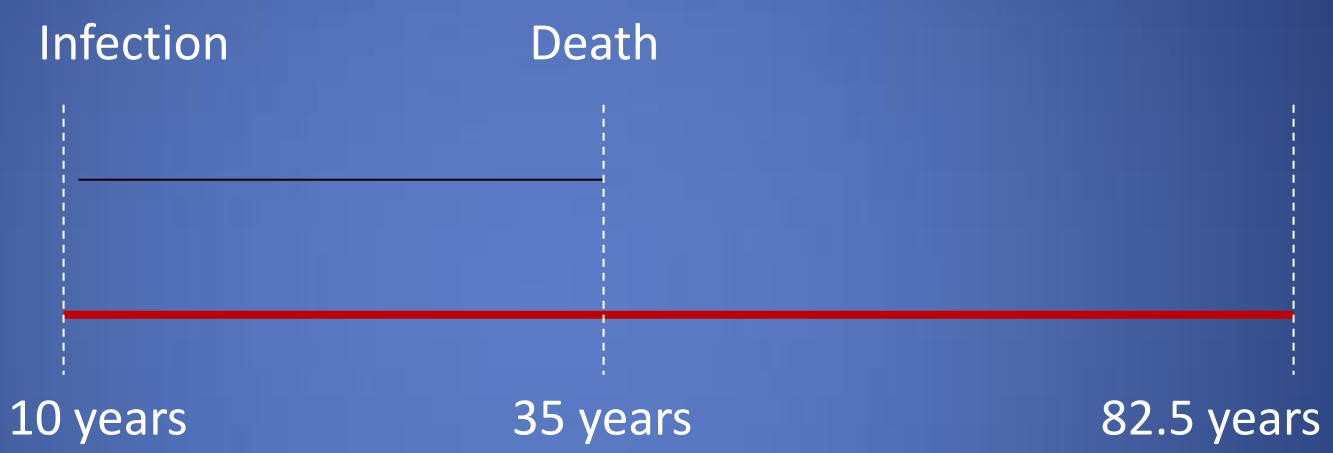
B Time spent in perfect health

C Time spent in less than perfect health

DALY = A + **C**

DALY –example calculation

Mariam from Burkina Faso with Schistosomiasis

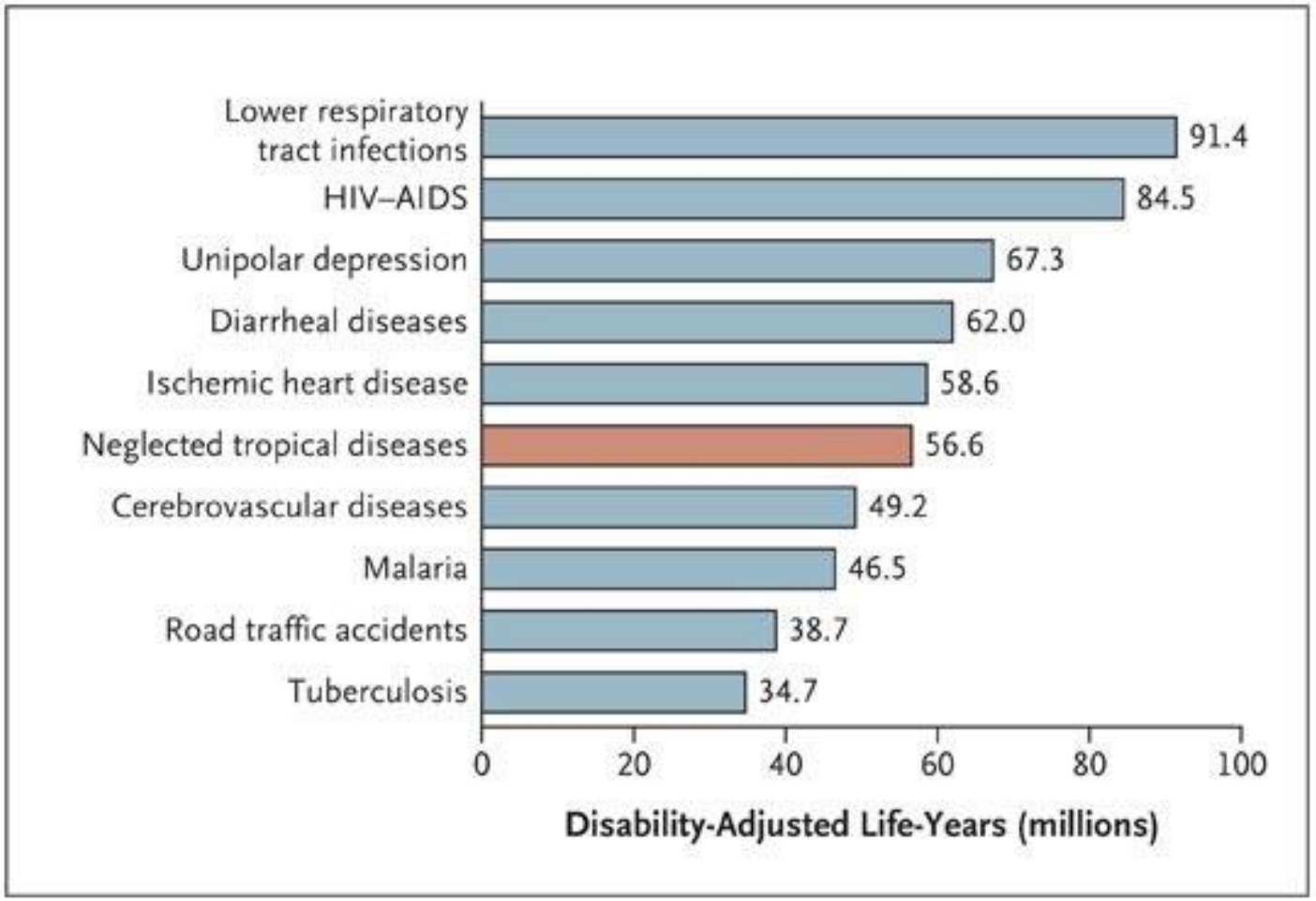


YLL = (82.5 – 35)
= 47.5 years

YLD = Years Lived with a disability* (25) x Disability weighting (0.55)
= 13.75 years

DALY = **YLL** (47.5) + **YLD** (13.75)
= 61.25 years

The 10 Leading Causes of Life-Years Lost to Disability and Premature Death in low income countries



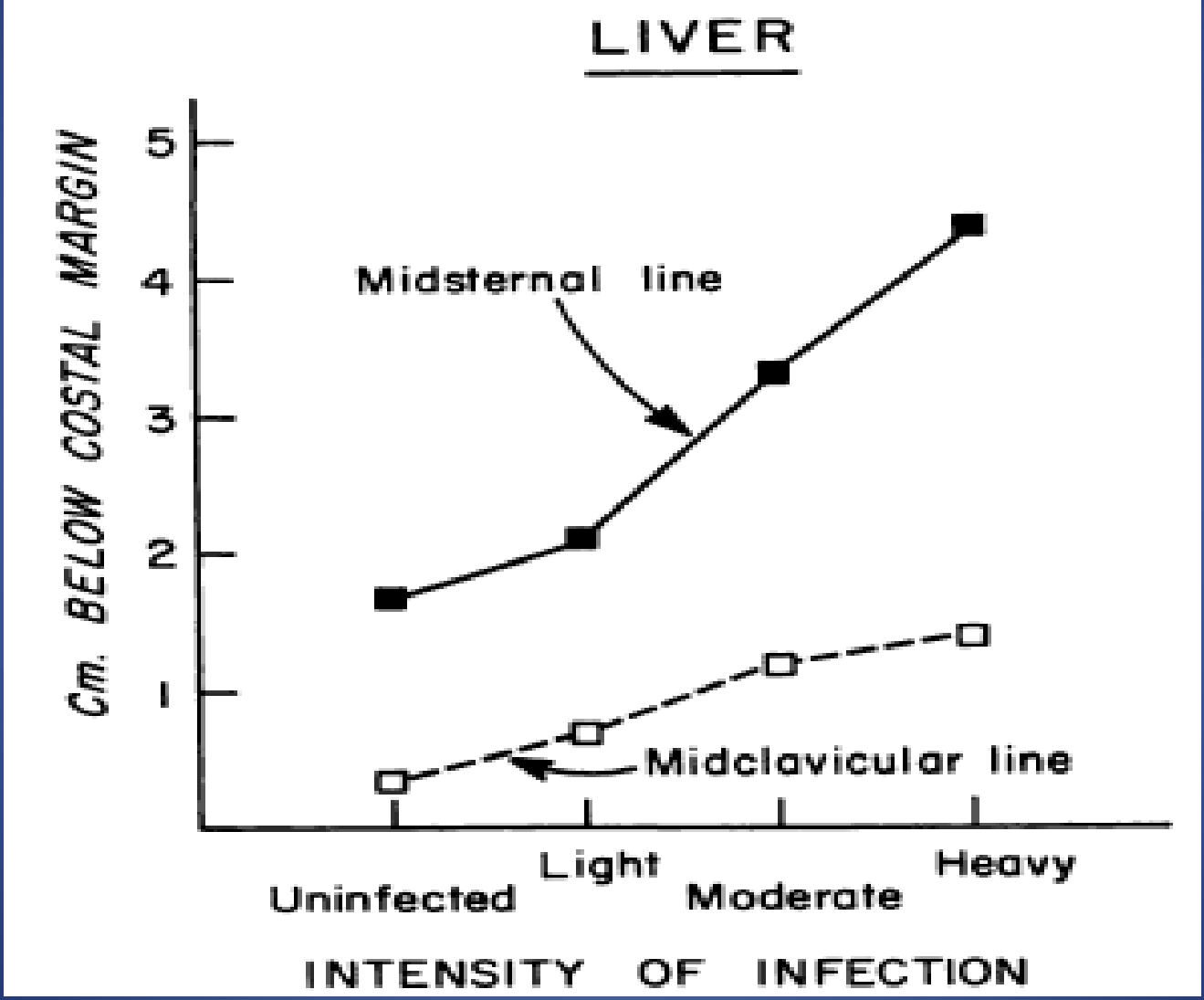
Hotez P et al. N Engl J Med 2007;357:1018-1027

Morbidity related to intensity

	Heavy/Mod	Light	Uninfected
	N=58	n=57	n=23
	>100 epg	1-99	0
Liver >2.5cm below MCL	15 (25.9%)	7 (12.3)	2(8)
Splenomegaly	5(8.6)	0 (0)	0

Cook, JAmSTMH, 1974

Hepatomegaly related to intensity



Cook, 1974 J AmSocTMH

Response to Rx related to intensity of infection in 143 patients 6 - 24 months

Intensity of infection	No. patients	Geometric mean, egg excretion	Hepatomegaly	Splenomegaly	No viable eggs*		
					6 months	12 months	24 months
Light (0–50)†	66	12.2†	11 (17%)	5 (8%)	45/53 (85%)	51/56 (91%)	54/62 (87%)
Moderate (51–399)	64	134.8	22 (35%)	11 (17%)	51/59 (86%)	49/59 (83%)	40/59 (68%)
Heavy (≥400)	13	629.5	6 (46%)	2 (15%)	10/13 (77%)	7/9 (78%)	7/12 (58%)

* Denominator is not constant because hatch tests could not be done on each patient at each follow-up visit.
† No. eggs/ml feces.

Cook 1974 AMJTROPMED&HYG 23:910

Evaluation of Hycanthone Rx up to 24 months

Months after treatment	No. patients treated	No eggs by any method	No viable eggs*	Total reduction in egg excretion
6	340	179/340(53%)	274/308(89%)	98%
12	223	118/223(53%)	175/202(87%)	98%
24	198	97/198(49%)	119/172(69%)	86%

J Cook JAmSocTropMed 1974

Therapeutic effect of Rx on liver and spleen enlargement

Clinical state	Age group (years)	No. patients	Mean extension below costal margin (cm)		Unchanged	Significant decrease*	Normal	Time to maximum decrease
			MCL	MSL				
Hepatomegaly	0–9	14	2.5	5.6	2	12	9	14 months
	10–14	18	2.4	7.1	0	18	10	16 months
	⩾15	7	3.1	8.8	1	6	2	18 months
			Mean Hackett grade					
Splenomegaly	0–9	2	2.0		0	2	2	6 months
	10–14	11	1.8		1	10	5	6 months
	⩾15	5	2.4		2	3	2	12 months

* For liver, decrease of >2 cm or regression to normal. For spleen, decrease of one Hackett grade.

Cook 1974 AMJTROPMED&HYG 23:910

Impact of repeated treatment

- Almost immediate impact on prevalence and intensity of infection.
- Reduction or regression of morbidity.
- However impact will depend on the levels of transmission
  - Can have a high reinfection rates with low intensities of infection
  - No apparent effect on prevalence

Strategies for control

- Morbidity control – chemotherapy at population level
- Infection control – treatment of infected individuals
- Transmission control - potable water, sanitation, environmental modification, and snail control,
- Not mutually exclusive as all operational components will result in reduced infection levels and less disease
- Strategy will depend on the situation and available resources

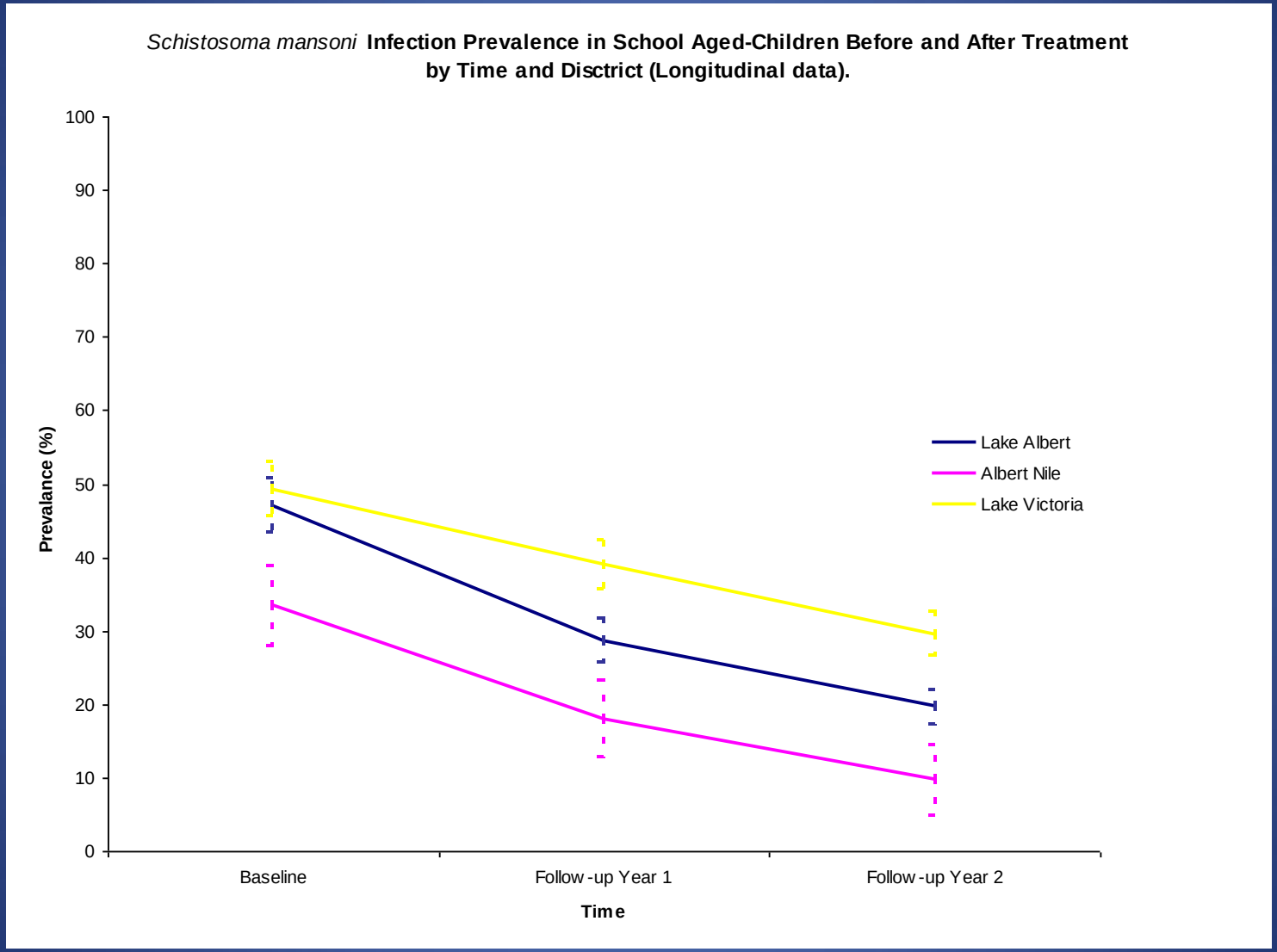
Operational components for control

- Chemotherapy
- Health education
- Provision of safe water and sanitation
- Snail control
- Use of these components will depend on the situation

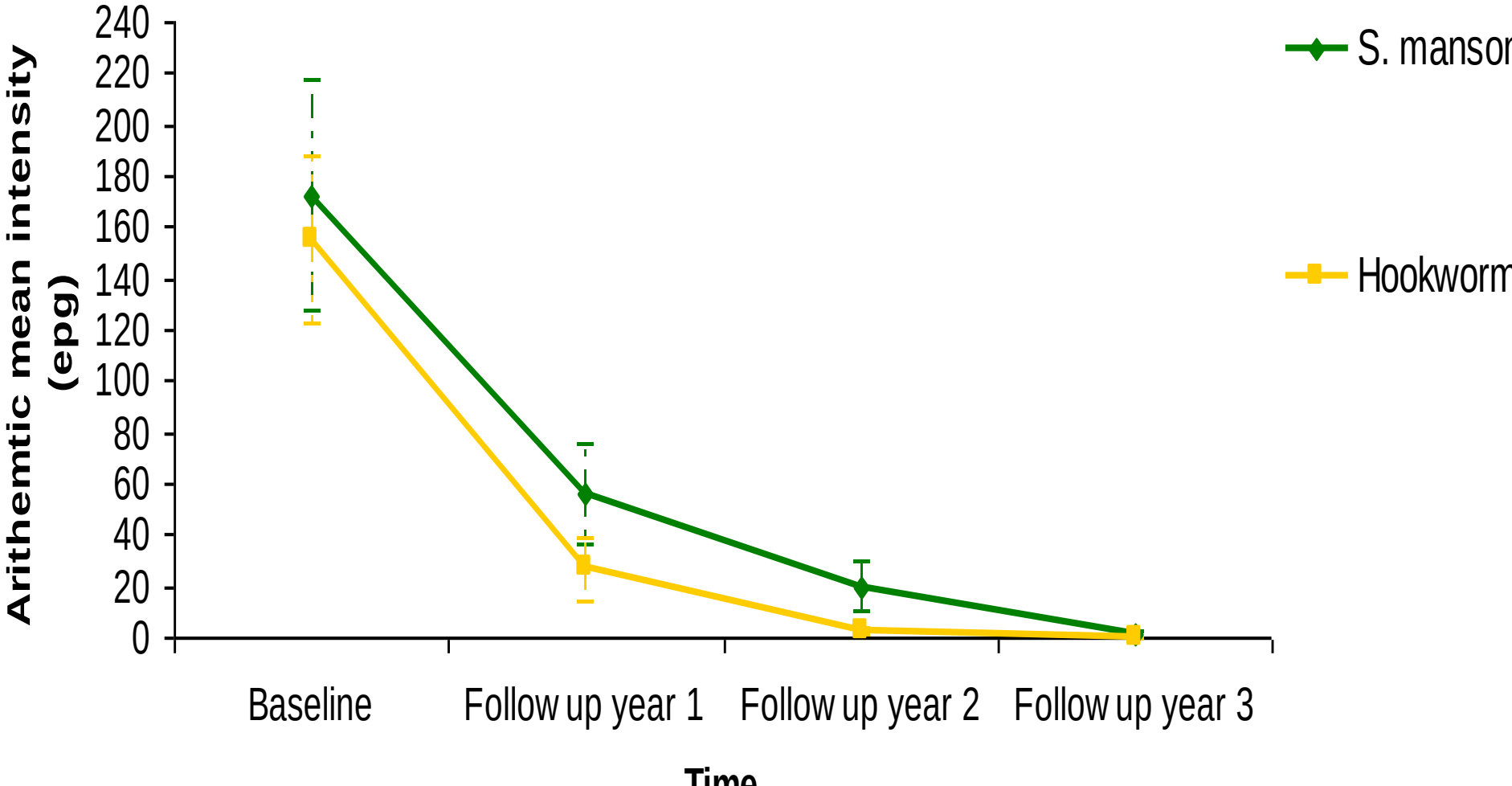
143 Patients followed 2 years

Age group (years)	No. patients	Time after treatment	No eggs by any method	No viable eggs*	Reinfected	Total reduction in egg excretion
0–14	84	6 wks	46/84 (55%)	Not done	0	98%
		6 mos.	37/84 (44%)	61/74 (82%)	0	98%
		12 mos.	35/84 (42%)	60/71 (85%)	2 (2%)	97%
		24 mos.	37/84 (44%)	57/79 (72%)	15 (18%)	85%
⩾15	59	6 wks	34/59 (58%)	Not done	0	98%
		6 mos.	38/59 (64%)	45/51 (88%)	0	99%
		12 mos.	35/59 (59%)	47/53 (89%)	0	99%
		24 mos.	36/59 (61%)	44/54 (82%)	7 (12%)	90%
TOTAL	143	6 wks	80/143(56%)	Not done	0	98%
		6 mos.	75/143(53%)	106/125(85%)	0	99%
		12 mos.	70/143(49%)	107/124(86%)	2 (1%)	98%
		24 mos.	73/143(51%)	101/133(76%)	22 (15%)	87%

Uganda: Narcis Kabatereine / Schisto Control Initiative 2003-2005



Uganda (Baseline, Year 1, Year 2, Year 3 in 3 districts completed so far) Arithmetic mean intensity of infection for 391 children successfully followed up



ULTRASOUND (CHILDREN)

Category of morbidity	% age affected	Year of examination
Pattern B fibrosis (early change)	39.4	2003
	9.4	2004
	1.7	2005

- No child hard pattern C-F

Narcis Kabatereine - Uganda

ULTRASOUND (CHILDREN) Continued

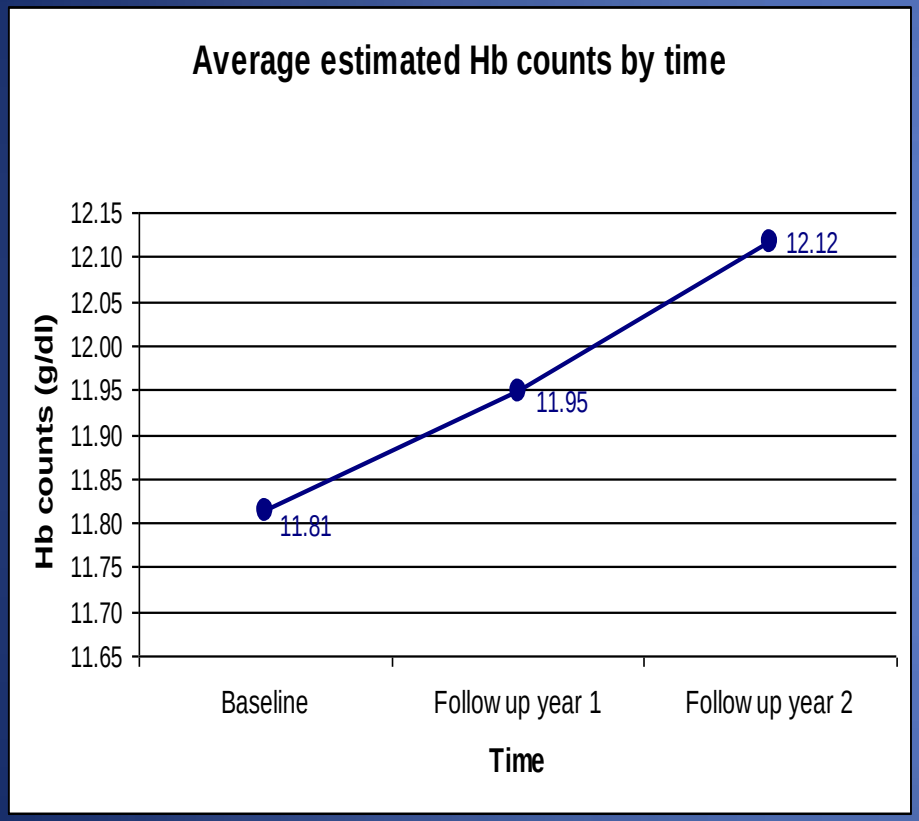
Category of morbidity	% age affected	Year of examination
Dilated portal vein	17.8	2003
	2.2	2004
	3.3	2005

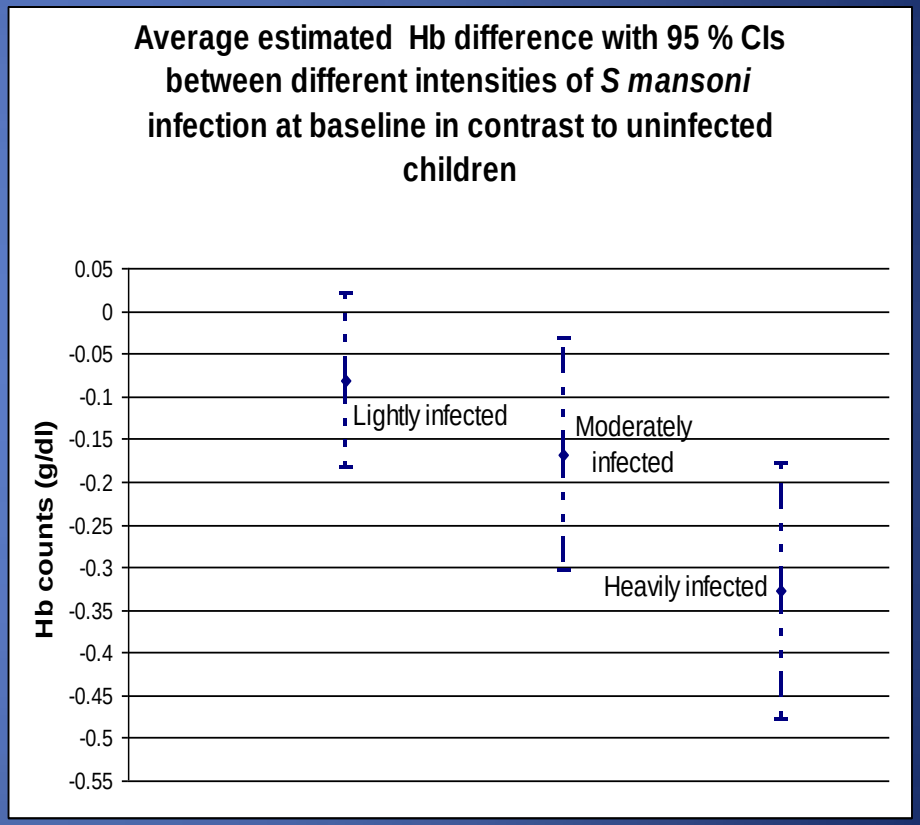
- No child had marked dilation of Portal vein throughout the study.

Narcis Kabatereine - Uganda

Results

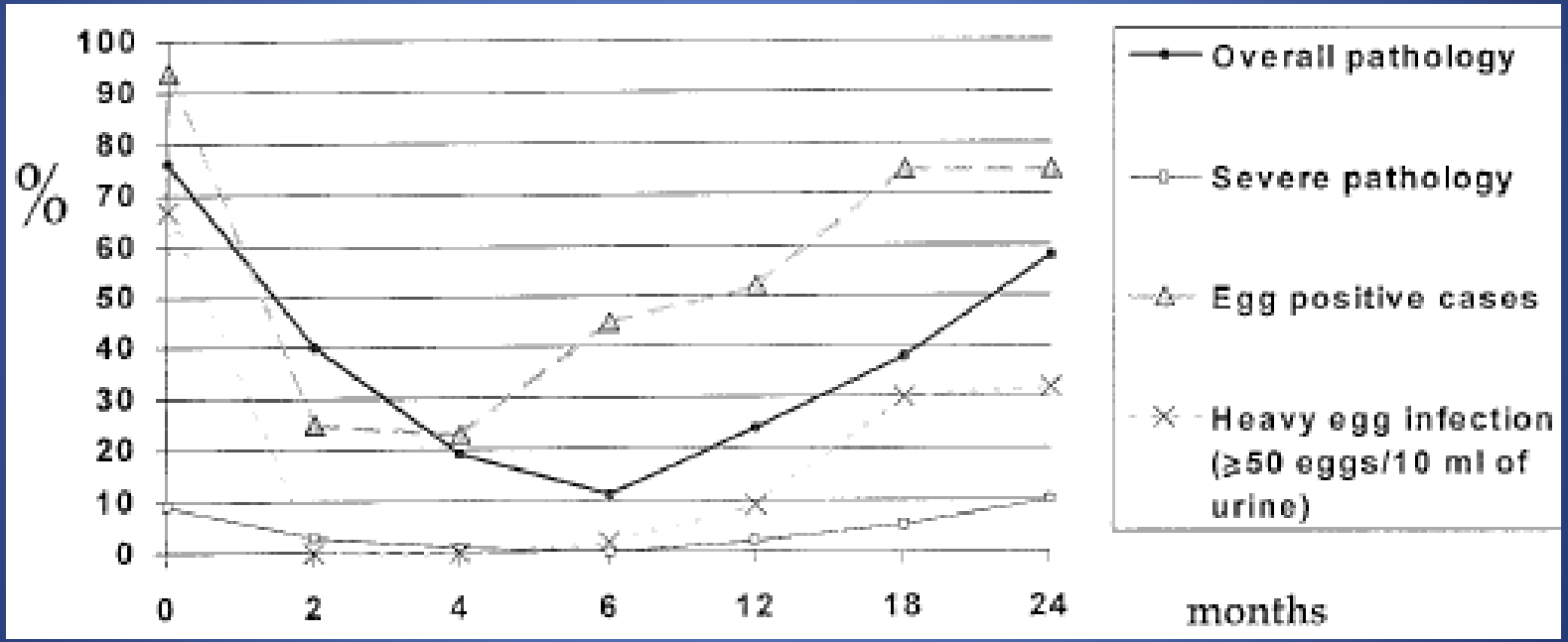
3-level random intercepts model for Haemoglobin counts before and 2 years after praziquantel and albendazole treatment controlling for age and sex among 1789 Uganda schoolchildren 2003-2005





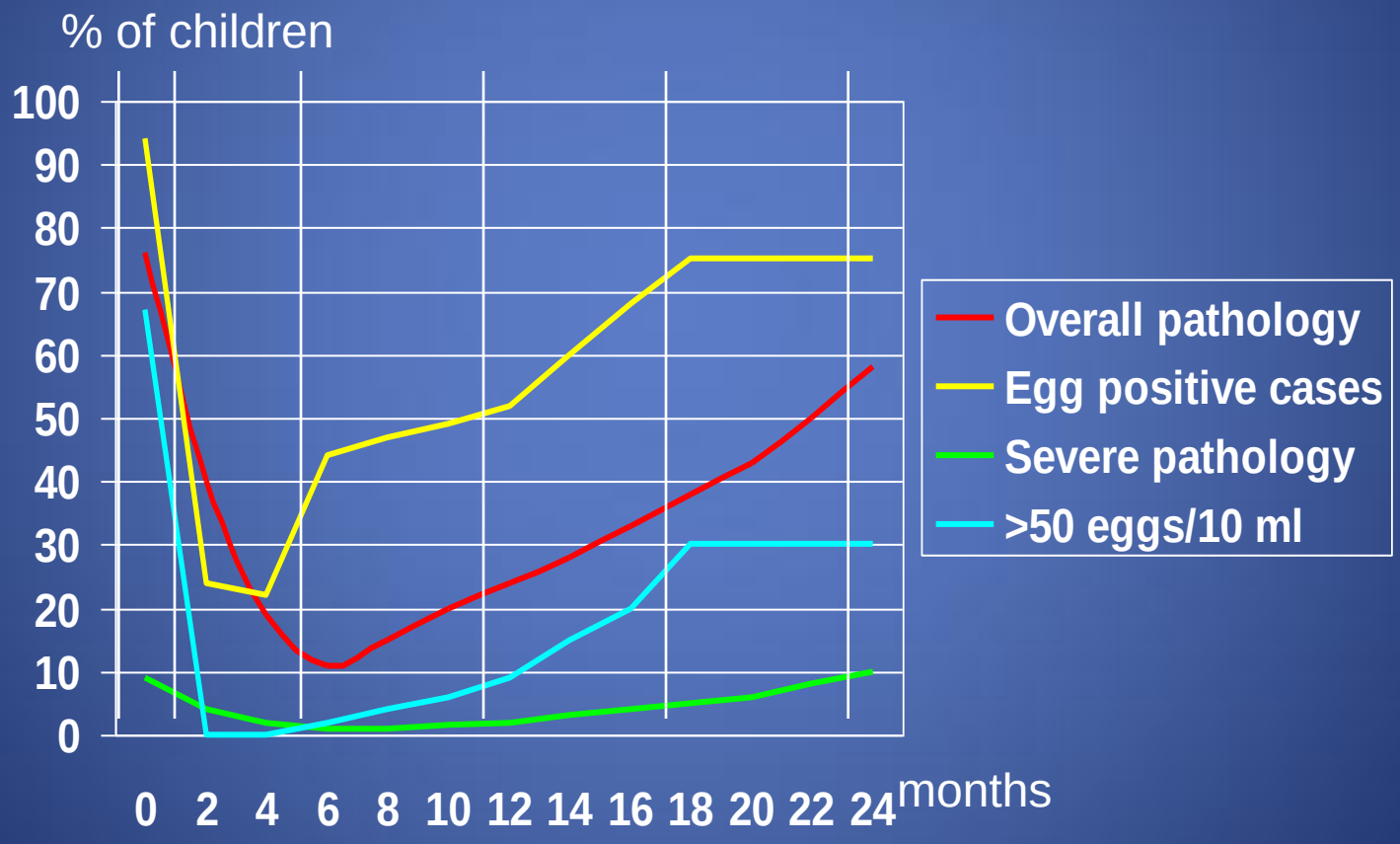
Evolution of egg output and S. haematobium pathology after Rx

Ifakara, Tanzania



CF Hatz, et al *Am. J. Trop. Med. Hyg.*, 59(5), 1998, pp. 775–781

Evolution of *Schistosoma haematobium*-related pathology over 24 months after treatment with praziquantel among school children in southeastern Tanzania



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