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Improving HIV/AIDS management in children: Nutrition as a vital component

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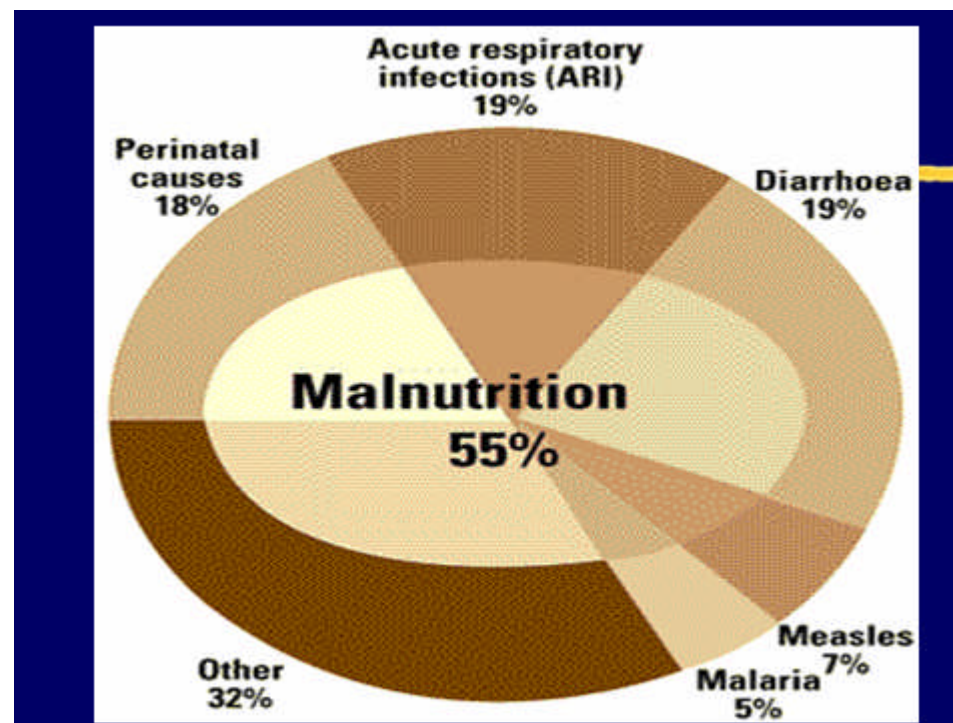
Malnutrition in children



- Still prevalent worldwide
- It is a major factor in the 10.4 million annual child mortality in developing countries.
- Major cause of disability and disease



Nutrition is at the core of all causes of childhood mortality





Protein Energy Malnutrition (PEM)

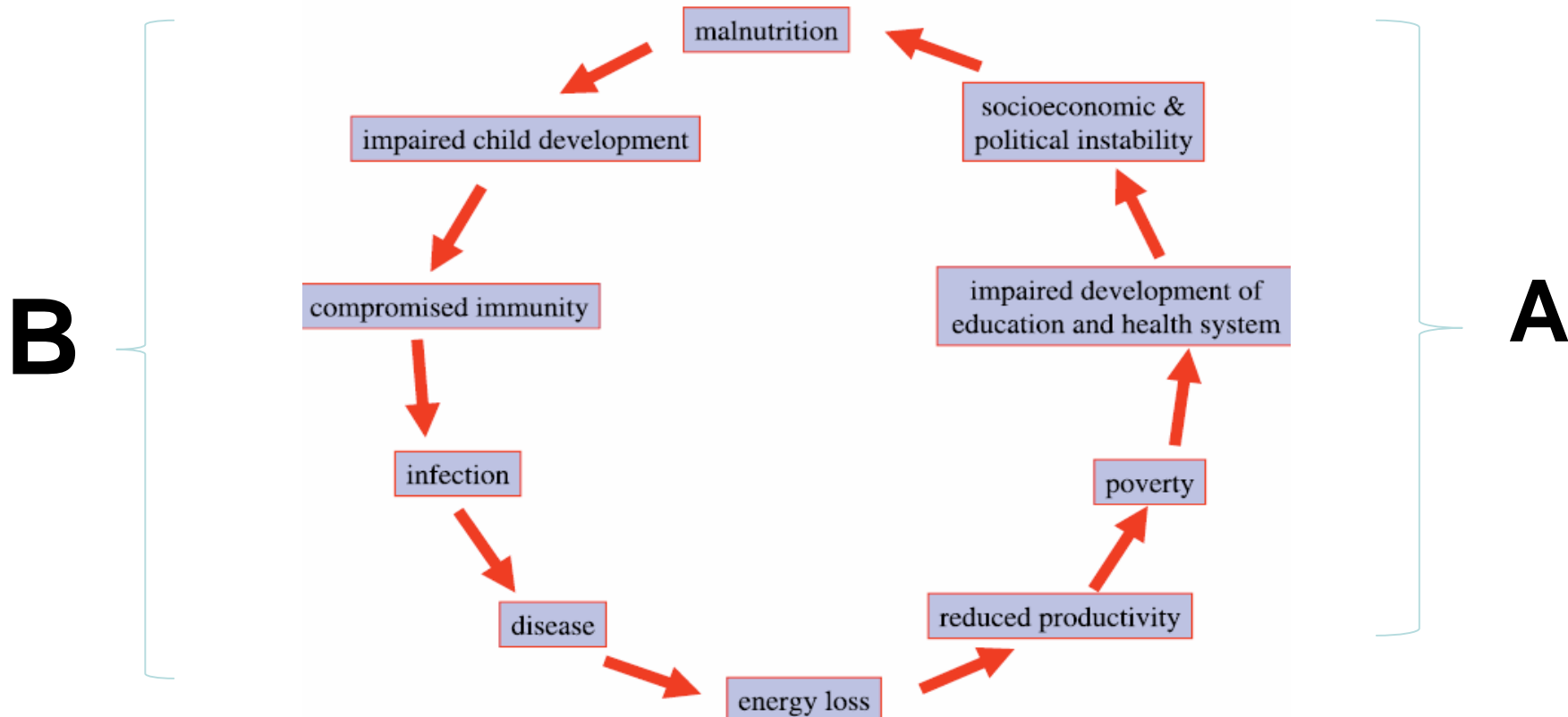


- Estimated that every fourth child has PEM in developing countries. This presents as:
- Stunting ($< \text{length/Ht-for-age} < 2 \text{ Z scores}$)
- Underweight ($< \text{Wt-for-ht}$ or $\text{Wt-for-age} < 2 \text{ Z scores}$)
- Wasting ($< \text{Wt/age}$ or $\text{Wt-for-length/ht} < 2 \text{ Z scores}$)



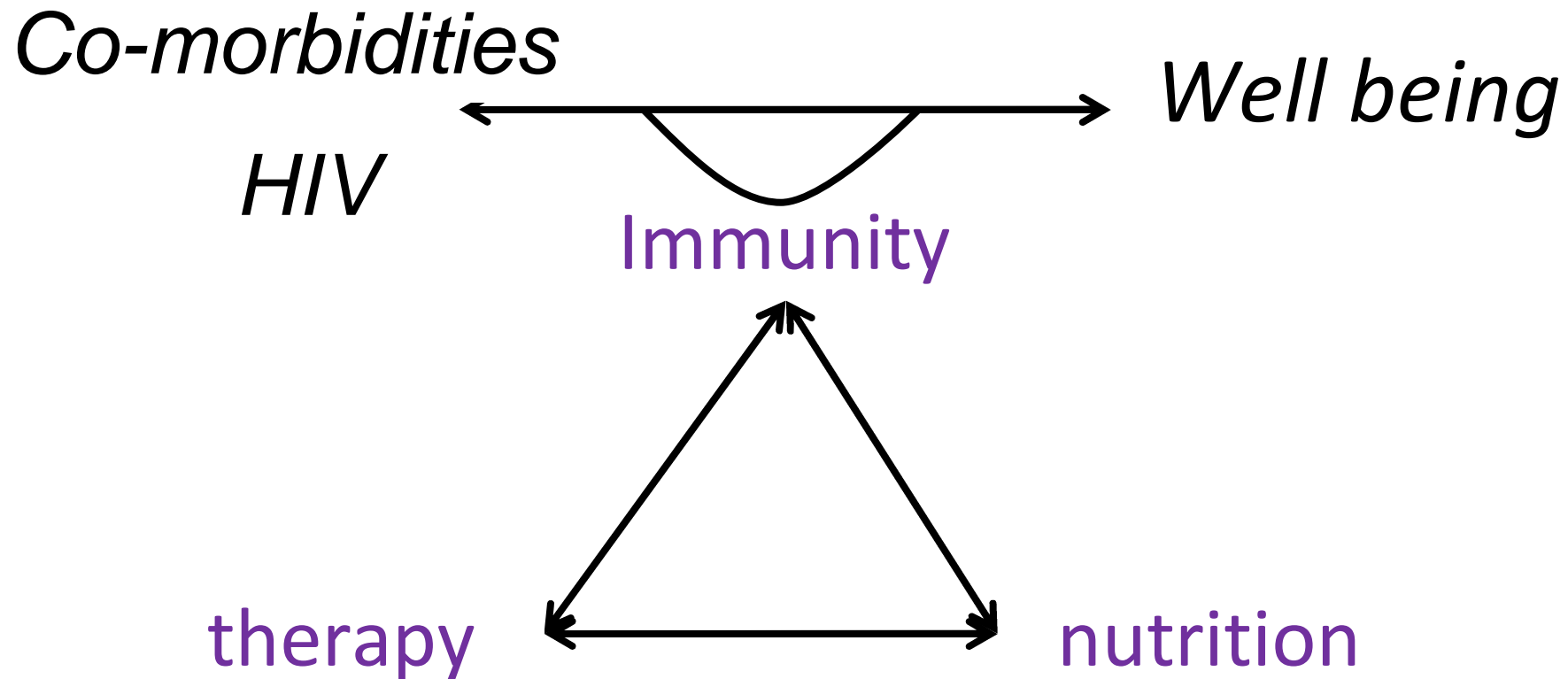
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Specifically.....



A- indirect effect on child

B-direct effect on child





Clinical presentation of children with HIV infection in Low/middle income countries



- Stunted
- Wasted
- Underweight
- Low CD4 counts
- Aids defining illness



Pediatric HIV/AIDS malnutrition



- *Severe PEM defined by MUAC or BMI-
indicators:*
- ($<70\%$ wt/ht) +/- pitting oedema and
anemia
- presence of oedema defines *kwashiorkor*,
absence is *marasmus*
- *Or $<60\%$ wt/age +/- oedema (presence of oedema is marasmic-
kwashiorkor, absence is marasmus*
- *60-80% wt/age +/- oedema, presence of oedema is kwashiorkor,
absence is underweight*



Problem?



***Why concern ourselves
with HIV/AIDS and nutrition
in Children now?***



Milestone in HIV/AIDS Biology History



Year	Event
1880	First suggested case of HIV infection of Humans in Kinshasha
1959	First case confirmed retrospectively in Congo
1981	<i>Pneumocystis carinii</i> outbreak and Kaposi's sarcoma reported as a gay compromised syndrome or immune deficiency
1982	Syndrome renamed as AIDS
1983	Identification of HIV -1 as lymphadenopathy associated virus by Luc Montagnier
1986	Global AIDS strategy launched by WHO
1996	Launching of UNAIDS



Viral Biology and therapeutics



Year	Event
1987	AZT(Zidovudine approved as the first anti-HIV drug
1996	Triple combination ART drug approved
1998	First human trial of AIDS vaccine begins in the US
2008	Novel host derived factors of HIV-1 identified
2008	Luc Montagnier, Francoise Barre-Sinoussi and Harald zur Hausen receive Nobel prize for HIV and HPV discovery



Projected changes in HIV/AIDS disease burden Globally by 2020



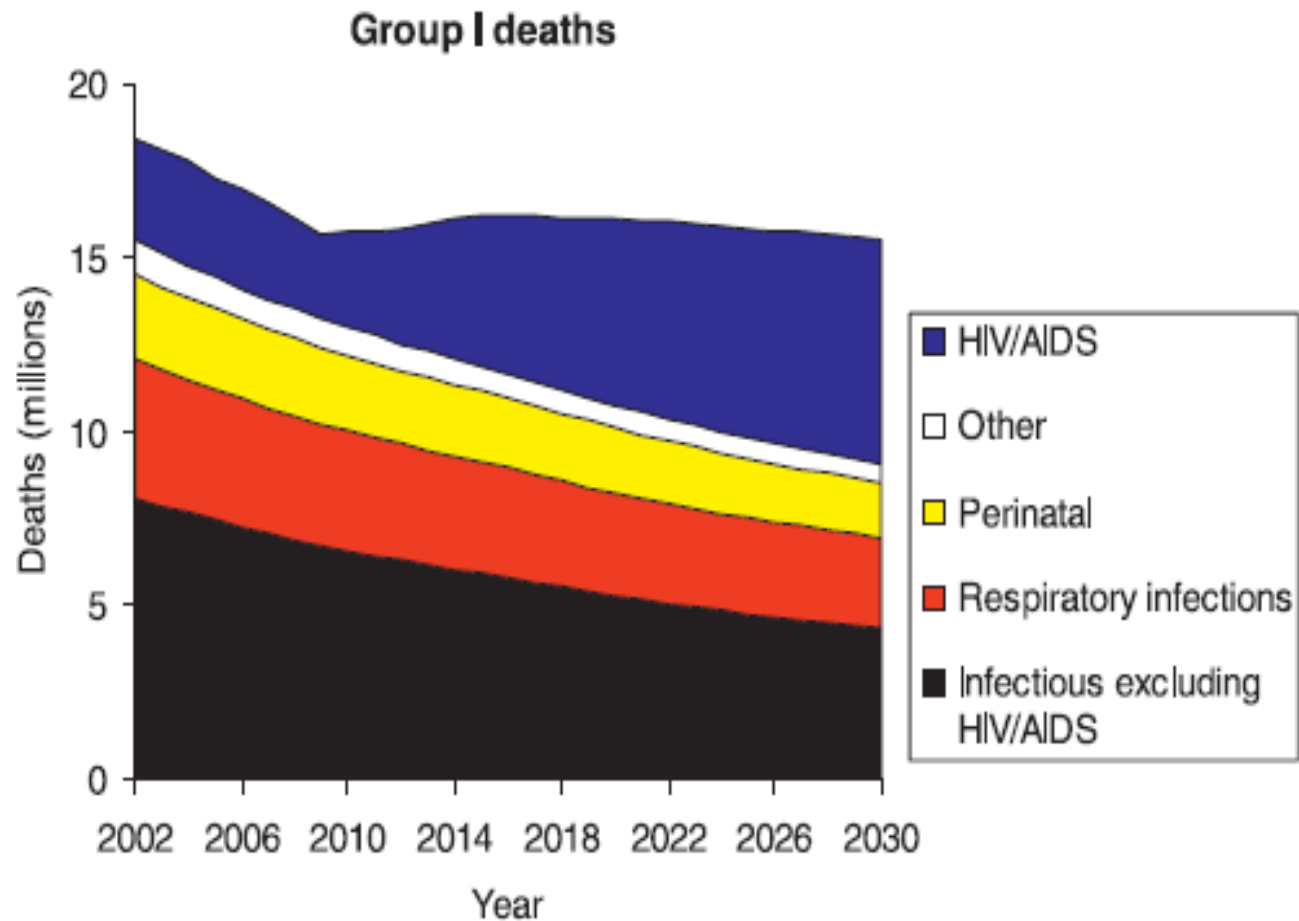
Table 1. Projected Average Annual Rates of Change in Age-Standardized Death Rates for Selected Causes: World, 2002–2020

Group	Cause	Average Annual Change (Percent) in Age-Standardized Death Rate	
		Males	Females
All Causes		-0.8	-1.1
Group I		-1.4	-1.9
	Tuberculosis	-5.4	-5.3
	HIV/AIDS	3.0	2.1
	Malaria	-1.3	-1.5
	Other infectious diseases	-3.4	-3.3
	Respiratory infections	-2.7	-3.4
	Perinatal conditions ^a	-1.7	-1.9
	Other Group I	-3.0	-3.6

Source: Mathers and Loncar, 2006



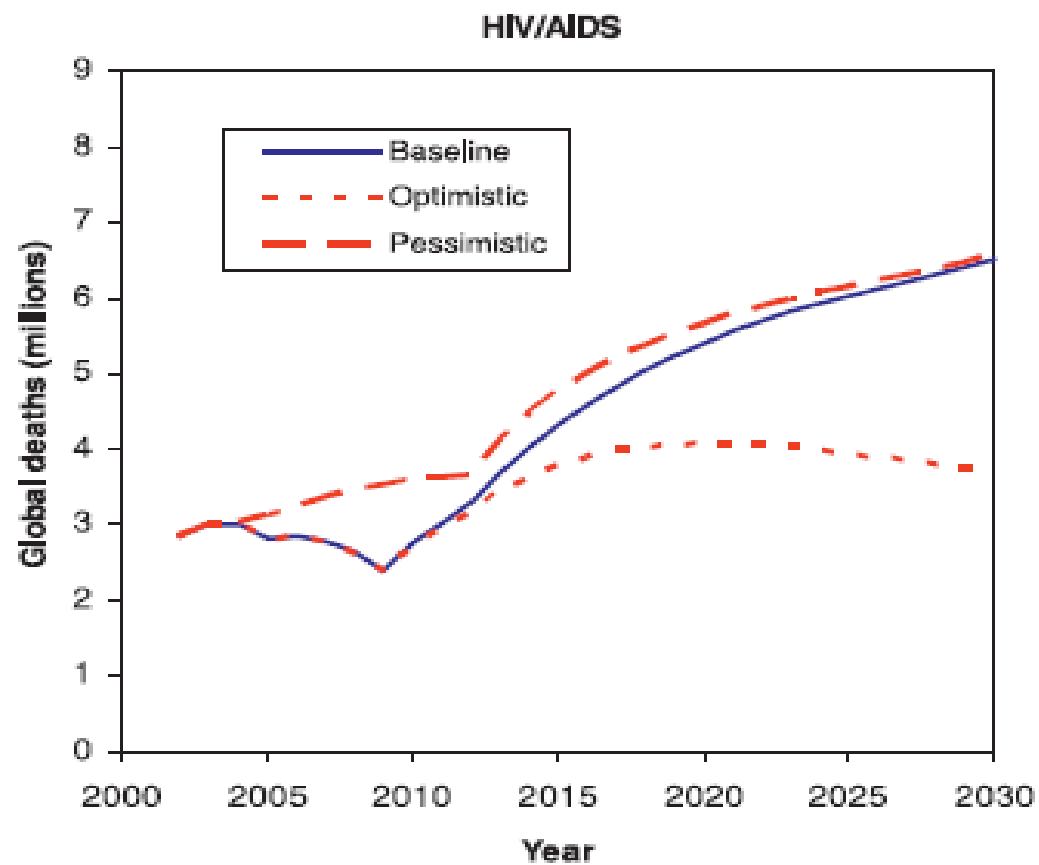
Projected Deaths attributed to HIV/AIDS in relation to other causes globally



Source: Mathers and Loncar, 2006



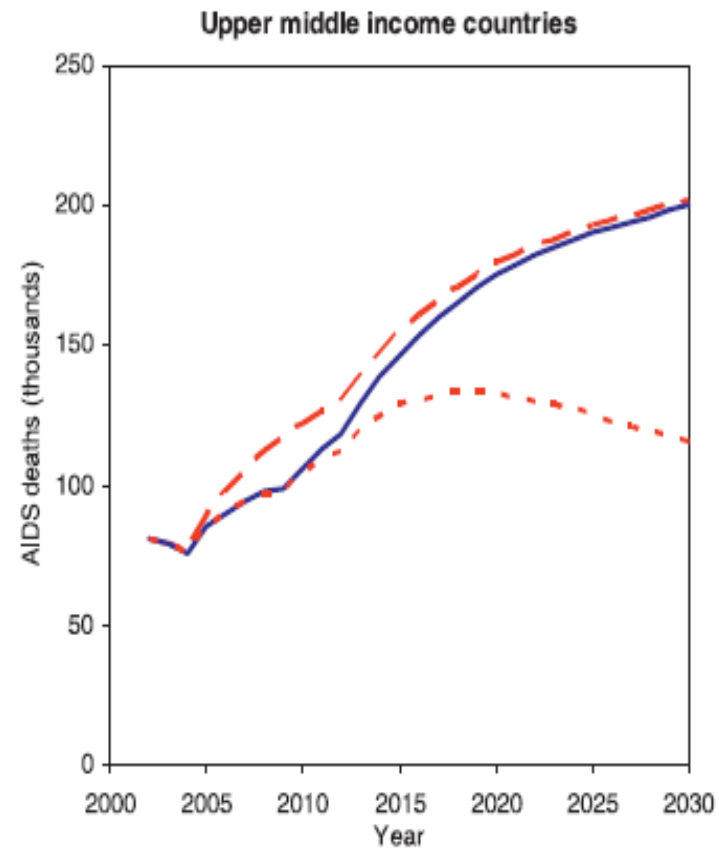
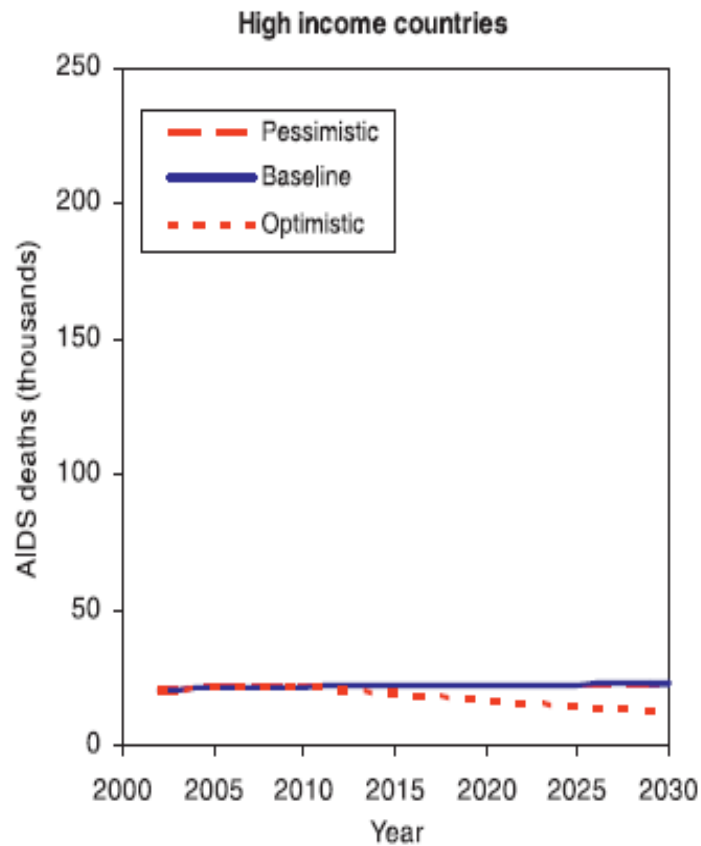
Global HIV/AIDS Deaths



Source: Mathers and Loncar, 2006

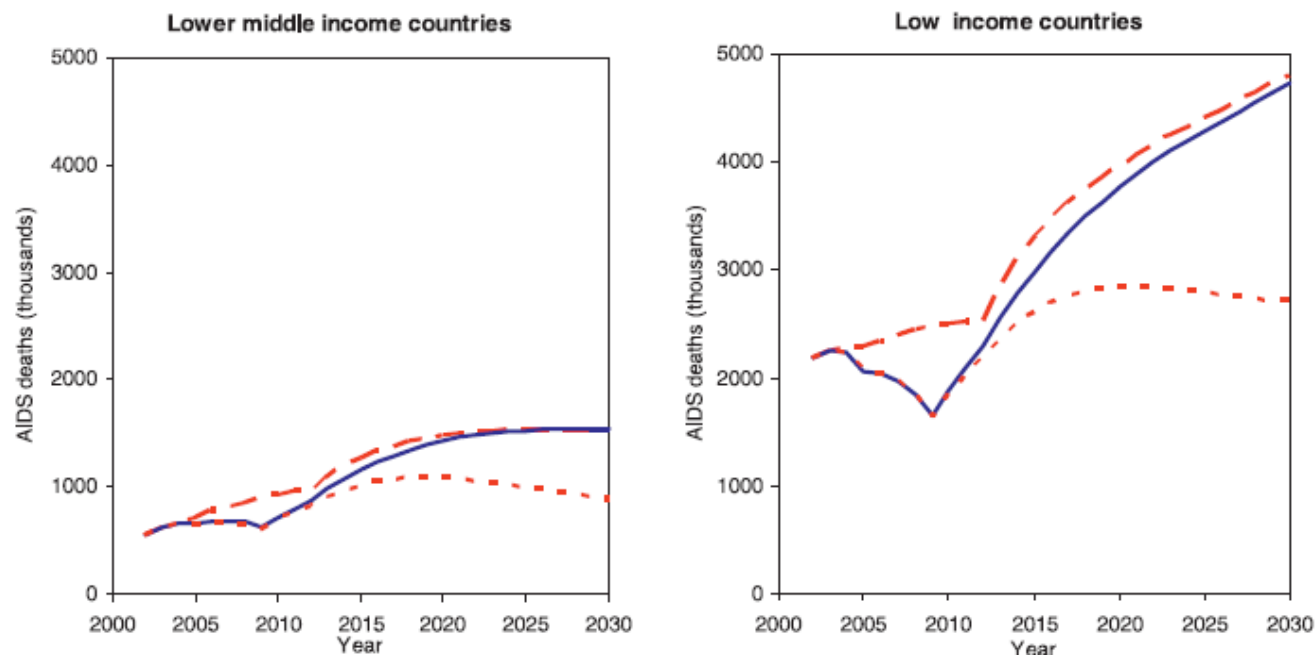


Global Deaths due to HIV/AIDS by income





Global Deaths due to HIV/AIDS by income



Source: Mathers and Loncar, 2006



Conclusion



- *HIV/AIDS will remain a major cause of disability and death in middle and low income countries in the next decade*



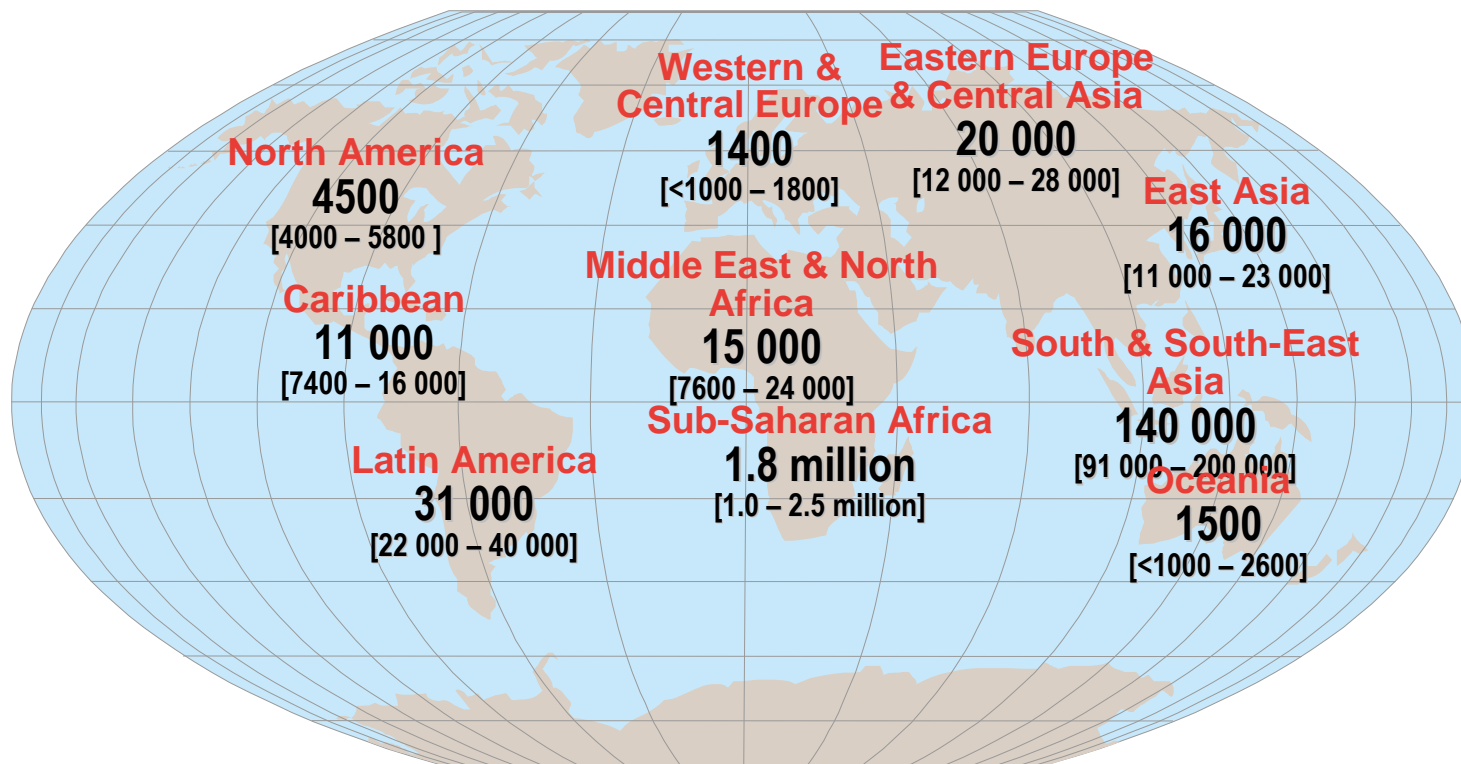
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What is the status in children currently?



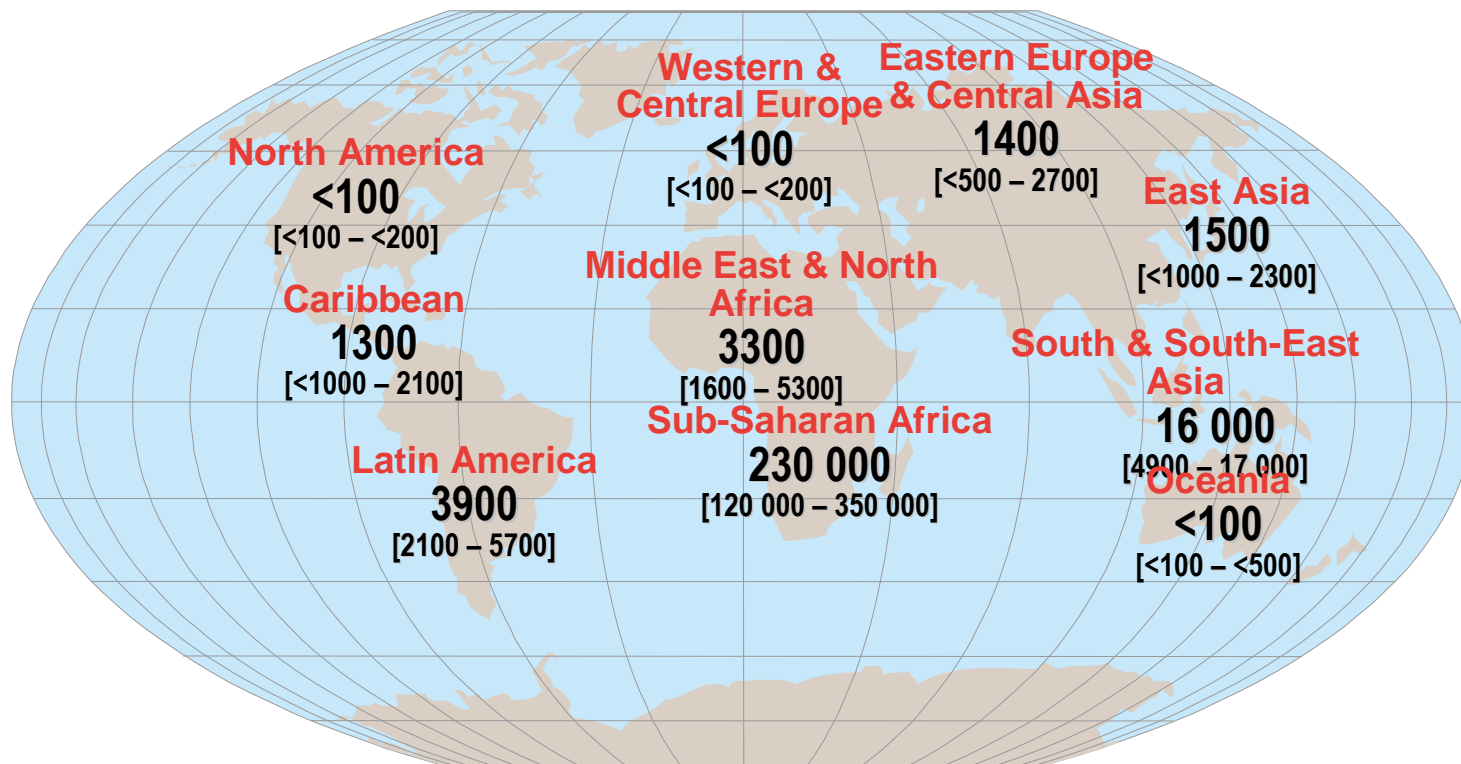
Children (<15 years) estimated to be living with HIV, 2008



Total: 2.1 million (1.2 – 2.9 million)
(6.3% of global burden)



Estimated deaths of children (<15 years) due to AIDS, 2008



Total: 280 000 (150 000 – 410 000)

(16% of infected)



Conclusion



- *Pediatric HIV will still constitute a significant proportion of HIV infection in future projections*



HIV transmission in children



- World wide, >90% of children acquire HIV infection primarily by Mother to child transmission (MTCT) (in utero, intrapartum or postpartum)
- *SO.....*
- *Maternal care and adequate nutrition postpartum for mother and child is critical.*



Problem of HIV patients in low income countries



- Access to treatment
- Food insecurity
- Poor maternal health care delivery



Nutrition and HIV Research issues



- Only a fraction of funds is available for improving patient care nutritionally
-
- Early diagnosis is missed because of stigmatization and poor health systems
- Malnutrition is endemic in most low income countries with HIV/AIDS epidemic



Facts on the ground needing attention



- Problem with capture and management of HIV/AIDS patient data (AMPATH (Academic Model for the prevention and treatment of HIV/AIDS))
- Syndemic theory (disease interactions including the social context define the course and cluster)
- Changes in assessment of malnutrition introduced by new WHO definitions from NCHS



Lessons



- Big Gap in targeted goals and practice in HIV care
- Medical care is necessary but not sufficient in HIV care
- Food insecurity is pervasive in HIV infected patients and dependants
- Attending to only index patients does not give the expected outcomes
- Care should extend to vulnerable members of patients' households
- Program to ensure food security may differ between rural and urban communities
- Need to reassess number of malnourished patients based on new WHO indices for targeted intervention.



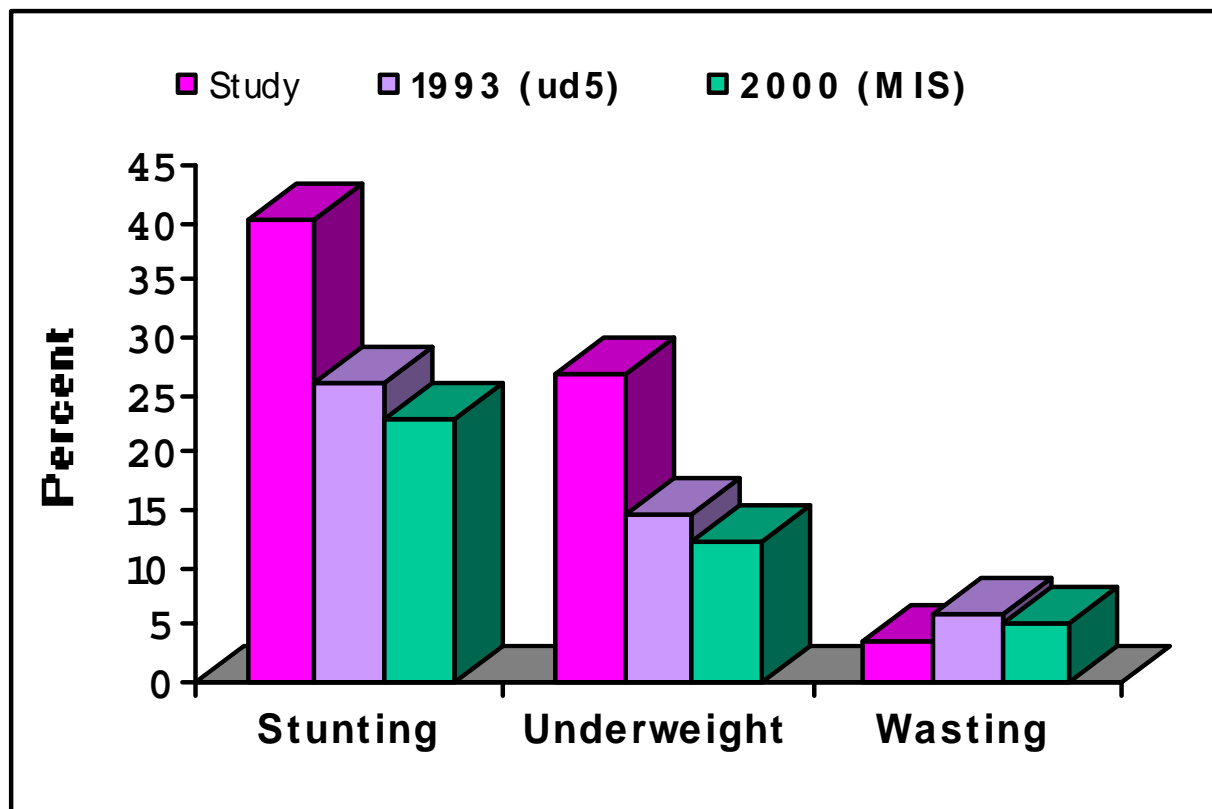
Pilot clinical nutrition trial in Botswana



- Design: Single-blind randomized study
- Test food product - fortified sorghum & bean
- Control food product - sorghum
- Subjects: 6-14 year old HIV+ children; n = 201 participants
- Participants on HAART on average 12 months before enrolment in study
- HAART:3TC/AZT/EFV (88%) or 3TC/AZT/NVP (12%)
- Follow-up assessments at quarterly intervals for 12 months:
- Nutrition assessment: anthropometric assessment using skin folds and bio-impedance; Dietary intake was assessed with the 24-hr recall method and nutrient intake was estimated using Food Finder 3



Prevalence of malnutrition in HIV+ children in Botswana





Socio-demographic profile of the subjects



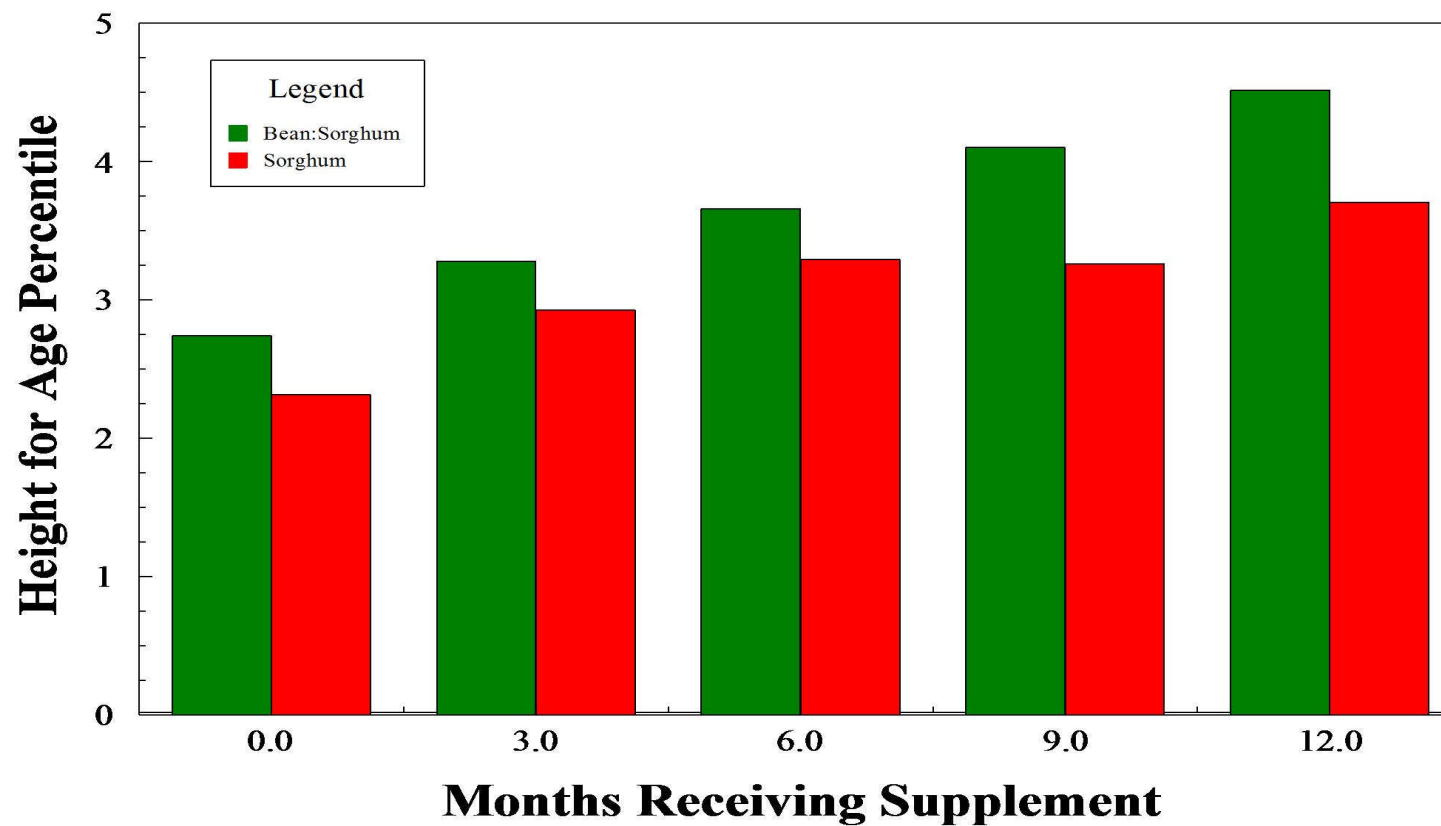
- 201 subjects enrolled
- 56% were males and 44% females
- over 60% had lost either one or both parents
- Over 70% reported that their mother or grandmother was their primary caregiver
- Majority of the caregivers (almost 80%) had only primary or secondary education
- The majority of the households (80%) were earning less than P2,000 / month (i.e. < US\$300 / month)



Improvement in nutritional status of HIV+ children in Botswana



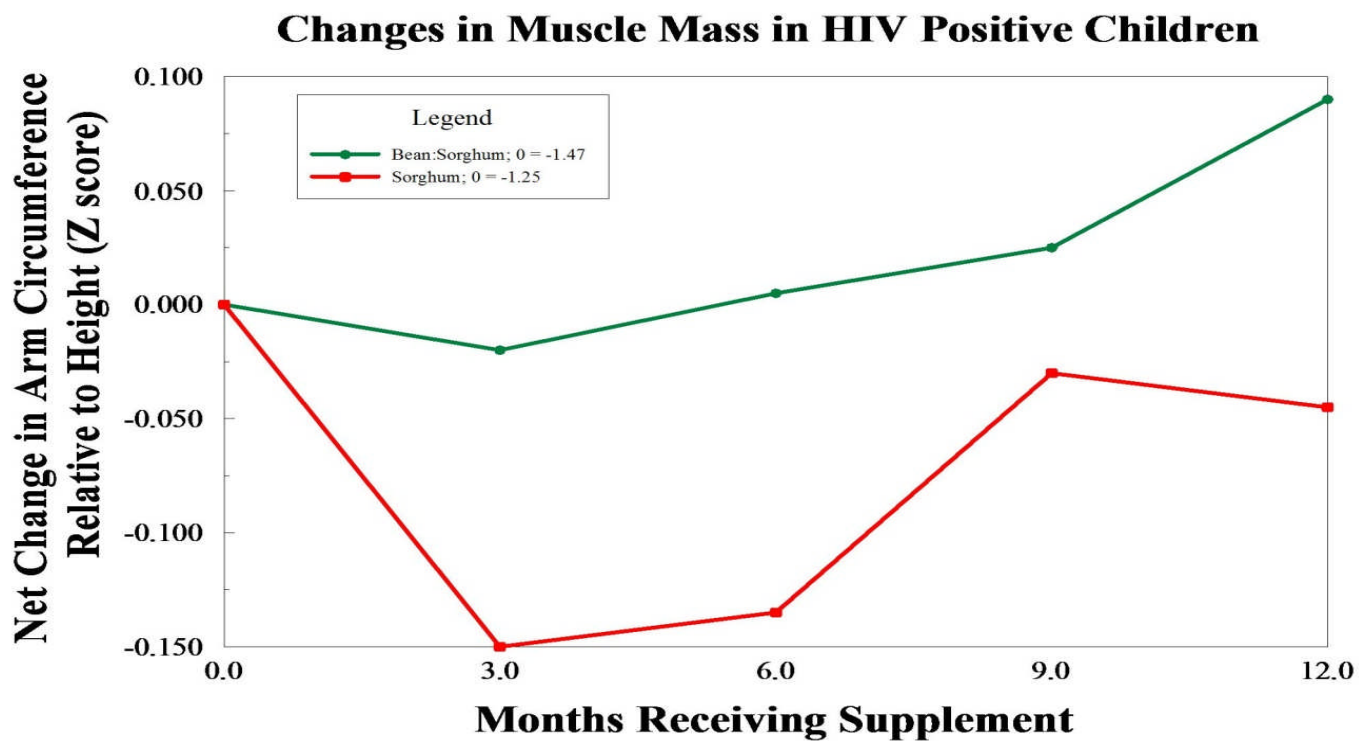
Supplements Improved Stature of HIV Positive Children



Source: Jackson et al, 2008



Improvement in nutritional status of HIV+ children in Botswana



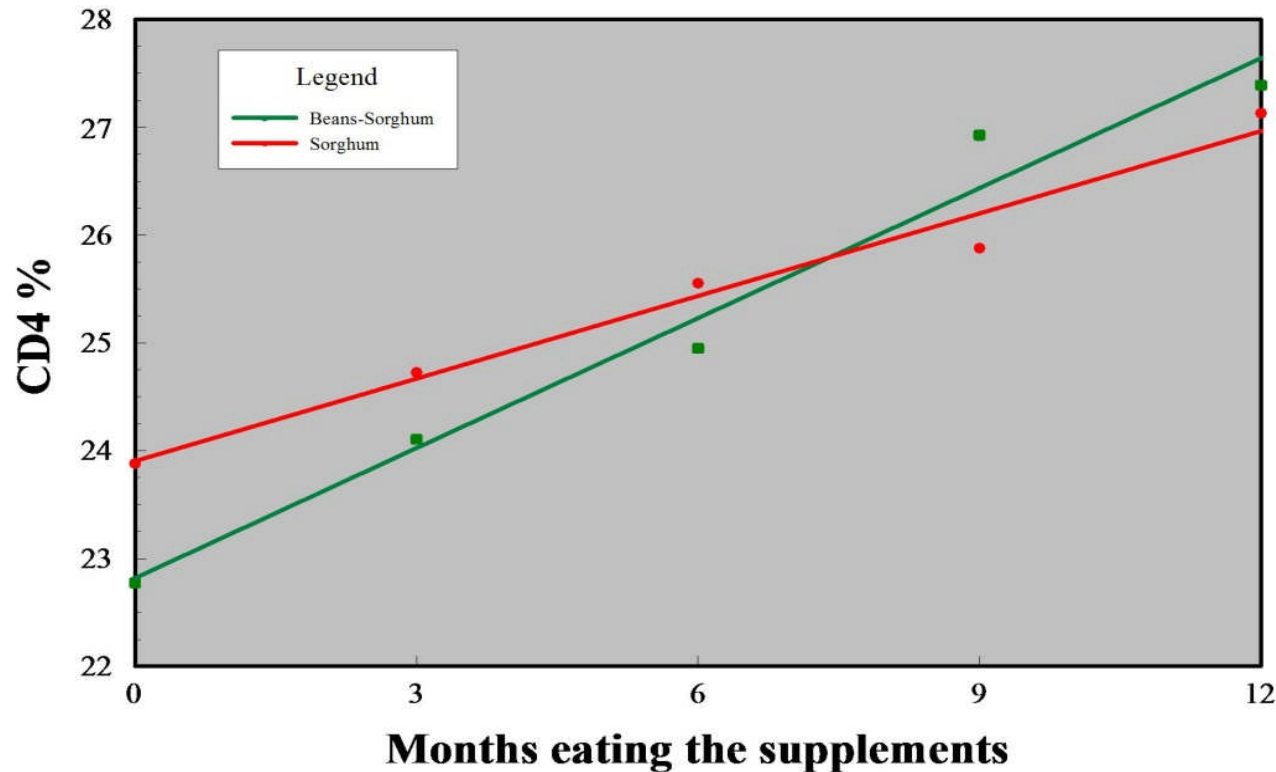
Source: Jackson et al, 2008



Improvement in immune status of HIV+ children in Botswana



Children eating the bean-sorghum supplement had a greater increase in CD4% ($p < 0.05$)



Source: Jackson et al, 2008



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Conclusions from the pilot



- The majority of children were nutritionally compromised at baseline displaying signs of underweight, wasting and stunting
- Poor socio-economic and living conditions put them at an increased risk for nutritional and developmental problems
- Interventions can be useful stop gap measures for improving the nutritional and immune status of children with HIV/AIDS combination.
- Nutritional support augments ARV therapy and should be integrated into HIVAIDS programs.



The way forward: HIV/Nutritional intervention



- New studies are needed on the epidemiology of malnutrition in HIV/AIDS patients based on current WHO criteria
- Studies should involve patients on HAART and those who are not
- Studies should include adults, pregnant women, infants and children
- Core syndemic components (eg socioeconomic status, co-morbidities) needs to be urgently assessed
- The importance of food supplements with local bias +/- micronutrients requires urgent interrogation



Acknowledgements



- ICSU Science planning on Health and Human Well being
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