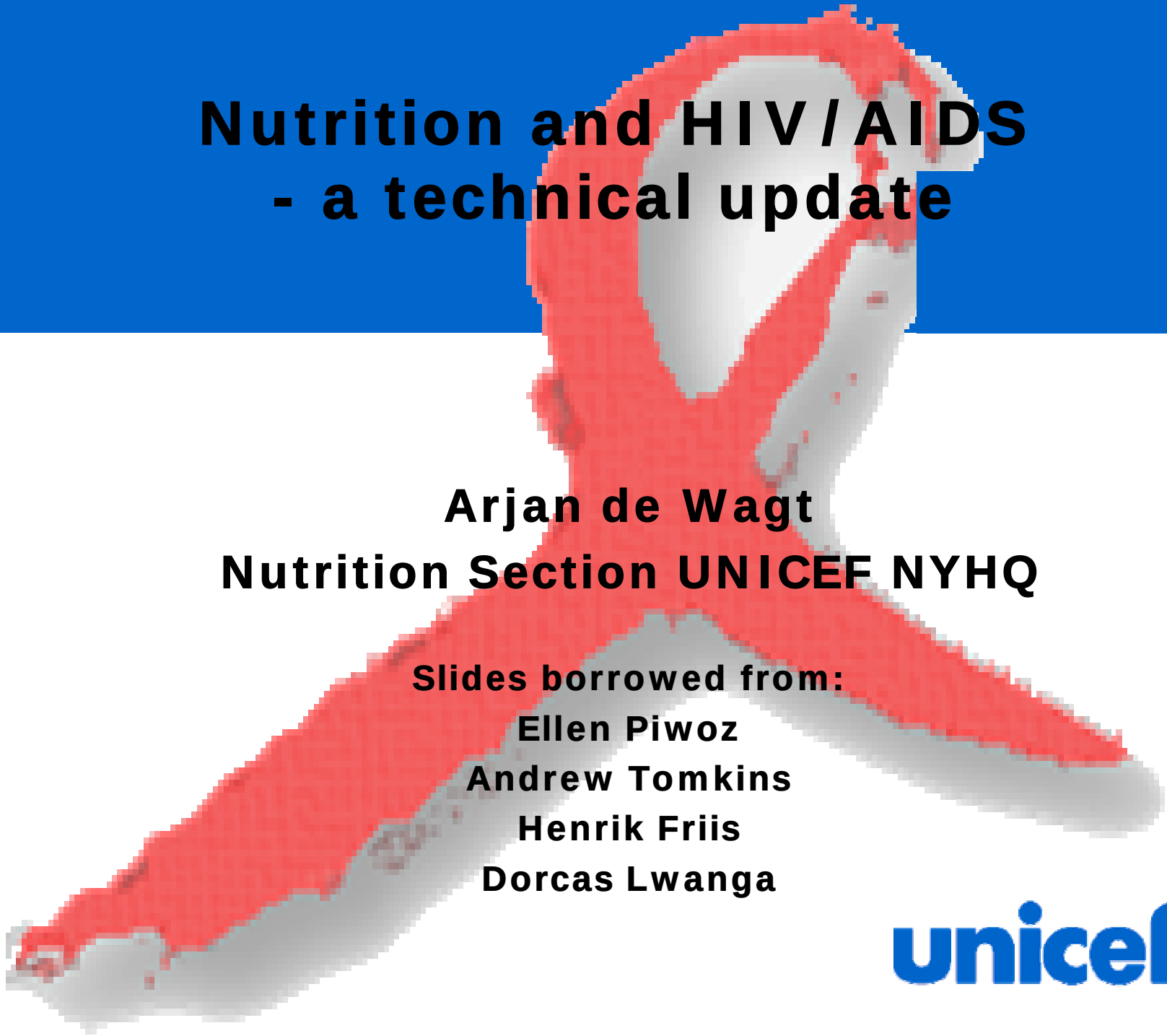
Nutrition and HIV/AIDS - a technical update



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Outline of presentation

- Links between nutrition and HIV
- Micronutrients and HIV
- Nutrition guidelines for PLWHA
- Nutrition and OVCs
- ARVs and nutrition

Links between nutrition and HIV

Clinical and proxy outcomes indicators

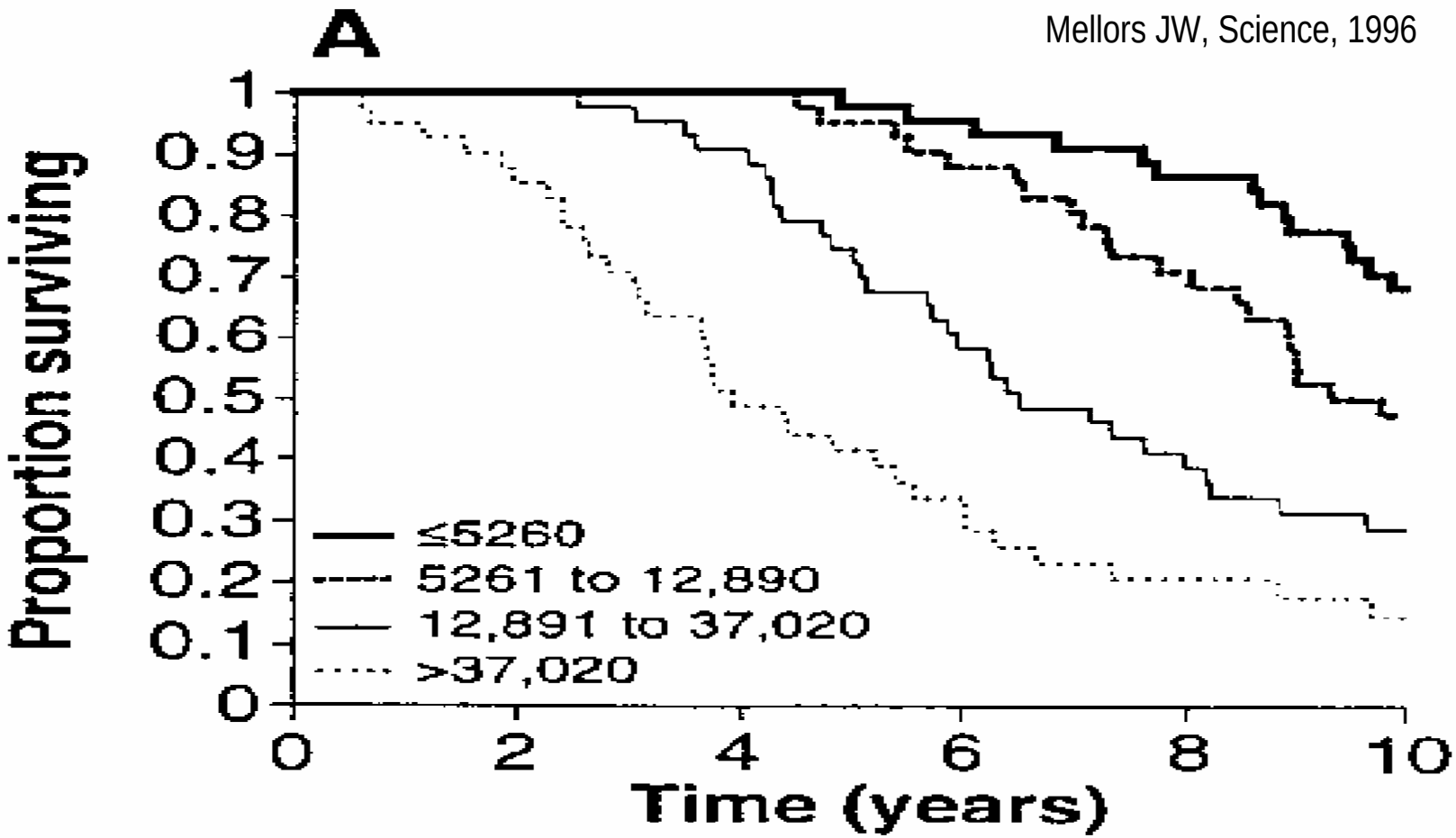
Clinical outcomes	Proxy variables
❖ Transmission	
❖ Female to male	Infectiousness: cervico-vaginal HIV shedding?
❖ Male to female	Infectiousness: viral load in semen?
❖ Mother-to-child	
- In utero / intrapartum	Infectiousness: cervico- vaginal HIV shedding?
- Postnatal	Infectiousness: viral load in milk?
❖ Progression	
❖ AIDS or mortality	Viral load in plasma
❖ Co-infections	immune system(CD4)

❖ Nutrition status (BMI, WfH etc)

❖ Nutrient status (serum retinol, iron stores etc)

Link viral load and survival

Mellors JW, Science, 1996



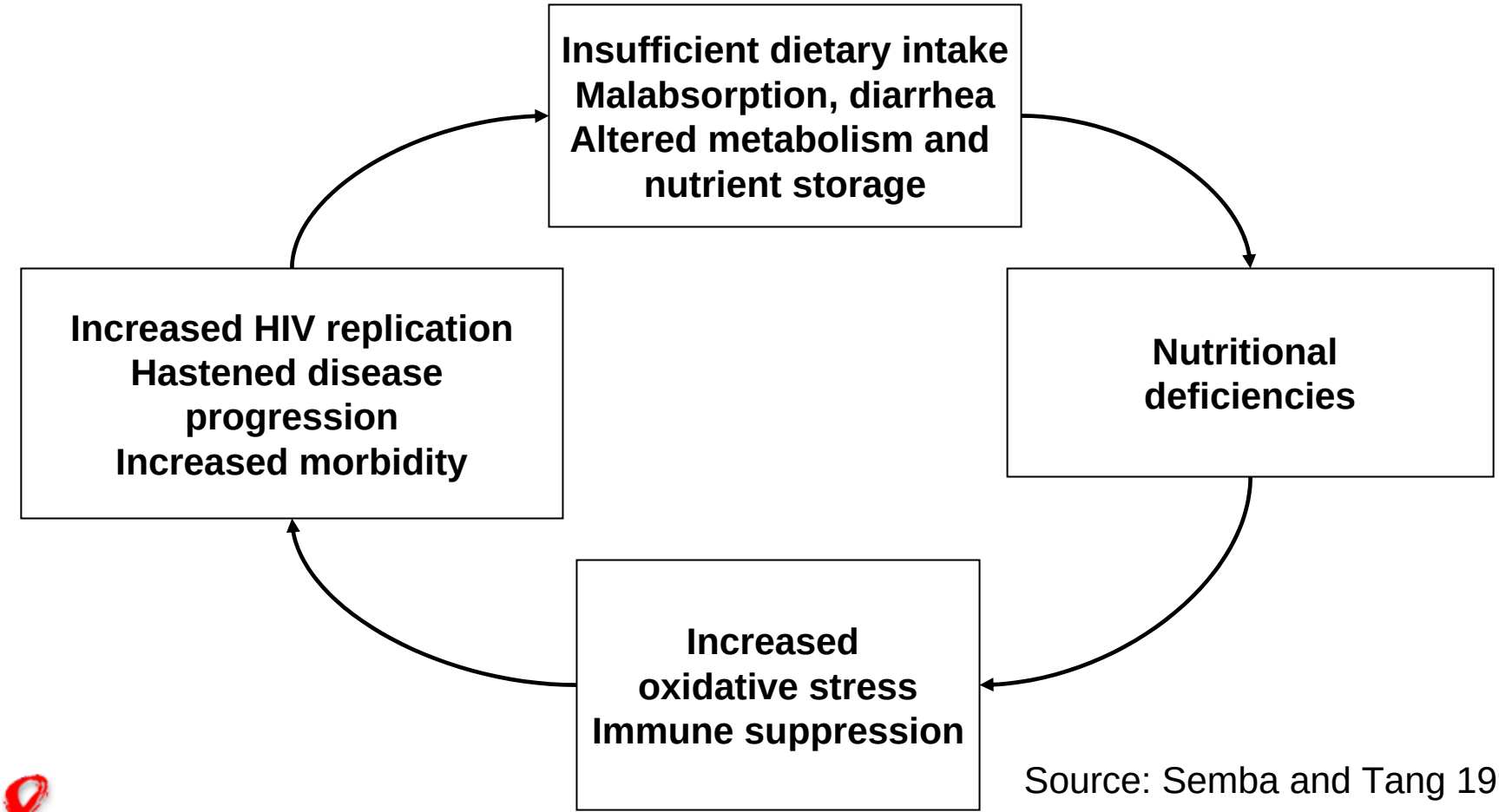
How Does HIV/AIDS Affect Nutrition?

- Causes a decrease in the amount of food consumed (anorexia; mouth/throat sores; reduced care: loss of appetite / anorexia / fatigue / depression; effects from medication; food insecurity)

- Impairs nutrient absorption (frequent diarrhea; poor absorption of fats affects use of fat-soluble vitamins (vit A & E)

- Changes metabolism (Infection increases energy and protein requirements; increased demand for antioxidant vitamins and minerals - Vit E, C, beta-carotene, zinc, selenium, iron, when antioxidants are not sufficient, oxidative stress occurs, increases HIV replication and leads to higher viral loads)

The Vicious Cycle of Malnutrition and HIV



Source: Semba and Tang 1999.

Observational Studies on Nutrition on HIV/AIDS

- Early observational studies showed:
  - Weight loss associated with HIV infection, disease progression, mortality
  - Some nutrient deficiencies (vitamins A, B_{12}, E, selenium, zinc) associated with HIV transmission, disease progression and mortality
- Observational studies do not tell us whether these conditions caused more rapid progression or resulted from it
- Clinical trials are required to show that improving nutrition can slow HIV disease progression and increase survival, few done in SSA

Micronutrients and HIV/AIDS

Summary, Micronutrients and host defence

(Modified from Friis H, ed. *Micronutrients and HIV infection*, CRC Press, 2001)

	Antioxidant	Immune funct.	Resistence
A	↑	↑ ↑ ↑	↑ ↑ ↑
B	↑	↑ ↑	↑
C	↑ ↑ ↑	↑	
E	↑ ↑ ↑	↑ ↑	
Fe	↓	↑	↑ ↓
Zn	↑ ↑ ↑	↑ ↑ ↑	↑ ↑ ↑
Se	↑ ↑ ↑	↑	↑

Increase: ↑ Decrease: ↓ (number of arrows indicate weak, moderate, strong effect)

Summary micronutrients and HIV infection

(Modified from Friis H, ed. *Micronutrients and HIV infection*, CRC Press, 2001)

	Viral load	Progression	Transmission
A	≈	↓ (↑)	≈ / ↑
B		(↓)	
C	(↓)		
E	(↓)		
Fe	Low dose ≈/ high dose?	(↑)	
Zn		(↑)	
Se	(≈)	(↓)	

No effect: ≈ Decrease: ↓ Increase: ↑ (Weak data)

Impact of vitamin A in PLWHA

- Vit A status associated with MTCT risk, suppl. No effect on reduction (RSA-Coutsoudis, Malawi-Kumwenda). Maybe during BF (Humphrey expected 2003)?
- No impact of 300,000IU on VL/CD4 in women (Humprhey)
- Reduction of diarrhoea in HIV+ children mort. 50% (RSA, Coutsoudis 1995), 92% (Tan., Fawzi, 1999)
- Reduced all cause mort. 63% in HIV+ 6-60 months and 68% AIDS related deaths (Tan., Fawzi 1999)
- No significant or prolonged impact on VL, CD4 (US, Semba 1996; Tan., Fawzi 1999)

Impact of vitamin A in PLWHA - contd

- High intakes (>20,000 IU/day) associated with increased mort. (Tang 1996)
- In vitro data indicates that suppl may activate HIV replication (Kitano, '90; Poli, '92; Turnpin '92)
- Suppl no significant effect on VL in vaginal secretion, CD4, 8. Vit A suppl unlikely to decrease infectivity of HIV+ women
- Men with STDs in Kenya: lower retinol levels/deficiency associated with lower risk of HIV (MacDonald, 2001)
- Men with STD in India: low b-carotene were 21 times more likely to acquire HIV (Mehendale, 2000)

Fawzi et all (AIDS, 2002) - set up

- 4 groups of women:L

  1) 5000 IU/daily + 30 mg b-carotene and 200.000 IU after birth

  2) vitA/carotene and daily multivatimin and 200.000 IU

  3) daily multivitamin

  4) placebo
- Start at 20 weeks continue during BF (median 18 months)

Fawzi et all (AIDS, 2002) - results

- Multivit no significant reduction of MTCT (20%) between 6 weeks and 24 months
- Multivit significant reduction of MTCT when mother had low CD4 (63% reduction) or high erythrocyte sedimentation, low HB and among low birth weight infants
- multivit significant reduced death and prolonged HIV-free survival when mother had low CD4 or poor nutrition
- Vit A arm non-significant effect on MTCT at 6 months (5% increase) and 6-24 months (33% increase), significant higher MTCT between 0 and 24 months (38% increase) - (At 24 months MTCT in vitamin A: 42.2%, in placebo: 33.8%)
- Combined vit A /multivit has similar effect as Vit A suppl alone

Fawzi et all (AIDS, 2002) - Conclusions / recommendations

- Daily multi-vit suppl to HIV+ pregnant and BF women has positive impact
- Very high doses of VitA might increase risk of MTCT
- However, results not confirmed by other studies (RSA and Malawi), both showed non-significant lower MTCT when vitA suppl. during pregnancy. 300,000 IU to HIV+ women did not affect VL or CD4 (Zimbabwe, Humphrey, 1999)
- What is cause: high dose, low does, carotene or combination?
- Where vitamin A deficiency is a problem, supplementation to women after delivery and young children should continue and be expanded using existing recommended dosage
- Impact of vitamin A supplementation (and other micronutrients) in PLWHA to be further studied

Overall conclusions

- No impact of normal levels of vitamin A supplementation on MTCT shown
- Vitamin A supplementation might reduce morbidity and mortality in HIV+ children
- Possible negative impact of dosage much higher than present recommendations (like iron, zinc?)

Dietary guidelines for People living with HIV/AIDS

WHO expert consultation on nutrient requirements for PLWHA - May 2003

- Limited evidence resulting in difficulties making evidence recommendations
- Energy: 10% increase in RDA when HIV+, 30% increase when AIDS
- Protein: possible increase, not yet quantified
- Micronutrients:
  - existing iron, folate and vitamin A supplementation guidelines to be followed independent of HIV status. Not less, not more
  - Normal fortification levels not expected to give problems
  - PLWHA need at least 100%RDA and possibly more. Based on present evidence not possible to provide guidelines for composition of and micronutrient levels in supplement

Components of Nutritional Care and Support

- Nutrition Assessment: BMI, WFH, WFA,HFA, MUAC
- Nutrition education and counselling: adequate diet, proper food handling and safety
- Hygiene: water, sanitation
- Physical Activity: exercise to improve body composition
- Safer sex and reproductive health practices: use of condoms
- Psychosocial support: emotional, spiritual, and social support
- Symptom based management: diet and medication strategies for symptom control, safe traditional therapies for symptom management

Stages of HIV Disease and Nutrition

- **Early - no symptoms, stable weight:**
  - Promote a diet adequate in energy, protein, and other essential nutrients
  - Maintain physical activity
- **Middle - weight loss:** "minimize consequences"
  - Maintain intake during periods of acute illness and depressed appetite, increase intake to promote weight gain and recovery
  - Continue physical activity as able
  - Manage the symptoms that affect food intake immediately
- **Late - symptomatic AIDS, wasting** " provide comfort"
  - Treat infections affecting appetite, ability to eat, retention of nutrients
  - Maintain intake during periods of acute illness
  - Modify diet according to symptoms
  - Encourage physical activity as able

Recommendations for Symptom-Based Nutrition Care and Support

Symptom	Nutritional Strategy
Loss of appetite	Eat small, frequent meals throughout the day (5-6 meals/d) Eat nutritious snacks whenever possible - “make every bite count” Drink plenty of liquids Take walks before meals – the fresh air helps to stimulate appetite Have family or friends assist with food preparation
Sore mouth and throat	Avoid citrus fruits, acidic and spicy foods Eat foods at room temperature or cold Eat soft and moist foods Avoid caffeine and alcohol

Recommendations for Symptom-based Nutrition Care and Support continued

Symptom	Nutritional Strategy
Nausea and vomiting	Eat small, frequent meals (avoid an empty stomach as this makes the nausea worse) Eat dry bread or toast, and other plain dry foods, preferably in the morning before getting out of bed Avoid foods with strong or unpleasant odors Avoid fried foods Drink plenty of liquids Rest and relax after and between meals Avoid lying down immediately after eating (wait for at least 1-2 hours) Avoid coffee and alcohol

Recommendations for Symptom-Based Nutrition Care and Support continued

Symptom	Nutritional Strategy
Diarrhea	Eat bananas, mashed fruits, soft white rice, porridge Eat smaller meals, more often Eliminate milk and milk products to see if symptoms improve Avoid intake of fried and high fat foods Don't eat foods with insoluble fiber ("roughage") - take the skin off fruits and vegetables Drink plenty of fluids (8-10 cups/day) Give oral rehydration solution if diarrhea is severe Avoid sweet drinks Drink diluted juice Avoid very hot or very cold foods (they stimulate the bowels)

If diarrhea is severe, food may be withheld for 24 hrs or restricted to only clear fluids, such as, soups, tea or soft foods (mashed fruit, potatoes, white rice, porridge)

Recommendations for Symptom-Based Nutrition Care and Support continued

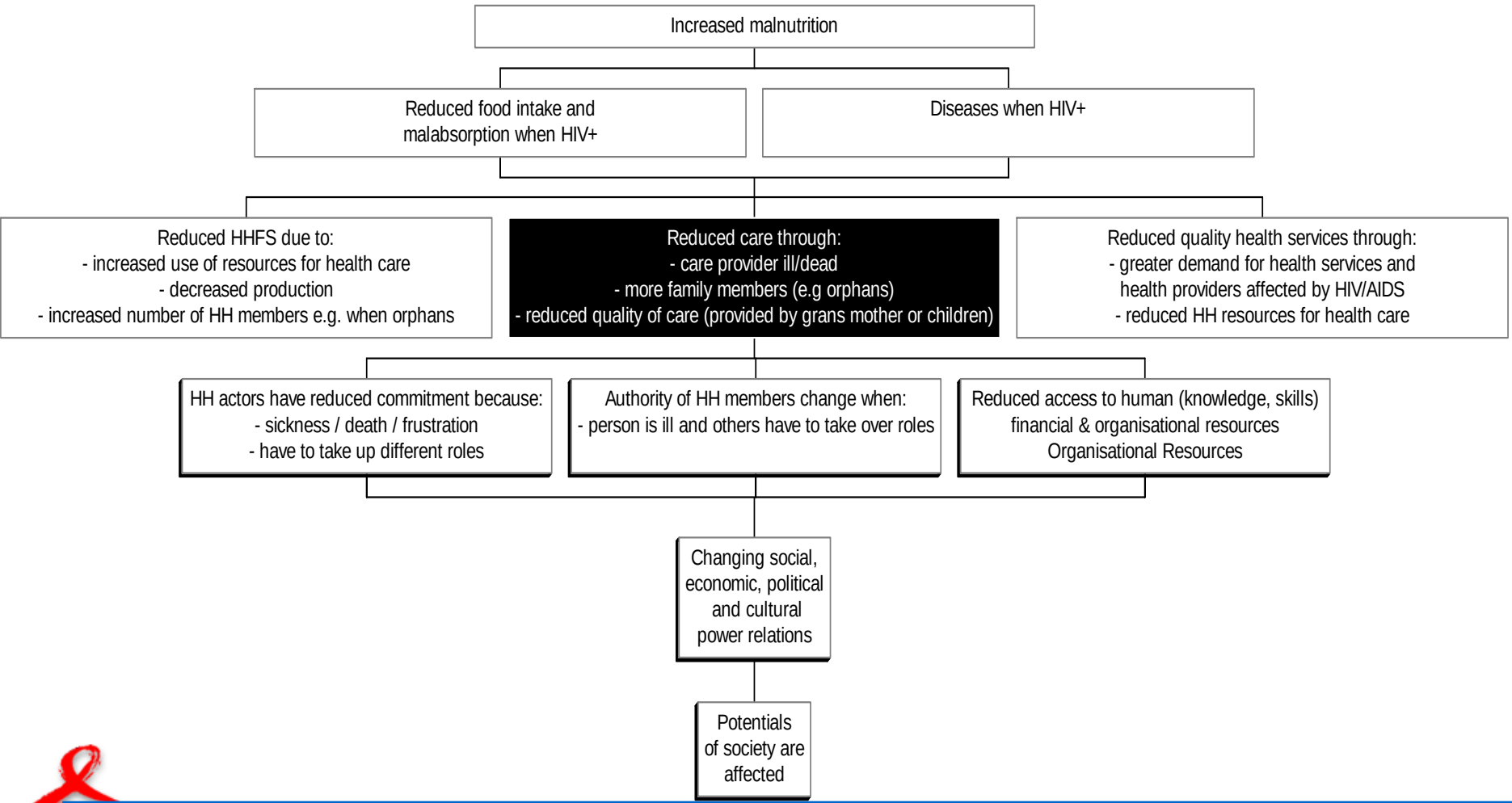
Symptom	Nutritional Strategy
Fever	Drink plenty of fluids Eat small frequent meals as tolerated Add snacks between meals
Altered Taste	Use a variety of herbs and spices to enhance the flavor of the food Try different textures of food Chew food well and move around mouth to stimulate receptors

Recommendations for Symptom-Based Nutrition Care and Support continued

Symptom	Nutritional Strategy
Poor fat absorption	Eliminate oils, butter, margarine, ghee and foods that contain or were prepared with them Eat lean meats. Trim all visible fat and remove skin from chicken Avoid deep fried, greasy and high fat foods Eat fruit and vegetables and other low-fat foods
Fatigue, lethargy	If possible, have someone pre-cook foods Eat fresh fruits that don't require preparation in between meals Eat smaller, more frequent meals and snacks throughout the day Exercise as able to increase energy Try to eat at the same time each day

Nutrition and OVCs

causal analysis of malnutrition and HIV



Effects of Parental Death, Illness on Nutrition of Child

- Less food available because of loss of adult earner
- Less food available because of adoption into resource limited household – extended family/fostered
- Childcare less available when parent is ill
- Childcare quality reduced when orphaned
- Child increasingly involved in caring for ill parents and siblings
- Illness treatment less often achieved
- Emotional stress/eating not so readily supported
- School attendance less frequent
- Social development impaired

ARVs and Nutrition

Nutrition / ARV interactions

- Food affects medication absorption, metabolism, distribution, excretion
- medication affects nutrition absorption, metabolism, distribution, excretion
- Medication side effects affect food consumption, nutrient absorption
- medication and certain foods can give unhealthy side effects

Food and ARVs

- Some ARVs should be taken with food (2-3 times per day)
- Some ARVs should be taken without food (food not be taken within 2 hour before, 1 hour after taking medication (2-3 times daily)

Common Side effects of ARVs

- Diarrhea, nausea, reduced appetite
- Fat metabolism:
  - Lypodistrophy
  - cholesterol
- Liver / kidney problems

Basically nothing known about impact of ARV use in nutrition compromised populations and on impact of ARVs on micronutrient status