

## SESSION 8 NUTRITIONAL CARE FOR YOUNG CHILDREN INFECTED WITH HIV OR BORN TO HIV-INFECTED MOTHERS

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### Purpose

The purpose of this session is to equip students with knowledge and materials on nutritional care and support for children infected with HIV or born to mothers infected with HIV and the care of severely malnourished children with HIV/AIDS.

### Learning objectives

By the end of the session students will be able to:

- Explain the relationship between nutrition and HIV/AIDS in children and the etiology of growth failure among HIV-infected children and children born of mothers infected with HIV.
- List the nutrition actions to prevent or reduce wasting and specific nutrition deficiencies.
- Present the key issues in the management of severely malnourished children with HIV/AIDS.

### Prerequisite knowledge

- Technical background in infant and young child nutrition.
- Session 2: The Link between Nutrition and HIV/AIDS

**Estimated time:** 120 minutes, excluding time for field work

## Outline

Content	Methodology	Time
<p>1. Etiology of malnutrition in children infected with HIV or born to HIV-infected mothers</p> <ul style="list-style-type: none"> <li>• Number of children infected with HIV/AIDS in the region</li> <li>• Sources of malnutrition among HIV-infected children and children born to HIV-infected mothers               <ul style="list-style-type: none"> <li>○ Malnutrition before and after birth and progressive post-natal malnutrition in HIV-infected children</li> <li>○ Reasons for growth retardation in HIV-infected children</li> </ul> </li> <li>• Consequences of growth failure among children with HIV/AIDS</li> </ul> <p>2. Nutritional care and support for children infected with HIV or born to HIV-infected mothers</p> <ul style="list-style-type: none"> <li>• Goals of nutritional care and support</li> <li>• Components of nutritional care and support for children infected with HIV or born to HIV-infected mothers</li> <li>• Provider guidelines for nutritional care and support of children infected with HIV or born to HIV-infected mothers</li> </ul>	<p>Facilitate an interactive lecture using <b>PowerPoint 8</b> presentation</p> <p>Brainstorm reasons for growth failure in HIV-infected children</p> <p>Use <b>Discussion Points 8</b> to help participants master the concepts during discussion</p> <p>Brainstorm key nutrition actions for children with HIV</p>	<p>100 minutes</p>
<p>3. Special considerations for care and support of severely malnourished children who are HIV positive</p> <p>4. Considerations in and approaches to care and support</p> <p>5. Case study: Why Did Norman Die?</p> <p>6. Nutritional considerations for a terminally ill child</p>	<p><u>After the lecture</u></p> <p>Divide class into groups of 4 and give <b>Exercise 8</b> cards on “Why Did Norman Die?” (cards and case studies attached)</p> <p>Distribute Arpadi 2000a and <b>Handout 8.1: Growth Failure in Children with HIV Infection</b></p>	<p>20 minutes</p>

## Required materials

- LCD or overhead projector
- Flipchart stand and paper or board and chalk
- Writing pens

## Recommended preparation

- Be familiar with **Lecture Notes 8: Nutrition and HIV/AIDS among Young Children**.
- Look through **Discussion Points 8** to identify relevant questions to help students master the concepts. Facilitate group discussions of these issues if time allows.
- Allocate time for each activity considering students' backgrounds and coverage of the activity elsewhere.
- If necessary, refer to some reading materials, particularly Arpadi 2000a.
- Prepare cards for **Exercise 8: Why Did Norman Die?**

## Materials provided

### PowerPoint Presentations

- **PowerPoint 8/overhead presentation: Nutrition and HIV/AIDS among Young Children**

### Additional Resources Available on CD

- Arpadi S. 2000a. Growth failure in children with HIV infection. *JAIDS* 25: S37-S42.

## Suggested reading materials

Agostoni C, GV Zuccotti , M Giovannini , et al. 1998. Growth in the first two years of uninfected children born to HIV-1 seropositive mothers. *Arch Dis Child* 79: 175-78.  
<http://adc.bmjournals.com/cgi/content/full/archdischild%3b79/2/175>

Arpadi, S. 2000a. Growth failure in children with HIV infection. *JAIDS* 25: S37-S42.

———. 2000b. Growth velocity, fat-free mass and energy intake are inversely related to viral load in HIV-infected children. *J Nutrition*. 130: 2498-502.  
[www.nutrition.org/cgi/content/full/130/10/2498](http://www.nutrition.org/cgi/content/full/130/10/2498)

Bailey RC, MC Kamenga., MJ Nsuami, et al. 1999. Growth of children according to maternal and child HIV, immunological and disease characteristics: A prospective cohort study in Kinshasa, Democratic Republic of Congo. *Inter J Epidemiology*. 28: 532-40.

Berhane, R, et al. 1997. Growth failure as a prognostic indicator of mortality in pediatric HIV infection. *Pediatrics* 100.  
[www.pediatrics.org/cgi/content/full/100/1/e7](http://www.pediatrics.org/cgi/content/full/100/1/e7)

Fontana, M, G Zuin, A Plebani, K Bastoni., et al. 1999. Body composition in HIV-infected children: Relations with disease progression and survival. *Am J Clin Nutr* 69: 1282-86

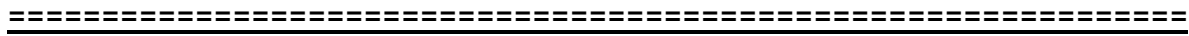
Miller, TL, et al. 2001. The effect of protease inhibitor therapy on growth and body composition in human immunodeficiency virus type 1-infected children". *Pediatrics* 107. [www.pediatrics.org/cgi/content/full/107/5/e77](http://www.pediatrics.org/cgi/content/full/107/5/e77)

Prasuck T, et al. 1993. HIV infection and severe malnutrition: A clinical and epidemiological study in Burkina Faso. *AIDS* 7(1): 103-8.

Semba, RD, P Miotti, JD Chipangwi, et al. 1997. Maternal vitamin A deficiency and child growth failure during human immuno deficiency virus type 1 infection. *J Acquir Immune Defic Syndr Hum Retroviral* 14: 219-22.

Villamor, E, et al. 2002. Vitamin A supplements ameliorate the effect of HIV-1, malaria, and diarrheal infection on child growth. *Pediatrics* 109.  
[www.pediatrics.org/cgi/content/full/109/1/e6](http://www.pediatrics.org/cgi/content/full/109/1/e6)

# LECTURE NOTES 8: NUTRITION AND HIV/AIDS AMONG YOUNG CHILDREN



## Introduction

The Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) recognize malnutrition or growth faltering as an important sign of AIDS infection in children (CDC 1987). Malnutrition is a problem not only for children infected with HIV but also for HIV-negative children born to infected mothers. Numerous factors known to clinically indicate HIV infection in children have been used to define the essential actions for care of HIV-affected children, though many other factors are still unknown.

## Purpose (slides 2, 3)

The purpose of this session is to equip students with knowledge and materials on nutritional care and support for children infected with HIV or born to mothers infected with HIV and the care of severely malnourished children with HIV/AIDS. The session:

- Explains the relation between nutrition and HIV/AIDS in children and the etiology of growth failure among HIV-infected children and children born of mothers infected with HIV.
- Lists the nutrition actions to prevent or reduce wasting and specific nutrition deficiencies.
- Presents the key issues in the management of severely malnourished children with HIV/AIDS.

## How children become infected with HIV (slides 4, 5, 6)

Infants can acquire HIV from their infected mothers during pregnancy, at the time of labor and delivery, or after birth through breastfeeding. They can also become

infected with HIV-contaminated blood or from medical equipment or sometimes through child abuse. In some populations in sub-Saharan Africa, 30 percent or more of pregnant women are infected with HIV. As presented in Session 7, in the absence of prevention of mother-to-child transmission (PMTCT) interventions, 24 percent–45 percent of HIV-infected mothers will pass on the virus to their infants.

By 2000 an estimated 5 million children were infected with HIV. As shown in table 1, over 150,000 children in Ethiopia, 95,000 in South Africa, and 78,000 in Kenya were living with HIV/AIDS in 2000. The number of orphans from HIV/AIDS in some countries is 5 percent–8 percent of the total population. All these children have to be given special care.

**Table 1 HIV infection rates by African country, 2000**

Country	HIV rate in adult population (percentage)	Children 0–14 infected	Children orphaned
Angola	2.8	7,900	98,000
Burundi	11.3	19,000	230,000
Botswana	35.8	10,000	66,000
DR Congo	5.1	53,000	680,000
Ethiopia	10.6	150,000	1,200,000
Kenya	13.9	78,000	730,000
Lesotho	23.5	8,200	35,000
Madagascar	0.2	450	2,600
Malawi	15.9	40,000	390,000
Mozambique	13.2	52,000	310,000
Namibia	19.5	6,600	67,000
South Africa	19.9	95,000	420,000
Rwanda	11.2	22,000	270,000
Swaziland	25.2	3,800	12,000
Tanzania	8.1	59,000	1,100,000
Uganda	8.3	53,000	1,700,000
Zambia	19.9	40,000	650,000
Zimbabwe	25.1	56,000	900,000

Source: UNAIDS 2002

Despite these statistics, it is difficult to assess whether and when a child is infected with HIV. Conventional methods such as HIV antibody tests (ELISA and Western blot assays) cannot reliably differentiate infants' own HIV antibodies from trans-placenta-acquired maternal antibodies. Expensive virologic assays such as HIV DNA polymerase chain reaction (PCR) are more useful in defining HIV among young children. Because of these challenges in assessing the HIV status of infants, this session discusses only how to care for children born to the one-third of mothers assumed to be infected with HIV. The session also presents current knowledge on the etiology of malnutrition in HIV-infected children.

## **Risk of malnutrition among children born to HIV-infected women and HIV-infected children**

Low birth weight and stunting are common among children born to HIV-infected mothers.

**HIV-infected women are likely to give birth to low birth weight children (slides 7, 8)**

Studies differ on the effect of maternal HIV status on birth weight. Generally, infants born to HIV-infected women have a higher risk of lower birth weight, regardless of their HIV status, compared with infants of uninfected women. A study in Kigali, Rwanda, reported a mean birth weight of 2,047g among children born to HIV-infected women, compared with 3,104g among children born to HIV-negative women of the same social and economic conditions (Casterborn et al 1999). Some studies report lower birth weight but not shorter mean length among children born to HIV-infected women at full term (Agostoni et al 1998; Bailey et al 1999). Reduced birth weight and length are not necessarily more severe among HIV-infected children than among uninfected children born to HIV-positive women (Bailey et al 1999; LePage et al 1998).

Four factors seem to be associated with reduced birth weight among children born to HIV-infected women:

- Shorter gestational age among HIV-infected women
- Severity of maternal HIV disease, a factor of viral load

- Intrauterine growth retardation and micronutrient deficiency, most likely occurring late in the pregnancy. Infection with HIV increases demand for energy and nutrients. If food intake is not adequate to compensate for the increased needs, a negative energy and micronutrient balance may result.
  - In one study in areas prone to vitamin A deficiency in Malawi (Semba et al 1997), 1-year-old children of vitamin A-deficient mothers weighed approximately 8 percent less and were 2 percent shorter than infants born to vitamin A-replete mothers, regardless of the infants' HIV status.
  - In another study in Tanzania (Fawzi et al 1998), supplementation of HIV-infected women with multivitamins during pregnancy improved the pattern of weight gain and improved birth weight and birth outcome.
- Prenatal drug or alcohol use during pregnancy (Arpadi 2000a).

**Progressive post-natal stunting is common among HIV-infected children (slides 9, 10, 11)**

Although uninfected infants born to HIV-infected women start with lower birth weights, they show rapid weight gain and “catch-up” growth immediately after birth. Mainly this is facilitated by fat mass deposition. By the third month most uninfected children born of HIV-infected women have caught up in height and weight with children born to HIV-negative women (Agostoni et al 1998).

Poor growth, however, is common among children infected with HIV. As many as 50 percent of children with HIV fail to thrive (Arpadi 2000a). In fact, since 1994 the CDC has used failure to thrive as an AIDS definition condition in children. By the third month, linear growth (height) is proportionately decreased among HIV-infected children. The difference in linear height is significant and evident by the second year of life. By that time, HIV-infected children have a growth velocity of less than the fifth percentile, an indication of severe growth failure. Along with stunting, symptomatic HIV-infected children commonly show HIV-related wasting, mainly marasmus.

## Etiology of growth failure among HIV infected children (slides 12, 13, 14)

What explains the slow linear growth among HIV-infected children? The etiology is not well understood and may involve many factors. Some documented factors are listed below.

- The rate of HIV replication has a reciprocal relation to the rate of growth.
  - HIV-infected children with poor growth also have higher viral loads than infected children with normal growth curves (Pollack et al 1997).
  - Suppression of viral load with antiretroviral drugs (ARVs) appears to have a favorable effect on growth, especially weight gain (Arpadi 2000a).
- Underlying disease activity seems to be a major factor in children's growth (Bailey et al 1999). Gastrointestinal dysfunction (including persistent diarrhea) and malabsorption are key factors in the nutrition of children in resource-constrained areas.
- Inadequate energy and micronutrient intake (simple starvation) affect growth. For most HIV-infected children, daily intake may not be sufficient to meet increased metabolic demands. In addition, during this period of rapid growth there is normally increased demand on available nutrient pools. HIV-infected children or children born to HIV-infected parents may not be able to consume adequate foods to meet all their needs, for various reasons:
  - High social risk of being born to poor households and having mothers with HIV/AIDS who are unable to access enough food for themselves and their babies or to provide quality care
  - Gastrointestinal dysfunction, including infections and malabsorption
  - Infections and use of medicine affecting child food intake
  - Micronutrient deficiency associated with growth failure
  - Additional nutrient and energy needs for growth and development, even in the absence of abnormal eating habits

- Children infected with HIV also show preferential decreases of fat-free mass (lean body mass) compared to uninfected children . This is also seen among children (especially boys) depicting normal rates of growth. This may be associated with:
  - High viral load, also associated with decreased proportion of free fat mass
  - Host immune response to the replication of the virus, which may increase the basal metabolic demands (and thus increased energy expenditures) in HIV-infected children. Unlike in adults, hypermetabolism is rarely reported in HIV-infected children. However, the lack of hypermetabolism may partly result from a lower amount of FFM, which is preferentially decreased in children infected with HIV, especially those with growth failure.
- Maternal vitamin A deficiency influences infant linear growth during the first year of life. Increased mortality is associated with vitamin A deficiency during human immunodeficiency virus infection (Semba, Miotti, Chipangwi, et al 1997).
- The following additional factors may be associated with the etiology of growth failure and altered body composition:
  - Metabolic and endocrine alterations or disorders associated with stress
  - Growth hormone deficiency
  - Hypothyroidism

**Consequences of growth failure among HIV-infected children (slides 15, 16, 17, 18)**

Poor growth is associated with poor survival. HIV-infected Ugandan infants with weight-for-age below -1.5 Z-scores have five times the risk of dying before the age of 25 months compared with non-infected children (Berhane et al 1997). Growth failure among HIV-infected children is associated with retarded cognitive development and functional deficits such as delayed sexual development among

boys. Micronutrient deficiencies will result in functional consequences similar to those reported in uninfected children.

### **Nutritional care and support of children infected with HIV or born to mothers with HIV (slide 19)**

Nutritional care and support of children born to HIV-infected women is similar to that of HIV-infected adults.

### **Goals of nutritional care and support of children born to HIV-infected women (slides 20, 21)**

- Improving nutritional status—maintaining weight, preventing weight loss, and preserving lean body mass
- Building stores of essential nutrients (macronutrients and micronutrients) necessary to boost immunity for resistance to infections and speedy recovery in case of infections
- Preventing food-borne illnesses by promoting hygiene and food and water safety
- Enhancing the quality of life by promptly treating infections and managing the symptoms that affect food intake to minimize the impact of secondary infections on nutritional status

### **Components of nutritional care and support for HIV-infected children and children born to HIV-infected women (slide 22)**

The risk of malnutrition among children born to HIV-infected women or children infected with HIV requires regular nutritional assessments and early nutrition interventions. Programs that provide nutritional care and support for affected children should include the following components:

- Prevention of mother-to-child transmission of HIV (including maintaining appropriate weight gain in pregnancy and avoiding behaviors that increase risk of low birth weight and length)

- Periodic nutritional assessment of infants and young children
- Nutrition support and behavior change communication to improve nutrition for the mother and the child
- Proper food hygiene and handling (plus periodic deworming)
- Diversification of the child's food (or the use of micronutrient supplements and fortified foods) to increase energy density and micronutrient availability
- Prompt treatment of infections and opportunistic infections that affect food intake and nutrition
- Use of ARVs where available or affordable

***Good obstetric care and maternal nutrition*** (slide 23)

Good obstetric care and prevention of mother-to-child transmission of HIV are vital to prevent transmission of HIV to children and maintain good nutrition. Actions include supporting women to maintain appropriate weight gain in pregnancy, take multivitamin supplementation, and avoid behaviors that increase the risk of low birth weight and length.

***Periodic nutritional assessment (growth monitoring)*** (slides 24, 25)

The goal of nutritional assessment and intervention is to improve nutrition status, prevent further complications, and enhance the child's quality of life and survival.

The nutritional assessment is important to gather information on the current nutrition status and adequacy of the diet and to identify risk factors for developing nutritional complications. The earlier and more consistently this can be done the better. The information gathered should be interpreted to identify problems that put the children at increased nutrition risk and to design the best intervention with caregivers. The assessment should help capture the following information:

- Changes in nutritional status (weight for height and height for age)

- Changes in eating behaviors associated, for example, with food availability issues, feeding pattern changes, and appetite changes
- Morbidity that may result in nutritional changes

### Components of the nutritional assessment

The nutritional assessment should cover the child's physical and biochemical (laboratory) data, nutrition history, medical history, and medication profile.

#### **1. Physical assessment**

- Anthropometric measurements
  - Growth monitoring measures normally include weight and age but should also include height.
  - Weight changes are assessed monthly basis (a child should grow parallel to the growth curves).
- Measurements to assess changes in muscle mass
- Screening for pallor (inner eyelids and palms) to assess anemia

#### **2. Biochemical data (where available and feasible)**

- Serum albumin
- CD4 and viral load counts
- Evaluation of anemia: iron (Hb), B<sub>12</sub>, and folate status

#### **3. Nutrition history**

- Dietary intake, frequency and adequacy of food consumed (including breastmilk for infants who are breastfed), exclusiveness of breastfeeding among infants

who are breastfed, exclusiveness of replacement feeding among infants who are not breastfed, adequacy of breastmilk substitutes for infants who receive replacement feeding, foods given, and hygiene practices

- Dietary problems such as poor appetite, difficulty chewing and swallowing, gastrointestinal problems, oral thrush, and sores
- Food intolerance and aversions, especially related to dietary symptoms
- Hygiene and practices in preparing and handling baby foods
- Use of vitamin and mineral supplements (e.g., vitamin A, iron supplementation), deworming, and alternative practices
- Medical history
- Recent gastrointestinal problems (e.g., diarrhea, abdominal pain, nausea, and vomiting)
- Pattern of bowel movements (e.g., incidence of constipation)
- Opportunistic infections
- Concurrent medical problems (e.g., malaria, worm infestation, oral thrush and sores)

## **5. Medication profile**

- Drug use (e.g., ARVs, alternative therapies, and other medications)
- Side effects of medications and their nutrition implications

### Nutritional support, education, and counseling of caregivers

Caregivers need not only nutrition education but also a sense of empowerment and confidence to apply the knowledge in their contexts. Nutritional support and counseling of caregivers should:

- Address issues relevant and of concern to most caregivers and their children
- Allocate time for individual evaluation and counseling
- Provide practical suggestions
- Use a list of local, affordable, and accessible foods to show mothers how much extra food they need to eat or to feed their children
- Provide advice on how to manage symptoms such as loss of appetite, diarrhea, vomiting, and weight loss
- Address harmful traditional feeding practices and practices that do no harm that should be encouraged
- Be respectful and confidential at all times

***Proper food hygiene and handling practices*** (slide 26)

Session 3 on nutrition actions for the care and support of people living with HIV/AIDS addresses food hygiene, including water and sanitation and proper handling and safety of children's food and drinks. The aim of proper food hygiene and handling is to avoid food- or water-borne infections such as diarrhea, dysentery, cholera, and typhoid that can further weaken the immune system and thus foster HIV disease progression.

***Food diversification*** (slide 27)

Children's food can be diversified by increasing energy density and providing micronutrient supplementation or fortification. This meets the energy requirements of children infected with HIV or born to HIV-infected mothers and optimizes their nutrient intake.

Energy

There is no documented energy recommendation for children with HIV/AIDS, but asymptomatic HIV-infected adults require 10 percent more energy than non-infected adults of the same age, sex, and activity level, and symptomatic HIV-infected adults

require 20 percent-30 percent more energy. Children with HIV/AIDS also have increased energy needs, but there is no current recommendation specific to children. Most of the energy for a young child may come from breastmilk if the mother chooses to breastfeed. The breastfeeding mother needs adequate food intake and nutrition to benefit both herself and her child (see Session 7 for details).

### Optimizing intake

For a child infected with HIV to consume enough calories, proteins, and nutrients, intake needs to be optimized by:

- Increasing the frequency of feeding (probably to 5–8 small servings per day)
- Providing higher energy- and nutrient-dense foods (germinated or fermented foods, fortified foods)
- Modifying the diet to enable the child to increase consumption (e.g., by pureeing or slightly spicing the food )

### ***Prompt treatment of infections and opportunistic infections*** (slide 28)

Prompt treatment of diseases such as malaria, diarrhea, acute respiratory infections, sore mouth, and ulcers minimizes the impact of the infection on the child's nutritional status. The possible effect of infections on food intake and absorption is also important. The following common opportunistic infections may affect food intake among children infected with HIV:

- Sore throat and wounds in the gastrointestinal tract
- Thrush
- Fever

Children need medications to treat opportunistic infections and other diseases. The medicines themselves may affect food intake through side effects, discomfort, changes in taste.

### ***Enhanced ARV therapy*** (slide 29)

Children need antiretroviral therapy to reduce viral load and delay disease progression. However, ARVs may have side effects (nausea, vomiting, diarrhea, constipation, and changes in taste) that may affect the dietary intake of the infected children. The side effects may be caused by the interaction between food or nutrients and the drugs (see Session 9). Side effects should be managed to ensure continued food intake and adherence to medication regimens.

### **Nutrition actions that service providers can take in care and support** (slide 30)

As noted above, HIV-infected children are more likely than non-HIV-infected children to experience growth failure and face an increased risk of death. These risks require early intervention and continual follow up.

#### **For all children**

- Regularly and accurately monitor growth (weight and height) to recognize growth failure, malnutrition, and its possible causes.
- Provide or refer caregivers for routine essential infant and child services (e.g., immunization, vitamin A supplementation, and deworming), according to national guidelines.
- Counsel caregivers to identify any opportunistic infection (e.g., oral thrush or sores, fever, gastrointestinal problems) or other infection (e.g., malaria, acute respiratory infections, diarrhea) and seek early support from a health worker.
- Counsel caregivers to identify support services and programs in their communities (e.g., home-based care, food distribution, psychosocial support) that may improve their or their children's nutrition.
- Review the child's diet at every clinic visit to ensure appropriate feeding.
- Counsel caregivers on cultural feeding habits, traditional therapies, and other practices that may be harmful to young children.

- Promote good food hygiene and food handling practices to make food safe and prevent food-borne infections.
- Refer caregivers to programs that may have available medications, including ARVs for young children.

#### **For infants 0–5 months**

- If the mother is breastfeeding, promote ONLY exclusive and frequent breastfeeding (> 8 times/day).
- If the mother is not breastfeeding, ensure infants receive ONLY replacement feeding (see Session 7) and that proper hygiene is maintained. Provide the child with multivitamins or counsel on giving foods fortified with micronutrients (e.g., “sprinkle sachets” for home fortification where available).

#### **For children 6–35 months**

- If the infant is HIV negative or of unknown status, educate and support the mother on early weaning at or before 6 months of age.
- Promote adequate and proper feeding to 24 months or beyond. Review the child’s diet at every well- and sick-baby clinic visit to ensure appropriate feeding (crucial if the mother is formula feeding).
- Promote good hygiene and proper food safety and handling.
- Counsel the caregiver to increase the amount and variety of foods given to the child, emphasizing the use of locally available, energy-dense foods (e.g., germinated or fermented flours to make porridge), fortified foods (e.g., fortification sachets), and increased use of fruits and vegetables.

#### **For severely malnourished children (slides 31, 32, 33, 34, 35, 36, 37, 38, 39)**

Severely malnourished HIV-infected children rarely respond to conventional rehabilitation or take much longer to rehabilitate.

- Refer children with severe malnutrition to an appropriate nutritional rehabilitation institution.
- Treat severe malnutrition according to new WHO guidelines, following the following steps:
  - Categorize the extent of malnutrition by both anthropometric (e.g., body weight, skinfold measures, height) and clinical and biochemical methods. Also try to determine current intake patterns to assess adequacy and determine optimal intervention.
  - Treat any infections, especially those that affect food intake and absorption.
    - Prevent and control hypoglycemia (also a common complication of ARVs).
    - Use oral rehydration therapy to replace lost fluids.
    - Regulate body temperature to prevent hypothermia.
    - Use antibiotics as necessary to treat any infections.
  - Give adequate nutritional therapy.
    - Provide locally available and culturally acceptable high-energy and nutrient-dense diets.
    - Promote breastfeeding where appropriate during rehabilitation.
    - Provide vitamin A supplements according to national protocols (e.g., 200,000 IU on admission, a second dose the next day, and a follow-up dose 14 days later).
    - Use gastrostomy tube supplementation for HIV-infected children if other oral methods fail.
  - Provide nutrition counseling to the caretakers.

- Provide follow up after discharge while monitoring weight and other infections (slide 40).

## DISCUSSION POINTS 8

### Questions for class reflection and discussion

- Ask students to list the factors in the country that are likely to influence the nutrition of children born to HIV-infected mothers and the actions they propose to address those factors at a) policy, b) programmatic, and c) household levels.
- Which of the components of nutritional care and support discussed above do students think are more likely to improve the nutrition and survival of children affected by HIV/AIDS in the communities where they come from? Ask them to explain their choices.
- Ask students to identify several key programs (government, NGO, and private sector) in which nutritional care and support of children can be integrated and to indicate how this can be done.
- Show the students some of the country's policies and guidelines on HIV/AIDS and nutritional care and support, if available. Also bring job aids, protocols, posters, and recording sheets (e.g., Integrated Management of Childhood Illnesses guidelines and chart books, supervision checklists) that may be used by people handling children.
  - Ask students how the tools could be improved or modified to address the key issues and areas identified above.
  - Discuss the adequacy of available materials (e.g., job aids, protocols, posters, and recording sheets) in improving the quality of services offered in the care and support of children infected with or born to mothers infected with HIV.

## EXERCISE 8

**TASK 1: Why did Norman die?** The actions and activities in the table below show a sequence of events in the short life of an HIV-infected infant named Norman. Prepare sets of cards marked with the actions and activities. Divide the students into small groups, giving each group one set of the cards. Shuffle the cards to make sure the groups cannot easily find the sequence of events. Ask them to reconstruct this sequence and determine why Norman died (the underlying reason was discontinuation of the follow up).

Action/activity	Information
Helen, a 17-year-old student	
Helen married	
Helen pregnant	
Helen attending antenatal clinic	
Helen receiving VCT	
Helen found HIV positive	EIA test
Helen giving birth to a baby boy (Norman)	
Norman born weighing 2.7kg	
Norman testing HIV positive	
Norman exclusively breastfed for 5 months	PCR at 1.5 months
Norman abruptly weaned on cow's milk	
Norman fully immunized for age	
Norman admitted suffering from severe diarrhea	
Norman admitted with pneumonia	
Norman at 13 months and 3.2kg	

Action/activity	Information
<p>Norman admitted to nutrition rehabilitation</p> <p>Norman discharged after 51 days</p> <p>Norman weighing 4.8kg at discharge</p> <p>Norman receiving monthly follow up from Nutrition Rehabilitation Unit</p> <p>Helen getting sick and being cared for at home</p> <p>Norman suffering from diarrhea</p> <p>Helen dying</p> <p>Caretaker (aunt) given education on hygiene and diet planning</p> <p>Norman registered in an antiretroviral program at 33 months</p> <p>Monthly follow up from NRU stopped</p> <p>Follow up by NRU 24 months finding that Norman died 8 months earlier</p>	<p>OBSERVED: Severe wasting (W/A=44%); absence of pedal edema; moderate dehydration; marked irritability; clinical signs of anemia; indrawn chest and bilateral crepitations)</p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Rehydration</li> <li>• Temperature control</li> <li>• High-energy milk (HEM) (150kcal/kg body weight per day) fed every 2 hours</li> <li>• Vitamin A (400,000 IU given on admission and on day 2)</li> <li>• Multivitamins given (1 tablet daily)</li> <li>• Folic acid given (5mg/day)</li> <li>• Anthelmintics given</li> <li>• Antimalarials given</li> <li>• Antibiotics given</li> <li>• Antituberculosis given empirically</li> </ul> <p>Helen taught essential nutrition behaviors:</p> <ul style="list-style-type: none"> <li>• Family planning (registered)</li> <li>• Diet planning and food preparation</li> <li>• Child feeding practices (with active feeding)</li> <li>• Food and personal hygiene</li> </ul>