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Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean

Godfrey C. Xuereb^a

The AIDS epidemic has had a great impact on children younger than 15 years of age. From 39.4 million persons living with HIV globally, 2.2 million are children under 15 years. Half a million children died of AIDS in 2004, which is a very high mortality rate. In the Caribbean the infection rate is also high and it has become the leading cause of death in this age group. Girls are about twice more likely than boys in the same age group to be infected and so the mortality of girls tends to also be higher than boys.

It is well known that nutrition has a profound influence on the immune system. Infections, no matter how mild, have adverse effects on nutritional status. On the other hand almost any nutritional deficiency will lower resistance to infection. Therefore nutritional status can greatly influence and is greatly influenced by any acute or chronic infectious disease.

With this background the nutritional management of children infected with HIV needs to take high

importance and is the cornerstone of good management. The infected child needs to be screened for nutritional deficiencies and have their nutritional status regularly checked to ensure that they attain the growth milestones and therefore have a good quality of life and a prolonged lifespan.

It is now internationally recognized that the human immunodeficiency virus is transmitted via breastmilk and is an important route for mother to child transmission (MTCT) of the virus. Successful programmes to prevent MTCT are complex and have multiple components, nutrition being just one of these. In the absence of any preventive intervention, rates of transmission of the virus from mother to child range from 15 to 30%, the highest rates being observed in populations where prolonged breastfeeding is common. Breastfeeding can lead to an additional risk of HIV transmission of up to 20% depending on duration, mode of feeding and breast health. However, breastfeeding also provides infants

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with optimal nutrition, reduces morbidity and mortality associated with infections other than HIV, and delays the mother's return to fertility. Therefore, an HIV-infected woman should receive counseling and support to be able to choose the infant feeding option most appropriate to her situation. Current guidance on infant feeding and HIV is as follows:

- When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended;
- Otherwise, exclusive breastfeeding is recommended during the first months of life;
- To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding;
- HIV-infected women who breast-feed should be assisted to ensure that they use a good breastfeeding technique to prevent breast pathologies, which should be treated promptly if they occur.

This issue of **Cajanus** focuses on the needs of children infected with the HIV and also on how mothers can help prevent MTCT. These articles focus on the nutritional needs of children and

on methods which can be applied to prevent secondary infection and ensure that the nutritional needs for healthy growth are achieved.

One article in this edition looks at nutrition strategies to alleviate and prevent common dietary problems which arise due to HIV infection. These strategies can be applied to and by Persons Living With HIV/AIDS (PLWHA) irrespective of age and are important tips on how to improve quality of life and ensure that the nutritional status is not jeopardized.

The development of medications to control and combat HIV has meant that many infected persons can live a longer and more productive life. As with all drugs, the ones used in the management of HIV have specific side-effects. Some of these relate to drug-food interactions and it is important that PLWHA who are using medication be aware of these interactions so as to get the maximum benefit of the drug whilst not jeopardizing their nutritional status. Another article looks at drug-food interactions and provides recommendations on how to counteract them or minimize the effects. This information is useful to all healthcare professions as well as PLWHAs and their lay care givers. This will ensure that the drugs being taken produce the response that is predicted and not only add years to life but also improve the quality of life of the PLWHA.

Whilst the main drugs prescribed to PLWHAs are normally of the conventional type many have sought refuge in the area of complementary medicine. Some of the foods, tinctures, methods and procedures that are prescribed by complementary and alternative medicine practitioners may have some scientific basis, however all PLWHAs and their care givers should be aware that these have not necessarily gone through the rigorous scientific testing as those prescribed in traditional medicine. The article that looks at complementary and alternative medicine highlights these issues and provides information on how the PLWHAs and their care givers should deal with this subject.

Many PLWHA may resort to alternative or complimentary medicine as they are worried about their nutritional status. Much has been written and said about the importance of vitamins and minerals for the attainment of optimal health. An important article in this issue looks at the micronutrient needs of PLWHAs and how these can be achieved through traditional diets and also when and how supplementation is required. This is an important article and should inform all about the specific needs of PLWHAs, which in many instances differ from those of non-infected individuals.

Finally, the issue of water safety is also discussed in this edition. Water safety is an important component of all healthy living persons but is especially so for PLWHAs whether they are newborns, infants, children, adolescents or adults. Safe water is healthy water and unsafe water can lead to opportunistic infections which can be devastating for the health of PLWHA. Special care, needs to be taken to ensure that all water used for consumption, washing of foods and the preparation of food items, including babies' feeds, is safe from contamination. Information on how to ensure this is given in this article which again will help all those with HIV live a healthier and better life.

Nutrition is an essential component of healthy living both for those infected with HIV and those who are not. Healthy eating has an important role to play in the holistic approach to better living. We hope that in these two editions of **Cajanus** we have helped all those living with the virus and those caring for them to have a better understanding of how and why healthy eating can lead to better living.

For more information on nutrition and HIV/AIDS visit the CFNI website at www.paho.org/cfni



Mother-to-Child Transmission^a

TRANSMISSION OF HIV DURING PREGNANCY AND LACTATION

HIV is transmitted from mother to child across the placenta, during the intra-partum period or through breast milk. The risk of vertical transmission is decreased significantly with the use of anti-retroviral therapy for the mother during pregnancy and at the time of delivery, and for the infant in the early postpartum period. The fact that HIV is transmitted via breastmilk may complicate infant feeding recommendations in some settings and impact negatively on efforts to improve breastfeeding prevalence rates in countries and regionally. Exclusive breastfeeding during the first 3 months may not increase the risk of vertical transmission to the same degree as early mixed feeding. Because breastmilk is well tolerated, the gastrointestinal barrier of the infant remains intact, preventing entry of the virus.

Partial/mixed breastfeeding, (whether cow's milk, tea, or cereal), has been associated with an additional risk of HIV transmission from mother to

child. Mixed feeding can cause irritation to the intestinal wall thus making it more permeable to the virus. Therefore, women who choose to breastfeed should be advised to provide breastmilk exclusively for approximately 3 months and then change completely to replacement feeding. In resource-poor situations, replacement feeding may not be a safe alternative to exclusive breastfeeding for the first six months. It is important not to recommend mixed feeding.

WORLD HEALTH ORGANIZATION (WHO) POSITION ABOUT FEEDING OPTIONS

The nutritional and immunologic benefits of breastmilk are well proven and overall, efforts must be intensified to protect, promote and support breastfeeding within countries. However, WHO supports the right of HIV-infected women to choose a safe alternative (replacement feeds) to breastfeeding, if they are fully informed regarding feeding options, risks and benefits. WHO recommends, “when replacement feeding is acceptable, feasible, affordable, sustainable, and safe, avoidance of all breast-

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

feeding is recommended for HIV-infected mothers. To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding.”

THE CARIBBEAN SITUATION

Various Caribbean countries have developed and adopted a policy that discourages HIV+ mothers from breastfeeding as a measure to stem mothers transmission (MTCT) of the HIV. This is supported by the fact that the virus is transmitted via breastmilk, even though exclusive breastfeeding during the first 3 months may not increase the risk of vertical transmission of the virus.

FEEDING OPTIONS

Replacement Feeds

Acceptable replacement feeds include commercial infant formulas, heat-treated breast milk, and animal milks from cows or goats but these must be modified, Appendix 5: Modifying Adult Milks for Infant Feeding, to decrease the renal solute load and provide adequate carbohydrate to cater for the needs of the infant. Vitamin/mineral supplements should be given to infants fed on home-prepared formula because the feed may not provide sufficient micro-

nutrients, especially iron, zinc, vitamin A, C and folic acid. It is essential that commercial and homemade formulas be made correctly to provide adequate nutrition with minimal gastrointestinal symptoms. Infants fed breastmilk substitutes should be fed on demand requiring approximately 750 ml of feeds per day in the initial postnatal period. Tea, juice, and cereals are not suitable foods for replacement feeding.

Heat-treated Breastmilk

Breast milk can be expressed and either pasteurized (heated to 62.5°C for 30 minutes) or boiled briefly and cooled. Thereafter the milk must be refrigerated immediately in sterile containers to prevent bacterial contamination. This heat-treating process may be more practical in a hospital setting. The process kills the virus but it can also destroy the anti-infective properties that are unique to breast milk. To convert °C to °F or vice versa, the following is provided:

- °C to °F: $(^{\circ}\text{C}) (1.8) + 32$ thus
 $(62.5) (1.8) + 32 = 144.5^{\circ}\text{F}$
- °F to °C: $(^{\circ}\text{F} - 32) / 1.8 = ^{\circ}\text{C}$ thus
 $(144-32)/1.8 = 112/1.8 = 62^{\circ}\text{C}$

Wet Nursing

Using a “wet nurse” to breastfeed an infant is not an option that is generally culturally acceptable in the Caribbean. However, should such a

person be used, she must be HIV-negative and be committed to safe sexual habits, otherwise there is the risk of transmitting the virus if the wet nurse becomes HIV-infected. Remember that a single HIV test is not sufficient to ensure that the wet nurse is not infected as she could still be in the process of seroconverting.

Complementary Feeding

Energy and nutrient dense feeds should be recommended from about 6 months of age. Mixing breastmilk with complementary feeds could introduce infections to the developing infant, and can thus increase the risk of HIV and other illnesses.

Key Points

1. All HIV-infected mothers should receive counselling to guide them to make the best decision about the feeding options that will prevent mother to child transmission.
2. Mixing breastmilk with replacement feeds can increase the risk of HIV infection.
3. It is important to ensure that the replacement feed mixture is nutritionally adequate for the infant and that hygienic conditions prevail during mixing and such an environment is maintained.
4. Generally, energy and nutrient-dense complementary feeds should not be introduced before the infant is about six months old.

Nutritional Management of the HIV-Infected Infant or Child^a

HIV infection occurs in infants born to HIV-infected mothers when the human immunodeficiency virus is transmitted from the mother to the infant. All of these infants will have maternal antibodies to the virus until they are approximately 18 months old at which time they sero-revert to HIV antibody-negative. HIV-infected children will continue to be positive for antibodies as well as the PCR test, and will have detectable virus with subsequent decline in immune functions.

NUTRITIONAL RISK FACTORS FOR INFANTS AND CHILDREN

HIV-infected children are at higher risk of malnutrition and failure to thrive. The outcome of malnutrition can be devastating, resulting in growth retardation, increased susceptibility to infection and decreased functional capacity.

Many factors that contribute to growth failure have nutritional implications. Some of these factors are:

- Inadequate food intake occurs due to poor appetite, early satiety and a high degree of selectivity around food choices.
- Abdominal pain and nausea, common side effects of medications, decrease appetite and interest in food.
- Feeding difficulties in infancy include uncoordinated suck/swallow/ breathe reflex, poor suck and/or formula intolerance.
- Introduction of solid foods with antiretroviral medications mixed into them often leads to food aversions and food refusal.
- Increased nutrient intakes are required for catch-up growth and to ameliorate the hypermetabolic/hypercatabolic effects of fever and opportunistic infection.
- Dyslipidaemia, peripheral lipotrophy and visceral adipose accumulation may develop due to highly active antiretroviral therapy.
- Disordered eating patterns result in deranged eating habits or self-limiting intake.

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

- Gastrointestinal complications induce nutrient losses via emesis, diarrhoea and malabsorption.
- Dysguesia (altered taste), caused by malnutrition, medications, or HIV infection, decreases interest in feeding.
- Encephalopathy may result in regression of feeding ability with limited food tolerance.
- The feeding relationship between caregiver and child often becomes distorted due to difficulties feeding a child with HIV disease.
- Socioeconomic factors such as poverty and substance use by parents affect access to food.
- Illness of a parent compromises the ability of the parent to implement nutritional recommendations.

Because of the myriad complications experienced by HIV-infected children, nutrition therapy is an important adjunct to medical therapy in the treatment of HIV disease.

NUTRITION CARE

Goal of Nutrition Care

Adequate nutrition is especially important for young children to ensure that they grow properly as well as have sufficient nutrients to boost their immune system and fight infection.

Nutrition Care Process

The approach to nutrition care in the management of the HIV-infected child is the same process as used for managing the adult: **nutrition assessment** which includes evaluation of anthropometric and body composition, biochemical, clinical and dietary parameters using techniques appropriate for children; **nutrition diagnosis; nutrition intervention; monitoring and evaluation.**

Nutrition Assessment

Anthropometric and Body Composition Assessment

Anthropometric Assessment

Anthropometric assessment of HIV-infected children should include serial measurements of weight and recumbent length/height, which are sensitive of nutritional status. In children, the three most commonly used anthropometric indices are *weight for age, weight for height, and length/height for age.*

Tracking trends over time facilitates early identification of growth failure, an indicator of nutritional deficit. Weight is a good index of acute and chronic nutritional status. Weight and height/length should be taken at each visit using standardized methods. Measurements can be plotted on the CDC/NCHS growth charts using the appropriate *weight for age, height for*

age and weight for height charts. Alternatively, Caribbean Growth Charts are available for plotting weight for age (0 to 5 years), and weight for height (0 to 23 months), and (24 to 59 months) for either boys or girls. The Caribbean Growth Charts were developed based on NCHS/WHO Standards.

Weight

Weight measurement is the most fundamental of indexes for assessing nutritional status. Weight is affected early and more so than length/ height when undernutrition or overnutrition exists. Weight gain is decreased when there is calorie deficit or output is excessive but growth in stature is delayed when protein intake is inadequate or if a calorie deficit exists for an extended period.

Weight measurements must be taken using standardized procedures and evaluated in two ways: *weight for age* and *weight for height*.

Weight for Age

Weight for Age compares the child to reference data for weight attained at any given age and is stated in terms of percentile. It is:

- a short-term marker of growth;
- affected by acute nutritional stress or illness;

- an indicator of acute malnutrition (wasting) but cannot distinguish between stunting (chronic malnutrition) and wasting because height is not considered.

Nutritional status can be estimated using this formula:

$$\frac{\text{Actual Weight}}{50^{\text{th}} \text{ percentile weight/height}} \times 100 = \text{acute nutritional status}$$

Interpretation: Results can be used to determine the severity of malnutrition in the table below:

Nutritional Status	Acute	Chronic
Normal/Healthy	>90%	>95%
Mild	81-90%	90-95%
Moderate	70-80%	85-89%
Severe	<70%	<85%

Weight for Height

Weight for Height compares appropriateness of the child's weight to his/her own height, that is, body mass (weight) is compared to own stature. It is independent of age until puberty, and can be used to distinguish between stunting (chronic malnutrition) and wasting (acute malnutrition).

Weight for height:

- is an indicator of present nutritional status;
- can be plotted on a graph appropriate for age, that is up to 5 years of age, or

- measurements can be used to calculate body mass index depending on the age of the child.

Body Mass Index (BMI) or Quetelet Index is an indicator that can be used with children between 2 to 19 years old, to assess weight for height status. BMI growth charts (CDC, 2000) have been developed for interpreting measurements for this age group. Note that the adult BMI formula and charts **DO NOT** apply for the age group.

Weight Change

Recent change in weight (loss or gain) is also important since this is an indicator of acute nutritional problems. Weight change can be evaluated as follows:

$$\frac{\text{Actual Weight} - \text{Usual Weight}}{\text{Usual Weight}} \times 100 = \% \text{ change}$$

Weight loss is significant when:

- > 2% in 1 week
- > 5% in 1 month
- > 7.5 % in 3 months
- > 10% in 6 months

Length/Height for Age

Length is measured in relation to age. It is a measure of linear growth and an indicator of past/chronic nutritional status and stunting especially in early childhood. Standardized procedures for measuring children's length

are detailed in Appendix 6.2. Supine length should be measured for infants until about age 2 and thereafter standing height can be measured.

Interpretation:

Below the 5th percentile = severe deficit

Between 5th and 10th percentile = evaluate further

Chronic nutritional status can be estimated using this formula:

$$\frac{\text{Actual Height}}{50^{\text{th}} \text{ Percentile height/age}} \times 100 = \text{Chronic nutritional status}$$

Nutritional Status	Acute	Chronic
Normal/Healthy	>90%	>95%
Mild	81-90%	90-95%
Moderate	70-80%	85-89%
Severe	<70%	<85%

Body Composition Assessment

Mid-arm circumference, subscapular and triceps skinfolds, and mid-arm muscle circumference/area in children >1 year of age reflect fat and lean body mass stores. Children may also experience morphologic changes as a result of lipodystrophy, including loss of subcutaneous adipose tissue, facial wasting, and visceral fat accumulation. Body composition measurements may be useful in identifying changes over time.

Biochemical Assessment

Biochemical assessment in children includes laboratory measurements similar to those used for adults. The nutritional implications of the values must be considered in the context of other parameters of nutritional assessment.

Biochemical assessment may include the following:

- CD4 cell count and viral load.
- Serum Prealbumin and/or Albumin, liver enzymes, Blood Urea Nitrogen (BUN), creatinine, electrolytes and Complete Blood Count (CBC).
- Children on antiretroviral therapy should also have fasting total cholesterol, triglycerides, HDL/ LDL cholesterol, and blood glucose measured.
- ART including nucleosides, especially zidovudine, causes macrocytic anaemia which should be differentiated from anemia due to iron, folate or B₁₂ deficiency.

Clinical Assessment

Clinical assessment parameters specific to children include detailed medical history and physical examination.

Medical History

- Special consideration should be given to the presence of gastro-

intestinal disease or opportunistic infections, dental health, development, neurological complications and behavioural issues.

- Infant nutritional status and feeding ability will be affected by the nutritional health of the mother during pregnancy, substance (e.g. drugs, alcohol, tobacco) use during pregnancy, birth weight and perinatal complications.

Physical Examination

- Clinical evidence of nutrient deficiencies.
- Evidence of failure to thrive such as low stores of adipose or lean body mass, short stature, or loss of weight or height percentiles.
- Evidence of delayed development.

Dietary Assessment

Dietary assessment in children reviews diet history, assesses current dietary intake and factors affecting such intake, and identifies risks for nutritional problems.

Key areas that should be explored in taking the diet history and intake are:

- Appetite, expression of hunger and satiety, taste changes.
- Frequency, type, and amount of foods and fluids taken.
- Duration of meals and feeding dynamics between child and caregiver.

- Feeding ability and tolerance; use of feeding aids.
- Food allergies.
- Appropriateness of infant diet and preparation of infant formula.
- Use of proper food and water safety techniques.
- Quality of diet and food security.
- Food-medication interactions.
- Use of complementary and alternative medicines.
- Physical activity.

As with adults, numerous psychosocial issues influence nutritional intake and food security. Consider the following issues:

- Socioeconomic status which affects housing and ability to acquire and store food.
- The social and physical environment of the home and school.
- Evidence of depression or social isolation.
- Illness or death of parents or caregivers.
- Substance use/abuse by the child/adolescent or family members.
- Cultural or religious practices which affect dietary intake.
- Living arrangements, family dynamics.

- Community resources utilized.

NUTRITION DIAGNOSIS

As for adults, nutrition diagnosis requires analysis of data obtained during assessment and results in identification of situations that require intervention.

NUTRITION INTERVENTION

Children are especially vulnerable to malnutrition and its cascading adverse consequences. Almost all malnourished children initially have poor appetites. Patience is needed to encourage consumption of feed using cup and spoon, and holding the child securely in a sitting position in the caregiver's lap. If the child is too weak, a dropper or syringe can be used. Feeding bottles can be a source of further infection and should be thoroughly cleaned and sanitized, especially for use in severely immunocompromised children. Dietary modifications to increase nutrient density of the child's diet should be implemented.

Goals of Therapy

The goals of therapy are:

- to maintain normal growth and development.
- to prevent nutrient deficits.
- to support the immune system.
- to enhance quality of life.

Step-Wise Approach to Intervention

Therapeutic intervention is implemented in a step-wise fashion for children who require nutritional support beyond the usual dietary intake:

1. Polymeric oral liquid nutritional supplements or modular calorie supplements may be recommended.
2. If children experience weight loss, lack of weight gain, delayed height velocity, or crossing of percentiles on a paediatric growth chart and the situation is not resolved with diet or oral supplements, a feeding tube may be required. A percutaneous endoscopic gastrostomy (PEG) is the preferred method of providing involuntary feeds as tube feeding is expected to be long term.

Formula selection depends on the feeding modality, the goals of treatment and the clinical picture.

3. Children with poor nutritional status who are hospitalized with acute illness and severe gastrointestinal symptoms should be considered for total parenteral nutrition (TPN).

Determining Nutritional Requirements

Nutritional requirements depend on clinical picture, growth parameters, as well as past and present nutritional status. Energy and protein require-

ments can be determined based on whether the child is asymptomatic or symptomatic.

Asymptomatic HIV-infection:

Energy requirements vary for asymptomatic children depending on current nutritional status as well as weight and growth trends. Children displaying good nutritional status and appropriate growth with no symptoms may well be able to meet energy needs with the RDA for age. Those who require catch-up growth or nutritional rehabilitation may require up to 50% more kilocalories.

Energy needs can be calculated as follows:

Minimum: Wt (kg) at 50th percentile for actual height x RDA (kcal/kg) for age.

Maximum: Wt (kg) for age at 50th percentile for actual height x RDA (kcal/kg) for age.

If a child is ill with fever or sepsis, then kcal need to be increased further:

- 12% for each degree Centigrade (7% for each degree Fahrenheit) rise in fever.
- 25% for acute diarrhoea; and 60% for sepsis.

Symptomatic, failure to thrive: Energy requirements are elevated to facilitate accelerated weight gain and linear growth. To achieve catch-up growth, energy intakes for children

experiencing weight loss need to be increased by 50% to 100% over established requirements for otherwise healthy uninfected children.

To calculate energy requirements for catch-up growth:

$$\frac{\text{Energy} = \text{RDA (grams/kg/day) for age} \times \text{IBW (kg) (weight for age at 5}^{\text{th}} \text{ percentile)}}{\text{Actual Body Weight (kg)}}$$

Protein requirements are based on a need to support the immune system and prevent wasting. Intake may need to be increased to 1.5 to 2 times the RDA for age. If intake reaches >4g/kg, renal function (BUN and creatinine) should be monitored.

To calculate protein requirements for catch-up growth:

$$\frac{\text{Protein} = \text{RDA (grams/kg/day) for age} \times \text{IBW (kg) (weight for age 50}^{\text{th}} \text{ percentile)}}{\text{Current/Actual body weight (kg)}}$$

Dietary Modifications

Increasing kilocalories for Formula-fed infants

Severely undernourished children are unable to tolerate usual amounts of dietary protein, fat and sodium, thus, feeds should be low in these nutrients and high in carbohydrate. The concentration of replacement infant formula should be increased in a step-wise fashion to 75 kcal/100 ml (acute phase) to maximum 100 kcal/100 ml

during the rehabilitation phase after appetite has returned (WHO). Formula that is hyper-concentrated must be monitored carefully for tolerance and progress. Other options include fortification of formula with carbohydrate polymers or fatty acid supplements.

Increasing kilocalories for Breastfed infants

If expressed breast milk is used, it should be fortified or changed to hypercaloric concentration with carbohydrate polymers or fatty acid supplements.

Increasing kilocalories for Children

- Use added dietary fat as tolerated.
- Use full cream milk and other full fat dairy products; gravy, sauces, and added fats.
- Use commercial liquid nutritional supplements.
- Fortify foods with full cream milk powder.
- Avoid overloading intestine, kidneys and liver. Offer small, frequent feeds every 2, 3 or 4 hours day and night.

Strategies for Selected Situations

The following strategies are suggested:

❖ **Poor Appetite, Food Refusal**

Strategies to address the above include:

- Ensure symptoms or neurological impediments are treated.
- Provide small frequent feeds and snacks.
- Make every bite count with nutrient dense foods.
- Take advantage of times of day when appetite is better.
- Provide regularly scheduled meals and snacks. Discourage non-stop snacking.
- Limit time spent on meals to 45 minutes and to 20 minutes for snacks.
- Give small portions.
- Reinforce/reward small efforts.
- Ensure meal times and family dynamics support a positive attitude towards eating.

❖ **Diarrhoea**

Strategies to address the above situation include:

Infants

- Ensure that formula is not over-concentrated.
- Consider the use of lactose-free formulas.

- For unresponsive diarrhoea with possible malabsorption, try elemental infant formula.
- Use commercial or WHO rehydration products.

Children

- Avoid fluids high in concentrated sugar (e.g. sweetened fruit juice), as these may induce osmotic diarrhoea.
- Increase soluble fibre to slow intestinal transit and reduce foods high in insoluble fibre.
- Provide small frequent meals.
- For unresponsive diarrhoea, provide a low residue, low-fat, lactose-free diet.
- Elemental nutritional supplements may be beneficial if accepted by the child.
- Replace fluids and electrolytes.

❖ **Nausea and/or Vomiting**

Strategies to address the above include:

- Medications should be taken with food to minimize nausea.
- Avoid high fat or sweet foods and cooking odours.
- Bland, dry, salty and cold foods are often better tolerated.
- Give beverages between meals.

- Encourage the child to eat slowly, sitting up.
- Replace fluids and electrolytes if vomiting is present.
- Consider the use of anti-emetic medication.

❖ **Lactose Intolerance**

Lactose restriction can result in the elimination of many important foods. Ensure that this is a confirmed diagnosis. Monitor dietary intake and make adjustments as necessary. Supplementation of calcium may be necessary.

❖ **Neurological Impairment**

Children are at risk of encephalopathy, and this may induce regression of feeding abilities. Children who were proficient at eating table foods and cup-drinking may revert to needing bottles, pureed foods and feeding assistance. Feeding ability is more closely linked to developmental age than chronological age.

❖ **Illness of Parent or Caregiver**

Children are particularly vulnerable in a household with HIV-infected adults as they are dependent for feeding and care. Food security may be threatened by medical expenses and limited resources. Sick parents may not have the energy to provide adequate nutrition for an HIV-infected child with exceptional needs. It is important to ensure that the family has

the capability to follow dietary recommendations and to seek appropriate support within their community where possible.

❖ **Food and Water Safety**

Ensure that the caregivers understand the basic principles of food and water safety, which includes the preparation of infant formula.

Monitoring and Evaluation

Monitor weight gain and growth patterns with incremental growth charts in order to determine whether any further modifications are needed in energy intake. Body composition and nutrition assessment parameters are also useful to monitor nutrition adequacy.

People living with HIV/AIDS get what is called “Opportunistic infections”.

These are infections that take advantage of the body’s weakened immune system.

Managing Nutrition and Food-Related Problems^a

NUTRITIONAL STRATEGIES FOR COMMON DIETARY PROBLEMS

During the course of HIV/AIDS, infected persons may experience any of a variety of symptoms that could interfere with dietary intake and ultimately nutritional status. This chapter addresses these conditions and the strategies that can be applied to improve intake when the respective conditions prevail.

Anorexia

Loss of appetite is common and can be multifactorial in origin. Factors such as depression, lack of resources, weakness, fever, medication side-effects and addictions can be implicated. The individual's medical, social and diet histories should provide information that will help with choosing strategies from the following that will support increased intake:

- Consume small, frequent meals at regular intervals.
- Use high calorie supplements.
- Make every bite count with calorie and protein-dense foods. (see

ideas for Recipes in “Healthy Eating for Better Living: A Caribbean Handbook”).

- Eat a few mouthfuls even if not hungry.
- Eat on schedule rather than relying on hunger cues.
- Enhance the eating environment. Relax, share meals with friends, and eat favourite foods.
- Use community or family supports such as meal delivery where available, home-help or assistance with shopping, cooking, and cleaning up.
- Consider appetite stimulants such as Megace ®, or even social and environmental supports such as fresh air, exercise or friends.
- Take a multivitamin and mineral supplement.

Constipation

A high-fibre diet, high fluid intake and exercise will help to alleviate constipation. Increase fibre slowly and gradually as a sudden increase in fibre can cause cramping and/or gas.

^aExtracts from CFNI’s “Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean”.

Good high fibre choices are:

- Whole wheat breads and cereals, corn and foods made with high-fibre items.
- Cooked dried peas or beans.
- Starchy fruits, roots and tubers (provisions).
- Fruits and vegetables. Note that prunes are a good source of fibre and contain a natural laxative.
- Some foods which may be tolerated are: cereals, pasta, bread, porridge, plain cookies, tapioca/sago pudding, eggs, lean meat, poultry (without skin), baked or steamed fish, flavoured gelatin (jello), canned fruit, banana, cooked carrots, squash, yams, potato, liquid nutritional supplements such as Boost® or Ensure®.

Diarrhoea and Malabsorption

Rapid transit time of food through the GI tract may result in nutrient losses. Dietary strategies that decrease stimulation to the bowel and that delay transit time are indicated. Replace loss of fluids and electrolytes with low osmolality fluids and salty foods or electrolyte replacement drinks such as Gatorade® or Pedialyte® or WHO rehydration formula.

Helpful strategies are:

- Avoid high fat foods, sugar, alcohol, caffeine and insoluble fibre (bran).
- Try small, frequent meals.
- Soluble fibre, such as oats, provisions, legumes and Metamucil® slow intestinal transit.
- Probiotics may be helpful (e.g. acidophilus, bifidus). Yoghurt containing live culture is a good source of probiotics.
- Add high potassium foods such as bananas, potatoes or other provisions.
- 10-30 g/day of glutamine powder can be an effective treatment for diarrhoea in adults.
- 1000 mg/day of calcium may help to alleviate diarrhoea.
- High doses of vitamin C or magnesium and some herbal medicines can worsen diarrhoea.
- Clove tonic taken several times daily may help – add 10 cloves to 1 cup green tea. Simmer to reduce to ½ cup and then take by spoon throughout the day.
- Home-made rehydration drink – to one cup of pure orange juice add 3 cups of water and ½ teaspoon of salt.
- Rice porridge may help: cook 1 cup of white rice in 6 cups of water or broth for one hour. Eat a small amount several times a day.

Lactose Intolerance

This may occur during bouts of diarrhoea necessitating restriction of milk. Low lactose dairy products such as hard cheeses are usually tolerated as are lactose reduced milk, soymilk and yogurt. Trials of taking milk with meals or reducing size of milk portion may increase tolerance depending on the degree of lactase deficiency.

Steatorrhoea or Fat Malabsorption

Fat malabsorption can be diagnosed through a lab test but is more generally identified by the individual noticing greasy, floating, greenish stools. A fat reduced diet (less than 50 g/day) is generally indicated. Individual tolerance should be monitored and the level of fat restriction adjusted if symptoms persist. A diet with less than 25 g fat/day may be necessary. Prolonged diarrhea or steatorrhea may lead to nutrient deficiencies, including calcium, iron, magnesium, potassium, zinc, fat-soluble vitamins and vitamin B₁₂.

Medium chain triglycerides (MCT's) may be substituted for some fat in the diet because these are more easily absorbed than long chain fatty acids when intestinal surface area is altered or reduced.

For persons who need to gain weight or require nutritional repletion,

supplemental feedings of elemental formula or lower osmolality formula high in MCT's may be used. In some cases Pancreatic Enzyme replacement may be prescribed.

More about MCT's

- MCT oil does not contain essential fatty acids. Therefore at least 3% of calories as linoleic acid need to be provided by adding up to 10 g/day vegetable seed oils (soy, corn, sunflower, safflower, or margarine blended with vegetable oils).
- Coconut oil is a good natural source of MCT's.
- MCT oil may be added to juices, salads, dressings, vegetables or sauces.
- MCT oil has a low smoke point: 65-75 degrees C and should not be used at high temperatures.
- MCT oil is contra-indicated in people with hepatic insufficiency and those who are prone to ketosis and acidosis, such as insulin-dependent diabetics.
- Introduce MCT oil slowly and gradually increase to desired level in the diet to reduce side-effects such as nausea, vomiting, abdominal pain, distension and diarrhoea. Use water-miscible forms of the fat-soluble vitamins.

Nausea and Vomiting

Many medications cause nausea, as can infection, GI disorders and malignancies. Medications are generally less likely to cause nausea if taken with a meal. Nausea can have a significant effect on nutritional intake. Dietary modifications to improve food tolerance may allow some persons to continue their antiviral medications and are well worth the effort.

- Small frequent bland meals are best tolerated.
- Foods that are salty, low in sugar and fat, dry and cold are generally better choices. These include dry crackers/salt or soda biscuits, cookies, dry cereal, dry toast, sandwiches, fruits and vegetables, plain potatoes, yams, plantain, skinned, broiled or baked chicken or bland fish, plain cheese or yogurt.
- Avoid strong odors, spicy foods and gastric irritants such as coffee and alcohol.
- Fluids may be better tolerated between rather than with meals.
- Replace fluids and electrolytes lost by emesis. Try popsicles, diluted juices, flat carbonated drink, ginger tea, soup, broth.
- Anti-emetic medications can be used.
- Ginger in tea, candied or in tablets may decrease nausea.

Early Satiety

It can be frustrating to the individual and to the caregiver when appetite fails after only the first couple of bites. Try to:

- Eat small, frequent meals and snacks.
- Eat every 2-3 hours.
- Divide the meal in half and freeze a portion for another time.
- Choose nutrient rich foods, not calorie free foods or drinks.

Eat slowly and chew food well.

- Avoid high fat foods that take a long time to digest.

Dysgeusia

Abnormal taste sensations or loss of taste acuity is frequent in HIV infected individuals. Malnourished persons are most susceptible to loss of taste perception due to decreased capacity for taste receptor turnover, resulting in fewer taste receptors. Medications frequently cause abnormal taste sensations, such as persistent sweet, metallic or bitter taste. Chewing food well and moving it all around in the mouth stimulates the most taste receptors and also cleans the mouth of lingering medication residue.

Any of these strategies can be helpful:

- Enhance food flavor with marinades, sauces, salt and spices to increase taste acuity and mask unpleasant flavors. Soy sauce is a good example.
- Chocolate and vanilla are effective taste and smell stimulants; use them in stronger than normal applications.
- Eat protein foods cold or at room temperature.
- Sugar masks a salty taste; salt masks sweet; sour decreases metallic taste.
- Recommend sugar free candy and gum to get rid of bitter taste.
- Use of plastic utensils can minimize a metallic taste.

Gingivitis

Inflammation, swelling and bleeding gums may accompany stomatitis or be a result of mouth or upper

respiratory infections. Xerostomia can also contribute to gingivitis.

- Ensure good dental hygiene.
- Rinse with warm salty water or dilute hydrogen peroxide. Do not swallow hydrogen peroxide (refer to Table 1 on mouth rinses).

Mouth Soreness, Stomatitis and Oesophagitis

The mouth and throat are common targets for certain opportunistic infections, particularly Candida and Herpes. Sores may develop which can make eating very painful. Fissuring at the angles of the mouth can be caused by riboflavin, iron or pyridoxine deficiency or by herpes infection. Generally, soft and non-acidic foods are better accepted.

- Avoid citrus fruits and tomato products. Try milder nectars, apple juice and milk drinks.

Table 1: Home-made Mouth Rinses

	Ingredient	Water
1	¼ tsp. salt	1 cup
2	¼ tsp. baking soda	1 cup
3	¼ tsp. Glycerin	1 cup
4	1 Tbsp. 3% hydrogen peroxide	1 cup

- Avoid salty, spicy, coarse or dry foods. Choose soft, bland, non-irritating foods such as oatmeal, cornmeal, pasta, avocado, soups, mashed yams, custards, puddings, bananas, and fish.
- Moisten food with butter, cream, sauces and gravies if tolerated.
- Cold or room temperature foods may feel best.
- If it hurts, don't eat it. If necessary, blend or purée food. Use a straw to drink liquids.
- Rinse the mouth many times daily with warm salt water or other rinses listed below. Soda water can also be used.
- Avoid smoking and alcohol as these are irritating to the inflamed tissue.
- Keep lips moist with lip balm. Sucking on popsicles or ice cubes made from juice may help to numb the pain.
- Candida thrives on sugar. Clean the mouth and throat of the residual sugars with cold boiled water used in any of the following four recipes:

Xerostomia

A lack of saliva can make eating less appealing and can increase the risk of cavities and mouth sores. Artificial saliva substitutes (Moistur®, Zero-Lube®) can be tried. Fluid intake of 1.5-2 liters daily is

recommended. Try these recommendations:

- Offer ice or frozen juice chips.
- Moisten foods. Dry or hard foods can be softened in milk or soup.
- Carry a spray bottle with rinses in it (mentioned above) and mist often.
- Brush teeth often using a toothbrush with gentle/soft bristles.
- Suck on sugarless gum or candy.
- Do not use commercial mouthwashes as they may irritate tender tissues.
- Avoid alcohol and tobacco.
- Use lip balm.

Dysphagia

People with swallowing disorders are at risk for aspiration pneumonia, decreased intake due to fear of choking or aspiration and weight loss. Warning signs are:

- Coughing and choking at meals.
- Drooling.
- “Gurgly” voice after eating or drinking.
- Muscle weakness in the face and mouth.
- Holding or “pocketing” food in the mouth.
- Eating very slowly.

- Reflux of food from the nose or mouth after trying to swallow.
- Repeated swallows for one bite of food.
- Complaints that food catches in the throat.
- Simplify meal preparation by using ready-to-eat foods and disposable dishes.
- Suggest preparing extra foods when the patient is well and freeze some for low energy days.

An assessment of the extent of the problem can be done with the physician, dietitian and other health professionals, such as speech therapist and physiotherapist. Changes in texture of the diet may be indicated, i.e. minced or puréed and thickened fluids. Adding a commercial thickener can thicken fluids. This can be done at home or in the hospital. Soups can be thickened with instant potato flakes or pureed vegetables. Foods at hotter or cooler than body temperature may give more stimuli to swallow and may be better tolerated. Correct eating posture is important.

Fatigue

Fatigue can be a major obstacle to buying food, preparing meals and eating. Check for anaemia and other causes, and try any of the following:

- Suggest community and family supports, such as grocery delivery, home care services, volunteers, and community feeding programmes.
- Liquid nutritional supplements, such as Ensure®, Resource® or homemade blender drinks are useful.

Fever

Fever increases energy, fluid and electrolyte requirements. Calorie needs may be increased by as much as 30-50%. Fluids should contain calories and electrolytes.

- Suggest soups, juices, milk, and commercial supplements.
- Eat 5 meals per day.

Key Points

- 1. Early nutritional assessment, regular monitoring and reassessment of HIV infected children facilitate early intervention using strategies to achieve nutritional goals thereby helping to improve the quality of life.**
- 2. Nutritional care should be ongoing.**
- 3. Involvement of caregivers is essential to the attainment of nutritional goals.**

Drug-Food Interactions^a

Interactions between antiretroviral therapy (ART), food and nutrition can affect the efficacy of the drug(s), nutrition status of the PLWHA, and adherence to drug regimens. Drug-food interactions consist of the effects of food on medication efficacy, the effects of medication on nutrient utilization and the effects of medication side effects on food consumption.

Drugs

Antiretroviral (ARV) medications are potent drugs that can drastically decrease replication of the human immunodeficiency virus and significantly slow the progression of the disease. ARV medications do not kill the virus nor cure HIV. ARV may not be required by all PLWHA at all stages of the disease. Most often they are prescribed when the virus has begun to significantly damage the immune system.

There are two main classes and three types of commonly and widely used ARV (see Table 1).

ARV medications slow the progression of the disease by a variety

of mechanisms. HIV needs certain proteins and chemicals supplied by the host/infected person in order to replicate itself. Reverse transcriptase inhibitors operate early in the HIV life cycle to stop viral replication. Reverse transcriptase is an essential enzyme that helps the single stranded RNA convert to the double stranded DNA.

Nucleoside Reverse Transcriptase Inhibitors (NRTI) bind onto the reverse transcriptase enzyme and prevent the enzyme from transcribing viral RNA to host DNA (CD4 T cells).

Nucleotide Reverse Transcriptase Inhibitor – only one drug in this class to date – is very similar to NRTI.

Non-nucleoside Reverse Transcriptase Inhibitors (NNRTI) also block reverse transcriptase, but slightly differently to NRTI, and block HIV from taking over CD4 T cells.

Protease Inhibitors operate later in the cycle of HIV. They block the functioning of the enzyme protease that is involved in viral assembly and keep the infected CD4 T cells from making active copies and releasing them into the blood.

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

Table 1: Classes and Types of Anti-Retrovirals

Class	Type	Examples of Drugs (Generic name)
Reverse Transcriptase Inhibitors	Non-nucleoside reverse transcriptase inhibitors (NNRTI or "non-nucs")	nevirapine, efavirenz
	Nucleoside/nucleotide reverse transcriptase inhibitors (NRTI or "nucs") – also called nucleoside analogues	abacavir, lamivudine (3TC), zidovudine (AZT), didano - sine (DDI), stavudine (D4T), tenofovir
Protease Inhibitors	Protease Inhibitors (PI)	indinavir, ritonavir, nelfinavir, saquinavir, lopinavir, kaletra

Highly active anti-retroviral therapy (HAART) employs a combination of at least 3 medications, usually from different classes, to obtain maximum viral suppression. Known also as combination therapy (CT), drug efficacy is optimized and the chances of drug resistance are reduced.

PLWHA often take other drugs to treat opportunistic infections and possibly other common diseases or conditions. Nutrition is a critical factor in the safety and efficacy of many medications. As a nutrition counselor, it is important to be familiar with the client's regimen. During the counseling process, he/she should be encouraged to adhere to his/her regimen so as to minimize any opportunity for the development of drug resistance.

Drug Absorption

Medications are absorbed in the small intestine and metabolized in the liver by the cytochrome P450 enzyme system. There are numerous isoforms of this enzyme system, which can be induced or inhibited by nutrients, other drugs and herbs. How these are affected influences the levels of medication in the blood.

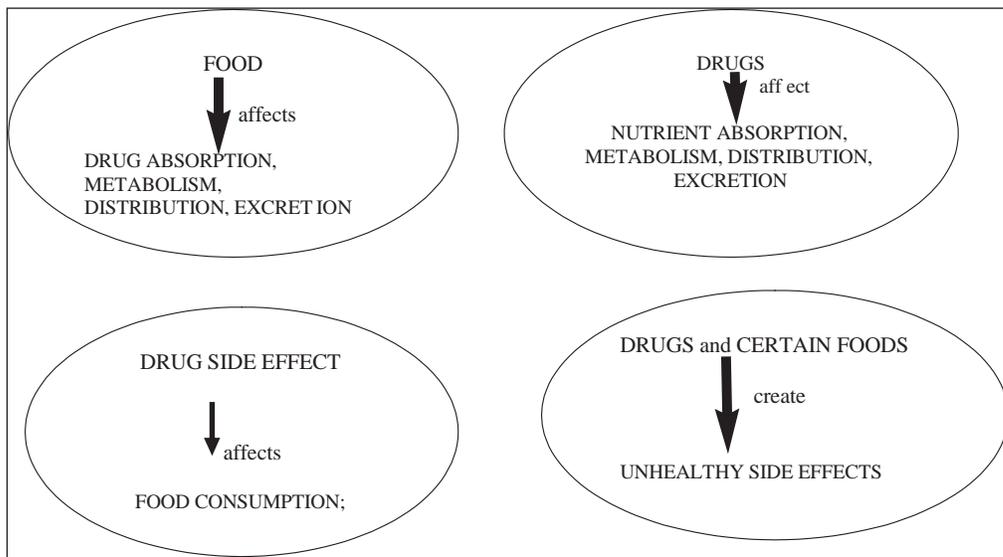
The Cmax of a medication is the maximum plasma concentration of a drug and the Cmin is the minimum concentration when the plasma levels are lowest, usually just before the next dose. The area under the curve (AUC) measures exposure to a drug during the full dosing interval and is often used to determine whether a drug is working. The Cmax is associated with severity of adverse effects and the Cmin predicts the efficacy of a drug.

Drug-food Interactions

The virus can develop resistance to antiretroviral medications. Therefore it is of critical importance that they be taken properly with complete

adherence. ARV, like other drugs can interact with food and nutrition in many ways resulting in both positive and negative outcomes. Four main types of interactions can occur as shown in Figure 1.

Figure 1: Interaction Between Drugs, Food and Nutrition



Dietary measures can either improve or decrease absorption as well as utilization of the medications, because of the potential for drug-nutrient interaction at various sites. Food can affect the bioavailability of a medication by changing gastric acidity, increasing or decreasing intestinal transit time, or by changing levels of metabolizing enzymes in the

liver. ARV-food management should be drug specific. **Table 1.2** and **Table 1.3** give some indications of the possible nutrition-related side effects that can result from different groups of drugs. Some of the side effects are more common than others. Nevertheless, they all require nutritional management.

Table 1.2: Nutrition-Related Side Effects of Drugs by Groupings

Groupings	Possible Nutrition -related Side Effects
Anti-bacterials (sometimes referred to as antibiotics)	<ul style="list-style-type: none"> • Dry mouth • Sore mouth • Nausea • Vomiting • Diarrhoea • Constipation • Taste changes • Thrush • Abdominal pain • Loss of appetite • Problems swallowing
Anti-cancer	<ul style="list-style-type: none"> • Loss of appetite • Sore mouth and throat • Nausea • Vomiting • Weight loss • Abdominal cramps/pain • Constipation • Swelling of gums • Irritation of the stomach • Altered taste • Difficulty swallowing • Thirst
Anti-fungal	<ul style="list-style-type: none"> • Loss of appetite • Nausea • Vomiting • Metallic taste • Weight loss • Diarrhoea • Cramping • Stomach pain • Increased thirst • Dry mouth and taste changes • Cough • Fatigue/tiredness
Anti-HIV	<ul style="list-style-type: none"> • Weight gain • Nausea • Vomiting • Abdominal pain • Diarrhoea • Taste changes • Increased or decreased appetite • Constipation • Fatigue/tiredness
Anti-viral	<ul style="list-style-type: none"> • Nausea • Vomiting • Metallic taste • Mild diarrhoea

Table 1.3: Dietary Recommendations for Side Effects of Anti-Retroviral Medications

Class of ARV	Medications	Side Effects	Dietary Recommendations
Nucleoside Reverse Transcriptase Inhibitors (NRTI)	Zidovudine Retrovir (AZT)	Nausea, vomiting, taste changes, fatigue, abdominal pain, appetite changes (increased or decreased), anaemia, constipation, weight gain	Take with food to decrease nausea. High fat foods decrease absorption. <i>Avoid alcohol.</i>
	Lamivudine (3TC, Epivir)	Nausea, vomiting, abdominal cramps, diarrhoea	Food has no effect but taking with food can decrease side effects. <i>Avoid alcohol.</i>
	Combivir (3TC/AZT)	Similar to AZT or 3TC alone	Take with food to decrease nausea
	Didanosine (DDI, Videx)	Pancreatitis, nausea, diarrhea, stomatitis, dry mouth, flatulence, decreased taste acuity	Take on an empty stomach 1 hour before or 2 hours after a meal. Taking with food reduces absorption. <i>Avoid alcohol.</i> Do not take with juice, antacids or supplements that contain Aluminum or Magnesium.
	Abacavir (Ziagen, ABC)	Anorexia, nausea, vomiting, abdominal pain, diarrhoea, anaemia, weakness and insomnia. May slightly increase glycaemia.	No effect of food but taking with food can decrease side effects. Alcohol increases AUC. <i>Avoid alcohol.</i>
	Trizivir (ABC, 3TC, AZT)	See individual profiles.	Take with low fat meal. <i>Avoid alcohol.</i>
	Stavudine (D4T, Zerit)	Anorexia, stomatitis, nausea, vomiting, abdominal pain, diarrhoea, chills/fever. May increase risk of lipodystrophy.	Food has no effect but taking with food may decrease side effects. <i>Avoid alcohol.</i>

Table 1.3: Dietary Recommendations for Side Effects of Anti-Retroviral Medications(cont'd)

Class of ARV	Medications	Side Effects	Dietary Recommendations
Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI's)	Nevirapine (Viramune NVP)	Stomatitis, nausea, vomiting, abdominal pain, fever, headache, fatigue, drowsiness, high risk of hepatotoxicity	Food has no effect. <i>Avoid alcohol.</i> Avoid St. John's Wort.
	Efavirenz (Sustiva, EFV)	Nausea, vomiting, abdominal pain, flatulence, diarrhoea, elevated blood cholesterol and triglycerides, anorexia, flatulence	Take with a low fat meal; a high fat meal reduces absorption; take at bedtime; <i>Avoid alcohol.</i>
	Delavirdine	Dry mouth, stomatitis, taste changes, tongue edema, bleeding gums, dysphagia, gastritis, GI bleeding, colitis, diarrhoea, dyspepsia, constipation.	Food has no effect; antacids can decrease absorption.
Protease Inhibitors	Indinavir (Crixivan, IDV)	Nausea, vomiting, abdominal pain, fatigue, diarrhoea, dry mouth, taste changes, sore throat. May increase risk of lipodystrophy	Take on an empty stomach at least 1 hr before or 2 hrs. after a meal or with a low-fat (3 grams), low-protein snack (6 grams) 300 kcal Avoid grapefruit juice. Drink at least 1.5 litres fluid daily.
	Indinavir with Ritonavir	See individual profiles	Food has little effect. Take with food to decrease side effects.
	Saquinavir (Invirase, Fortovase, SQV)	Nausea, diarrhoea, abdominal pain, mouth ulceration, taste changes, diarrhoea, constipation, flatulence. May increase risk of lipodystrophy.	High fat foods increase AUC; take within 2 hours of a high-fat and high-calcium meal. Take with meal or light snack. <i>Avoid alcohol.</i> Grapefruit juice will increase drug concentration. Avoid St John's Wort
	Ritonavir (Norvir RTV)	Nausea, diarrhoea, vomiting, muscle weakness, taste changes	Take with food to decrease side effects. <i>Avoid alcohol.</i> Avoid St John's Wort.
	Nelfinavir (Viracept, NFV)	Diarrhoea, flatulence, lactose intolerance, nausea, abdominal pain	Take with food that includes protein. Avoid bowel irritants.
	Kaletra (Lopinavir/ Ritonavir)	Nausea, abdominal pain, diarrhoea	Take with high fat meal.
Nucleotide Reverse Transcriptase Inhibitor	Tenofovir (Viread TDF)	Abdominal pain, headache, fatigue, dizziness	Take with meals to increase AUC and bioavailability.

Combination Drug Therapy

Multiple drug usage/combination therapy warrants consideration of the different interactions. Drug and food timetables need to be arranged with the PLWHA. Some food interactions of combination drug therapy (CT) are different from those of the individual drug, for example the PI indinavir with a high energy, high-fat, high protein meal reduces its absorption, but when taken with the PI ritonavir, the food

has no effect on its absorption and it may be taken with or without food. In addition, drugs for opportunistic infections and other conditions may require consideration when planning management of drug and food consumption.

Drug-drug interactions arising from prescribed, over-the-counter or traditional therapies should be evaluated especially since the content of traditional therapies is unknown.

Key Points

1. Managing the interactions between ARVs, food and nutrition can significantly influence the success of ART. This is a critical factor in the extent to which the therapy is effective in slowing the progression of HIV /AIDS and improving the quality of life.
2. Appropriate dietary changes can help to manage certain ARV side effects and reduce the impact the side effects can have on nutritional status. Failure to be drug-specific when managing ARV-food interactions may result in non-adherence and thus contribute to a decline in health.
3. Information about drug-food interactions continues to evolve. It is therefore important to remain informed.
4. ARVs can improve the health of the PLWHA but they can also create additional food and nutrition needs and constraints. Adequate dietary intake can be challenging.
5. Non-adherence to drug regimen gives the virus the opportunity to copy itself, grow and mutate leading to drug resistance and fewer options for fighting HIV.

Food and Water Safety^a

Avoiding infection from food or water borne pathogens is of utmost importance for HIV-infected persons. Immuno-compromised individuals can acquire infectious organisms by eating undercooked or contaminated foods or drinking untreated water. Food either supports growth or serves as a passive carrier of the infectious microorganisms or toxins.

The symptoms of food or water-borne infection include diarrhoea, nausea and vomiting, which in some cases can be life-threatening. Diarrhoea is a common clinical feature of symptomatic HIV infection and is usually the most significant manifestation. It is challenging to treat and it may contribute to wasting and malnutrition if treatment is not timely and effective.

A number of food and water borne microorganisms have been identified as aetiological agents in gastrointestinal infections in HIV-infected persons including *Giardia lamblia*, *Entamoeba histolytica*, *Cryptosporidium*, *Salmonella*, *Shigella*,

Listeria, *Yersinia* and *Camphyllobacter*.

Persons with CD4 cell counts below 200/mm³ are particularly vulnerable due to immune suppression. Early in HIV infection PLWHA and their families should be counselled to adopt safe food handling practices and to use water from a safe source. Caregivers of infants should understand the basic principles of food and water safety, including the preparation of infant formula.

Food Safety Precautions

HIV-infected persons and their caregivers should ensure clean/safe food handling techniques are used at all times. Fruits and vegetables should be washed well or peeled.

Hands should be washed before, during and after food handling.

- Work surfaces should be clean. A sanitizing solution can be mixed using 1 tablespoon of bleach:1 litre of water and this can be sprayed onto the surfaces. Washing cloths should be changed daily.

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

- Avoid cross contamination of foods. Uncooked meats should not come in contact with other foods. Wash hands, cutting boards, counters and cooking utensils thoroughly after contact with uncooked foods. Ideally separate cutting boards are recommended for meats and non-meat products.
- Thaw frozen foods in the refrigerator, microwave or cold water changed every 30 minutes. Cook immediately after thawing. Do not refreeze thawed foods.
- All meats, poultry, eggs and seafood should be cooked well to a safe temperature to destroy infectious micro-organisms. Cook eggs until whites and yolks are firm. Fish and shellfish until opaque. Fish should flake easily with a fork. Raw or undercooked foods are prohibited.
- Foods should be kept hot at a temperature greater than 140°F/60°C or cold at a temperature less than 40°F/4°C. Bacteria grow rapidly in this danger zone. Whether raw or cooked, foods should not be left at room temperature for more than 2 hours (1 hour in weather 90°F/32°C or above).
- Chill/refrigerate leftovers immediately or within the above time frame. Use within 3 days. Any suspicious foods should be thrown out.
- Reheat leftovers thoroughly (165°F/74°C if a food thermometer is available) until very hot. Allow sauces, soups and gravies to come to a boil.
- Eating out – order foods that have been thoroughly cooked and ensure that they are very hot.
- Only pasteurized milk and dairy products should be used as Salmonella can be present in unpasteurized milk.
- Soft cheeses like Brie or Camembert should be avoided. Ready-to-eat foods such as hot dogs and “deli” cold cuts/sausages should be reheated well. These may contain *Listeria*.
- Persons should understand and apply the basic guidelines for procuring foods, such as looking for bruises, expiry date, presence of moulds, or dented cans.

Water Safety Precautions

- *Cryptosporidiosis, microsporidiosis and giardia infection are typical water-borne illnesses.* These can be avoided by using treated water. HIV-infected persons;
 - ◆ should not use water directly from lakes, rivers, ponds, springs or the rain;
 - ◆ should avoid swimming in water that may be contaminated with human or animal waste;

- ◆ should avoid swallowing water when swimming
- Chlorination of municipal water systems will destroy *giardia* but not *cryptosporidium*. Immune suppressed individuals should take further measures to ensure a safe water supply by using one of these 3 options:
 - ◆ water should be boiled rapidly for one minute to eliminate *cryptosporidia*.
 - ◆ bottled water can be used if it has been treated by distillation or reverse osmosis.
 - ◆ water can be filtered with a one micron filter that will filter out *cryptosporidia*.
- Bottled or canned soft drinks, commercially packaged noncarbonated drinks and juices that do not require refrigeration until after opening are safe to drink.
- Fruit juice or drinks reconstituted with water from a safe source is permitted.
- Reconstituted fruit juice or drinks as usually sold in retail outlets or by roadside vendors may not be safe to use since the water source may be questionable.

Key Points

1. Knowledge and practice of safe food handling techniques are essential for HIV-infected persons.
2. Prevention of food and waterborne illness is critical to decrease risk of associated infections.
3. Emphasis should be placed on proper selection and storage of foods, adequate cooking of foods from animals, avoiding cross contamination of raw and cooked foods.
4. Keep a sanitary kitchen environment.
5. Practise proper personal hygiene.
6. Use clean water from safe sources.

Other Issues^a

Micronutrient Therapy

Aside from a multivitamin-mineral, which should be considered for HIV-infected persons, supplementation regimens should be individualized based on clinical condition, measured deficiencies, and economic situation. The therapeutic effect and dosing requirements have yet to be determined but some patients will decide to self-administer these supplements. The World Health Organization recommends that micronutrient needs for HIV-infected people in resource-limited settings is the same as the healthy population, but that a pre-existing state of malnutrition must be considered. Given the myriad nutritional problems experienced by PLWHA and the prevalence of micronutrient deficiencies, a multivitamin might be a prudent intervention.

Antioxidants: Studies show an increase in oxidative stress in HIV. Oxidative stress contributes to disease pathogenesis by damaging cell structures, increasing the inflammatory response, increasing viral replication via the NFKB pathway,

and inducing apoptosis of immune cells. There is a concomitant decline in endogenous antioxidant production, notably glutathione, as well as a decreased intake of dietary sources. Although there remains no consensus regarding the use of antioxidant supplements, in clinical practice vitamins C and E are widely recommended, as they are relatively inexpensive and non-toxic. Suggested doses are 500-1000 mg of vitamin C and 400-800 IU vitamin E per day). For vitamin C the upper tolerable limit (UTL) is 2000mg daily and for vitamin E the UTL is 1000 mg (1100 IU) daily.

Vitamin B Complex: Epidemiological studies suggest that B vitamins are protective in terms of slowing disease progression. Patients with a history of acute infection, fever, alcohol use, and malnutrition are at particular risk of deficiency, and should consider a B complex supplement.

Vitamin B₁₂: A deficiency of this vitamin causes megaloblastic anaemia and has been linked to neuropathy, decreased cognition, increased disease

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

progression, and increased risk of mortality. The primary contributing factors are malabsorption due to gastric hypochlorhydria and intestinal disease, as well as increased turnover. Serum levels of vitamin B₁₂ do not accurately reflect functionality or tissue stores, which limits the reliability of testing and makes it more difficult to determine the appropriateness of supplementation. Persons with low serum levels, advanced disease, neuropathy, declining cognition, and prolonged gastrointestinal complications should be considered for vitamin B₁₂ supplementation. The repletion dose of vitamin B₁₂ is oral supplementation of 1000-2000 µg daily or 30-100 µg by intramuscular injection for 5-10 days.

Selenium: Research has shown that selenium deficiency is associated with increased risk of mortality and has been associated with wasting syndrome and possibly viral load. Whether selenium deficiency has a causal role in mortality or is a marker of disease progression remains to be determined. However, at this stage it is prudent to prevent, or at the very least, correct, abnormally low serum levels. It should be noted that functional tests (e.g., glutathione peroxidase) more accurately reflect selenium status, but serum levels have been widely used to assess selenium status in HIV disease. Selenium is toxic in high doses, but 100-200 µg per day is thought to be a safe and adequate dose to prevent deficiency. The UTL is 400 µg daily.

Zinc: Zinc deficiency, a common occurrence in HIV infection, is profoundly immunosuppressive, is associated with an increased risk of mortality, and has a negative impact on taste acuity, wound healing and growth. Zinc supplementation remains highly controversial, as high intakes are also immunosuppressive. The level of zinc intake that causes declining immune function is unknown. The amount of zinc found in a multi-vitamin-mineral is safe and adequate unless there is a measured deficiency. To correct zinc deficiency, prescribe 25-50 mg elemental zinc three times daily. The UTL is 40 mg daily.

Vitamin A: Deficiency is common in resource-poor settings, injection drug users and malabsorptive disorders. Deficiency compromises the integrity of the epithelial barrier, increases the risk of opportunistic infection and increases the risk of vertical transmission. Deficiency prophylaxis will be obtained with the use of a daily multivitamin supplement. Doses higher than 20,000 IU per day should not be taken without documented evidence of vitamin A deficiency. Persons with compromised liver function should not take doses greater than 5000 IU vitamin A per day (the usual amount in a multivitamin). The UTL is 10,000 IU daily.

Iron: Iron deficiency anaemia is common in impoverished populations due mainly to inadequate intake. The main symptom of iron deficiency is

fatigue with reduced functional capacity. Individuals with AIDS may develop anaemia of chronic disease. Iron deficiency also has negative effects on lymphocytes, natural killer cells and neutrophils. However, excess iron is also problematic as iron provides an important substrate for bacterial growth. PLWHA on anti-retroviral therapy, especially zidovudine, may have decreased serum haemoglobin with elevated MCV (mean corpuscular volume). It should not be assumed, however, that low haemoglobin is due to ART and confirmatory studies including, serum ferritin, folate and vitamin B₁₂ should be performed. Iron supplements should be prescribed on the basis of iron deficiency anemia. The UTL is 45 mg daily.

Many other foods, nutrients and herbal remedies are promoted as having antiviral and immune enhancing properties. Health care professionals should investigate which therapies patients are already taking or plan to start taking and counsel accordingly.

Complementary and Alternative Medicine

Complementary and alternative medicines (CAM) include mind and body therapies that are practised outside of conventional medicine. CAM may be used in conjunction with or instead of allopathic medicines. These practices are common among people living with

HIV/ AIDS in order to have a more holistic approach to healing.

PLWHA often seek to minimize side effects, enhance quality of life and delay disease progression. In some cases CAM offers the only available medicine for treatment of HIV infection and symptoms.

PLWHA often receive information from friends and may not be well informed about the rationale for taking the therapy, possible toxicities, or interactions with their antiretroviral medication. However, exploring CAM may be an avenue of empowerment for persons with HIV/AIDS as they endeavour to gain more control of their health. Clinicians can help patients to make sound choices even with the limited scientific information available.

Individuals exploring the use of CAM should be well informed by a suitably qualified practitioner about the following:

- The potential benefits for their particular situation.
- How the therapy will work.
- Possible side effects or negative interactions with their conventional medicines.
- What type of commitment they have to make to the treatment, whether the treatment is regularly available, and what they have to do to acquire it.

The cost of therapy and whether they can afford it.

They should be very cautious about the following:

- Therapists that discourage them from consulting other health care professionals, or negate other information or practices.
- Practitioners who advise them to discontinue life-saving conventional medicine in favour of CAM.
- Products or practices that 'cure' a whole range of illnesses.
- Practitioners who are not qualified.
- Products that are unjustifiably expensive with no rationale given for the high cost.
- Products or therapies that have 'secret' properties.

Key Points

1. Timely nutrition screening and assessment with effective nutrition intervention can facilitate access to adequate dietary intake thus influencing health outcomes.
2. The spectrum of nutritional intervention includes ensuring basic education on healthy eating, identifying common practices and diseases that usually require nutrition intervention or counseling, and assessing conditions that are specific to, and span the spectrum of HIV disease that can affect morbidity and mortality, if not addressed in a timely manner.
3. Each encounter of the nutrition counselling process should provide the PLWHA, the family or caregivers, with the necessary information for them to make informed choices about dietary strategies that will help with maintaining optimal nutritional health.
4. Client should be guided to create specific goals stated positively in terms of food behaviours.
5. During the asymptomatic stage, counselling should include information for performing self-screening and monitoring of weight. It is important that the principle of good nutrition status for improving the quality of life and increasing the life span be embraced.
6. Establish a helping relationship during counselling. Demonstrate care and understanding.
7. As a counsellor, you are helping or guiding the client to cope better and to decide what is best for himself/herself. The client is the problem solver/ decision maker.

Selected Nutritional Supplements^a

ORAL LIQUID NUTRITIONAL SUPPLEMENTS

1. For High Calorie, High Protein Diets

Standard formula with 1 kcal/mL are the first choice for weight gain with no other complications. These products are polymeric, containing intact protein, and require a functioning gastrointestinal tract. Acceptance and tolerance are variable as these products are not isotonic, and tend to be very sweet with a mild chemical taste. Taste fatigue can be a problem and strategies to enhance flavour and decrease off tastes may improve long-term acceptance. These include chilling or freezing the drinks, using a straw to avoid unpleasant smells, adding flavour enhancers such as vanilla, instant coffee, or fruit. Examples include the following formulas:

- Ensure®
- Resource®
- Boost®

Hypercaloric formulas provide 1.5 kcal/mL. Although these provide additional calories and protein they

must be used with caution due to the high osmolality. Examples include the following formulas:

- Boost Plus Calories®
- Ensure Plus®
- Resource 2.0®

2. Specialized Oral Supplements

Specialized formulas may be used for specific conditions such as gastrointestinal symptoms, glucose intolerance, and elevated protein requirements. Examples include the following formulas:

- Ensure High Protein® for increased protein needs, glucose intolerance.
- Nutren® for gastrointestinal symptoms as this product contains 25% of the fat as MCT.
- Peptamen® is a semi-elemental, peptide-based formula used for severe diarrhoea and malabsorption.
- Vital® and Vivonex® are elemental amino acid based formulas for intestinal disease and malabsorption.

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

3. For Enteral Feeds

Some oral liquid nutritional products may also be used for enteral feeding if they meet specific criteria in their formulation. Many of these are not well tolerated by HIV-infected patients because they have high osmolality. For improved tolerance choose products that are isotonic, which are generally unflavoured and not suitable for oral supplementation.

Examples of oral liquid nutritional supplements that may be used for tube feeding include the following:

- Ensure®
- Resource®
- Nutren®
- Peptamen®

Isotonic nutritional products developed specifically for tube feeding are not suitable for oral supplementation. Examples include the following:

- Osmolyte HN®
- Jevity®
- Isocal, Isocal HN®, Isocal with Fibre®
- Isosource®, Isosource HN®, Isosource VCHN®

Elemental enteral formulas have high osmolality due to the presence of free amino acids. These are used in

cases of gastrointestinal disease and malabsorption. They are usually initiated in a diluted form to build tolerance. Examples include the following:

- Criticare HN®
- Vital HN®
- Tolerex®
- Vivonex®

4. Modular Formula

Kilocalories, protein and fats may be added to foods, oral liquid nutritional supplements, tube feeding formulas and infant formulas. Examples include the following products:

- Polycose® calorie supplement
- Caloreen® calorie supplement
- MCT oil

Immuno-compromised individuals can acquire infectious organisms by eating undercooked or contaminated foods or drinking untreated water.

Modifying Adult Milk for Infant Feeding

Fresh cow's or goat's milk

80 ml liquid full cream/
whole milk
40 ml cooled, boiled water
8 g sugar

Yield: 120 ml prepared formula

Evaporated milk

32 ml evaporated milk
48 ml cooled, boiled water
to make 80 ml full
strength milk
40 ml water
8 g sugar

Yield: 120 ml prepared formula

Powdered full-cream milk

10 g full cream powdered
milk
80 ml cooled, boiled water
to make 80 ml full
strength milk
40 ml water
8 g sugar

Yield: 120 ml prepared formula

*Micronutrient supplements should
be given with any of these home-
prepared formulas.*

Source: WHO/UNICEF/UNAIDS, HIV and Infant Feeding Counselling: A Training Course.

Composition of Oral Rehydration Salts Solution for Severely Malnourished Children

<i>Concentration (mmol/L)</i>	<i>Component</i>
125	<i>Glucose</i>
45	<i>Sodium</i>
40	<i>Potassium</i>
70	<i>Chloride</i>
7	<i>Citrate</i>
3	<i>Magnesium</i>
0.3	<i>Zinc</i>
0.045	<i>Copper</i>
300	Osmolarity

Glossary^a

Word	What it Means
Acquired Immunodeficiency Syndrome (AIDS)	A secondary immunodeficiency disease that results from infection with the human immunodeficiency virus.
Alternative medicine (Complementary medicine)	Mind or body therapy that is practised instead of conventional medicine. Examples include healing touch, acupuncture, nutrition and herbal or homeo-pathic medicine.
Antigen	A foreign protein present in the blood that stimulates an antibody response.
Anti-retroviral therapy	Drugs that prevent replication of retroviruses, in this case the human immunodeficiency virus.
Apoptosis	Programmed cell death that takes place in normal cells by nuclear fragmentation. It is an active, selective and tightly regulated process.
Area under the curve	Measure of exposure to a drug during the full dosing interval. This determines the efficacy of the drug.
Body cell mass	Metabolically active protein including somatic protein and visceral protein pool.

^aExtracts from CFNI's "Healthy Eating for Better Living: A Manual on Nutrition and HIV/AIDS for Healthcare Workers in the Caribbean".

Word	What it Means
Breastmilk Substitute	Any food used for infant feeding as a replacement or supplement to breast milk.
Cachexia	Weight loss, wasting of muscle, loss of appetite and general debility that can occur during a chronic disease.
CD4	The site on the T helper cells to which HIV binds itself. CD4 cell count is a measure of immune function.
Candidiasis	An opportunistic fungal infection that usually occurs in the mouth, esophagus, vagina or skin.
Cryptosporidium	A parasite that infects the intestines causing severe, protracted diarrhoea, often resulting in dehydration and malnutrition.
Dysgeusia	Altered taste.
Dysphagia	Difficulty swallowing.
Encephalopathy	Any disease or disorder of the structure or function of the brain.
Evaluation	Systematic comparison of current findings with previous status, intervention goals or a reference standard.
Exclusive breastfeeding	Giving the infant only breastmilk on demand. No other food item, including water, is offered.
Gastrostomy tube	A feeding tube that is placed in the stomach to provide nutrition. The tube is placed surgically or with percutaneous endoscopic gastrostomy.

Word	What it Means
Highly Active Antiretroviral Therapy (HAART)	Antiretroviral therapy that combines medications, usually at least 3 different drugs, to achieve suppression of viral replication.
Human Immunodeficiency Virus (HIV)	The virus that causes acquired immunodeficiency syndrome (AIDS).
Immunocompromised (immune suppressed)	The immune system has declined to the point where it can no longer mount an effective defense against pathogens
Incidence	The frequency of occurrence of any event or condition over a period of time and in relation to the population in which it occurs.
Lymphocytes	A parasite that infects the intestines causing severe, protracted diarrhoea, often resulting in dehydration and malnutrition.
Jejunostomy	A feeding tube that is placed in the jejunum. This may be placed directly through the abdominal wall or as an extension from a gastrostomy feeding tube.
Malnutrition	Any condition caused by deficient or excess energy and nutrient intake, or by an imbalance of nutrients.
Monitoring	Review and measurement of individual's status at selected times to determine the degree to which progress is being made and nutrition goals are being achieved.
NFKB pathway	Nuclear factor kappa B (NFKB) is a cellular transcription factor that is involved in replication of the human immunodeficiency virus.

Word	What it Means
Nutrition assessment	Gathering information about diet adequacy and nutrition status, evaluating parameters and identifying risks for impending nutrition complications.
Nutrition diagnosis	Identifying and labeling actual occurrences and risk of or potential for developing a nutrition problem.
Nutrition intervention	Strategies applied to address nutrition issues; includes both food-based approaches, micronutrient supplementation and behaviour change strategies.
Opportunistic Infection	An infection that occurs when the immune system cannot mount a defense.
Oxidative stress	The production of reactive oxygen species is greater than the available antioxidant defense.
Percentile	The rank position of an individual on a given reference distribution, stated in terms of what percentage of the group the individual equals or exceeds the reference population of children of the same age.
Prevalence	The total number of cases of a disease in a population at a given time.
Resistance Training	Exercise program in which exercises are performed with progressively increasing weights and repetitions.
Retrovirus	A virus that transcribes its RNA to the hosts DNA using the enzyme reverse transcriptase.

Word	What it Means
Somatic proteins	Skeletal muscle proteins.
Stadiometer	A device that is used to measure standing height. It includes a vertical 'ruler' with a right angled head board.
Starvation	Prolonged absence of nutrients to the body.
Viral load	A measure of the amount of HIV in the blood.
Wasting	Depletion of body cell mass.
Wasting Syndrome	Involuntary weight loss of more than 10% of baseline body weight in the presence of unexplained chronic diarrhoea, or intermittent or constant fever for more than 30 days.

– Remember –

To speak with your healthcare worker especially your doctor or pharmacist to find out about the nutrition-related side effects of the drugs that have been prescribed for you. Either of these persons or a nutrition counsellor can give you some suggestions as to what you can do, should you experience any of these side effects.

The sooner you begin to pay attention to your diet, the better your chances will be in fighting infections and illnesses that may develop.



The following recipes are extracted from "Healthy Eating for Better Living: A Caribbean Handbook".

Coco Bana

Coco Bana is a smooth blend of ripe banana/fig and coconut cream powder to give a delicious drink. It will be a favourite for the kids too!

Ingredients

300 g	Very ripe bananas/figs, peeled
750 g	Double-strength Soya Milk
40 g	Granulated Sugar
1 tsp	Vanilla essence
1/8 tsp	Grated Nutmeg
1/8 tsp	Cinnamon powder
23 g	Coconut cream powder
1/8 tsp	Salt

Method: Blend all ingredients together until thoroughly mixed. Strain, put in a clean, covered container and refrigerate. Serve cold. Shake or stir well before serving. **Makes 4 cups (1 L) 4 servings**

Serving size: 1 cup (250 mL)

Amount per serving

Calories:	369
Protein:	10 g
Total fat:	17 g
Saturated fat:	8 g
Cholesterol:	0 mg
Total carbohydrate:	46 g
Dietary fibre:	1 g
Iron:	0.9 mg

Note:

You may notice a thin black layer at the top of the beverage upon settling. This is due to the natural reaction of the ingredients, so don't be alarmed.

Peanut Shake

Ingredients

112 g Peanut Butter
 917 g Double-strength Soya Milk
 100 g Granulated Sugar

Method: Blend all ingredients at medium-high speed until thoroughly mixed. Strained, place in a clean, covered container and refrigerate. Serve cold. Shake or stir well before serving.

Makes 4 cups (1 L) 4 servings

Serving size: 1 cup (250 mL)	
<i>Amount per serving</i>	
Calories:	551
Protein:	18 g
Total fat:	31 g
Saturated fat:	8 g
Cholesterol:	0 mg
Total carbohydrate:	55 g
Dietary fibre:	2 g
Iron:	0.8 mg

Caribbean Delight

Be enveloped by this tropical enchantment. soothe your soul with flavours from the Caribbean in this spectacular combination of local fruits and vegetables...almost too much for one glass to handle.

Ingredients

112 g	Local Carrot, peeled and chopped
168 g	Ripe Tomato
100 g	Very Ripe Banana/fig, peeled
625 g	Pineapple Juice
125 g	Orange Juice
112 g	Ripe Mango, peeled
120 g	Granulated Sugar
1 tbsp	Lime Juice
30 g	Oil

Method: Blend all ingredients at high speed until thoroughly blended. Strain (twice if necessary), squeezing juice from ingredients well. Place in a clean, covered container and refrigerate. Serve cold. Shake or stir well before serving.

Makes 4 cups (1 L) 4 servings

Serving size: 1 cup (250 mL)

Amount per serving

Calories:	326
Protein:	1 g
Total fat:	8 g
Saturated fat:	1 g
Cholesterol:	0 mg
Total carbohydrate:	70 g
Dietary fibre:	1 g
Iron:	1.1 mg

Fried Chicken

Ingredients

812 g Chicken parts

Seasoning:

28 g Garlic cloves, chopped
 168 g Onion, chopped
 28 g Chive/Scallion, chopped
 1 tbsp Thyme
 ½ tsp Hot pepper, chopped (optional)
 4 tbsp Soy sauce
 4 tsp All-purpose meat seasoning
 ½ tsp Black pepper (optional)
 1 tsp Salt

Coating:

240 g All-purpose Flour
 55 g Breadcrumbs
 2 tsp All-purpose meat seasoning
 ¼ tsp Black pepper
 1 tsp Salt
 150 g Eggs
 60 g Double-strength soya milk
 Oil (for deep frying)

Amount per serving	
Calories:	783
Protein:	50 g
Total fat:	37 g
Saturated fat:	10 g
Cholesterol:	388 mg
Total carbohydrate:	58 g
Dietary fibre:	2 g
Iron:	6.7 mg

Method:

1. Season chicken and leave to marinate for at least 1 hour in the refrigerator.
2. Mix together dry ingredients for coating; beat eggs and milk together in a bowl.
3. Set up breading station; put about ½ of the flour coating mixture in a plate; place bowl with egg mixture beside flour mixture; put the remainder of the flour mixture in a plate beside the egg mixture.
4. Scrape seasoning off chicken; coat in the order of the breading station: flour, then egg, then flour again, making sure that each individual chicken part is well coated.
5. Fry coated chicken in hot oil over high heat for about 2 minutes, so that chicken is crispy, then reduce heat and fry for 10 minutes more or until done and golden brown.

Remember that if the oil does not cover the chicken it might become soggy!

Serves 4

Delicate Tuna Florentine

Persons with difficulty chewing or swallowing will find this dish somewhat of a relief. Delicate Tuna Florentine may be used by persons on a soft diet, or those who simply desire something light to eat.

Ingredients

336 g	Tuna, canned in oil
1 tsp	Lime juice
224 g	Callaloo (Can be substituted with either spinach, bhagi or dasheen bush)
56 g	Onion, chopped
60 g	Margarine
36 g	All-purpose flour
28 g	Onion, finely diced
1	Garlic clove, finely diced
250 g	Double-strength soya milk
1 tsp	Stock cube
125 g	Warm water
¼ tsp	Black pepper (optional)
⅛ tsp	Salt
60 g	Bread crumbs

Amount per serving	
Calories:	524
Protein:	32 g
Total fat:	31 g
Saturated fat:	12 g
Cholesterol:	15 mg
Total carbohydrate:	28 g
Dietary fibre:	1 g
Iron:	5.9 mg

Method:

1. Drain tuna and flake slightly. Drizzle with lime juice and mix well.
2. Cook callaloo: melt margarine, and sauté onion; add callaloo and black pepper and stir; allow to cook until callaloo is just tender.
3. Dissolve stock cube in water. Make sauce: melt margarine and sauté onion and garlic with salt and black pepper; add flour and mix well; remove pot from heat and gradually add milk, stirring until all the flour is mixed out; return pot to heat; add stock and stir until sauce becomes thick.
4. Mix about 1/3 of the sauce with the callaloo and place in an ovenproof serving container.
5. Sprinkle tuna on top of callaloo. Spoon on the remainder of the sauce over the tuna. Sprinkle breadcrumbs over sauce.
6. Put in a 350°F pre-heated oven for about 5 minutes. Serve from dish.

Serves 4

Vegetable Beef Stew

Ingredients

336 g Boneless stewing beef, cut in strips or chunks

Seasoning:

- 168 g Onion, chopped
- 28 g Garlic cloves, chopped
- 28 g Chive/Scallion, chopped
- 120 g Soya sauce
- 1 tbsp Thyme
- 4 tsp All-purpose meat seasoning
- ½ tsp Black pepper (optional)
- ½ tsp Salt
- ½ tsp Hot pepper, chopped (optional)
- 60 g Oil
- 750 g Water
- 15 g Granulated sugar
- 224 g Sweet pepper, cut in strips
- 224 g Local carrot, peeled and cut in circles
- 224 g Irish potato, peeled and cut in ½" cubes
- 56 g Ketchup

Amount per serving	
Calories:	425
Protein:	25 g
Total fat:	25 g
Saturated fat:	6 g
Cholesterol:	53 mg
Total carbohydrate:	31 g
Dietary fibre:	1 g
Iron:	4.6 mg

Method:

1. Season beef and let marinate for at least 1 hour in the refrigerator.
2. Scrape seasoning off beef and sear in hot oil over medium flame for about 10 minutes.
3. Add seasoning and water and simmer over low heat for 1-2 hours or until beef is tender.
4. Add sugar, carrot, potato and ketchup. continue to simmer for about 5-10 minutes more or until potatoes and carrots are just tender. Add sweet pepper about 2 minutes before the carrots are finished (just enough time for them to cook without getting too soft).

Serves 4

Garden Salad Exotica

Ingredients

- 336 g Cold fried chicken, without bones, cut in strips or cubes
- 336 g Just ripened plantain, peeled, cut in ½” cubes, fried, and cooled
- 336 g Just ripened pawpaw, peeled and cut in ½” cubes
- 224 g Tomato, chopped
- 60 g Lettuce leaves
- 56 g Peanuts, unsalted, crushed
- 56 g Peanuts, unsalted, crushed
- 56 g Raisins

Dressing

- 112 g Mayonnaise
- 56 g Onion, finely chopped
- 56 g Cucumber, finely chopped
- ¼ tsp Black pepper

Amount per serving	
Calories:	693
Protein:	30 g
Total fat:	42 g
Saturated fat:	7 g
Cholesterol:	86 mg
Total carbohydrate:	53 g
Dietary fibre:	4 g
Iron:	2.7 mg

Method:

1. All ingredients should be cold.
2. Tear lettuce and line bottom of serving container. Toss together plantain, pawpaw, tomato, peanuts, and raisins, reserving enough peanuts and raisins to sprinkle on top of salad. Put tossed ingredients on top of bed of lettuce. Sprinkle on remaining peanut and raisin. Refrigerate until ready to serve.
3. Mix together all the ingredients for the dressing. Keep refrigerated until ready to serve.
4. Spoon dressing on salad before serving.

Serves 4

A New Worldwide Definition of the Metabolic Syndrome

Consensus from the International Diabetes Federation Could Help Stop the Cardiovascular Disease Time Bomb

Early detection and more intensive management of the metabolic syndrome in order to reduce the long-term risk of cardiovascular disease and diabetes is now possible, according to the International Diabetes Federation (IDF) in a global consensus statement presented for the first time April 14, 2005. The statement includes a new, clinically accessible definition of the metabolic syndrome, representing the views of experts in the fields of diabetes, cardiology, lipidology, public health, epidemiology, genetics, metabolism and nutrition from six continents.

Professor Sir George Alberti, past president of IDF and co-chairman of the consensus group said: “With a single, universally accepted diagnostic tool, clinicians can now more quickly identify patients with the metabolic syndrome in the practice setting.

Early and aggressive action will inevitably reduce the increased risk to the patient of developing cardiovascular disease and/or Type 2 diabetes. Put simply, we have the potential to stop the cardiovascular disease time bomb”.

The metabolic syndrome is a cluster of the most dangerous heart attack risk factors: diabetes or pre-diabetes, abdominal obesity, changes in cholesterol and high blood pressure. While up to 80 per cent of the almost 200 million adults worldwide with diabetes will die of cardiovascular disease, people with metabolic syndrome are also at increase risk, being twice as likely to die from and three times as likely to have a heart attack or stroke compared to people without the syndrome. This puts metabolic syndrome and diabetes way ahead of HIV/AIDS in morbidity and mortality terms yet the problem is not as well recognised. People with metabolic syndrome have a five-fold greater risk of developing Type 2 diabetes (if not already present). It is the exact nature of the cluster which appears to bring additional risk over and above that which would be expected from each of the components (high triglycerides when measuring cholesterol, for example).

Building on earlier definitions put forward by the WHO and NCEP ATP III, the new definition is easy to use in clinical practice. It avoids the need for measurements that may only be available in research settings. For a person to be defined as having the metabolic syndrome, the new definition requires they have central obesity, plus two of the following four additional factors: raised triglycerides, reduced HDL cholesterol, raised blood pressure, or raised fasting plasma glucose level. Gender and, for the first time, ethnicity-specific cut-points for central obesity as measured by waist circumference are included.

The use of different definitions up until now has made it difficult to estimate the prevalence of metabolic syndrome and make comparisons between nations but recent data from Australia and the US provides a broad estimate of 20-25 per cent of the adult population.

Professor Paul Zimmet, director, International Diabetes Institute and co-author of the consensus statement

said: “The key to tackling this escalating pandemic lies in a better understanding and early diagnosis and treatment of the metabolic syndrome. While no single treatment for the metabolic syndrome as a whole exist, we know that lifestyle changes, for example changes in diet and an increase in exercise, form the underlying strategy of treatment. In addition, new therapies are on the horizon which may address several of the risk factors concurrently and this may have a significant impact on reducing both cardiovascular and diabetes morbidity and mortality”.

As well as the diagnostic tool, the new IDF consensus statement includes recommendations for additional criteria to be included in research and epidemiological studies of the metabolic syndrome. While the underlying cause of the metabolic syndrome is still the subject of intense debate, the IDF consensus statement identifies both abnormal abdominal fat distribution and insulin resistance as potential, interrelated causes.

[Source: <http://www.idf.org/home/index>]

Tips

...If you are asymptomatic HIV-positive, you may be able to slow the onset of AIDS by improving your eating habits.

...If you are symptomatic HIV-positive, you can improve your quality of life by following a pattern of eating that makes you feel stronger.